On the Link Between the English Patent System and the Industrial Revolution: Economic, Legal, and Sociological Issues

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Abstract

This paper is a part of a broader attempt to link shifts in stages of capitalism with changes in intellectual property law. The article is focused on the 18th century in England and it attempts to combine sociological, economic, and legal literature to underscore the bond between the ideology of the rational profit-seeking individual, the takeoff of industrial revolution, and the evolution of patent law. Firstly, we show that while the usual economic measures (TFP, labor and capital productivities, foreign trade, etc.) are not useful to distinguish the UK from other countries in that period, the quantity of patents is one of the only measures which announced the changes that were taking place. Secondly, we explain the historical development of the complex institutional arrangements that resulted in a patent system that, paradoxically, fostered particular micro inefficiencies that turned into macro efficiencies.

Keywords: Intellectual Property, Capitalism, Industrial Revolution, Patents, Knowledge

I. Introduction: Stages of Capitalism and Intellectual Property Institutions

The history of capitalism is one of periodic metamorphosis. The combination of crisis, growth, and attrition results, at some point, in an all-encompassing transformation, in a transition from one stage to another. Many classic authors have produced rich and vivid narratives of capitalism (or the Western world in general.) We find in their accounts all sorts of milestones which mark ruptures, turning points, and discontinuities in that history. However, the laws regulating knowledge (intellectual property being the main corpus) are mostly absent. By omission, these narratives agree silently in neglecting the relevance of the link between intellectual property and the functioning of capitalism. Nevertheless, in recent years, evidence about the existence and relevance of the link has been rising.

Thus, nowadays, a wide range of academic discourse postulates that knowledge has become a crucial resource in the development of economies over the past forty years. Consequently, intellectual property institutions are being rescued from their previous role,

perceived as marginal, and brought to the center of the economic, political, and social agenda. Specifically, this has led to underlining the link between the enormous expansion of intellectual property rights and the dawning of a new stage of capitalism. We call it Informational Capitalism (Castells, 2000) but there are other frequently used expressions: Post-Industrial society, Knowledge Based Economy, Cognitive Capitalism, etc. Indeed, to understand the last major shift in the history of capitalism it becomes clearly relevant to take into account the role and scope of intellectual property institutions.

Now, if it is the case that knowledge has been crucial to understand the productivity of an economy in the whole history of capitalism (as every paper discussing the so called "knowledge society" usually admits in a footnote) and if it is also the case that there have always been institutions regulating access to the flows and stocks of different kinds of knowledge, we might raise two simple questions: Are the institutions regulating access to knowledge (for instance, intellectual property law) relevant to characterize *different* stages of capitalism? How and to what extent are changes in intellectual property law useful to understand the *shifts from one stage to another*?

So, let us take a simple division of capitalism between three stages[i] (Vercellone, 2012; Boutang, 1999): Mercantile Capitalism, Industrial Capitalism, and Informational or Cognitive Capitalism. We´ve just mentioned the last stage. Let us turn to the previous one.

In the hundred years spanning from the second half of the 15th century to the first half of the 16th century, a series of profound changes in Western civilization took place. From high school, we have been instructed about the facts and years that marked the end of Middle Ages: 1453, the capture of Constantinople by the Turks; 1492, the arrival of Columbus to America; circa 1450, the invention of the Gutenberg press; around 1517, the Protestant Reformation. Besides specific facts and years, there is some consensus about the speeding up of merchant activities in those 100 years, giving rise to Mercantile Capitalism. Now, in the middle of that period, and right in a region where merchant capitalism was flourishing, an unprecedented event took place. A fact that does not receive attention in any high school history book, nor in college books on the history of capitalism. *This is the Venice Act of 1474, which established the first modern regulation of patents*, fostering the attraction and diffusion of valuable knowledge to that kingdom. Is this just a random event? Is it purely coincidental that the first modern regulation of access to knowledge occurred at the very place and time where the embryo of merchant capitalist was being conceived?

When we turn to study Industrial Capitalism, we find a very similar situation. Despite the fact that the origins of this phase have been much more widely reviewed than the above, we find the regulation of access to knowledge again neglected in the grand narratives—Marx does not mention it at all[ii], nor does it have any relevance in the work of Hobsbawm (1968), Polanyi (2001 [1944]) or Braudel (1984). Rivers of economists´ ink have been devoted to the enclosures, the double freedom of labor power, machinery and coal.

Mountains of books are filled with the importance of the Enlightenment, Contractualism, Political Economy and modern science. However, by the time of the Industrial Revolution, England was the first and only country that *had stabilized the regulation of copyright and patents* (in the contemporary sense). Through some Acts (Statute of Monopolies, 1623; Act of Anne, 1709), but especially through some key rulings (as we will discuss in detail below) England developed clear laws framing *the notions of author, inventor and public domain*. Is that a mere coincidence again? Did the changes in the regulation of knowledge and a crucial twist in the history of capitalism cross paths just by accident? This time, there is enough data to reject the contingency hypothesis. Although the process is far from linear, it is clear that regulation of access to knowledge had a close and unavoidable link with the launch of Industrial Capitalism.

So, this article draws on this theoretical assumption: *the changes in the stages of capitalism coincide with (do not determine nor are determined by) changes in intellectual property law and, more broadly, in the regulation of access to knowledge.* With this framework in mind, this paper will focus only on one small piece of the puzzle: the take off of industrial capitalism and, particularly, the realm of patent law in England[iii].

Thus, this paper intends to combine sociology, economics, and law to underscore the bond between the ideology of the rational profit-seeking individual, the takeoff of industrial revolution and some changes in patent regulations which occurred in 18th century England. In section II we depart from some well-known examples of inventors and industrial machines in order to suggest that the flow of innovations was somehow related to intellectual property law. Section III deepens the analysis of the link between patented inventions and the launch of the industrial revolution in two complementary ways. On the one hand, it offers quantitative evidence from economics to support the relevance of that link: patenting trends in England skyrocketed towards the end of the 18th century. On the other hand, a hypothetical explanation of this trend is presented, following economic historian Joel Mokyr: inventors delivered and tried to patent ingenious machines, expecting to secure huge profits. However, this was rarely the case, and the English economy benefited from the flaws in the patent system –which made cheaper machines available. But why did the inventors substantially increase the patenting trends? Economics can´t answer this question, and that´s why section IV turns to sociology and law in order to put together an explanation. Regarding the former, the dawn of a particular ideology is mentioned: that of the rational, profit-seeking, property owner and rights holding individual, along with the complementary emergence of the public sphere. Concerning the legal underpinnings of the change, the stabilization of the patent system through judicial means is discussed. It involved three main axes: the change in jurisdiction from the Privy Council to Common Law; the emergence of the requisite of "novelty" as we know it nowadays, and the requirement of full disclosure in the specifications of the patents. Finally, section V summarizes our findings.

II. Industrial Machines and Patents: A Complex Link

A glance at the literature related to the Industrial Revolution reveals the emphasis put on the link between Watt´s machine[1] and the takeoff of industrialism (e.g., Dickinson and Vowles, 1943). However, the complementary connection between the inventors and the patent system has not received a similar deal of attention (e.g. Toynbee, 1957; Thompson, 1964; Pike, 1966; Ashton, 1969; Payne, 1974) at least until the 1970s[iv]. In exceptional cases that connection is the focus of author´s thoughts, and different conclusions can be drawn. It may be noted, as is the majority opinion, that the English patent system has contributed to the Industrial Revolution by securing benefits (or claiming to do so) for innovative individuals such as James Watt. On the contrary, it is possible to argue that the monopoly of inventors like Watt delayed the spread of innovations and that, consequently, the Industrial Revolution would have happened faster without a patent system (Boldrin and Levine, 2008: Chapter 1). At this stage of the argument, it does not matter what the right position is, it is enough to underscore the relevance of the discussion.

Of course, this story goes beyond Watt´s machine to encompass, for instance, spinning machines. Let us take a quick look at them. With no claim of originality, we identify three of these machines as critical, and three individuals as their respective inventors. James Hargreaves and the Spinning Jenny, Richard Arkwright and the Water Frame, Samuel Crompton and the Spinning Mule are the pairs that are usually listed. While the history of the adoption of these technologies is strongly linked to the successes and failures of their inventors in patenting them, this crucial aspect is not discussed in traditional narratives of the industrial revolution.

For example, the wide dissemination of the Spinning Jenny seems to have been closely linked to the fact that Hargreaves (having launched the machine in 1764) only applied for the patent in 1770, after noticing that many manufacturers of Lancashire were copying and selling similar artifacts without his consent. Moreover, despite having obtained the patent, Hargreaves was not able to stop the parallel production.

Nonetheless, *the necessary fiction of the individual inventor is fragile before historical inquiry*. Indeed, Hargreaves seems to have taken the idea of the machine from Thomas Highs—the former was an assistant of the latter. The famous Richard Arkwright, in turn, would have assisted and parasitized Highs and John Kay, obtaining from them the guidelines of the Water Frame (Mantoux, 1964: 220-228). The lack of money seems to be the cause that prevented Highs from patenting his inventions. As the reader may imagine, Highs cannot be credited as the creator *ex nihili* of either of the two machines. There is evidence that suggests he would have taken the core ideas from John

[1] James Watt was a Scottish inventor whose improvements to the Newcomen steam engine were fundamental to the changes brought by the Industrial Revolution in both his native Great Britain and the rest of the world (http://en.wikipedia.org/wiki/James_Watt).

Wyatt and Lewis Paul in the 1730/40 decade. Returning to Arkwright, it is worth noting that he patented and litigated with enthusiasm from 1768 and he maintained reasonable control of the externalities of his inventions. However, his very modest contributions to the artifacts over which he exercised that fervent ownership became apparent in 1785 when his patents were overturned (Hewish, 1987: 80).

When leaving behind these examples, the relationship between the patent system and the industrial revolution seems necessary, but confusing. There is a link between one and the other, but what kind of link is it?

III. Seduced and Abandoned: The Inventors and the Patent System

To some extent, patents seem to have stimulated the rational action of individuals in the search of riches. At the same time, the industrial revolution seems to have benefited from the failures of the system: the textile industry would have substantially reduced its productivity, if it had paid the proper licenses for each machine it used. In this sense, a hypothesis worthy of mention is that suggested by Joel Mokyr:

> But inventors were but a small subset of the population. Given that the benefits of the inventions were almost entirely captured by the population of consumers at large in increased consumer surpluses, the patent system may well have had the unintentional side effect of stimulating a level of inventive activity that was about right. *By cheating the few, it benefitted the many*. *Had there been no patent system altogether, or had no one ever been able to get rich on fourteen years of monopoly, the level of inventive activity may have been lower*. Honor alone would not have been enough in some industries. On the other hand, had the system been more open and accessible, and had patents been more enforced, blocking patents and monopolies in rapidly changing industries may have slowed down the pace of progress. As it was, it may just have been enough to help keep Britain as the Workshop of the World until deep into the nineteenth century. (Mokyr, 2008: 19, emphasis added)

Mokyr understands, similarly to Dutton (1984), that the English patent system contributed to the industrial revolution by a curious and unintended balance. It encouraged a fantasy of personal riches that in reality was not going to be realized at all for the vast majority of inventors. Of course, some real cases fed this idea, like those of Watt and Arkwright. But once the inventions were produced, the difficulties in obtaining patents or enforcing them were transformed into benefits for the consumers of these technologies. Thus, according to Mokyr the patent system had two merits. One is predictable: its very existence. Another is curious: to be inefficient. If obtaining a patent had been easier and if its enforcement had been more effective, the industrial revolution would have encountered considerable obstacles in taking off. Nevertheless, it can be argued wisely that a bunch of examples of famous inventors who acted seduced (and eventually betrayed) by the patent system is not enough to make our point. More evidence is needed to support the idea that the patent system played an important role in the take off of the industrial revolution

Fortunately, the research conducted over the past thirty years resulted in the discovery of valuable facts that go beyond the stories of inventors as heroes. For example, Dutton (1984) found, based on careful work with primary sources, that during the second half of the eighteenth century in England an entire class of inventors emerged, pursuing economic profits associated with patents. Moreover, he and other academics have gathered statistics that support the point we raised.

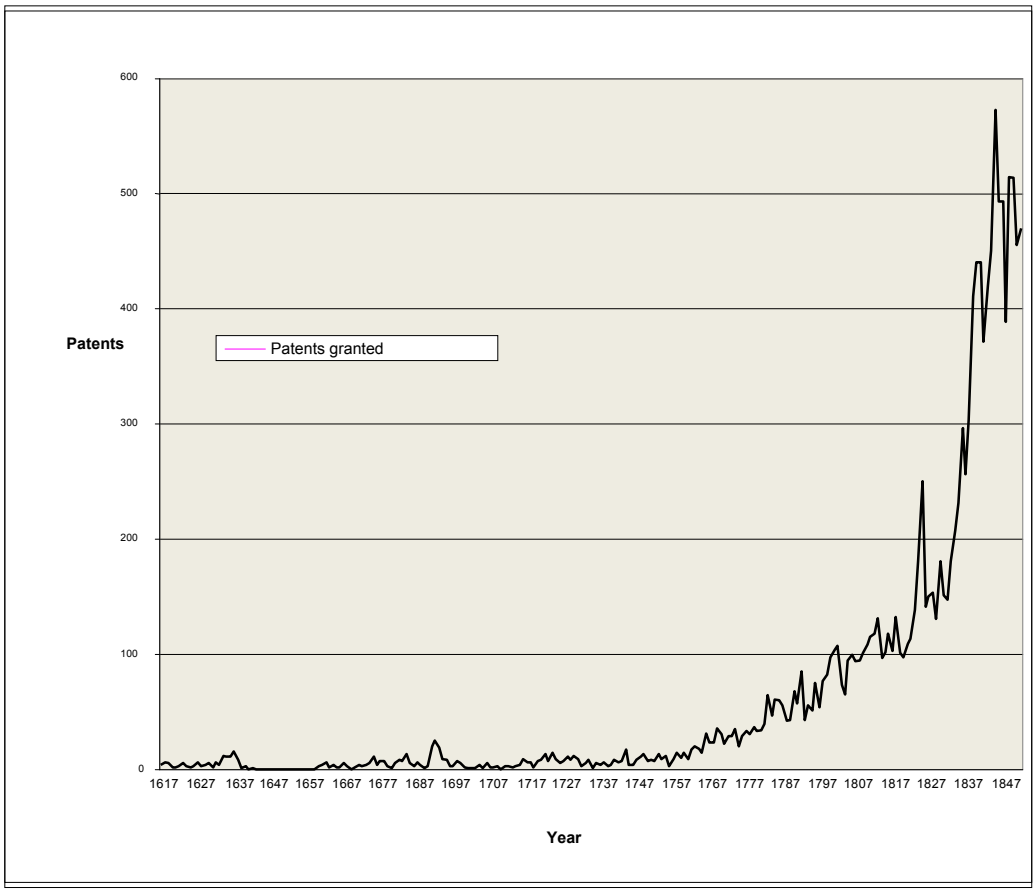

FIGURE 1: Patents Granted (England,1617/1852)
Source: Adapted from Dutton, 1984: 2 and Mitchell, 1988: 438

The chart is interesting in several respects. Obviously it displays the advancement of patenting trends since the mid eighteenth century, which coincides perfectly with the period usually assigned to the beginning of the Industrial Revolution (Mokyr, 2008:7). This overlap can be interpreted in different ways, but cannot be denied or ignored. Beyond the work of Dutton and the chart, other authors have refined the analysis. For instance Sullivan (1989) shows that there was a shift in patenting trends around 1757. Additionally, there is evidence that industries with higher growth in patenting were those linked to the industrial revolution[v].

The coincidence referred to in the preceding paragraph is more remarkable when we consider the fact that the beginning of the Industrial Revolution has been elusive in terms of statistical indicators. As is well known, neither the product nor the gross income per capita showed substantial or differential increases in eighteenth century England when compared with other countries.

Take, for instance, data on the annual growth of the product and the contribution of TFP (Total Factor Productivity)—which is often used as an indicator of the role of technological progress in increasing productivity. Table 1 compares the results obtained by various authors with different methods of estimation.

Author	Period	Output growth	Contribution of the Total Factor Productivity (TFP)
Crafts	1760-80	0.6	0.0
	1780-1831	1.7	0.3
	1831-73	2.4	0.75
Feinstein	1761-1800	1.1	0.2
	1801-30	2.7	1.3
	1831-60	2.5	0.8
Greasley y Oxley	1760-80	0,6	0,1
	1780-1831	1,7	0,0
	1831-1873	2,4	-0,2
Antras y Voth	1770-1801	-0,1	0,1
	1801-31	0.3	0,5
	1831-60	0.3	0,6

TABLE 1: Annualized Output Growth and TFP for England, 18th and 19th Centuries, by Different Authors
Source: Crafts, 2002: 21.

Beyond the reasonable methodological discussions, there seems to be enough evidence to assert that the industrial revolution can neither be found in the annual increases in product—modest, in all estimates—nor in additional productivity that technology would have had on the economy as a whole—as it is showed by the marginal contribution of TFP in the period. According to these variables, the industrial revolution begins only in the nineteenth century.

Moreover, the comparison between England and France for some usual economic variables does not shed much light on why was England first.

Indicator	Great Britain		France	
	1700	1780	1700	1780
Population (1700=100)	100	133,6	6,9	130
Urban population (1700=100)	100	173	1,2	183
Foreign Trade (1700=100)	100	244	13	177
Total Production (1700=100)	100	169	100	167
Income/head (1700=100)	100	127	100	129

TABLE 2: France and England in the 18th Century
Source: Adaptation from Crafts, 1985:128.

In most cases, where England grew, France did so as well[vi]. Crafts' argument is that the Industrial Revolution was an undoubtedly English phenomenon, although this cannot be proved by statistical data. Our response is different.

Without denying the complexity and multi-causality of the phenomenon, the dramatic growth in the patents granted (displayed in FIGURE 1) should not be overlooked.

Of course, an objection might be raised. The reader could say that the data presented is asymmetrical. We have challenged some common assumptions by comparing England with France and we have said that the English increase in patenting is the obvious difference between both countries in the period we are focused on. Nevertheless, we have not looked at French patenting statistics. What if patents granted in France also increased dramatically? If that were the case, our argument would be misguided. To answer this question we use data collected by Rostow (1985). The table shows annual averages of patents granted for selected time periods, to facilitate the comparison.

Period	UK	France
1702-1711	2	6
1712-1721	5	7
1722-1731	10	10
1731-1741	5	6
1742-1751	9	4
1752-1761	10	0
1769	21	7
1770-71	25	10
1789-1792	63	22
1796-1798	69	8

TABLE 3: Patents granted in the UK and France

Source: Rostow, 1985:132

The evidence seems to support our point to some extent. But some questions arise: why English patents started to rise? Why there was a change in the gradient? Why did such a change occur at that time*? It is crucial to recognize that these questions can´t be answered by economics.* We must turn to other social sciences, i.e. legal history and sociology. Whereas an exhaustive discussion should include many factors, here we will only be able to deal with one and mention another of them: i) *the foreground of institutional arrangements* and ii) *the background of a rising new ideology, that of the rational profit-seeking property owner individual and the public sphere* (through contractualism, political economy and liberalism). Certainly, unilateral causality should be erased from the explanation: the birth of a class of individuals willing to patent their inventions, the dawning of a particular ideology and the changes in key rulings are mutually determined.

IV. The Individual Inventor, the Patents and some Key Rulings

Curiously, the change in the gradient of figure 1 did not occur in the vicinity of the enactment of any law or decree. However, and this is our hypothesis regarding this point, *there were important institutional changes in that period that fostered the patenting tendencies. They did not come from the Parliament, but from the courts*. In the eighteenth century, the English patent system was stabilized without legal changes, but with significant rulings. Thus, the set of judicial decisions that were establishing the figure of the inventor (as an owner of exclusive rights) appears to be an important catalyst of the dialectical process that resulted in an increase of the willingness to patent (Mac Leod and Nuvolari, 2006: 5; Sullivan, 1989:435; Dutton, 1984: 73-75). Let's discuss this idea further.

The birth of the notions of "author" and "inventor" are both related with the diffusion of a particular ideology throughout the eighteenth century. This ideology conceives the human subject as a rational, profit-seeking, property owner, and rights holder individual (Boyle, 1996; Lemley, 1997; Foucault [1969]1990). In the field of literary works, the Statute of Anne from 1710 established and tailored the notion of copyright to this kind of subject: it meant the birth of the modern concept of author. Conversely and maybe surprisingly there were no new statutes or laws governing the English patent system in the eighteenth century. Instead, the Statute of Monopolies of 1623-24 remained the reference standard until the mid-nineteenth century. Moreover, Bracha, contrary to the standard vision—such that of Fox (1947) or Klitzke (1959)—, recently developed a convincing argument stating that the Statute was not a break with the traditional scheme and practice of the patent grant [vii].

So, did the new ideas about individual, freedom, property, economic incentives, and so on stay away from the subjects devoted to

the invention of new artifacts and processes? Not at all: a group of judicial decisions replaced the enactment of new laws and stabilized a patent system suitable for the takeoff of the industrial civilization (Mac Leod, 2002; Mossof, 2001; Hulme, 1896)[viii].

Some decades after its adoption, the Statute of Monopolies was confronted with two kinds of obstacles. The first obstacle was the background of new ideas about rationality, rights, individualism and property while the other obstacle was new technological developments. With these obstacles in mind, vacancy areas, incoherencies, and the need to reach a broader scope became apparent. The commentators agree that a long period of legal uncertainty started[ix] from this point. The judicial stabilization that came to (partially) solve this problem took place in the second half of the eighteenth century (Bracha, 2005), and it can be described around three axes: the change in jurisdiction, the requisite of novelty, and the requisite of presenting precise specifications in order to obtain a patent.

Change in Jurisdiction

Although the Statute of Monopolies was aimed at limiting the arbitrary royal grants of privileges, for many years the practice remained unchanged. In the seventeenth century, the intention and even the words of the Statute were less powerful than the monarchy. Therefore, the patents, far from becoming a result of individuals´ rights, continued as royal grants. The shift from privileges granted by the Crown to rights inherent to the individuals only took place during the eighteenth century. One way to analyze how this happened in empirical terms is to look at *who were the judges who decided to grant patents and settled lawsuits related to them*. Interestingly, although the Statute mandated that patent lawsuits should be resolved in the context of Common Law, in practice they were under the scope of the Privy Council (Hulme, 1917; Bracha, 2005). Originally formed by Cromwell in the 1530's, the Privy Council was a kind of cabinet that advised the King and had, among others, judicial functions. In the eighteenth century it began to lose power and nowadays its importance is almost ornamental. *The jurisdiction of the Privy Council in all matters relating to patents in the seventeenth century expressed the character of privileges and concessions of the grants: ultimately, the decision was subject to royal arbitrariness*. So, it was only with the shift from the Privy Council to the Common Law judges that the individual inventor began to be recognized as a rights holder (Mossof, 2001: 1277/1286).

This transfer of jurisdiction occurred only in 1753 through the trial of Baker v. James. Besides the details of the case, the key point is that it confronted Lord Mansfield and the Council. For the first time, the latter relinquished jurisdiction to the law courts over determining the validity of patents for inventions.

> We are probably justified, therefore, in assuming that the quarrel between the Council and Lord Mansfield led to a reconsideration, from a constitutional standpoint, of the Council's jurisdiction, and that as a result

> the Council decided, under the advice of the Law Officers, to divest itself of its functions. (Hulme, 1896:194)

Thus, Section 2 of the Statute of Monopolies was put into effect after 130 years: some of the ideas of the contractualists were landing in the regulation of economic behavior[x].

Indeed, the shift towards Common Law helped to shape a new kind of individual: innovative subjects who saw themselves much more as rights holders than supplicants for royal concessions.

Requirement of Novelty

The Statute of Monopolies stated that the patent should be granted to the "true and first inventor." These words, interpreted in the context of the current doctrine, automatically refer to the granting of rights to the original author of the invention. However, the interpretation given in the seventeenth century to this phrase was quite different. As noted by the literature (May and Sell, 2006: 49-74; David, 1993; Biagioli, 2006), in the preindustrial period, the key to granting a patent was not if there had been any truly new invention, but if the knowledge involved was unknown in the Kingdom. As an expert puts it:

> Another main difference between past and present is that while the modern patent system is deemed to increase local innovation, early modern privileges were frequently used to foster the international mobility of skilled engineers and artisans. (Biagioli, 2006:148)

In this regard, a case report from Edgeberry v. Stephens, 1691, is illuminating:

> A grant of a monopoly may be to the first inventor . . . and if the invention be new in England, a patent may be granted though the thing was practiced beyond the sea before; for the statute speaks of new manufactures within this realm, so that, if they be new here, it is within the statute: for the Act intended to encourage new devices useful to the kingdom, and whether learned by travel or by study, it is the same thing. (Carpmael, 1843: 35)

Consequently, the patent was for the inventor *and for the importer*[xi]. But contrary to what might be expected, *the rights of the original creator were the offspring of those of the importer*, and not vice versa (Bracha, 2005: 38). As Hulme points:

> …the Crown and Courts alike recognized two classes of individuals . . . as the proper recipients of royal favor, (1) the bringer-in or importer, (2) the first finder or inventor—the latter grounding his title to favourable consideration on the fact that he possessed in common with the importer the qualification of introducing a new industry within the realm. *In other words, the rights of the inventor are derived from those of the importer, and not vice versa as is commonly supposed*. (Hulme, 1896:175, emphasis added)

Notice that this idea of (what we now call) an importer being the father of (what we now call) an inventor is consistent with the etymology of the word "invention."[xii] In Latin, it comes from *in venire* which means "to bring", or "to find", but never "to create *ex nihili.*"[xiii]

The knowledge could be grasped from the Platonic *topos uranus* or from a French village: in both cases it would be fair to talk about "inventions."

But this state of affairs changed during the eighteenth century. The notion of *novelty* started the metamorphosis towards its actual meaning, i.e. the artifacts or processes that are eligible for a patent must not have had any prior use at all in anytime and, to some extent, in anyplace. (Mossof, 2001; Bracha, 2005)

A critical milestone in this shift can be found in the case Liardet vs. Johnson, 1778. Specifically, in the considerations with which Judge Mansfield instructed the jury:

> Is it a new invention? Is it new? For if it is new and good for nothing, nobody will make use of it. The great point is, is it a new thing in the trade, or was it used before and known by them'? …And it is material…that in all patents for new inventions, if not really new discoveries, the trade must be against them: for if it is an old thing it is a prejudice to every man in the trade; it is a monopoly (Judge Mansfield, quoted in Mossof, 2001:1308)

Now the threshold of innovation that the patent must meet is whether anyone had ever heard of the invention. Although far from being obvious, this clearly implies that the authorities must determine whether the product or the process is the result of the efforts of the individual inventor[xiv].

> The standard for novelty is no longer whether the invention violates the practice of a trade at the time of the grant, but rather novelty is now tested solely in terms of whether the invention was "used before and known by" those in the trade. This means: is the patented product the result of the inventor's own labor? The test of whether this is the case is whether there was anyone at any time in the past that knew about or used the patented invention within the realm. If yes, the invention is not the result of the inventor's own labors and thus he failed to rightfully earn his patent. This requirement easily fits into the Lockean moral and political schema that maintains that an individual's right to his property is grounded in the labor that begets property itself. (Mossof, 2001:1308)

Thus, the development of the requisite of novelty cannot be dissociated from the rise of the notion of the individual creator. Certainly, *only a subject who conceived himself as an independent entity from the social magma that surrounded him could conceive of his ideas as creations not indebted with the social flows of knowledge.*

When the subject becomes an autonomous individual creator, the fruits of his intellect have to become genuine novelties. When this individual has become a proprietor as well, the products of his activity must be clearly distinguished from the intellectual cattle of other owners. Although here we are concerned with the field of patents and inventors, this reasoning applies also to the emergence of the notion of author and the modern copyright (Woodmansee, 1984; Boyle, 1996; Lemley, 1997; Foucault [1969]1990).

Thus, the innovation of the eighteenth century lies, at this point, in assigning much of the actual meaning to the idea of ¨true and first inventor¨. That is the heart of the "novelty" requisite, present

nowadays in patent laws all over the world. The patent is granted if the product or process has never been used, not only if it is out of current use. Consequently, the inventor became an individual in the modern sense of the word, a creator of original knowledge *ex nihili*. Of course, and incidentally, there is no more room in the concept of inventor for the ingenious importer, the memorious traveler, or the smart spy.

This last point can be argued. It could be said (as a generous colleague did) that "the change that occurred in 18th century was to do with old domestic uses—´forgotten uses´." and that "This has nothing to do with the end of patents of importation." This is partially correct. In the law-in-the-books (as Bracha puts it), it is true that novelty was still assessed on a national basis until 1977. However, the social practices and the innovation pace of England changed profoundly in the 18th century.

> Instead of immigrant tradesmen and those with ties in the court, patentees were increasingly local entrepreneurs of different kinds, from small manufacturers innovating in their field to amateur inventors. (Bracha, 2005:64)

This is why as early as in 1730 Attorney General Yorke, referring to a patent application from a foreign immigrating craftsmen, stated that: "it appears to me that patents of this kind for the sole use of manufacture newly brought into England and never before made here have formerly passed." (Mac Leod, 2002:82).

The Specification as a Requisite

The sociological literature states that the births of the modern Individual (as synonym of autonomous subject) and the Society (as a rational association, opposed to the notion of Community) are firmly bound (Williams, 1980; Horkheimer, 1976; Bauman 2005 and, ultimately, Weber, 1930). To put it simply, the private and the public, in their current sense, were born together. Departing from this idea, is easy to understand that in the realm of intellectual property, the dawns of the author and the inventor are tied to the rise of the Public Domain (Rose, 2003:76; Chander y Sunders, 2004: 133). Consequently, now we will discuss how a sphere of public knowledge was built in the patent law.

From their very beginning, patents were designed to spread protected knowledge *in a controlled manner and in the specific area for which they were granted*. In the craft guilds, the institutional means to achieve this goal was the obligation of training apprentices assumed by the master (Biagioli, 2006; David, 1993; May and Sell, 2006). This procedure guaranteed the diffusion of knowledge, to some extent. But it did so in a way that in today's terms we would understand as *entirely private.* From the Guild to the Master, and from him to the apprentice. Indeed, there was nothing similar to the public domain in this institutional arrangement. The state representatives were pleased enough if the patented knowledge impacted on the productivity of the region. This is, they were not concerned at all with keeping any records or disclosing publicly the ideas for which the monopoly was

being granted. When the guild system collapsed, the lack of interest from the authorities regarding the role of the state in the registration and diffusion of knowledge remained unchanged. The shift only came in the eighteenth century. The public domain was ultimately shaped through *the obligation of specifying the principles behind the functioning of the patented artifacts, on the one hand, and through a new intention given to those specifications, on the other.* Let´s focus on the procedure of describing the technique or technology candidate for a patent.

In this regard, two facts are remarkable for the period before the eighteenth century. Not surprisingly, the first is that for a long time detailed descriptions were not usual or required[xv]. The second is more interesting. According to the classics in the field, the origin of such descriptions was in the reassurance sought by the patent holders rather than in a state requirement[xvi] (Hulme, 1896; Davies, 1934). Indeed, a patentee confronted with a disguised imitation of his artifact could go to the recorded specification to support his claim. However, this opinion was challenged recently (Adams and Averley, 1986; Mac Leod, 2002). In any case, it is clear that specifications did not *emerge* as a part of a deal between the individual and the society (Bracha, 2005).

Indeed, the first specification seems to be that of Sturtevant, filed in 1611, entirely voluntary and tied to the self-interest of the patentee (Mossoff, 2001:1290). In the most comprehensive study of English patents, Christine MacLeod adds only two specifications to the seventeenth century (the patent of the Marquis of Worcester in 1663 and the one of Howard and Watson, in 1670). It seems that the practice of presenting the specifications was reasonably spread by the middle of the eighteenth century. In 1711, John Nasmith offered to detail his method of distilling spirituous beverages—see the previous endnote. And according to MacLeod, between that date and 1734 about 20% of patents were accompanied by some kind of specification. From then on, the specifications became usual, although their quality was far from being optimal (MacLeod, 2002:49).

An important milestone appears to have been the case of Baker v. James, already mentioned above. In that case, Baker attempted to void the patent granted to James of an anti-fever medicine, claiming that the latter was not in any way the original inventor of the product. What interests us now is that the discussion between the parties revolved around the specification that was submitted in 1747 by James. For the first time, the specification was at the center of the stage, raising the debate about the relationship between the individual, the original creation, and the public benefits. Naturally, this is still far from establishing that the objective of the specification is to augment the public domain, but the case was a step in that direction.

It would take a quarter of century more and another leading case to firmly link the full disclosure in specifications and the notion of public access to technological knowledge. Similar to the novelty requirement, the instructions of Judge Mansfield in Liardet v. Johnson paved the doctrinarian way[xvii].

> …you must specify upon record your invention in such a way as shall teach an artist, when your term is out, to make it—and to make it as well as you by your directions: *for then at the end of the term, the public have the benefit of it.* (Judge Mansfield, Instructions to the Jury in Liardet vs. Johnson, 1778, cited in Rose, 1978: lxxvi, emphasis added)

As various authors pointed out[xviii], these instructions resulted, on the one hand, in the stabilization of the clear specification—a full disclosure—as a requisite for the patent[xix]; on the other hand, in linking this requisite with the expansion of the public sphere. It may be said that this threshold of full disclosure—nowadays present in all patent laws—represents the bond between the individual rights owner inventor and the civil society, which agrees to grant a limited exclusivity in exchange for the specification[xx]. In this regard:

> The meaning of specification is that others may be taught to do the thing for which the patent is granted; and if the specification is false, the patent is void, for after the term the public ought to have the benefit of the discovery. Hence the law requires as the price the patentee should pay to the public for his monopoly, that he should, to the very best of his knowledge, give the fullest and most sufficient description of all the particulars on which the effect depends (Carpmael, 1843:36-37).

Note how the change in jurisdiction and the requirements of novelty and specification (points i, ii and iii, respectively) *bind the appearance of the individual inventor, the idea of invention as an original creation, and the emergence of the public domain for technological knowledge.* The coincidence of time and space is also complemented by the fact that only two trials (Baker v. James, and Liardet v. Johnson) were the benchmarks for the three items.

V. Final Remarks

This article can be summarized in three points. While the second and third are strictly conclusions, the first one is an attempt to underline our theoretical position. Indeed, our first and more general point is not a result derived from the analysis, but a theoretical standpoint from which the analysis started. *The regulation of knowledge—and particularly intellectual property rights—must be taken into account in order to understand the historical shifts of capitalism from one stage to another one.* At this level, patents may have had much, little or no importance in the launch of the Industrial Revolution: above all what matters is that the historical accounts discuss the issue in depth. Moreover, from our theoretical framework this discussion is not even limited to patents. What we are trying to underscore is the relevance of the regulation of flows of different types of knowledge (objectified in patents, but also codified in texts, subjectified in inventors and workers, and other types); and how both (knowledge in general and its regulations in particular) affected the history of capitalism. Let´s go back to the bigger picture, framing this article in a broader research agenda. The origin of the period called Mercantile Capitalism, around the second half of the fifteenth century and centered in Italian cities,

should not be depicted without referring to the Statute of Venice of 1474—the first law concerning patents. Same time, same place. The origin of the actual Informational Capitalism (also called Knowledge Society, Knowledge Based Economy, Post Industrial Society, Cognitive Capitalism, etc.) starting in the second half of the twentieth century, and centered in the U.S. should not be analyzed forgetting the brutal expansion of intellectual property law (in terms of scope, magnitude, duration, jurisdiction, litigation, and so on). Same time, same place. And, certainly, when discussing the launch of Industrial Capitalism, in eighteenth century England, forgetting the changes in regulations around copyright and patents is a huge mistake. Again, same time, same place[xxi].

However, in this article we were only concerned with a small portion of patent law. Indeed, the second idea advanced in these pages was more specific. Based on previous research, this paper *tried to show that the complex and inefficient mechanisms of the English patent system seem to have played a simple and efficient role fostering—but not at all causing—the launch of the industrial revolution*. In this regard, and following the works of economists and historians, we argued that i) there was a huge uprising in patenting in the second half of the eighteenth century; ii) such a change in the patenting trends is one of the scarce indicators which allows us to measure the transformation that was taking place in England; iii) the English patent system contributed to the industrial revolution by a curious and unintended balance: it encouraged dreams of individual enrichment that were not going to be realized for the vast majority of the inventors. Doing so, it fostered both the innovative activity of individuals seeking rents and the social appropriation of the benefits of the innovations. Unfortunately, the literature that raised these economic conclusions did not inquire enough into the institutional and social underpinnings of the change in the willingness to patent.

Therefore, the third point of this article referred to some elements that contributed to this change in patenting trends, and was based in legal and sociological approaches. Obviously, a full explanation should take into account multiple factors. Nevertheless, here we were satisfied by mentioning only two of them. In the *background*, the dawn of a particular ideology: that of the rational, profit-seeking, property owner and rights holder individual, along with the complementary emergence of the public sphere. As is well known, rivers of ink and blood were successfully devoted to establishing this ideology through the social body. But in the *foreground* of the regulations of knowledge, there was an institutional change taking place. Contrasting with the field of copyright (where the transformations were carried out mainly by the passing of the Statute of Anne, 1709-10), there were no new laws in the realm of patents. The paving of the patent law (that linked the nascent ideology, the uprising in patenting, and the takeoff of industrialism) occurred through judicial means[xxii]. Thus we argued that the stabilization of the patent system was shaped around three axes: i) The change in jurisdiction from the Privy Council to Common Law. This helped to transform the patents from royal prerogatives into the

rights of individuals. ii) The emergence of the requisite of "novelty" as we know it nowadays. Departing from an old tradition, this threshold meant to legitimize the belief that there were individuals capable of absolutely original inventions. iii) The requirement of full disclosure in the specifications of the patents. This condition established clearly the idea of a contract between the individual inventor and the public sphere of knowledge.

Certainly, the contribution of this paper could be quite disappointing for some academic readers. It does not lie in offering a new understanding of the economics of the Industrial Revolution or in rescuing old patent cases from an obscure archive. It consists merely of an invitation. An invitation to ask two questions, addressed to any social scientist who studies any major shift in the history of capitalism: Are there (in that period, in that place) major changes in the grouping of institutions now called intellectual property rights? If the answer is yes, how are the changes in the stage of capitalism and those in the regulation of knowledge related?

References

Adams, Jn and Averley, G (1986) The Patent Specification: The Role of *Liardet v Johnson* (1986) 7 *Journal of Legal History* 156–177.

Ashton, T. S. (1969) *The Industrial Revolution.* London*:* Oxford *University* Press Chambers

Bauman, Zygmut (2000) *Liquid Modernity,* Cambridge: Polity.

Bell, Daniel [1973](1999) *The coming of postindustrial society: A venture in social forecasting*. Nueva York: Basic Books.

Boldrin, Michele y Levine, David (2008) *Against Intellectual Monopoly*, Nueva York: Cambridge University Press.

Boyle, James (1996) *Shamans, Software And Spleens; Law And The Construction Of*

The Information Society, Cambridge, Massachusetts: Harvard University Press.

Braudel, Fernand (1984) *Civilization and Capitalism, 15th - 18th Century.* New York: Harper and Row.

Bracha, Oren (2005) *Owning Ideas: A History of Anglo-American Intellectual Property*. Cambridge Mass: Harvard Law School S.J.D. Dissertation.

Boutang, Yann Moullier (2007) *Le capitalisme cognitif : la nouvelle grande transformation*, París: Éd. Amsterdam.

Carpmael, William (1843) *Law Reports of Patent Cases Vol. 1*, London: Macintosh.

Castells, Manuel (2000). *The Rise of the Network Society, The Information Age: Economy, Society and Culture Vol. I.* Cambridge, MA: Blackwell.

Chander, Anupam y SUNDER, Madhavi (2004)¨The Romance of the Public Domain". California Law Review, Vol. 92.

Coriat, Benjamin & WEINSTEIN, Olivier, (2009) "Intellectual Property Right Regimes, Firms and The Commodification Of Knowledge". CLPE Research Paper No. 17/2009.

Crafts, Nicholas F.R. (1985)"Industrial Revolution in England and France: Some thoughts on the Question "Why Was England First", in Mokyr, J. *The Economics of the Industrial Revolution* , Nueva Jersey: Rowman and Allanheld.

_____(2002) "Productivity growth in the Industrial Revolution: a new growth accounting perspective," *Proceedings*, Federal Reserve Bank of San Francisco, November 2002.

_____(2003) Steam as a General Purpose Technology: A Growth Accounting Perspective, Department of Economic History, London School of Economics Working Paper No. 75/03,

David, Paul (1993a) ¨Intellectual property institutions and the panda's thumb: patents, copyrights, and trade secrets in economic theory and history, in Wallerstein, Mogee, y Schoen (eds.), *Global Dimensions of Intellectual Property Protection in Science and Technology*, Washington, D.C: National Academy Press.

Davies, D. Seaborne (1934) *Early History of the Patent Specification*, (pts. 1-2), 50 L.Q.R. 88-109, 260-274

Dickinson, H. W. and Vowles, H. P (1943) *James Watt and the industrial Revolution*. London: Longmans Green & Company.

Drahos, Peter y Braithwaite, John (2002) *Information Feudalism: Who owns the knowledge economy?* New York: The New Press,.

Dutton, Harry I. (1984), The Patent System and Inventive Activity during the Industrial Revolution, 1750-1852 Manchester: Manchester University Press.

Foucault, Michel [1969](2000)*What is an Author? in* AUBION, J. D. (ed.) *Aesthetics,Method and Epistemology. Essential Works of Foucault 1954-1984*, Vol. 2, London: Penguin Books

Fox, Harold G (1947*) Monopolies and patents: a study of the History and future of the patent monopoly*. Toronto: University of Toronto Press.

Hewish John (1987) ¨From Cromford to Chancery Lane: New Light on the Arkwright Patent Trials¨ *Technology and Culture*, Vol. 28, No. 1 (Jan., 1987). 80-86

Hobsbawm, Eric J. (1971) Hobsbawn, E. J. (1968) *Industry and Empire*. New York: Random House.

Horkheimer, Max (1976) *Critique of Instrumental Reason*, London: Harper

Hughes, Justin (1988) "The Philosophy of Intellectual Property", en *Georgetown Law Journal,* 287.

Hulme, Wyndham (1896) The History of the Patent System under the Prerogative and at Common Law, *The Law Quarterly Review,* Vol 46, April 1896, 141-154.

_____(1917) *Privy Council Law and Practice of Letters Patent for Invention from the Restoration to 1794,* 33 L.Q.R 63, 18.1

Khan, Zorina (2004) ¨Does copyright piracy pay? The effects of US International copyright laws on the market for books, 1790-1920¨, NBER (Nacional Bureau of Economic Research)Working Paper 10271.

_____(2005) *The democratization of invention: patents and copyrights in American economic development, 1790-1920.* Massachussets: Cambridge University Press.

_____(2008) "An Economic History of Patent Institutions". *H.Net* 651 *Encyclopedia*, edited by Robert Whaples. March 16, 2008. Available at: http://eh.net/encyclopedia/article/khan.patents

Klitzke,Ramon A. (1959) "Historical Background of the English Patent Law", 41. *J. Pat. Off. Soc.* 615

Lemley, Mark (1997) ¨Romantic Authorship and the Rhetoric of Property¨ Book Review of *Shamans, Software and Spleens: Law and the Construction of the Information Society*, by James Boyle, 75 *Texas Law Review*, 873-906.

MacLeod, Christine (2002) *Inventing the Industrial Revolution: The English Patent System, 1660-1800* Massachussets: Cambridge University Press.

_____(2007) *Heroes of invention: technology, liberalism and British identity, 1750-1914*, Massachussets: Cambridge University Press.

MacLeod, Christine y Nuvolari, Alessandro (2006) "Inventive Activities, Patents andEarly Industrialization. A Synthesis of Research Issues", DRUID w.p. No 06-28. Available at: www.druid.dk

Mantoux, Paul (1929) *The Industrial Revolution in the Eighteenth Century: An Outline of the Beginnings of the Modern Factory System in England.* Vernon. London: Jonathan Cape.

Mitchell Brian R. (1988) *British historical statistics.* New York: Cambridge University Pres.

Mokyr, Joel (2008) ¨Intellectual Property Rights, the Industrial Revolution, and the Beginnings of Modern Economic growth¨ Prepared for the *Research Symposium on Property Rights Economics and Innovation* Searle Center on Law, Regulation, and Economic growth Northwestern University School of Law Nov. 13, 2008 Available at: www.law.northwestern.edu/searlecenter/papers/Mokyr_industrial.pdf

_____(ed.) (1985) *The Economics of the Industrial Revolution*. New Jersey: Rowman and Allanheld.

_____ (2005) The Intellectual Origins of Modern Economic Growth *The Journal of Economic History*, Vol. 65, No. 2

_____(2002) *The Gifts of Athena: Historical Origins of the Knowledge Economy.* Princeton, NJ: Princeton University Press.

_____(2001)*Twenty-Five Centuries of Technological Change: An Historical Survey,* London: Routledge.

_____ (1990) *The Lever of Riches*, London: Oxford University Press.

Mossoff, Adam (2001) ¨Rethinking the Development of Patents: An Intellectual History, 1550-1800¨ *Hastings Law Journal*, Vol. 52, p. 1255; MSU Legal Studies Research Paper.

Payne, P.L. (1974) *British Entrepreneurship in the Nineteenth Century*. New York: Macmillan.

Pike, E. R. (1966) *Hard Times: Human Documents of the Industrial Revolution*. New York: Praeger.

Perez, Carlota (2010); "Technological revolutions and techno-economic paradigms" en *Cambridge Journal of Economics.* Year 34 Nº 1

Polanyi, Karl (2001)[1944]. *The great transformation: The political and economic origins of our time.* Boston: Beacon Press

Robinson, Eric (1972) James Watt and the Law of Patents, *Technology and Culture*
Vol. 13, No. 2 (Apr., 1972), 115-139.

Rose, Gerald (1978) "Introductory Survey" in *Intellectual Property Law Review*, Clark Boardman, v.10.

Rose, Mark (2003) "Nine-tenths of theLaw: The English Copyright Debates and the Rhetoric of the Public Domain", 66 *Law & Contemp. Probs*. 75, 78 (Winter/Spring 2003)

Thambisetty, Sivaramjani, "The Evolution of Sufficiency in Common Law" (February 5, 2013). LSE Legal Studies Working Paper No. 6/2013. Available at SSRN: http://ssrn.com/abstract=2212064 or http://dx.doi.org/10.2139/ssrn.2212064

Thompson, E. P. (1964) *The Making of the English Working Class*. New York: Pantheon.

Toynbee, A. (1957) *The Industrial Revolution*. Boston: Beacon Press.

Vercellone, Carlo (2011) *Capitalismo Cognitivo*, Buenos Aires: Prometeo.

Walterschied, Edward C., (1998) *To Promote the Progress of the Useful Arts: American Patent Law and Administration, 1798-1836*. Littleton, Colo.: Fred B. Rothman & Co.

Weber, Max [1905] (1930) *The Protestant Ethic and the Spirit of Capitalism.* London & Boston: Unwin Hyman.

Williams, Raymond (1977). *Marxism and literature* Oxford: Oxford University Press.

Woodmansee, Martha (1984) "The Genius and the Copyright," *Eighteenth-Century Studies* 17,4 (Summer, 1984) 440.

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[i] Of course, this idea of three stages in capitalism is highly controversial. However, our point remains the same for those advocates of neo-Schumpeterian or evolutionist approaches: when discussing the shift from one techno-economic paradigm (Pérez, 2010) to another, intellectual property institutions and, more broadly, the regulations of access to knowledge are not fully taken into account, at least in the main literature. Something similar *could* be said regarding the Regulation School. Fortunately, in the last years, Coriat is adding intellectual property to his theoretical framework (Coriat y Weinstein, 2009).

[ii] Worsening the omission, we must remember that in the pages of The Economist - a magazine closely followed by Marx - the patents debate was a hot topic in 1850's. The contemporary reader could be surprised by the publication's editorial line on the issue: campaigning for the abolition of the patent system. And doing so with a Marxist flavored reasoning!

> Before they (the inventors) could establish the right of ownership over their inventions, *they must abandon all the knowledge and assistance they have obtained from the knowledge and inventions of others. This is impossible and that impossibility shows that their minds and inventions are in fact large parts of the overall mentality of society ...* (The Economist, 28/12/1850: 1434 quoted in Penrose, 1974 [1951]: 25 emphasis added).

[iii] To be sure, the role of the patent system in the early phases of British industrialization started to become a subject of historical investigation in the mid 1980s (MacLeod y Nuvolari, 2006:5). Here we are trying to frame both the literature coming from economics and that of the law field in our theoretical approach to the history of capitalism. It should be underlined that our contribution here lies in merging secondary sources from different fields and framing them in the aforementioned theoretical approach, but not in bringing primary data.

[iv] To be sure, Robinson, 1972; Dutton, 1984 and Mac Leod, 2002 focused increasingly in that link.

[v] The textile industry led the patenting during the period, followed closely by metals and transportation.

> The number of patents filed in Britain, as has long been noted, seems at first glance to reflect the history of the Industrial Revolution. As Table 1 shows, not only that the number of patents seems to take off exactly when

> the process of economic change was accelerating, but its distribution across industries vaguely reflects the growth of the so-called "modern" sectors. (Mokyr, 2008: 7)

[vi] To be sure, there are exceptions: Foreign Trade among those listed in the c table, but also Cotton Consumption, Agricultural Output and Industrial Output are some economic variables that distinguish England from France. However, these variables are more likely to be consequences of the industrial take off than its causes.

[vii] In terms of the author:

> Thus, it becomes crucial to ask to what extent the emerging common law framework and the Statute of Monopolies were a break with the traditional scheme and practice of the patent grant. The answer is that, while those were important landmarks, neither common law nor the statute created any significant break with the main characteristics of the early patent practice. Rather than a dividing line between the traditional administrative practices and a beginning of a modern patent system, those legal developments were mainly formalizations and incorporations of the basic existing framework of patent grants (Bracha, 2005: 24-25).

[viii] Certainly, it must be kept in mind that in a common law system, a ruling made by a judge can be as significant as the enactment of a new law.

[ix] For instance:

> In the second half of the eighteenth century, nation-wide lobbies of manufacturers and patentees expressed dissatisfaction with the operation of the British patent system.(Khan, 2008:2)

In the same respect:

> Despite the fundamental role that the Statute of Monopolies plays in patent law, it would be more than a century after its passage in 1623 that a coherent legal doctrine concerning patents would develop. (Mossof, 2001: 1272)

[x] To be sure, the Privy Council patent proceedings did not disappear overnight (Bracha, 2005:60). For instance, Davies (1934) found that the last record of actual revocation by the council is dated in 1779. Nevertheless, Hulmes´s thesis about Baker v. James as a benchmark in the gradual change in jurisdiction remains correct.

[xi] In addition to the importer, the idea of "true and first inventor" of the Statute also applied to whom recovered a knowledge that had been used in the jurisdiction, but was not currently being exploited. The key was that the invention had no actual use, and therefore, that the royal prerogative did not impede on a branch of the trade that was flourishing on its own merits (Mossoff, 2001:1303).

[xii] According to a dictionary of Etymology:

> Invention: c.1350, from L. inventionem (nom. inventio) "a finding, discovery," from inventus, pp. of invenire "devise, discover, find," from in- "in, on" + venire "to come" (see venue). Meaning of "thing invented" is first recorded 1513. Invent is from c.1475. Etymological sense preserved in Invention of the Cross, Church festival (May 3) celebrating the reputed finding of the Cross of the Crucifixion by Helena, mother of Constantine, in 326 C.E. (Online etymology Dictionary, http://www.etymonline.com/, 10-5-2009.)

[xiii] The Vox dictionary says so: ¨Inventio, -onis: f: "Action of finding or discovering."

[xiv] Following the Lockean theory of Property applied to patents. See Hughes, 1988.

[xv] As Mac Leod puts it:

> …specification - the enrolment of a separate, more detailed description of the invention within a certain time of the patent's issue-was at first exceptional (MacLeod, 2002:48-49)

Or Adam Mossoff:

> The specification was unheard of as a requirement for a patent grant prior to the late seventeenth century, i.e., Garill's patent petition. This is hardly surprising; patent monopolies were granted to promote industrial development and a self-sufficient economy, not to protect an inventor's product up which he labored for years. A specification, in essence a disclosure by the inventor of the process or machine that he has alone created, would have been, and was in fact, moot in the early years of patent grants of monopolies (Mossof, 2001:1288)

[xvi] Besides the patent of Sturtevant (from 1611), which had annexed a treatise on the treatment of metals using coal, the patent Queen Anne granted to John Nasmith in 1711 is illustrative:

> Whereas John Nasmith of Hamelton in North Britain, apothecary, has by his petition represented to us that he has at great expense found out a new Invention for preparing and fermenting wash from sugar "Molosses" and all sorts of grain to be distilled which will greatly increase our revenues when put in practice which he alleges he is ready to do "but that he thinks it not safe to mention in what the New Invention consists until he shall have obtained our Letters Patents for the same. But *has proposed* to ascertain the same in writing under his hand and seal to be enrolled in our High Court of Chancery within a reasonable time after the passing of these our Letters Patents. (Patent Grant to John Nasmith, cited in Hulme, 1896, emphasis added)

The emphasized part is clear enough. Far from the specification requirement as we know it today, the applicant Nasmith offered it voluntarily. Additionally, the quote reinforces a point already made above: the patents were conceived, long after the passing of the Statute of Monopolies, as concessions and not as rights of the individuals.

[xvii] To be sure, works as such of Adams & Averley (1986), and Walterscheid (1998) rejected the relevance given by Hulme and others to the instructions of Judge Mansfield. Moreover, Bracha (2005:69) refers to "earlier cases in which Mansfield made references to the new theory of the patent considerations". Nevertheless, they all agree on the fact that the change towards the notion of full disclosure took shape in the XVIIIth century.

[xviii] Two comments in this regard. First, Hulme:

> In 1778, Lord Mansfield, in Liardet v. Johnson - a trial which may be regarded as a landmark in the history of English patent law - invested the patent specification with a character and function totally distinct from that with which it had been originally introduced. For the facts of this case we have mainly to rely upon the memory of Bramah, who was present at the trial, and who subsequently incorporated his account in a letter published some years later. From this source we gather that the doctrine of the instruction of the public by means of the personal efforts and supervision of the grantee was definitely and finally laid aside in favor of the novel theory that this function belongs to the patent specification - an instrument introduced by the irony of fate to make the grant more certain! At the same time the novelty of the invention was subjected to a new and more searching test. (Hulme, 1896: 147)

Similarly, in the words of Mac Leod:

> Increasing emphasis by the judiciary on accurate and full specification culminated in Lord Mansfield´s decision in Liardet v. Johnson (1778). This stipulated that the specification should be sufficiently full and detailed to enable anyone, skilled in the art or trade to which the invention pertained, to understand and apply it without further experiment. For the first time, the recognized quid pro quo for the award of a patent was the disclosure of the invention (MacLeod, 2002: 49).

[xix] This is the actual cause of the overturning of Arkwright´s patent mentioned in section II.

[xx] For a discussion of this point, see for instance Thambisetti, 2013

[xxi] Furthermore, our point remains the same for those fields that reject the three stages division of capitalism. Those advocates of neo-Schumpeterian or evolutionary approaches, when discussing the shift from one techno-economic paradigm (Pérez, 2010) to another, could significantly improve their arguments by discussing intellectual property institutions and, more broadly, the regulations of access to knowledge. Something similar could be said regarding the Regulation School. However, it must be taken into account the fact that Benjamin Coriat has recently shed some light on how intellectual property is related to different modes of regulation (Coriat y Weinstein, 2009).

[xxii] The image of changes through legislation in the field of copyright together with similar changes in the patent system, but only through the courts, is not unique to eighteenth century England. It occurred again in the U.S. in the late twentieth century. In 1976 and 1998 new copyright legislation was passed and the patent system was adapted to the informational capitalism by the creation of a new circuit of appeals in 1982. It is tempting to recall what Hegel once said.