

FROM TINPLATE TO GALVANIZATION: THE BIRTH OF A METAL-COATING INDUSTRY IN LIÈGE (1845-1905)

Dalla banda stagnata alla zincatura: la nascita dell'industria dei rivestimenti metallici a
Liegi (1845-1905)

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Keyword

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Abstract *This study investigates the emergence of galvanization in Liège in the mid-nineteenth century, in a context marked by the rise of the zinc industry. It draws on a body of sources consisting of authorisations from the provincial council for the establishment of new activities, which provide insight into the technical aspects of this innovation, as well as company archives, which shed light on the economic networks between suppliers, entrepreneurs and clients. Although this industry has already been the subject of some recent studies, this article aims to refine our understanding of the specific conditions that favoured its establishment in Liège, to identify the first technical processes and machinery used, and to trace the origins of its founding companies. The analysis draws attention to the structuring role of family dynamics in this development, where professional reproduction and the transmission of capital acted as key drivers of this growth. It also underscores the geographical importance of the Liège industrial basin, whose technical knowledge, available capital and commercial outlets provided a fertile ground for the emergence of this activity. This work emphasizes the early and structuring role played by Liège in the continental development of this industry.*

1. PRECONDITIONS FOR THE EMERGENCE OF GALVANIZATION

Before the emergence of galvanization, defined as the application of a more or less substantial protective zinc coating onto a metal, several scientific and technical advances were necessary prerequisites for the development of this technology. Among these, the understanding of the coating's function as a corrosion-inhibiting agent and a protective barrier against acidity was paramount. Tinplate played a crucial role in this respect, as the practice of coating iron or copper with a protective layer of tin has been employed since antiquity, and it continued to develop in Saxony until the early eighteenth century, before England gradually became its main centre of production¹.

A second major advance was the onset of sheet-iron production, and, more importantly, its industrialization, which entailed both significant increases in production rates and improvements in product quality. These advances were achieved in England by the late eighteenth century. In Belgium, a comparable consistency in the thickness and quality of sheets was attained in the early nineteenth

¹ F. PASQUASY, *La sidérurgie au pays de Liège : vingt siècles de technologie : du martelage du fer au revêtement de l'acier*, Liège, Société des Bibliophiles liégeois, 2017, p. 103-106.

century, notably by the enterprise of Henri Delloye in Huy, allowing it to compete with firms from the world's leading industrial power. It is therefore unsurprising that Delloye, like other manufacturers, developed a production programme that incorporated the manufacture of tinplate sheets².

Finally, the application of a zinc coating onto iron presupposed the availability of both raw materials, or, alternatively, the existence of trade networks capable of ensuring their importation. While iron ore deposits in the Liège industrial basin gradually declined and were largely exhausted by the mid-nineteenth century, new extraction sites were opened in neighbouring provinces to compensate. Zinc ore appeared in two main forms: calamine (zinc carbonate) and blende (zinc sulphide). Calamine had already been exploited since antiquity, particularly by the Romans for brass production, whereas blende only came into industrial use from 1744 onwards, thanks to the work of the Swedish chemist Anton von Swab³.

The industrial production of zinc metal gained momentum at the turn of the nineteenth century with the invention of several processes in Europe. The first was the "English process" (or "Welsh method") developed by John and William Champion in the mid-eighteenth century. Other methods emerged in Central Europe, including the "Silesian techniques" of Johann Christian Ruberg (1798) and Gustav Freytag (1805), as well as the "Carinthian process" of Dillinger (1799). These processes differed in furnace configuration, the type of fuel used, distillation procedures, and the form and arrangement of the crucibles within the furnace⁴.

In Belgium, the development of industrial zinc production was largely driven by the Liège-based entrepreneur Jean-Jacques-Daniel Dony. His interest in this sector was likely influenced by his connections with regional industrialists such as Henri Delloye in Huy and Berthold de Libert de Beaufraipont in Chênée⁵, as well as with scientists François Laurent Villette and Jean Démeste⁶. In 1807, Dony devised a new method of zinc production, later known as the "Liège process", which he patented in 1810. This process was distinguished in particular by the use of nearly horizontal condensers in which the reductive distillation of zinc took place.

To implement his research, Dony obtained from Napoléon Ist the concession for the calamine mine at Vieille-Montagne in 1805 and established a zinc-production plant in 1809 at Saint-Léonard, Liège. However, markets for this newly available metal remained limited, compelling him to seek additional capital. He obtained funding from the Brussels industrialist François-Dominique Mosselman, but died in 1819, heavily in debt. Nonetheless, his enterprise continued to expand, to the extent that Mosselman's heirs founded in 1837 the *Société anonyme des mines et fonderies de zinc de la Vieille-Montagne*, with financial support from the *Banque de Belgique*. In this way, the conditions in Liège were ripe for the emergence of a galvanization industry, made possible by the pioneering work of numerous European

² J. FRANQUOY, *L'histoire des progrès de la fabrication du fer dans le pays de Liège*, in "Mémoires in-8° de la Société libre d'Émulation de Liège, nouvelle série", s.n., s.l., 1860, p. 368-371.

³ R. HALLEUX, *Cockerill : deux siècles de technologie*, Liège, Editions du Perron, 2002, p.103-104.

⁴ R. BRION, J.-L. MOREAU, *De la mine à Mars : la genèse d'Umicore*, Tielt, Lannoo, 2006, p. 12-15.

⁵ J. F. GERARDON, *Mémoire pour la Dame Françoise de Cassal, veuve du Sr Frédéric de Bris, rentière, domiciliée à Hollentfeltz, canton de Mersch, département des Forêts, arrondissement de Luxembourg, et pour le Sr. Louis de Brias, capitaine de cavalerie au service de l'Empire français, la demoiselle Léopoldine de Brias, et la Dame épouse du Sr Joseph Vaneyll, née Victoire de Brias, défendeurs-intimés, ses enfants ; contre les Srs Berthold de Libert de Beaufraipont, domicilié à Beaufraipont, commune de Chênée, le Sr. Jean-Jacques-Daniel Dony, négociant et fabricant de zinc, domicilié à Liège, et les Srs. Jean et Joseph Ledent, frères cultivateurs, domiciliés à Jupille, co-intéressés, demandeurs-appelans. Cour impériale de Liège*, Liège, H. Dessain, 1793.

⁶ R. BRION, J.-L. MOREAU, *De la mine à Mars*, op. cit., p. 13.

scientists and physicians, including Paul-Jacques Malouin, Luigi Galvani, Alessandro Volta, Johann Ritter, Sir Humphry Davy, and Stanislas Sorel, among others⁷.

2. THE FIRST GALVANIZATION COMPANIES IN LIÈGE

By the mid-nineteenth century, the Liège industrial basin was increasingly specializing in metal coating. The company that best epitomized this success was the tinplate firm Dieudonné Dothée-Russon, whose factory, established in 1845 in the Longdoz district, remained operational until 1905, despite its acquisition by the Société anonyme des Charbonnages et Hauts-Fourneaux de l'Espérance in 1862⁸. Although our focus is on galvanization rather than tin plating, it is relevant for the purposes of this article to study how D. Dothée & Compagnie was established. The history of this firm primarily illustrates a dynamic of dual family inheritance.

It begins with Jean-Louis Russon (1708-1792), a tin merchant, who, having no direct descendants, designated his nephew Martin Dothée (1758-1801) as his universal heir. Martin Dothée continued the business until his death but, like his uncle, left no direct heirs. The inheritance then passed to his nephew, Dieudonné Dothée (1777-1825), who acquired all family assets, including a tinware shop. Following Dieudonné's death, his widow maintained the operation of the business until 1839, when her three sons joined forces to take over its management, thereby founding the company Dieudonné Dothée-Russon. Their factory, however, was not established until 1846. Ultimately, the history of the Dothée-Russon family reflects both a professional inheritance, where successive sons and nephews pursued the same profession, and an economic inheritance, as the growth of the tinsmithing business and the consolidation of the family's wealth were made possible through this continuous chain of succession.

Within this dynamic environment, the first galvanization company in Liège was founded in 1851 by Auguste-Charles-Joseph Lassence. Located at 187 Grétry Street, the firm initially specialized in the production of telegraph iron wires, which required galvanization to ensure resistance to weather conditions, before expanding into the manufacture of corrugated sheets, also galvanized. The company's performance and the strength of the market are reflected in a series of investments in equipment: in 1851, a fifteen-horsepower steam engine was installed; in 1853, a sixty-horsepower steam engine powered by a new boiler, complemented by two reverberatory furnaces, was commissioned⁹; and in 1863, five additional steam boilers were added to drive the rolling mill hammer, and shears¹⁰.

In 1864, a new factory opened at 143 Grétry Street by J.-F. Jowa & Compagnie, specialized in galvanized products and structural frameworks¹¹. Its products quickly gained international recognition, as

⁷ E. LARKIN, M. ZAMANZADEH, *Some Failure Analysis Case Histories in Galvanized Steel Products*, in "Metallography: Past, Present, and Future (75th Anniversary Volume)", ed. by G. F. VANDER VOORT, F. J. WARMUTH, S. M. PURDY, A. SZIRMAE, s. l., ASTM International, 1993, p. 1-3.

⁸ L. WILLEM, *450 ans d'Espérance : la S.A. métallurgique d'Espérance-Longdoz de 1519 à 1969*, Liège, Editions du Perron, 1990, p. 55-58.

⁹ AEL, EID, 1853, n. 799, "Lassence Auguste". Decree of the Permanent Deputation of the Provincial Council, 27th July 1853.

¹⁰ AEL, EID, 1863, n. 2097, "Lassence Auguste et Compagnie". Decree of the Permanent Deputation of the Provincial Council, 16th September 1863.

¹¹ AEL, EID, 1869, n. 3242, "Jowa J.-F. et compagnie". Decree of the Governor of the Province of Liège, 23rd February 1869.

evidenced by awards at exhibitions in Paris, Vienna, and Liège¹². A production catalogue from 1884 indicates that the firm manufactured complete buildings made of corrugated galvanized iron sheets¹³. Similar production was attempted by other manufacturers. For instance, Dieudonné Dothée & Company sought, albeit unsuccessfully, to export tinplate sheets to Canada, a construction style particularly valued in the British Empire and in certain U.S. states¹⁴ (fig. 1). This unsuccessful initiative was not isolated, as illustrated by the Chamber of Commerce's advocacy for reduced tariffs on the importation of iron, tin, and especially a specific type of coal called "houille" to support tinplate manufacturers¹⁵.

In the neighbouring city of Huy, at Godelet Street, the Vandekieboom & Procès company, founded in January 1863, operated a factory producing tin-coated ironware. In 1876, the firm diversified its activities with the installation of a galvanization workshop powered by three steam boilers¹⁶.

In 1883, Joseph Crahay inaugurated a galvanization and nickel-plating workshop in his factory on Louvrex Street. While other Liège companies employed hot-dip galvanization, which involved immersing a metal piece in molten zinc, Crahay's facility used electroplating¹⁷. Also referred to as electrolytic galvanization, this method coats a metal through the electrolysis of an aqueous solution containing dissolved zinc salts (typically zinc sulfate or chloride). The system was powered by several cells supplying the current necessary for electrolysis¹⁸. The introduction of this technique in Liège was relatively late, as the first patent applying the method had been filed in 1805 by the British industrialist Charles Hobson, active in the nail and bolt sector¹⁹.

Frédéric Nyst was another industrialist entering this nascent sector. In 1885, he established a galvanization workshop within his rivet manufacturing facility on Harscamp Street, again in the Longdoz district. Unlike other firms, his galvanization capacity was limited to 500 kg per day, since these installations were primarily used for experimental purposes and for coating part of local production, as operations were carried out intermittently²⁰.

Most of these companies shared the common feature of being located in the Longdoz district, which offered two significant advantages. Prior to industrialization, Longdoz was dotted with meadows, particularly suitable for the construction of new factories. The historical name of the area, *longum dorsum* in Latin, meaning "long meadow", underscored the open nature of the terrain. This configuration facilitated the establishment of a railway station in 1851, providing companies with enhanced logistical

¹² *Exposition universelle de Paris 1878 : Section belge : Catalogue officiel des œuvres d'art, des produits de l'industrie et de l'agriculture*, Bruxelles, Ch. Vanderauwera, 1878.

¹³ *Ateliers de galvanisation de JF Jova à Liège Belgique. Construction de charpentes et de bâtiments complets en fer avec parois et toitures en tôles galvanisées ondulées. Brevets d'invention*, Liège, s.n., 1884.

¹⁴ L. WILLEM, *450 ans d'Espérance*, op. cit., p. 50-52.

¹⁵ AEL, *Chambre du Commerce de Liège*, 1854-1858, n. 85, "Rapport adressé à la Chambre concernant la dérivation de la Meuse, sans date". Report to the Minister of Foreign Affairs on the State of Commerce and Industry in 1856, 29th May 1857.

¹⁶ AEL, EID, 1876, n. 4418, "Vandekieboom et Procès". Decree of the Permanent Deputation of the Provincial Council, 19th September 1876.

¹⁷ AEL, EID, 1881-1883, n. 4903, "Crahay Joseph". Decree of the Permanent Deputation of the Provincial Council, 21st February 1883.

¹⁸ P. JADOT, *Prayon, du zinc à la chimie*, Liège, CEFAL, 2007, p. 107-108.

¹⁹ E. LARKIN, M. ZAMANZADEH, *Some Failure Analysis*, op. cit., p. 1-3.

²⁰ AEL, EID, 1887-1890, n. 5201, "Nyst Frédéric". Letter from Frédéric Nyst to the Governor of the Province of Liège, 18th July 1887.

access and, in some cases, a connection to the rail network, as exemplified by Dieudonné Dothée & Company in 1856²¹. The new station greatly benefited industrialists in the district, who had advocated for its creation for years, especially from the Chamber of Commerce.

3. THE BORGNET FAMILY

The Borgnet family's involvement in Liège metallurgy began as a family enterprise. When the Dieudonné Dothée & Compagnie factories were acquired by the *Société anonyme des Hauts Fourneaux, Usines et Charbonnages de l'Espérance*, Charles Borgnet was appointed director, replacing the founder, Frédéric-Louis Behr. He provided financial support to his son, Henri Borgnet, enabling him to establish his own company, *Les Ateliers de Galvanisation et de Plombage Henri Borgnet*, located at 79 Orban Embankment, just a few dozen meters from what had by then become the *Société anonyme métallurgique d'Espérance-Longdoz*. Henri's brother, Paul Borgnet, also contributed by acquiring the property that housed the new company, again with financial backing from his father²².

These buildings had previously belonged to the Liège industrialist Jean Minette, who had installed the *Société anonyme belge lainière* there between 1865 and 1881 to wash and card wool²³. It is noteworthy that Isidore Mosselman, a relative of François-Dominique Mosselman, was among the administrators of this wool-washing facility. The Borgnet example illustrates how the decline of wool-washing operations in Liège during the second half of the nineteenth century created opportunities, similar to the Englebert family, who purchased a wool-washing factory a few hundred meters upstream along the Meuse in 1877 to establish a prosperous rubber factory²⁴.

In 1891, Henri left the company, and Paul purchased his brother's shares. At this point, the firm, whose activity was limited to hot-dip galvanization of sheets, was renamed *Les Ateliers Paul Borgnet* (fig. 2)²⁵.

By 1904, after expansions in 1900²⁶ and 1902²⁷, the factory's premises were no longer sufficient to accommodate its 250 workers, prompting the direction to relocate operations. The following year, a sixteen-hectare site in Flémalle-Haute, on the outskirts of Liège, was selected for the new factory, which incorporated a newly created electrolytic galvanization division. A distinctive feature of this relocation was the merger with the *Société anonyme des Acières de Roux*, which was located near Charleroi in the Hainaut province. Paul Borgnet became the general director of the newly formed *Société anonyme Phenix Works* and retained this position until his death in 1944. As of today, despite subsequent acquisitions and restructuring, the company continues to exist in one form or another²⁸.

²¹ C. RUESS, *Made in Longdoz : métamorphoses d'un quartier industriel*, Liège, Maison de la Métallurgie et de l'Industrie de Liège, 2017, p. 22.

²² M-L. BOUVY COUPERY DE SAINT-GEORGES-NEYS, *Les Borgnet, ces mosans : évolution sociale d'une famille*, Bruxelles, Office généalogique et héraldique de Belgique, 1977, p. 204.

²³ F. PASQUASY, *La sidérurgie au pays de Liège*, op. cit., p. 212.

²⁴ J-P. BEAUFAYS, *Histoire des pneus Englebert*, in "Vétéran Moto Club Belge", 2018, n. CCCLXIX p. 4-5.

²⁵ M-L. BOUVY COUPERY DE SAINT-GEORGES-NEYS, *Les Borgnet*, op. cit., p. 198-200.

²⁶ AEL, EID, 1900, n. 6712, "Borgnet Paul". Letter from the College of the Mayor and Aldermen to Paul Borgnet, 30th May 1900.

²⁷ AEL, EID, 1901-1902, n. 7026, "Borgnet Paul". Certificate of Publication from the College of the Mayor and Aldermen to the Governor of the Province of Liège, 22nd October 1902.

²⁸ F. PASQUASY, *La sidérurgie au pays de Liège*, op. cit., p. 212-216.

4. THE MAISON DE LA MÉTALLURGIE ET DE L'INDUSTRIE DE LIÈGE : PRESERVING A LEGACY

Today, 160 years after the foundation of Jean Minette's wool-washing facility, the building still stands and houses the museum *Maison de la Métallurgie et de l'Industrie de Liège* (MMIL). The museum's mission is to disseminate the history of Liège's metallurgical companies, to convey the development of industrial techniques, and to provide insight into upcoming transformations within these sectors.

The intertwining of Liège's metallurgical history with that of the museum is largely explained by the museum's foundation in 1963 by the *Société anonyme métallurgique d'Espérance-Longdoz*. The merger of Cockerill-Providence with Espérance-Longdoz in 1970 marked a further milestone. The museum subsequently became the non-profit *Musée du fer et du charbon* in 1973, following Cockerill's donation of the facility to the City of Liège. However, this situation proved unsustainable. Due to financial difficulties faced by the city, the University of Liège, the *Musée de la Vie Wallonne*, Cockerill-Sambre, and Vieille-Montagne collaborated to create the *Maison de la Métallurgie* in 1990, which adopted its current name two years later²⁹ (fig. 3)³⁰.

Few other buildings in Liège have enjoyed comparable preservation to the Borgnet workshops. Other workshops and factories illustrated on the map above have been replaced by residential buildings, a shopping center, and office spaces.

The MMIL occupies a key position in preserving and transmitting the industrial heritage of the Liège basin. It highlights the history of metallurgy and addresses both the general public and the academic community. Through its diverse activities, the museum not only fosters understanding of past metallurgical and industrial techniques but also contributes to the analysis of contemporary industrial challenges. By positioning itself as a space of active memory, it strengthens local heritage consciousness, ensures intergenerational continuity, and underscores Liège's role as a cradle of European metallurgical industry.

5. CONCLUSION

In summary, this study devoted to the emergence of galvanization in Liège during the second half of the nineteenth century highlights the close interconnection between scientific progress, industrial dynamics, and family networks and inheritance. By retracing several of the conditions that enabled its development, the structuring role of key families and the institutional legacy embodied today by the MMIL, it becomes clear that this sector did not evolve in isolation, but rather at the crossroads of technical, economic, and social factors.

This historical trajectory also reveals the ability of the Liège industrial basin to appropriate European innovations and to integrate and expand them within a favorable local context. By emphasizing the importance of family networks, available capital, technical specialization and infrastructure, the analysis underscores Liège's pioneering role in shaping the galvanization industry on the European continent. The transmission of this heritage, now carried forward by the MMIL, confirms the necessity of anchoring industrial memory within a perspective of continuity, in order to better understand the

²⁹ S. LEVECQ, E. MARCOS ALVAREZ, *La Métallurgie à Liège : la MMIL, une histoire de collecte et de valorisation du patrimoine industriel*, in "Des usines et des hommes : 40 ans de patrimoine industriel en Wallonie et à Bruxelles", ed. by J.-L. DELAET, J. CRUL, C. PAYEN, Mons, Muséa Nostra, 2024, p. 138-140.

³⁰ We wish to express our gratitude to Paul Gathy, architect at the MMIL, for his assistance in producing the reproduction of the cadastral map of Liège-East.

foundations of the region's economic identity and to inform ongoing reflections on contemporary industrial transformations³¹.

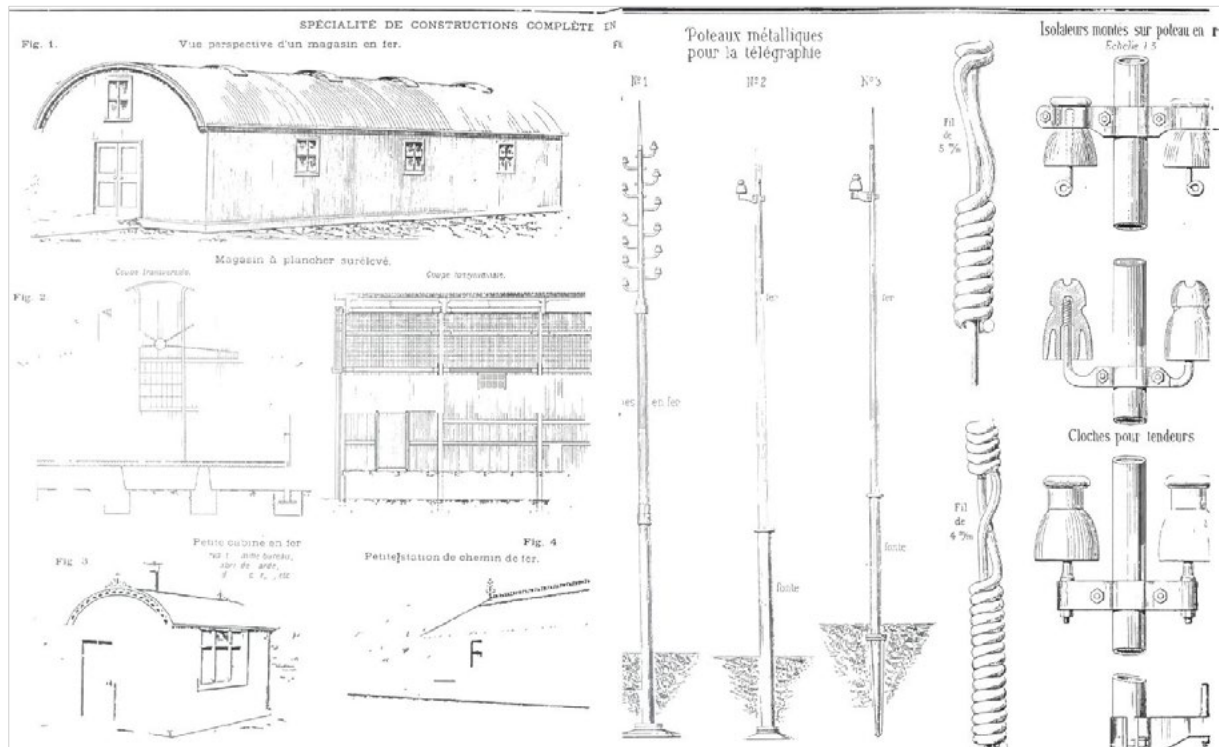


Fig. 1. Production catalogue of complete buildings and electrical installations of the Société anonyme de produits galvanisés et de constructions métalliques (*Société anonyme de produits galvanisés et de constructions métalliques, succ. de J.-F. Jona à Liège*, Belgique, Liège, Société anonyme des produits galvanisés et de constructions métalliques, 1897, p. 44, 48).

³¹ The destruction of the Ougrée coking plant in August 2025 and the looming prospect of dismantling that hangs like a Damoclean sword over Blast Furnace B in Ougrée, both located in Liège, only reinforce this point.



Fig. 2. FISCHWEILER, *Bronze bas-relief depicting Paul Borgnet*, s.d. (MMIL).



Fig. 3. Reproduction of the cadastral map of Liège-East from January 1881, showing the area known as the Longdoz district (AEL, EID, n. 4793, “Borgnet Henri”. Locality map, 4th January 1881)³².

³² The areas above the iron foundry and the Pétry-Chaudoir factory appear blank due to the absence of any representation of their buildings in the cadastral plans consulted.