

Virtuous Legislation: The Royal Decree for the Sustainable Management of the Woods of Serra San Bruno, Stilo, Mongiana, and Ferdinandea

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Abstract

The extraction and processing of metals in the Calabrian Serre region have ancient origins, with Greek colonies utilizing local mines for tools and coins. The Normans later granted mines to Carthusian monks, enhancing military production. Ferdinand II's reign saw the peak of the Ferdinandea foundry, leading to its designation as a military colony. The region's steel complex became a European industrial hub.

In the 18th century, laws were enacted to balance industrial needs with environmental protection. The Salvaboschi Decree of 1773, issued by the Bourbons and King Ferdinand IV, aimed to protect the forest heritage by implementing forty-year cutting cycles. It regulated tree selection and cutting height to promote forest regeneration, representing a significant step towards sustainable forest management in the Calabrian Serre region.

Keywords: Economic History, Environmental History, History of the Kingdom of the Two Sicilies, Economy of Southern Italy in the Nineteenth Century

1. From mining extraction activity to the foundation of the New Arms Factory of Mongiana.

The extraction and processing of metals in the territories of the Calabrian Serre constituted an activity undertaken since ancient times. Already from the second half of the 6th century BC, the colonies of Magna Graecia exploited the mines present in Calabria to produce tools and weapons (Fiorenza, 2019). Considering the significant presence of silver (Franco, 2003; Cunsolo, 1965), these colonies also used local mining resources to mint their own coins, providing a considerable boost to the economy and prosperity of the Greek communities settled in the region (Franco, 2019).

With the Norman dominion succeeding the Byzantines in Calabria, there was a marked evolution in the approach to the management of mining resources.

The mines, smelting furnaces, and watercourses, vital for powering the ironworks, acquired significant strategic importance and economic potential. These elements became subject to donations and concessions by the Norman crown, as evidenced by the concession acts drawn up in 1094 by Roger II of Normandy in favor of the Carthusian monks of San Bruno. Historical documentation reveals that the Normans, aware of the decisive relevance of mining resources, decided to introduce the smelting furnace into the forges of the Calabrian Serre. This mechanism, already in use in Nordic countries, was particularly renowned to produce Osmund iron, also known as Norman iron.

This type of iron was widely used to produce arrowheads and cutting weapons characterized by superior strength and durability, thus representing a significant contribution to the development of metallurgy and the military capability of the Norman era. The attention given to mining activity in Calabria remained unchanged throughout the various dominations that succeeded each other in the territories between Aspromonte and the Calabrian Serre, each of which, at its time, took control of the different ironworks or their products. This historical continuum ultimately led to the period of the Kingdom of the Two Sicilies, during which the architect Gioffredo was entrusted with the task of conceiving a project to modernize the facilities. The goal was to transform the ironworks into stable industrial structures and optimize production cycles to enhance production, improving both quality and quantity.

The previous administrations, up to that point, had operated on temporary processing sites, mainly due to the intensive exploitation of forests for obtaining firewood charcoal. This practice quickly led to the depletion of available timber resources. Furthermore, when charcoal had to be transported over considerable distances, the entire production process

became economically disadvantageous. The mandate to architect Gioffredo (Franco, 2019) therefore reflected the need to adopt innovative and sustainable solutions to ensure the continuity and profitability of the mining industry in the area.

The new complex was designed as a permanent industrial settlement, located in an area characterized by the simultaneous presence of all essential production factors: mineral deposits, forest resources for timber, and continuously flowing watercourses managed sustainably.

However, despite the good intentions and exceptional efforts, the steel complex showed significant inefficiency from the outset, often requiring further modernization interventions due to outdated processing methods, inadequate road infrastructure, and significant damage inflicted by the earthquakes of 1783.

The process of improving the facilities culminated during the period of French rule, with Joseph Bonaparte (from 1806 to 1809) and Joachim Murat (until 1815), who mainly directed the activity towards military production.

The military needs and the continental blockade imposed around the Kingdom of Murat established the specialization of the plant in the production of main components for rifles, pistols, and flints intended for the army. Alongside the exponential expansion of production, there was a growth in urban settlement around the factory, transitioning from temporary barracks to masonry buildings for workers, accountants, engineers, and their respective families. This transformation reflects the socio-economic and infrastructural changes resulting from the evolution of the steel industry within the context of French rule.

With Ferdinand II's ascension to the throne of Naples in 1825, the economic context of the Kingdom experienced a favorable upturn, characterized by an increase in government orders (Ciccolella, 2012). The State, engaged in various public works, significantly boosted civil engineering, railways, and shipyards.

Indeed, by around 1840, the Ferdinanda foundry recorded an annual production of pig iron ranging between 36,000 and 45,000 quintals (Fiorenza, 2023). This raw material was subsequently transformed on-site into finished products of excellent quality, a result attributed to the use of beechwood charcoal. This economic prosperity reflects not only the positive effect of state policies on industrial demand but also the Ferdinanda's ability to adapt to new needs and efficiently exploit local resources.

In 1852, the "New Arms Factory" was inaugurated, representing a significant advancement compared to the management during the Bonaparte period. While during that time only the main parts of weapons were produced to be assembled elsewhere, the new factory stood out for the

complete and ready-to-deliver production of firearms and edged weapons (Fiorenza, 2023).

In the same year, King Ferdinand II visited the production complex, which was emerging as the most modern and efficient in the Kingdom, as attested by the official report:

«Mongiana, October 19, 1852, no. 855. On the evening of the 16th, this Establishment received the honor of an almost unexpected visit from Our August Monarch, accompanied by Their Royal Highnesses, the Royal Princes, His Royal Highness the Duke of Calabria, and the Count of Trapani». (De Cesare, 2003).

The establishment of the "New Arms Factory" and the royal visit testify to a qualitative leap in the production and technological capacity of the plant. The complete production of firearms and edged weapons on-site indicated greater autonomy and sophistication in the arms industry. The sovereign's visit, moreover, underscores the crucial importance and consideration of the production complex by the monarchic authority, highlighting the socio-economic and political relevance of the manufacturing industry within the context of the Kingdom of Naples.

Following this inspection, the king proclaimed the complete designation of the settlement cluster as a military colony with administrative autonomy, delegating its management to an officer of the royal armed forces. This officer, in addition to carrying out military duties, assumes the civilian role of mayor, assisted in his function by subordinate officers.

The relentless initiatives for renewal and expansion of the facilities had catapulted the Royal Ironworks and the Bourbon Workshops of Mongiana into a position of preeminence in the steel industry of the time, configuring them as a technologically advanced hub. Specifically, the industrial complex was able to exert a significant appeal on the surrounding workforce, which quickly transformed into a highly specialized labor force. Furthermore, the production of these facilities was intended to provide, through their products, widespread supply on a European scale.

As highlighted, the exceptional working conditions within the steel center in the Kingdom of the Two Sicilies emerge through a cutting-edge legislative framework, aimed at safeguarding the forest heritage and favoring the perpetuation of coal supply. Additionally, employees engaged in mining activities served for a maximum duration of eight hours per day, while those employed in foundries were subject to a daily working limit of ten hours (Fiorenza, 2023).

2. On laws to ensure the safeguarding and sustainable management of the environment and forest resources.

To counteract the indiscriminate management of forest resources, which over time had systematically led to the depletion of vegetal fuel reserves, imposing legislation was introduced aimed at safeguarding forest resources, which were largely subject to a constant depletion process due to the numerous small ironworks existing in Mongiana.

The legislation, which was appreciated by Giovan Francesco Conty, aimed to ensure a steady and sustainable flow of charcoal. In particular, the so-called "Salvaboschi Decree," promulgated by King Ferdinand IV in 1773, established cutting cycles with a forty-year periodicity. According to this decree, through an official marking on identified trees, the annual felling of a single tree was allowed, chosen as the most mature among the surrounding forty. This operation was carried out at a height of about one and a half meters from the ground, to promote the natural reproduction of the forests. The adoption of such legislative measures reflects a growing awareness of the importance of sustainable forest resource management, aiming to preserve not only the environmental heritage but also to ensure a continuous supply of combustible material for industrial needs. This decree, therefore, constituted a precise regulatory tool aimed at balancing the economic requirements of extractive industries with the protection of the forest ecosystem.

However, over the course of thirty years (De Stefano Manno, B., Matacena, G., 1979), when the artillery took control of the establishment, the military found a lack of adherence to the previously issued safeguard decree and observed a total disregard for the fundamental principles of the existing legislation. The artillerymen found themselves in a situation where the forests, originally adjacent to the ironworks during its initial settlement phase, were now about twelve miles away from the facilities. This discrepancy led to the ineffectiveness of the initial reasons that had justified the transfer from Stilo, which had been conceived to balance the increasing transportation costs of the ore with the reduction of the price of coal produced near the ironworks.

In this context, the failure to implement regulatory measures and the deterioration of environmental conditions are highlighted, with direct implications for the economic sustainability of the ironworks.

The law of 1773, designed to mitigate the fuel supply problem, faced resistance in its implementation that led to significant consequences. The condition denounced by the military, highlighted in the report of the captain "al Dettaglio" on the state of the forests, reveals a concerning picture:

«[...] the negligence in enforcing the laws of the past Government has resulted in the loss of the Bosco del Marchese di Arena, which, after

being destroyed for charcoal production, has been cultivated and turned into farmland, thus finding itself entirely devoid of trees, in violation of the law of 1773 which ordered the owners of adjacent forests to prevent clear-cutting and cultivation in their forests under penalty of paying 500 ducats and having their properties confiscated [...]». (BNN, 63/1).

In truth, the captain denounces the lacking observance of the laws of the previous government, with particular reference to the loss of the forest of the Marquis of Arena. This wooded area, after being destroyed for charcoal production, was subsequently cultivated, resulting in it now being devoid of trees. This constitutes a direct violation of the law of 1773, which had specifically ordered owners of adjacent forests to prevent clear-cutting and cultivation on their forest properties. The penalty prescribed for such transgression, according to the law, consisted of paying 500 ducats and confiscation of assets.

This scenario underscores the importance of rigorously enforcing environmental and forestry laws to ensure sustainable management of natural resources. Non-compliance with these regulations can result not only in the direct loss of forest resources but also in negative impacts on soil fertility and biodiversity.

Furthermore, it should be emphasized that the report highlights the need for careful surveillance and appropriate sanctions to ensure the effectiveness of environmental laws in preserving and protecting forest heritage.

The presence of a well-established legal norm, accompanied by substantial pecuniary sanctions for offenders, could have provided a robust foundation for the coercive enforcement of the law. The military forces could have utilized such a tool, opposing authoritative management to the fragility of previous administrations, to firmly impose compliance with these provisions, directed at all social classes, nobles included. The mere presence of the resolute body would constitute a significant deterrent. As a demonstration of the determination to enforce the regulations, the artillerymen establish systematic surveillance of each forest, by assigning a guardian accompanied by an armed detachment. Their task is to prohibit grazing, prevent the unjustified destruction of plants and saplings, and ensure the enforcement of the prohibition on cultivating previously deforested land.

It is undeniable that the law of 1773 failed to eliminate harmful pre-existing clauses, which granted landowners, beneficiaries of state contributions for afforestation, considerable discretion and maneuverability:

«[...] the forests that have belonged to this establishment for a century and a half are those called the Demanio di Stilo, which are to the east of Mongiana, beginning three miles from the present establishment, covering an area of two leagues of beech trees. These

forests were purchased by the University of Stilo from the Marquis of Arena, given to the King for charcoal production, with the understanding that they retained the sole right to take some poles for their own use and the right to keep animals out of pasture [...]». (BNN, 63/1).

Starting from the limited land extensions measured in poles, with the right to confiscate animals found grazing illegally or introduced illegally into the lands (an inherently harmful practice), it evolves towards the agricultural reconversion of previously deforested soils, considering them, in this sense, as no man's land. This process serves to highlight the determination of the new administrators of the complex:

«[...] it is necessary, in order to put a limit to this terrible inconvenience, to set an example by obliging the Marquis of Arena to comply with the decree, and furthermore, to compel him to sow acorns and remove the animals to regenerate his large estate of trees that have been destroyed [...]» (BNN, 63/1).

For the noble owner, failure to comply with the order would have resulted in stricter sanctions. The threats were not limited to the Marquis of Arena alone but extended to other landowners who were previously under surveillance, accustomed to viewing laws from Naples as merely symbolic of a distant central power. The list of subjects under observation includes the Prince of Roccella, the Duchess of Girifalco, and the Carthusians, all owners of the forests surrounding the ironworks.

The protection of forest heritage proves to be an issue that cannot be solely resolved through policing measures, nor could such measures ensure lasting sustainability for ironworking activities. The issue is addressed through botanical interventions, as highlighted by Captain Ritucci himself, who proposes the planting of "pines picea," the only species of pine capable of producing excellent quality charcoal. Furthermore, it is suggested to plant "white birch" in degraded clearings, a species known for its easy and rapid growth and for producing charcoal with high calorific value. The captain "al Dettaglio," with a markedly military attitude, issues the order to the charcoal burners:

«[...] to obtain excellent charcoal, it must be made in the summer, not in winter, the wood must be cut at the third hour of the moon, or in January, and it should not be very young because otherwise, with the presence of moisture, it is necessary to make many holes, called vents, in the charcoal pile, to allow air to enter, which fuels the fire, causing the charcoal to become burnt, known as Corvino, which is entirely useless [...]» (BNN, 63/1).

The attention given to carbonization and reforestation is not merely discretionary initiatives of the ironworks administrators, driven by the

concern to comply with the operational planning established in Mongiana to meet the needs of the armed forces. In this context, it is Murat himself who issues specific directives. In Decree no. 846, article 5, he instructs the Ritucci-Melograni-Paolotti Commission:

«[...] (said Commission) *will then designate and identify the same forests and the regulations and annual cuts to be made, taking into account the vegetation and life of the trees in that climate, in order to obtain their perpetuation [...]*». The absence of generality in this provision is evident from the presence in the commission of Giuseppe Melograni, Inspector of Waters and Forests, called upon to serve as an expert in the forestry sector. (BSNSP).

Numerous and diverse are the problems to be addressed, not least among them the need to endure prohibitive winter weather conditions that interrupt the carbonization process for a considerable period. On several occasions, it has been observed that the fuel stocks stored in the warehouse were barely sufficient for two to three days of activity, as delays in government supplies prevented the material from being subjected to carbonization in the summer for use during the winter. Additionally, it was not possible to accumulate, during the favorable season, the complete quantity required by the annual scheduling of smelting activities. The military's attention is focused on preventing inadequate coal supply in the structure called the "Carbonile," the largest hall in the entire ironworks complex, and it is their concern to ensure adequate supplies to prevent such an eventuality. (BNN, Ms. 63/1).

It should not be assumed that all optimizations implemented during this time interval were achieved solely through the exercise of authority, through continuous oppression, nor that the only ones bearing the burden of increased production are the workers. In fact, the absurd and decidedly unpopular demands from the Neapolitan Ministry are firmly rejected by military authorities, justified through various arguments.

In response to an inquiry from the Ministry regarding the forge's capacity to supply the army with 60,000 cantaja of bullets, it is noted that such an extraordinary quantity would put both men and facilities at risk of overwork. Considering that the production of one melted mass would require approximately 40,000 loads of charcoal, its consumption would inevitably lead to the devastation of all surrounding forests within a few years, resulting in the irreversible cessation of activities in Mongiana. The Minister, who proposes the requisition of mules to increase fuel supply, is kindly but firmly informed that:

«[...] *requisition is nothing but an act of the moment's necessity, it is violence, not applicable to a system of long, regular, and well-ordered work; it would drive up the price of charcoal by half as much*

again as it costs with mules and the Mongiana tariff, and make the price of raw iron material and its manufactured products much higher [...]» (National Library of Naples, Manuscripts Section, Ms 63/7).

If the military avoids using excessive force or putting pressure on the workers, they still do not tolerate smuggling or theft of materials from the facility. They carefully monitor all stages of operations, such as cutting, carbonization, and transportation:

«[...] and for the charcoal burners, who although working on a piece-rate basis, it was still likely that they would sell the charcoal for a higher profit to outsiders, operations were conducted to verify the amount of wood obtained from a bushel of forested land, the amount that one man can cut per day, and the carbonization process was simultaneously monitored, along with the quantity that can be derived from a given amount of wood. Meanwhile, the charcoal burners were divided into three groups, each with its own leader, whose obligation was to report any shortages and notify if there were any smuggling activities. Additionally, it was ordered that two Forest Guards be sent daily to the carbonization site to stand guard, and they remained there overnight as well. At the end of each week, the Captain of Detail calculates the quantity that each charcoal burner leader should have delivered based on the number of men they had; this quantity is then compared to what was received, and if it is less, the leader is punished unless they disclose who is responsible for the shortfall. As for the mule drivers, they also work on a piece-rate basis, but since they could potentially miss a day's work and take advantage of a transport offered at a higher price if not supervised, it was ordered that one of them act as the leader of the others. Their obligations include reporting each evening on any absent mule drivers and any sick mules. Just as the Captain of Detail receives reports every evening on the various items received in minerals, coal, and timber during the day, he compares whether the service of the mule drivers has been proportional, given the number of existing transports and the quantity of items received [...]». (Ms 63/12, BNN).

In addition, an analogous nightly report, submitted by the charcoal burners, is transmitted through the personnel sergeant to the Detail captain, who receives regular updates on the progress of operations from the forest guard corporal. Drawing from this information source, the officer synthesizes, compares, and systematically annotates the data in a load register. Every morning, they attend a briefing with the director, with whom they agree on daily strategies.

Although the dense network of controls is effective in preventing glaring shortages, it cannot eliminate the risk that small amounts of material are diverted through more lucrative alternative routes.

The approval of brigand bands or the sale of coal destined for the ironworks to inhabitants of surrounding villages represents a necessity arising from circumstances, and this phenomenon cannot escape the attention of the administration or the surveillance personnel. Therefore, it is found that, to prevent supplies from reaching the bands, the administration itself, to purchase contraband material unofficially, even gains an economic advantage, as the price paid is lower than the rates applied by the plant for the sale of coal to third parties.

A significant improvement in current conditions will likely be achieved through the approval of a 40% increase in costs related to logging and carbonization, once the outdated and insufficient tariffs from 1804 are modified.

With the implementation of the new tariffs, each ton of timber (which generates approximately 500 quintals of coal) will be subject to a cost of 11 ducats. The carbonization process of a quintal will incur a charge of 18 grains for the forge, while transportation costs from nearby forests will amount to an additional 15 grains; transportation from more remote forests will incur an expenditure of 18 grains.

Under the new tariffs, the compensation for a quintal of coal (equivalent to 7 and a half Neapolitan tomoli) will amount to a total of 35 grains for nearby forests and 45 grains for more remote ones. While it cannot be described as a period of abundance, this nonetheless represents a significant improvement over the precarious wages of the past. Furthermore, considering that at this time a form of healthcare assistance is being established and a pension fund implemented, the approaches adopted are far from coercive. The entire credit for these improvements can be attributed to the new military administration and the workers themselves, who, through their conduct, prevent the establishment of a regime of excessively severe exploitation.

The recent tabulation introduces significant differentiations between summer and winter tariffs for carbonization operations. Specifically, a distinct pricing scheme could be implemented for the winter period, with a surcharge of seven grains for each load of processed product delivered during the "short days," namely from November to late April. This tariff structure aims to incentivize activities carried out by lumberjacks by providing more adequate compensation for the efforts undertaken in unfavorable environmental conditions:

«[...] *The price increase is not intended to be applied universally and in young forests, where cutting is particularly easier, but it will*

always be ensured that the price of labor is compensated so that an ordinary worker can earn at least 30 grains per day, both on long and short days». (BNN, Ms 63/10)

It is not difficult to notice that salary increases are not only the result of humanitarian considerations but rather reflect more precise and tangible reasons. The primary objective is to preserve the unity and loyalty of workers in the sector, attempting to bind them as much as possible to a facility that, day by day, sees carbon workers leaving in search of more profitable employment opportunities elsewhere.

The approximately one hundred specialized workers in the sector find it advantageous to continue working for the ironworks because, thanks to the privilege of "filiazione", they are exempt from mandatory military service. While ensuring a quieter life, free from the hardships and dangers of prolonged military service, this choice does not, however, offer adequate sources of income to support family needs in the maturing phase of life. A natural phenomenon of emigration to the free forests occurs as soon as the filiazione period expires in the free forests, charcoal production can be carried out independently with the prospect of achieving higher profits. In the neighboring woods of the nearby Serra, the product is sold directly at the charcoal site, exempt from transportation costs, and reaches a value more than double the rate practiced in Mongiana, with a quotation of 60 grana per soma.

The recent tariff structuring agreed upon by the military authorities constitutes a significant incentive for many workers to remain at the facility, favoring a lower but stable income over exposure to fluctuations in the free market, essentially dependent on the local supply demands of the surrounding village residents and the demand from blacksmiths in Serra. In addition to a superficial concession, it is implicit that the military authorities have planned for a severe sanction in the form of a fine of ten carlini for each young tree fraudulently felled or for the felling of a tree not previously marked by the Forest Rangers. The same penalty will be imposed on charcoal workers caught lighting fires on pyres placed in the heart of the forest. This procedure must be carried out in the open, in remote clearings, away from the density of trees. Exemplary sanctions will be applied to anyone uprooting saplings or cutting down the "advance trees" left in the center of deforested areas to facilitate the spread of new seeds in the soil. It is also forbidden for anyone to use branches to start deliberate fires.

The charcoal burner and the forest guard are required to oversee the proper process of tree felling, ensuring that it occurs accurately and without prejudice to the underlying seedlings. A categorical ban on felling pine groves, thickets, and clearing bushes is proposed, as they constitute a crucial environment serving as shelter and protection against wind and snow for

growing shoots. In summary, it is imperative to carefully monitor the forest's development, promoting the natural course of events, and, akin to a well-tended garden, intervene only where strictly necessary.

The debate over freely gathering firewood or accumulating bundles is not applied indiscriminately. The basic needs, customs, and customary rights of the Mongiana community and neighboring villages are preserved. The facility ensures to annually provide quantities of charcoal for heating and household use, considering the population's needs. An analysis of the data stimulates reflections on daily life in the village and the fairness of distribution. The amounts of fuel provided by the administration (600 during the Napoleonic era) are distributed proportionally among officers, non-commissioned officers, employees, troops, and workers, with a decreasing distribution.

Officers receive a lower per capita quantity since their residences are characterized by greater comfort and better protection from winter harshness compared to those of all other categories. Non-commissioned officers and employees are allotted a higher individual quantity, considering that they reside in lower-quality housing. Workers, who are skilled artisans or simple laborers, enjoy a higher quota, as they reside in homes built in a rudimentary manner, sometimes constructed by themselves or, in previous epochs, in simple wooden shacks.

Officers receive a lower per capita amount because their residences are characterized by greater comfort and better protection from winter hardships compared to those of all other categories. Non-commissioned officers and clerks are allocated a higher individual amount, considering that they reside in lower-quality housing. Workers, who are skilled craftsmen or simple apprentices, enjoy a higher rate, as they reside in dwellings built in a more rudimentary manner, sometimes constructed by themselves or, in earlier times, in simple wooden shacks.

In meeting the immediate needs of the inhabitants of Mongiana, attention is also paid to the needs and habits of neighboring communities. In 1819, the former director Ritucci, now assigned to more significant tasks, while preparing an estimate for the purchase, by the ironworks, of the woods owned by the Carthusians of Serra, draws the attention of the Ministry's superiors to a matter of considerable importance. In particular, he highlights that the residents of Serra claim the right, rooted in centuries-old customs, to gather timber and firewood for personal use in the woods. Ritucci emphasizes this aspect so that adequate attention is given to it during the negotiations between the Government and the Pontifical Executor. He also points out that the restrictions applicable to the residents of Mongiana cannot be extended to those of Serra, otherwise there would be a risk of compromising the balance of the local economy based on water-powered

sawmills and wrought iron craftsmanship, the latter being representative of a significant market for the ironworks. The complexity of territorial dynamics and local customs clearly emerges in this context. Captain Vincenzo Ritucci, who served as director of the industrial complex from 1808 to 1811, while recognizing the need to protect Mongiana's economic interests, also concerns himself with respecting centuries-old traditions and the needs of neighboring communities. His attention to the socioeconomic component of the negotiations suggests a holistic approach that considers economic sustainability and the integration of surrounding communities in the management of forest resources (Ritucci, 1819).

One of the strategic imperatives for all the ironworks administrations is the constant expansion of forest properties. In addition to the significant consumption of coal, Mongiana requires a considerable amount of timber, used in local sawmills, and transformed into beams and boards used for building roofs, floors, frameworks of huts covered with light boards, bridges, canals, and in the structures of water wheels that require periodic replacement due to damage from rot and frost. In mining operations, the demand for timber reaches exorbitant levels, to the extent of resorting to recycling of props to obtain the necessary caps. The Arms Factory, including its sawmill, undertakes the responsibility not only to provide rifle castings but also all the required packaging crates.

The efficient and sustainable management of forest resources represents a crucial priority for the administrations of the ironworks in Mongiana. The increasing demand for timber, both for structural and industrial purposes, highlights the importance of consistent and sustainable supply. The acquisition of increasingly larger forest extensions thus becomes an essential plan to ensure the continuity of production activities and the coverage of the various needs of the industrial complex.

Finally, the Neapolitan Royal Navy selects spruce trees from the forests of Serra and Mongiana, destined to form the most elegant and imposing masts of its vessels. This particular selection primarily takes place in the Fillò forest, characterized exclusively by this type of wood, where trees of the same variety grow with exceptional vigor and prosperity.

« [...] from which it provides for its most beautiful and majestic masts, which mainly come from the said Fillò forest that contains no other species of timber and where trees of the same species grow with greater vigor and prosperity» (ASMN, 1811).

As soon as opportunities arise, the governmental authority proceeds with the acquisition of available forests in the market of Mongiana. A tangible example of this practice is found in the purchase contract signed in 1825 for an oak forest in the municipality of Placanica (ASMN, 27). As early as September 1813, a government decree allocated a considerable portion of

the surrounding forests to the ironworks, thus consolidating its control over the forest resource. In the same year, regulatory provisions are enacted for the restoration of forests, and the most favorable periods for conducting such operations are outlined. The regulation introduces the criterion, perpetuated subsequently, of dividing the breadth of forests into forty equivalent units, intended for sequential use, one each year. This innovative approach allows for the felling of trees at the peak of their vitality, and the implementation of periodic cycles enables production planning and mitigates fuel shortages. However, drawbacks arise as the process of felling trees of considerable size leads to leaving numerous wood splinters on the ground; furthermore, charcoal derived from nearly forty-year-old plants does not achieve optimal calorific yield. This method replaces the previous practice, proposed by Melograni and briefly used, of periodically cutting the "suckers" that regrow around the stumps. The latter method involved less cutting effort, reduced waste of splinters, and a higher calorific yield of charcoal obtained from wood of appropriate age. Despite the "low forest" cutting resulting in higher charcoal production, unfortunately, it could only be used for species with rapid regrowth of "shoots".

3. The Regulation on Analytical Aspects and Environmental Protection

In Mongiana, throughout the entire operational period of the ironworks, the phases of the carbonization process have retained their unchanged structure, and this remains largely unchanged today. Charcoal burners still carry out the construction of the kilns; it is enough to travel the road from the Ionian coast to Mount Pecoraro, or to traverse the forest roads, to observe the smoke from the charcoal kilns rising above the vegetation. Saverio Strati's book "A mani vuote" offers an account of the difficult life of contemporary Calabrian charcoal burners, who still supply charcoal to the inhabitants of mountain villages, where kitchens continue to use charcoal and where the only remaining heating system is represented by the brazier (Strati, 1960).

In the carbonization system employed in Mongiana in the 19th century, some disparities are evident compared to the methods used in Alpine or French regions. The entire operation is managed by the head charcoal burner, who, in addition to his daily wage, receives a percentage of the profits from each kiln worked and delivered.

The head charcoal burner supervises the charcoal makers, who are paid based on piecework, advances their wages, and oversees all phases of the process. He bears the responsibility for the success of the entire operation, including the transportation of the material. The portion of forest to be felled is delimited annually by the forest guards, subject to the approval

of the Detail captain or the management. The guards, under the command of the corporal guard, promptly go to the site in military uniforms (of blue cloth, with scarlet cuffs and collar, buttons of white metal bearing the bourbon lily surmounted by a crown). The forest guards proceed with the marking of the trees destined for annual charcoal production by applying a stamp. This stamp is impressed into the still-living wood using a hammer-punch, generating the letter "M" (symbolizing Mongiana). A second stamp, containing the letters "SC" (referring to Sicilia Citeriore), is hammered onto the trees that delineate the section and on the trunks of the fifteen trees per moggio, in accordance with Article 35 of Forest Law No. 967 of 21/8/1826. These latter trees are preserved intact for the purpose of providing "seeds of hope." (Art. 44). The government-owned hammers are carefully kept in cases equipped with two keys, the first of which is entrusted to the custody of the director and the second to the corporal guard. The application of the stamp follows an official procedure: for each tree, all information is carefully recorded in the report, which is initiated during the punch retrieval phase. This document, signed by both the guard and the designated agent to whom the hammer was assigned, details the specific uses to which the tool has been allocated. The stamping procedure is followed by the cutting procedure, usually carried out during the "season of firm sap," which extends from early September to the end of March. The cutting is performed exclusively using an axe, occasionally with a saw, severing the trunk at about 120 centimeters from the ground, at the point where the blow can be most vigorous and precise. The head charcoal burner divides the assigned sector among the lumberjacks of his team, each of whom is responsible for their own area and cannot encroach on others'. After the tree falls, the trunk, stripped of branches, is fragmented into stumps of 80 centimeters called "tropelli." These are rolled to the charcoal kilns, rarely using the establishment's oxen to drag the whole trunk. Near the kilns, the "tropelli" are subjected to the action of the axe and divided into pieces.

The carbonization period extends from spring to the first snowfall, however, the most active participants, euphemistically referred to as "in need," extend their activities around the kilns even during the winter months. Since the tree felling period and the carbonization period do not coincide, it is common for the trunks to lie overturned throughout the estate. The actual carbonization phase follows the usual process employed in forests: after identifying a suitable location characterized by clayey, compact, and non-porous soil, the central pole is inserted, and the base circumference of the pile is delineated. Subsequently, the construction of the dome begins, a task entrusted to the older and more experienced elements among the charcoal burners, upon which the success of the charcoal production process depends.

The ignition of the kiln occurs through a dedicated channel, with a base diameter measuring four meters, a value lower than that found in Alpine, Maremman, and French methods, specific to Mongiana.

The carbonization process is subject to continuous monitoring, with targeted corrective interventions in response to variations in the color of the smoke, an indicator of adequate progress in combustion. The duration required for the carbonization of a wood mass varies depending on the quality of the wood used, whether it is dry or fresh, as well as environmental conditions such as air humidity, atmospheric temperature, and wind direction. Typically, the process is planned to take place over six to eight days. At the end of this period, the air intake holes are closed, causing the reaction to cease.

After an additional period of two days dedicated to cooling, the surface layer of soil is removed, and the pile is dismantled, usually in nighttime operations that facilitate the removal of any remaining fires. The resulting charcoal is carefully packaged in hemp sacks and transported by mules to the foundries. Here, the carriers unload the material in designated areas in front of the carbonization structures and wait twenty-four hours before proceeding with the actual delivery. The suspension of carbonization activities during the months of July and August is aimed at preventing potential fires, which could arise due to a faulty extinguishing process. Indicative projections suggest that accidental incidents of this nature could become more frequent in the second half of the century. (Archivio di Stato Catanzaro). This precautionary measure translates into an operational pause to avoid the risk of self-combustion phenomena. At the end of the quarantine period, the carbonized product is entrusted to the warehouse managers, who carry out meticulous inspection and counting under the supervision of a technician. However, there were drawbacks. In particular, the class of charcoal burners and transporters lived in extreme poverty.

« [...] *even the processing and transportation could be greatly improved*». (Giordano, 1864).

The cost of coal to the establishments was calculated approximately as follows:

<i>Thank you for the charcoal workers.</i>	<i>L. 1,01</i>
<i>Profit for the head charcoal burner and different wages.</i>	<i>L. 0,13</i>
<i>Transportation to the foundries of Mongiana.</i>	<i>L. 1,63</i>
	<i>L. 2,77</i>
<i>You still need to add the price of timber, calculated for state-owned forests.</i>	<i>L. 0.13</i>
Total cost.	<i>L. 2,90</i>

In the Giordano report, some economic and logistical considerations are highlighted in the evaluation of the price of vegetal fuel, as well as an attempt to compensate for an insufficient decrease of 4.010 in the use of coals through excess measurement, while discussing the financial and environmental impacts related to ecclesiastical fees and the use of forests for charcoal production.

«[...] for Ferdinanda, the transportation being lesser, the price of coal was calculated at L. 2.12. In the use of coals for blast furnaces, a decrease or deficiency of 4.010 is considered, a figure that is insufficient but is compensated by the excessive measurement of the coal received from the charcoal burners, at the expense of their wages. The prices of the coals mentioned do not consider the general expenses of the establishment nor the burdens that may weigh on the forests. The price of L. 0.13 attributed to timber is very low and on the total annual coal production (29,200 quintals), it barely represents the salary of the 7 guards. Now, wanting to attribute to coal its real value and especially what it can have in the future, one must calculate all the influencing conditions. The four forests Santa Maria and San Miceli, Archiforo and Chiudilli, Fallo and Chiuselli, and Boscarello came to the Domain from the ecclesiastical patrimony by instrument of June 19, 1826, in which an annual gross canon of 7500 ducats and a net tax of 6000 ducats, equivalent to L. 25,500, were stipulated in favor of said patrimony: which canon is now paid annually to the ecclesiastical treasury. However, since the forests provide little wood and timber to the establishments but rather to the sawmills, so only a minimal part of the heavy canon of L. 25,500, as well as any others that may still exist, can be attributed to the coals destined for the ironworks. For the forests of Stilo, Lacina, and Dinami, of which the first is the most essential for the ironworks, the existing burdens, as it appears from the obtained information, are very light. On the other hand, these same forests, while they can easily supply 20 to 30,000 quintals of beech coal to the establishments, are still capable of yielding a large annual income from fir and other tree species cutting, as well as from pastures». (Giordano, 1864).

From a series of analyses reported by Giordano emerges the possibility, in terms of sustainable management, of assigning to the government the burdens that weigh on the Calabrian state-owned forests mainly in relation to timber and other products, thus freeing up the coal destined for the ironworks. However, it is crucial to carefully consider the ecological and economic aspects in the planning of forest policies, ensuring

sustainable management that balances industrial needs with the conservation of forest ecosystems.

«[...] *The general guard of Catanzaro d'Elia, delegated to the estimation, carefully calculated the potential income of the 7 state-owned forests, both in beech coals and in the other items just indicated, and found that by attributing a value of L. 85 per hectare to the coal cutting, which is the price of timber, that is, L. 0.28 per quintal of coal (double the current price), there would be a total income of about L. 11,500, of which only L. 10,000 from the 3 forests of Stilo, Lacina, and Dinami. Instead, the other proceeds from fir cuttings, other species, and pastures, assuming some improvement in forest cultivation and communication routes, would amount to an annual total of L. 36,000, of which L. 25,000 from Santa Maria and San Miceli, 6800 from Stilo, 1,400 from Archiforo, 1,300 from Fillo, and 900 from Dinami. From the previous considerations, it can be deduced that strictly speaking, the burdens weighing on the Calabrian state-owned forests could be attributed in whole or in most part to timber and other items they are susceptible to, leaving the coal free to supply the ironworks*». (Giordano, 1864).

The commission therefore suggests that the Calabrian forests, crucial for the iron and steel industry and the wealth of mountainous regions, require improvement in their cultivation. It proposes the appointment of an experienced technician in forest administration to oversee forest management operations, cultivation, and improvement, including coal production. This proposal highlights the need for more careful management of forest resources, considering their economic and environmental importance.

«[...] *However, the value of L. 0.13 currently attributed to timber is and would be excessively low in the future. A similar value for timber is, as we have seen, between L. 1.50 and L. 2 and more in the Lombard and Aosta valleys, not counting the tax, and it is L. 0.80 in the state-owned forests of Tuscany that supply the Maremma establishments. In these areas, considering the few existing communications, a value of L. 0.60 or at least L. 0.50 could be established, which would represent an income of L. 15,000 on the annual production of 30,000 quintals, and therefore, for the cutting of beech forests on fortieth rotations, the price would be L. 150 per hectare at the rate of 39.*

Therefore, the probable price of coals, also assuming some improvement in wages, would be:

Timber (assumed)	L. 0,50
Total processing	L. 1,30
General expenses and calculated at 10,010	L. 0,20
Transportation to Ferdinandea	L. 0,80
	L. 2,80

In Mongiana, the coal from Stilo and Dinami, still transported by mule, might cost around 0.50 more, making the price 3.30 Lire. The Calabrian forests we are concerned with are not only the essential resource for the steel industry but almost the sole wealth of those mountainous regions. It is not inappropriate to mention the possible and not difficult improvement of their cultivation. Firstly, if these forests are to be kept under the administration of forest authorities, it would be advisable to assign a skilled technical employee to oversee their management. This individual would be responsible for general supervision and various operations related to cultivation, improvement, and charcoal production». (Giordano, 1864).

Finally, the commission proposes several measures for the improvement of the depleted forest land, emphasizing the need to repopulate empty areas or clearings through prompt intervention in soil regeneration. Currently, the soil, being overgrown and compacted, hinders the germination of plant seeds. The practice of ordinary cereal cultivation for several years in these empty spaces could be granted free of charge to surrounding private individuals to facilitate repopulation without any expense, resulting in mutual benefit.

Further improvement proposals include the opening of horizontal ditches on steep slopes to retain water and soil, selective cutting of trees at an angle and close to the ground, removal of stumps that do not produce new shoots, and other similar considerations deemed necessary to significantly increase forest production. The importance of strategically laying out roads in the forests is emphasized to reduce costs and facilitate the transportation of coal and timber to the facilities. The proposed approach demonstrates a comprehensive and well-considered plan for the restoration and sustainable management of forest resources, considering ecological, economic, and logistical factors.

«Among the measures to recommend for the improvement of the depleted forest land, it is worth mentioning the prompt repopulation of the frequent empty spaces or clearings that currently exist, where the overgrown and compacted soil now refuses the regrowth of plant seeds. Recognizing that in such cases it greatly benefits soil

restoration to practice ordinary cereal cultivation for several years, the cultivation of these spaces could be granted free of charge to local private individuals for 2 or 3 years, who, according to the information received, would willingly participate. In this way, without expense and with mutual benefit, the beneficial purpose would be achieved. Various other measures can also be recommended, such as the opening of horizontal ditches on steeper slopes to retain water and soil, the cutting of trees at an angle and closer to the ground, the removal of stumps that clutter the land without producing shoots, and various similar precautions recognized as necessary in those forests, through which it would not be difficult or expensive to significantly increase production. It is worth noting how the opening of some trunk roads properly laid out in those woods would help reduce the transportation of coal and timber to the facilities». (Giordano, 1864).

The forests surrounding the locality of Mongiana boast a significant diversity of tree and fruit species, a characteristic that contributes to their heterogeneity. Despite the presence of a varied range of species, beech and fir stand out as predominant elements, exhibiting, as is common in nature, a relationship of mutual complementarity in their vegetative development. This characteristic was promptly observed by the members of the study mission sent to Mongiana by the Ministry of the Navy immediately after the Unification of Italy.

The 'Commission for the Ironworks' arrived in the town with the objective of subjecting the ironworking activity to thorough scrutiny. The importance of this examination is crucial for the community of Mongiana, as the survival of the iron industry in Calabria depends on it. Engineer Felice Giordano, at the forefront along with his colleagues, furthermore, conducted a detailed analysis through X-ray examination of the mines, ironworks equipment, and personnel involved.

In 1864, Giordano will publish a detailed report on the efficiency of the ironworks in the Lombard, Aosta, Tuscan, and Calabrian regions. This document will be fundamental for assessing and improving the performance of the iron industry in these locations, thereby contributing to the progress and competitiveness of the sector on a national scale.

To better outline the impact on the forests, it is essential to emphasize:

«[...] These forests shading the steep slopes and peaks of the Calabrian Apennines represent a significant wealth and adornment of those mountains that border two seas at their feet. Along the banks of these mountains and on the gentle slopes, there are mild climates, gardens filled with the finest citrus fruits, and extensive and fertile

olive groves. On the middle slopes, there are chestnut woods, meticulously cultivated in rows and parcels. On the higher grounds and peaks, there are ancient forests of tall trees, where the predominant beech thrives alongside spruces, wild pines, and in smaller numbers, oaks, maples, ashes, yews, elms, and various fruit trees. The nature of the woodland species, the granitic soil, the freshness of the sites and waters, imbue this elevated region with a striking resemblance to certain sites in our Alps and even to the wooded regions of Germany, particularly those of the Hercynian Forest» (Giordano, 1864).

The observer, fascinated by the unexpected landscape diversity of the Serre mountains, characterized by an exceptional combination of alpine elements and Nordic influences, finds himself immersed in a unique blend of flora and fauna. However, his initial enthusiasm quickly dissolves into criticism, focusing significantly on the absence of infrastructure, particularly on communication routes within the dense forests that envelop the region. The lack of practical and accessible pathways proves to be a significant obstacle, hindering a comprehensive appreciation of the natural riches offered by this environment.

From a critical perspective, the traveler highlights how this lack limits the overall experience, preventing nature lovers and explorers from fully immersing themselves in the wild and untouched beauty of the Calabrian Serre. His analysis could delve into the consequences of this deficiency, highlighting the missed opportunity to develop sustainable tourism and preserve these ecosystems harmoniously.

«[...] all the potential profit from the enormous masses of trees of various ages accumulated there, much of which could be utilized for various purposes along the adjacent Tyrrhenian and Ionian seas. Therefore, their cultivation is neglected and can be said to be abandoned to nature itself, and devastations are not infrequent, although less so than in other locations» (Giordano, 1864).

Gratitude is solicited towards the descendants of Mongiana for the posthumous praise attributed to their ancestors for the careful management of forest resources, which proved to be significantly superior to other Italian locations visited by the commission. Furthermore, the engineer's perplexity regarding the underlying reasons behind the reported situation, which escape his understanding, is noted.

Particular attention is given to the surprising disparity in current prices of local timber, eliciting a profound sense of wonder in the engineer. The analysis of these divergences could be the subject of further investigation to delineate the economic and environmental variables that determine their peculiarity. In this context, an in-depth exploration of the

socioeconomic dynamics influencing the timber market in Mongiana is proposed, aiming to gain a deeper understanding of the complex interactions that characterize this reality.

«[...] *The value of timber on the site is very low. A century-old fir is hardly estimated at more than L. 13; an ordinary Scots pine at L. 2.50; even a large beech capable of providing twenty cubic meters of timber for carbonization (equivalent to nine quintals of charcoal) is estimated at from L. 1.30 to L. 1.50*». (Giordano, 1864).

The engineer, with his profit-oriented perspective, shows a clear resistance to believing that the voluminous quantity of available timber is not being maximally exploited. The apparent state of "neglect" of the forest resource stimulates the appetite of economic operators who see the opportunity to activate operational sawmills, ready to process the raw material and subsequently send it through maritime networks to reach strategic markets. The engineer's mercantile mentality seems to focus primarily on the exploitative aspect of the resource.

Giordano's perplexity increases further when compared with the relatively modest value of local timber, described as "exaggeratedly mild and tenuous" compared to the rates practiced in the Lombard and Aosta valleys, as well as significantly lower than those in Tuscany. This difference elicits surprise and, at the same time, incomprehension regarding the lack of interest shown by the local populations in the market value of the resource. This indifference, according to Giordano's observation, seems to escape the attention of targeted preventive action previously implemented by the authorities to preserve the forests from the risk of degradation, evidently perceived as an imminent danger.

The engineer, on some occasions, distorts the observed data, leaving open the question of whether such distortion is the result of bad faith or impatience associated with a visit characterized by preconceived diagnosis and therapy.

Furthermore, the documentation states that Giordano notes:

«[...] *for minor provisions, L. 0.145 per quintal (3 grains per cantajo) of charcoal delivered to the warehouse was paid. It happened here that sometimes the charcoal burners and mule drivers tasked with making and transporting the charcoal would steal much of it, to the clear loss of the owners. These charcoal burners and mule drivers demanded that the price be paid not based on the quantity placed in the warehouse but on the presumed quantity: in that case, the frauds fell to the detriment of the Government*». (Giordano, 1864).

The assumption that the bourbon government could have been so negligent as to make payments solely based on word of mouth, and how warehouse officials could have endorsed transporter-declared quantities

without any checks, is not clearly understandable. Since the Napoleonic era, muleteers were subject to restrictions, no longer having the right to demand compensation based on presumed quantities but rather being penalized for presumed material shortages.

The understanding of how the engineer could conceive such scenarios of carelessness on the part of the Bourbon government is ambiguous. The attitude of complacency towards everything related to the "Bourbon" sphere seems to be a constant element, which, combined with the inherent haste of the visit, could lead to misunderstandings.

Similarly, when the engineer ventures into expressing judgments about the new "Piedmontese" management, there is an omission in providing a clear statement or confession. The documentation reveals, therefore, a gap in the engineer's critical analysis regarding the administrative management of the new "Piedmontese" government, leaving open the question of his actual evaluations or impressions on the matter.

«[...] *Now we proceed with some modifications to this system, but the accounting with the different charcoal burners proves to be very complicated and requires a lot of work from employees*». (Giordano, 1864).

The inadvertent incident in question evokes the era of mass immigration of officials of every hierarchy, imposed on southerners immediately after the Unification. In a context where new job opportunities are guaranteed to those who have secured their position, meticulous attention is required so that no detail escapes notice, almost as if to teach the South the operational standards, even at the cost of considerable human resources in the administrative field. The presence of the new officials, perhaps induced by detailed information on southern dynamics conveyed by the last-minute "unitarians," eager to condemn the previous regime in order to gain favor with the new leaders, raises questions about the real benefit derived from the contribution of the Piedmontese "policarpi." This uncertainty also concerns the balance between the presumed advantages brought by such figures and the alleged payment methods suggested by Giordano, always considering the validity of his theories regarding compensation.

The observation of the endemic presence of smuggling, already mentioned, is a subject of reflection in the context of the commission's visit to the ironworks.

The statement emphasizes that, at that time, illicit traffic had long ceased. This conclusion is supported by the assumption that, if this were not the case, the military forces would certainly have discovered someone involved in illegal activities, subject to repressive actions.

Reference is made to a specific episode, dating back to the flood of 1855, in which individuals attempted to appropriate and sell material from

the establishment swept away by the waters. The use of the term "dragged downstream by the waters" evokes a context of natural disaster that influenced the management of subsequent events. The mention of the penalties imposed on those who were guilty of such actions suggests the application of severe sanctions to discourage illicit behavior, thereby contributing to maintaining order and legality in the industrial environment under examination.

To shed light on the angle adopted by the commission during the visit and to emphasize the enthusiasm aroused by the unexpected forest heritage, below is a portion of the conclusions elaborated by Giordano:

«[...] The ancient administration, not devoid of defects, like in general that of the fallen government, antiquated practices and almost total lack of communication contributed to make the industry in Mongiana rather unprofitable for the government. Moreover, aside from the abuses and defects inherent in it, it would be very difficult nowadays to know the precise financial result of the ancient managements, while the system then used for accounting based on tariffs and conventional prices of a country where the principle of isolation and protectionism reigned, could only present fictitious positions unrelated to true industrial benefit. Now it is a matter of energetically working to derive a better outcome from those government-owned establishments, leading them towards a future more suited to their habits. Simplifying administration, closing sources of abuse and waste, choosing, distributing, and conducting operations more conveniently, improving roads, are the most essential and urgent tasks. And first of all, it is advisable to decide whether such industry should continue under government administration or be entrusted to private industry. As for the general principle, there is no doubt that the principle of private industry prevails: only in the special case does the opinion of some hesitate, fearing that the private sector, too concerned with its immediate profit, might harshly sacrifice the customs and interests of those mountain populations who have been living for so many years on a meager but regularly paid work. It is useless to discuss this difficulty now [...] because if the enterprise offers elements of good success, these will necessarily benefit, albeit reduced in number but improved in conditions, the employees and workers.

Certainly, it is necessary for the government, in its concession, to proceed with caution, nor to neglect the precautions that are allowable with the free exercise of industry. Meanwhile, the Commission admitted by a large majority the principle of the swiftest transition from government to private administration, advising the

government at the same time, considering the local difficulties, to use every possible facilitation towards the lessees. Indeed, on the one hand, it is indispensable for the government to leave to private industry the opportunity to provide itself with the necessary wood and coal at a moderate price, but on the other hand, it could not abandon them entirely at the disposal of the same without some danger. As we saw, those forests possess, in addition to the species useful for the enterprise in question, many others that can be a profitable source of income for the owner: therefore, there is no reason why, by granting to industry the exclusive use and even ownership of the mine and the establishments, the government should also transfer to it in equal measure the benefit of its own forests. They could remain as before under forest administration, and this could annually provide the concessionaire with the necessary goods at agreed prices [...]». (Giordano, 1864).

The statement presents a situation of ambiguity and questionable orientation. The judgment regarding Mongiana has been pronounced and requires careful analysis. Initially, it would have been straightforward to gain an understanding of the economic performance of previous administrations. A direct approach would have involved consulting administrative archives to obtain detailed production and financial data, applying the tariffs of Neapolitan duties, thus simplifying the acquisition of fundamental information. However, the assessment of Mongiana as "burdensome rather than profitable" raises questions, as it lacks a comprehensive analysis based on objective criteria. The discourse focuses on the idea of simplifying administration, but the application of this concept is murky, especially considering the progressive growth of an administrative structure protected by Piedmontese elephantiasis. Apparent contradictions also emerge, as, on one hand, the principle of not sacrificing the interests of wage earners is upheld, while on the other hand, a drastic dismissal of workers is proposed, with negative consequences for employment levels. The commission, while lacking unanimous agreement, leans towards adhering to the principles of free market, transferring responsibilities to private actors. It is noteworthy that, despite favoring the privatization of the plants and mines, an exception is made for the management of the trees. Specifically, it is emphasized that an entrepreneur who acquired the ironworks would be required to pay for the coal in advance, even at agreed prices, prompting reflections on the feasibility and sustainability of such an approach in industrial management.

The commission, although lacking the necessary time to resolve issues of such magnitude, seems to overlook the relevance of the legal context in which the forests of Mongiana are situated.

The presence of these intact and flourishing environments is signaled by as many as 186 articles of a dated forest law, number 967. This legislation, issued by a government criticized as "shortsighted," highlights principles oriented towards isolationism and protectionism, as denounced by the commission itself. A more in-depth analysis might lead to the consideration that these principles should aim at safeguarding the national heritage, a perspective that would have required the reading of certain articles of the southern forest law.

The observation suggests that if the commission had devoted greater effort to understanding the details of the contents of the forest legislation, it could have appreciated the role of protecting the national heritage played by such provisions. This deepening could have contributed to a fairer and more comprehensive evaluation of the forest resources of Mongiana, integrating the legal context with the environmental and historical perspective.

«Protection was:

Art. 12. No wooded land may be cleared or cultivated.

Art. 13. To prevent damage from misguided cultivation, even solid non-wooded lands, provided their solidity does not result from regular cultivation, may not be cultivated without permission.

Art. 16 For sloping lands, whether wooded or not, commonly called hanging lands, easily traversed by water, and causing damage to lower lands, no permissions for clearing or cultivation shall ever be granted.

Art. 17. For all other lands not covered by the previous articles, clearances and cultivations may be permitted according to the provisions of this law, following a careful examination of local needs; an examination that, in the case of wooded lands, must also consider circumstances that may, depending on the case, affect public utility due to lack of fuel and other factors.

Art. 35. Regular cutting shall be done by cutting down all trees at ground level, reserving only 15 per moggio, which shall be marked for seed or hope; and protecting the felled part, by forbidding access to animals until permitted by the General Directorate.

Art. 38. The Directorate may permit clear cutting when young forests destined for tall growth need to be thinned out. It may permit it when it concerns isolated trees at the edges and paths of the forests, seed, or mature trees, and standing dead or diseased trees.

Art. 76. Since animals are harmful to forests and woods, administrators shall ensure that grazing is prohibited, except in rocky places and useless shrubs, where they do not cause damage.

Art. 79. Stubble burning shall never be allowed within 400 palmi of woodland adjacent lands». (De Stefano Manno, Maticena, 1979).

Omitting reference to the severe penalties imposed for acts such as violation, destruction, and burning of forests, the significant sanction provided by Article 108 of the forest law under examination is highlighted. This provision stipulates a first-degree imprisonment penalty, in accordance with Article 428 of the second part of the Code, for those who commit usurpation in forests. In cases where usurpation is associated with deforestation and land clearing, an additional fine is imposed as established in Section II of the same title.

This forest legislation, characterized by an extremely modern profile, assumes a national scope, and is not limited solely to the three Calabrias. The observation of limited damage to forests by Giordano testifies to the respect reserved for these resources during that period. The first unified forest laws, inspired by the Sardinian law, differed radically from the principles of the Neapolitan law "967". (De Stefano Manno, Maticena, 1979).

The enactment of the Sardinian Forest law in the South, immediately after unification, contrasts with the omission of mining legislation. This fact could be interpreted as an open exploitation policy, as mining legislation, favorable to underground activity, was not extended to southern regions, while the forest law was quickly adopted, encouraging deforestation.

The adoption of this legislation, which had previously brought benefits in Sardinia by reclaiming unusable land due to low scrubland, proved fatal for many forests on the mainland. Its reintroduction in Italy, instead of facilitating land recovery, resulted in an acceleration of exploitation, with forests sacrificed in the name of quick and easy profit. This policy contributed to stimulating speculation, offering incentives to owners of wooded lands, who suddenly saw the value of their holdings increase, reaping immediate benefits.

One aspect of the craving for the sudden forest heritage emerges from Giordano's report, who briefly addresses multiple aspects of the metallurgical plant, focusing mainly on its critical elements, while devoting a detailed and accurate analysis to the forests surrounding the ironworks. The engineer undertook an in-depth exploration of the woods, starting from the Bosco di S. Maria (or S. Miceli), proceeding along the Serra-Mongiana Road, and reaching the two woods adjacent to the plant (Bosco di Archiforo and Bosco Chiudilli). Subsequently, following the path connecting Mongiana to Ferdinanda and crossing the Pecoraro pass, he traversed the vast Bosco di Stilo. In a clockwise route, he explored the Lacina wood, the Boscarello, the Fillò, and finally the Dinami wood (Giordano, 1864).

In the exploration account, the engineer paid particular attention to the accurate evaluation of each wooded area, highlighting an unexpected specific interest in the forest heritage and emphasizing the selective nature of

his analysis, focusing more on natural resources than on the industrial aspects of the area.

The surface area of the demesne areas, excluding municipal and private ones, could be approximately quantified at 8,000 hectares. The dominant tree species included beech, silver fir, red fir, white fir, holly, chestnut, and heather. In addition to extensive stands of Scots pine, there were also holm oaks, oaks, yews, hornbeams, maples, alders, and, in the locality of Chiuselli, rare larch pines imported and planted by the forest inspector Thomas.

From demesne lands, it was possible to obtain approximately 32,000 quintals of beech charcoal annually, in addition to 3,000 quintals from various tree species. Giordano was unable to assess privately owned forests and relied on local experts for an approximate estimate. Based on their assessments, it is estimated that they could provide 51,000 quintals of charcoal annually, suggesting they were considerably more productive than demesne forests.

Considering that a forty-year-old forest, adequately populated and subject to complete harvesting, with the preservation of protection trees, could produce 500 some metric tons of forest mass (equivalent to 300 quintals per hectare), the average yield of the fortieth part would be 750 kilograms per hectare. This estimate elicited wonder and disbelief from Giordano, who commented:

«[...] Such charcoal production is quite remarkable, and if it were indeed admissible, it would indicate significant vegetative strength in those areas.» In drawing conclusions, he adds: "[...] overall, it could be obtained from non-demesne forests a quantity of 50,000 quintals of charcoal, which, combined with the 30,000 from demesne forests, would constitute a total yield of 80,000 quintals». (Giordano, 1864).

The calculation was: (Giordano, 1864).

Serra	Quintali 600	Q. 4,000
Stilo	Quintali 600	
Bivongi	Quintali 600	
Arena	Quintali 1800	
Spadola e Brognaturo	Quintali 400	
Duca di Bruzzano	Quintali 1800	Q. 47,000
Marchese d'Arena	Quintali 24,600	
Pellicane	Quintali 20,600	
Total		51,000

Together with the other members of the commission, they began their departure, met with a natural apprehension, as the fate of the ironworks was now sealed; Giordano's "verdict" was made public in 1864. Fortunately, the Government did not prove so blinded as to passively follow the advice of its

own experts. It became clear that the survival of the ironworks was closely linked to the forest resources, even though vegetable fuel had already peaked and had been outdated for several decades when Fazzari took on the improvised role of industrialist. (Mazza, 2021).

However, in 1873, with the drafting of the auction specifications for the transfer of the entire plant, the Government also included the forests. The significant indication of reluctance to alienate them is fully evident in the fact that, of the 524,000 lire requested for the overall purchase, a substantial 416,000 were earmarked to exclusively ensure the forest heritage of the plant. The remaining amount had a relatively insignificant value, as it had already been decided to leave Mongiana to its fate.

This decision underscores the crucial importance that the Government attributed to the management and conservation of forest resources within the entire industrial complex. The sale of the forests to a buyer who understood their strategic value could be considered essential to preserve the environmental heritage and ensure a responsible transition in the destiny of Mongiana.

Currently, a fraction of the work activity in the forests persists, involving some inhabitants of Mongiana who have been spared from the phenomenon of emigration. (Regione Calabria U.O.A.).

Until the 1990s, these individuals offered their labor as guards at the watch-fire towers. Today, the practice of wood carbonization is still carried out by some. Others, more fortunate, manage to obtain seasonal job opportunities from the State Forestry Corps, taking on roles such as lumberjacks, planters, and guards in the mountain animal repopulation park managed jointly by the corps and the municipality. The constant presence of the Forestry Corps in Serra and Mongiana has favored the reforestation process for several years, constituting a crucial element in defense against the depletion and environmental degradation that has affected the region since it was abandoned and handed over to speculators.

What was once a "complementary" occupation to the activities of the forges now plays a vital role for those few brave individuals who have chosen to resist emigration. The sustainable management of forest resources, supported by the active presence of the Forestry Corps, is critically important in protecting the local environment and creating job opportunities for those who have chosen to remain in the area.

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10. The Arms Factory, constructed in 1852 as part of the Mongiana steel complex, was pivotal in the arms industry of the Kingdom of the Two Sicilies. Initially designed by architect Domenico F. Savino, it replaced a previous structure built during French rule in Calabria for

rifle barrel production. Throughout its operation, it annually supplied the Bourbon army with a substantial quantity of weapons, ranging from 2000-3000 units during regular periods to 7000-8000 during peak activity. It manufactured rifles, pistols, and swords, showcasing versatility. Notably, it introduced the innovative "Mongiana" back-spring rifle design, replacing the French model of 1842. Despite its significant contribution to Bourbon defense, it declined post-Italian Unification, eventually closing its doors in the mid-1860s, highlighting the evolution and decline of an important industrial institution in post-Unitarian Italy. See Franco, D. (2019). *Le Reali Fabbriche del Ferro in Calabria: Tra storia e archeologia industriale*. Rubbettino Editore. (pp. 85-91).

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13. Fiorenza, E. (2023). A virtuous form of work organization: the regulation of Pazzano of 1845. *International Journal of Entrepreneurship*, 27(Special Issue 4), 1-12.
14. In the Ferdinanda context, the workforce consisted solely of adult individuals, with no child or female labor. This unique practice set it apart from other European steel centers of the time. Similar conditions were observed in the "Royal Silk Colony of San Leucio" in Caserta, reflecting an exclusive work model unique to the Kingdom of the Two Sicilies; see: M. R. Iacono, The history of the site, in *The Beauty of Seeing San Leucio and the Royal Manufactures*, Napoli, ESI 1998, pp.77-102.
15. Of Spanish origin, Giovan Francesco Conty served as director from 1771 to 1790 and designed the first ironworks complex in Mongiana, which became operational in 1768.
16. The Salvaboschi Decree, issued in 1773 by Ferdinand IV of Bourbon, also known as Ferdinand III of Sicily, represented a significant early initiative for the conservation of the territory and the protection of forests in the Kingdom of Naples and Sicily (followed later by Ferdinand II's Royal Decree of December 20, 1858). The decree aimed primarily at conserving the forest heritage by introducing specific measures to prevent excessive damage. One of the key provisions was the adoption of cutting cycles every fortieth year, using the practice of marking. This meant that only one tree could be felled out of every forty, and the chosen tree for cutting had to be the oldest among those surrounding it. This policy aimed to ensure the

sustainability of forest management and to prevent excessive deforestation.

17. Today's environmental laws are more comprehensive than those of the past, reflecting a shift towards holistic protection. While the Salvaboschi Decree of the 18th century focused on regulating tree cutting for sustainable management, modern regulations encompass broader environmental concerns. They prioritize safeguarding forest ecosystems for their role in climate change mitigation, biodiversity preservation, and maintaining air and water quality, in addition to timber resources. Contemporary laws also embrace sustainable development principles, involving local communities, promoting reforestation, and considering the environmental impacts of industrial activities. This regulatory evolution signifies a transition towards prioritizing the long-term well-being of the environment and society over short-term economic gains. However, challenges like illegal deforestation, climate change, and biodiversity loss highlight the ongoing need to strengthen and refine environmental laws to address current and future issues.
18. De Stefano Manno, B., & Maticena, G. (1979). *Le Reali Ferriere ed Officine di Mongiana, una scoperta di Archeologia industriale: storia, condizione operaia, tecnologie di produzione, trasformazione del territorio, architettura delle più antiche ed importanti fonderie del Regno delle Due Sicilie. Storia di Napoli e della Sicilia*, Società Editrice, Napoli, 98.
19. BNN, 63/1 - Memory on the Mongiana Establishment made by Captain Settimo by order of Mr. Major Sappel, Artillery Commander in Calabria. (n.d.). National Library of Naples (BNN), Manuscripts Section, Ms. 63/1.
20. (BSNSP) - In the decree issued in Persano on January 16, 1811, Murat, following the proposal of the Ministry of War, appointed members of the commission with specific duties: the Director of the Ironworks and Mines of Calabria Ulterior Seconda, Battalion Chief of Artillery V. Ritucci, designated as President, V. Raimondini (Mineralogist - absent for health reasons), G. Melograni (Inspector of Waters and Forests), and T. Paolotti (Engineer of Bridges and Roads). Murat's particular attention to the problem of afforestation emerges on more than one occasion: he exerted pressure on the Minister of Finance for the enactment of a comprehensive forestry law valid throughout the national territory. Reference is made to a letter dated March 18, 1809, sent by the Minister to Poerio and preserved in Ms. XXX A 8 of the Biblioteca Società Napoletana di Storia Patria (BSNSP): "The woods and forests are of particular

concern to the King, who has ordered me to present him with a project for forestry organization." As a result of discussions held at the Council of State regarding this draft law, the Administration of Waters and Forests was established, and the Forest Rangers Corps was created. For further details, see: A. Valente: G. Murat and Southern Italy, Turin 1976.

21. BNN, Ms. 63/1. The Carbonile, around 1810, measured 180x60 palmi and was divided into six compartments. National Library of Naples (hereafter: BNN), manuscripts section Ms. 63/1.
22. National Library of Naples, Manuscripts Section, Ms 63/7. According to the summary table of the current condition of Mongiana in relation to the requests made by His Excellency the Ministry of War and the Navy «[...] with which an attempt is made to ascertain how long this establishment will be able to supply 60 thousand cantara of projectiles to meet the pressing needs of the service [...]».
23. (Ms 63/12, BNN) - Administrative Memorandum Budget for 1814. National Library of Naples manuscripts section Ms 63/12."
24. (BNN, Ms 63/10) - The comparison is made between the price set for beech charcoal production and for wood splitting in the century-old forests independent of tall trees intended for the service of the Mongiana ironworks. See BNN Manuscripts Section Ms 63/10.
25. The introduction of severe and specific penalties underscores the firm determination of the military authorities to preserve the environmental integrity and sustainability of the forest resource. The sanctions aim to discourage harmful, fraudulent, or negligent practices that could compromise the health of the forest and proper forest management. The coercive dimension of the measures reflects the need to balance economic interests with responsible conservation of natural resources.
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27. ASMN, 1811. Ten. Colonnello di Art. (1811, January 4). [Letter to Mar/llo di Campo Macry, General Director of Train Corps]. ASMN Pizzofalcone, Comando Artiglieria fascio 28. From Mongiana.
28. ASMN, 27 - Ritucci, V. (Senza data). [Letter to the Mongiana Administration]. ASMN Pizzofalcone, Comando Artiglieria fascio 27.
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30. The measurement of forests was expressed in terms of "moggio," where the moggio comprised nine hundred square steps, equivalent to seven palms and one-third each.

31. Art. 44 of Law No. 967 decreed: "The Government hammers shall be kept in a case with two keys, one to be held by the senior official of the civil administration residing in the Municipality, and the other by the Forest Inspector, or by the General Guard in the absence of the Inspector. The hammer cannot be removed without first drawing up a report, which shall be signed by the officials and the agent to whom it will be assigned. The report shall mention the purpose for which it is to be used and the instructions received on the matter from the General Directorate." For the forest regulations of 1859, see: Regulation... in the Appendix.
32. Archivio di Stato Catanzaro (ASCZ). (n.d.). Mongiana fascio 37. Regarding fires, Law No. 967 warned: "If a fire breaks out in a forest, the guards responsible for guarding the forest and the rural guards shall be required to notify the Mayors of the neighboring Municipalities, under penalty of dismissal, in addition to any penalties incurred by law. The Mayors shall convene the inhabitants at the sound of the bells, so that, provided with hoes, axes, and shovels, they may come to the aid as needed."
33. Giordano, F. (1864). *Industria del ferro in Italia. Relazione dell'ingegnere Felice Giordano, per la Commissione delle Ferriere istituita dal Ministero di Marina*. Torino: Tipografia Gotta e Cappellino.
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condizione operaia, tecnologie di produzione, trasformazione del territorio, architettura delle più antiche ed importanti fonderie del Regno delle Due Sicilie. Storia di Napoli e della Sicilia, Società Editrice, Napoli, 110.

39. Giordano, F. (1864) *Industria del ferro in Italia. Relazione dell'ingegnere Felice Giordano, per la Commissione delle Ferriere istituita dal Ministero di Marina. Torino: Tipografia Gotta e Cappellino. (p. 303).* Bosco S. Maria or S. Miceli: located in the municipal territory of Serra S. Bruno and adjacent to the road that ascended from Mount Cucco to Mongiana. The forest was 10 kilometers away from the ironworks. The surface area was easily calculable at 1300 hectares; few clearings, with 90% of the dominant species being silver fir, and the remainder beech. It supplied timber to the state sawmills and to the Mongiana sawmill located on the National Road; Bosco di Archiforo and Bosco Chiudilli: located in the territory of Serra and adjacent to the previous one; in 1832-34, much of it had been assigned to the Municipalities of Serra and Spadola. The remaining state-owned part was about 500 hectares of dense beech forest, in addition to numerous extensions of spruces, hollies, and heathers; Bosco di Stilo: the 1858 statistics estimated the total surface area of the state-owned part at 4862 hectares. According to other estimates, it would have been more than 5400 hectares, of which at least 4300 were densely populated forest. Beeches accounted for 70%, with the remainder being Scots pines, oaks, yews, maples, and other less significant species. It supplied all the material to Ferdinanda and the mines of Pazzano; Bosco Lacina: adjacent to an ancient lake basin, in the territory of Brognaturo and north of Ferdinanda. 25 kilometers away from Mongiana. Its 170 hectares of beech forest were used as a reserve and rarely for charcoal production due to their distance; Boscarello: in the territory of Brognaturo and adjacent to Lacina. Average distance from Mongiana was 17 kilometers; surface area of 170 hectares dominated by beech and spruce. It was rarely used for charcoal production, and its timber was processed in the local sawmills. Bosco Fillò: in the municipal territory of Serra with the eastern part adjacent to the road to Mongiana. In this forest, the Neapolitan Navy carried out continuous logging for its ships. The dominant species is silver fir. The climate and particular exposure mean that even today, the trees grow there reaching sizes much larger than average. In the Chiuselli area, there are still specimens of the rare larch pine imported by Thomas; Bosco di Dinami: in the homonymous municipality and southwest of

- Mongiana. Estimated surface area of 300 hectares of beech forest in addition to the presence of some alder clearings.
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 42. Regione Calabria U.O.A. "Politiche della Montagna, Foreste e Forestazione, Difesa del suolo". (n.d.). *Albo imprese forestali regolamento n. 8/2015 aggiornato al 29/06/2023, categoria A*. Mongiana, Italy: Author.