

Inventions and privileges in the XVIIIth century : norms and practices.

A comparison between France and Piedmont.

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Introduction

This paper is about privileges in XVIIIth century France and Piedmont, with some references to English patents. Our perspective is comparative ; we aim to stress the similarities and the differences between the juridical systems for promoting invention in Modern Europe¹. We also would like to show that each system was shaped by the circulation and appropriation of foreign models ; this will lead us to develop the idea of malleability of legal forms.

All monopolies for invention, whatever their differences and transformations, were intended to find out a solution to the "knowledge dilemma" as economists have identified it : a tension between the incitation to produce knowledge and the promotion of knowledge in the whole society². On the one hand, inventive activities can be costly and investing may be risky as innovation is always an uncertain process ; moreover, knowledge is a good that is hard to control, it can be easily copied by a great number of agents and the benefit for the producers can be nil. Such externalities reduce the private incentives to invent. On the other hand, producing knowledge is a cumulative activity based upon its wide dissemination in society. "Open knowledge" economies are the most liable to be inventive³. According to Dominique Foray, "maximum efficiency in its use implies that there is no restriction to access and that the price of use is equal to zero"⁴.

Privileges for invention were one of the answers to this dilemma. According to the first codification in Venice, in 1474, inventors and importers of new techniques were granted

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a ten years exclusive right of exploitation, out of guilds controls, if the invention was deemed useful by the municipality and if it was actually put in use⁵. The Venetian solution was combining the incentives to invent and the openness of knowledge in the name of the public good. Exclusivity brought benefits to the inventor and at the same time, publicity was enhanced through public expertise, private exploitation and economic transactions⁶.

As it is well known, monopolies for invention spread out in Europe thanks to the migrations of Italians artisans in the XVIth century and to the progress of openness helped by humanism, Baconian principles and the growing interests of princes in economic ventures⁷. But this legal form was never homogeneous. It varied according to regions and to periods. Exclusivity was often reshaped : in France and in Piedmont, monopolies were free but in England, they were sold by government and were expensive or rather, « cost was not at all negligible »; on the continent, their grant depended on examinations of utility, and local novelty, but this was not so in England⁸. These reshapings were materialising different relationships between inventors and public authorities and more generally, between knowledge and power. Moreover, inventive entrepreneurs could negotiate some clauses like the term and the extension of the monopoly. In the XVIIIth century, in France and in Piedmont, the State was holding back on the possibility to adapt privileges in order to make a compromise between its interests and the inventors' ones⁹. The privileges were the result of political choices, of State strategies of intervention and of the negotiations between officials and economic actors. Furthermore, as in the past and in several other countries, privileged manufacture were created with the direct participation of high court dignitaries, creating both monopolistic situations and, sometimes, gains in production. Beyond the norm (exclusivity), expectations, uses and practices were most important¹⁰.

Eliminado: This could include pressure of clientism, like in Piedmont.

Furthermore, since the Renaissance, monopolies have coexisted with other protections. European States, townships and provinces granted rewards and a whole range of privileges

History of Technology, special issue, Anna Guanini & Ian Inkster ed., vol. 24, 2002, p. 21-44 without monopolies, allowing fiscal exemptions, derogations from guilds controls and titles like royal manufactures which offered both material advantages and reputation in the market-place¹¹. In XVIIIth-century France, these solutions were frequently preferred to exclusivity which was rather considered as a threat to the openness of knowledge¹². In France and in Piedmont, where governments tried to reform and modernize industrial activities, this diversity of safeguards gave way to complex institutional constructions, combining resources and involving different scales (central and local administrations) : and the two countries, at different level, became laboratories of public management of innovation¹³.

In continental Europe, the logic was the same for exclusive rights and the other types of protection : they were rewards. They expressed the price of the service the inventor offered to the State and to the public good. This relationship based upon service and contract, inherited from Venice, reached its climax in France and in Piedmont during the Enlightenment. As a consequence, privileges (exclusive or not), financial and honorific grants were all bestowed only after a close examination of the invention¹⁴. The State had to evaluate the public benefits of the inventions before committing its protection and its credit, both material and symbolical. This was a major legitimization for inventions ; it enhanced their official reputation in the market-place.

In this article, we shall study both the complexity and instability of the systems for promoting innovation and their practical effects by comparing France and Piedmont in the textile industries. Textile was an economic sector which dominated international trade and fostered numerous inventions due to the significance and dynamism of the clothing economy in the XVIIIth century¹⁵.

I - Silk and wool in Piedmont: an introduction

From the reconstitution of the State following the peace of Cateau-Cambrésis of 1559 until the late 1700s, Piedmont, as other countries elsewhere in Europe, implemented a variety

of strategies to foster the local industries: control through guilds, protection of the local industry, incentives for foreign skilled workers to settle in Piedmont, trips abroad, privileges, and public support¹⁶. Thanks to these policies and the excellent natural quality of Piedmontese silk, at the beginning of the XVIII, Piedmont was already able to compete with the rest of Europe for the production of spun silk and among the Italian states, it ranked as the leading exporter of organzine beyond the Alps¹⁷.

As the government had done for the silk industry, but to a greater extent, it gave a continuous series of loans and privileges to the woollen industry, a delicate sector for this belligerent little state¹⁸. However, by the end of the XVIIIth century, the woollen industry was still producing a steady flow of low and medium grade cloth for the home market and silk was still the most important industry of the state, and its tax on importation, the 80% of the government income¹⁹.

As a matter of fact, other countries with a strong textile sector had found it profitable to sell finished fabric and buy Piedmontese raw silk. For the whole century, Piedmont had not enough political power to react to this commercial policy -- it needed funds to finance its expenditure, including for expansionist purposes, which it could only raise through the trade in raw silk. All efforts, whether strong or weak depending on the ruler, proved unable to oppose this trend. Whatever domestic finances were left, they were not enough to develop a competitive and autarchic local industry, so important both for the Savoy finances and for the impending war. However, notwithstanding the contradictories policies of the government, carried out mainly troughs the incentive of *privilege*, failed in promoting the woollen industry, it elicited parallel advantage.

I.1 The set up of a woollen strategy

When Victor Amadeus II rose to power at the very end of the XVII century, intervention in textile manufacture start to become systematic²⁰. During his long reign, he fought two wars to free Piedmont from French influence, to extend its boundaries and to turn Piedmont into an effective military power. He restructured the most important institutions, extended his authority at a local level through a network of provincial intendants, radically modified the tax system, diminished the economic independence of the nobility, and fostered industrial development in order to revitalise economic life and make Piedmont free and competitive.

Since his accession to power, Victor Amadeus's absolutist conception of government was already revealed by his concern for industry, which he tried to bring under complete state control. Until then, the central mechanism through which state control had been exercised, following the French example, had been the *Consolato*²¹. The origins of the *Consolato* can be traced back to a commercial tribunal founded in the sixteenth century and restored in 1676. Victor Amadeus II reorganised this tribunal in 1687, giving it special powers to protect local industry, and enforcing bans on the export of raw silk and on the emigration of skilled workers. The main tasks of the *Consolato*, controlled by Ducal officials, were to find new ways and rules to help trade and provide fair judgements concerning commercial disputes²². It was required to inspect manufacturing sites and products and to uphold standards of quality, to draw up proposals for the advancement of trade, and to enforce guild statutes²³. Guilds were considered too weak and unassertive, therefore in 1687 Victor Amadeus II extended governmental control to them too²⁴. The *Consolato* became active as soon as it was reorganised, and new and stricter rules were implemented for the working and dyeing of silk. Its members, mainly bankers and shopkeepers, were still convinced that the backwardness of the others industries was due to a certain confusion ruling in the artisan's world. In order to improve the situation, they assumed that a regulation as strict as the one controlling silk

manufacture and trade might be a sufficient enhancement; hence the first action of the *Consolato* concerning for example dyeing was to "select", in 1687, a limited number of dyers to be masters²⁵.

After the reforms mentioned above, which constituted the starting point of his policy, Victor Amadeus II devoted his entire attention to the conflict with his more important commercial partner and supplier, France (1690-1696). At the time, uniforms for the army were only partially supplied by a woollen industry close to Biella²⁶. Paradoxically, the rest of the demand, with serious difficulties, had to be satisfied by imports from France. The end of the conflict was a success for Piedmont, who obtained several advantages, bought at a considerable cost. Widespread devastation, a battered economy and exhausted finances were the result of a victory that only peace could now amend. The war had revealed serious weaknesses in the administrative, industrial, and fiscal structure of the state, calling for reorganisation and reforms that Victor Amadeus II proceeded to introduce.

On the French model, he created the position of "General Inspector" of the woollen industry, an officer who was supposed to report on the state of the industry, and to suggest new ways of advancing it. Furthermore, he helped entrepreneurs to set up their factories, and elicit several workmen from Holland and Flanders (after his military campaigns) to come to Turin²⁷. Then, he spent a vast amount of money to set up the poorhouse *Ospedale di Carità* of Turin, a place where, as in the *Albergo di virtù*, the workers were mainly vagrants²⁸. The aim of the poorhouse was to teach vagrants a skill and to use their work at a cheaper price. In 1713, more than 20% of the workers were engaged in woollen manufacturing, including dyeing. The director of the poorhouse, for more than 17 years, was from Flanders, and when he retired asked for and obtained governmental aid to set up a woollen blankets factory²⁹.

The recourse to a foreign workforce was a recurring feature of the Duke's policy. The cornerstone of the policy was the edict of 28 April 1701. By this edict, Victor Amadeus

invited foreign merchants and "artists" (craftsmen) to come to Piedmont to provide masters for the local workers in order to form a local workforce. The invitation was addressed to workers in both the silk and wool industries, but, as far as we know, and with just a few exceptions, it was accepted mainly by French silk workers³⁰. To give an idea of the nature of the flow of migrants into Turin, 26% of 142 employees in the workhouse *Albergo di Virtù* were from France³¹. In 1702, in the list of registered employees in the silk industry, more than one third were French³².

In addition, several entrepreneurs, most of them from France and Geneva, accepted the Duke's offer and started a tradition that was to be active until the Italian Unification. Thereafter, a steady flow of foreigners went to live in Piedmont. Between 1702 and 1723, for example, 84 foreigners were authorised to establish activities connected with the textile industry³³. The influence of this influx was considered beneficial for the production of silk, the quantity of which had doubled by 1780.

The woollen industry benefited from the stimulus of foreign workers only after 1720, when various European entrepreneurs and workmen began to settle in Piedmont. One reason for this delay compared to the silk industry was the importance of the diplomatic relationship with England³⁴. By the 1720s English woollens were being exported to Piedmont in considerable volume and had penetrated a market hitherto closed to them, creating a serious problem for the Savoyard government as it sought to develop its own textile industry. But this was the price that Victor Amadeus had to pay for British support during the peace negotiations: peace that granted him more territories and the crown: the new Kingdom of Sardinia was thus established.

I.2 From Utrecht to Victor Amadeus's abdication: the struggle

In 1717 citizens were spurred by the Provençal Jesuit Guillardme to contribute towards an endowment for the rebuilding of the poorhouse *Ospedale della Carità*, which was closed during the war³⁵. Its main activity was again the production, including both weaving and dyeing, of woollen cloth, especially for uniforms. Artisans were hired to teach the poor useful trades. The government fed them and sold their labour at bargain rates to the textile entrepreneurs who ran the state factories. Between 1717 and 1720 this system was extended to the entire state, except for Sardinia. In the same period of time, from 1732 outside the capital, state-supported woollen factories were established and given protection, helped also by a military order to oust imported cloth from the upper reaches of the market. Yet again in the list of the entrepreneurs of the subsidised and privileged industries we can find various foreign names : in 1725 the French Delauney got several privileges, in the same year Germain of Poitier gave birth to a subsidised firm for the production of combs³⁶. In 1726 Marmière of Montauban assured the government to be able to produce the right scissors for shearing wollen cloth and till the very end of the century we can enlist name of foreigners subsidised small scale industries connected with the wool's one³⁷.

The government, now in a stronger position, wanted to develop internal resources to supply its market. In 1722 the Savoyard authorities banned the export of raw silk from their territories, claiming with some justification that a shortage of cocoons in that year had left insufficient raw silk for their own spinners³⁸. This ban was mainly imposed to protect the Savoyard industries in response to the growing English silk-spinning industry. The British government protested, threatening an embargo, but the ban was upheld, with serious consequences for the new spinning factories in England³⁹. The silk embargo became the first shot fired in a trade war that rapidly escalated. Victor Amadeus was persuaded by an influential group in the government to uphold his protectionist policy. Of paramount

importance was the fact that those men in government holding key positions like Ormea and later, Fontana and Salmour, needed the protectionist stance of the King to be maintained in order to support their new-born strong personal interests in the woollen industry. They comprehended the potential of a local woollen industry fostered by the state, and assuring the King that the state could manage without foreigners, persuaded him to pursue his policy⁴⁰.

In 1725 Victor Amadeus embarked on his tariff war with France and England, ordering all merchants within the state to sell a fixed quantity of locally made cloth, even if this was often more expensive and of poorer quality than the imported variety⁴¹. Customs were increased to 10% on every kind of cloth except those that were not produced in sufficient quantity or were of an unacceptable quality⁴². A year later these customs were extended to other types of cloth, particularly high-quality English woollens⁴³.

The French government retaliated by halting the export of raw wool to Piedmont in order to create difficulties for the cloth industry there. The English took revenge by reducing the demand of Piedmontese spun silk. However, they could not carry out their intentions because of the interests in the silk-weaving trade by those who used powerful lobbying⁴⁴. In addition, the export of the tools necessary to weave wool was banned, as was emigration without a license of workers specialising in wool, for which the penalty was a fine and bodily punishment⁴⁵. As has been said, a constructive policy toward the woollen industry began during the 1720s with the prolonged attempt to break free from English influence. Hence, the desire to have a nationally independent woollen manufacture brought with it a new strength: a focus on the dyeing industry. From 1718 onwards various foreign dyers began to settle in Piedmont. When we reach this century the documentary evidence is more abundant, and one can form more definite opinions about the presence and influence of foreigners. As a first manoeuvre, in order to encourage foreign as well as local artisans, houses in Turin were rented free to dyers. Hence, within a few years, several economic advantages were granted

from the government to foreign dyers who decided to settle in Turin, which testifies to the commitment of the government to the development of the industry. In 1720 the Dutchman Giovanni Paul, who declared he had travelled extensively and had been in Florence for many years, obtained a substantial loan of 25,000 *lire*, a workshop rent free and the equipment for weaving and dyeing in his workshop⁴⁶. In 1721 a French dyer, Giovanni Guerit from Kantonge in Provence obtained a house for a period of 10 years for dyeing fabrics⁴⁷. The following year a French wool dyer named Rounneilau set up his workshop at Borgo Po, promising he would not damage the silk dyers workshop even though they were using the same water⁴⁸.

The policy of the Piedmontese government toward foreign artisans can be demonstrated by the case of the dyer Francesco Suarz⁴⁹. In 1724 the dyer was called by Fontana (one of the ministers involved in the woollen industry) and by Biaggio Nigri (the owner of a woollen industry in Turin) to come to Piedmont from Olmutz, Moldavia to dye wool and to teach locals how to dye it⁵⁰. Unfortunately, it is not known how the Piedmontese came to know this dyer nor why he, coming from a distant country with few and sporadic contacts with Piedmont, had been preferred to anyone else. (The only reason seems to be an annual "fiera" -trade fair- that was held there.) Nevertheless the artillery corps built a house for him which, by his expressed desire, was not built in the dyers' village, Borgo Po. On the contrary, it was erected in the opposite part of the town, outside the city wall, using a canal derived from the other river: the Dora. However, the dyer was provided with a warehouse in the dyers' village in case the water of the canal proved to be cloudy. A house was built for Suarz with a dye shop annexed to it and the government loaned a considerable amount of money to furnish it with the best dye drugs, tin and copper cauldrons, tins for pastel dye and others tools⁵¹. In addition, he asked for the privilege of being the exclusive dyer of army fabrics (particularly red, green and blue)⁵². He received everything he requested: the privilege

of dyeing uniforms made in Turin banning anyone from dyeing in the same colours, except in Biella and Ormea, and an annual salary that lasted until 1738⁵³. In return, he was to teach his art to local dyers. The public demonstrations were conducted by Suarz in the poorhouse *Ospedale di Carità* and then later in his dye shop. The demonstrations were on the art of dyeing in red, as the focus of attention was on the colour of the Piedmontese uniform at that time. It is interesting to note that these lessons were recorded. It may seem strange that a dyer allowed his skills and secrets to be remembered, but Suarz was getting old and he had already lost his privilege of being the only dyer in red in Turin. In the Turinese archives there is a notebook where each step of the experiments - where, when and who was attending - is recorded⁵⁴. This precious document reveals the process used by Suarz for dyeing in red and records that all the wool dyers from Borgo Po, as well as dyers from the surrounding areas came to attend the lessons⁵⁵.

In 1735, following this new effort to foster the dyeing industry, and considering that one of the main problems was the cost of the raw material imported from abroad, merchants and wool manufacturers as well as dyers resolved to establish a "ceiling price", the maximum price, based on the price used in Lyon, dyers could demand for dyed fabrics. The *Consolato*, with the help of Francesco Suarz, the wool dyer mentioned earlier, established and then published a list of the cost of dyeing in every colour according to the price of the dyes. Generally the price of dyed fabrics depended on the price of the dyes, a factor that weighed heavily on the final price⁵⁶.

The policy of the "fair price" or of the "ceiling" was pursued throughout the century. Some years later, as in the case of Jean Ollier, the master was not only to share his knowledge, but also to maintain a "juste prix" for his monopoly:

"(...) Qu'il prendra chez lui dans le terme de deux mois deux apprentifs intelligents dont on lui laisse le choix (...) qu'il sera obligé de les garder aussi longtemps qu'il sera nécessaire (...) qu'il sera par la même obligé de leur comminiquer de bouche, par écrit et par pratique

tous ses secrets et recettes (...) qu'il donnera par écrit au Conseil de commerce tous ses secrets pour faire le beau noir sans être sujet à changer et avec toute la perfection qu'il est capable de donner, expliquant méthodiquement le procédé exact qu'il faut suivre pour le mélange et choix des drogues afin d'arriver à ce procédé exact (...) bien entendu que le Conseil fera un usage discret des susdits secrets et recettes. Sa Majesté exige finalement qu'il travaille à un juste prix pour le public et qu'en sa faveur il modère particulièrement celui de sa teinture noire, et le tout avec les précautions qui lui seront indiquées par le Royal Conseil de commerce”⁵⁷.

I.3 The Royal Council of Commerce and the “fair prices”

In the last reported phrase, appears one of the most important economic actors of the century: the *Consiglio di Commercio* (Royal Council of Commerce), created in 1729, one year before the abdication of Victor Amadeus⁵⁸. Inspired by an analogous institution created in France to supervise commercial affairs on land and sea under the direct presidency of the sovereign, the *Consiglio* assumed the consultative and control functions previously carried out by the *Consolato*, which maintained the duties of a commercial tribunal. From then, till the first half of the XIX century, pursuing the general objectives of the monarchy, it became the centre of regulation of the country's economic life. Modelled on the French system, it covered the main important economic actors: guilds, manufacture, foreign trade and commercial companies⁵⁹. It stimulated, projected, studied practical solution at economic problems, corrected the abuses, preserved the quality standard, controlled the price level, mediated in conflicts of economic nature but above it, its main weapon was the concession, confirmation or abrogation of the privilege. Experiments were made in different and various forms, but their common denominator was the systematic and pragmatic recourse to the method of economic privilege as an instrument for dynamically co-ordinating the actions of economic actors.

The procedure to obtain a legal recognition of conditions of privilege consisted in the presentation of a document upon which the council was to express an opinion, regarding its

interest for the economy of the country. In every case, the final decision was to be determined by the sovereign himself. The council had to pay attention that the function attributed to economic privilege did not turn in a “monopoly iniquitous, unfair to the public”⁶⁰. The privilege of displaying the royal signs, fiscal incentives, exemption from customs duties, taxes were the most common privileges, as the monopoly on production conceded for a set time, protection that in the case of a technical innovation, assumed implicitly the nature of a patent⁶¹. When the monopoly referred to a new product, the council fixed or a maximum price that could be charged, or a tariff.

Victor Amadeus II abdicated in favour of his son Charles Emmanuel III the following year of the creation of the *Consiglio*, in 1730. Emphasising his father's industrial policies, he was even more protectionists in matters concerning the woollen industry. The main reason for this was the recognised importance of the woollen industry for the Piedmontese economy (during his reign the army doubled compared to his father's era), and the role played until 1740 by one of his more powerful advisers, the Marquis d'Ormea. Under the reign of Victor Amadeus II he had held the position of Foreign Minister; in 1730 Charles Emmanuel III further awarded him the position of Interior Minister. In 1740 he reached the peak of his career and influence: in addition to being Head of the Financial Office, he gained the position of *Gran Cancelliere*, the first and the only such post in Savoyard history, controlling the Supreme Justice Administration, as well as the post of Foreign Secretary (which he then delegated) and Interior Secretary⁶². By 1740 the Marquis d'Ormea was the rich owner of a woollen factory who was almost supplanting the role of Charles Emmanuel III. In 1723 Marquis Ormea, at that time Minister of Finance, obtained patents to set up a woollen factory in his own birthplace, Ormea, a mountain village close to Cuneo⁶³. To direct it, he called upon an Englishman, John Conward from Frome in Somerset, who brought with him specialised workers, including a dyer. This enterprise, for a long time the largest woollen textile factory

in the state of Savoy for the production of finished and dyed cloths, benefited from its owner's high political position who obtained several privileges throughout the eighteenth century. Among these was permission to own a factory although he was a member of the aristocracy and of the government⁶⁴.

As a matter of fact, the industrial policy of the King was strongly influenced, till the Marquis' death in 1745, by the economic interest of his adviser. With a drastic manoeuvre in 1730, it was prohibited to sell foreign fabrics within the national borders and ordered merchants to hand over some of their foreign fabrics to the *Consolato*⁶⁵. Naturally, foreign merchants complained, and local merchants were also dissatisfied with this arrangement, because local production was not at all competitive compared with foreign production. Foreign complaints did not stop the woollen protectionist policy and the associated attempt to create an independent industry under state control. However, the reality was that the woollen industry was not yet ready to supply the internal market. In the reports is stated that Biella was not selling its production to Piedmont, and the other industries were not producing enough cloth; merchants complained about their empty shops and storehouses. A few years later, after an investigation, the *Consiglio di Commercio* was forced to admit the rights of the merchants and in 1735, to allow the market to survive, they accepted the import of some plain, "white" cloth⁶⁶.

Then, in 1732, an cumbersome decision concerning the woollen industry was made⁶⁷. As a result of the series of reports and enquiries, the *Consolato* and the Council of Commerce decreed that all woollen manufactures must leave Turin and be decentralised throughout the land, with the sole exception of the poorhouses⁶⁸. The reasons underlying this change were several. First, they wanted to leave only the most important textile industry, the silk one, in Turin, in order to limit competition for labour between the silk and the woollen industries, and to reduce the number of workers in the town for reasons of control and security. Another

factor was the desire to keep the industry decentralised, partly to spread employment to every region of the state and partly to serve the needs of the army. Military uniforms were made from local cloth, and by keeping the industry dispersed the government hoped to assure the supply of this strategic commodity even if an invader occupied parts of the state. Then, last but not least, the factory of the Marquis d'Ormea was 100 km. from Turin. It was undoubtedly in his own interest to have the woollen industry decentralised, as an industry in Turin would have been naturally advantaged.

All the governmental reports on the state of the woollen industry written at the end of the century emphasised how this decree had highly negative consequences on the woollen industry. As it required the immediate halt of all manufacturing activity within the city's boundaries, except for the poorhouses, and the transfer of all plants to the province, the woollen industry lost its tight links with the city. The 1733 decree undermined the financial efforts employed since the end of the sixteenth century, and jeopardised the whole set of activities which were dependent on the woollen industry. In the course of the same year, convinced that the implementation of such measures would reap as beneficial rewards as they had done in the silk industry, the government enforced strict regulations on woollen manufacture, which had never previously been the object of such legislation.

I.4 The second half of the century: privileges, poorhouses and monopoly

Ormea died in 1745, and few years later, an extensive enquiry was carried out to discover the true condition of the industry within the country. In 1756, John Conward, the ex-director of the Ormea factory, now General Inspector, presented the King the result of his investigation⁶⁹. He highlighted unfavourable conditions and apportioned part of the blame to the absence of local production of raw materials. On a practical level, manufacture was almost completely dependent upon foreign imports. Despite some weak attempts to change the

situation, the production and supply of raw materials represented one of the major problems of the woollen industry, not only in Piedmont, for a long time, right through to the first half of the nineteenth century⁷⁰. A strong policy of defence of the agriculture was banning the already weak attempts to set up breeding⁷¹. Also, despite the presence of foreign entrepreneurs and the government effort in Piedmont, Conward discovered that there were few substantial investments. The Inspector surmised that the woollen industry in Piedmont at that time was underdeveloped and lacking in resources, where Biella was the only outstanding centre with 63 workshops and several hundred looms.

The social and economic changes that were taking place in the country and in the towns in the second half of the eighteenth century are essential to understand the government policy toward mendicity, and the poors' capacity and possibility of working also in the manufacture of wool. Notwithstanding the problems of the woollen industry, it was never taken into account the possibility to reopen the capital at the woollen manufactures, and to seriously reconsider the policy towards the poorhouses. In the same year of its foundation, 1755 the *Ritiro di San Giovanni di Dio*, the workhouse for girls founded and directed by Rosa Govona was placed under the supervision of the Royal Council of Commerce⁷². For the first time in Piedmont, an institution claimed to be able to sustain itself simply with the inmates work « labores manuum tuarum manducabis »⁷³. Since its inception, was favoured with regular work from government commission and, above all, with significant privileges assigned to its manufacturing activities. Even if it was often at the centre of a great deal of controversy, hostility and, from a commercial and moral point of view it was a complete failure, the government never stop to help it, secretly financially, and publicly with his support and privileges.

In 1779, after years of weak attempt to change the situation, several wars, the minister Donaudi wrote that the policy followed hitherto by the Piedmontese government -of

indiscriminate opening of new plants in the province and at the poorhouses -had kept their size at a sub-optimal level, and that the favourable treatment accorded to purely speculative ventures, or in regions without a local market, had discouraged efforts to improve the quality of manufacturing⁷⁴. Moreover, according to Donaudi, the raw material became more expensive --even if its import was duty-free-- due to increased international demand, worsening the situation for local manufacturers who depended almost completely on foreign wool suppliers⁷⁵. A final indicator of the weakness of the productive system was the insufficient self-financing capacity, which forced most merchants to deal with foreign money.

In the following years, several reports, written by members of the government, the Royal Council, economists, academicians, some of them under the influence of free market theories, arrived at the same remarks, comments and pointed out the same difficulties of the national manufacturing. The powerful criticisms made on various occasions were not influential enough to convince the rulers of the old regime of the effectiveness of the idea that industry should not have to suffer restrictions on liberties. However, if the system was not capable, for different reasons, of starting up an effective process of industrialisation, it left as an inheritance a solid fabric of artisans and professional skills.

II - The uses of exclusivity in France : the case of John Kay.

John Kay is famous for the textile inventions he brought to France : the flying shuttle, cards and a machine for making cards (for wool and then cotton). Less is known about his business in France. Kay's mobility illustrates how inventors could play upon the range of protections, even outside their countries. As he stayed a long time in France (1749-1779), his example also reveals the transformations of the French system in relationship with migrations,

with entrepreneurs' pressures and with governmental strategies. It helps to understand exclusivity in the light of uses and practices.

Eliminado: s

II.1 John Kay and the weakness of English patents

As a comb-maker for looms, Kay belonged to mechanical trades developing in tune with the growth of textile industry. He contrived different technical devices even though his 1733 patent for his flying-shuttle is most famous, especially because he faced troubles with weavers fearing for their employment and with others, ready to infringe the patent and reluctant to pay the royalties especially in regions of "kaufsystem" where small producers were independent⁷⁶. The scattered proto-industry made it very difficult for him to enforce his right ; worse, the weavers argued that the actual shuttle they used was not the patented one but an improvement⁷⁷. Kay tried to remedy this by prosecution in law courts and by applying for a parlamentary reward but without any success⁷⁸. When his patent expired in 1747 he decided to move to France.

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Kay's problems with his patent were revealing the main feature of the English system. The procedure was based upon the inventor's individual responsibility, on his personal assets, on his business contacts and backers, on his ability to assert his right to exclusivity and to take advantage of other available institutional resources such as private acts and rewards from Parliament or awards from advancement societies⁷⁹. As Christine MacLeod has demonstrated, since the Statute of Monopolies (1624), patents were tolerated provided they did not entail public inconvenience and that they be limited to fourteen years. They did not play any part in economic policies and the State never ordered any examination to test the utility of inventions. Inventors had to pay for their patent and the legal procedure was a mere registration, without any support from the State ; it was entirely to the expense of the patentee. The State only limited speculation on patents by the Bubble Act (1720), which curbed the

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formation of companies for exploiting patents. In 1734, the filing of a specification was made compulsory, after the granting of any patent in order to ensure smoother running of the procedures in courts. Public utility and experts' evaluation were not at stake. So, taking a patent meant investment and risk for the patentee. Transactions between the State and the inventor were mainly financial and rested on a minimal investment by the authorities. This could lead to disappointments, failures and emigrations.

II.2 John Kay in France : the collective logics of privileges

Kay's business in France took place from 1747 to 1779. It was a period of important changes in the legal procedure to promote innovation. Since 1699, the Paris *Académie des sciences* was in charge of examining inventions for the State ; in 1722, the government created the *Bureau du Commerce* which specialized in industrial policies and innovation with the help of scientists directly working inside this department ; in 1752, a special fund for commerce and industry was instituted ; in 1762, the first codification of monopolies for invention was issued ; in 1777, a national prize was founded to encourage inventors.

At the same time, many other institutional devices were set up : the Paris Society of Arts (1726) ; the Royal Agricultural Society of Brittany created by the provincial administration (1760) ; the *Société Libre d'Emulation* founded by the physiocratic Abbé Baudeau (1776) ; the official repository for inventions in Paris (1782) ; and engineering schools like for *Ponts-et-Chaussées*, 1748. Ancient institutions were also involved in this mobilization for innovation through the formation of provincial boards, townships, guilds, local scientific societies⁸⁰.

This provided a multiplicity of institutional networks, many financial opportunities and possibilities of experimentation. All kinds of arrangements were tried out, in government and provinces. Kay experienced this institutional experiment in three stages.

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John Kay's first privilege : a juridical hybrid.

John Kay found very quickly a partner, and in December 1747 they were granted an exclusive privilege which was very similar to an English patent. It was a fourteen years monopoly, like a patent and, in an unusual way in France, it allowed the patentees to collect royalties from weavers and to organize transactions with sub-contracted makers⁸¹. Kay himself sent a specification to avoid infringements. This description was not aimed to teach the users or the public ; Kay wanted to ensure his right in the courts. The diffusion of the new technology was expected to take place through business : Kay and his partner would teach the licenced weavers how to use the shuttle and makers would receive "instructions".

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This privilege was very similar to a patent. Nevertheless, Kay also benefited from specifically French advantages. French exclusive privileges were free. Above all, Kay's privilege provided the mediation of State inspectors of manufactures and of guilds officials for enforcing his right. The State was mobilizing two of its networks of control in behalf of the inventor ; this reduced the cost of managing the privilege and could convince Kay to stay in France.

As a counterpart, Kay's privilege was conditioned by a close examination. The shuttles were tested in the royal manufacture of the Gobelins and in another one, near Paris, in Mouy. Three inspectors were committed. The proof process combined a whole range of different criteria : productivity, quality of cloth, handiness of the loom, time for learning to use it ; workers were asked their opinions as users and inspectors had to evaluate the benefits for the country. Most of the time, the French procedure rather involved academicians. The legitimacy of scientific knowledge in the French monarchy was mainly related to its usefulness in evaluating techniques and in modernizing industry⁸². But the academicians evaluations were

wide open to facts, to practices and to different opinions. Ascertaining utility entailed collaborations with other experts and with users ; it promoted collective negotiations and confrontations of judgements as means to reduce the uncertainties proper to innovation⁸³. For the inventors, this system was burdensome, but the benefits were huge : these examinations were real trials, inventions were tested and improved and privileges expressed a strong official recognition which attracted investors. The support of the State was important. It even became stronger at the middle of the century as the logic of service was enhanced. During the 1750's, the French system differed more radically ~~from~~ the English one. John Kay also experienced this change.

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John Kay's privilege reshaped : a flexible right

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In England, Kay had faced many difficulties in exploiting his patent because he could not control users and levy royalties in a rural, scattered industry. The patent was not profitable in this context. The French government tried two sets of solutions for a better remuneration of the inventor and for an efficient spread of the shuttles. The first arrangement, in 1748, concerned the province of Languedoc, a very important region for wool industry and an experimental district for reforming the promotion of industry run by State inspectors and guilds officials⁸⁴. The government organized the assignment of Kay's privilege to a merchant called Vallat who was also a partner in the manufacture of Mouy. Vallat belonged to the closest circle of persons informed about Kay's inventions. He agreed to invest 16000 pounds (660 pounds sterling) which he planned to make profitable by the weavers' royalties. In fact, he did not have to collect any royalty ; the provincial administration (called provincial states) paid off the merchant. Public investment was supposed to ease innovation in a proto-industrial region. At the same time, Vallat had to bring over and pay two workers from Mouy who had been taught by John Kay how to use the shuttle. The result seemed positive as the king's

representative (the "intendant") wrote that the guild officials in Carcassonne appreciated the shuttle as well as the weavers. This institutional patchwork was illustrating the main directions of the promotion of innovation during the Enlightenment : it rested on a complex administrative network, connecting national and local institutions (*Bureau du Commerce*, inspectors, "intendant" and also guilds) ; it combined private and public funding and initiatives ; it coordinated centralised and decentralised units of production ; the pedagogy of innovation was becoming a main focus and it was based upon the mobility of qualified workers.

But John Kay was still disappointed by the profits. A second system was tried in 1749 with more public investment. Kay was granted a new privilege, covering the rest of the realm, outside Languedoc⁸⁵. Instead of getting royalties, which seemed too hard to collect, he got an annual allowance of 2 500 pounds (100 pounds sterling). In return, he accepted the responsibility to teach the use of the loom in several French textile cities. This privilege was made out when the administration of commerce came under direction of Daniel-Charles Trudaine. Trudaine was acquainted with the encyclopedists and with liberals and reformers inside the *Bureau du Commerce* like Vincent de Gournay or Véron de Forbonnais. They all developed a Newtonian vision of the economy, considering that the economy was moving by itself, thanks to an invisible attraction, private interests and to the interdependence of all the trades⁸⁶. The State could be useful if it stimulated the initiatives and if it helped to keep the balance between private vices and public good. Social cohesion was their main focus. In this context, technical invention was valued as one of the best means for economic reform. It was serving a project of well-balanced economic growth. Public utility was the only criteria to grant privileges. This presided over the setting of a political technology, "politization of technology "⁸⁷. This was the basis of the royal declaration of the 24th December 1762: exclusive privileges were only granted to the deserving inventor (and their term was limited to

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15 years)⁸⁸. Familial transmitting and commercial business could not legitimate any such monopoly. This codification was the outcome of the spread of enlightened academism and of liberalism and encyclopedism among State elites. Although it was not mentioned in the declaration, nearly all privileges made compulsory to teach the invention to apprentices.

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This logic also brought the administrators to prefer to grant other kinds of protection : rewards, bonuses and all sorts of privileges without exclusivity, like fiscal exemptions and honorific distinctions for the manufacture. The enlightened and liberal State in the 1750's was investing massively in the promotion of innovation. From 1740 to 1789, the Bureau of Commerce granted 5, 5 millions of pounds to entrepreneurs and lent them 1, 3 million of pounds⁸⁹. As the funds were often associated with local rewards from townships, guilds or provincial boards, the whole public investment is hard to quantify exactly but we can say that it was massive. For some inventors, this represented huge benefits, which could extend to their wives and heirs. For instance, Philippe de La Salle, a famous drawer and silk merchant in Lyons, received 122 000 pounds during his life and part of his pension was continued on behalf of his daughter. Public funding could be by no way negligible ; it could have an economic impact as a remuneration for inventors. It was in this context that John Kay's cards and machine for making cards were diffused in France.

An inventor under contract : innovation outside exclusivity

After experiences were made under control of inspectors of manufactures and guilds officials in woollen cities, Kay obtained a workshop in Paris, in 1752, where he had to produce shuttles and to build up models of his machine to make cards with the help of workers⁹⁰. He had to work side by side with two card makers ("*faiseurs de cartes*"), one coming from Lyon, who were themselves inventors and were paid by the State to improve

their own devices. Kay's workshop was an experimental centre for mechanical engineering.

But he was still unsatisfied by his grants and he left for England.

The government, who did not care for inventor's right but about the success of innovation, gave his machines to makers from Rouen, the Lemarchands, who set up in Paris⁹¹. They were supported by John Holker, an Englishman, a wealthy manufacturer, a State inspector and a great adept of modernization, at a general level and in his own plants (cotton industry), in Rouen and Sens where he organized important technological transfers with England⁹². As a public expert and a privileged manufacturer, Holker was also a wise capitalist, investing in innovation with institutional guarantees. As a matter of fact, in 1758, amongst the 380 pairs of cards sold by the Lemarchands, 100 were bought by Holker in Rouen, 82 also by him in Sens, 72 by the inspector of manufacture of Amiens. The intricacy of private and public markets and the interplay between investors and experts were supporting the mecanization of textile.

John Kay came back in 1769 and, as he had learnt very well how to negotiate with the authorities, he got an allowance provided that he would send machines in six provinces ; he was also settled in Holker's manufacture of Sens to teach six apprentices for 12 000 pounds (500 pounds sterling). In 1776, he was still in Sens where he taught his techniques to two workers and then in Troyes⁹³.

This public funding of innovation was a long term characteristic of the French system and it was continued even after the Revolution, with the creation of new special funds for rewarding worthy inventors⁹⁴. John Mac Leod, who reintroduced the flying shuttle in France at the end of the 1780's, worked in Sens in 1790-1791 and then in the hospital of the Quinze-Vingts in Eastern Paris where he taught twenty apprentices and realised models for the official repository of inventions, the Hôtel de Mortagne, in the same part of Paris⁹⁵.

Nevertheless, in a paradoxal way, this public investment coexisted with the exclusive rights that never disappeared. On the contrary, from the 1780's, monopolies for invention were more easily granted. The duality of the French system (rewards and monopolies) was reinforced. The birth of the *brevet*, in 1791, was prompted by the new legitimacy of the exclusive privileges during the last decade before Revolution. The main reasons were the growing capitalist pressures for benefiting from investments in innovation at a time when markets for novelties were expanding in a society of consumers. This new economic context, more open to profit, business and speculation, changed the relationships between inventors and the State. With Necker as the *Contrôleur général des Finances* (1776), exclusive privileges were reinstated as means to remunerate investments and to convince capitalists to support innovative firms. Private investment was officially recognized as a good means for the modernisation of industry, especially in sectors requiring heavy equipment, like cotton spinning, or resting on numerous experiences like in chemicals (soda, sulphuric acid). This was a "new deal". Liberals like Necker considered that capitalists needed institutional resources to risk their assets in market competition. Exclusive privileges acquired a new legitimacy. Monopolies and competition were no longer incompatible. If the ethic of public service did not fade away, it intermeshed more and more with that of profit. At the same time, the growing opposition of inventors to academic power and censorship in the name of creators' natural right also favoured this evolution.

Legal procedure was becoming a mere registration, as in England, which was a model for this redefinition of privileges at the end of the century. This led to changes in the examination. Even if the *Bureau du Commerce* was not unanimous, the exclusive privileges were granted less on the basis of utility than in virtue of difference in the nature of the processes invented. Examinations also aimed to certify reliability. As patterns of consumption were more and more diversified, as different standards of quality were coexisting in the

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market place, the State sought to help the consumers to make their choices by guaranteeing that new products were healthy (food but also kitchenware, equipment to make wine, oil, starch, vinegar ... and cosmetics⁹⁶) and that there was no cheating on quality thanks to certifications and specifications available to the public⁹⁷. In a similar way, the State wanted to prevent gullible investors from being cheated and to protect the inventor of limited means from the depredations of powerful capitalists. Like in England, since the Bubble Act, joint-stock companies for exploiting inventions were restricted and controlled. This was readopted by the *brevet*, in 1791 which led to a ban on joint stock companies (until 1806)⁹⁸. Capitalism did not mean any disruption of social cohesion.

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This also explained the maintaining of public funds for the promotion of innovation during the Revolution (*Bureau de Consultation des Arts et Métiers* in 1790)⁹⁹. The State intended to preserve the resources of the economic actors (inventors, capitalists, consumers) and the access of the greatest part of the nation to technical progress and welfare. This was matched too by the development of technical training and information in the long term (a national repository of inventions in 1782, the *Conservatoire des Arts et Métiers* in 1794, technical schools, proliferation of lists, specifications, journals, practical literature, tracts, advertisements ...). The emphasis shifted from proof positive through regulation, in hands of the State and the academicians, towards public judgement and individual responsibility, provided that modernization did not threaten the public good. Such ideology ran through the Enlightenment into the Revolution.

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Conclusions

The cases of Piedmont and France reveal that during the XVIII century, privileges were a flexible institutional resource that was reshaped according to local contexts of utilisation. Depending on periods, regions, and the expectations of actors, the public credit

embodied in this right could favor or inhibit innovation and technological policies of independence. In the two countries, privileges for invention (exclusive or not) had presented some advantages. First of all, the policy of privilege offered the possibility to encouraging foreign artisans to settle and to share their knowledge. At the end of the XVIIIth century, the Piedmontese government thought that “the acquisition of an artisan, or of an entrepreneur in a nation frequently brought forward the progress of a century”. It was the case of John Kay in France. Then, the preservation of the system of privilege allowed the rulers to maintain a control over the productive forces, control important for the conviction that under a free market crises of over or under production could occur with dramatic effects on employment and public control.

However, these monopolies could also come to a dead-lock at least for two reasons. First, privileged manufactures were sometimes too powerful and could choke innovation by limiting competition. This happened in Piedmont (Ormea) but also in France where Holker's fiscal exemptions in chemicals were strongly opposed by competitors under Necker¹⁰⁰. In both States, innovative entrepreneurs were asking for more resources to benefit from market competition. This was confirmed by economists who observed the English system. In response, the French government began to grant monopolies for invention more easily ; privileges were no longer considered as brakes to economic competition. In the long term, this was an evolution leading to a privatisation of knowledge and to the growth of markets of inventions. Innovation more and more relied on the resources of the inventors, on their commercial skill and on their juridical ability.

Second, before reaching this stage, governments preferred to help the diffusion of innovation by promoting human mobilities and apprenticeship rather than develop the commercialization of knowledge that would have recognized private rights to inventors¹⁰¹. Although there was a change in the 1780's in France, XVIIIth-century privileges were mainly

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based upon academic examination. The inventors' opposition to the tribunal of science favoured claims for a natural right, which the *brevet* recognised in 1791. In Piedmont, this new system was soon adopted during the French occupation (Napoleon) although the Restoration resettled the previous procedure, which lasted until Cavour modernized a range of economic institutions in 1855.

The critique of the existing system of privilege in the late eighteenth century, based on arguments about the right of entrepreneurial freedom and the extortion that would result from the maintenance of privilege, bolstered, on a fertile background, by the influence of the foreign writers, modified the attitude towards privileges. But, the new institutional frame built up in France since 1791 was far from satisfying all inventors. As in England, in France inventors had to pay for *brevets*, they had to risk their assets and to build up strategies to secure their investments. This contradiction of the *brevet*, ratifying a natural right but closing markets to small inventors was immediately denounced by societies of inventors during the Revolution, like the *Société du Point central des Arts et Métiers*. Some manufacturers were also disappointed as the *brevet* was no longer expressing any guarantee from the State ; without examinations, its value seemed more fragile¹⁰². In both cases, the criticisms focused less on the question of the diffusion of knowledge than on the lack of incentives to innovate.

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¹ For the flexibility of juridical forms, see Hermitte, M.-A. (1988) “Les concepts mous de la propriété industrielle : passage du modèle de la propriété foncière au modèle du marché” in B. Edelman, Hermitte M.-A. éd., L’homme, la nature et le droit, Paris : C. Bourgois.

² Foray, D. (2000), L'économie de la connaissance, Paris : La Découverte, chapter V.

³ Garçon, A.-F., Hilaire-Pérez, L. (2002), "Open technique between community and individuality in eighteenth-century France", in Ferry de Goey and Jan Willem Veluwenkamp eds. Entrepreneurs and Institutions in Europe and Asia 1500-2000, Rotterdam, Aksant, 2002, p. 237-256.

⁴ Ibid., p. 65.

⁵ Dolza, L., Vasta, M. (1995), "Tra diffusione e tutela: i paradossi dell'attività innovativa" in Storia della Scienza vol.5: " Conoscenze scientifiche e trasferimento tecnologico, Turin, Einaudi, pp. 79-113 ; Long, P. O. (2001), Openness, Secrecy, Authorship. Technical Arts and the Culture of Knowledge fom Antiquity to the Renaissance, Baltimore : Johns Hopkins University Press ; id. (1991), "Invention, authorship, "intellectual property", and the origin of patents: notes toward a conceptual history", Technology and Culture, "Patents and Invention", 32, pp. 846-884 ; Braunstein, P. (1984), "A l'origine des brevets d'invention aux XIVe et XVe siècles", in Caron F., Les brevets, Leur utilisation en histoire des techniques et de l'économie, Paris : I.H.M.C.-C.N.R.S., pp. 53-60.

⁶ For ther "good properties" of Italian privileges in Renaissance, see : Belfanti, M. (2003), "Corporations et brevets : les deux faces du progrès technique dans une économie pré-industrielle (Italie du nord, XVI^e-XVIII^e siècle)", in Garçon, A.-F., Hilaire-Pérez L., eds. Les chemins de la nouveauté. Innover, inventer au regard de l'histoire, Paris, CTHS , Collection Histoire, no. 9 (forthcoming).

⁷ MacLeod, C. (1988), Inventing the Industrial Revolution. The English Patent System, 1660-1800, Cambridge : C.U.P, first edition in paperback, 2002, chapter I ; Maitte, C. (2001), "Corporation et politique au village: Altare entre migrations et processus de différenciation sociale", Revue Historique, n°617, pp. 45-79 ; Brioist, P (1993), Les cercles intellectuels de Londres, XVIe-XVIIe siècle, Ph.D thesis, Florence : Institut universitaire européen, 1995 (to

be published) ; Long, P. O. (2001), op. cit. ; id. "The openness of knowledge: an ideal and its context in the 16th-century. Writings on mining and metallurgy", Technology & Culture, 32, avril 1991, p. 318-355.

⁸ MacLeod, C. , ibid.

⁹ Hilaire-Pérez, L. (2000a), L'invention technique au siècle des Lumières, Paris : Albin Michel ; id. (2000b), "Technical invention and institutional credit in France and Britain in the 18th century", History and Technology, vol. 16, pp. 295-306.

¹⁰ Cerutti, S. (1995), "Normes et pratiques ou de la légitimité de leur opposition" in Lepetit B. éd., Les formes de l'expérience ; une autre histoire sociale , Paris : Albin Michel, pp. 126-149.

¹¹ Dolza, L. (1994), "I privilegi industriali nel Piemonte pre-Unitario", Il Coltello di Delfo, pp. 31-37 ; Gayot, G. (1985), "Les entrepreneurs au bon temps des privilèges la draperie royale de Sedan au XVIII^e siècle", Revue du Nord, 265, pp. 413-445.

¹² Hilaire-Pérez, L. (2002), "Diderot's views on artists' and inventors' rights : invention, imitation and reputation", British Journal for the History of Science, 35, pp. 129-150.

¹³ Dolza, L. (1990), "Alla frontiera della Rivoluzione. Note sullo sviluppo tecnologico nel Piemonte Preunitario", in Bassignana P. L., Le macchine della Rivoluzione, Torino : U. Allemandi, pp.165-178 ; Hilaire-Pérez, L. (2000a), op.cit., chap. II.

¹⁴ Dolza L. (1992), « Le richieste di Privilegio industriale in Piemonte 1814-1855 » in Marchis V, Dolza L., Vasta M., I privilegi Industriali come specchio dell'innovazione nel Piemonte preunitario, Turin, La Rosa, pp. 15-120 ; id. (2000), "Utilitas o utilitarismo? Il ruolo sociale della scienza nell'Accademia delle Scienze di Torino", in Abbri F. and Segala M. (eds.), Il ruolo sociale della scienza. Ricerca e istituzioni scientifiche nello Stato moderno, 1789-1830, Florence : L. S. Olschki, pp. 17-35 ; Hilaire-Pérez, L. (2002), "L'examen des

Eliminado: Dolza, L. (1992), "Le richieste di Privilegio industriale in Piemonte (1814-1855): un inventario", in L. Dolza, V. Marchis, M. Vasta, I privilegi industriali come specchio dell'innovazione nel Piemonte Preunitario, Torino : La Rosa, pp. 15-114

inventions au XVIIIe siècle”, in Demeulenaere -Douyère C., Brian E. eds. Règlement, usages et science dans la France de l’Absolutisme, Paris : Tec et Doc. Lavoisier, pp. 309-321.

¹⁵ Roche, D. (1989), La culture des apparences. Une histoire du vêtement XVIIe-XVIIIe siècle, Paris, Fayard ; Dolza, L. (1996), "Dyeing in Piedmont in the Late Eighteenth Century ", Archives Internationales d’Histoire des Sciences, vol. 46, n. 136, 1996, pp. 75-83 ; id. (1999), How did they know? A successful artisans network: the art of dyeing at the end of the eighteenth century", Fox R., Nieto-Galán A. eds., Natural Dyestuffs and Industrial Culture in Europe, 1750-1880, Canton (USA) : Watson, pp. 129-160.

¹⁶ Dolza, L., (1999), op. cit.

¹⁷ AA.VV. (1991), Torino sul Filo della Seta, Bracco G. ed., Torino.

¹⁸ Dolza, L. (1995), The struggle for technological independence : textiles and dyeing in eighteenth Century Piedmont, Unpublished M. Litt. Thesis, University of Oxford.

¹⁹ Levi, G. (1967), "La Seta e l'Economia Piemontese del Settecento. A Proposito di un Saggio Inedito di Dalmazzo Francesco Vasco", Rivista Storica Italiana, LXXIX (1967), pp. 803-841; Prato, G. (1908), La vita economica in Piemonte a mezzo del secolo XVIII, Torino, S.T.E.N. ; and Abrate, M. (1969), "Elementi per la Storia della Finanza dello Stato Sabauda nella Seconda Metà del XVIII Secolo", Bullettino Storico Bibliografico Subalpino, LXVII, pp.389-406.

²⁰ On Victor Amadeus and his industrial policy cfr. Symcox, G. (1983), Victor Amadeus II. Absolutism in the Savoyard State, 1675-1730, London.

²¹ Quazza, G. (1957), Le Riforme in Piemonte nella prima Metà del Settecento, Modena, pp. 242-44.

²² On the establishment of the new Tribunal, its relation with the previous one and its importance, see the work of Cerutti S. (1992), Mestieri e Privilegi. Nascita delle Corporazioni a Torino, Secoli XVII-XVIII, Torino, Einaudi, pp.130-139; Duboin, F.A. (1820-

1869), Raccolta per Ordine di Materie delle Leggi cioè Editti, Patenti, Manifesti ecc. Emanate negli Stati di Terraferma sino all'8 Settembre 1798 dai Sovrani della Real Casa di Savoia, 31 vols., Torino, vol IV, p.794. Further reorganisations of *Consolato* in 1701, 1713 and 1723 confirmed it as an agency mainly for supervising economic development. On its French equivalent, the *Bureau du Commerce*, see Parker H.T. (1979), The Bureau du Commerce in 1781 and its Policies with Respect to French Industry, Durham N.C. It covers the period from Colbert to 1781.

²³ For the guilds system see, Cerutti S. (1992) op. cit., and Sacco I. M. (1940), Professioni, Arti e Mestieri in Torino dal secolo XIV al secolo XIX, Torino.

²⁴ Ibid., A sweeping reform was undertaken and the guilds' statutes were rewritten. The choice of officers was made subject to the approval of the Duke.

²⁵ Duboin, F.A., XVI, p.957 (2 October 1687).

²⁶ On 8 April 1691 the brothers Ambrosetti, owners of a woollen industry in Sordevolo, a town in the Biellese, agreed with the government to supply grey fabrics for the army at a fixed price. Archivio di Stato di torino (from now onward AST), M.E., Demanio, donativi, sussidi, m.IV, n.13. Quoted in Quazza, G., op. cit., p.258.

²⁷ Blackley (ed.), The Diplomatic Correspondence of the Right. Hon. Richard Hill Envoy Extraordinary from the Court of S.James to the Duke of Savoy, 2 vols. (London, 1845-1848), vol. II, p. 814

²⁸ The idea was to promote the textile industry following the charitable example of the Borromaic Counter-Reformation. Cfr. Rosso C. (1992), "Seta e Dintorni: Lombardi e Genovesi a Torino fra Cinque e Seicento", Studi Storici, 33, pp.175-193. The *Albergo* was directed for several years by foreigners, mainly people from Milanese and Genova. Many of the provisions favouring the *Albergo* are detailed in the book of Ponzo G. (1976), Stato e Pauperismo in Italia: l'Albergo di Virtù di Torino (1580-1836) Roma, pp.99-120. See also

A.S.T. Sez. I, Luoghi pii al di quà dei Monti, m.16 d'addizione, Albergo di Virtù, fasc. 3. For the problem of poverty in Piedmont see Cavallo, S. (1991), "Conceptions of Poverty and Poor-Relief in Turin in the Second Half of the Eighteenth Century", in Woolf, S. (ed.), Domestic Strategies: Work and Family in France and Italy, Cambridge, pp. 148-189.

²⁹ In 1720 the ex-director of the *Ospedale*, Van der Rich obtained a loan from the government to set up a woollen factory on his own. He received the government's order for 18,000 metres of fabrics, to thank him for his long-standing contribution in this trade. Quazza, G., op. cit., p. 258.

³⁰ Levi, G. (1971), "Mobilità della Popolazione e Immigrazione a Torino nella Prima Metà del Settecento", Quaderni Storici, VI, 2, pp.510-554.

³¹ Cavallo, S., op. cit.

³² A.S.T., *Provincia di Torino*, mazzo 5).

³³ A.S.T., Materie Economiche, *Ubenà*, m.1, n.2, quoted in Quazza, op.cit., pp. 241-294.

³⁴ On the commercial relationship between England and Piedmont in this period see Venturi F. (1956), "Il Piemonte nei Primi Decenni del Settecento nelle Relazioni dei Diplomatici Inglesi", Bollettino Storico Bibliografico Subalpino, LIV pp.227-271. On the .growth of English trade see Davis R. (1961), "England and the Mediterranean, 1570-1670", in F.J. Fisher (ed.) Essays in the Economic and Social History of Tudor and Stuart England in Honour of R.H. Tawney, Cambridge, and id. (1954), "English Foreign Trade, 1660-1700", Economic History Review, VII. In 1699, in England, 1\3 of the imported silk was from Italy. Cfr. also G. Symcox, op. cit., p. 337. Contessa G. (1914), "Aspirazioni Commerciali Intrecciate ad Alleanze Politiche della Casa Savoia coll'Inghilterra nel Secoli XVII e XVIII", Memoria Accademia delle Scienze di Torino, serie II, LXIV, pp. 11-50.

³⁵ On the Savoy's policy on charity see Cavallo S. (1995), Charity and power in early modern Italy. Benefactors and their motives in Turin, 1541-1789, Cambridge, Cambridge University Press.

³⁶ Duboin, F.A., op. cit., p. 585.

³⁷ Ibid., p. 590 ; Quazza, G., op.cit.

³⁸ Symcox, G., op. cit., p.208.

³⁹ The case of industrial espionage of Thomas Lombe is quite famous. He set up the first English silk-spinning factory, in Northampton, aided by the government which rewarded it with several privileges. See Porter, G.R. (1831) *Treatise on the Origins, Progressive Improvement and the Present State of the Silk Manufacture*, London; Hilton Jones, G. "English Diplomacy and Italian Silk in the Time of Lombie", Bullettin of the Institute of Historical Research, XXXIV (1961), pp.184-191. Amongst the writings which have referred to eighteenth century industrial espionage, especially between England and France, the one specifically on the topic is Harris, J.R., (1992), Essays in Industry and Technology in the Eighteenth Century: England and France, Variorum. Further, see Eric Robinson's paper on the "International Exchange of Men and Machines", in Business History, I (1958), Musson A.E. (1972), "The Manchester School and the Exportation of Machinery", in Business History, XIV, Peter Mathias' (1975) "Skill and the Diffusion of Innovations from Britain in the Eighteenth Century", in Trans. Royal Historical Society, 25, provides an excellent background.

⁴⁰ There were some, like the minister Saint Lorain, who were not convinced of it and who tried unsuccessfully to change the king's mind. See Quazza, G., op. cit., pag. 261.

⁴¹ Ibid. and Duboin, F.A., op. cit., XVI, p.973 (22 June 1725).

⁴² Quazza, G., op. cit., pp.263-69. Duboin, F.A., op. cit., XVI, p.625 (19 June 1725). The same edict had also been published two years before, in 1723, Ibid., p. 623 (30 May 1723),

but only for a few kinds of cloth. The debate that followed the edict, shown in these pages, was very interesting and rich in information.

⁴³ Ibid., p.629 (7 June 1726).

⁴⁴ A report of the "Commissioners for Trade and Plantation" in 1726 confirmed the importance of Piedmontese silk for the English trade: "which is the finest silk that is produced in any part of the world". Journal of the Commissioners for Trade and Plantations from January 1722-23 to December 1728 Preserved in the Public Record Office (London, 1928), p. 385.

⁴⁵ Duboin, F.A., op. cit., XVI, p.590 (7 May 1726).

⁴⁶ Ibid., p.508 (9 November 1720).

⁴⁷ Ibid., p.968 (6 September 1721).

⁴⁸ Ibid., p.954 (28 May 1722).

⁴⁹ In the manuscripts it sometimes appears as Swarz.

⁵⁰ Duboin, F.A., op. cit., XVI, p.970 (24 May 1724).

⁵¹ The government loaned him 5.000 *lire*. The loan was to be repaid in 10 years. Ibid., XVI, p.973 (23 June 1723). However, the budget was not adequate as the following year Suarz asked the government for another loan for double the amount of money. He asked them to buy more equipment for his dye shop and for permission to extend it into the house which had been previously occupied by the Frenchman Rounelleau before he died. Ibid., p.973 (23 and 28 June 1723).

⁵² In the 1720s the free entrance of cochineal (the french chenille) for dyeing in red was permitted. Suarz obtained the privilege to dye with this dye also. Ibid., XVI, p.933 (31 December 1721; 2 January 1723; 27 December 1725; 1726; 1 January 1727; 22 December 1727). Later, when the local production of madder was started, he was to obtain the privilege to dye with it.

⁵³ At the same time as Suarz gained a sort of monopoly for dyeing in Turin, Biella was banned from dyeing cloth which was not produced in its own territory. This shows that the government was trying to create self-sufficient microcosms in its territory, especially after the establishment of the new factory in Ormea and to prevent Biella from concentrating all the woollen industry in its territory. *Ibid.*, p.975 (18 January 1726).

⁵⁴ A.S.T., Sez.Riunite, Finanze, 1 arch., *Commercio....*, mazzo 1.

⁵⁵ In 1755 the dyers were again asked to leave the town and move to Borgo Po for hygienic reasons. The town was growing and it needed the space taken by manufactures, furthermore it became essential to control the dye shops once their importance began to be realised. This new edict, followed by almost every dyer, provoked the dislocation of dyers in Borgo Po village and offered the chance to study them at a different level. For example a thesis in Modern History at the University of Turin studied their demography during the Eighteenth century. See unpublished thesis, "Un Borgo di Torino nel Triennio 1793-95", student: Francesca Fabrizio, Prof. Adriana Lay, A.A. 1990-91. It refers to an unpublished manuscript held in A.S.C.T., collezione XII, voll.159-161-162.

⁵⁶ To dye in blue (with woad, as indigo was not yet used in Piedmont) cost 11 *lire* for each cloth. To dye red with madder cost 15.10 *lire* for the same cloth, and for dyeing without madder 13.10. To dye in the other colours was far cheaper. A.S.T., Sezione I, Commercio, cat. 4, *Lanifizi*, m.11, "Tariffa del Consiglio di Commercio per Tintori e pressatori dei pannilana", 19 July 1735.

⁵⁷ Duboin, *op. cit.*, "Rapport de President du Conseil du Commerce sur plusieurs privilèges et grâces accordées à un maître teinturier étranger (Jean Ollier, françois) pour le dédommager des pertes faites pour le soutien de son établissement de teinturerie dans la ville de Turin", 30 settembre, 1751, p. 940.

⁵⁸ ASTO, Sez. 1, ME, cat. 2°, mazzo 2, da ordinare “Copia di Regie Patenti d’erezione del Consiglio del Commercio”.

⁵⁹ Ibid., “Istruzioni pel Consiglio di Commercio, 15 gennaio 1729”.

⁶⁰ Id.

⁶¹ ASTO, Sez. I, Reg. 3, « Concessioni di Sua Maestà per manifatture e privilegi principianti li 17 ottobre 1776 al 1825 ».

⁶² On the Marquis d’Ormea cfr. Merlin P., Rosso C., Symcox G., Ricuperati G. (1994), Il Piemonte sabauda. Stato e territori in età moderna, Turin, Utet, pp.458-471.

⁶³ For the manufacture at Ormea see Prato, op. cit., p.240.

⁶⁴ Members of aristocracy could not personally pursue trade. A.S.T., M.C., cat. 1, m.1, n.5; but several of them had interests in industry, see Quazza, op. cit., pp. 283-4. Marquis d’Ormea furthermore was a member of the government. He obtained the privilege of owning a factory in 1729. See Duboin, F.A., op. cit., XVI, p.705 "nonostante il divieto delle Regie Costituzioni si permette al marchese Ormea di continuare a possedere il lanificio d’Ormea senza che tale impresa industriale possa offuscare in alcun modo il lustro dei suoi natali".

⁶⁵ The government decided to prohibit merchants from foreign "panni ordinari", "R. Biglietto con il quale S.M. determina quali siano le stoffe di lana forestiera d’inferiore prezzo l’introduzione delle quali è vietata ai mercanti", Duboin, op. cit., XVIII, p.636 (29 September 1730).

⁶⁶ Quazza, G., op. cit., p.271.

⁶⁷ Duboin, F.A., op. cit., XVI, p.529 (12 April 1732).

⁶⁸ On the re-localisation of the woollen factories, and the interesting debate surrounding it, see Maitte, C. (2002), “Etat, territoire et industries au Piémont au XVIIIe siècle”, in Journée Pierre Deyon, forthcoming.

⁶⁹ The state of the woollen industry in 1756 is in Biblioteca Reale of Turin, cod. 970, "Panni del Piemonte", "Stato dei lanifici del Piemonte nel 1757". The statistic said *circa* 9,000 people were employed in the woollen manufacture in Piedmont at that time. Conward reported that, because of the scarcity of raw materials, four woollen industries were forced to stop production in the same period of the year, while Ormea was relying on the French and Roman imports.

⁷⁰ Dolza, L., (1999), op. cit.

⁷¹ In 1760 the government acknowledged the utility of breeding sheep close to Turin, but it was an inadequate proposal compared to the needs of the industry. Only shortly before the Restoration were merino sheep raised in Piedmont.

⁷² On the Rosine, cfr. Cavallo S. (1995), op. cit., and Danna C. (1876), L'Istituto creato da Rosa Govona, Turin, ; Matta, P. (1889), Breve Monografia del Regio Istituto delle Rosine, Turin ; Turletti, C. (1896), Vita di Rosa Govona, Fondatrice del Regio Istituto delle Rosine, Turin. On the relationship between industry and charity during the XVIII century in France and Piedmont cfr. Dolza L, Hilaire-Pérez L., Weygand Z. (2002), "Les institutions d'assistance aux XVIIIe et XIXe siècles à Paris et à Turin : des ateliers entre rentabilité, philanthropie et expérimentation" in Le travail et les hommes, Paris : CTHS, to be published.

⁷³ This motto was written on the main door of the poorhouse. Matta, op. cit.

⁷⁴ Biblioteca Comunale di Torino, Manuscripts, "Riflessioni del conte Donaudi delle Mallere sopra varii rapporti delle finanze col commercio, con alcune osservazioni riguardanti le Finanze, e il Commercio negli Stati di S.M.", January 1779.

⁷⁵ A.S.T., Sez. 1, M.C., cat.4, Lanifizi, m.13, "Stato delle Stoffe di Lana fabbricate nei Lanifizi del Piemonte escluso il Biellese nell'anno 1779 col relativo valore in Fabbrica". The final cost of a fabric was reported as 20-25% higher than in the manufactures in Sedan.

⁷⁶ MacLeod, C. (1988), op.cit., pp. 92, 102 ; Randall, A. (1991), Before the Luddites: Custom, Community and Machinery in the English Woollen Industry, 1776-1809, Cambridge : C.U.P.

⁷⁷ MacLeod, C. (1988), op.cit., p. 63 ; Paulinyi, A. (1984), "Patente die keine rendite brachten: der fall von John Kay und Edmund Cartwright", in Caron F., op.cit., pp. 87-100 ; Mokyr, J. (1990), The Lever of Riches. Technological Creativity and Economic Progress, Oxford : O.U.P. , pp. 255-256.

⁷⁸ MacLeod, C. (1988), op.cit., pp. 60, 193.

⁷⁹ Ibid., p. 97-114 ; Hilaire-Pérez, L. (2000a), op.cit., pp. 189-223 ; id. (2001), "Les économies du savoir en Angleterre au XVIIIe siècle : le cas des inventeurs" in Lachaud F., Ruggiu F.-J., Lescent-Gilles I. dir. Histoires d'Outre-Manche. Tendances récentes de l'historiographie britannique, Paris : Presses universitaires de la Sorbonne, p. 186-206.

⁸⁰ Hilaire-Pérez, L. (2000a), op.cit. ; id. (2000b), op.cit. ; Roche, D. (1978), Le siècle des Lumières en province. Académies et académiciens provinciaux, 1680-1789, Paris : E.H.E.S.S. ; Hahn, R. (1971), The Anatomy of a Scientific Institution. The Paris Academy of Sciences, 1666-1803, Berkeley : University of California Press ; Minard, P. (1998), La fortune du colbertisme. Etat et industrie dans la France des Lumières, Paris : Fayard.

⁸¹ Centre historique des Archives nationales (CHAN) : F12 992, F12 993.

⁸² Hahn, R. (1971), op. cit. ; Hilaire-Pérez, L. (2000a), op.cit. ; Brian, E. (1994), La mesure de l'Etat. Administrateurs et géomètres au XVIIIe siècle, Paris : Albin Michel ; Minard, P. (1998), op.cit.

⁸³ Licoppe, C. (1996), La formation de la pratique scientifique. Le discours de l'expérience en France et en Angleterre (1630-1820), Paris : La Découverte.

⁸⁴ Ibid., pp. 52-57.

⁸⁵ CHAN : F12 993, E*2695.

⁸⁶ Meyssonier, S. (1989), La balance et l'horloge. La genèse de la pensée libérale en France

au XVIII^e siècle, Montreuil : Editions de la Passion ; Perrot, J.-C. (1992), "Economie politique" in Une histoire intellectuelle de l'économie politique (XVII^e-XVIII^e siècle), Paris : E.H.E.S.S., 1992, pp. 63-95.

⁸⁷ Kaplan, S. L. (1988), Les ventres de Paris. Pouvoir et approvisionnement dans la France d'Ancien Régime, Paris : Fayard, pp. 328-385.

⁸⁸ Hilaire-Pérez, L. (2000a), op.cit., pp. 124-133.

⁸⁹ Parker, H. T. The Bureau of Commerce in 1781 and its policies with respect to French industry, op. cit., p. 50.

⁹⁰ CHAN : F12 993

⁹¹ CHAN : F12 992.

⁹² Chassagne, S. (1991), Le coton et ses patrons. France, 1760-1840, Paris : EHESS ; Harris, J. R. (1998), Industrial Espionage and Technology Transfer ; Britain and France in the 18th-Century, Aldershot : Ashgate.

⁹³ CHAN : F12 1341.

⁹⁴ Hilaire-Pérez, L. (2000a), op.cit., pp. 286-287 ; Bret, P. (2002), L'Etat, l'armée, la science. l'invention de la recherche publique en France (1763-1830), Rennes : P.U.R.

⁹⁵ CHAN : F12 1295. Dolza, L., Hilaire-Pérez, L., Weygand, Z. (2002), op. cit.

⁹⁶ Lanoë, C. (2001), "La céruse dans la fabrication des cosmétiques sous l'Ancien Régime (XVI^e-XVIII^e siècles)", Techniques & culture, 38, pp. 17-33.

⁹⁷ Hilaire-Pérez, L. (2002), op.cit. ; Hilaire-Pérez, L. (2000), "Les boutiques d'inventeurs à Londres et à Paris au XVIII^e siècle : jeux de l'enchantement et de la raison citoyenne " in Coquery N. éd. La boutique et la ville. Commerces, commerçants, espaces et clientèles, Tours, CEHVI, pp. 171-189.

⁹⁸ Jobert, P. (1989), "L'incompatibilité entre brevets d'invention et société anonyme sous la Révolution et l'Empire" in G. Gayot, J.-P. Hirsch eds. La Révolution Française et le

développement du capitalisme, Revue du Nord, 5 hors-série, pp. 227-241.

⁹⁹ Bret, P. (2002), op.cit.

¹⁰⁰ Hilaire-Pérez, L. (2000a), op.cit., p. 250.

¹⁰¹ Hilaire-Pérez, L. (2002), "Cultures techniques et pratiques de l'échange, entre Lyon et le Levant : inventions et réseaux au XVIIIe siècle", Revue d'Histoire Moderne et Contemporaine, 49-1, pp. 89-114.

¹⁰² Hirsch, J.-P. (1985), "A propos des brevets d'invention dans les entreprises du Nord au XIXe siècle", Revue du Nord, 265, pp. 447-459.