

## The Historical Review/La Revue Historique

Vol 7 (2010)

Networking and Spatial Allocation around the Mediterranean, Seventeenth-Nineteenth Centuries



### The Spread of Technology through Commercial Networks in the Nineteenth Century: Foreign Merchant-entrepreneurs and Calabrian Sericulture amid Changes and Conflicts

*Idamaria Fusco*

doi: [10.12681/hr.264](https://doi.org/10.12681/hr.264)

#### To cite this article:

Fusco, I. . (2011). The Spread of Technology through Commercial Networks in the Nineteenth Century: Foreign Merchant-entrepreneurs and Calabrian Sericulture amid Changes and Conflicts. *The Historical Review/La Revue Historique*, 7, 253–275. <https://doi.org/10.12681/hr.264>

THE SPREAD OF TECHNOLOGY THROUGH COMMERCIAL NETWORKS  
IN THE NINETEENTH CENTURY:  
FOREIGN MERCHANT-ENTREPRENEURS AND CALABRIAN SERICULTURE  
AMID CHANGES AND CONFLICTS

*Idamaria Fusco*

---

ABSTRACT: In the first half of the 1800s, silk throwing in Calabria expanded and was technologically renovated due to the contribution provided by foreign labour. This favoured the arrival of foreign merchant-entrepreneurs, who brought further expansion and new changes to methods of production. Those changes, even if they were not always received with enthusiasm by the local population, strongly influenced Calabrian silk throwing, encouraging local mill owners to imitate the example of the foreigners. Silk throwing grew and was renewed mainly in the Reggio area, a region close to Sicily and to the port of Messina. The proximity to Messina and its port, particularly active in the 1800s, constituted a unique advantage for silk throwing in the region.

---

*Introduction*

This work takes as its starting point a research project still ongoing, which has, however, already furnished some preliminary results.<sup>1</sup> The aim of the research is to analyse the economic and technological evolution of the silk industry in Calabria, a region of Southern Italy, from the end of the eighteenth century to the beginning of the twentieth.<sup>2</sup> In this essay we will provide some preliminary

---

<sup>1</sup> We refer, in particular, to the following essays by I. Fusco: "Trattura e tecnologia in Calabria nella prima metà dell'Ottocento", in I. Fusco (ed.), *La seta. E oltre...*, Naples: Edizioni Scientifiche Italiane, 2004, pp. 109-160; "Gelsi, bachi e seta in Calabria tra passato e presente", *I Frutti di Demetra. Bollettino di Storia e Ambiente* (2004), no. 4, pp. 43-46; "Centri urbani, manifatture e salute pubblica nella Calabria di metà Ottocento", *I Frutti di Demetra. Bollettino di Storia e Ambiente* (2005), no. 6, pp. 23-26; "La trattura della seta in Calabria. Rinnovo tecnologico e crescita tra Sette e Ottocento", *Società e Storia* (2005), no. 109, pp. 503-540; "Industrie urbane, conflitti e salute nella Calabria dell'Ottocento", *Meridiana. Rivista di Storia e Scienze Sociali* (2006), no. 57, pp. 85-110; "La Calabria della seta. Una regione del Mediterraneo", co-authored with A. Marcelli, forthcoming in the proceedings of the international convention *Making Waves in the Mediterranean*, Messina and Taormina 2006; "La Calabria e la seta. Una lunga storia dai molti risvolti", introductory essay to D. Gaudio, *La seta. Uno sguardo al passato*, Naples: Edizioni Scientifiche Italiane, 2007, pp. 13-24.

<sup>2</sup> Over the course of centuries, there have been numerous publications on the silk

conclusions regarding technological change recorded in Calabria during the course of the first half of the nineteenth century with respect to one of the phases of silk production, namely silk throwing, in which the silk thread is unravelled from the cocoon before it is then twisted, dyed and woven.

This paper examines a specific area of Calabria, that of the Province of Reggio, in particular the strip of land that faces onto the Strait of Messina. It was there that technological change would first be realised, and in a more rapid way – but why precisely in the Reggio area? This was because this area – thanks to its proximity to Messina and its port –<sup>3</sup> had unique characteristics associated with a greater opening up to the Mediterranean and to its commercial and technological exchanges. Due to this opening up, and due to its close ties with the Sicilian area of Messina, the Reggio area would receive new technology, which would then renovate the silk throwing industry in a more rapid and radical manner compared to other Calabrian areas. This technological renewal would favour the growth of the silk throwing industry in the region, which eventually would also be positioned to attract raw material (silk cocoons) from the rest of Calabria.

During the first half of the 1800s, silk throwing became a key economic sector for the Province of Reggio, stimulated by both the increase in international demand for spun silk and the possibility of having Calabrian silk converge on international markets via Messina. The great potential for silk throwing in the Reggio area, together with the opening up of the region to the

---

sector in Italy. Regarding silk in Calabria during the 1800s, here we mention only the essay of P. Bevilacqua, “Uomini, terre, economie”, in P. Bevilacqua and A. Placanica (eds), *Storia d'Italia. Le regioni dall'Unità ad oggi. La Calabria*, Turin: Einaudi, 1985, pp. 115-362.

<sup>3</sup> On the port of Messina and on commercial relations between the Sicilian port and Reggian Calabria, see R. Battaglia, *Porto e commercio a Messina nei rapporti dei consoli inglese, francese e piemontese (1840-1880)*, Reggio Calabria: Editori Meridionali Riuniti, 1977; *id.*, “Il commercio della Calabria attraverso il porto di Messina (1839-1840)”, *Archivio Storico per la Calabria e la Lucania* LIII (1986), pp. 81-121; *id.*, “La ‘conurbazione’ commerciale dell’area dello stretto’ nell’Ottocento”, *Archivio Storico per la Calabria e la Lucania* LVIII (1991), pp. 121-150; *id.*, *Mercanti e imprenditori in una città marittima. Il caso di Messina, 1850-1900*, Milan: Giuffrè, 1992; M. D’Angelo, “Aspetti commerciali e finanziari in un porto mediterraneo. Messina (1795-1805)”, *Atti dell’Accademia Peloritana* LV/16 (1979), pp. 201-247. As well, see the following two essays by R. Battaglia: “Filande calabresi e capitali messinesi a metà Ottocento”, *Messina e la Calabria dal Basso Medioevo all’età contemporanea*, in the proceedings of the First Calabrian-Sicilian Conference, Messina: Società di Storia Patria, 1988, pp. 497-514; and “L’industria della seta a Villa San Giovanni tra Otto e Novecento”, *Archivio Storico per la Calabria e la Lucania* LXIV (1997), pp. 175-194.

Mediterranean, favoured the arrival of foreign merchant-entrepreneurs, who then promoted further technical improvements and who even undertook a leadership role for local manufacturers. All this permitted Reggian spun silk to compete successfully against other silks of excellent quality, such as those manufactured in France. Nonetheless, such rapid growth, together with the radical changes that the area underwent due to the arrival of foreign merchant-entrepreneurs, led to numerous and inevitable conflicts with the local population.

Thus far, a few “prejudices” regarding the isolation of Calabria have been raised for discussion, highlighting the diversity among the different Calabrian areas. In the second part of this essay, we will briefly discuss the technological renovation from the end of the 1700s to the beginning of the 1800s – which took place above all in the Reggio area – and the consequent growth of silk throwing in the area, closely connected to those technological changes and to the opening up of the region to the Mediterranean and its exchanges. In the third part, we will analyse a few cases of foreign merchant-entrepreneurs who were present in Calabria because of the possibilities that the Reggio area offered for silk exportation, as well as the changes that these entrepreneurs brought to silk throwing in the region. On the one hand, these changes – together with increased silk throwing – served as models for the other manufacturers in the area, while on the other hand, they generated numerous conflicts at the local level.

#### *Calabria: “An Island without Sea”?*<sup>4</sup>

By the 1800s, Calabria was already traditionally considered an “isolated” area. This was especially due to its numerous orographic and infrastructural limits: first, because of the presence of high mountains – the Apennine Range, very near to its coasts; second, because its coasts were malarial and of difficult access; third, because of the lack of roads; and fourth, because of the absence of ports and secure docking facilities. As Giuseppe Carelli wrote in 1858, “the construction of a port on the shores of Calabria bathed by the Tyrrhenian Sea has always been the beseeching prayer of all mariners”, adding that the coast “from Naples to Messina, even though there are many coves and bays, doesn’t yet have even one port worthy of the name”.<sup>5</sup>

---

<sup>4</sup> P. Matvejević, *Mediterraneo. Un nuovo breviario*, Milan: Garzanti, 1991, p. 33.

<sup>5</sup> G. Carelli, “Ragguaglio di alcuni principali porti, fari e lazzaretti de’ Reali Domini di qua dal Faro”, *Annali Civili del Regno delle Due Sicilie* CXXVII (September-October 1858), p. 40.

As a result of the orographic and infrastructural limits just indicated, Calabria lacked active commerce. As well, maritime navigation consisted of small-scale coastal shipping towards Naples or Sicily, which included much contraband. In general, Calabria was difficult to reach, whether by land or sea. All these conditions made the region one that was often virtually closed to trade, especially international trade, which favoured isolation.

However, the isolation of Calabria was in contrast with its geographic position. The region, stretching out into the Mediterranean and surrounded by the sea, actually offered a position favourable to navigation and maritime commerce. As Domenico Muratori noted in 1838, Calabria had “advantages” that should have favoured the development of commerce, such as its location between the Ionian Sea and the Mediterranean; moreover, Calabrian territory was abundant in timber, a useful raw material “for the construction of *legni* [wooden boats] of any size”, and was rich in products “that are sought after by the most far-off Nations”.<sup>6</sup> Nevertheless, in spite of such “advantages”, Muratori reminds us that the Calabrian fleets, although numerous, lacked large boats or at best were equipped with “small numbers of wooden boats apt for coasting, not long-distance navigation”.<sup>7</sup>

What then, according to Muratori, were the causes of this considerable indifference of the Calabrian population towards commerce? Muratori dwelled on the lack of ports and of any other “place of secure anchorage” where boats “could stay without danger during the loading of goods”.<sup>8</sup> To this he added the “lack of necessary knowledge of the subject matter (commerce), which is truly the case among our people”: “...ignorance,” he affirmed, “hinders us from calculating the immense advantages that could be obtained if this course were followed with the guidance of science, and with the wisdom that comes from experience”.<sup>9</sup> Finally, he mentioned “bad faith and the spirit of fraud and deceit” as well as “mutual distrust” which “make the founding of business firms infrequent and difficult, without which no relevant enterprise can be undertaken”:<sup>10</sup> in a few words, it was a problem of mentality. In sum, the Calabrian population – people of the land rather than the sea, farmers and shepherds rather than merchants and fishermen –

---

<sup>6</sup> D. Muratori, “Discorso letto dal presidente nella tornata generale de’ 30 maggio 1838”, *Atti della Società Economica di Calabria Ulteriore Prima* 1/5 (1839), pp. 118 ff.

<sup>7</sup> *Ibid.*, p. 119.

<sup>8</sup> *Ibid.*, p. 121.

<sup>9</sup> *Ibid.*, p. 123.

<sup>10</sup> *Ibid.*, p. 124.



Fig. 1. The Three Calabrias: Calabria Citeriore (Cosenza), Calabria Ulteriore Seconda (Catanzaro) and Calabria Ulteriore Prima (Reggio).

Source: "Regno delle Due Sicilie, Domini al di qua del Faro" (1870), in I. Principe, *Carte geografiche di Calabria nella raccolta Zerbi*, Vibo Valentia: Edizioni Mapograf, 1989, p. 261.

seemed little inclined to commerce due to limits that were both cultural and infrastructural.

Nevertheless, the conviction that Calabrians were people of the land and not of the sea, and that Calabria was an isolated land, perhaps needs to be reconsidered. First of all, the idea of “one” Calabria is not historically valid; instead, it would probably be more correct to speak of “diverse” Calabrias, each one profoundly different from the others: the Cosenza area, the Catanzaro area, and the Reggio area.<sup>11</sup> The distinctness of each did not correspond only to the traditional historical subdivisions of Calabria: the Province of Citeriore (the Cosenza area), the Province of Ulteriore Seconda (the Catanzaro area) and the Province of Ulteriore Prima (the Reggio area).<sup>12</sup> In fact, a detailed consideration of silk thread production technologies in the 1800s, in conjunction with a closer examination of the silk sector, reveals a correspondence between the historical subdivisions of the diverse areas of Calabria and an economic subdivision that responded to different markets: the Cosenza and Catanzaro areas responded to the Neapolitan silk thread market, while the Reggio area responded to the Sicilian market.<sup>13</sup>

It is the Reggio area of Calabria that is of most interest, that which in other studies we have defined as “the Calabria of the sea” and which could also be defined as “the Calabria of the Mediterranean”:<sup>14</sup> that is to say, that part of Calabria more open to international commerce and less “isolated”. Of course, the Reggio area suffered from problems of isolation that were similar to the rest of the Calabrian territory. In 1865, the Chamber of Commerce, Trades and Professions of Reggio Calabria stated:

This province, lapped by sea waves for a distance of 220 kilometres on its eastern, southern and western coasts, unfortunately does not have even one port, nor any other refuge that nature or the skills of man might offer. There is no infrastructure that might facilitate the loading of ships, with the exception of a broken-down dock in Reggio, in no way conducive to good fortune.<sup>15</sup>

In that same year of 1865, lighthouses were scarce: there were only two, one near Reggio and the other near Scilla, which resulted in dark, risky coasts

---

<sup>11</sup> For additional detail, cf. Fusco, “Trattura e tecnologia”, p. 109 ff.

<sup>12</sup> See fig. 1.

<sup>13</sup> Fusco, “Trattura e tecnologia”, pp. 139 ff.

<sup>14</sup> Fusco and Marcelli, “La Calabria della seta”, pp. 31 ff.

<sup>15</sup> *Seconda relazione della Camera di Commercio ed Arti di Reggio (Calabria) al Ministero di Agricoltura, Industria e Commercio su l'andamento industriale e commerciale della provincia per l'anno 1864*, Reggio Calabria: Tipografia di Domenico Siclari, 1865, p. 7. The

and frequent shipwrecks, especially on winter nights.<sup>16</sup> It was not that the construction of a port at Reggio had not already been contemplated, yet such a port, “planned so many times, and so eminently necessary, had always encountered insurmountable obstacles”.<sup>17</sup>

In short, the difficulties the Reggian population faced in order to carry out commerce along their own coasts were undeniable. Yet, in the case of the Reggio area, this infrastructural isolation was compensated in part by a unique advantage: the nearness of Sicily and its active port of Messina. And it was, in fact, through Messina that the Reggio area opened up to international commerce and to innovation. As the permanent secretary of the local Economic Society affirmed in 1854: “...[our] proximity to the city of Messina, graced by a free port, has without doubt extended our commercial relations”.<sup>18</sup>

The Reggio area was not, then, one of direct commercial relations, given that the Calabrian area lacked effective infrastructures, but rather a “mediated” commerce, taking place largely through Messina. This was true not only for the entire first half of the 1800s, but also for a good part of the second half. In fact, even in 1864, the Chamber of Commerce, Trades and Professions of Reggio Calabria affirmed that commerce extending outside the Province of Calabria was being developed through Messina.<sup>19</sup> This “dependence” of the Reggio area on Sicily would be partially overcome perhaps only with the advent of the railway in 1883, which partially modified Calabrian commercial routes, providing overland access to the north of Italy. The railway signalled the end of numerous small Calabrian businesses: in fact, it would cause

---

Chamber of Commerce, Trades and Professions of Reggio Calabria was founded on 23 October 1862 under provisions of the law dated 6 July of the same year and – as was the case for all Italian Chambers of Commerce – was responsible for representing commercial and industrial interests at the provincial level to the central government.

<sup>16</sup> *Ibid.*

<sup>17</sup> *Ibid.*

<sup>18</sup> “Rapporto del segretario perpetuo alla Società economica della Provincia di Calabria Ulteriore Prima nella generale adunanza de’ 30 maggio 1854”, *Atti della Società Economica della Prima Calabria Ulteriore* 1/1 (1855), p. 39. Each provincial-level economic society developed propulsive and policy-orientation functions *vis-à-vis* the government for economic matters: cf. *Le Società Economiche alla prova della storia (secoli XVIII-XIX)*, Atti del Convegno Internazionale di Studi, Chivari, 16-18 March 1991, Rapallo: Azienda Grafica Busco Editrice, 1996; and M. M. Augello and M. E. L. Guidi (eds), *Associazionismo economico e diffusione dell’economia politica nell’Italia dell’Ottocento. Dalle società economico-agrarie alle associazioni di economisti*, 2 vols, Milan: Franco Angeli, 2000.

<sup>19</sup> *Seconda relazione della Camera di Commercio*, p. 64.



the disappearance of the small merchant marine (*marineria*) of the area, which until then had been active between Calabria and Sicily.<sup>20</sup> Yet, until the construction of the railway, such “dependence” would characterise the Reggian silk business.

In the case of Reggian silk throwing, however, such “dependence” would show itself to be particularly beneficial, and in a double sense: firstly, it would permit the silk to find satisfactory placement in the international markets; secondly, it would favour the arrival in Calabria of foreign entrepreneurs and personnel competent in the production technologies already spread elsewhere in Europe, individuals who would bring economic growth and innovation to the area and who would also develop a leadership role in relation to the local population. Such an inflow of foreigners would transform the Reggio area into a leading area for the production of silk thread, and, in particular, of a distinctive type of thread produced with more innovative methods, of better quality and more sought-after in the international markets.

*The First Foreigners in Calabria: Technological Changes and the Growth of Calabrian Silk Throwing from the End of the 1700s to the Mid-1800s*

Let us begin by briefly analysing the technological changes that took place, above all in the Reggio area, from the end of the 1700s to the mid-1800s. In those years, Calabria received production technologies that had already spread elsewhere on the European continent and that would favour the development of Calabrian silk throwing.

In reality, the production of silk thread in Calabria at the end of the 1700s was still tied to old technologies, which yielded a Calabrian silk of poor quality and low competitiveness in the international markets. As Domenico Grimaldi observed in 1780, while the “Piedmontese style” or “small reel” silk throwing (known as *alla piemontese* or *ad aspo piccolo*) was the system already extensively used in the Mediterranean, especially in the various silk production localities of France, in the area of Valencia in Spain,<sup>21</sup> and even in nearby Messina,<sup>22</sup> Calabria remained faithful to the rather antiquated

---

<sup>20</sup> L. Nostro, *Libro primo. Notizie storiche e topografiche intorno a Colonna Reggina, antica città sul Cenide prima dell'era volgare*, Reggio Calabria: Tipografia Ca. Francesco Morello, 1923, p. 159.

<sup>21</sup> D. Grimaldi, *Osservazioni economiche sopra la manifattura e commercio delle sete del Regno di Napoli alle sue finanze & c.*, Naples: Giuseppe Maria Porcelli, 1780, pp. 28-29, note 1.

<sup>22</sup> *Ibid.*, p. 20.

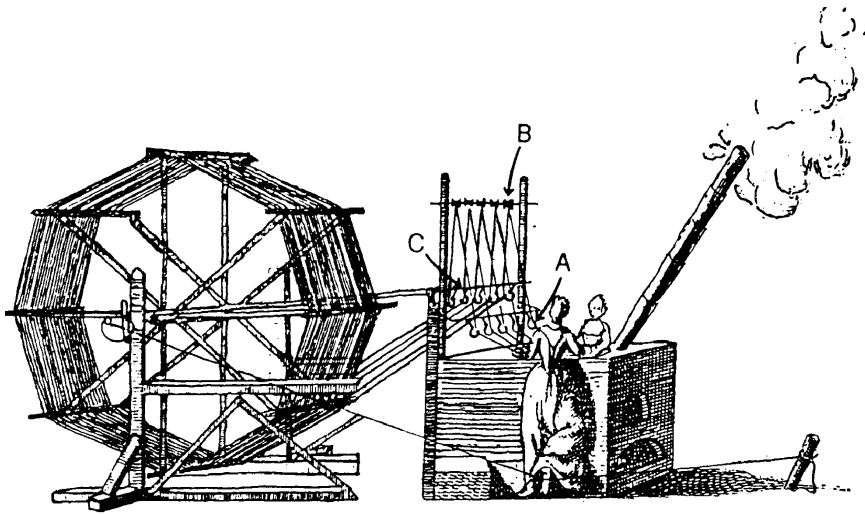


Fig. 2. “Calabrian style” or “big reel” silk throwing (called *trattura alla calabrese* or *trattura ad aspo grande*).

Source: <http://www.unicz.it/lavoro/MALANIMA.htm>.

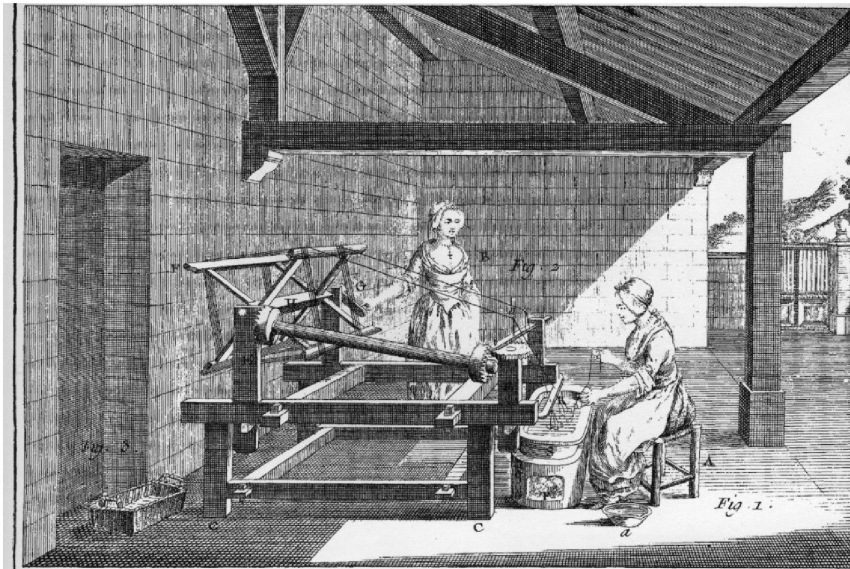


Fig. 3. “Piedmontese style” or “small reel” silk throwing (called *trattura alla piemontese* or *trattura ad aspo piccolo*).

Source: “Recueil de planches, sur les sciences, les arts libéraux, et les arts mécaniques, avec leur explications. Art de la soie”, *L'Encyclopédie Diderot & d'Alembert*, Paris: Bibliothèque de l'Image, 2002 (reprint), p. 1, fig. 1.

method called “Calabrian style” or “big reel” silk throwing (*alla calabrese* or *ad aspo grande*).<sup>23</sup>

The two manufacturing techniques differed in several respects: in the dimension of the reel upon which the silk thread was wound; in the quantity of silk cocoons used to form each thread – less in the case of “small reel” production; in the temperature of the water contained in the silk-throwing basins (*bacinelle*)<sup>24</sup> – excessively hot in the “big reel” system; and in the diverse productivity of the two systems – greater in the case of the “Piedmontese style” technique. Besides, in the case of “big reel” production, the filaments thrown from the cocoons were not intertwined together before being wound on the reel; in addition, in the case of “small reel” production, the labourers employed were mainly female and better trained.<sup>25</sup> As a result of all of this, the final product of each of the two techniques was quite different. The silk obtained from the “small reel” system – referred to as “organzine” or “royal” silk – was qualitatively better, more uniform and fine, with a decisively higher price, and was particularly sought-after for warp yarn; the southern silks, of the Calabrian variety, thrown on big reels, were used as weft as they were “thick, fibrous and irregular”.<sup>26</sup> The difference was noted at the time of weaving: if the thread employed as the warp yarn was from “big reel” production, the resulting fabric was “heavy”, full of filament ends, lacking “a bright and brilliant colour”, and not very “durable”, characteristics that were opposite to those of fabric obtained from “royal” silk thread.<sup>27</sup>

The superiority of the “small reel” method was evident to contemporaries in the silk trade. At first, however, this new method did not manage to spread in the Kingdom of Naples, particularly in the Reggio area. This was principally because – until the abolition of the silk production tax (*arrendamento*) in September of 1805 –<sup>28</sup> the government had continued

---

<sup>23</sup> The reel – called *aspo*, and sometimes *mangano* – was a kind of wheel around which the silk thread was wound as it was unravelled from the silk cocoon. Regarding the two methods of throwing, see figs 2 and 3.

<sup>24</sup> The silk-throwing basins consisted of small tubs, filled to the brim with hot water, in which the silk cocoons were immersed; the heat of the water melted the sericin, that is, the substance which holds the strands of silk together around the chrysalis to form the cocoon.

<sup>25</sup> Cf. Fusco, “La trattura della seta”, p. 521.

<sup>26</sup> *Ibid.* The weft (also called woof) consists of a series of threads placed on the loom at right angles to the other threads (the warp), which are interlaced together to form the desired design.

<sup>27</sup> Grimaldi, *Osservazioni economiche*, pp. 30-31.

<sup>28</sup> Cf. I. Fusco, “Attività produttive e fiscalità in Calabria tra XVI e XVIII secolo. Il

to exercise a strict control over southern silk production, requiring that all silk cocoons be brought to “big reel” facilities, where they were processed under the supervision of a royal functionary.<sup>29</sup> Notwithstanding, some initial changes were accomplished in the Reggio area even before 1805, due to the arrival of foreigners who were experts in the new techniques.<sup>30</sup>

As a matter of fact, the first attempt at introducing the “small reel” method probably took place in 1790 or 1791, when, thanks to a royal loan, production of organzine was started in the silk throwing mill belonging to the Caracciolo brothers in Villa San Giovanni, close to the city of Reggio, and perhaps also due to the collaboration of a priest, a certain Petrucci originally from Gorizia.<sup>31</sup> It is probable, however, that the successful introduction of new methods of silk throwing would wait some years more, when – because things were not going well for newly established mills – recourse to the counsel of a certain Francesco Bal was taken, a man “considered to be an intendent, probably because he was Torinese”.<sup>32</sup> Bal disembarked in “Villa” in April of 1792 under the sponsorship of Tommaso Caracciolo, obtaining full management responsibility for the Caracciolo silk mill within approximately one year of his arrival on Calabrian soil.<sup>33</sup>

---

settore serico”, in G. Anania (ed.), *Scelte pubbliche, strategie private e sviluppo economico in Calabria. Conoscere per decidere*, Soveria Mannelli: Rubbettino Editore, 2001, pp. 206-207. The term *arrendamento* (from *arrendar* in Spanish), used in the place of *affittare*, signified the subcontracting of rent collection, granted by the government to some private individuals known as *arrendatori* in exchange for a fixed fee or royalty (L. Bianchini, *Storia delle finanze del Regno delle Due Sicilie*, ed. L. De Rosa, Naples: Edizioni Scientifiche Italiane, 1971, p. 262). On this topic, see L. De Rosa, *Studi sugli arrendamenti del Regno di Napoli*, Naples: L’Arte Tipografica, 1958.

<sup>29</sup> The reasons for a rigid government control resided in the government’s requirement that the taxes due on silk production (*arrendamento*) be collected more easily, and that the government monopoly over silk production be preserved. In fact, silk thread was sold to a royal buyer and then sent to Naples (Grimaldi, *Osservazioni economiche*, p. 5).

<sup>30</sup> It should be borne in mind that the arrival of those foreigners in Calabria in those first years was first and foremost thanks to the support of local entrepreneurs and the central government. In the case of the entrepreneurial merchants mentioned in the following paragraph, however, there was a spontaneous movement of individuals to Calabrian soil because they believed they could make a profit by establishing silk works there.

<sup>31</sup> For more details, see Fusco, “La trattura della seta”, pp. 523 ff.

<sup>32</sup> M. C. Lamberti, *Splendori e miserie di Francesco Bal, 1766-1836*, Turin: Rosenberg & Sellier, 1994, pp. 144-145.

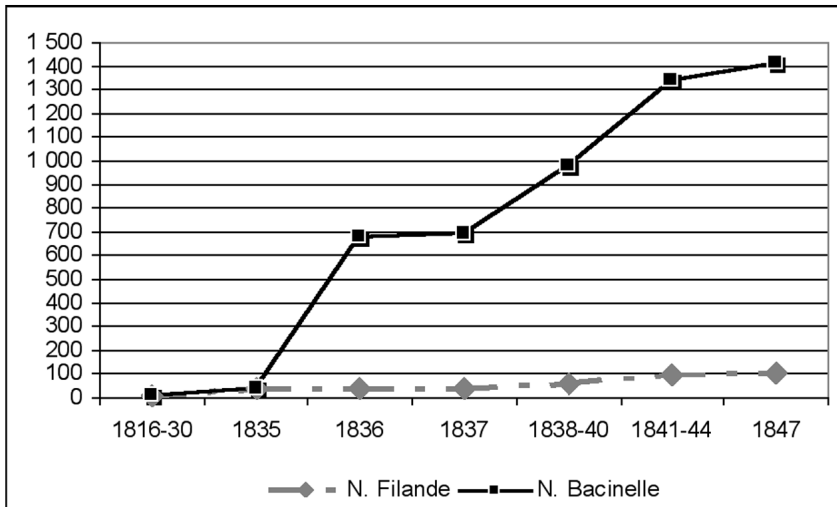
<sup>33</sup> *Ibid.*, pp. 150 ff.

This was the most important moment for the innovation of silk throwing in the Reggio area. It was a time of rupture with the past, in which the new “small reel” method finally superseded the old “big reel” system. In fact, once adopted at the Caracciolo silk mill, the “small reel” technique spread throughout the Reggio area within a few years.

The expansion of “small reel” silk throwing in the Reggio area during the course of the first half of the 1800s was tied to the technological changes just described. In fact, the international demand for silk, which experienced a strong increase during all that half century, was mainly aimed at the type of silk thread produced with the new techniques, a demand which arrived in Reggio through the port of Messina, from where Calabrian silks were sent out to various European destinations.<sup>34</sup>

For additional detail, the following figures show the magnitude of the expansion of “Piedmontese style” silk throwing in the Province of Calabria Ulteriore Prima.<sup>35</sup>

Fig. 4. “Piedmontese style” silk throwing mills (*filande*) and the number of silk-throwing basins (*bacinelle*) in Calabria Ulteriore Prima (1816-1847).<sup>36</sup>

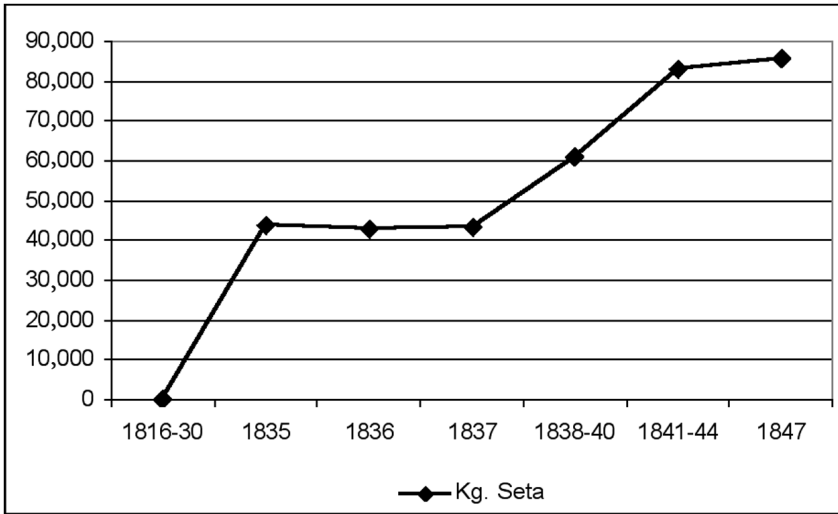


<sup>34</sup> For more details, see Fusco, “La trattura della seta”, pp. 516 ff.

<sup>35</sup> Figs 4 and 5 are based on data found in *ibid.*, table 1, p. 505.

<sup>36</sup> The term *filande* refers to silk throwing mills.

Fig. 5. Production of organzine in Calabria Ulteriore Prima from 1816 to 1847 (in kilograms of silk).



As can be inferred from the figures above, the Reggio area experienced a growth in “Piedmontese style” silk throwing mills in the first half of the 1800s, especially from the early 1830s onwards; the number of silk-throwing basins or *bacinelle* (fig. 4) corresponded to a resulting quantity of silk production (fig. 5). This growth is evident even in relative terms, that is, with respect to population growth in the province.<sup>37</sup> The population grew more slowly than silk throwing mills and their respective means of production (silk-throwing basins); furthermore, the production of organzine also increased in per capita terms during the course of the years examined. This growth was influenced – and not in small measure – by the opening up of the Reggio area to the Mediterranean, as well as to the technical knowledge that voyaged on board its sea-going vessels.

#### *Foreign Entrepreneurs in Calabria amid Innovation and Conflicts*

As we have seen, an increase during the entire first half of the 1800s in “small reel” silk throwing production – particularly in demand in the international markets – took place in the Reggio area, where it became possible to produce silk of good quality and at competitive prices. In fact, quality was guaranteed

<sup>37</sup> In this regard, see Fusco, “La trattura della seta”, table 2, p. 508.

by the fact that the most innovative production techniques were spreading throughout the territory, and because the workforce dedicated to silk thread production was becoming skilled at those new techniques. In addition, silk mills managed to produce good-quality silk at moderate cost. In the first place, this was possible because of the abundance of competent labour: the local population offered itself at low cost on the labour market since other *in loco* work opportunities were not easily found; and secondly, thanks to the abundance of raw material (silk cocoons). The Reggio area, in fact, enjoyed conditions that were especially favourable for the development of mulberry growing and silkworm breeding. In particular, the climate was mild; moreover, the presence of high mountains close to the coast discouraged the population from dedication to other agricultural activities, and instead encouraged the spread of mulberry tree cultivation, which – unlike other types of plants – grew even at higher elevations. The raw material, however, also came from the rest of Calabria: during the course of the 1800s, in fact, the presence of numerous and active silk throwing mills in the Reggio area began to attract silkworm production from the other areas of Calabria.<sup>38</sup>

The conditions just described made the Reggio area a privileged one for silk throwing. It was not a coincidence, then, that during the course of the 1800s, various foreign merchant-entrepreneurs devoted to the production of silk – and often to silk trading – thought of starting up their own production activities in this region which offered them first-rate possibilities for profit-making. Thus, in 1847 and 1848 some foreign merchant-entrepreneurs arrived in Calabria in order to establish their own silk throwing mills. The area of interest was the whole Reggio area; however, Villa San Giovanni – a small Calabrian locality on the Strait of Messina – was to become the principal centre for silk throwing. By way of example, a few cases of such merchant-entrepreneurs are discussed below.

In 1847, the permanent secretary of the Economic Society, Pietro Greco, mentioned the “establishment of certain foreign industrialists in Villa S. Giovanni”.<sup>39</sup> Those entrepreneurs, he stated, “attracted primarily by the expertise and honesty of certain silk mill owners, have taken factories on their own accounts and have called upon persons who understand the silk industry according to the true principles of science to provide the best management”.<sup>40</sup>

---

<sup>38</sup> Fusco and Marcelli, “La Calabria della setta”, p. 40

<sup>39</sup> P. Greco, “Relazione de’ lavori della Società Economica di Calabria Ultra Prima compiuti nell’anno 1846 (letta nell’adunanza generale de’ 30 maggio 1847)”, *Atti della Società Economica della Prima Calabria Ulteriore* III/2 (1847), p. 50.

<sup>40</sup> *Ibid.*

Only one year later, in 1848, the provincial intendent reported to the competent government minister that the presence of those foreigners had contributed to improving the manufacture of silk thread in the region, as well as to spreading the new methods among the local workers.<sup>41</sup> Specifically, he spoke of “various English businessmen”<sup>42</sup> who had installed silk throwing mills in Villa San Giovanni. He referred to a certain Barker and to a certain Thomas Hallam, who had built a total of 10 mills in Villa San Giovanni by about 1847 – which then corresponded to almost one quarter of the 44 silk throwing mills present in that small locality.<sup>43</sup> Thanks to those two Englishmen, he continued, “Villa” was affirming itself as the centre of Calabrian silk throwing, hosting almost half of all the silk mills in the Reggio area.<sup>44</sup>

We know little of Barker, but more information can be found regarding Hallam, known in the area as “the Englishman”. Hallam arrived in Messina between 1843 and 1847<sup>45</sup> and not by chance went from there to Calabria. There, he confirmed “the favourable conditions of [the] land and climate for the development of silkworm breeding” and consequently did his best “to propagate the cultivation of the white mulberry tree in the province”. He also set up “various silk throwing mills in Villa San Giovanni, in the village of Gaz[z]i (in the environs of Messina), and in Messina itself”.<sup>46</sup> Before founding his silk mills, he made various forays into Calabrian territory.<sup>47</sup> He had visited diverse localities in Calabria: in Reggio, in Cosenza, and in Scilla – but only in Villa had he been “welcomed by all, with open arms”.<sup>48</sup>

---

<sup>41</sup> Archivio di Stato di Napoli (ASN), Ministero di Agricoltura, Industria e Commercio (MAIC), envelope 239, fasc. unnumbered, f. 123r/v (letter from Intendent G. Demarco to the Minister of Agriculture and Commerce; Reggio, 15 January 1848). The intendenza was an administrative structure present in every province, directed by a Council of Intendence, which was, in turn, headed by the figure of the intendent.

<sup>42</sup> *Ibid.*

<sup>43</sup> “Stato di tutte le filande esistenti nel primo distretto di Reggio a tutto li 30 dicembre 1847” (Reggio, 30 April 1848) (from the Intendence), in ASN, MAIC, envelope 239, fasc. II, ff. 1r/v - 1 bis r.

<sup>44</sup> In Villa there were 44 silk throwing mills (*filande*) out of a total of 102 in Reggio (“Stato di tutte le filande”).

<sup>45</sup> The year 1843 was deduced from Hallam’s own words (“Incartamento relativo alla quistione della filanda del Signor Hallam posta nell’abitato del comune del Villa S. Giovanni”), letter from Thomas Hallam to the director of the Royal Secretariat of the Interior, Messina, 20 November 1852; in ASN, MAIC, sheaf 516, fasc. 10, ff. 28-40), while 1846 is the date referred to in Nostro, *Libro primo*, p. 155.

<sup>46</sup> *Ibid.*

<sup>47</sup> *Ibid.*

<sup>48</sup> *Ibid.*, pp. 155-156.



Initially, in 1848, he had leased some already existing silk mills: one “from *padron* [owner] Francesco Santoro, and then another from *padron* Santo Coppola”.<sup>49</sup> However, because he had wanted to use coal to heat the water in the silk-throwing basins, he encountered numerous obstacles at the local level: the population and the authorities of Villa were in fact afraid, not only that the steam boiler could explode, but also that the smoke emissions from the combustion of coal could be damaging to the public health.<sup>50</sup> Hallam’s first silk throwing mills were located inside the urban centre,<sup>51</sup> which meant that they more easily encountered opposition from the local population. It was actually because of that opposition that Hallam preferred to temporarily suspend his plan to use coal and to use charcoal instead.<sup>52</sup> Only in this way did he manage to obtain permission to carry out his business operations.<sup>53</sup>

Yet this was only a temporary solution for a period of time in the 1850s, after which we know that Hallam “began to buy extensive plots of land [...] and to construct a large steam-fired silk throwing mill”.<sup>54</sup> In the 1870s, we find Hallam engaged in the production of silk in a steam-fired plant located in the open countryside,<sup>55</sup> which boasted two innovations with respect to the former plant (still in operation): in the first place, coal was finally being used; secondly, the steam boiler was no longer used exclusively for heating the water for the silk-throwing basins, but was also used for turning the reels.<sup>56</sup> We are, in short, in the presence of a “modern” steam-fired silk throwing mill,<sup>57</sup>

---

<sup>49</sup> *Ibid.*, p. 156.

<sup>50</sup> ASN, MAIC, sheaf 516, fasc. 10, ff. 28-40 (letter from the intendent of Prima Calabria Ulteriore to the director of the Ministry and the Royal Secretariat of the Interior; subject: “Per la filanda del Signor Hallam in Villa S. Giovanni”, Reggio, 13 April 1853).

<sup>51</sup> Archivio di Stato di Reggio Calabria (ASRC), Prefettura, Inventario 14, envelope 35, fasc. 377 bis, ff. unnumbered (report from the *decurioni* [members of the municipal council] to the mayor of Villa San Giovanni, 24 October 1852).

<sup>52</sup> ASRC, Prefettura, Inventario 14, envelope 35, fasc. 377 bis, ff. unnumbered (letter from Thomas Hallam to the intendent of the Province of Reggio, Villa San Giovanni, 11 April 1853).

<sup>53</sup> ASRC, Prefettura, Inventario 14, envelope 35, fasc. 377 bis, ff. unnumbered (letter from the director of the Ministry and the Royal Secretariat of the Interior to the intendent, Naples, 30 April 1853).

<sup>54</sup> Nostro, *Libro primo*, p. 156.

<sup>55</sup> Cf. fig. 6.

<sup>56</sup> ASRC, Tribunale Civile, Reggio Calabria, Inventario 65, envelope 786, ff. 111r - 124v (expert testimony delivered to the president and the judges of the district court of Reggio, opened at Villa San Giovanni on 2 January 1863 and closed at Reggio on 11 March 1863).

<sup>57</sup> To better explain this difference, sources often mention the term *filanda a vapore*

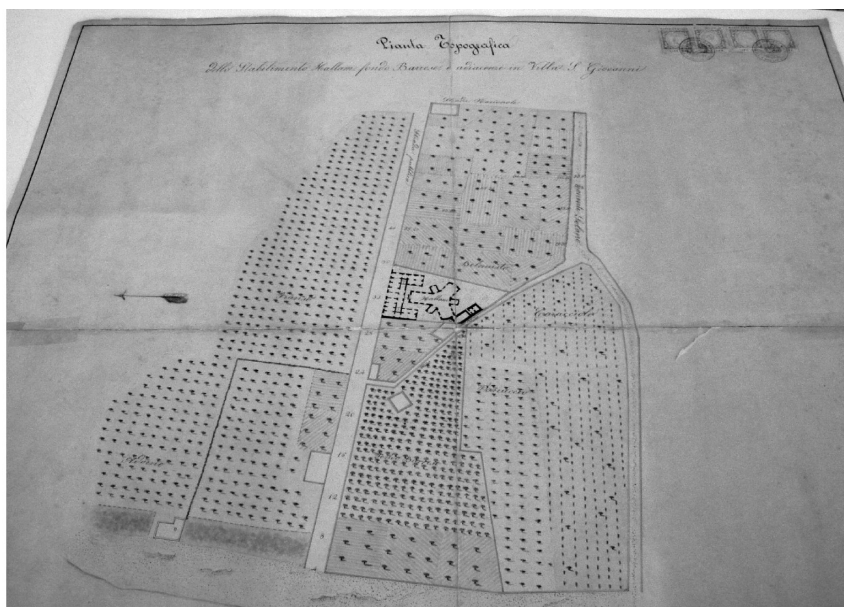


Fig. 6. Thomas Hallam's silk throwing mill.

Source: ASRC, Prefettura, Inventario 14, envelope 35, fasc. 377 bis, ff. unnumbered.

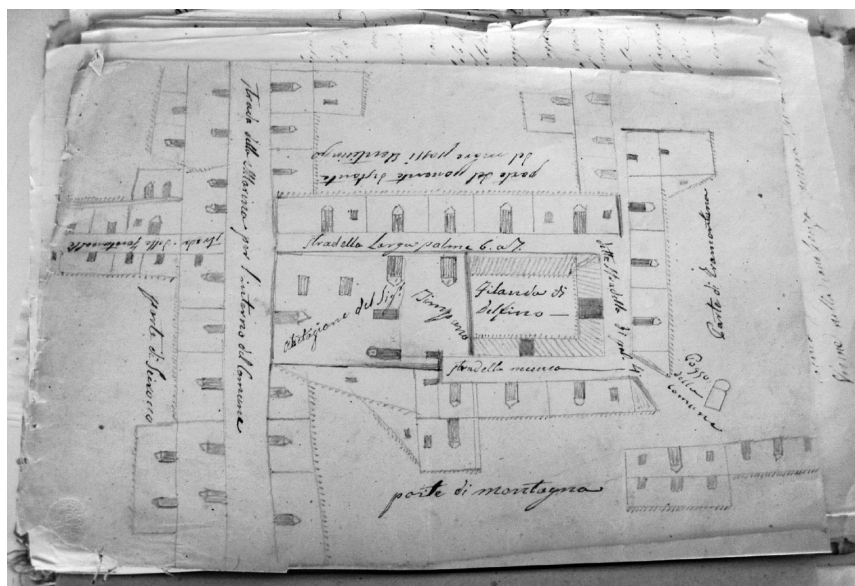


Fig. 7. Silk throwing mills in Catona in 1852.

Source: ASRC, Inventario 50 bis, envelope 1, fasc. 20, ff. unnumbered.

which produced a silk of excellent quality, able to “withstand competition against the most valuable raw silks of France and of upper Italy”,<sup>58</sup> so much so as to merit a medal at the International Exposition held in London in 1862.<sup>59</sup>

In addition, the steam-fired boiler represented the motive power behind two of Hallam’s other activities: grain grinding and sulphur pulverization.<sup>60</sup> Actually, Hallam was not only involved with sericulture, but also with the exportation to England of *agrocotto* (a citric juice concentrate used for industrial food preparation), as well as with sulphur and flour trading<sup>61</sup> directly to Marseille, in France.<sup>62</sup> If what was written about Hallam was true, those businesses made him a wealthy man who built “a princely palace”<sup>63</sup> for himself; and all his commercial dealings surely took place via Messina.

Hallam continued his activity as silk mill owner until 1874, the year of his death,<sup>64</sup> but his silk throwing mills were not abandoned. Indeed, he was succeeded in the business by a nephew of his, James Edward Eaton, son of his sister, who had “wanted to follow in the footsteps of his uncle, and who maintained the silk mills in Calabria and Sicily until the end of his days”.<sup>65</sup> In fact, Eaton’s principal residence was located in Messina, having married a certain Miss Oates there, but after becoming ill, and in the last days of his life, he preferred retirement in Villa “to feel more tranquil” and “to find health”.<sup>66</sup> It had also been in Villa where Eaton had inherited the grain grinding and

---

[steam-fired silk throwing mill], though this refers not so much to factories in which machinery was powered by coal combustion, but rather to factories known in Calabria as *opifici a fuoco diretto* [directly fired mills], in which the coal was used only to heat the water contained in the silk-throwing basins.

<sup>58</sup> *Seconda relazione della Camera di Commercio*, p. 27.

<sup>59</sup> ASRC, Prefettura, Inventario 8, b. 73, no. 2211 (“Esposizione internazionale a Londra. Medaglie e menzioni agli espositori della provincia di Reggio”, “Notamento degli individui che inviarono degli oggetti all’esposizione di Londra del 1862”, Reggio, 30 May 1863).

<sup>60</sup> *Seconda relazione della Camera di Commercio*, table VII, p. 27.

<sup>61</sup> Nostro, *Libro primo*, p. 156.

<sup>62</sup> *Seconda relazione della Camera di Commercio*, statistical maps, table VI, unpaginated.

<sup>63</sup> Nostro, *Libro primo*, p. 156.

<sup>64</sup> *Ibid.*

<sup>65</sup> *Ibid.* Actually, it is not clear whether Eaton was really a nephew of Hallam or whether he was the representative of another important English businessman. We are presently carrying out additional research regarding this matter.

<sup>66</sup> *Ibid.*, p. 156.

trading business of his uncle.<sup>67</sup> In short, the bond to Villa would not be broken until 1902, the year of his death.<sup>68</sup>

In the meantime, a role in the activities of the family was being played by a certain Herbert Oates (“son of George”), also called “the Englishman”, a relative of Eaton. In fact, we find him managing a silk throwing mill in the centre of Villa in 1889<sup>69</sup> when he was 36 years old: he had come from Messina but was resident in Villa.<sup>70</sup>

In brief, the activity of the “Englishmen” continued on through the course of centuries, managing to attract foreign labour<sup>71</sup> and to transfer technology to the Calabrian territory. Those merchant-entrepreneurs played a leading role in the economy of the region. As recorded by Luigi Nostro, “The example of the enterprising Englishman [Hallam] served as an incentive and as noble competition” among all the manufacturers in the region “and important silk throwing mills quickly sprang up on the outward-looking Calabrian coast, as well as in the province of Messina, their raw silks competing with those of Piedmont and of Cevennes, and superior to those of Lombardy, of Veneto and other centres of production.”<sup>72</sup> Thus, within 50 years, almost 20 steam-fired factories had sprung up in Villa: one thinks of the steam mill owned by the Caminiti family, the one owned by the Lofaro family from Acciarello, the one belonging to Calabrò, to Domenico Lofaro, to the Sergi uncle-and-

---

<sup>67</sup> ASRC, Prefettura, Inventario 17, b. 277 (“Comitato peritale per l'accertamento della tassa sulla macinazione dei cereali nella provincia di Calabria Ulteriore Prima”, municipality of Villa San Giovanni, fiscal year 1876, “Molino inglese a vapore di James Eduardo Eaton”).

<sup>68</sup> After Eaton's death, writes Nostro (*Libro primo*, p. 157), “Villa [San Giovanni] entered gradually into decline, first with the closure of the silk throwing mills and a few years later due to the terrible cataclysm (the earthquake of 1908) which damaged if not destroyed the grain grinding mills and the pasta factory.”

<sup>69</sup> ASRC, Tribunale Penale, Reggio, Inventario 68, envelope 593, fasc. 5485, ff. unnumbered (trial record no. 108 of the Legion of Royal Carabineers, Villa San Giovanni, 2 July 1889).

<sup>70</sup> *Ibid.* (record of lawsuit or verbal accusation; Villa San Giovanni, 4 July 1889).

<sup>71</sup> In 1889, for example, we find Sicilian workers at Oates' silk throwing mill in Villa San Giovanni: a certain Teresa Paladino, age 40, born in Castrogiovanni (today Enna) and resident of Villa San Giovanni, employed as a silk throwing worker (*filandiera*), accused of having robbed a certain quantity of silk cocoons, and a certain Rosina Arena, age 24, born in Messina and resident of Villa San Giovanni, responsible for inspection of workers when they were leaving the silk mill (*Ibid.*, “Esame di testimone senza giuramento”, Villa San Giovanni 4 July 1889).

<sup>72</sup> Nostro, *Libro primo*, p. 155.

nephew team, to the mill owned by Belmusto, and to the one belonging to the Santoro family.<sup>73</sup> These factories were able to attract “all the silk cocoons from the three provinces [of Calabria], from Sicily, from the region of Naples, occasionally from Lombardy, and sometimes even from Constantinople and Salonika”, and would make Villa “renowned in all the world”, to the degree that some called her “the little Manchester of Italy, or the city of silk”.<sup>74</sup>

On the other hand, the “Englishmen” were not the only foreigners to establish their own silk throwing mills in the Reggio area, nor were they the only ones to bring innovation into the region. We mention just one example here, that of Giuseppe Fumagalli, a native of Milan who settled in Villa in the mid-1800s.<sup>75</sup> About 1857, he claimed “to have found [...] a new way to construct stoves for silk spinning and for their improvement, with a positive fuel savings”, for which he requested a ten-year patent licence permitting an exclusive use of the new system.<sup>76</sup> The Economic Society confirmed that this new system indeed represented an effective improvement and expressed support for his request.<sup>77</sup> From the description supplied by the Economic Society, the advantages of the new system were evident: product improvement (silk of better quality), as well as process improvements (a savings of fuel of more than double and reduced production time, that is, more product in less time). The impossibility of using coal, perhaps the only limit of the new type of stove, did not in the end represent a real problem for the Reggio area, rich in woods and forests.<sup>78</sup> As well, the use of this stove spread to other manufacturers in the region.<sup>79</sup>

In conclusion, we can confirm that the arrival of those foreign merchant-entrepreneurs in the Reggio area represented a positive element for the economy of the region. Their arrival brought work, wealth and technology to a territory that, at that time, did not offer many other alternatives to its own population. Those foreign merchant-entrepreneurs contributed to making

---

<sup>73</sup> *Ibid.*, p. 157.

<sup>74</sup> *Ibid.*

<sup>75</sup> It should be kept in mind that in the mid-1800s, that is, before the unification of Italy, a Milanese was actually a “foreigner” in Calabria.

<sup>76</sup> ASRC, Intendenza, Inventario 50 bis, envelope 88, fasc. 4, ff. unnumbered (record of the ordinary meeting of the Economic Society on 17 November 1857).

<sup>77</sup> *Ibid.*

<sup>78</sup> For more detail, see Fusco, “La trattura della seta”, pp. 530 ff.

<sup>79</sup> *Seconda relazione della Camera di Commercio*, p. 27.

local silk throwing grow and improve so that Calabrian silk thread could better compete in the international markets.

These entrepreneurs were not always received with open arms by the local population, however. The most evident example was that of Hallam, the individual who most incisively affected the local reality. As we have already mentioned, in order to investigate the territory, Hallam first visited various urban centres in Calabria; nevertheless, “he was not well received because it was said that silk mills would stink!”<sup>80</sup> It seems that he was well received only in Villa, as has already been commented on.

Still, we know from our sources that Hallam had to face numerous problems even in Villa, not only because of the silk throwing mill which was established inside the urban centre, but also because of the new factory which he built in the open countryside: in this last case, he was accused by the owner of an adjoining property of having damaged her plants with the smoke emissions from his silk processing.<sup>81</sup> In those years, setting up a mill to manufacture silk – a rather frequent activity in the Reggio area – could give rise to not a few conflicts. Moreover, those conflicts were encouraged by the crowding of numerous silk mills into the small urban centres of the Reggio area, whose population was concerned about the possible health problems that might result from smoke emissions and from the discharged waste water from silk production.<sup>82</sup> Frequently, those silk factories sprang up alongside (when not actually inside) residential dwellings. As one reads repeatedly in the source literature, at the beginning of the 1850s, the industrial landscape in the area of the Strait of Messina had changed: in the Reggio area, silk throwing had become “widespread”.<sup>83</sup> In Catona, for example, a small locality in the area of the Strait, “at every short distance there was a silk mill” and the larger part of those production structures were located within the urban centre.<sup>84</sup>

---

<sup>80</sup> Nostro, *Libro primo*, pp. 155 ff.

<sup>81</sup> ASRC, Tribunale Civile, Reggio Calabria, Inventario 65, envelope 786, ff. 100r-108v (“Verbale di perizia redatto da’ chimici Signori Vincenzo Dedomenico, Valentino Basile e Nicola Macri di Reggio nella causa tra Suor Vittoria Barrese ed il Signor Tommaso Hallam di Villa S. Giovanni”, record opened in Villa San Giovanni on 2 January 1863 and closed in Reggio on 12 March 1863).

<sup>82</sup> On the health problems that silk throwing mills could bring, and on the conflicts that resulted between mill workers, local administration officials and the general population in Calabria in the 1880s, see Fusco, “Industrie urbane”, pp. 85-110.

<sup>83</sup> ASRC, Inventario 50 bis, envelope 1, fasc. 20, ff. unnumbered (letter from Giuseppe Delfino, owner of a silk throwing mill in Catona, to the intendent, 23 June 1851). For more detail on Delfino, see Fusco, “Industrie urbane”, pp. 94 ff.

<sup>84</sup> ASRC, Inventario 50 bis, envelope 1, fasc. 20, ff. unnumbered (report from the

Many silk factories were established in those years as a result of the possibilities for profit-making that the area of the Strait – as well as Messina and the Mediterranean – offered to local sericulturists and to all the foreign entrepreneurs who had decided to move there. Neither were those entrepreneurs discouraged by the hostility that they often encountered at the local level, a hostility that gave life to long and complicated conflicts, for the most part resolved by local government administrators in favour of the silk mill owners; moreover, the presence of silk throwing mills inside urban centres was considered by local administrators to be a necessary evil in towns that owed their livelihoods to silk throwing, an evil in which those same administrators had not a few personal interests.<sup>85</sup>

### *Some Concluding Observations*

What conclusions can we draw from this essay? In the first half of the 1800s, silk throwing in Calabria expanded and was technologically renovated thanks to the contribution provided by foreign labour. This would favour the arrival of foreign merchant-entrepreneurs, who would bring further expansion and new changes to methods of production. Those changes, even if they were not always received with enthusiasm by the local population, would strongly influence Calabrian silk throwing – in general, on a positive note – encouraging local mill owners to imitate the example of the foreigners.

Silk throwing grew and was renovated mainly in the Reggio area, above all because it was an area quite “far” from the “isolated” Calabria (which also underwent renovation in those years<sup>86</sup>). It was, instead, close to Sicily and to the port of Messina. The proximity to Messina and its port, particularly active in the 1800s, constituted a unique advantage for the region. Given the lack of inland communication routes and the lack of ports of call along the Calabrian coast, the little Sicilian city was the principal, if not the only real outlet for Calabrian goods, not of least importance silk, which was transported to Messina in small boats, where most was subsequently re-exported. Through the port of Messina, Calabrian silk could sail the seas to France, Great Britain, and even the United States of America.

A luxury good such as silk would, in fact, not have had a future had it been relegated to the inland areas of Calabria, a sparsely urbanised

---

intendent to the water-and-roads engineer entrusted with verifying the status of Delfino’s silk throwing mill; Reggio, 11 June 1852). See also fig. 7.

<sup>85</sup> Fusco, “Industrie urbane”, pp. 91 ff.

<sup>86</sup> Fusco and Marcelli, “La Calabria della seta”, pp. 45 ff.

region without large centres of consumption and inhabited mainly by an agricultural population whose use of silk was limited to production rejects. The demand for silk, which increased during the entire first half of the 1800s, came principally from outside, reached Calabria above all by sea, and was “mediated” through the port of Messina.

In brief, the opening up of the Reggio area to international markets through Messina allowed the silk throwing industry in the area to expand and renovate. Foreign merchant-entrepreneurs chose to move to Calabria because there they found fertile land for their business ventures, above all thanks to the outlet for commerce offered by the Reggio area.

In conclusion, commerce, foreign merchant-entrepreneurs and the spread of technology are indispensable concepts, in our opinion, in order to correctly read the events of Calabrian silk throwing in the 1800s.

*Translated by Stéphane Fournier*

*ISSM-CNR*



