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## [62] Examining inventions, shaping property: The savants and the French patent system

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### **Abstract**

In 1791, the Loi relative aux découvertes utiles instituted a new patent system in France. Because patents were seen as the expression of the natural right of inventors, prior examination was abolished. However, only a few years after the law was passed, an unofficial examination was reinstated, and it was entrusted to the Comité Consultatif des Arts et Manufactures – a consultative body composed of prominent scientists. I analyze the political significance of the involvement of the savants in the patent system, and based on the archives of the Comité, I study the scope and practicalities of the examination process, paying close attention to the ways through which the savants of the Comité directly intervened in the writing and drawing of specifications. I show how a distinct regime of intellectual property emerged in France and how it was constructed by the interests and norms of scientists, eager as they were to distinguish ‘science’ from ‘industry’ and establish the superiority of the former over the latter.

### **Keywords**

Examination of inventions, France, intellectual property, patents, science and industry, specifications

### **Introduction: From Privileges to Patents**

In Thermidor Year 5 of the French Republic (August 1797), the inventor Martinet believed that his research on the construction of large carriages was complete and decided that it was time for him to get a patent for his invention.<sup>1</sup> As if the Ancien Régime had [63] not ended, he addressed a letter to the Academy of Sciences, which had been in charge of almost all technological matters in France for more than a century.<sup>2</sup> Yet, this time, the Academy declared itself powerless, and the savants declined to examine Martinet’s invention. Since the

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<sup>1</sup> *Procès-verbaux des séances de l’Académie, tenues depuis la fondation de l’Institut jusqu’au mois d’août 1835*, vol. 1, 1795-1799 (Hendaye: Imprimerie de l’Observatoire d’Abbadia, 1910), p.242.

<sup>2</sup> Roger Hahn, *The Anatomy of a Scientific Institution: The Paris Academy of Sciences, 1666-1803* (Berkeley: University of California Press, 1971), p.23.

beginning of the Revolution, the situation had changed drastically and quickly: firstly, the Academy was dissolved in 1793, and was considerably weaker when it reemerged in a new version in 1795;<sup>3</sup> secondly, in 1791, the first French patent legislation, the “Loi relative aux découvertes utiles et aux moyens d’en assurer la propriété à ceux qui seront reconnus en être les auteurs” (“An Act concerning useful discoveries and the means of securing their property to those who shall be recognized as their authors”) was passed. This law replaced the privileges of invention of the Ancien Régime with patents or ‘brevets d’invention,’ which gave inventors a five-, ten- or fifteen-year exclusive right on a new machine or chemical process. The law also explicitly ejected the Academy’s savants from the administrative procedure through which new patents could be delivered. Although the transition from privilege to patent shows more continuity than what the parallel, Revolutionary shift from absolute monarchy to representative ‘democracy’ tends to suggest,<sup>4</sup> among the diverse provisions of the law, one measure proved to be crucial: the abolition of prior examination.

Before 1791, privileges of invention were delivered after a thorough examination of the so-called invention by the Bureau du Commerce, which advised the Royal Council in economic and commercial matters. Members of the Bureau, allied with members of the Paris Academy of Sciences, and sometimes with artisans recruited from related corporations, subjected the invention to a material and actual examination in order to determine its true utility, independently from the (often exaggerated) claims of the inventor. In their evaluations, the examiners witnessed the operations of a machine or tested the alleged properties of a chemical process. Utility figured prominently in the evaluations of the Bureau; only those

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<sup>3</sup> On the Paris Academy of Sciences after the Revolution, see Maurice Crosland, *Science under Control. The French Academy of Sciences, 1795-1914* (Cambridge: Cambridge University Press, 1992).

<sup>4</sup> Mario Biagioli has argued that “The transition from patents as privileges to patents as intellectual property rights parallels the demise of political absolutism, the development of liberal economies, and the emergence of the modern political subject.” See Mario Biagioli, “Patent Republic: Representing Inventions, Constructing Rights and Authors,” *Social Research* 73, no. 4 (2006): 1129.

inventions which were deemed sufficiently useful were worthy of receiving a privilege from the king.<sup>5</sup>

Although the Academy as a body, a “corps”, was not officially in charge of the examination process – this was the mandated mission of the Bureau du Commerce –, it played a considerable role in the granting of privileges. On top of acting as a pool of technoscientific experts into which the Bureau could tap, the Academy was central to the confirmation of the privileges, which, once they had been granted by the king, had to be registered by a sovereign court, such as the Parlement de Paris. The Parlement checked [64] that the privilege did not hamper previously established rights of other individuals and of the corporations, and asked the Academy, as a “corps”, to assist by assessing not just the utility, as the Bureau did, but also the novelty of the invention.<sup>6</sup> Because the Academy provided many of the experts that participated in the examinations of the Bureau du Commerce, and because the Academy also had its say in the registration of the privilege by the Parlement, inventors often started their long journeys for their privilege by petitioning the Academy for its approbation, in the hope that this early endorsement would ease their way into the later stages of the procedure.

After 1791, patents were delivered upon request, with minimal bureaucratic requirements. After declaring to be the inventor of a new machine or process and paying a (substantial) fee,<sup>7</sup> petitioners only had to file a description, or specification, of their invention; if they wanted, they could add drawings, models or samples to their textual “mémoire

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<sup>5</sup> For more details on the procedure, see Liliane Hilaire-Pérez, “Invention and the State in 18<sup>th</sup>-century France,” *Technology & Culture* 32, no. 4 (1991): 911-931.

<sup>6</sup> For example, in 1752, the master builder Louis Petit and his associate Nicolas Prévost had received an exclusive privilege from the king for a machine that sawed stone and marble. Before registering their privilege, the Parliament of Paris asked the Academy to examine the machine. The Academy found that Petit and Prévost’s machine was exactly the same as another machine in the Academy’s depository of machines and that it was, in addition, published in the multivolume *Machines et inventions approuvées par l’Académie des Sciences*. For the savants of the Academy, this precluded the Parliament from registering the privilege. See Archives de l’Académie des Sciences, pochettes de séance 23 June 1752 and 28 June 1752.

<sup>7</sup> According to the 1791 law, the tax amounted to 300 livres for a five-year exclusivity, 800 livres for ten years, and 1500 livres for fifteen years. Overall, given that English and American patents had a fixed duration of fourteen years, the French tax was comparable to the English one, but both were substantially more significant than the American one.

descriptif et explicatif”. The repeal of the examination procedure may appear as a minor and mundane point inside the new legal framework, yet it was predicated on crucial political and epistemological considerations – or, rather, in a new, inseparable blend of politics and epistemology. Because patents resulted not from the will of the sovereign but from the inventor’s natural rights of property, they could not be subject to the caprices of a bureaucratic tribunal, be it made of the leading scientists of the country. And because no invention could be assessed before it was put in use, the right to judge and determine the worth of an invention belonged only to the public, that is, to consumers, whose decisions were always more enlightened than those of a body of experts. In other words, the fate of a patent lay in the sole hands of the public, which would decide questions of utility *ex post* and *in actu*, and would hand over questions of novelty to the judicial system.

This is how the deputy Stanislas de Boufflers, who in 1791 was in charge of presenting the new law to the National Constituent Assembly, framed the logics underpinning the new patent system.<sup>8</sup> In this deliberately political construct, the role of the state was minimized: patents were seen as emanating from a social contract between inventor and society – a contract in which no intermediary should be allowed to step in. The introduction of a tax requirement would ensure that the patent system was self-regulating: because [65] inventors followed their self-interest, and because they knew an enlightened public would promptly adjudicate against inept or already known inventions (simply by not buying them), they had no incentive to take ‘bad’ patents. Attempts to fool the public would only lead the inventor to lose the tax. All these measures made prior examination both useless and antidemocratic. To the deputies who argued in favor of preserving prior examination, such as the academician Dionis du Séjour, Boufflers asked rhetorically: “why always contradiction

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<sup>8</sup> Jérôme Mavidal and Émile Laurent (eds.), *Archives parlementaires, première série, vol. XXI*, (Paris: Librairie administrative de Paul Dupont, 1885), pp.721-32. For a cultural and ideological analysis of the political construct behind the 1791 patent law, see Jérôme Baudry, “A Politics of Intellectual Property. The French Revolution and the Creation of a Patent System,” forthcoming in *Technology & Culture*.

and detractors? [...] The spirit of the law is to abandon the inventor to his own judgment. [...] You want a detractor, I offer you two; one of them is more enlightened than you think, and the other is infallible: interest and experience.”<sup>9</sup>

In this essay, I compare what I call the ‘liberalism’ of the French patent system – a political construct based on natural rights, contractualism and the self-regulatory mechanism of self-interest and experience – with the actual operation of the system in the first fifty years of its existence. I pay close attention to the role of the members of official science, the so-called ‘savants’,<sup>10</sup> analyzing both the political significance of their discreet, yet influential, involvement in the patent system, and the legal effects of their contribution to the development of intellectual property in France. In doing so, I draw on, connect, and contribute to two important and growing bodies of literature on patents and intellectual property. The first body of literature builds on the now-classic historiography on the politics of patents in order to show how different kinds of patent systems simultaneously enact and construct different ways of articulating democracy.<sup>11</sup> The second body [66] of literature focuses on the

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<sup>9</sup> “Réponse de M. de Boufflers aux objections élevées contre la loi du 7 janvier 1791,” in Théodore Regnault, *De la législation et de la jurisprudence concernant les brevets d’invention, de perfectionnement et d’importation* (Paris: Lachevardière fils, 1825), pp.56-74.

<sup>10</sup> On the savants and state-sanctioned scientists in France, see Robert Fox, *The Savant and the State. Science and Cultural Politics in Nineteenth-Century France* (Baltimore: The Johns Hopkins University Press, 2012).

<sup>11</sup> In their classic work on the British patent system and on French privileges of invention before the Revolution, Christine MacLeod and especially Liliane Hilaire-Pérez have shown that patents were intensely political in the 18<sup>th</sup> century—political both as an instrument of the industrial policies of the state and as a tool connecting private and public interests through a web of actors and institutions, such as inventors, learned societies, state experts, and bureaucracies. See Christine MacLeod, *Inventing the Industrial Revolution. The English Patent System, 1660-1800* (Cambridge: Cambridge University Press, 1988) and Liliane Hilaire-Pérez, *L’invention technique au siècle des Lumières* (Paris: Albin Michel, 2000), pp.51-142. More recently, Kara W. Swanson has shown how, in the United States, shifting policies on patent examination reflected different opinions on how the balance between private and public interest—the so-called “patent bargain”—should be struck, and on the role the administrative state should play in securing and maintaining that balance. See Kara W. Swanson, “The Administration of Genius: Expertise and the Patent Bargain,” paper presented at Law & Humanities Junior Scholar Workshop, Georgetown University School of Law, 2013. Several scholars working on 20<sup>th</sup>- and 21<sup>st</sup>-century developments in intellectual property have also carefully emphasized the politics of patents. For example, Shobitha Parthasarathy has shown how, in the face of attempts at patenting life forms, the European and US patent systems have embodied drastically diverging understandings of what the public interest should be. See Shobitha Parthasarathy, *Patent Politics. Life Forms, Markets, and the Public Interest in the United States and Europe* (Chicago: University of Chicago Press, 2017). On pharmaceutical patents and “public interest,” see Maurice Cassier and Christiane Sinding, “Patenting in the public interest: administration of insulin patents at the University of Toronto,” *History and Technology* 24, no. 2 (2008): 153-171. On the internationalization of patents and the shifting balance between patent holders and the public, see Eda Kranakis, “Patents and Power: European Patent-System Integration in the Context of Globalization,” *Technology & Culture* 48, no. 4 (2007): 689-728.

material and representational practices of patent systems—the writing and drawing of specifications, the examination of applications, the rhetoric and figures of invention at court—to show how these practices, and the intermediaries that handle them, shape the legal categories of intellectual property.<sup>12</sup>

My goal here is not to point out the inevitable discrepancy between theory and practice and blame it on the false consciousness of the actors, but instead to analyze the inseparably material and ideological work that allowed to circumvent the discrepancy. Indeed, when an unofficial examination procedure was reinstated, just a few years after the passing of the “Loi relative aux découvertes utiles”, it was not necessarily seen to contradict the liberal conception espoused by the National Assembly in 1791. Because the examination was assigned to the Consultative Committee of Arts and Manufactures (Comité consultatif des arts et manufactures), a consultative body composed of prominent scientists, it was conducted under the banner of science, with its assumed disinterestedness and benevolent paternalism. In helping inventors understand where their true self-interest lay, instructing the public on the fundamentals of technology and actively building the ‘public domain’, the savants argued that their technocratic liberalism did not impinge on the fundamental politics of the patent system.

However, a close study of the archives of the Comité consultatif shows that the involvement of the savants had a tremendous influence on the patent system and especially on the law. Far from being fully circumscribed by the original legislation of 1791 or by the rather slow accumulation of doctrine and jurisprudence, patent law was actively shaped by the examination procedures of the Committee. Eager to distinguish ‘science’ from ‘industry’ and

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<sup>12</sup> Alain Pottage and Brad Sherman have told the history of American patent law in terms of what they call “figures of invention,” showing how the legal idea of invention and of intangible objects “are generated and sustained by real-world acts of representation, interpretation, and argumentation.” See Alain Pottage and Brad Sherman, *Figures of Invention. A History of Modern Patent Law* (Oxford: Oxford University Press, 2010). Interesting case studies, all on the US patent system, include William J. Rankin, “The ‘Person Skilled in the Art’ Is Really Quite Conventional: U.S. Patent Drawings and the Persona of the Inventor, 1870-2005,” in *Making and Unmaking Intellectual Property: Creative Production in Legal and Cultural Perspective*, ed. Mario Biagioli, Peter Jaszi, and Martha Woodmansee (Chicago, 2011), pp.55-77 and Kara W. Swanson, “Authoring an Invention: Nineteenth-Century American Law and Patent Authorship,” in *Making and Unmaking Intellectual Property*, pp.41-54.

to establish the superiority of the former over the latter, the savants – through their specific protocols and techniques of examination – helped to shape a distinct regime of intellectual property in France. Paradoxically, in a patent system shaped by the practices of scientists and by the norms of science, the ‘intellectual’ dimension of intellectual property was stymied; the savants turned down broad property affirmations over principles or ideas and favored limited claims restricted to individual machines and objects. [67]

### **Examining inventions: the Comité Consultatif des Arts et Manufactures**

Writing in 1844 on the eve of a significant patent reform, the lawyer and jurist Théodore Regnault returned, once again, to the revolutionary origins of the French patent system. According to him, the National Constituent Assembly of 1791 had opted for a patent system only after all other alternatives had been duly considered. Regnault listed three such alternatives: the purchase of inventions by the state, state-granted rewards, and license fees paid to the inventor by those using his or her invention. All three options came up against the same difficulty, that of evaluating the invention: it was nearly impossible to judge objectively an invention’s novelty and utility, and it was even more problematic to fix a monetary value to the invention.<sup>13</sup> The matter was first of all ontological: an invention differed from a standard object because it did not exist in the present. As Boufflers argued in his speech to the National Assembly, an invention was virtual, and could be assessed only once it was put to use. The matter was thus also one of political economy: the price of an invention could only be fixed by the market, and no “expert,” Boufflers said, could strike a fair balance between the inventor’s inflated self-esteem and the state’s power to impose.<sup>14</sup>

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<sup>13</sup> Théodore Regnault, *Examen du projet de loi sur les brevets d’invention* (Paris: Regnault, 1843), pp.34-6.

<sup>14</sup> In the end, the matter was epistemological, too, because the practices and routines of the traditional experts—the savants—did not put them in a position to understand inventors. “Study finds it hard to believe in inspiration; and the men used to setting out the paths leading to the entirety of knowledge do not imagine easily that one can arrive there as the crow flies,” Boufflers argued, *Archives parlementaires, première série, vol. XXI*, p.724.

In addition to the disclosure requirement and the obligation for the inventor to file a description of his or her invention, the abolition of prior examination was thus central to the new patent regime born in 1791 in the context of the democratic coming of age of the public. The young American Republic seemingly confirmed this conclusion when, in 1793, it revoked the examination procedure it had installed three years earlier, following, after France, the English model of a registration system.<sup>15</sup> Although the procedure was reinstated as soon as 1836 in the United States, in France it was not the case until 1968, and the question resurfaced regularly. As early as 1798, Jean-François Eude, a member of the Conseil des Cinq-Cents (the name of the National Assembly during the Directory), proposed to reinstate such an examination. Eude suggested that the absence of prior examination had led to the delivery of many “illegitimate patents,” which were “equally harmful to commerce in general and to the rights of inventors.”<sup>16</sup> Another deputy, Jacques-Charles Bailleul, replied that the idea of instituting a “special jury” contradicted the very “principle” of the new patent system: property. For Bailleul, the Constitution itself ruled that only the judiciary could adjudicate on matters of [68] property, whether material or immaterial, and such an intervention could only take place *ex post*, after the patent had been granted.<sup>17</sup> Eude’s suggestion was promptly put aside.

However, an informal and unofficial examination procedure had already been established in 1796, and it had been entrusted to the Comité consultatif des arts et manufactures (Consultative Committee of Arts and Manufactures), which was part of the

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<sup>15</sup> In England, the first specification was filed in 1711. It took more than 20 years for the specification to become standard practice, and by the end of the 1740s, it became compulsory. See Christine MacLeod, *Inventing the Industrial Revolution. The British Patent System, 1660-1800* (Cambridge: Cambridge University Press, 1988), pp.48-54, and Sean Bottomley, *The British Patent System During the Industrial Revolution, 1700-1852* (Cambridge: Cambridge University Press, 2014), pp.46-50.

<sup>16</sup> “Rapport fait par François Eude, au Conseil des cinq-cents, sur les brevets d’invention,” in Regnault, *De la législation*, pp.75-93.

<sup>17</sup> “Observations de Bailleul sur quelques articles du projet de résolution présenté par J.-F. Eude au conseil des cinq-cents, concernant les brevets d’inventions,” in Regnault, *De la législation*, pp.93-99.



Ministry of the Interior.<sup>18</sup> The Comité consultatif was a truly unique institution—first and foremost due to its members, who were none other than the leading savants, engineers and industrialists of the time. Among others, the scientists André-Marie Ampère, Louis Joseph Gay-Lussac, Louis Jacques Thénard, François Arago, the scientists and engineers Gustave Coriolis and Charles Dupin, the industrialist Jean-Louis Roard, and the successive directors of the Conservatoire des arts métiers Claude-Pierre Molard and Gérard-Joseph Christian took part in the meetings of the Committee. The Committee was in charge of three main missions: rewarding inventors who did not want a patent but preferred to be awarded a sum of money by the state;<sup>19</sup> examining import requests of new machines free of tax; and examining patent applications. Moreover, since the Committee already formed a reservoir of leading figures and techno-scientific experts, the Ministry of the Interior often consulted the Committee on various projects and bill proposals—from the creation of the Écoles d’arts et métiers to the revision of the patent law, or even the establishment of import duties on diverse products.

The Committee fulfilled its patent mission in the following way.<sup>20</sup> After the patent requests were transferred from the local préfetures to the Ministry of the Interior, they were immediately forwarded to the Committee, whose president handed out the specifications to members with the appropriate expertise. From a remaining 1821 worksheet, we know that,

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<sup>18</sup> The Committee had changing names during the Revolution and until the Empire: Bureau consultatif des arts et commerce, Bureau consultatif des arts et métiers, Comité consultatif des arts et métiers, and, lastly when the term ‘crafts’ (métiers) was thought outmoded, Comité consultatif des arts et manufactures. The Committee was the successor of the Bureau de consultation pour les arts et métiers, which operated between 1791 and 1796 and was in charge of rewarding inventors. On the Bureau de consultation, see Dominique de Place, “Le Bureau de Consultation pour les Arts, 1791-1796,” *History and Technology* 5, no. 2 (1988): 139-178. Between 1796 and 1804, it seems that the missions of the future *Comité consultatif* were taken up by the Conservatoire des arts et métiers. See Archives du Musée des arts et métiers, 10°361.

<sup>19</sup> Alongside the Loi sur les découvertes utiles, another law passed in 1791 introduced the possibility for inventors to be directly rewarded by the state, if they agreed to put their invention in the public domain. The two measures were thought as exclusive: if one received a patent, one could not ask for a state reward. Compared to the number of patents delivered (between 1791 and 1844, more than 11,000), few rewards were granted under this scheme.

<sup>20</sup> The Committee’s procedure regarding patents can be reconstructed from the opinion given on the patent delivered to Claude-François Jaillet in 1830. Jaillet had complained about a previous opinion drafted by Molard, one of the members of the Committee, whom he accused of trying to steal his invention. The Committee replied to the accusation by clarifying its examination policies. See Archives de l’Institut National de la Propriété Industrielle (INPI), patent no. 1BA3434.

unsurprisingly, the specifications were distributed according to the skills and particular knowledge of each member. For example, Dupin, an engineer, was mainly in charge of inventions pertaining to the mechanical arts (from printing presses to steam engines), while Gay-Lussac, the renowned chemist, dealt principally with chemical processes for dyeing or distillation. [69] Molard, the director of the Conservatoire des arts et métiers, was particularly in charge of textile inventions, while Thénard, another chemist, evaluated various chemical processes, from new glues to carbonization methods, including waterproofing processes.<sup>21</sup> Once drafted by one member, each opinion was read and approved collectively, which meant that its authority derived not from one individual but from the Committee itself as a collective body.

The role of the Committee in examining patent requests and specifications was threefold. First and foremost, it checked whether or not inventors had sufficiently complied with the disclosure requirement of the patent law—in other words, whether or not the textual and pictorial description provided enough of an idea of what the invention was. Since the law only mentioned that the description had to be “exact” and exhaustive, specifying “all the means that one proposes to employ,” the Committee had considerable leeway in determining the suitability of a description.<sup>22</sup> When specifications were judged too summary, the Committee would ask for supplementary information. For example, when Breguet asked for his first brevet d’invention in 1798 for a clock mechanism called ‘constant force escapement’, the Committee asked him to provide either a drawing or a model in addition to his description, because the invention appeared too complex to be understood through text. Only when Breguet complied was the patent issued.<sup>23</sup>

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<sup>21</sup> Archives nationales, F12 4972.

<sup>22</sup> “Loi portant règlement sur la propriété des auteurs d’inventions et découvertes en tout genre d’industrie (25 mai 1791),” in Regnault, *De la législation*, p.169.

<sup>23</sup> Archives INPI, patent no. 1BA146.

This first mission essentially justified the involvement of the Committee in the patent system: the 1791 patent law had ruled out any prior examination of the utility and of the novelty of inventions, but this provision did not mean that the examination of the quality of the disclosure was illegal. This is how the Committee usually answered applicants who were infuriated by negative opinions. The reaction of the Parisian tailor Christian Beck, who requested a patent in 1817 for an instrument he called a “longimeter,” was quite common: “Today I read that the law, although it said that a patent would be delivered on request and without prior examination, did not rule out the existence of an examination... What a curious logic! Should not the law be the same for everyone? Nobody has the right to interpret the law according to his own whims.”<sup>24</sup>

Second, even if this was not stated explicitly, the Committee played a role in taming ‘bad discourses’ in technology—that is, in discreetly shaping a normative language for the description of technological artifacts. The Committee did not limit its examination to the quantity of information disclosed by the inventors; its members also commented on the quality of this information: on how, by what means, styles, and types of inscriptions the specifications attempted to describe the invention. Regarding the textual description, the Committee’s standards of precision implied that inventors were compelled to surrender their custom and sometimes inaccurate lexicon in favor of the ‘universal’ language of science. In 1825, the inventor Auguste Chammas was thus asked to explain what he meant by “animal soap”: was he referring to “tallow soap” or to “lard soap”?<sup>25</sup> In 1812, the Committee complained that another inventor, Chardin, “did not always call things by their proper names” and that before issuing the patent, it was necessary to ask him what he meant by “*persicaria*; *alun gramens*; *gélamira*; etc.”<sup>26</sup> These terminological requirements were not inscribed in the

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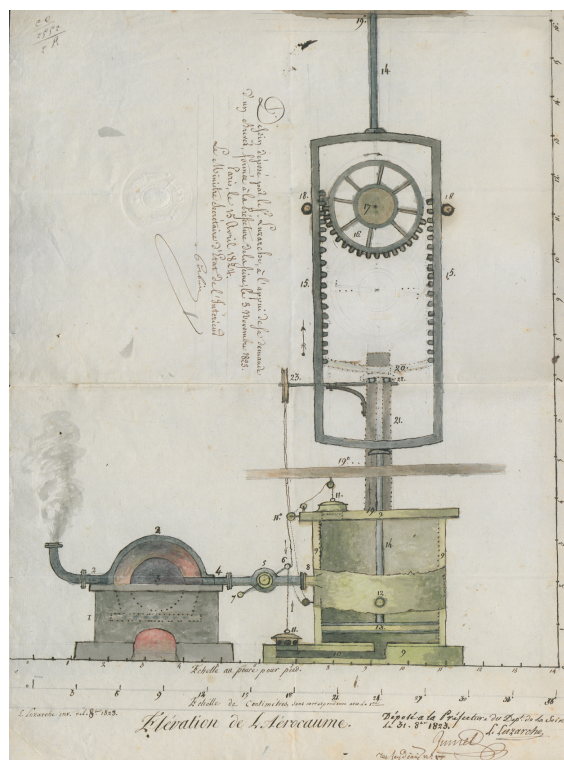
<sup>24</sup> Archives INPI, patent no. 1BA1565.

<sup>25</sup> Archives INPI, patent no. 1BA2216.

<sup>26</sup> Archives INPI, patent no. 1BA2155.

law but rather [70] grew from the examination practices themselves. While it would be easy to underestimate them as mere technicalities, they contribute to constituting what counted as ‘invention’.

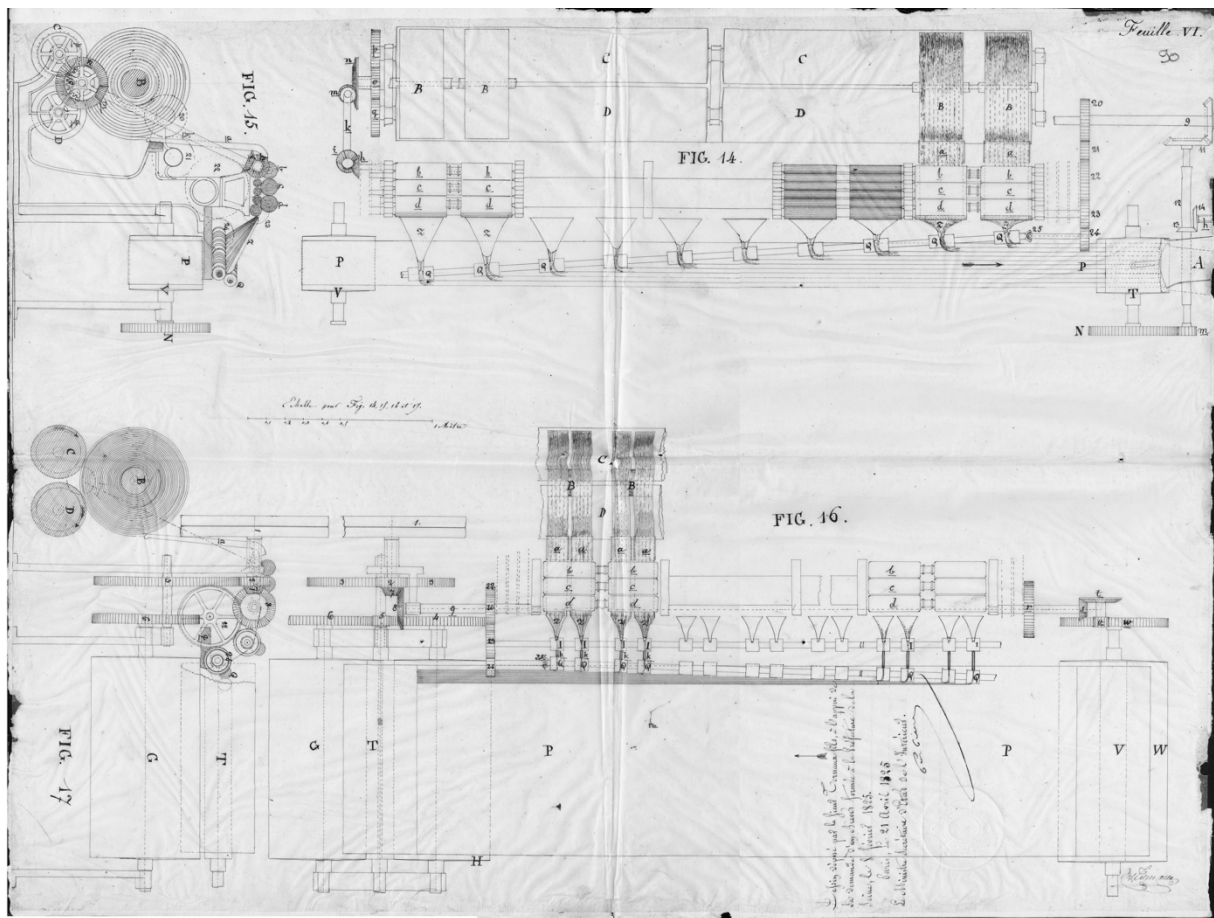
Normative language included that of the images as well. For drawings, four criteria were essential to the Committee: they had to include a scale; they had to be line drawings instead of wash drawings (and preferably drawn in ink rather than with a pencil); they had to offer multiple views of the device, namely plan, elevation and section views; lastly, the best way to connect image and text was to use indicative letters that were reproduced in a caption, or, even better, in a text explaining the mechanism of the invention.<sup>27</sup> Members of the Committee frequently expressed their judgment on the quality of the descriptions and of drawings that were submitted by the petitioners (see Figures 1 and 2). One drawing was “very



**Figure 1.** A “very badly executed drawing” according to the Consultative Committee of Arts and Manufactures: Luzarche and Jumel’s “atmospheric and caloric machine,” 1835<sup>28</sup> [71]

<sup>27</sup> An example of the use of indicative letters is John Nicholson’s 1838 description of his new spinning machine: “Supposing that the machine is set in movement by the belt E while the carriage C is below the cylinders, the first necessary movement is the exit of the carriage, which is obtained when the belt D which is activated by the pulley D’ to which it is fastened...” Archives INPI, patent no. 1BA6422.

<sup>28</sup> Archives INPI, patent no. 1BA1935.



**Figure 2.** A “well done drawing” according to the Consultative Committee of Arts and Manufactures: Ternaux’s “machine for the purpose of cleaning, peeling, carding and spinning wool and cotton”, 1825<sup>29</sup>

badly executed,” another was “unintelligible,” one description was “drafted in an unknown language,” and so on. The Committee always tried to obtain descriptions that individualized the invention—texts and drawings that effectively circumscribed the invention to one precise, actual object. In so doing, the savants strived to curb the extravagant property claims of some inventors.

The third and last role taken up by the Committee fell even shorter within its official remit. Despite the abolition of prior examination, the Committee did comment—quite frequently—on the novelty and utility of the inventions described in the specifications it reviewed. This practice occurred very early in the history of the new patent regime but

<sup>29</sup> Archives INPI, patent no. 1BA2137.

remained concealed to the petitioners for some years. When a Pierre Billion asked for a patent for his ‘hemp meshing machine’ in 1799, the Committee noticed that, even if the specification was adequate, it was obvious that one could find descriptions of the said machine in “many printed works.”<sup>30</sup> A model of the very same machine was even displayed at the Conservatoire des arts et métiers, the Committee noted. However, the Committee thought that these observations should be kept secret and “should not be [72] passed on to the petitioner,”<sup>31</sup> probably thinking that doing so would encroach on the sacrosanct principle of no prior examination—the very heart of the new system.

However, it was only a few years until these observations started to be regularly communicated to would-be patentees.<sup>32</sup> As early as 1801, Nicolas Dollfus and Alexandre Jaegerschmidt, two manufacturers from Mulhouse who had requested a patent for their “improvements in the manufacturing of oxygenated muriatic acid,” were advised by the Committee that there were several weaknesses to their patent claims:

- 1° Metal devices for the preparation of oxygenated acid muriatic have long been in use in various factories, especially in Rouen;
- 2° Whether one prepares oxygenated muriate of potash with caustic potash or with potash carbonate does not matter at all. [...] There is nothing here that is unknown and could deserve the artists’ interest and preference.<sup>33</sup>

Like many inventors, Dollfus and Jaegerschmidt were thankful to the Committee for these observations, but they nonetheless persisted in their patent request. Their answer shows that they had carefully reviewed the objections and believed they were not really significant. In particular, they noted that manufacturers in Rouen only used devices made of lead, whereas they advocated the use of cast iron, terracotta or copper. Furthermore, they were confident

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<sup>30</sup> Archives INPI, patent no. 1BA1420.

<sup>31</sup> Ibid.

<sup>32</sup> After a few years, it was common knowledge amongst would-be patentees that patent applications were examined by the Committee. Although the role of the Committee was not enshrined in law, many patent manuals mentioned its existence and procedures. See Antoine Perpigna, *Manuel des inventeurs et des brevetés* (Paris: Perpigna, 1834), pp.61-64. See also, in English, Antoine Perpigna, *The French Law and Practice of Patents for Inventions* (Paris: Dezauch, 1832), pp.51-3.

<sup>33</sup> Archives INPI, patent no. 1BA2072.

that “oxygenated muriate made from caustic potash was not only cheaper, but also brightened up colors more powerfully than potash carbonate.”<sup>34</sup>

Because we are only left with the patents that were actually granted, and not with those who were withdrawn by their authors, it is difficult to measure the true influence of the Committee on the decisions of inventors in search for a patent. However, a series of worksheets dated from 1828 to 1839 show that, on average, approximately one fifth of the patent requests were withdrawn by would-be patentees after being examined by the Committee,<sup>35</sup> showing that the examination played an essential role in filtering patents and governing the patent system. The savants who formed the Committee were generally quite critical; between 1796 and 1839,<sup>36</sup> 22% of issued patents had originally [73] received a negative opinion. Interestingly, as the table below shows, their main concern was with the supposed novelty of the inventions, rather than with the (in)completeness of the specifications.<sup>37</sup>

<b>Prior art</b>	<b>Incomplete specification</b>	<b>Badly written/drawn specification</b>	<b>Invention will not work</b>	<b>Non-patentable</b>	<b>Several inventions in the patent</b>
12,1%	8,6%	1,6%	0,9%	0,5%	0,5%

**Table 1.** The notifications of the Consultative Committee (% of issued patents, 1791-1839)

Inventors sometimes strongly resisted what they perceived to be the illegitimate interference of the savants in their private business. The existence of the Comité consultatif

<sup>34</sup> Ibid.

<sup>35</sup> These worksheets indicate the number of patent specifications that were examined the Committee for each year between 1828 and 1839. If we compare it to the number of patents actually issued during the same years, we get the proportion of the patents that were withdrawn by inventors after the examination by the Committee (although it is not impossible that these patents could have been withdrawn for other reasons). This ratio varied widely: from 8,3 percent in 1834 to 29,6 percent in 1836. Archives nationales, F12 4972.

<sup>36</sup> Between those years, I have been able to retrieve more than 96 percent of the Committee notifications for issued patents. After 1839, the archives of the Committee are fragmentary.

<sup>37</sup> The percentages add up to more than 22 percent, because some notifications could be negative for several reasons.

des arts et manufactures and its involvement in the patent system gave rise to several types of recriminations. Some inventors, such as the aforementioned Christian Beck, chose to fashion their opposition to the Committee in a legalistic manner: the 1791 law, they claimed, had ruled out any kind of prior examination and should be followed accordingly. Others chose to deny the expertise of the members of the Committee, openly questioning the technical knowledge of the savants. In 1826, when the Committee observed that a patent had already been issued for melted horn buttons, Christofle bluntly replied that “one does not need to be well-versed in the arts and crafts to know that there cannot be any resemblance between the means for making a button of unmelted horn and those for making a button of melted horn.”<sup>38</sup> Finally, another group of disgruntled inventors took their criticisms further and dismissed not only the alleged expertise of the savants who made up the Committee but also the very disinterestedness that these experts were supposedly embodying. According to the inventors, the Committee’s examination of inventions breached the trust necessary to the functioning of the patent system because the savants could reject a patent request on futile grounds and at the same time gain access to the secret that was enclosed in the specification. In 1820, Jean-Baptiste Souton accused the Committee of attempting to steal his invention and complained to the Ministry of the Interior of the interference of the savants, accusing them of “vindictive hatred” and “self-interest.”<sup>39</sup> Quite paradoxically, even after the demise of the Royal Academy and despite the liberalism which informed the supersession of privileges by patents, inventors and savants seemed to revert to their highly antagonistic relations of pre-revolutionary days.<sup>40</sup> Or maybe it was that the liberalism of the modern patent system was proving ultimately untenable.

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<sup>38</sup> Archives INPI, patent no. 1BA2370.

<sup>39</sup> Archives INPI, patent no. 1BA1448.

<sup>40</sup> On inventors and artisans’ refusal of the legitimacy of the Academy of Sciences, see Charles C. Gillispie, *Science and Polity in France: The Revolutionary and Napoleonic Years* (Princeton: Princeton University Press, 2004), pp.195-209



Rather than a mere return to the Ancien Régime social organization of invention, however, what happened was the construction of a new collective on the ashes of the ci-devant social order. The economic and political liberalism bequeathed by the Revolution took root not on an individualistic *tabula rasa*, but on new institutional forms that, if they [74] indeed rarely looked like those of the Ancien Régime, were still needed to regulate social life. In the case of patents, the Comité consultatif des arts et manufactures was part of such a collective. It was not alone—the Conservatoire des arts et métiers, which was in charge of the publication of patents,<sup>41</sup> and patent agents as a new profession<sup>42</sup> also helped to give flesh to the theoretically unmediated relationship between the inventor and consumers, between the individual and the public.

The Committee was able to fulfill its role because of its peculiar characteristics. Although it was housed inside of and depended financially on the Ministry of the Interior, it was largely independent from state administration. This institutional ambiguity explains why the opinions of the Committee were only consultative; at the same time, this ambiguity ensured that the fragile contractualism on which the French patent system relied could be preserved. The Committee's interference could not be likened to an actual intervention of the state into the private affairs of inventors, and the members of the Committee unflinchingly defended the liberalism that was at the root of the patent system. Because the Committee was not composed of administrators and civil servants but consisted in a learned assembly of savants, engineers and industrialists at the service of national prosperity, the authority it enjoyed was not that of the state, but rather that of science—of reason itself.

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<sup>41</sup> On the role of the Conservatoire in the publication of patents, see Jérôme Baudry, “Publier les brevets d'invention: la *Description des machines et procédés* (France, 1791-1844),” in Liliane Hilaire-Pérez, Valérie Nègre, Delphine Spicq and Koen Vermeir (eds.), *Le livre technique à l'échelle du monde* (Paris: CNRS Editions, 2017), pp.241-252.

<sup>42</sup> In France, patent agents appeared at the very end of the 1810s. In 1817, less than 1 percent of the annual patents had been taken through the services of a patent agent; after 1840, this proportion had risen to more than 20 percent. On patent agents in France between 1870 and 1914, see Gabriel Galvez-Behar, “Des médiateurs au cœur du système d'innovation. Les agents de brevets en France (1870-1914),” in Marie-Sophie Corcy, Christiane Demeleunaere-Douyère and Liliane Hilaire-Pérez (eds.), *Les archives de l'invention. Écrits, objets et images de l'activité inventive* (Toulouse: CNRS/Université de Toulouse, 2006), pp.437-448.

## Conclusion: Science, politics, and the patent system

In his seminal essay “Paris 1800,” Michel Serres has shown how, in the aftermath of the Revolution, “the history of France met the history of science,” and how science replaced the old clergy to emerge as a new power.<sup>43</sup> Never before had the savants been as invested in the affairs of the state. More profoundly, according to Serres, science’s claim to being the only legitimate power was no less religious than that of the Church—both were grounded in their ability to appeal to universality, to transcendence.<sup>44</sup> “By virtue of the intermediary position of their order,” Serres writes, “the priests/scientists ensure the closure of the social system with the guarantee they provide of a transcendent truth, [75] absolutely external to any social production.”<sup>45</sup> The invention of ‘science’ in the singular in the nineteenth century was *in fine* the political means of pacifying society and, perhaps, of putting an end to the French Revolution.<sup>46</sup> The role the savants took in governing the French patent system is a testament to this political dimension of science. In post-revolutionary France, only the savants and their appeal to disinterestedness and transcendence could solve the deficiencies of the liberalism that had informed the newly crafted patent system. Of course, patents were no longer privileges granted by the state but were the expression of the natural right of inventors. Undoubtedly, they were now a contract between an inventor and a public who each followed their own interests. However, both the inventor and the public were figures whose qualities had to be actively construed, and here the savants pried into the contract. Inventors had to be taught where their true self-interest lay, and the public had to be warned of the potential

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<sup>43</sup> Michel Serres, “Paris 1800,” in Michel Serres (ed.), *A History of Scientific Thought: Elements of a History of Science* (Oxford: Blackwell, 1995), p.422.

<sup>44</sup> “There is no functional or structural difference between the world of faith in a transcendent God and the belief that there exists a scientific object independent of us and capable of being expressed in an through a universal truth, binding upon all and objective in itself. Transcendence as such is the same in the two cases and the social consequences are the same.” Serres, “Paris 1800,” p.454.

<sup>45</sup> Serres, “Paris 1800,” p.453 (note 27). On science as a new power in France around 1800, see Nicole and Jean Dhombres, *Naissance d’un nouveau pouvoir : sciences et savants en France, 1793-1824* (Paris: Payot, 1982).

<sup>46</sup> Guillaume Carnino, *L’invention de la science. La nouvelle religion de l’âge industriel* (Paris: Seuil, 2015).

abuses of the system and instructed in the fundamentals of good technology. To borrow Boufflers's words, "interests" had to be regulated and "experience" had to be directed.

The savants were entrusted with these tasks because they represented an authority that seemed to lie outside of politics. Wherever one turns, savants are everywhere—not only inside the Comité consultatif des arts et manufactures but in every cog of the patent system. Whether one looks at the Committee, at the Conservatoire des arts et métiers, at the courts, at other institutions like the Société d'encouragement pour l'industrie nationale,<sup>47</sup> or even at the Chamber of Deputies and at the Chamber of Peers during the patent law revision of 1844, the same circle of techno-scientific experts is at play. This points to a peculiarity of not only French politics but also French industrialization in the nineteenth century. What characterized France's transition into industrialization was an intermediary path between the English model of laissez-faire and the active state intervention of the Terror, which acted as a foil to the views of statesmen (and savants) like Jean-Antoine Chaptal. If French industrialization was ultimately successful, it is because it took place in a highly institutionalized context.<sup>48</sup> In this way, France's patent system has to be put in a larger context of a blossoming of intermediary bodies and institutions such as the Conservatoire, the Écoles d'arts et métiers, the Expositions de l'industrie nationale and the Société d'encouragement, which had all been created with the intention of bringing about, at last, industrial prosperity. All these collectives were in the hands of the [76] same savants and engineers, who were often members of the Academy of Science and who had likely been trained at the École polytechnique.

The degree to which savants pervaded the patent system was perhaps unique to France. In England, inventive and patenting practices were largely left to private initiative,

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<sup>47</sup> On the *Société d'encouragement*, see Pietro Redondi, "Nation et entreprise. La Société d'encouragement pour l'industrie nationale, 1801-1814," *History and Technology* 5, no. 2 (1998): 193-222.

<sup>48</sup> Jeff Horn, *The Path not Taken. French Industrialization in the Age of Revolution, 1750-1830* (Cambridge, Mass.: MIT Press, 2006). See also Jean-Pierre Hirsch and Philippe Minard, "Laissez-nous faire et protégez-nous beaucoup: Pour une histoire des pratiques institutionnelles dans l'industrie française, XVIII<sup>e</sup>-XIX<sup>e</sup> siècles," in Louis Bergeron and Patrice Bourdelais (ed.), *La France n'est-elle pas douée par l'industrie?* (Paris: Belin, 1998), pp.135-159.

such as that of patent agents, inventors' societies or technological periodicals such as the *Repertory of Arts and Manufactures*. Only when *caveats* were filed did inventions receive a form of prior examination, but this examination was handled by the law officers.<sup>49</sup> In the United States, between 1793 and 1836, patents were not thoroughly examined, and when they were, they underwent an unofficial screening process that was not institutionalized.<sup>50</sup> However, the 1836 Patent Act introduced a major overhaul of the U.S. patent system, with the reintroduction of prior examination and the establishment of the Patent Office as a separate bureau within the State Department. In the 1840s and 1850s, the Patent Office was mainly composed of so-called "scientific men," like the Consultative Committee of Arts and Manufactures.<sup>51</sup> These men introduced stringent standards of examination, maintained high rejection rates, and eagerly displayed their belief in the social and epistemological separation between science and technology. Inventors and patent agents soon launched a vigorous campaign in the *Scientific American*—a campaign in which they questioned the suitability of "scientific men," who were not "practical men," for the position of patent examiner, and asked for the "liberalization" of the Patent Office's examination practices.<sup>52</sup>

At about the same time, U.S. "scientific men" and French savants thus played an essential role in articulating private and public interests in their respective patent systems,

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<sup>49</sup> In the English system, a *caveat* was a "form submitted to a particular office requesting that the holder be given notice of any patent petition that passed through which was applicable to an area of interest as defined by the *caveat*. Upon receipt of notice, the holder could choose to oppose the petition at a hearing, if he believed it conflicted with one of his inventions." See Bottomley, *The British Patent System During the Industrial Revolution*, p.53. Bottomley estimates that 25% of the total number of inventions were examined because of the *caveat* procedure. Unfortunately, to my knowledge, there is no detailed study of the examination procedures of the law officers.

<sup>50</sup> It derived mainly from the whims of William Thornton, who had christened himself "Superintendent of Patents"; after his tenure of office, the practice was altogether discarded. See Edward C. Walterscheid, *To Promote the Progress of Useful Arts: American Patent Law and Administration, 1798-1836* (Littleton, Colorado: Rothman & Co., 1998), pp.243-280.

<sup>51</sup> In a nation where scientific employment remained scarce for much of the 19<sup>th</sup> century, the Patent Office offered office jobs that were often less time-consuming than professorships, as well as the chance to live in a large city, where scientists were numerous enough to coalesce into a community. See Kara W. Swanson, "Rubbing Elbows and Blowing Smoke: Gender, Class, and Science in the Nineteenth-Century Patent Office," *Isis* 108, no. 1 (2017): 40-61.

<sup>52</sup> Robert C. Post, "'Liberalizers versus 'Scientific Men' in the Antebellum Patent Office,'" *Technology & Culture* 17, no. 1 (1976): 24-54. See also Robert C. Post, *Physics, Patents, and Politics. A Biography of Charles Grafton Page* (New York: Science History Publications, 1976).

engaging actively in the co-production of science and liberal-democratic politics. Yet this significant convergence also hides important differences between the U.S. and the French cases—differences that point to the emergence of distinct “civic epistemologies” in the [77] two countries.<sup>53</sup> First, in the U.S., the involvement of scientists in the patent system was short-lived; after 1859, many “scientific men” left the Patent Office in the wake of “liberalization.” In France, where the links between state-building and expert knowledge were both more ancient and more deeply rooted, the role of the savants proved long-lasting:<sup>54</sup> they remained in charge well into the twentieth century, even after a proper Patent Office (the Office National de la Propriété Industrielle, or ONPI), with its own examination committee, was established in 1901.<sup>55</sup>

Second, the examination of patent applications at the U.S. Patent Office was radically different from the one performed by the Consultative Committee in France. In the U.S., a patent could not be issued without a positive judgment of the novelty, utility, and importance of the invention, while in France, the Committee’s opinion was only consultative and thus non-binding. The U.S. examination meant that the value of a patent was no longer exclusively determined *ex post*, by the public and, ultimately, the courts, but that it was now partly fixed *ex ante*, by the expert bureaucracy of the federal Patent Office.<sup>56</sup> The French examination was

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<sup>53</sup> According to Sheila Jasanoff, “science, no less than politics, must fit itself into established ways of public knowing in order to gain political support—and these ways of knowing vary across well-defined cultural domains such as nation states (p.249).” The concept of “civic epistemology” refers to these “historically and politically situated, culturally specific, public knowledge-ways (p.249).” See Sheila Jasanoff, *Designs on Nature. Science and Democracy in Europe and the United States* (Princeton: Princeton University Press, 2007), pp.247-271.

<sup>54</sup> On scientific expertise and state-building in France from the 18<sup>th</sup> to the 20<sup>th</sup> century, see Charles C. Gillispie, *Science and Polity in France. The End of the Old Regime* (Princeton: Princeton University Press, 1980); Fox, *The Savant and the State*; Robert Gilpin, *France in the Age of the Scientific State* (Princeton: Princeton University Press, 1968).

<sup>55</sup> After 1901, the ONPI handled the examination of all patent applications, but the more problematic cases were still forwarded to the expertise of the Consultative Committee of Arts and Manufactures. See Gabriel Galvez-Behar, “Les faux-semblants du droit de l’inventeur ou l’examen clandestin des brevets d’invention dans la France de la Belle Époque,” *Documents pour l’histoire des techniques* 17 (2009): 98-105.

<sup>56</sup> Kara W. Swanson, “The Administration of Genius. Expertise and the Patent Bargain” (note 11). On the importance of litigation for assessing patent value during the registration period in the U.S., see Carolyn C. Cooper, *Shaping Invention. Thomas Blanchard’s Machinery and Patent Management in Nineteenth-Century America* (New York: Columbia University Press, 1991).

tailored so as to preclude any such intervention of the state in fixing the value of a patent, leaving the matter entirely to the public, in accordance to the foundational idea of the contract between the inventor and the public. By policing the patent document, what the Consultative Committee secured was not the *value* of the patent but the preconditions for the subsequent *valuation* of the patent. The savants neither attempted to thwart the inventor's aspirations nor to replace the public; instead, they positioned themselves as the gatekeepers of the contract between those two figures. In so doing, they hoped to ensure that the practices of the Committee were no mere return to those of the Old Regime, when both the *Bureau du commerce* and the Academy of Sciences expressly ruled the worth of an invention. The Revolution had helped to pave the way towards a form of technocracy that was perhaps not incompatible with liberalism; in any case, the alliance between science and politics had been [78] redefined, in the words of Roger Hahn, from "aristocratic" to "democratic."<sup>57</sup> In a democracy, the savants could neither speak for the public nor directly intervene in the affairs of civil society; instead, they made science responsible for providing and maintaining the cognitive and epistemic frames—the rational subject (here, inventor) and the educated public—that hold democratic politics together.<sup>58</sup>

What were the effects of the takeover of the savants on the French patent system and patent law? As we know, science is always engaged in a dual process of hybridization and purification.<sup>59</sup> While they profoundly immersed themselves in the design, governing and orientation of the patent system, the savants were also quick to distinguish themselves and their own activity from that of the inventors, patentees and manufacturers. The legal definition of an invention – or more precisely, what counted as a patentable invention – was

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<sup>57</sup> Hahn, *The Anatomy of a Scientific Institution*, pp.252-285.

<sup>58</sup> Yaron Ezrahi, *The Descent of Icarus: Science and the Transformation of Contemporary Democracy* (Cambridge, MA: Harvard University Press, 1990).

<sup>59</sup> Bruno Latour, *We Have Never Been Modern* (Cambridge, Mass.: Harvard University Press, 1993).

thus central to them.<sup>60</sup> Their main concern was to narrow down and operationalize the rather vague definition of invention that had been inscribed in the foundational 1791 patent law, which had declared that “any discovery or new invention in every kind of industry, is the property of its author.” The preamble of the law even stated that “any new idea (...) primitively belongs to the person who has conceived it.”<sup>61</sup> What these definitions lacked was a precise reference to materiality – objects, machines, methods – especially because, at the end of the eighteenth century, ‘industry’ had not fully gained its actual meaning. In 1791, ‘industry’ did not limit patentability to the domain of manufactures, but rather it meant a faculty of the body like skill or dexterity,<sup>62</sup> or a faculty of the mind.<sup>63</sup> As a result, any kind of discovery could be, in principle, claimed as a property. And indeed, in 1791, most patents were taken for financial inventions in banking, insurance or investment—inventions that would nowadays be called business methods. This prompted a strong reaction from the National Assembly, which repealed the said patents and specified that inventions had to belong to the “arts and crafts” (*arts et métiers*).<sup>64</sup>

However, this left a major question unanswered: were scientific theories or abstract principles patentable or not? Faced with patent requests for teaching methods and mechanical principles, the Comité consultatif des arts et manufactures consistently [79] replied that patents were delivered only for ‘industrial applications’ and that these applications had to be specified in the patent itself. As we have seen, the examination’s emphasis on disclosure quality was another way through which the Committee tried to control the claims of

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<sup>60</sup> For example, during the 1844 patent law revision, Gay-Lussac and Thénard, who were both members of the Chamber of Peers at the time (as well as veterans of the Comité consultatif), engaged in an extensive debate over the patentability of drugs, which were finally declared non-patentable, against Gay-Lussac’s opinion.

<sup>61</sup> “Loi relative aux découvertes utiles et aux moyens d’en assurer la propriété à ceux qui seront reconnus en être les auteurs,” in Regnault, *De la législation*, p.135.

<sup>62</sup> See the *Dictionnaire de l’Académie française*, 5th edition, Paris, 1798.

<sup>63</sup> Denis Diderot and Jean Le Rond d’Alembert (eds.), *Encyclopédie, ou Dictionnaire raisonné des sciences, des arts et des métiers, par une société de gens de lettres, vol. VIII* (Neuchâtel: Samuel Faulche & Compagnie, 1765), p.694.

<sup>64</sup> “Loi relative aux brevets d’invention délivrés pour des établissements de finance (30 septembre 1793),” in Regnault, *De la législation*, p.116.

inventors. In 1844, the new patent law (partially prepared by the Comité consultatif) stipulated that

Art. 2. Shall be considered as new inventions or discoveries:

The invention of new industrial products;

The invention of new means, or the new application of known means for obtaining an industrial result or product.

Art. 30. Shall be declared null and void the patents issued for principles, methods, systems, discoveries and theoretical or purely scientific conceptions, the industrial applications of which have not been specified.<sup>65</sup>

In this way, the legal definition of an invention was clarified, and by the end of the nineteenth century, it was firmly established that patents for principles (“brevets de principe”) were excluded in the French patent legislation.<sup>66</sup> Conversely, in the United States, where “scientific men” eventually surrendered to the patent lobby, a much broader definition of invention – one which covered principles in most cases – blossomed.<sup>67</sup> In France, at the same time patentability was narrowed down to a new definition of industry, the distinction between science and industry was vigorously affirmed. The activity of the savants could not be confused with that of the manufacturers, and the preeminence clearly resided in the former, since industry was nothing more than an ‘application’ of science. The powerful and long-lasting demarcation between science and technology (where technology is conceived as applied science) was thus put in motion, leading to a very specific definition of ‘invention’. It was a [80] definition that the savants articulated through their examinations of specific

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<sup>65</sup> “Loi sur les brevets d’invention (5 juillet 1844),” in Adrien Huard, *Répertoire de législation et de jurisprudence en matière de brevets d’invention* (Paris: Cosse et Marchal, 1863), pp.387-394.

<sup>66</sup> See, for example, Eugène Pouillet, *Traité théorique et pratique des brevets d’invention et de la contrefaçon* (Paris: Imprimerie et librairie générale de jurisprudence, 1879), pp.84-85. Quoted in Pierre-André Mangolte, *La guerre des brevets d’Édison aux frères Wright. Une comparaison franco-américaine* (Paris: L’Harmattan, 2014), p.33.

<sup>67</sup> Mangolte, *La guerre des brevets*, pp.39-52. Several patent examiners who resigned in 1852, including Charles Page, chose to set themselves up as patent solicitors, and turned from strict examiners to ardent proponents of “liberalization.” See Robert Post, “‘Liberalizers’ versus ‘Scientific Men’,” p.44. Liberalization was not limited to patent examination; of course, the courts played a major role in construing invention in such a way that “pioneer patents” became possible. See Christopher Beauchamp, *Invented by Law: Alexander Graham Bell and the Patent That Changed America* (Cambridge, MA: Harvard University Press, 2015), pp.61-64. In the United Kingdom, judges could also grant “master patents,” which gave a monopoly over all creative uses of an invention, but this happened rarely. See Stathis Arapostathis and Graeme Gooday, *Patently Contestable. Electrical Technologies and Inventor Identities on Trial in Britain* (Cambridge, Mass.: MIT Press, 2013), p.15; Beauchamp, *Invented by Law*, pp.157-161.



inventions, which in turn framed the articulation of what the parameters and practices of patent examination should be. In the end, what counted as technology was constructed by another technology: patent examination.

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