L'Histoire. Special issue "XIX World Economic History Congress"

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Special issue

COVER
The new « Campus Condorcet » - set in Aubervilliers and where the 19th WECH takes place - as imagined before its opening in 2021(© Campus Condorcet)

In order to welcome the WEHC 2022 participants in Paris, the Congress steering committee wanted to make available the English translation of the texts published in L'Histoire *all along the year 2021-2022, as well as texts testifying to the scientific collaborations set up in France with the socio-economic world – through three contributions from our sponsors the Comité pour l'histoire de la Poste, the Crédit Agricole and the Société d'Encouragement pour l'Industrie Nationale. This special issue also gives us the opportunity to pay tribute to Jean-Claude Perrot, whose original contribution to economic history and to the intellectual history of political economy was essential to a whole generation of historians.*

We wish all the participants a very good reading, and, above all, a very fruitful 19th World Economic History Congress !

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L'Histoire

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PARIS 2022 XIX World Economic History Congress

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Let's prepare for the WEHC

In France, economic history is a discipline in full renewal.

By Liliane Hilaire-Pérez and Manuela Martini

Initiated in Stockholm in 1960 by one of the great names of economic history, Fernand Braudel (Collège de France), along with Michael Postan (London School of Economics) and Ernst Söderlund (University of Stockholm), the first Congress of Economic History was held in France, in Aix-en-Provence, in 1962, by the International Economic History Association. Founded at the end of the 1950s, in the context of the Cold War, this association – whose English acronym, AFHé, quickly became established – considered itself *"as involved in the process of détente between Western Europe and the United States and Eastern Europe and the Soviet Union"*[1]. It expressed *"the history of an academic culture"* nourished by scientific and institutional cooperation, drawing *"a world of academic international diplomacy"*.

The golden age of the 1960s

At the same time, in France, historians with different backgrounds specializing in a wide variety of periods and fields, but all well-recognized, met in Paris in 1963 to lay the foundations of the AFHé. Among the founding members were Robert Boutruche, Fernand Braudel, Jean Bouvier, François Crouzet, Georges Duby, Bertrand Gille, Pierre Goubert, Ernest Labrousse, Pierre Léon, Frédéric Mauro and Pierre Vilar. The elaboration period was relatively long: this organizing committee submitted, more than two years later, the statutes to the constituent assembly which met on May 30, 1965 and which also included, among others, Pierre Chaunu, Jacques Le Goff, Emmanuel Le Roy Ladurie and Maurice Lévy-Leboyer[2]. Ernest Labrousse was the first president, while Fernand Braudel was the president of the IEHA between 1962 and 1965. It was during these same years that the two men conceived and directed the long project that gave birth to the volumes of the *Histoire économique et sociale de la France*, published by the Presses Universitaires de France.

Ernest Labrousse was the first president of the French Association of Economic History

THE AUTHORS

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Professor at the University Lumière-Lyon-2, Manuela Martini is president of the French Association of Economic History (AFHé).

These different initiatives bear witness to a scientific influence that economic history can be nostalgic about. At that time, specific departments were founded in many universities in France and abroad. Historical production was dominated by economic history. In the wake of the *Annales* and Ernest Labrousse, Pierre Goubert, in particular with his thesis *Beauvais et le Beauvaisis, de 1600 à 1730* (1960), renewed the history of the Ancien Régime by paying attention to the complexity of socio-economic situations, thus speaking of various peasantries and not of a single French peasantry. Fernand Braudel introduced the concept of world-economy, showing that capitalism, on this scale, had taken on several forms, irreducible to the industrial era. In the 1960s, Jean Bouvier proposed an embodied history of finance and banking, focusing on emblematic institutions such as the Crédit Lyonnais.

Even beyond scientific circles, economic history was a crucial issue. It was an area of debate and dialogue between Marxist and non-Marxist historians, as well as a tool for thinking about development policies and the concept of modernization. The appeal of Walt W. Rostow's *The Stages of Economic Growth. A Non-Communist Manifesto* (1960), which proposed a normative and linear analysis of growth processes, was already subject to critique, for example in the debates over the place of industrialization in economic development.

Current dynamics

While economic history is less institutionally anchored today, the discipline has recently

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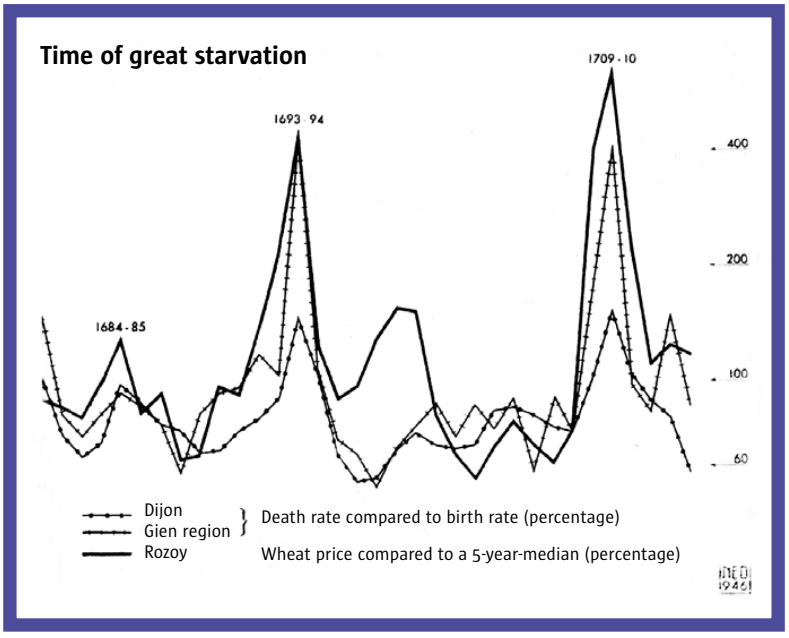

Serial Graph from an article by Jean Meuvret, *Population* 1946/4 (available at www.persee.fr).

Haymaking (Rustican by Pierre de Crescent, 15th century manuscript, BNF).

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experienced a revival. Women are now present in the departments, in the representative associations and in research. The research themes are also largely renewed and diversified. Finally, economic history is increasingly recognized as a key to understanding the globalization of trade and production and its consequences (inequalities, predation of resources, global environmental impacts, health and economic crises).

In this renewed context, where is French economic history going through? As the success of Thomas Piketty's book *Capital in the Twenty-First Century* (Harvard, 2014) shows, it undeniably shines on the international scene. Moreover, France will hold the presidency of the IEHA for three years, between 2022 and 2025, and is teeming with new projects.

French economic history could have disappeared with the questioning of the quantitative approach in the 1990s and the rise in France of the history of representations. This was not the case. The methods were questioned. The categories that where used for the classifications of quantitative history have been contextualized. Not only has the quantitative approach to socio-economic phenomena not been abandoned, but it now mobilizes models capable of taking into account increasingly refined or broad variables through the growing use of digital technology, and this for all periods, including most ancient.

Beyond its traditional association with economics, economic history is being renewed through interdisciplinary encounters with anthropology, organizational sciences, digital humanities, automated language processing (NLP), ethnomethodology, which allows the reconstitution of family budgets and standards of living, and archaeometry, a key method for the study of ancient materials and processes. Original themes have crossed French economic history for a generation (techniques, knowledge, gender, environment, migrations, health, institutions…), as shown by the articles in the following pages.

This dynamic resonates on a global scale. The 19th World Economic History Congress (WEHC), to be held in Paris in 2022, attests to this new development. Its theme, "Resources" is in line with the themes that today place economic history at the forefront of social debates and political choices. This is why the Paris Congress will inaugurate a new formula next summer: a "Public History Pass" that will ensure the opening of the Congress to a large audience. Thus the WEHC 2022 has decided to open a new page, that of economic history in the city. ■

Notes

1. Maxine Berg, "East-West dialogues: economist historians, the Cold War and détente", *The Journal of Modern History*, vol.87, n°1, March 2015, 36-71.

2. Michèle Merger, "L'AFHE : quelques repères historiques", special issue, D. Barjot (dir.), "Où va l'histoire économique ?", *Historiens & Géographes* n° 378, 2002, 7-8.

The prehistoric "Homo economicus"

As opposed to popular belief, prehistoric society did not suffer from scarcity. Their economic decisions depended on cultural as well as biological factors.

By François Bon

The image that persists of prehistoric societies is that of an economy of survival. As if these cohorts of starving men and women had maintained themselves courageously in life, under circumstances that would seem painful for us. It is only a few centuries ago that our humanity would have freed itself from this alienation.

Of course, we are ready to admit that it is a great success to have survived so many climatic and environmental fluctuations throughout the Quaternary; to have adapted in this way to the tracking of the wildebeest, the gazelle, the reindeer or the buffalo throughout the continents, the steppes and the forests, the cycles of glaciation. It is not a small thing either to have succeeded in populating the entire surface of the Earth – for it is indeed what we owe, distant islands excluded, to these nomadic hunter-gatherers-fishermen of the Paleolithic era, who took their roots more than 3 million years ago, and who spread, wave by wave, over the entire planet.

To explain such a success, one likes to appeal to a form of biological rationality more or less directly inspired by ethology. Only those who, unconsciously, would have opted for choices allowing to optimize the yield of hunting and gathering would have survived. And it is common to equate the energy yield of this or that portion of an animal carcass, which is both more fleshy and belongs to a prey that one will have had to chase less, in order to explain why those who chose to eat it fared better than others. In fact, the question must be turned around: in what way is an economy really prehistoric? In other words, to what extent are these ancient hunter-gatherer economies based on rules and foundations that place them in the infancy of later economies?

THE AUTHOR

Professor at the University of Toulouse-Jean-Jaurès, François Bon is a specialist of the Upper Paleolithic. He has notably published, with Isabelle Crevecœur, **Sapiens à l'œil nu** *(CNRS Éditions, 2019).*

Food behaviors

Let us narrow our focus a bit and concentrate on a period of prehistory called the Upper Paleolithic, which spans between 40,000 and 10,000 B. C. This is indeed the very last period when hunter-gatherers ruled the Earth without sharing – before the beginning of the Neolithic and the rise of agriculture and animal husbandry, which may seem a more rational economy. Above all, this period saw a decisive expansion of human populations, due in this case to *Sapiens*.

If we look at subsistence behaviors, we are dealing with societies that practiced an economy of collection and not of production. But does this mean that there could not have been a real anthropology of food behaviors? All the studies devoted to hunting practices underline the existence of choices which, however fruitful they may have been in terms of subsistence, also translate a world of values linked to the animal world – and the cave paintings invented at that time do not say anything else either, in their own way; animals are both symbol and flesh, and feed one's mind as well as one's body.

Moreover, the economy of these populations is naturally not limited to what they fed on. They integrated all the resources which were used to build various objects and equipment: rocks suitable to be cut, dyes to coat the body or to protect the skins, bones and ivory to build tools or jewels, finely tanned skins for clothing and protection. These societies were above all societies of nomads in wich economic choices were dictated by the necessity to travel lightly

Animals are as much a symbol as they are flesh, and we feed our minds and bodies on them

DR

and follow a controlled yearly itineary according to seasonal ressources. This could imply either to develop a highly planned strategy, or to adapt to circumstances in a very flexible manner.

Many ways of being nomadic

Both solutions have been tested at length. Thus, to take just one example, if it was always necessary to tan skins for clothing and protection, and to do so to equip oneself with adequate stone instruments that prehistorians call "scrapers", some people rather chose to build objects requiring demanding know-how (beautiful flint blades), from carefully selected materials (high quality flints, for which it was necessary to know the sites and to return to them regularly). The reward for these efforts was to have efficient tools with a long life expectancy, because they could be resharpened over time. Others, on the contrary, preferred simpler objects, involving much less effort and knowledge of materials and of the ways to transform them; the price of these efforts was that these more rudimentary objects needed to be manufactured more often, because they did not last long.

These different choices show us that there were many ways of being nomadic in prehistoric societies. They were many ways of managing one's equipments in time as well as in space, of choosing to pass on more or less knowledge, of anticipating or not anticipating foreseeable needs, of integrating this or that stage of collecting raw materials in its itinerant journey, etc. In short, they already tell us that there were many ways of making societies which were prehistoric only in name, because they saw an economic elaboration in which we can easily recognize ourselves, with values with which we continue to dialogue. ■

Buffalo This Magdalenian engraving on bone discovered in the Raymonden shelter (Dordogne, 16,000-12,000 B.C.) seems to show a gaunt buffalo surrounded by human figures. A scene of game sharing? Or the evocation of the symbolic relationship of these societies with this animal?

Camp The Aurignacian camp of Régismont-le-Haut (Hérault) tells another story of buffalo, that of a slaughtered animal whose skin, flesh and bones were exploited to make clothing, protection of hut, and of course to eat, a story that plunges us, for one season, into the daily life of these itinerant hunter-gatherers 30,000 years ago.

Pioneer

With his famous book *Age of Stone, Age of Plenty. The Economy of Primitive Societies* (1972 for the original English edition, cf. *L'Histoire* n° 487), the American anthropologist Marshall Sahlins (1930-2021) reversed a commonplace: far from the image of hunter-gatherers in a precarious state of survival, he demonstrates that they built economic systems wich gave them ample resources, so that they didn't have to spend all their time acquiring them. It allowed them to have time for many other activities, with social, creative vocation, even leisure – activities at least as essential to the construction of human societies.

COLLECTIONS VILLE DE PÉRIGUEUX/MUSÉE D'ART ET D'ARCHÉOLOGIE DU PÉRIGORD, N° PR.A.2104/PHOTO BERNARD DUPUY – DR

The asian origins of global capitalism

In the modern era, the beating heart of world trade was in Asia. It is there that Europeans acquired the know-how that allowed the rise of modern capitalism.

By Giorgio Riello

The economic rise of Asia – and most especially of China and India – over the past thirty years coincided with a phase of stagnation for the Western economies. Before the Covid-19 pandemic hit, China's GDP was growing at 6-7 % a year and in 2018 the country was approaching 30 % of the world's manufacturing capacity. These are impressive figures that prove that the emerging economies of Asia have now joined the capitalist world that had been centred on Europe and North America since the Industrial Revolution. Yet, as impressive as these performances might be, they are in no sense new for Asia. Five centuries ago, China and India accounted for between half and two thirds of the world economy. The enormous production of silk and porcelain in Ming China and the equally gigantic manufacture of cotton and other beautiful textiles in the Indian Subcontinent are just some of the many high-quality and sophisticated goods that were produced in pre-modern Asia. Even after the industrialization of Western Europe was well underway, in the 1820s, more than half of the world GDP was produced in these two countries.

Andre Gunder Frank claimed in his book *ReOrient* (1997) that the premodern age was truly one of Asian dominance and told a story in which the European industrial capitalism of the nineteenth and twentieth centuries was just a blip in a long tradition of Asian dominance. In his *Great Divergence* (2000), Kenneth Pomeranz explained the commercial and environmental reasons that brought the West into a trajectory of growth much more sustained than any other part of the world, including China and India. All of this served as a corrective to explanations that presented capitalism (and the associated economic growth) as a purely European and North American process, steming from the Western world's distinctive entrepreneurial spirit, its creativity and technological innovation, or its cultural traits.

Over the past twenty years, historians of capitalism have questioned the link between modernity and the rise of capitalism. In doing so they taught us that capitalist transformation was born out of global forces and processes, and stemmed from economic, political and power connections between different parts of the word. As Europe's role was cut to size, a group of scholars, mainly based in the US, scholars forming what is now called the New History of Capitalism has taken slavery and the slave plantation – most especially in the US South – as the cornerstone of new narratives of capitalist transformation on a global scale.

Five centuries ago, China and India represented between half and two thirds of global economy

THE AUTHOR

Professor of Global Modern History at the European University Institute in Florence, Giorgio Riello's publications include* Cotton. The Fabric that Made the Modern World *(Cambridge University Press, 2013).

The "factoreries" of the Indian Ocean

India's Marxist and China's communist scholarly works have been more hesitant in asserting an Asian contribution to global capitalist development.However, beyond its production capacities, Asia in modern times was also distinguished by its weight in world trade. In the middle of the 15th century, Europe was only a periphery of an Afro-Eurasian commercial space whose beating heart was located between the Persian Gulf, India and Indonesia. Muslim, Jewish and Indian merchants visited the rich port cities of the Indian Ocean in search of fabrics, spices and precious stones. Between the 16th and 18th centuries, the European powers, attracted by these luxury goods, took control of some of these cities,

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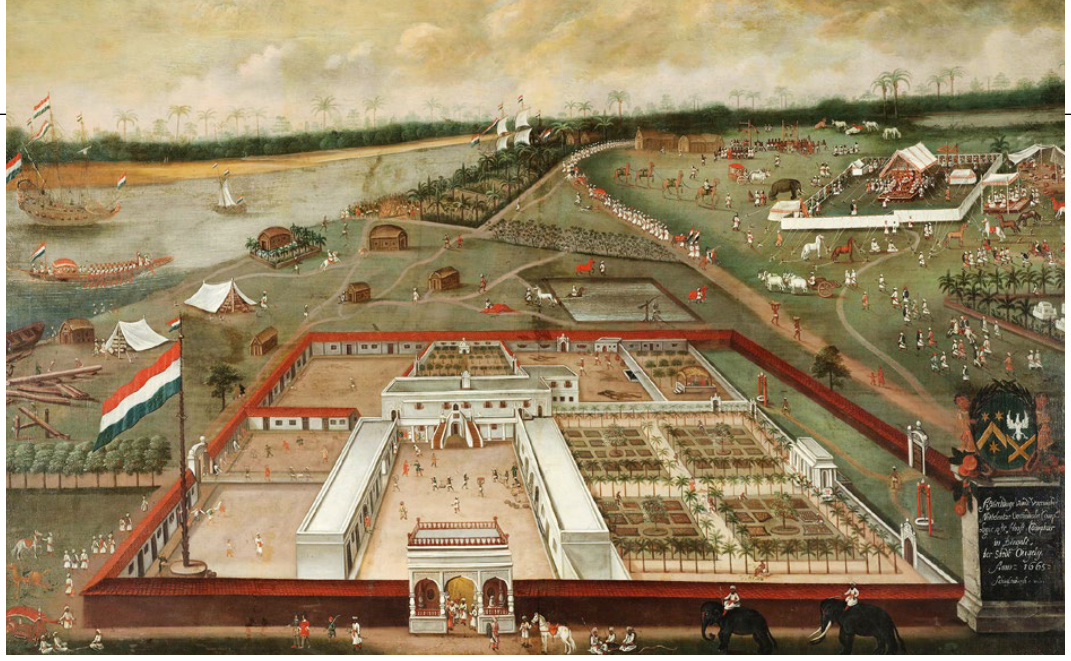
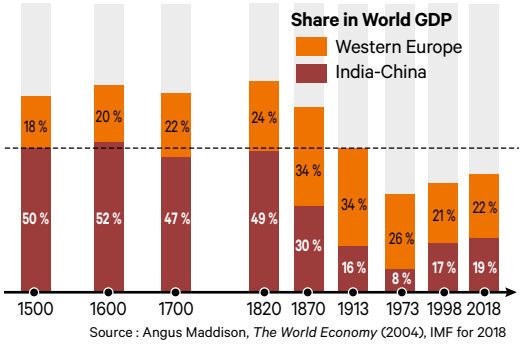


On the banks of the Ganges
Hendrik van Schuylenburgh's well-walled and orderly Dutch East India Company trading post in Hooghly (Calcutta). 1665, Amsterdam, Rijksmuseum.

such as Surat and Macao or established new ones such as Batavia or Madras, true pillars of European trade in Asia. The 'factories' (Fr. *comptoirs*) were either enclaves in a pre-existing city inhabited by a handful of employees, or entire cities. They served as centers for collecting, assembling and sometimes manufacturing commodities that were then distributed via ships returning to Europe or through intra-Asian trade.

In engravings and paintings, they are represented as places teeming with men and goods. This is the case of the Dutch East India Company (VOC) trading post in the port of Surat, Gujarat, painted in 1629 by Pieter Van den Broecke. Entitled *"Logie van Suratte"*, this painting shows what we would call today a "military compound" composed of accommodation, an internal courtyard where goods are inspected, and a kitchen garden. A guarded entrance is open and people come and go. The 1665 famous painting by Hendrik van Schuylenbergh, now at the Rijksmuseum in Amsterdam shows the Dutch factory at Hooghly (Calcutta) as a well-managed citadel on the riverbanks with literally hundreds of people working in it.

These factories were the equivalent of today's "Special Economic Zones" and world trade and financial centres, acting as poles of intercontinental trade and engines of economic transformation in the period before 1800. It is here that products for world markets were conceived. European traders had to contend for a space of action and to learn merchandising and production techniques. Procurement was a key skill in a period of "apprenticeship" for European traders who relied on their knowledge of commodities, trading communities and markets. While new histories of capitalism emphasize the importance of the exploitation of labour – most especially that of enslaved people – the hypothesis of an Asian origin of global capitalism considers instead the role of transfers and an 'upgrading' of European knowledge developed through centuries of interaction with Asia and its commercial communities.



Source : Angus Maddison, *The World Economy* (2004), IMF for 2018

Many of the features of today's smooth global logistics were learned the hard way on Asian markets. Europeans, for instance, were keen buyers of different types of Indian cotton textiles, something that was achieved with great difficulty. Low quality goods were often passed off as high quality ones. This is why the cloth was brought into the companies' warehouses to be checked. Yet, there were ways to cheat the system, for instance by placing the best cloth on the top of a bale. Suppliers relied on the fact that because of the high volumes, not everything could be checked. In the 1670s, the English East India Company's servant Edward Herrys reported that: *"notwithstanding all the care & paines that he takes in the sorting & looking after the qualities of the Callicos, he finds it in a manner impossible to make a thorough examination of the latter in regard of the necessity of receiving & sorting it while through the shortness of time,* [and] *for want of a stock aforehand to buy it in more early & seasonable in the yeare"*[1]. To get around these difficulties, Europeans had to constantly acquire new skills in storage and quality control.

Early modern global capitalism was as much industrial as it was commercial. Yet, the role of the nodes of commerce and factories of the Indian ocean in shaping a transition towards "modern" capitalism is still a missing piece in the jigsaw. ■

Note
1. *Records of Fort St George. Diary and Consultation Book*. Vol. 1, *1672-1678* (Madras, 1910), p. 75: "Consultation at Fort St. George: From Mr. Edward Herrys to the Honorable Sr. William Langhorn and Council", 27 September 1675.

AMSTERDAM, RIJKSMUSEUM, SK A 4282

How the merchants of Florence evaded taxation

In the 15th century, tax evasion was a common place in the Mediterranean. A fresh look at the commercial sources shows us a lot about merchant practices at the end of the Middle Ages.

By Ingrid Houssaye Michienzi

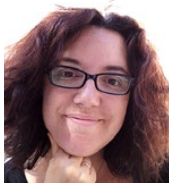
April 11, 1405, port of Valencia, Crown of Aragon. The agents of the Florentine merchant Francesco Datini loaded a bundle of silk on a boat bound for the Italian coast. This bundle was recorded in the ship's log under the name of the Catalan merchant Johan Beyona and sealed with his seal.

May 14, 1405, port of Piombino, Tuscany. Giovanni Cirioni, an agent of the Datini company, boarded the ship that had just arrived from Valencia to urge the scribe to change the commercial mark on the silk bundle and to change the name of its owner in the ship's log. This involved replacing the name and trademark of the Catalan Johan Beyona with those of the Datini company. The objective of this maneuver: to avoid paying taxes in Valencia and Piombino.

But Cirioni was not careful enough. The fraud was discovered following a denunciation made to the authorities of Piombino. The bundle of silk was confiscated and a trial for *"fraud and deceit"* was initiated, led by the podestate, the first magistrate of the commune, and by the tax collector Iacopo Pucci.

This case can be traced thanks to the formidable merchant documentation preserved in the Datini collection of the Prato archives in Tuscany. This exceptional corpus (more than 150,000 letters and 600 registers of accounts) was thoroughly analyzed from the 1960s onwards with a rather quantitative approach, often trapped in a classic economic reading. It was then abandoned by researchers. It is now being examined in a more transversal manner in order to answer new, more qualitative questions. For example, we find written traces of an important inter-religious trade in the Iberian Peninsula in a context of spatial segregation and persecution of the Jews. The business practices and the functioning of the business networks in the western Mediterranean are also exposed concretely.

THE AUTHOR



DR

Ingrid Houssaye Michienzi is a researcher at the CNRS specialized in the economic and social history of the Mediterranean region in the late Middle Ages. She has published* Datini, Majorque et le Maghreb, XIVe-XVe siècles. Réseaux, espaces méditerranéens et stratégies marchandes *(Brill, 2013).

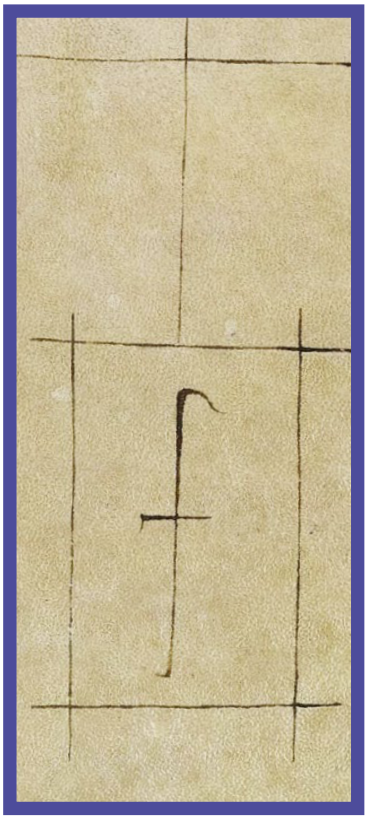
Catalan and Aragonese merchants complain about Italian traders to the sovereigns of the Crown of Aragon

Trade war

This case of tax fraud allows us to learn more about the business strategies deployed by the Florentine company. Let us first return to Valencia. Since the end of the 13th century, Catalan and Aragonese merchants had been complaining to the sovereigns of the Crown of Aragon about Italian traders. They accused them of monopolizing goods and infiltrating the financial circles of the Crown.

In reaction, the monarchs alternatively took punitive measures of expulsion against Italian merchants and allowed a return to the status quo. Following yet another expulsion measure decreed in 1401 by Martin I, a new measure was introduced: the establishment of a specific tax of 3 denarii per lira (1,25 %) on goods imported or exported by Italians from the Crown's territories.

But immediately, Tuscan merchants thought of a way to avoid this. Since the subjects of the



Powerful merchant
Portrait of Francesco Datini (c. 1335-1410) by Tommaso di Piero del Trombetto, 1490 (Prato, Museo di Palazzo Pretorio). This rich merchant from Prato, in Tuscany, left an exceptional collection of correspondence, accounts and administrative documents, testifying to the vast activities carried out in the industrial, commercial and banking fields in Europe and the Mediterranean basin in the 14th and 15th centuries.

◂ Trademark.
Each company had its own trademark, using ink or a sceal.The cross represented here is a direct reference to the notion of fides, that implies trust between partners. Usually, the trademark was made of the first letters of the merchant's name (here, F for Francesco). This sign was put on letters and cargo inventories, as well as on merchandises and bundles.

Crown of Aragon did not pay this tax, regardless of their origin, there were two ways to do so. The first was to obtain the Aragonese citizenship after a rather simple procedure. As a Tuscan who lived on the island of Majorca wrote, *"for the sake of our goods and those of our friends, I made myself a citizen of this country"*.

The second way was the substitution of identity, i.e. trading under the name of a consenting third party, usually a close business relation. The borrowing of fake identities was made easier by the absence of a real administrative registration allowing a complete identification process. Only the mark of the sovereign or of the authorities issuing an official document, through seals and signatures, made it authentic.

The citizenship of others quickly became an instrument of fraud. Tuscan merchants trafficked in citizenship cards among themselves. In Majorca, the agents of the Datini company acted under the name of other Tuscan merchants, such as Frosino di ser Giovanni, a Florentine citizen of Barcelona, or Tommaso Casini, a citizen of Valencia. Thus, it was in order to avoid paying the tax specific to Italians that, on April 11, 1405, the agents of the Datini company of Valencia placed their silk bundle under the name of the Catalan Johan Beyona.

Once the ship arrived in Piombino, Giovanni Cirioni wanted to carry out the opposite procedure and place the silk under a Tuscan name to avoid paying the tax for foreign goods. A practice that was not unusual, as suggested by the reaction of the local authorities, who took the matter very seriously. According to Francesco Datini's agents in Piombino, *"those here are very concerned about this case because it is an example for others to follow"*.

A long legal procedure

Cirioni's carelessness is therefore a godsend for the historian. The legal procedure that followed, well documented in the company's archives, shows us the complexity of the merchant networks involved in this case. The sources show that the procedure lasted more than a month. It was not a question of judging Cirioni's actions, but of identifying the owner of the silk bundle. The ownership of the goods had to be determined very precisely. If it belonged to the Catalan merchant, the tax had to be paid in Piombino; on the other hand, if the silk bundle belonged to the Datini company, the payment was not required.

After contradictory statements, Cirioni had to provide documents registered in the Court through notarial writings. These were commercial letters proving the terms of purchase of the silk bundle and its expedition, the insurance contract and statements made by of people present at the arrival of the ship.

But the procedure draged on. The agents on the spot used various means to push it through, including intimidation. They threatened to file a complaint against the collector in Florence so that any cost or damage to the silk bundle would be charged to him. This pressure, reinforced by the influence of the merchant – Francesco Datini – to whom the goods belonged and who followed the case closely, speeded up the legal process. The silk was quickly recovered and the case was closed. As for Giovanni Cirioni, he was never bothered. He remained free during the procedure. No letter mentions any incarceration or fine. And as his correspondence attests, he quietly resumed his activities in Piombino. A fortunate outcome, which shows that at the beginning of the 15th century the big companies were already able to free themselves from the laws of taxation… ■

DE AGOSTINI PICTURE LIBRARY/SCALA – ASPO, DATINI, 604, C. 1R ; SU CONCESSIONE DEL MINISTERO DELLA CULTURA-ARCHIVIO DI STATO DI PRATO

The privilege, an economic resource

Privilege has long been castigated as an obstacle to economic activity. A recent survey shows, on the contrary, how it was able to stimulate innovation and support entrepreneurs in the 17th and 18th centuries.

By Anne Conchon and Pauline Lemaigre-Gaffier

Abolishing privileges, considered an expression of royal arbitrariness and social inequality under the Ancien Régime, was one of the major acts of the French Revolution. Among the different types of privileges granted by royalty, there was one that, from the 18th century, was the subject of a particularly strong criticism: privileges granted to entrepreneurs in order to exploit a resource, develop a productive or commercial activity or promote innovations.

In order to distance themselves from the simplistic view of privilege as a monopolistic concept, a team of researchers recently undertook a comparative study of entrepreneurial privileges in several European countries between the 16th and 17th centuries. Revealing the massive character of the phenomenon, this investigation shows that, far from being obstacles to economic activity, privileges where an essential resource for entrepreneurship in pre-modern era.

A legal tool for entrepreneurship

The privilege was the subject of a request from an entrepreneur or a nominee on behalf of various partners. After examining the request, the king could decide to grant it or not. In the name of the common good, it was then up to him to organize the coexistence of the privileged enterprises, by delimiting the territories of production (especially for mining), marketing or service (in the case of transport services), or by strictly defining the types of products and the quality ranges to which the beneficiaries were entitled.

In the kingdom of France, the analysis of privileges granted between the reigns of Henri IV and Louis XVI shows how they served the intervention of the State on the long term. Colbert used them to establish new techniques and productions in the kingdom (such as the cloth factory in Abbeville), and to develop maritime and colonial trade (following the example of the West India Company). More broadly, royal privileges offered the beneficiaries legal guarantees to establish their business against the encroachments of potential competitors or local guild masters.

The analysis of the corpus reveals that these privileges could be granted to a great lord well-connected with the court as well as to a simple craftsman. Some were also granted to foreign inventors and manufacturers to facilitate the introduction of new techniques.

Rights were granted on an Atlantic or kingdom-wide scale, but most were limited to a town or a factory, such as the famous Indian factory established in Jouy by Oberkampf in 1760.

They were decisive in the case of costly undertakings that required the mobilization of large amounts of capital for the development of transport infrastructures (such as the construction of the Picardy Canal) or the exploitation of natural resources (through concessions for mining or fishing) and agricultural resources (through marsh drainage operations).

The privilege was also used to support the production of luxury goods or fashionable textiles (such as printed cotton fabrics), the promotion of innovative machinery and processes, the provision of transportation services, the development of entertainment businesses, and the growth of the metallurgical and chemical industries. The granting of a privilege could support the launch of a business, but it could also strengthen an already

THE AUTHORS

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***Pauline Lemaigre-Gaffier** is an Associate Professor at the UVSQ/University of Paris-Saclay and has published* **Administrer les Menus Plaisirs du roi. L'État, la Cour et les spectacles dans la France des Lumières** *(Champ Vallon, 2016).*

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established company by consolidating its reputation.

Making companies profitable

Certain prerogatives attached to the privilege were supposed to reduce costs, facilitate the formation of a partnership, the raising of capital, and ultimately guarantee the profitability of the business. It was in fact according to the needs and requests of the applicants that the royal power allocated provisions such as exclusivity, tax exemptions, personal provisions (ennoblement, naturalization, possibility of transmitting the privilege to the heirs), distinctive labels (trademark rights, royal manufacturing title) or access to labor or resources.

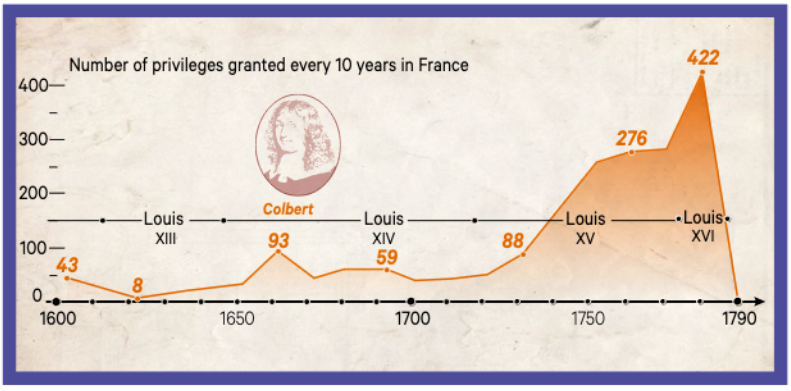
Mr. Ploos-Vanamstel obtained in 1721 a privilege for twenty years allowing him to establish in Auch a manufacture of mixed fabrics imitating the Dutch and English confections. In addition to administrative facilities to import the equipment and raw materials necessary for the manufacture, and to hire local labor, the king allowed the naturalization of foreign workers, the exemption of billeting soldiers and a monopoly of production in a perimeter of 8 leagues.

In the 18th century, political economy authors criticized exclusive privileges, particularly in the field of trade, as obstacles to individual initiative. Even when this liberal opposition imposed free competition as a norm and a value, the number of privileges increased markedly and concession procedures became standardized. In a context in which any enterprise theoretically had to be authorized beforehand, the privileges gradually lost their exorbitant character, the great majority no longer granting more than relatively modest rights.

A way to develop employment and economic activity, between state interventionism and the rise of capitalism

This survey is an example of recent research that is renewing the political, social and technical history of the Ancien Régime economy (on entrepreneurial circles, on invention, etc.). It gives an account of the variety of uses of company privilege, and its transformation from royal grace to administrative authorization. But it also shows its lasting plasticy. The granting of privileges must therefore be considered as a lever for encouraging economic enterprises, a means of developing employment and economic activity, between state interventionism and the rise of capitalism. ■

Porcelain *The Manufacture de Sèvres* by Achille-Etna Michallon (1817, Paris, BNF). A porcelain workshop created in Vincennes in 1740 obtained a royal privilege from Louis XV five years later and was transferred to Sèvres in 1756.



The 18th century boom The peak of the 1660s is linked to the policy led by Colbert (the high number of the grants shows that privileges were not only given to famous factories). But it remains modest compared to the growth of the 18th century and the second peak in the decades 1760 and 1770.

KEY WORD

Privileges
These are specific rights and advantages that the king grants and recognizes to individuals or groups.

Research in progress

The research program "Counting Privileges in Early Modern Europe," coordinated by Dominique Margairaz (University of Paris-I-Panthéon-Sorbonne), was funded by the Agence nationale de la Recherche between 2012 and 2015. It has made possible to compile a database listing approximately 15,000 mentions of privileges in various European states. The results of this survey will soon be published in a collective work by the Éditions de la Sorbonne (*Privilèges et entreprises en Europe, XVIe-XVIIIe siècles*).

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Deindustrialization, the hidden face of the "Trente Glorieuses"?

A political issue long ignored by historians, deindustrialization is now the subject of renewed research, which shows the complexity of a phenomenon that has its roots in the heart of The Glorious Thirty.

By Régis Boulat

More than any other European country, France has undergone a massive process of deindustrialization since the 1970s, which has led to the loss of jobs, a significant deficit in its trade balance, a relative decrease in its GDP and, ultimately, a weakening of its power. France's industrial production, which was a little more than half of Germany's in 1974, was only a third of it in 2014.

Long ignored or downplayed, deindustrialization is now the focus of attention from historians who emphasize its economic and social consequences and the lack of any industrial policy for forty years. This research allows us to understand the complexities of the chronology of deindustrialization. As early as the period of the "Trentre Glorieuses", partial deindustrialization and sectoral reconversion led to the demise of certain traditional economic actors. In the 1970s, a second phase of deindustrialization began, which saw a decline in industrial employment, due to changes in international capitalism.

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Régis Boulat is an Associate Professor at University of Haute-Alsace. He is a specialist of the "Trente Glorieuses". He has published **Jean Fourastié, un expert en productivité. La modernisation de la France, années trente-années cinquante** *(Besançon, PUFC, 2008).*

Some factories were closing, others were opening

This renewed vision of the deindustrialization process is illustrated by the case of the Mulhouse region. Here, the creation of the first floral indienne (printed cotton cloth) factories in the mid18th century was the starting point of an original process of collective industrialization oriented towards textile activity, mechanical engineering and chemistry. Its vigor can be explained in particular by the territorial anchoring of a strongly homogeneous and supportive Protestant employers' association, gathered within the Industrial Society of Mulhouse founded in 1826.

Although the Second World War left the region impoverished, reconstruction and modernization, largely self-financed, were faster in the mechanical engineering sector than in textiles. From the beginning of the 1950s, the the "Trente Glorieuses" saw industrialization and deindustrialization coexist in the Haut-Rhin region. The cotton industry underwent several crises from the beginning of the 1950s due to the deterioration of the international market (decolonization and competition from developing countries), the advent of synthetic fibers and the consumer society. By 1971, more than 220 textile companies in the Haut-Rhin region had already closed down. Only the most solid companies, led by skilful managers, managed to adapt (Société anonyme d'industrie cotonnière led by Jacques-Henry Gros or the Schaeffer group led by Bernard Thierry-Mieg). The result was a movement of concentration, often counterproductive in that it could lead to the departure of the head office – as in the case of DMC/Thiriez & Cartier-Bresson.

But the end of the textile industry in the Haut-Rhin region was accompanied by a conversion of the production system, thus allowing industrial employment to be maintained at a high level. In 1970, industry still employed 53 % of the working population (the others worked in agriculture or services), thanks to the changes

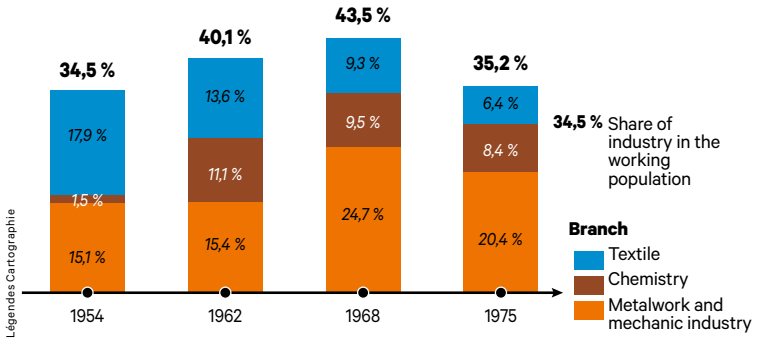
The end of the textile industry was accompanied in the Haut-Rhin region by a reconversion of the production system

SAMUEL COULON/IALSACE/PHOTOPQR/MAXPPP

DANIEL SIMON/GAMMA-RAPHO

Textile In Mulhouse, the "Trente Glorieuses" saw the decline of traditional activities such as textiles, a decline that was compensated by the rise of the chemical industry and the renewal of the metallurgy and mechanical industries. Employment dropped from the 1980s onwards (photo of the Schlumpf textile factory in 1976 in Mulhouse).

Mulhouse: early decline of the textile industry



in the mechanical and chemical sectors. In 1965, the metal industry overtook the textile industry in terms of the number of employees. This development was achieved through the establishment of 145 new businesses: in 1970 more than a quarter of the metal industry worked in companies that did not exist in 1960; conversely, companies that had been present in this sector since the 1820s were in turn experiencing difficulties. The collapse of the order book of the SACM (Société alsacienne de construction mécanique, founded in 1872) led the company to diversify its production and to enter into financial agreements that led to its dilution in groups over which it no longer had control, prior to its absorption by Hispano-Suiza, and its following dismantling in 1986.

Bidding farewell to textile machinery and capital goods, the automobile industry took first place in the early 1960s with the arrival of Peugeot. However, this "industrial mutation" was accompanied by the departure of the decision-making centers of large companies, as well as the arrival of capital from outside the region and the development of cross-border work.

In Mulhouse, the "Trente Glorieuses" were therefore characterized by a first wave of deindustrialization, which was the hidden face of a modernization and catching-up process at work within a national framework, from the beginning of the 1950s to the early 1970s. Since the disappearing textile and mechanical engineering companies were replaced by the automobile industry, an activity from another phase of industrialization, and by the development of cross-border work, unemployment did not explode until the 1980s.

From the second half of the 1970s, a second wave of deindustrialization, whose logic was quite different, hit the Mulhouse area: it was framed by a movement of financialization and resulted from offshorings and international subcontracting which developed on a now global market. In addition, there were constraints imposed by European integration.

At the end of these processes, which have led to a decline in industrial employment in favor of tertiary employment, Alsace nevertheless remains, along with Franche-Comté and Pays de la Loire, one of the most industrialized regions in France, thanks to three sectors: mechanical equipment, the automobile industry, and the food industry. But the structures of this productive system are no longer the same as they were fifty years ago. The last members of the Protestant employer dynasties disappeared in the 1980s and were replaced by large international groups. Thus, there is a strong concentration of industrial jobs in large establishments belonging to groups with German, Swiss or American capital (for 44 % of Alsatian employees, the decision-making center is located abroad, compared to a national average of 27 %), which is not without danger for the future.

The case of Mulhouse thus allows us to grasp the complexity of the process of deindustrialization that began during the the "Trente Glorieuses", and highlights the paradoxical fragility of contemporary industrial activity integrated into a financialized and globalized economy. ■

MOT CLÉ

The "Trente Glorieuses"

Term coined by the economist Jean Fourastié in 1979, in reference to the "three glorious" days of revolution in July 1830, and used to describe the period of prosperity that extended from the liberation of France to the 1973 oil crash, marked by strong demographic and industrial growth and significant technical progress. The expression is now being questioned by historians, who insist on its environmental cost and the persistence of social inequalities.

… and France specialized in luxury

Using computerized tools, historians are now proposing a new history of the luxury goods industry in France, which allows us to qualify the role traditionally attributed to Colbert.

By Loïc Charles and Guillaume Daudin

THE AUTHORS

***Professor of Economics at the University of Paris 8, Loïc Charles** co-edited the book* **Le Cercle de Vincent de Gournay. Savoirs économiques et pratiques administratives au milieu du XVIIIe siècle** *(Ined, 2011).* ***Guillaume Daudin** is a Professor of Economics at the University of Paris-Dauphine-PSL and has published* **Commerce et prospérité. La France au XVIIIe siècle** *(Presses de la Sorbonne, 2005).*

More than in any other sector of the economy, history and culture are essential resources for the luxury goods industry. In France, where luxury is a major industrial issue, this tradition is associated with the name of Colbert[1], who was at the origin of a first network of privileged factories. The names of these prestigious factories – Aubusson and Gobelins for tapestries, Saint-Gobain for mirrors, Van Robais for textiles – still remind us of the quality and good taste associated with the courtly society of Versailles. Colbert also had a decisive influence on French administrative culture and industrial prosperity in the 18th century: the Bureau du Commerce and the network of factory inspectors he set up were at the center of a policy that led to spectacular successes, as witnessed by the boom in cloth exports to the Levant or the silk industry.

Should we therefore give Colbert all the credit for the past and present power of the French luxury industry? Not so sure… Let us first recall that the court society of Versailles – which owes nothing to Colbert and everything to the pride of its absolute monarch, Louis XIV – played an essential role in the success of the luxury goods industry, by acting as a powerful consumer model attracting all Europe. Thus, as French historians have shown, the creation of fashion and of the famous articles of Paris, which were the pride of the European and American elites from the end of the Ancien Régime, stemmed from this desire to imitate the French court.

More importantly the analysis of French trade from 1750 to the 1820s calls into question some well-established certainties about the history of the luxury goods industry. Conducted within the framework of the Toflit18 research project, the exploitation of information collected by the Bureau de la Balance du Commerce makes it possible to propose a new chronology of French specialization in luxury goods, in which Colbert no longer plays the leading role.

Silk, linen, wool

In the textile sector (the leading manufacturing sector in France until the end of the 19th century), it is possible to distinguish the share of the luxury industry by schematically classifying woven products and trimmings into three categories (high, medium and low end), according to their price. In the 18th century, the high-end textile industry was essentially made of silk fabrics and ribbons, linen thread lace and certain woollen cloths such as those from Elbeuf and Sedan. The mid-range was dominated by woolen fabrics and cotton cloths and the low-range by linen and hemp. However, there were strong variations within each textile category:

American elites were fond of Parisian fashion

among woollen cloths, prices varied from 1 to 6 between the low end (twill, cadis, raze…) and the high end (sheets from Sedan, Elbeuf, Louviers, Abbeville…), while woolens from the Languedoc region had an intermediate position. In any case, analysis of the overall data provided by the Bureau du Commerce shows that between 1750 and 1821, France was a net exporter of textiles, thanks to high-end fabrics – even though it also imported large quantities of silk from India and China.

A more detailed analysis, however, reveals an increase in specialization in luxury goods from 1792 onwards. This evolution is strongly linked

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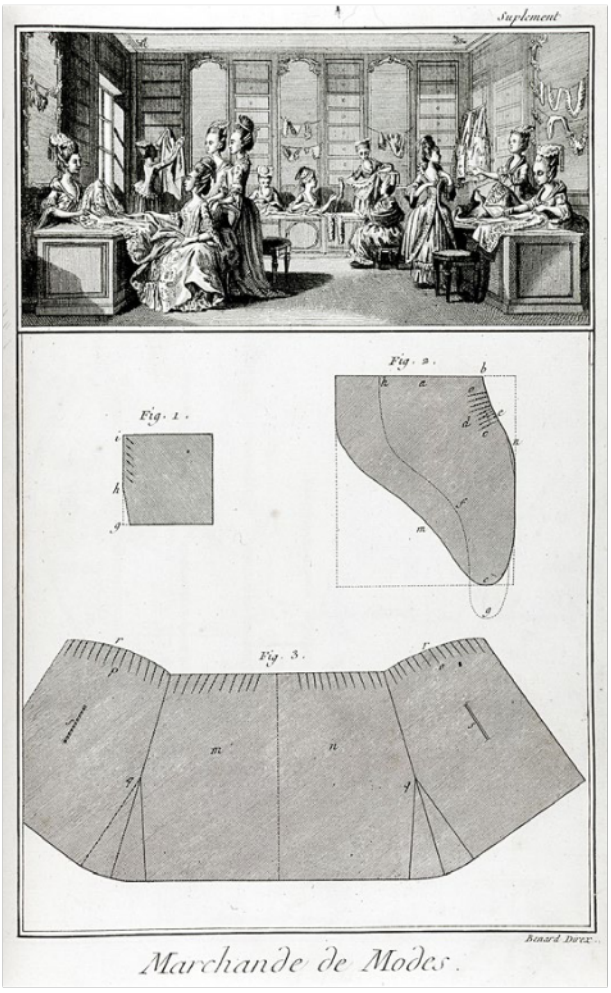
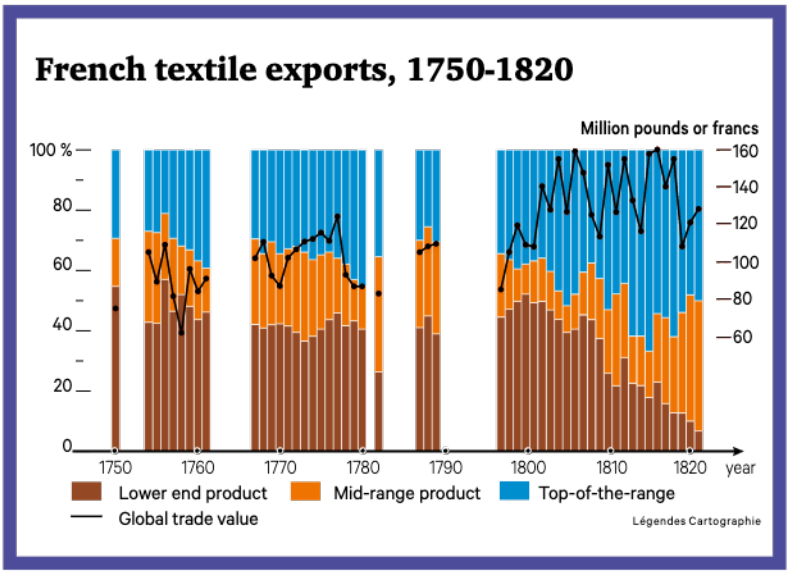


COLLECTION BHVP-GROB/KHARBINE-TAPABOR



Fashion From the French Revolution, French textile exports were concentrated at the top of the range. This was due to the success of Parisian fashion and the loss of competitiveness of other textile lines compared to the British. On the left: engraving from the *Encyclopedia*, circa 1770, representing a fashion store and a pattern maker.

to the turmoil of the French Revolution and the Napoleonic wars, which caused a decline in maritime trade. Between the end of the Ancien Régime and the Napoleonic period, the share of continental trade rose from 10 % to 35 % of French foreign trade, due to British domination of the oceans. However, distant markets (colonies, Spanish America) were consumers of low and mid-range textiles. After the fall of the Empire in 1815, English mechanics, supplying low-cost cotton cloth, took too much of a lead for France to recover these lost markets.

The sign of a failure

In contrast, French silk exports to continental Europe flourished under the First Empire. From the Restoration onwards, the revival of French Atlantic trade thus involved the deepening of this specialization in luxury goods. Throughout the 19th century, the strong growth in exports was fueled by the demand of American elites fond of Parisian fashion. The development of silk in Lyon was matched by the death of rural factories in the West (especially Brittany) and to a lesser extent in Languedoc, which had specialized in mid- and low-end textiles.

The rise of luxury exports at the beginning of the 19th century thus coincided with the end of a particularly prosperous period in French trade. Subsequently, the specialization in this sector reflected the failure of French industry to impose itself in the product ranges disrupted by the industrial revolution (cotton fabrics) and dominated by England, joined from the 1870s by Germany, then the United States.

Thus, while Colbert undoubtedly played a decisive role in the development of the luxury goods industry at the end of the 17th century, a detailed analysis of French trade data shows that specialization became more pronounced during the 19th century, as a consequence of the lag between French industry and its British competitor. The fact that in 2020 luxury goods are ahead of aeronautics in the list of French exports is therefore not necessarily a sign of good health for French industry today. ■

Note

1. For example, the French Association of Luxury Goods Manufacturers, created in 1954, chose to call itself the "Comité Colbert".

Database

The Toflit18 project "Les transformations de l'économie française par le prisme du commerce international, 1716-1821", financed by the Agence nationale de la Recherche, has collected data on French foreign trade from 1716 to 1821. These data were produced by the Bureau de la balance du commerce, created in 1713 to provide the information necessary for the Colbertist policy conducted by the royal administration. An impressive mass of data is thus offered to historians and economists: 550,000 trade flows, 60,000 products and 1,000 partners. The exploitation of this collection has been made possible by new computer tools, which allow the creation of real "data landscapes" (datascape). Discover more at: https://toflit18.hypotheses.org and http://toflit18.medialab.sciences-po.fr

The untraceable "agricultural revolution"

The real agricultural revolution took place in the middle of the 20th century. Alessandro Stanziani argues that what remains to be done is a truly «green» revolution.

By Alessandro Stanziani

At the beginning of the 20th century, historians introduced the idea of an "agricultural revolution" to describe the increase in yields and ploughed areas in Europe in the 18th and early 19th centuries. Subsequently, Braudel and many other authors placed this evolution in the long term, while taking into account other regional configurations (Asia, Africa, Latin America), which made it possible to show that the real "agricultural revolution", now called the "green revolution", rather happened inthe second half of the 20th century.

It is especially since the 2000s that this question of the ways and means and temporalities of agricultural transformations has been re-evaluated in the light of a pressing injunction: how to feed an expanding world population while preserving the planet? A review of the history of the «agricultural revolution» provides some answers, by highlighting production choices that are more diverse than it is generally thought.

A long process

The increase in agricultural production and yields in the 18th century has been explained for a long time by deforestation and the privatization of land, as well as by the manuring made possible by the abolition of fallow land, fodder and, therefore, livestock. England was considered the pioneer of this economic modernity. However, it is now known that privatization took place mainly in the 17th century and after 1830; in 1750, a quarter of the arable land was still divided. Moreover, until at least 1830, productivity was hardly higher on privatized land than on common land, in contrast to rent, which was 40 % higher. The privatization thus resulted in a concentration of wealth rather than an increase in productivity.

On the other hand, it is known that shared lands, often criticized by the supporters of "agricultural progress", made it possible to reduce the risk of climatic hazards without preventing innovation; only they directed it according to the needs not of rentiers and owners, but rather of farmers and consumers. They thus acted as a form of social insurance.

Another factor often put forward to explain the "agricultural revolution" was the mechanization of production. In reality, technical progress was a very long-term process: from the eleventh century onwards, innovations appeared all over Europe (heavy ploughs, open fields, three-yearly rotation, modern harnesses). Above all, at that time, farmers were less interested in saving labor than in increasing yields, which resulted in the domination of labor-intensive techniques. Throughout the modern era, the weight of labor increased in relation to that of capital.

It is only at the end of the 19th century that capital-intensive techniques (machines, chemical fertilizers, etc.) began to spread. Thus, even in Western Europe, mechanization was for a long time only a secondary factor in agricultural change. This did not prevent starvation from disappearing in the middle of the 19th century, thanks to a transformation in the organization of work and a better structuring of markets.

As a matter of fact, the real breakthrough came in the middle of the 20th century. While the relative share of agricultural work in the European economy had been declining since the 1870s, it was not until the 1950s that the decline in agricultural labor took place. In Africa

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DR

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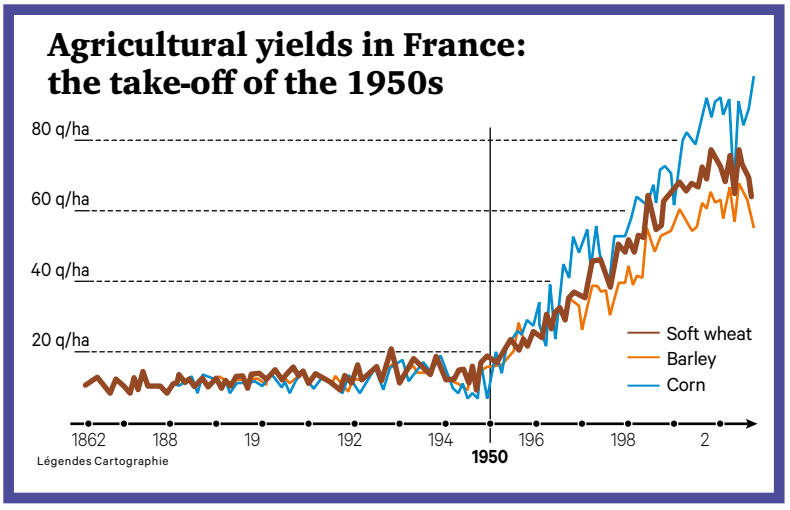
The aim is to protect old varieties and to transform seeds into a heritage of humanity

Mechanization Harvesting in the Meuse in 1950. At that time, farmers started to equip themselves with combine harvesters while agricultural yields increased considerably.



and Asia, its growth still continues to this day.

It is also from the middle of the century onwards that we observe a massive use of fertilizers and anti-parasites, the introduction of plant varieties selected in laboratories and the extension of irrigation systems. The progress was enormous in terms of yields and overall production; it was the era of mass consumption.

But the negative effects are just as important. As early as the 1870s, and even more so from the 1950s onwards, detailed analyses showed the impact of chemicals on health, but no real measures were adopted due to the influence of agricultural lobbies. Fertilizers and chemical fertilizers also have a considerable impact on ecosystems: soil yields first increase but then decrease, due to the disappearance of worms and micro-organisms. It was not until the new millennium that there was a greater awareness of the problem, in spite of the many resistances.

Thus, in the Southern countries, after the green revolution of the 1970s and 1990s, the increase in yields slowed down considerably. At the dawn of the third millennium, one third of agricultural land in Asia, half in Latin America and two thirds in Africa was degraded. These percentages reached 65 % in Europe and 74 % in North America. Desertification was one of the main forms of degradation in arid, semi-arid, dry and sub-humid regions.

The history of agricultural transformations thus confirms the logic of capitalism, which favors innovations that are effective in the short term, even if they are deleterious in the medium and long term. While a handful of companies reap the profits, millions of farmers are struck by disease, ecosystems are degraded and inequalities are accentuated on a global scale.

However, since the 18th century, and even more so today, forms of resistance to these transformations in agriculture have emerged. Often described as politically reactionary (usually with good reason) and economically stagnant (most often wrongly), they have made it possible to outline other paths for the future. The cooperative network born at the turn of the 19th and 20th centuries has never ceased to develop throughout the world and today constitutes a powerful force linking the agricultural worlds across the planet and allowing for the financing of sustainable and solidarity-based projects.

The strength of these commons applies to both land and intellectual property: after centuries of privatization, speculation and genetic manipulation of seeds, it is not only a matter of protecting ancient varieties, but also of transforming seeds into the heritage of humanity. And thus to feed the population while avoiding waste. Perhaps this is an opportunity to give true meaning to the "green revolution". ■

Definition

The "green revolution"

The expression "green revolution" appeared at the end of the 1960s to describe the experiments conducted in Mexico, then in India from 1965-1966 and in Southeast Asia. The selection of cereals adapted to the tropical climate (wheat, then corn and rice), combined with hydraulic developments and the use of chemical fertilizers and phytosanitary treatments allowed an increase in yields and put an end to starvation, but at the cost of serious environmental consequences.

MAURICE ZALEWSKI/ADOC-PHOTOS

Fake money, real expertise

How to distinguish the fake from the real? Until the 19th century, the detection of counterfeit money relied on the senses, more or less equipped. Historians are now rediscovering the effectiveness of these ancestral techniques.

By Patrice Baubeau and Arnaud Manas

Let us begin with a paradox. Since money is created by custom or by law, it is only a convention; therefore, as Diogenes the Cynic already noted in the fourth century B.C., all money is false, since it is not natural. Moreover, the notion of counterfeit money appears to be more varied than that of real money: a currency can be counterfeit by its manufacture but also by its uses – for example, when a real coin is introduced into a payment but has no legal value because it is, foreign, too worn out or critizied. In all these cases, the detection of counterfeit money involves assessing its appearance, weight, dimensions and finally its precious metal content. Since Antiquity, the detection of counterfeit money has relied on the senses (sight, touch and hearing).

For the first minted coins, in ancient China, like in ancient Greece, the signs drawn by the authorities were the first clue of the authenticity of a coin. However, wear* erases the most beautiful engravings and makes the work of the counterfeiter easier. It is therefore necessary to turn to other criteria, notably weight, which provide quantifiable criteria, for which the senses can be supplemented by machines. Thus, since Antiquity, weighing scales offer high precision, in the range of 1/10th of a gram. In the Middle Ages, the use of the trebuchet, a small precision scale, allowed for even finer weighing.

Minted money was generally weighed only by money changers and bankers: this is what distinguishes a system of weighed money, where money takes the form of ingots or nuggets without a precise shape, and the system of counted money, where only coins with a value fixed by law are exchanged. In this system, which was established in antiquity, economic agents had to refer to other criteria, in particular to the density of the money. As early as the Middle Ages, although there are exceptions, coins took the form of increasingly regular disks, defined by a diameter and a thickness. Also, by comparing these two dimensions to an authentic piece, it was possible to easily relate weight and volume in an empirical way. This technique was improved in the Middle Ages with the appearance of an engraving* higher than the reliefs in the center of the coins, which allowed them to be stacked in a regular manner.

There remains the question of the alloy*. It can be assessed in two ways: by the density, each metal having its own density; by the color, which varies according to the alloys. The evaluation of density remains difficult, even after the invention of the hydrostatic scale by Galileo in 1586, and in any case beyond the reach of the five senses. As for using the color of the coin to determine the nature of the metal, this requires, more than the other tests, a solid experience. Used since antiquity, the touchstone consists in comparing the thin layer left on its surface by the suspect coin with the one left by a wheel gauge, of which the assayer knows the exact composition. But this process is only effective for objects made of a homogeneous alloy of gold, silver and copper.

Monetary standardization

These various measures, using sight and touch, are not sufficient when the coins skilfully combine several layers of noble metals (which determine the value of the coin) and base metals (which complete the alloy). In this case, it is the sound that allows to estimate the quality of a coin, in particular if it is "sauced" (a core of base metal covered with a thin layer of precious metal) or "fourrée" (a core of base metal

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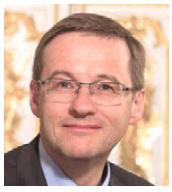

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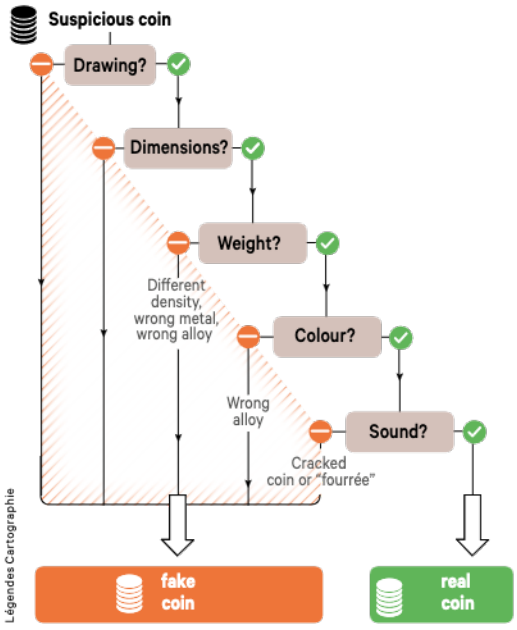
Control
This 19th-century tool makes it possible to precisely check the quality of British gold coins (shape and weight). The industrial standardization of coins allowed the improvement of control techniques.



The expertise of the senses

This «decision tree» designed by Arnaud Manas synthesizes the different steps and elements that allow, with the help of sight, touch and hearing, to determine if a coin is fake.

at the heart of a coin made of noble metal). This method, accessible to everyone, is based on comparison – except for the rare people gifted with a perfect pitch. Nevertheless, it requires a high quality of realization of the authentic pieces, mainly the absence of defects or impurities in the planchet*.

From this point of view, the steady progress of casting and minting techniques since the 16th century has considerably facilitated the work of detection through the senses, by producing coins calibrated in weight, diameter and thickness. Thus, in the 19th century, small hand-held devices appeared that allowed the verification of these three dimensions for the most widely circulated gold coins of the time, the British gold sovereigns and half-sovereigns minted between 1819 and 1914 *(see photo)*.

In the same way, technical progress has given authentic coins a more and more constant, and therefore more identifiable, sound. This is notably the case of the Maria Theresa minted from 1741, or the French 6 Pound and then 5 Franc coins (1803), which adopted the shape of cymbals. This standardization imposed sound as a decisive criterion for verification, to such an extent that during the 19th century coins lacking sound were recasted. Thus, technical progress has simplified the identification of forgeries for non-specialists. Perhaps this is one of the reasons – along with the reduction in the number of issuers – for the sharp decline in the number of money changers specializing in coin checking.

But progress, like coins, has two sides: it has also given counterfeiters the conceptual and technical tools to make ever more perfect fakes. This chase led to a real breakthrough after the First World War, with the creation, for the first time in the history of money, of security features inaccessible to the ordinary senses: secret dots on Banque de France banknotes, characters readable under ultraviolet light, magnetic strips. Thus, the old techniques of sensory verification slowly gave way to more and more sophisticated technologies. But the senses have not totally disappeared. The science of the beginning of the 21st century confirms, a posteriori, the extreme efficiency of the sensory techniques used since Antiquity. And, even today, the European Central Bank urges the bearer of its banknotes to "touch, look, tilt" them, and thus to rely on their senses. ■

KEY WORDS

Alloy
The proportion of precious metal in a coin.

Planchet
Piece of metal cut, weighed and intended to be struck.

Wear
The wear of a coin caused by its circulation.

Engraving
The edge of a coin in relief from the center.

Pioneering work

Historian and numismatist, specialized in the history of the Byzantine Empire, Cécile Morrisson participated in the first works associating historians and physicists. Access to non-destructive analysis methods from the late 1960s onwards made it possible to analyze the precise composition of rare coins. Thanks to the physicist Adon A. Gordus, she was able to date the beginning of the alteration of Byzantine coinage from the end of the 10th century. These collaborations have led to the opening of a number of projects on the minting and circulation of coins.

BJÖRN WYLEZICH/ALAMY/PHOTO12

What does archaeology tell us?

In medieval history, the material evidence provided by archaeology is an essential source. In recent decades, its analysis has deeply renewed our vision of medieval economy.

By Philippe Dillmann and Catherine Verna

It is no longer possible today to think and write an economic history of the ancient periods without refering to the material indicators that archaeologists extract from the field: from sites to waste and finished or semi-finished objects; artifacts that are often very common and that allow us to trace the material culture of an era, its level of production, the methods of exchange and thus to enter directly into the daily life of the economy.

The work of the archaeologist cannot be isolated from that of the archaeometrist, who analyzes in the laboratory the artifacts provided by the field. Their collaboration with historians is essential in order to grasp production processes, technical gestures, and even exchange networks and markets, which are the most accessible and most common frameworks in economic history.

Silos, mills and dumps

Food supply was a major objective in medieval societies, particularly in the large cities, from the 13th century onwards. Written sources make it possible to approach the question of quantities produced and even yields (through manorial archives, accounts, censors, etc.) and sometimes the quality and combination of species (association of cereals and leguminous plants, for example; supplementary cultivation), as well as technical treatises which, at least in the English case, gave management advise and ultimately aimed at increasing profits.

These written data are enriched by the field, in particular by the excavation of silos or dumps where we can find vegetable waste preserved in archaeological sediments studied by archaeobotanists: pollens, grains, and fruits. The historians of the ancient food heritage are also interested in commercialized plants and their integration and diffusion (for instance the orange tree).

Archeology brings also knew material to supplement the incomplete informations on the wheat mill given by the written sources of the Carolingian period which was, as we now know, a time of agricultural growth. Marc Bloch, in his famous article on the diffusion of the hydraulic mill published in the *Annales* in 1935, had already noticed the strong diffusion of wheat mills from the 800s. Since then, excavations have enriched the information provided by the texts on the devices themselves, their mechanisms and their uses (excavation of the flour and cloth mills of Audun-le-Tiche, Moselle, dated from the 9th century).

Medieval steelmaking

In recent years, archaeology and archaeometry have made major contributions to the fields of crafts and industry. The study of the form and the constituent material of the remains found on production sites – raw materials (coals, ores, clays, etc), fragments of products (blanks, production offcuts, objects or semi-finished products), waste (slag in metalwork industry) – makes it possible to identify the technical conditions of elaboration and their complexity (gestures, temperatures, nature and choice of materials used) inaccessible by written sources. The combination of excavation and chemical analysis of slag at production sites reveals in Lorraine, for example, the use of a phosphorous iron ore that was not thought to be used before the 19th century (Lorraine minette) and the production of a specific iron.

Similarly, the physico-chemical analysis of the products provides information of great importance on the quality of the products and makes it possible to determine the role of this quality in the price of the goods. Studies on ferrous

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Archaeology and archaeometry have revolutionized our vision of technical actions and exchange networks

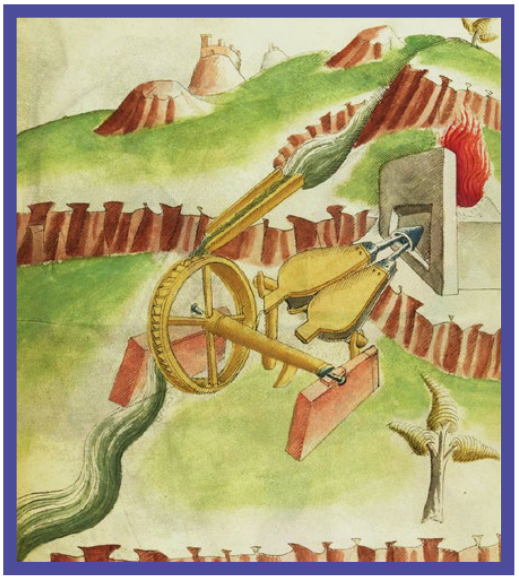
DR – LAURENT ARDHUIN/CNRS

Bloomery furnace Remains discovered in Ludres, near Nancy, dated from the Early Middle Ages. Their analysis revealed the use of a phosphorous iron ore (Lorraine minette) that was not thought to be used before the 19th century.

metals, often referred to by the generic term "ferrum/iron", have revealed a very wide variety of products, from steels to phosphorous irons, each with specific mechanical properties that can sometimes be associated with prices and trade networks.

The analysis of the material also makes it possible to highlight reuse and recycling practices. This supplements the information provided by written sources. It tends to show that reuse and recycling should not be considered as a marginal phenomenon, but, on the contrary, as a major source of supply, at the heart of the markets. During the renovation of the upper bays of the Rouen Cathedral in 1430 and 1433, 4,150 of the 4,830 pounds of iron came from iron recovered from the bays of the 13th century. Through the comparaison of chemical and isotopic signatures between the objects and the slag from different places of production, material analysis also makes it possible to trace the places of origin of the materials and thus the circulation of raw materials and artifacts that the texts ignore. In this way, it was possible to show that the iron used in the great Gothic monuments could have originated more or less far from the building site.

Finally, we know how much the study of markets has occupied medievalists and, with it, the study of coins. Nowadays numismatists and economic historians have taken a recent interest in excavated coins, especially low-value coins lost by their holders. Recent work has focused on tokens, used as a substitute currency, often associated with the devalued payment of wages in the context of large urban construction sites and found on these same sites by archaeologists. ■



Hydraulic forge Blower represented by the Sienese engineer Taccola (15th century). This type of workshop with camshaft used in the iron and steel industry allows to transform the continuous circular motion into an alternative motion.

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KEY WORDS

Archaeometry
Field of research dedicated to the physico-chemical analysis of materials discovered by archaeologists (metals, sediments, food remains, plants, etc.), to date and interprate them.

Archaeo-botany
Branch of archaeometry devoted to the analysis of plant remains (pollen, seeds, fruits, leaves, buds, wood, etc.)

Industrial Middle Ages

For the past twenty years, historians have admitted the existence of a medieval industry, distinct from the craft industry by its more important production, its insertion in long distance exchange networks and a higher level of technical innovation. The contribution of archaeology has been fundamental. Excavations in France and England on the sites of former Cistercian monasteries have established the existence of a real iron industry as early as the 11th century. This industry was based on the use of the "iron mill", which made it possible to forge larger masses of iron using hydraulic hammers. The spread of the iron mill, now well-known, affected all of Western Europe.

The Steam Engine: beyond the myth

The steam engine is a true modern legend. Nowadays, it is the subject of numerous re-assessments by historians, who have shown that it was neither the brilliant invention of James Watt alone nor a decisive factor in global industrial take-off. In fact, for a long time, it only played a minor role in industry.

By Liliane Hilaire-Pérez and François Jarrige

For most people, steam engine has played a major role in the industrialization of the world. Designed by James Watt at the end of the 18th century, this brilliant invention is considered to be the main factor in the sudden take-off of economic activity and the rapid increase in the mechanization of labor which allowed an increased exploitation of fossil energy sources and the rise a revolutionary economic system.

This "steam fetishism", as Andreas Malm calls it, has been questioned by historians for the past thirty years[1]. Some research have put the myth of James Watt in context, others have highlighted the different meanings and various uses of steam power in the 18th century. They have also revealed the diversity of energy sources at that time, offering a very different picture of the history of this totemic machine of the industrial age.

In a recent book, the historian and economist Harry Kitsikopoulos emphasized the need to rewrite the history of steam engine in the long term[2]. He reminded us of the pioneering work of the Greek mathematician Heron of Alexandria (1st century AD), rediscovered in the 16th century by humanists who tried to reproduce his machine, the aeolipile, and adapt it to ships and pumps. He also emphasized the importance of the research carried out in the 17th century on vacuum and atmospheric pressure, in England (Boyle), Italy (Torricelli), France (Pascal, Papin), the Dutch Republic (Huygens) and Germany (Guericke).

In fact, the first steam engines, developed in England by Thomas Savery in 1698 and Thomas Newcomen in 1711, were the product of this European research dynamic. However, while research had reached a plateau in continental Europe, England stood out with its "fire pumps", which were designed to evacuate underground water from mines*. They were coal-fired boilers* (hence the name) that could pump water from a depth of 45 meters at a rate of 500 liters per minute, using only steam energy.

This invention was made possible by a series of factors. First, there was the experimental orientation of English science and the close links between English scientists and manufacturers. The scientists who led the experiments were indeed well connected to entrepreneurs such as John Theophilus Desaguliers: a demonstrator at the Royal Society, he explained in his lectures how to use steam and gave some practical advises to industrial investors. Second, England had some very important coal deposits, which at that time were increasingly exploited for heating and for various industries (salt works, breweries, glassworks, etc.). This need for more and more coal stimulated the search for new solutions for the evacuation of underground water and ventilation in mines. Finally, England was under a capitalist system and its legislation was favorable to the economic exploitation of inventions protected by patents*.

Savery's machine was indeed protected from 1698 onwards by a patent whose duration was extended to thirty-five years the following year, which allowed the operating company to adapt Newcomen's machine. The machines were purchased by wealthy Newcastle mine owners who were able to pay the license fees. They were assembled by engineers paid by the mine owners, in a highly competitive atmosphere.

These techniques that were developed in England quickly spread and were adapted in other European countries, such as Sweden or Belgium in the region of Liege. But there were

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DR – JÉRÔME PANCONI/OPALE.PHOTO

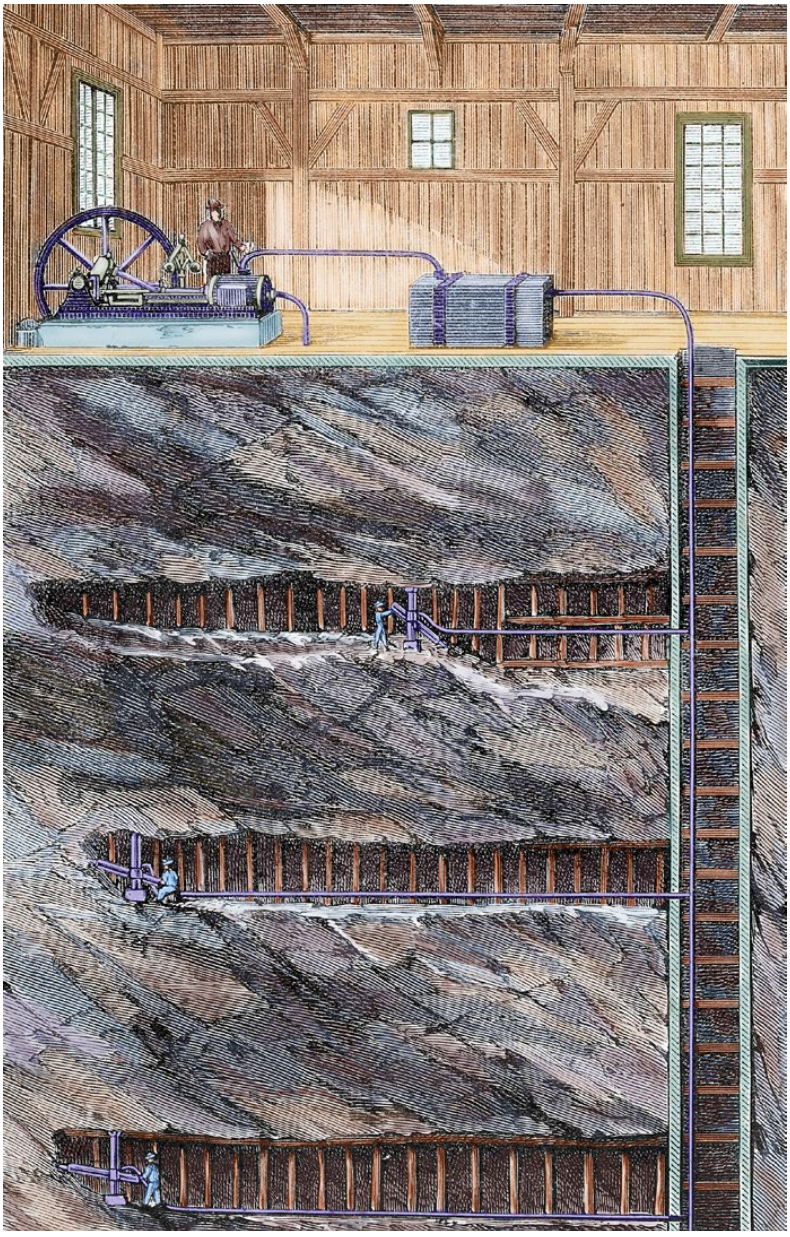
Pioneer Steam engine by Savery, model of 1753. This first steam engine received a patent in 1698. Dangerous and inefficient, it was only used to supply the fountains of princely gardens.

still some disappointments, and it was not uncommon for steam engines to fail and for the first users to abandon their project.

Watt, between progress and profit

Born near Glasgow in 1736, James Watt benefited both from these earlier inventions and from the specific context of the Scottish Enlightenment, which saw a strong mobilization of local elites in favor of useful science[3]. After an apprenticeship in London, he returned to Scotland and established himself in Glasgow as an instrument maker. For him, science was above all a market and an opportunity to engage in all kinds of business. Using his skills to serve various entrepreneurs, he acquired a reputation as a civil engineer during his time at the Scottish canal network, which was at that time experiencing a boom. He built Newcomen's machinery, notably for John Roebuck, contractor of the Carron forges* and mines. When he was in charge of repairing a fire pump at the University of Glasgow, he conceived a decisive improvement of Newcomen's machine, by adding a separate condenser; this addition allowed to maintain the cylinder's warmth and led to considerable energy gains.

In 1769 Watt joined forces with Roebuck and obtained a patent in order to get some financial benefits from his invention. In 1774, after the bankruptcy of his partner, he connected with another industrialist, Matthew Boulton, head of a hardware factory* in Soho, near Birmingham. Through intense lobbying, the two partners succeeded in obtaining a renewal of their patent



Fire pump to extract water British engraving from 1888 showing a series of mining galleries. On the surface, a steam engine activates a pump that is used to evacuate water and aerate the underground pipes. Initially, Savery and Newcomen's machines were intended for this purpose. For most of the 18th century, the steam engine was used to pump water for various purposes (mining, supplying water to cities, draining swamps). It was not until the end of the century that the steam engine was used as an engine to drive new machines in the textile, metallurgical and mechanical sectors.

for a period of twenty-five years in 1775. This was the beginning of the firm Boulton & Watt, which was to enjoy great success in the last quarter of the 18th century. Thanks to a fruitful collaboration with the ironmaster John Wilkinson, who added the steam engine to his blast furnaces*, Soho became the first mechanical construction site for steam engines, delivering 164 pumps until 1800, including 49 for the copper and tin ▶▶▶

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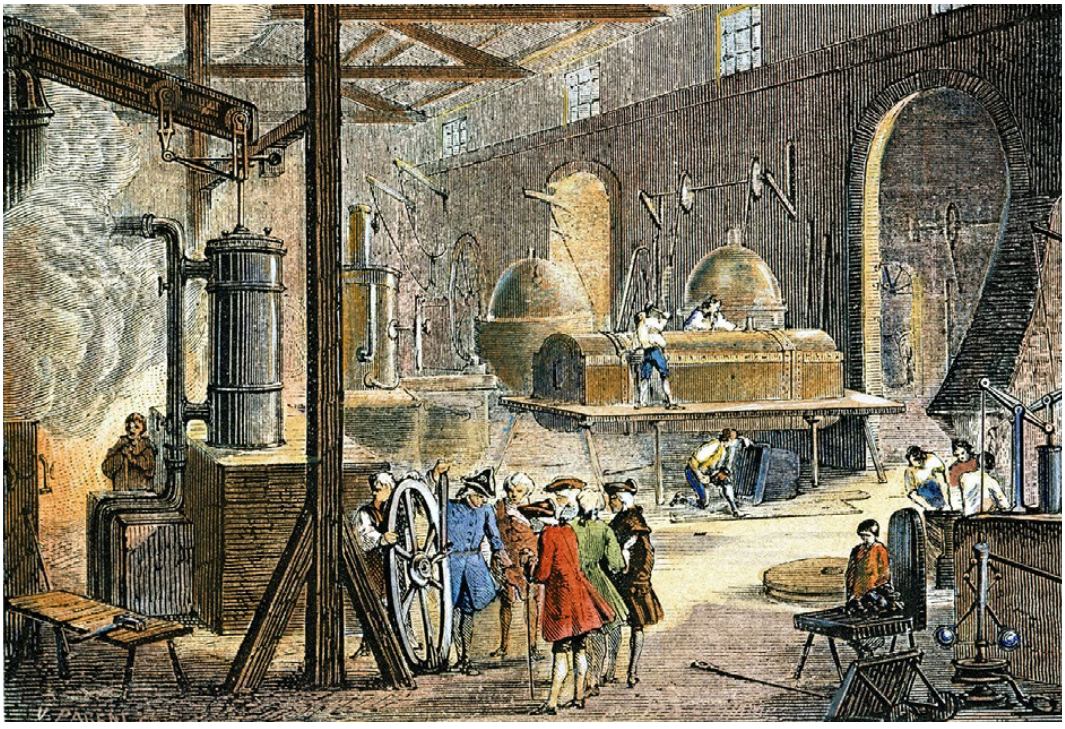


A successful business Watt and his partner visit their factory in Soho, near Birmingham (engraving from 1870). As opposed to his image as a selfless scientist, Watt played an important role in the commercialization of his invention.

mines of Cornwall. From 1782 onwards, "double effect" steam engines made it possible to activate wheels. 308 of these rotating machines were produced in Soho until 1800. Their installation in big cities was used as a means of promotion, like a show.

But this success should not be misleading. Among the 2,500 fire pumps used in the United Kingdom in 1800, 70 % were still Newcomen machines. There were many reasons for the slow start of Watt's machines, including the very restrictive nature of the 1775 patent, which prevented other engineers from perfecting the invention. It was not until 1800 and the expiry of the patent that a collective invention dynamic started among the Cornish mining engineers, allowing a series of improvements.

This does not mean, however, that Watt's invention was due to his genius alone. From the beginning, Watt was surrounded by a team of builders at his service. Boulton's technical contribution, in particular, has been reassessed by historians. Indeed, in addition to his role as a financial partner, he built his own model of fire pump in 1765. He was interested in boilers and worked on evaporation with Benjamin Franklin. He also made calculations on energy conservation and was involved in the design of the rotating steam engine. Watt, on the other hand, was very active in defending his rights, to such an extent that he became the most active promoter of the patent system in the 18th century. As a result, rather than a selfless scientist, historians nowadays consider him as a skillful manufacturer and an efficient defender of the economic rights of inventors.

Boulton Historians have reassessed the role played by industrialist Matthew Boulton, who was Watt's partner from 1774. Truly interested in science, he took an active part in the process of invention (painting from 1772).

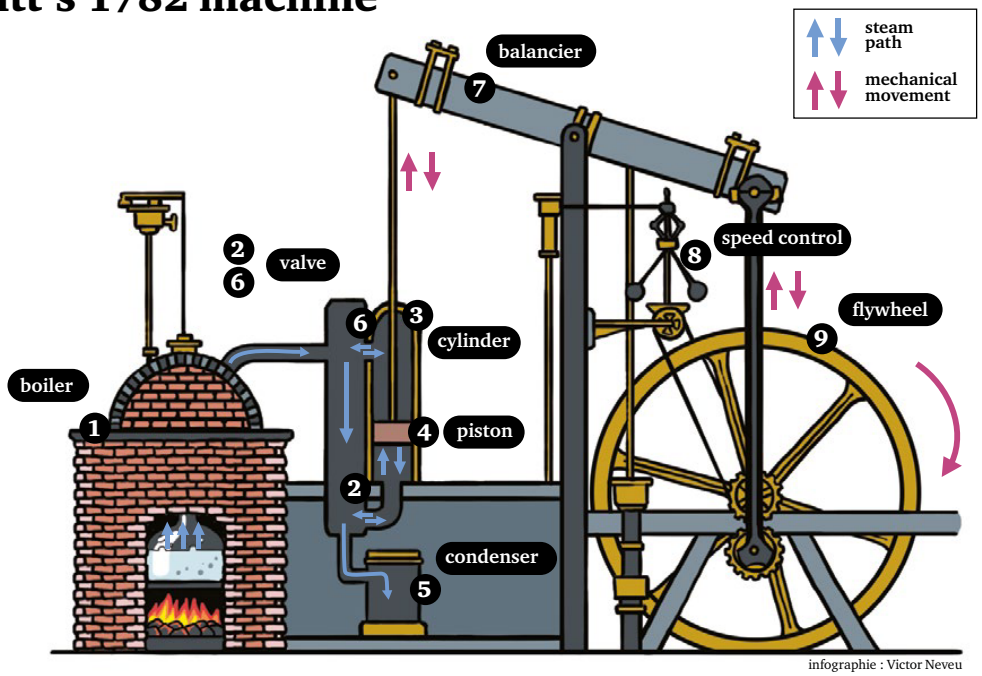
Atmospheric knowledge

Apart from this commercial aspect, Watt's invention also benefited from a profound renewal of scientific knowledge on steam. At that time, the study of steam was part of a vast body of knowledge and chemical practices concerning air, gases, fumes, but also climate, meteorology and geology – far from the sole approach in terms of thermodynamics, which became the norm in the 19th century. In fact, the meaning of the word "steam" was broader than it is now, as it applied to all kinds of emanations (liquids, mineral or vegetable substances). Steam was considered to be a combination of water and other elements, with "water vapor" being only a special case where water was combined with fire and heat.

This conception was central in the work of Watt and Boulton: the idea that heat was a separate substance

GRANGER COLLECTION NYC/BRIDGEMAN IMAGES – BIRMINGHAM MUSEUMS AND ART GALLERY ; BRIDGEMAN IMAGES

Watt's 1782 machine



infographie : Victor Neveu

The coal-fired boiler (1) heats the water and transforms it into vapor, which then enters through a valve (2) into the cylinder (3) and pushes the piston (4) upwards. When the cylinder is full, the vapor drains away into the cold condenser (5) through the bottom valve. It then enters into the cylinder again, this time from above (6). It pushes the piston downwards before being discharged into the condenser from the top when the piston rises again. The repetition of this cycle activates the rocker arm (7), which transforms the continuous rectilinear movement of the piston into a circular movement. The external condenser was added by Watt to the original machine; it allows the water to condense without cooling the cylinder itself. Watt also added a speed control with balls and a flywheel (9) to regulate the speed of the machine.

KEYWORD

Patent

Privilege of invention (comes from "letters patent" or "open letters"). The king granted patents, i.e. the exclusive right to exploit an invention. This law was regulated by the Statute of Monopolies of 1624, which set the duration of patents at fourteen years. As an exception the Parliament could extend this duration.

that could enter and leave the steam explains the use of the separate condenser to prevent the cold water injected into the cylinder from taking on heat and ruining the vacuum. From this point of view, Watt's engine reinforced the emerging atmospheric theories on winds, evaporation and cloud condensation, theories that were used, at the same time, by other inventors to design many devices (fans, furnaces, heating, aerostats, etc.).

The uses of the steam engine itself were not limited to mining. In England, the York Buildings Company, set up by the resourceful Duke of Chandos, used it to pump water from the Thames to London. As early as 1712, the company acquired a Savery machine, then a Newcomen machine in 1724. The latter was operational only after two years of testing but had to be abandoned in 1732 because it was too costly in terms of coal consumption. In France, Watt's machine was introduced in 1781 by the Compagnie des Eaux led by the Périer brothers to activate the pump of Chaillot, which supplied water to the wealthy inhabitants of northwest Paris. In Rotterdam, entrepreneurs mobilized to buy a Newcomen machine in 1775 and a Watt machine in 1787 to supply water and drain the polders (to the great displeasure of the inhabitants who were worried about the impacts). Still in the Netherlands, a Newcomen machine was installed in the garden of Groenendaal, south of Haarlem, in 1781, for water jets. In France too, the machines of Savery and Newcomen were used in gardens at Bagatelle, Monceau, Neuilly and Raincy, following a princely hydraulic tradition.

It is only from the years 1800-1820 that the steam engine was mainly used for the energetic efficiency of the "water vapor". External combustion engines using steam pressure were used to activate spinning machines*, forge hammers and mills, but also boats and locomotives. The mining engineer Richard Trevithick developed more compact and more powerful high-pressure machines that were easier to move and to install in farms, small factories*, or on ships and rails, which enabled him to design the first steam locomotive in 1803. In France, these machines were produced by the Périer brothers and used to equip the cannon foundry and forge at Indret, near Nantes, and the Littry coal mines, in Normandy. A few years later, Marc Seguin designed the tubular boiler, in which the combustion gases circulate in multiple tubes passing through the heating body, which increases the heat exchange surface and thus develops the ▶▶▶

Notes

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2. H. Kitsikopoulos, *Innovation and Technological Diffusion. An Economic History of Early Steam Engines*, London, Routledge, 2016.
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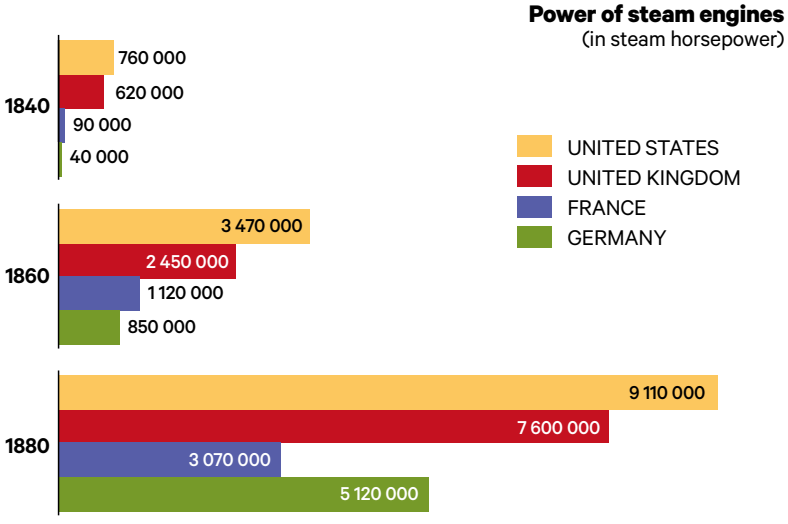
International dissemination



In 1840, only Great Britain and the United States had significant steam engine equipment. In the four decades that followed, these two countries increased the power of their arsenal tenfold, while France and Germany began to catch up rapidly.

power of the engine; this boiler was used as early as 1827 for steamboats sailing on the Rhone, and then on a first locomotive two years later.

Patents and experiments to improve steam engines multiplied throughout the 19th century. Thermodynamics was born and the myth of Watt was established. From then on, an "ideology of steam", emblem of the triumphant capitalist bourgeoisie, imposed itself, allowing the myth to triumph over history.

And yet, for a long time, steam engine was scarcely used. It was absent from most workshops* and factories*. Its spread around Europe was very slow and varied greatly from one region to another. In fact, it was a consequence of the "industrial revolution" much more than its cause. Far from replacing other engines, the steam engine coexisted with them.

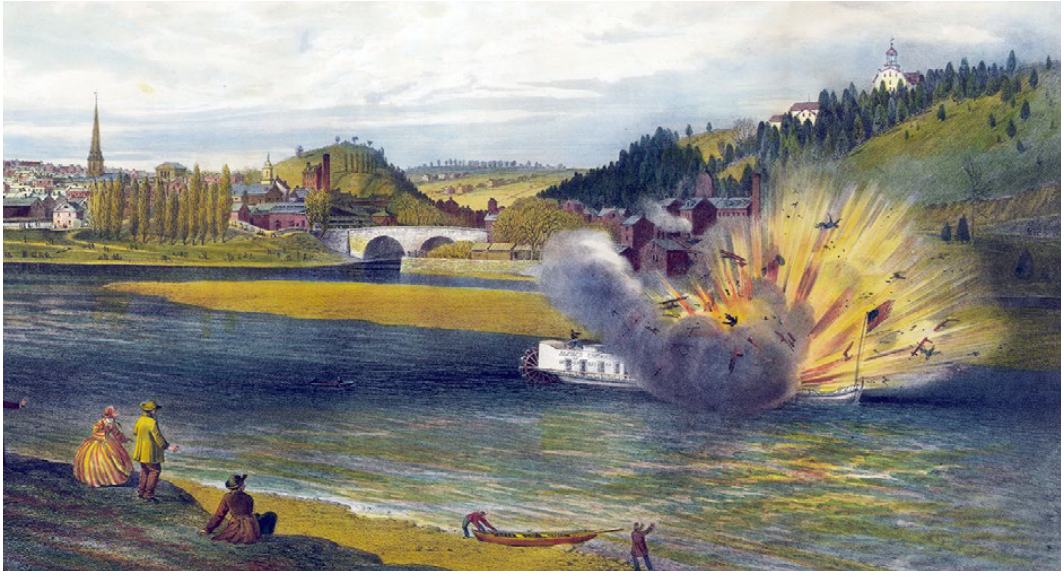
Uneven and limited use

Between 1775 and 1825, only a hundred orders or so from abroad were delivered by Watt & Boulton, the largest one being an engine used to active a sawmill in the docks of Cadiz, Spain[4]. While British industry used 30,000 steam engines around 1830, there were no more than 1,000 in the whole of France at the same date, and only 6,000 in 1852.

Even in England, the role of the steam engine in the process of industrialization was initially quite limited, except in certain counties or mining districts. For a long time, new machines used arms' and animals' strength or water wheels*. In the 1820s and 1830s, water power was still preferred to steam engines because it was renewable and cheaper. Hydraulic power was even more central on the Continent, in France as well as in Italy, where it shaped industrialization for a long time.

The fact that steam engine was ultimately chosen as the central energy in industry had less to do with its intrinsic superiority than with its greater flexibility: whereas hydraulic power relied on large-scale installations requiring coordination between several actors to regulate the flow of the watercourse (dam, feeder canal, wheel, etc.), the steam engine could be adapted to any support by an isolated entrepreneur, which matched better with the competitive and individualistic logic of English capitalism in the 1830s.

In North America and Asia, the adoption of steam was also slow and gave rise to hesitation, while coal was in short supply or expensive to



Accident Explosion of the steamboat Alfred-Thomas on the Easton River, Pennsylvania (lithograph, 1860). The manufacture of steam engines and their use were the cause of many accidents.

UNIVERSAL HISTORY ARCHIVE/UIG/BRIDGEMAN IMAGES

The triumph of the crank handle

The crank handle is a seemingly simple device that transforms the force of the hand or foot (pedal) into a rotational movement to produce mechanical labour. Despite its simplicity, this mechanism seems to have been used little in antiquity and it is only with the medieval hand mills that a rudimentary crank appears, an ordinary handle for grinding grain. The use of the crank handle extends and diversifies afterwards, even if it is necessary to wait for the Renaissance to observe the rise of the rod crank system, which allows to transform the circular movement into linear movement.

If the study of the crank handle is a classic problem in the modern history of technology, specialists in industrialization, obsessed with powerful machines powered by fossil fuels, have not paid much attention to it. However, in the 18th century, in the textile sector, the crank handle was the first engine of industrialization: it was the crank that drove the small spinning or shearing machines. It made it possible to employ unskilled workers such as women and children. Far from being outdated, the crank benefits from the progress of kinetics and the improvements of metallurgy and mechanics (lower cost of cast iron, adjustment of gears, friction reduction). From then on, the crank saw its uses multiply.

In the twentieth century it is with crank handles that the mechanization of domestic work begins (washing machine, vegetable mill and small domestic equipment, above: the front page of *Mode pratique*, 1928). We should also mention machine guns and the first movie cameras. After 1945, in the Soviet Union as well as in China, even though great machines are celebrated, the cranks are everywhere in agriculture and small industry. ***F. J.***

import, which led many actors to favor the improvement of hydraulic equipment or the use of old horse-drawn carriages. In China, the "discovery of steam" was still uncertain in the mid-19th century. Recent research by economic historian Kent G. Deng suggest that it was less a matter of incapacity to use steam engine, but rather a problem of technological inadequacy to China's needs and cultural context[5]. Moving away from the heroization of the technical object, a growing number of research have also emphasized the distrust and doubts that accompanied the use of the new machine. It was perceived as a despotic agent in the workshop, as a source of injustice and excessive concentration, but also as a source of increased risk, particularly because of the fires and fumes that many local inhabitants complained about.

Obstacles and uncertainties

Moreover, the yields of these machines remained mediocre until the middle of the 19th century, and the construction of boilers was poorly mastered, sometimes leading to spectacular accidents reported in the press. In Great Britain, more than 200 explosions were recorded in the 1840s and more than 400 in the 1850s; in France, between 1865 and 1885, there was an average of 32 accidents per year.

Technicians and engineers themselves were skeptical, calling for caution and not giving in to the fascination for the new energy converter, like the agricultural engineer Edmond Vianne who, during the French Second Empire, emphasized how "*steam is a brutal force that is always ready to explode*". These accidents led to the development of safety standards and a set of regulations that accompanied a gradual naturalization of the risk inherent to industrial modernity. The refusal to depend on coal also led many manufacturers to postpone investing in this equipment. Many practitioners favored their familiar tools, which they sought to improve. As for those who adopted steam, it created a dependence on outside technicians and implied new skills that they did not always master. In many craft sectors, the installation of these machines was difficult because of the layout and size of the buildings.

The question of coal depletion was also of concern to geologists and authorities, who were sometimes reluctant to rely on this machine, which involved importing coal fuel, a ▶▶▶

Notes

4. J. Tann, "The International Diffusion of the Watt Engine, 1775-1825", *The Economic History Review*, 31/4, 2008, pp. 541-564.

5. K.G.Deng, " Why the Chinese Failed to Develop a Steam Engine ", *History of Technology* n° 25, 2004, pp. 151-172; J. Tann, *op. cit.*

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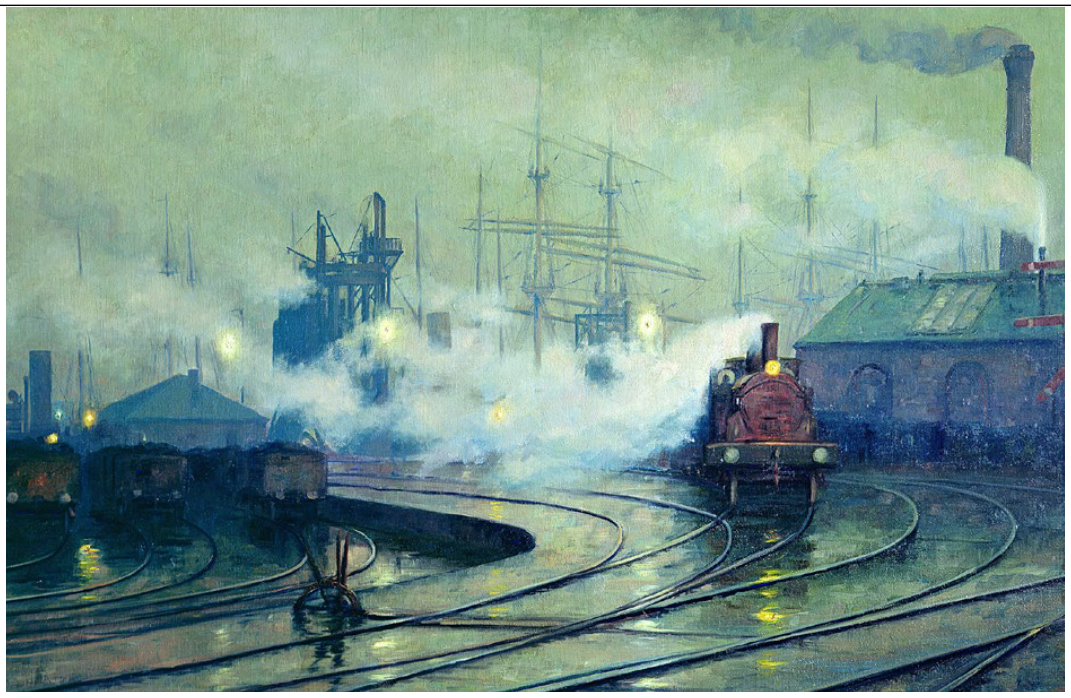
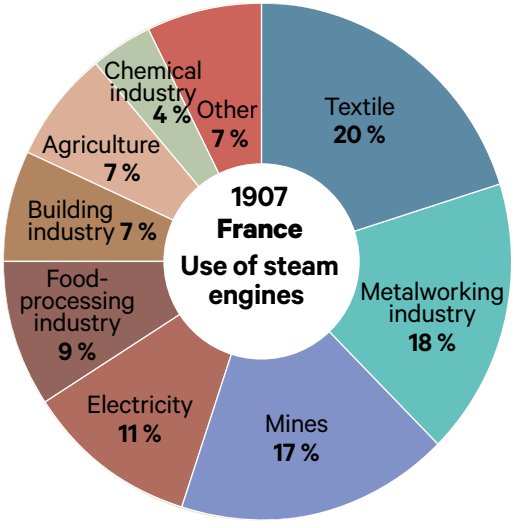


Locomotive
View of the docks at Cardiff, Wales, painting by Lionel Walden (1894, Paris, Musée d'Orsay). From the 1830s onwards, rail transport became one of the main fields of application of the steam engine.



The uses of steam in France
At the dawn of the 20th century, steam was the dominant energy source in large industrial sectors (textiles, mining, metallurgy, chemistry, etc.), where it was used for various machines: mechanical looms, pumps, boilers, hammers and blast furnaces. It also allowed the development of electrical production (steam turbine) and the modernization of agriculture (mechanical threshers and harvesters).

very costly import prior to the railroad expansion of the second half of the 19th century. The publication of the economist William S. Jevons' book *The Coal Question* in 1865 gave great publicity to these debates, while formulating the principle of the "rebound effect": the use of more efficient machines that consumed less energy did not lead to a decrease in overall consumption, because of the use of an increasing number of these very same machines.

Afterwards, the debate went on and led to the search for other solutions to produce power, for instance small experimental steam engines using solar energy in the 1870s, or through the improvement of hydraulic turbines coupled with electricity to invent "white coal". It was not until after 1870 that the choice of steam power really took hold in Western Europe, and even later in the colonial empires and the rest of the world. In 1870 Great Britain had 100,000 steam engines in activity. From then on, its available steam power increased by about 50% every ten years, reaching 10,5 million steam horsepower in 1907. By then, steam had become the main source of industrial energy, both in Europe and in the United States. In France, apart from transport, steam engines were mainly used in the textile industry, which accounted for about 20 % of the total power of machines according to the *Statistique de l'industrie minérale et des appareils à vapeur* published in 1907. The next largest use was in the metalworking industry, followed by mining, power stations, food-processing industry and agriculture, where a large number of steam engines were used to power threshers.

Far from being a revolutionary technology that would have imposed itself in due time because of its intrinsic superiority, there is every reason to believe that steam was installed very gradually, first in the main sectors of British capitalism, those that were the most visible to engineers and historians after them. Hence the significant discrepancy between the enthusiastic speeches and promises of the steam engine in the 19th century and the reality of the practices and uses of a technology that remained the exception for a long time.

The introduction of steam was ultimately the result of constant efforts to convince hesitant manufacturers, and it was extended through infinite adjustments and modifications as it was adapted to various uses and functions. Neither a genius invention nor a decisive factor in the beginning of global industrialization, it was rather a tool that accompanied the progressive expansion of production, before becoming the symbol of the new fossil economies of the industrial age. ■

PARIS, MUSÉE D'ORSAY ; JOSSE/BRIDGEMAN IMAGES

Jean-Claude Perrot (1928-2021)

Jean-Claude Perrot's intellectual project: economic and social history written by true historians

***By Éric Brian,** Prof. at the École des Hautes Études en Sciences Sociales*

In *Les Annales*, 1948, n° 177, Lucien Febvre wrote about the art historian Pierre Francastel: *"What the author intends to work on, is a history of art that is history. One that is integrated into history. That helps historians to write their history and relies on the history of historians to better understand the history of art itself, or of the arts."* This quotation can be applied to Jean-Claude Perrot's project for economic and social history.

Jean-Claude Perrot, as history teacher at the high school of Caen, in 1953.

Jean-Claude Perrot died in December 2021. He was 93 years old. His intellectual project was formed when preparing his doctoral dissertation on the genesis of the city of Caen. Among numerous comparable studies supervised by Ernest Labrousse, his was the most systematic and the most provocative.

In his work, Jean-Claude Perrot considered four layers of research. The first one, according to his master's thesis, was the study of things that could be counted: population, housing, density, production or trade. The second one consisted in identifying chronological evolutions. A third level studied the changing urban conceptions expressed by the actors themselves. In the rich early modern Normandy, numerous authors reflected on what they had under their eyes. This level thus encompassed the study of urban policy insofar as it conveyed intentions and produced real transformations. Finally, the fourth level of analysis was centered on images and representations of any kind.

"Critical turn"

Perrot observed that functional and even quantitative study was concealing the connections linking these four levels of analysis. During his research, he saw, as a rigorous historian, how economic phenomena were diversely understood and theorized in the 17th and 18th centuries. He thus chose to write the intellectual history of these different ways of approaching economics. He considered that ancient observers and commentators were providing a profusion of knowledge and a treasury of hypothesis and questions to be addressed by nowadays historians. Each question or observation, once analysed, may spur a new question to be explored. This is the principle of what Bernard Lepetit, one of Perrot's prominent students, called the "*critical turn*" as a tool of historiographical experimentation. It consists in studying from a critical standpoint an ancient approach of a phenomenon in order to question the phenomenon itself and thus raise new questions and new empirical results.

After that, Perrot's later orientation towards intellectual history was not a change in his line of reasoning, but an extension of his early program. His interest for intellectual history had nothing to do with the traditional "history of economic ideas": just like Lucien Febvre, he considered that historians of economic ideas tended to reduce a vast intellectual movement (some five thousand authors in French for instance) to a pantheon of a few authors, thus concealing the richness of economic thought during the period of the Enlightenment. That is why his program, rather than being centred on a few well-known authors, which is of no use from the standpoint of general history, "*focuse*[d] *on all the cognitive activities that precede constituted knowledge*" (1988).

This program was also a critique of Braudel's appeal for the methods developed by economists in the mid-20th century. In 1981, Perrot dared to publish a critique in *Les Annales* where he pointed out Braudel's anachronic conceptions of time in his magnus opus, *Civilisation matérielle*. Perrot thought that economists studying history first and foremost as economists were not actually historians. He thus promoted a program for historians, aware of the various stages of economic knowledge, and equipped as scrupulous intellectual historians: not economists studying history, but rather historians studying past economics. ■

For Perrots' list of publications and references, see Éric Brian "How can Intellectual History serve a Reform of Economic and Social History?", Revue de synthèse (Brill), *vol. 142, n° 3-4, 2021, p. 290-308.*

(C) PHOTOGRAPH FROM MICHELLE PERROT'S FAMILIAL ARCHIVES, PUBLISHED BY LE MONDE, DECEMBER, THE 16TH 2021.

From corporate monograph to transnational history:

a new historiography of the French Post Office (La Poste)

By Muriel Le Roux *(CNRS-IHMC-ENS-Panthéon Sorbonne) and* ***Sébastien Richez*** *(CHP)*

Under the influence of deregulation policies encouraged by the European Union and the digitalization of exchanges, La Poste is no longer in 2022 what it was at the end of the 20th century[1].

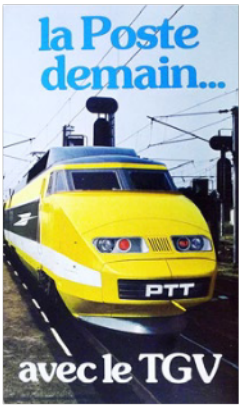
Meanwhile, its historiography has been renewed under the impetus of the Committee for the History of La Poste (CHP). Launched in 1995 by François Caron, a business and innovation historian and co-founder of the French School of Business History, the CHP has benefited from these new approaches as well as from the perspectives drawn up by Daniel Roche, in terms of material, cultural and social history.

A rich and diverse history

Eugène Vaillé's descriptive and institutional work on the early modern and modern periods was followed by new questions. Regional monographs (19th and 20th centuries) have outlined the conditions of La Poste's presence. Social studies have shed light on two emblematic professions, letter carriers and receivers, but also on the working conditions of itinerants and sorters, on the expectations of staff (more and more women) and contemporary customers. Works on the role of the Post Office, civil and military, in wartime, a history of techniques (pneumatic post and computerization of services) have also renewed the look on the institution's modernity. Through mobility or sport, from past to present, it is thus possible to study the role of the Post Office in society. On the economic and financial side, the evolution of the society, from a monopoly to a public company acting on the market can be analyzed through the history of the reforms regarding the parcel or financial services[2]. The Post Office was at the same time a tool of diplomacy, a means for the State to educate the citizens, a form of social protection, an economic planner. It is therefore the subject of a rich and diverse history which covers a broad spectrum and allows new international comparisons[3].

Mail history, Le comité pour l'histoire de La Poste: an evolving historiography.

Postal high-speed train, put into service in 1984, to cope with the continuous growth of mail and to be faster, a postal TGV ran from Paris to Cavaillon until 2015. Its abolition testifies to a new relationship with space and time in the transport of mail, which is now shrinking.



There are still, however, some aspects of this history that need to be explored by historians. For instance questions related to exchanges (trade and communication), in relation to the evolution of lifestyles and consumption. Even though parcels are nowadays becoming much more frequent than letters (in 2030, the letter traffic will have fallen back to its level of 1913), there are much more studies on the former. Both of them call for a technical, economic and cultural history that has not yet been explored. The interconnections and fragilities of postal systems also deserve to be further explored through the history of networks. The establishment and functioning of postal networks call for a history of territories over time, *via* a transnational approach based on colonial, post-colonial and globalization studies[4]. It can be articulated to the study of State building and European development, and questions about the notions of public service or market. From this perspective, the Post Office appears as a link under tension in the great chains of interdependence that influence national histories, as illustrated by the session proposed by the HPC at the World Economic History Conference in Paris in 2022, questioning the relationship of the Post Office to globalization. ■

Notes

1. Muriel Le Roux (ed.), "Les Postes à la recherche d'un nouveau modèle?", special issue, *Entreprises et Histoire*, n°105, Dec. 2021. **2.** M. Le Roux, Sébastien Richez (dir.), *Brève histoire de la Poste en France depuis 1945*, Brussels, PIE Peter Lang, 2016, 142 p. **3.** M. Le Roux, S. Richez, E. Vaillé, *A Concise History of the French Post Office*, Brussels, PIE Peter Lang, 2018, 329 p. **4.** Quentin Deluermoz, *D'ici et d'ailleurs. Histoires globales de la France contemporaine*, Paris, La Découverte, 2021, 337 p.

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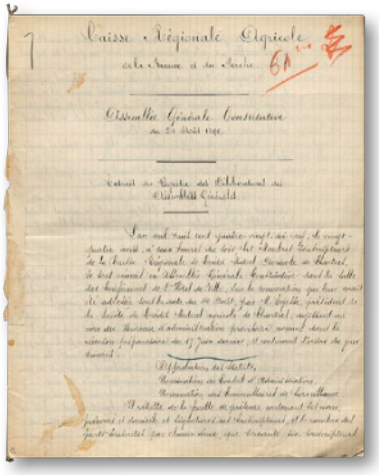
The historical archives of Crédit Agricole SA and the Fondation Maison de Salins:

promoting knowledge of the cooperative sector

By Pascal Pénot, *head of Crédit Agricole SA historical archives*

◂ **Barricade** in front of the American legation in Beijing during the Boxer Rebellion, between May 27 and August 19, 1900. This photograph was taken by an engineer from the economic and financial studies department of Crédit Lyonnais on a mission to China at the time of the "55 Days of Peking".



▸ **Official records** of the constitutive assembly of the Caisse régionale de crédit agricole de la Beauce et du Perche (1899).

With 51 million customers, more than 10,5 million members and 142,000 employees worldwide, the Crédit Agricole Group has a rich history that began 137 years ago with the creation of the first local bank in Salins-les-Bains, in the Jura region. It was initially a mutual and cooperative bank, specializing in agricultural lending. It then gradually broadened its scope to become a universal bank and a leader in insurance in the early 1990s. It has also strengthened its expertise in certain areas thanks to the integration of companies that also have a long history of their own, such as Crédit Lyonnais, Banque Indosuez and Sofinco.

Crédit Agricole SA's historical archives department includes three important archives for the study of the group's history: those of Crédit Agricole SA and the former Caisse nationale de Crédit Agricole; the archives of the former Crédit Lyonnais (now known as LCL); and the archives of Crédit Agricole Corporate and Investment Bank and its previous companies (Banque de l'Indochine, Indosuez, etc.). Beyond banking history, these archives are useful for agricultural history, for economic and financial history in general, for colonial history and for the history of the mutual and cooperative model.

2,000 documents online

Nearly 2,000 social documents from the Crédit Agricole regional banks from the beginning of the 20th century have been made available online. These documents include annual reports, minutes of general meetings, internal regulations, statutes, etc. This collection provides a better understanding of the history of these regional cooperative banks.

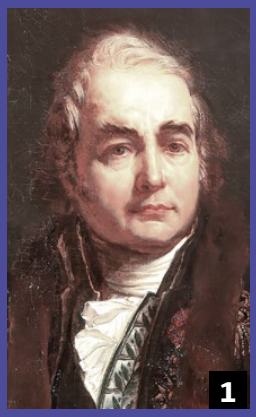
However, the Fondation Maison de Salins has a broader objective: it aims at promoting access to sources for the study of the cooperative model in general. Articles and digital exhibitions on this subject are frequently released.

A guide to sources for the history of the cooperative sector is also being produced and partnerships with other institutions are being established. This is notably the case with the Confédération nationale de la mutualité, de la coopération et du crédit agricole (CNMCCA), with the Fédération des sociétés coopératives de communication and, more recently, with the Peugeot Group for the enhancement of the archives of the Société coopérative of its employees.

With more than 7,5 linear kilometers of paper files and more than 12 terabytes of electronic archives, the Crédit Agricole SA Historical Archives offer great possibilities for studies on a wide variety of subjects. The iconographic collections of posters, photographs, and films make it possible to illustrate subjects that are broader than just banking history. The few illustrations presented here can highlight it. ■

For further information:

On the history of Crédit Agricole: History of the Crédit Agricole Group | Crédit Agricole (credit-agricole.com)
The Maison de Salins Foundation: Collections of the Maison de Salins Foundation (maison-salins.fr)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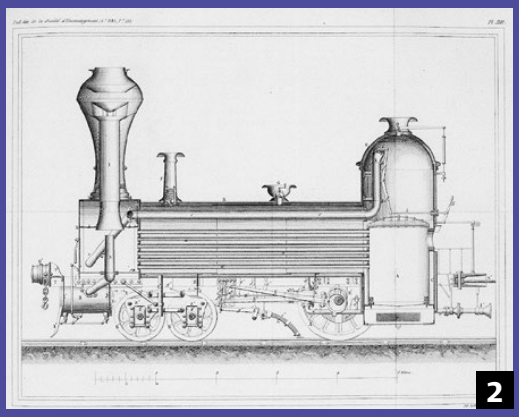
2


3

The Société d'Encouragement pour l'Industrie Nationale

Supporting innovation for 220 years

By Daniel Blouin *and* ***Gérard Emptoz,***
(History Commission of the Société d'Encouragement pour l'Industrie Nationale)

The Société d'Encouragement pour l'Industrie Nationale was founded in October 1801 by a group of men from different backgrounds, including scientists, engineers, agronomists, businessmen, intellectuals and "enlightened" minds, with the support of the First Consul Bonaparte. Its project was to "accompany industry in its development" by encouraging innovation in all areas of the productive sector, and to spread the "lights of instruction" through vocational training. The scientist, chemist, industrialist and Minister of the Interior, Jean-Antoine Chaptal, became its first president, symbolizing the union of science, business and power in the new institution.

Its reputation grew rapidly and durably: first, because of the personality of its leaders, scientists or engineers of worldwide reputation; second, because of the amount of awards – 2 million gold francs between 1800 and 1914 – given during the different competitions that the Société organized and for the inventions or scientific progress it distinguished; and third, because of its *Bulletin*, which was widely distributed in France and abroad.

From useful science to industrial science

In the first half of the 19th century, the Société's approach was to be as broad as possible: through dialogue between scientists, engineers and entrepreneurs, and "artists", practitioners or inventors, it sought to promote invention as part of a reasoned technology, in close relation to an active technological watch, particularly with respect to the British economy, which was considered more advanced at the time.

Its action evolved in the second half of the 19th century, in the context of the second industrialization: it was the time of industrial science, with the promotion of scientific discoveries considered the most interesting for industry, as well as their industrial applications. The Hôtel de l'Industrie, which was built on what is now the Place Saint-Germain-des-Prés by the Société's third president, the chemist Jean-Baptiste Dumas, became a place for representing and promoting scientific and technical progress.

The Société then turned to the promotion of a business model rationally organized on a scientific basis with a well-trained staff, capable of adapting to markets, which would be its major objective throughout most of the 20th century. This project brought the Société closer to big employers, to whom its leaders were often closely linked. The Hôtel de l'industrie thus became a center for documentation, animation and action in favor of technical standardization and the Taylor method, and for demonstration. After the Second World War, in spite of reduced material means, the Société wished to highlight the great companies and the great achievements of France during the reconstruction period that followed the Second World War and the "Trente Glorieuses".

At first, the nascent Société modelled its project and organization on the London Society of Arts, while quickly asserting its own specificities, such as its constant attachment to industrial property, or its strong relationship with political authorities, whom it wanted to advise in favor of innovation, sometimes highlighting the industrial stakes of governmental policy, for example at the end of the Great War. The regular presence of leading politicians among its successive

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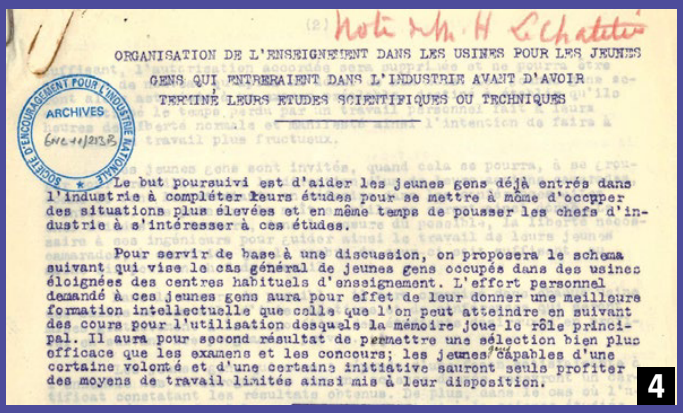
Note sur M. H. Le Chatelier

ORGANISATION DE L'ENSEIGNEMENT DANS LES USINES POUR LES JEUNES GENS QUI ENTRERAIENT DANS L'INDUSTRIE AVANT D'AVOIR TERMINÉ LEURS ETUDES SCIENTIFIQUES OU TECHNIQUES

SOCIÉTÉ D'ENCOURAGEMENT POUR L'INDUSTRIE NATIONALE ARCHIVES ENC-11/213B

Le but poursuivi est d'aider les jeunes gens déjà entrés dans l'industrie à compléter leurs études pour se mettre à même d'occuper des situations plus élevées et en même temps de pousser les chefs d'industrie à s'intéresser à ces études.

Pour servir de base à une discussion, on proposera le schema suivant qui vise le cas général de jeunes gens occupés dans des usines éloignées des centres habituels d'enseignement. L'effort personnel demandé à ces jeunes gens aura pour effet de leur donner une meilleure formation intellectuelle que celle que l'on peut atteindre en suivant des cours pour l'utilisation desquels la mémoire joue le rôle principal. Il aura pour second résultat de permettre une sélection bien plus efficace que les examens et les concours; les jeunes capables d'une certaine volonté et d'une certaine initiative sauront seuls profiter des moyens de travail limités ainsi mis à leur disposition.

4

1. Science, industry and politics : Jean-Antoine Chaptal (1756-1832) (by Jacques Bordier-Dubignon, 1835, Coll SEIN).

2. The Bulletin de la Société d'Encouragement: engraving of a steam locomotive Meyer, 1847 prize (Bulletin, 1849, plate 1101, Coll. SEIN).

3. The "hôtel de l'industrie", a centre of representation, communication and sociability (Coll. SEIN).

4. The Société d'Encouragement and professional training: instructing engineers after World War 1: Le Chatelier's proposition in 1917 (Archives of the SEIN, ENC-11/213B, Coll. SEIN).

directors marks this relationship, which enabled it to benefit from government subsidies. It obtained its recognition as a public utility in 1824, the very first time for a non-charitable civil association.

In turn, it served as a model for the development of industrial societies in the country's main production centers, the first being that of Mulhouse in 1826. This model spread internationally, with, for example, the creation of a group in Berlin in 1822 and another in Milan in 1838; the network thus created included institutions with similar projects such as the Smithsonian Institution, which appeared in 1846. Through the exchange of newsletters and technical information, this network favored the circulation of innovations between the major centers of the world economy in the 19th century.

Innovation, training and state intervention

Let us take one example. The production and reproduction of images has been one of the Société recurring themes since its inception in order to promote innovation in a field that confronts technique, aesthetics and utility. After lithography in the 1820s, the Société promoted, from the 1840s onwards, the techniques and uses of photography as part of its industrial science approach: this is how it promoted the scientific work of Edmond Becquerel, Eugène Chevreul, Alphonse Poitevin or Gustave Lippmann in the 1850s-1890s on color photography and their industrial implementation by the Lumière brothers from 1895 onwards. The latter used the springboard offered by the Société to make the first public presentation of their "projection kinetoscope" within its walls.

Besides, from the very beginning, the Société was aware of the importance of human capital in economic development: it encouraged and financed the creation of professional training programs, from apprenticeships to engineering schools, such as the École Centrale in 1829. At the beginning of the 20th century, under the impetus of one of its main leaders, the engineer and scientist Henry Le Chatelier, it took an active part in the debate on initial and continuing technical training. While contributing to the achievements of large companies in this field, it played the role of consultant in the debates that led to the law on technical education in 1919; it even organized, at the end of the First World War, a training course in engineering for young demobilized soldiers.

The Société, chaired by Chaptal, had placed itself at the service of the imperial power by relaying the innovation strategies associated with its economic policy: the introduction of new machines, for example in the textile industry, and of new products, such as beet sugar. 150 years later, during the "Trente Glorieuses", presided over by renowned engineers such as Albert Caquot or by leaders of industrial groups such as Georges Darrieus, it intended to be a relay in the dissemination and promotion of industrial programs initiated by the State. This was the case, for example, from the 1950s onwards, of the development of a national aerospace industry: it invites its leaders to present, at a very high level of approach, the aspects and stages, during well-attended conferences.

From the 1970s onwards, the Société, confronted with the industrial crisis and the questioning of the productivist model, set out, on the initiative of men such as Jean Fourastié and Alfred Sauvy, to reflect on the aims and limits of growth.

While inviting historians, on the occasion of its bicentenary in 2001, to examine its history and to promote its heritage, the Société decided to respond to the new challenges of the digital economy and globalization; in particular, it became increasingly involved in the project for an industrial renaissance in France. It is therefore still very much alive and the spirit of its founders is still present. ■

For more information:

Serge Benoit, Gérard Emptoz, Denis Woronoff (eds), *Encourager l'innovation en France et en Europe, autour du bicentenaire de la Société d'encouragement pour l'industrie nationale*, Paris, CTHS, 2007.

Gérard Emptoz, « Un groupe d'experts au service de la chimie et de ses industries : le Comité des arts chimiques de la Société d'encouragement pour l'industrie nationale », in Gérard Emptoz, Danielle Fauque, Jacques Breysse (eds.), *Entre reconstruction et mutations, les industries de la chimie entre les deux guerres*, Paris, EDP Sciences, 2018, pp. 137-164.

Daniel Blouin, Gérard Emptoz, « Constitution, usages et valorisation des collections de la Société d'encouragement pour l'industrie nationale : un projet fondateur, une mise en œuvre tardive, une sauvegarde récente (années 1800-2000) », in Sylvain Wenger (ed.), *Penser/Classer les collections des sociétés savantes*, Genève, Slatkine, 2018, pp. 19-30.

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