Lecture Notes in Networks and Systems 1183

Francesco Calabrò
Livia Madureira
Francesco Carlo Morabito
María José Piñeira Mantiñán *Editors*

Networks, Markets & People

Communities, Institutions and Enterprises Towards Post-humanism Epistemologies and AI Challenges, Volume 1

Springer

Lecture Notes in Networks and Systems 1183

The series "Lecture Notes in Networks and Systems" publishes the latest developments in Networks and Systems—quickly, informally and with high quality. Original research reported in proceedings and post-proceedings represents the core of LNNS.

Volumes published in LNNS embrace all aspects and subfields of, as well as new challenges in, Networks and Systems.

The series contains proceedings and edited volumes in systems and networks, spanning the areas of Cyber-Physical Systems, Autonomous Systems, Sensor Networks, Control Systems, Energy Systems, Automotive Systems, Biological Systems, Vehicular Networking and Connected Vehicles, Aerospace Systems, Automation, Manufacturing, Smart Grids, Nonlinear Systems, Power Systems, Robotics, Social Systems, Economic Systems and other. Of particular value to both the contributors and the readership are the short publication timeframe and the worldwide distribution and exposure which enable both a wide and rapid dissemination of research output.

The series covers the theory, applications, and perspectives on the state of the art and future developments relevant to systems and networks, decision making, control, complex processes and related areas, as embedded in the fields of interdisciplinary and applied sciences, engineering, computer science, physics, economics, social, and life sciences, as well as the paradigms and methodologies behind them.

Indexed by SCOPUS, EI Compendex, INSPEC, WTI Frankfurt eG, zbMATH, SCImago.

All books published in the series are submitted for consideration in Web of Science.

For proposals from Asia please contact Aninda Bose (aninda.bose@springer.com).

Francesco Calabrò · Livia Madureira ·
Francesco Carlo Morabito ·
María José Piñeira Mantiñán
Editors

Networks, Markets & People

Communities, Institutions and Enterprises Towards Post-humanism Epistemologies and AI Challenges, Volume 1

Springer

Editors
Francesco Calabrò
University of Reggio Calabria
Reggio Calabria, Italy

Francesco Carlo Morabito
University of Reggio Calabria
Reggio Calabria, Italy

Livia Madureira
Scientific coordinator of CETRAD
University of Trás-os-Montes e Alto Douro
Vila Real, Portugal

María José Piñeira Mantiñán
Chair of IGU Urban Geography Commission
University of Santiago de Compostela
Santiago de Compostela, Spain

ISSN 2367-3370 ISSN 2367-3389 (electronic)
Lecture Notes in Networks and Systems
ISBN 978-3-031-74500-3 ISBN 978-3-031-74501-0 (eBook)
https://doi.org/10.1007/978-3-031-74501-0

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

This volume contains the proceedings for the International Symposium "*NETWORKS, MARKETS & PEOPLE for transitioning settlement systems. Communities, Institutions and Enterprises towards post-humanism epistemologies and AI challenges—#NMP 2024"*, scheduled from 22 to 24 May 2024, in Reggio Calabria, Italy.

The symposium was promoted by the European Cultural Heritage Enhancement Lab—ECHE Lab (former UNESCO Med Lab), Mediterranea University of Reggio Calabria (Italy), with ASTRI Scientific Association and the National Italian Committee of ICOMOS.

The Symposium is organized in partnership with: CETRAD, Centre for Transdisciplinary Development Studies, University of Trás-os-Montes e Alto Douro, Vila Real (Portugal); NEUROLAB, Mediterranea University of Reggio Calabria (Italy); GRUPO ANTE, University of Santiago de Compostela (Spain); LaborEM, Mediterranea University of Reggio Calabria (Italy).

The Symposium is mainly supported by a qualified network of scientific societies: SIEV—Società Italiana di Estimo e Valutazione; SIIV—Società Italiana Infrastrutture Viarie; AIIT—Associazione Italiana per l'Ingegneria del Traffico e dei Trasporti; SITdA—Società Italiana di Tecnologia dell'Architettura; AISRe—Associazione Italiana di Scienze Regionali; SISTur—Società Italiana di Scienze del Turismo; AGEI—Associazione dei Geografi Italiani.

NMP2024 aimed to promote the scientific debate about the effects that the contemporary environmental, technological, social and economic global challenges produce on settlement systems, especially in Inner Areas and metropolitan cities of the Mediterranean basin.

Contemporary settlements express the distance between the built environment inertia and the "liquid" society flowing underneath. Blurred lines substituted the neat dualities such as culture-nature, urban-rural, central-marginal, affluent-deprived, enacting perpetual changes in between polarities.

The progressive increase in population raises new issues connected with resources availability and the ecological footprint of anthropic activities.

The theme of the green transition requires multidisciplinary points of view, touching on very different issues such as infrastructures and mobility systems, green buildings and energy communities, ecosystem services and land consumption.

In this scenario, a post humanist epistemology assumes that humans are dependent on the environment, and part of a larger evolving ecosystem whose agency is distributed through dynamic forces. Climate change challenges reinforced the understanding that human is entangled with its environment, encouraging in defining novel epistemologies, including, but not limited to, several disciplines: architecture, urban studies, economics, cybernetics, ecology, ethology, geography, art, psychoanalysis, sociology, anthropology and quantum physics.

The new frontier of adaptive and flexible production, supported by the ongoing digital revolution, encourages a rethinking of the concepts of proximity and interdependence within human settlements, with a paradigm shift in the center-periphery dualism. In this context, the social reproduction approach is mainly oriented at spatial justice, re-use, regeneration and environmental care.

Digital technologies and artificial intelligence bring extraordinary potential to institutions, companies and social organisations, but also carry the risk of negative impacts of unmanaged innovation.

The Artificial Intelligence, challenging the labor market, has been seen lately as both the exploitation and the destruction of the human being as known until now. The progressive replacement of human workforce with machines no longer concerns the traditional industries only, affecting intellectual and creative productions.

The side effects of this transition need to be studied in order to share benefits and tradeoffs equitably between technology and service developers on the one hand, and individuals and communities on the other.

Accessibility rights to services and goods, social inclusion, commoning and sharing economies, as well as informalities and self-organization permeate the incoming social organization associated with the digital transition, towards inclusive concepts of citizenship.

Social innovation practices, collaborative governance models, open innovation frontiers, human non-human entanglements concur in setting the route for the next generation settlements, notably: the built environment, the social system and the complexity and challenges of the everyday life.

These phenomena are even more significant for marginalized areas, which are compelled to face the risk of widening the socio-economic gap with advanced regions, as happens in some territories of Mediterranean bordering countries.

Green and digital transition are the two pillars on which European policies are based for the period 2021–2027, above all through the instrument of the Next Generation EU. The substantial investments planned by the EU to support the green and digital transition in the coming years require multidimensional evaluation systems, capable of supporting decision-makers in selecting the interventions most effective in pursuing the objectives, also considering that the financial resources used for the Policy implementation are borrowed from future generations, who will be held accountable for our work.

For this edition, meanwhile, the more than 300 articles received allowed us to develop 6 macro-topics, about "*Communities, Institutions and Enterprises towards post-humanism epistemologies and AI challenges*" as follow:

1. Cultural Heritage as driver of development for territories and tourism destinations
2. Ecosystems, people-nature cohesion and urban-rural relationships
3. Decision support systems for urban regeneration
4. Policies and practices of cohesion and social innovation for inclusive cities
5. Green buildings and sustainable solutions for ecological transition

and a Special Section, *Supersession intercluster SITdA*, chaired by our colleague Consuelo Nava.

We are pleased that the International Symposium NMP, thanks to its interdisciplinary character, stimulated growing interests and approvals from the scientific community, at the national and international levels.

We would like to take this opportunity to thank all who have contributed to the success of the International Symposium "*NETWORKS, MARKETS & PEOPLE for transitioning settlement systems. Communities, Institutions and Enterprises towards post-humanism epistemologies and AI challenges—#NMP 2024*": authors, keynote speakers, session chairs, referees, the scientific committee and the scientific partners, participants, student volunteers and those ones that with different roles have contributed to the dissemination and the success of the Symposium; a special thank goes to the "Associazione ASTRI", particularly to Angela Viglianisi and Immacolata Lorè, together with Alessandro Rugolo, for technical and organisational support activities: without them the Symposium couldn't have place; and, obviously, we would like to thank the academic representatives of the University of Reggio Calabria too: the Rector Prof. Giuseppe Zimbalatti and the chief of PAU Department Prof. Tommaso Manfredi.

Thank you very much for your support.

Last but not least, we would like to thank Springer for the support in the conference proceedings publication.

Reggio Calabria, Italy — Francesco Calabrò
Vila Real, Portugal — Livia Madureira
Reggio Calabria, Italy — Francesco Carlo Morabito
Santiago de Compostela, Spain — María José Piñeira Mantiñán

Contents

Risk Mitigation, Conservation and Enhancement of Cultural and Natural Heritage

Sericulture in Calabria in the 19th Century: Landscape, Architecture, Energy Transition

Nino Sulfaro(✉)

Mediterranean University of Reggio Calabria, Reggio Calabria, Italy
nino.sulfaro@unirc.it

Abstract. The paper deals with silk production in Calabria with particular regard to the activities in the area of the Strait of Messina during the 19th century. The study area offers the possibility to trace a constant search for a balance between local dynamics and external factors: on the one hand, there are rural activities and craftsmanship, the domestic, or cottage industry dimension of work, the subsistence economy, and local markets; on the other, there are industrialization and technological innovations, a new rational organization of work, and the global market. In the background, there is the energy transition from biomasses to coal, which presents consequences in terms of design and environmental issues. The paper tries to highlight some effects of the transition from this wide frame, such as the evolution of architectural typologies, the relationships between spinning mills and landscape, and the consequences of the introduction of coal.

Keywords: Silk production · Coal · Calabria

1 Calabria in a Production Landscape Perspective

It is difficult to imagine a period in which Calabria had much to offer in terms of raw materials, finished products, technological knowledge, and entrepreneurial skills, as it has been, for much of the 20th century and still today, one of the poorest Italian regions, also in terms of social and cultural progress [Matacena 1983, 7]. This perception is due, even more than to stereotypes about Southern Italy, to a historicistic practice that deals with a context which, from the end of the 19th century onwards, has seen a series of constantly unsuccessful development initiatives: backwardness of living conditions, difficulties in transport, lack of infrastructure, and absence of an entrepreneurial mentality have all fed the idea of a region that has perpetually been in a condition of delay. However, more recent historiography has acquired points of view which are different from those prevalent during the 20th century. This is also thanks to archival research and greater attention to issues regarding the study of the territory, which, at least in part, have put that interpretation into doubt, revealing completely unexpected production realities in the Italian pre-unification period [*ivi*, 8]. Like other regions in the South of Italy, Calabria exploited its natural resources for a long time, starting from the transformation of its subsoil resources, such as iron, silver, and other metals, which led to the development of metallurgy already during the high Middle Age, but above all the very diversified forms

F. Calabró et al. (Eds.): NMP 2024, LNNS 1183, pp. 24–34, 2024.
https://doi.org/10.1007/978-3-031-74501-0_3

of agriculture, favoured by climate conditions, encouraged transformation activities of agricultural products.

At the same time, we must not to fall into the temptation of projecting the productive activities in Calabria before the Unification of Italy into "mythography", aimed at claiming an image of the South which can recount a productive past comparable to that of other areas in the North. In some cases, this concerns the risk of creating political narratives based on unverifiable interpretations of modern and contemporary history, often aimed at glorifying questionable records of the Kingdom of the Two Sicilies [Felice 2019; Di Maria 2014, 804–805][1].

However, research in the last few decades has opened up an interdisciplinary perspective regarding the analysis of relationships between productive (rural, pre-industrial, and industrial) activities and the environmental context within the phases of social and economic changes [Bevilacqua, Corona 2000]. This perspective offers a wider frame in which it is possible to recognize some production landscapes due to the development of infrastructure, changes in the use of lands, energetic transitions, the evolution of productive and working spaces, improvement of knowledge in agriculture and technologies, the role of communities, etc. In this perspective, silk production in the area of the Strait of Messina, in Calabria, is a significant case study as it was characterized by the search for a balance between local dynamics and external change factors. On the one hand, there are rural activities and craftsmanship, the domestic, or cottage industry dimension of work, the subsistence economy, and local markets [Ciuffetti 2018, 25]; on the other, there are industrialization and technological innovations, capitalism, and a new rational organization of work, and the global market. The present paper tries to highlight some effects of this transition from this wide frame, such as the evolution of architectural typologies, the relationships between factories and urban and territorial contexts, and, above all, the consequences of the introduction of coal.

2 Silk Production in the Area of the Strait of Messina

The history of silk production in Calabria is very long and involves diverse territories. In truth, Catanzaro was probably the first city that introduced silk production to Italy during the 11th century; it then developed in the area of Cosenza [Capalbo 1988]. The southern part of the region started to play a significant role in sericulture only in the 15th century, when some expert silk producers arrived from Venice and Lucca to Messina, in Sicily. Since that moment, the harbour of Messina became an important hub for silk, extending its commercial network to some Mediterranean countries, such as Greece, Turkey, Egypt, Spain, and France, but also to the North of Europe, in Flanders, England, and some German cities [Abbate 2018, 28]. In order to satisfy the demand for silk in this vast network, Messina traders had to stock up on Calabrian raw silk, which was also often used by the population of the eastern shore of the Strait as a trade commodity to pay for the importation of other products [Laudani 1989, 113].

[1] Many scholars agree on recognizing a profound economic crisis in the South of Italy already at the end of the 17th century, due to the lack of structural reforms, which prevented the transition to a true industrial system between the 18th and 19th centuries, like in other regions of the North.

Traditional sericulture had several steps: first of all, mulberry cultivation in the lands; then the silkworm breeding on mulberry leaves indoors; once the worms started pupating in their cocoons, they were dissolved in boiling water (cocoons stewing) for individual long fibers to be extracted and fed into the spinning reel; finally the weaving and other treatment of the raw silk. Until the 17th century, mulberry cultivation and silkworm breeding took place on the Calabrian shore of the Strait; whereas the textile production activities, such as reeling and weaving, took place in Messina and then in towns where Silk Consulates were activated [Laudani 1989, 122]. Since the 18th century, also thanks to the transfer of some silk producers from Messina, the entire production process was established in Calabria, creating a pre-industrial district between the cities of Reggio Calabria and Villa San Giovanni [Battaglia 1991, 121] (see Fig. 1).

Fig. 1. *Carta austriaca del Regno di Napoli* (1821–1825). Detail of the area of the Strait of Messina, including the towns of Reggio Calabria, Villa S. Giovanni and Cannitello.

During the 18th century, silkworm breeding was essentially a domestic activity that accompanied other rural activities, such as olive oil and wine production, on farms often surrounded by orchards and, obviously, mulberry trees (see Fig. 2). In order to perform this function, there were the so-called "*case di nutricato*" which were simple, small rural buildings equipped with sufficient openings to guarantee ventilation and the correct temperature during the summer, while the room could be heated with a fireplace in winter; however, it was not so uncommon to have silkworm breeding also in rooms or attics of homes [Currò, Restifo 1991, 79]. The "*case di nutricato*" were replaced by increasingly specialized buildings, called "*baccelliere*" or "*bigattiere*" (silkworm-rearing houses), during the 19th century. They often had multiple levels and were equipped with more advanced ventilation and heating systems; despite this progress, the domestic dimension of the activity was maintained until the 20th century. Instead, some advancements in terms of technologies and work organization were found in silk reeling and in the

spinning process, which passed to more modern tools and, subsequently, from manual to mechanized tools[2], exploiting the power of steam engines.

Fig. 2. Reggio Calabria. Plan of the Doldo farm including a spinning mill (Archivio di Stato di Reggio Calabria, Planimetria Doldo, 1852, inv. 2, b. 194).

The 19th century represents the period of the greatest expansion of silk production in the area. According to some scholars, the reasons for this growth can be found in *prebina*, a devastating silkworm disease that, in the 1850s, affected a large part of Italian silk production, which was drastically reduced by 60%. Calabria was affected by the disease later and thus found itself taking advantage of the situation: the sharply increasing international demand and the wealth of raw materials favoured the opening of numerous new spinning mills along the coast, especially in the area between the towns of Reggio Calabria, Villa San Giovanni, and Cannitello. Just to mention some data regarding the explosion of silk production in the area, in 1847 in Reggio Calabria there were 102 spinning mills compared to only 8 in the period between 1816 and 1830; in the same year in Cannitello the number of workers in the silk sector had increased from 204 to 292 in just a few years; in Villa San Giovanni the number of spinning mills passed from 20 in 1835 to 59 in 1853 [Fusco 2006, 89–90; Laudani 1989, 90]. In this dynamic, the Messina bourgeoisie played a significant role; in particular, the numerous, rich foreign population resident in the town, especially English bankers and businessmen, who, from the end of the 18th century up to the early 20th century, launched initiatives aimed at supporting

[2] In the field of silk reeling, the more efficient "*mangano alla piemontese*" (short Piedmont mangle) was introduced to replace the more antiquated "*mangano alla calabrese*" (big Calabrian mangle), at the end of the 18th century. The new system sped up production and employed many more workers, usually women. See Parisi (2003, 246–247) and Laudani (1989, 135–136).

Calabrian silk production with funds and through the opening of new spinning mills [Laudani 1989, 128- - 129].

The catastrophic earthquake of 1908 and, then, the general global crisis of European silk production, marked the end of the extraordinary season. After the earthquake, some spinner families tried to reorganize the production by repairing, reconstructing, and extending the spinning mills. Therefore, today it is still possible to recognize a constellation of architectures, some in a state of ruin, others abandoned, others reused, which were saved from the earthquake of 1908 and, above all, from the profound urban transformations that affected the territory from the second half of the 20th century onwards. Some interesting examples are still present in Cannitello, such as the spinning mill by F.lli La Monica, which today consists only of a ruin and the chimney, part of a residential complex, the one by Paolo Messina, reused with residential function, and the one by F.lli Cogliandro, which is object of a proposed reuse project, as a museum (see Figs. 3–4).

Figs. 3–4. Cannitello (Villa S. Giovanni). On the left, the "Paolo Messina spinning mill" and, in the background, the chimney and the ruin of the "F.lli La Monica" spinning mill; on the right, the "F.lli Cogliandro" spinning mill (photo by the author, 2023).

3 Some Issues Regarding Energy Transition

3.1 New Productive Space Layouts

The technological innovations introduced during the 19th century, including the energy transition from biomass to coal, had a significant impact on the configuration of the spaces dedicated to production, which gradually expanded and specialized up to the early 20th century.

Despite this, the domestic dimension of production was maintained, with the consequence of not moving the new spinning mills to new industrial areas. They were built within the urban fabric, as natural extensions of family residences, often organized around various economic activities. This phenomenon often created problems of coexistence with inhabitants, since the new spinning mills arose within the city centres, and/or

the activities often took place in houses re-adapted to sericulture. This resulted not only in unhealthy working spaces due to the lack of sufficient ventilation, but also problems connected to the disposal of wastewater, which was difficult to channel into underground ducts and which stagnated in puddles near the houses, as well as problems with water supply for the rest of the communities, given the large quantity of water that was used for production [Laudani 1989; Fusco 2006].

The introduction of coal also saw a relevant change in silk production: converting from wood to coal was not, in fact, simply a question of chucking one fuel rather than the other onto the fire [Allen 2013, 13]. Switching fuels increased the spinning mills efficiency, leading to a large amount of production; however, it also had consequences in terms of design problems and then, as is well known, environmental issues.

Apart from the need to extend the working spaces in order to house more workers, the introduction of coal re-defined the architectural typology of the spinning mills, which concerned four main elements: a large, high-ceilinged silkworm house, a lower building for the stewing of the cocoons, the reeling and the weaving; a boiler room, and a high chimney[3].

The "F.lli Lofaro" spinning mill in Villa San Giovanni, today abandoned but partially preserved, represents an effective example as it presents some distinctive elements of the more updated factories between the 19th and 20th centuries. The plant is composed of two distinct buildings joined by a passage that connects the silkworm house with the lower building intended, in all likelihood, for stewing the cocoons, reeling, and weaving. Both buildings have a continuous load-bearing brick wall structure with a pitched roof. In particular, the silkworm house stands out for its elongated planimetric shape (9.50 × 35.50 m), for the relationship between plan and elevation (12 m), and for the divided elevations by a triple series of large rectangular openings. Furthermore, the smaller block of the boiler room and the high chimney conclude the complex (see Fig. 5).

Fig. 5. Villa S. Giovanni (RC). The "F.lli Lo Faro" spinning mill (photo by the author, 2023).

3.2 Health and Environmental Problems

The presence of numerous chimneys, above all, changed the urban landscape, so much so that the area between Villa San Giovanni and Cannitello was compared to the most famous English industrial towns [Battaglia 1991] (see Fig. 6). In addition, the smoke

[3] On the theme of architectural typology for spinning mill see Palmucci Quaglino (1992).

and gases produced by chimneys often worried the population who, however, did not know the consequences of the use of this new energy resource.

Fig. 6. Advertising post-card of the "Rocco Messina" spinning mill in Cannitello, 1898 (in Messina Gotho di Gurafi 2021, 629).

In this perspective, some interesting issues on environmental problems and public health due to energy transition have emerged through recent archival research at the *Archivio di Stato* (Historical National Archive) of Reggio Calabria. The first implementation of a coal-fired steam machine seems to have been in Villa S. Giovanni in 1861, by the English businessman Thomas Hallam, resident in Messina and owner of other silk factories in Devonshire, England. This spinning mill by Hallam had a modern Woolf high-pressure compound engine, patented in 1805 by the British engineer Arthur Woolf, and a very innovative concept for the design of working spaces. The factory had a very high production rate in comparison to the other traditional spinning mills in the area: in 1863 the production of raw silk was 25,650 lbs, compared to an average of about 3,000 lbs in the other spinning mills [Pasquale 1863, 267]. Unfortunately, nothing remains of this factory today, as it was probably destroyed or seriously damaged by the 1908 earthquake. However, some archival documents allow us to understand the impact of the introduction of the new steam system on the environment and, above all, on the local community.

In 1863, two years after the launch of the Hallam spinning mill activity, in the context of a legal dispute, the Court of Reggio Calabria ordered an expert's report to verify if the state of decay of the bergamot trees in the bordering land owned by Mrs. Barrese was the exclusive effect of the action of the gases and other substances which, as a consequence of the combustion of fossil coal, were emitted from the Hallam chimney [ASRC 1863].

The experts' reports compiled by three chemists, Basilio Lofaro, Giovanni Aricò, and Giovanni Gentile, and two architects, Giuseppe Costantino and Francesco Paviglianiti, offer the opportunity to learn about the first reflections on technological progress. There was great trust in industrial development in the second half of the 19th century, based, above all, on empirical data and logical deductions.

The experts, after having surveyed the locations involved and having drawn up a plan (see Fig. 7), performed some scientific observations and analyses aimed at verifying the characteristics of the steam machine, the quantity of coal that was consumed per day, the methods in which combustion took place, and the quantity and quality of smoke that came out of the chimney. They described the parts of the steam machine, with many technical details. In particular, they described the chimney, built in brick, 23 mt high and 1 mt wide at the base and 50 cm at the top; great details were given also regarding the quantity of burnt coal (600 kg per day) and the quantity of smoke (1927 mc per day) [*ivi*, 391]. They also evaluated the possible impact of smoke and gas on animals and vegetables. In this perspective, the experts elaborated a very interesting theory based on logical deductions and general observations. They argued that under high temperatures coal produces many gases which are harmful to animals, such as hydrogen hydrocarbons, carbonic acid gas, carbon monoxide, hydrogen sulphide gas, and ammonia hydrogen sulphide. In some European countries, such as France, this led to public regulations aimed at obliging factory owners to install systems that burnt coal without releasing gases. In this perspective, they demonstrated the perfect functioning of Hallam's steam engine and the absence of harmful gases, through three days of tests on the draft of the chimney and the observation of the lack of black residues (such as dust or other substances), on the tiles of the roof underneath the chimney [*ivi*, 393–394].

The most interesting experts' argument concerned the fact that while the mentioned gases were harmful to animals, they were instead beneficial for plants. They argued that those gases were the same products from the putrefaction of substances of animal origins which, as was well known, were excellent fertilizers. They quoted some works by the economist Melchiorre Gioia[4] in which he declared how in areas with many factories or large quantities of livestock there was fertile soil. In big cities and their surroundings, carbonic acid gas, hydrogen carbonate, sulphur and phosphorus gas had a beneficial effect even on the worst soils. Assuming that the gases in Hallam's machine were not completely burned as a result of the combustion of hard coal, they would have produced lush vegetation. In fact, in areas where there were many steam engines, such as in Turin and Genoa, very fertile vegetable gardens could be seen [*ivi*, 397–398]. The experts examined also the temperature in the internal rooms of the factory, the external area, the public street, Mrs Barrese's land, and the nearby beach. Finally, they examined the level of decay of the bergamot trees, the nature of the land, and the plant grafts, and, above all, they compared the conditions of those trees with other trees in the surrounding and more distant lands. The comparison with the surrounding bergamot trees led the experts to show that Mrs Barrese's trees were very old grafts that had been covered by soil during a previous flood of a nearby river. Actually, the experts had observed some black substance on the leaves of the trees, so they decided to carry out some chemical analyses, which showed the presence of some fungi and not soot as previously thought. Moreover, some

[4] Melchiorre Gioia (1767–1829) was an Italian politician and economist; see Catalano (1950).

bergamot trees from other lands near to food-producing factories using steam machines were tested, in the outskirts of Reggio Calabria, revealing no damage to the trees. This was also verified for trees on lands near Mrs. Barrese's [*ivi*, 401–403].

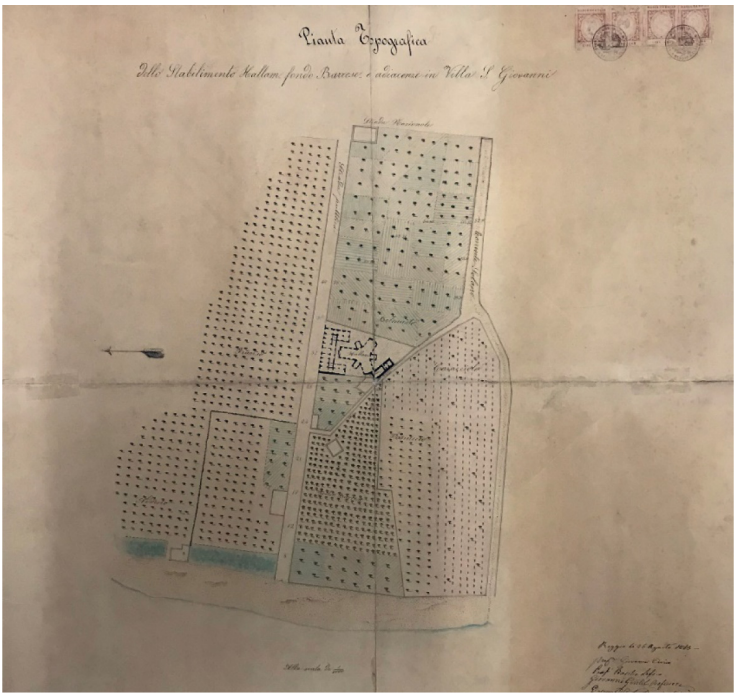

Fig. 7. Villa S. Giovanni (RC). Plan of the Thomas Hallam spinning mill (Archivio di Stato di Reggio Calabria, Planimetria Hallam 1863, Cartella AB n. 70, inv. 65 Perizie Tribunale, b. 816, Vol 16, perizia n. 19, foglio 363).

According to the experts, the causes of the decay of the trees was the age, which was more than 30 years, an age over which bergamot trees rarely survive, and the distance between the trees that was insufficient to guarantee a good level of ventilation, sunshine, and access to nutrition. Further elements to explain the bad condition of the trees were the position of the grafts covered by the soil due to the flooding, the widespread lack of upkeep, and of additional better-quality soil. The experts concluded that the presence of the steam machine in Mr. Hallam's spinning mill did not contribute to the decay of the trees, nor did the high temperature or humidity, or the presence of gas, which, if anything, would be a positive factor. In any case, the decay of the trees originated many years before the installation of the steam machine [*ivi*, 403–408].

4 Conclusions

The study of silk production, the survey on the ruins of some spinning mills, and archival research all offered the possibility to trace a constant search for a balance between local dynamics and external factors in the industrialization process in the area of the Strait of Messina at the end of 19th century. On the one hand, there are rural activities and craftsmanship, the domestic, or cottage industry dimension of work, the subsistence economy, and local markets; on the other, there are industrialization and technological innovations, a new rational organization of work, and the global market. In the background, the energy transition from biomass to coal emerges, presenting peculiar consequences in terms of design, landscape, and environmental issues.

Acknowledgements. The author acknowledges financial support under the National Recovery and Resilience Plan (NRRP), Mission 4, Component 2, Investment 1.1, Call for tender No. 104 published on 2.2.2022 by the Italian Ministry of University and Research (MUR), funded by the European Union – NextGenerationEU – PLanETs. Production Landscapes through Energy Transitions: Industrial heritage preservation, socio-political processes and potential reuse in Lombardy, Sardinia, and Calabria – *CUP C53D23006700006* – Grant Assignment Decree No. 1079 adopted on 19/07/2023 by the Italian Ministry of Ministry of University and Research (MUR).

References

1. Abbate, A.: Interscambi nella 'regione dello Stretto di Messina' nella prima età moderna. Peloro **III**(1), 25–44 (2018)
2. Allen, R.C.: Energy transitions in history: the shift to coal. RCC perspectives 2. In Energy Transitions in History: Global Cases of Continuity and Change, pp. 11–16 (2013)
3. ASRC, Archivio di Stato di Reggio Calabria: Tribunale Civile di Reggio Calabria, Serie Perizie, inv. 65 b. 184–185 (1863)
4. Battaglia, R.: La «conurbazione» commerciale dell'«area dello Stretto» nell'Ottocento. Archivio Storico per la Calabria e la Lucania **LVIII**, 121–150 (1991)
5. Bevilacqua, P., Corona, G. (eds.): Ambiente e risorse nel Mezzogiorno contemporaneo. Donzelli, Roma (2000)
6. Capalbo, C.: Mercato esterno e tradizione di mestiere. La produzione della seta a Cosenza tra Sette e Ottocento. Meridiana **3**, 73–96 (1988)
7. Catalano, F.: Melchiorre Gioia e il passaggio economico-sociale dal Settecento all'Ottocento. Belfagor **5**(6), 636–656 (1950)
8. Ciuffetti, A.: Protoindustria, paesaggi sociali e spazi rurali: un nuovo orizzonte per la storia delle attività e dei siti produttivi. In: Ciuffetti, A., Parisi, R. (eds.) Paesaggi italiani della protoindustria. Luoghi e processi della produzione dalla storia al recupero. Carocci, Roma, 14–27 (2018)
9. Currò, G., Restifo, G.: Reggio Calabria. Laterza, Roma-Bari (1991)
10. Di Maria, S.: La questione del Mezzogiorno e la crisi identitaria del Sud. Italica **91**(4), 803–830 (2014)
11. Felice, E.: Economia e società: il divario Nord-Sud all'Unità. Meridiana **95**, 39–62 (2019)
12. Fusco, I.: Centri abitati e industrie insalubri: la trattura della seta nella Calabria dell'Ottocento. Meridiana **57**, 85–110 (2006)
13. Laudani, S.: «Li posti delli mangani». Note sulla seta siciliana tra Sette e Ottocento. Meridiana **6**, 109–144 (1989)

14. Matacena, G.: Architettura del lavoro in Calabria tra i secoli XV e XIX. Edizioni Scientifiche Italiane, Napoli (1983)
15. Messina Gotho di Gurafi, N.: Cannitello dal 1601. La seta, la marineria, i commerci nello Stretto di Messina e la Commenda di Santa Maria di Cannitello detta Rocca Verdala nei Cabrei Gerosolimitani di Malta. De Franco, Reggio Calabria (2021)
16. Palmucci Quaglino, L.: Lo spazio del lavoro: filatoio, filande e manifatture da seta a Torino tra settecento e ottocento. In: G. Bracco (ed.) Torino sul filo della seta. Torino (1992)
17. Parisi, R.: La seta nell'Italia del Sud. Architettura e tecniche per la produzione serica tra Sette e Ottocento. Meridiana **47–48**, 245–274 (2003)
18. Pasquale, G.A.: Relazione sullo stato fisico-economico-agrario della Prima Calabria Ulteriore. Atti del R. Istituto d'Incoraggiamento XI, s.l. (1863)