

# THE INDUSTRIAL HERITAGE OF BUCHAREST THE METALLURGICAL INDUSTRY – LESS KNOWN HISTORIES

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**Abstract:** The end of the 19<sup>th</sup> century brings important transformations to the industrial architecture, similar to those in civil architecture, both reflecting times of profound change which the society and economy of the United Principalities were going through. The legislative measures adopted for the encouragement of the industry offer resources both for the development of business and for the extension of production workshops and their equipping.

Many of the new buildings will have small dimensions, which is characteristic for a developing industry. They will not benefit from any new technical solutions and will not be gifted with particular aesthetic qualities, since substantial investments in technology and materials limited those in construction.

However, projects that are adequate for this type of function will exist, with particular constructive solutions, vast surfaces covered with roofs with large spans, with no intermediate pillars, illuminated from above and adequately ventilated, which share an aesthetic quality that results from the accuracy of their details and proportions. Radical urban interventions as well as financial interests have determined, in time, the deterioration or disappearance of an important percentage of the industrial heritage of Bucharest, but their history proves, even in its absence, the value and remarkable importance that they had in the life of the city.

**Rezumat:** Sfârșitul secolului al XIX-lea aduce în arhitectura industrială transformări importante, similare celor din arhitectura civilă, ambele fiind reflexii ale unei perioade de profunde schimbări prin care societatea și economia Principatelor Unite treceau.

Măsurile legislative adoptate pentru încurajarea industriei oferă resurse atât pentru dezvoltarea afacerilor cât și pentru extinderea atelierelor de producție și dotarea acestora.

Multe din noile clădiri vor avea dimensiuni reduse, fiind caracteristice unei industrii încă în formare. Nu se vor bucura de soluții tehnice noi și nu vor fi înzestrate de calități estetice deosebite, investițiile financiare substanțiale în tehnologie și materiale limitându-le pe cele în construcții.

Cu toate acestea vor exista și proiecte adecvate acestui tip de funcțiune, cu rezolvări constructive particulare, suprafețe mari acoperite, fără reazeme intermediare, luminate zenital și ventilate corespunzător, a căror valoare estetică rezulta din acuratețea detaliilor și proporții. Intervențiile urbanistice radicale, precum și interesele financiare au determinat de-a lungul timpului, deteriorarea sau dispariția unui procent însemnat din patrimoniul industrial al Bucureștiului, dar istoria lor dovedește, chiar și în absență, valoarea și importanța deosebită pe care acesta a avut-o în viața orașului.

In the context of fundamental transformations that the architecture of Bucharest suffered after the second half of the 19<sup>th</sup> century, the iron and cast iron elements will become indispensable components of city buildings. Their structural and decorative purpose will be explored by the architects, builders and investors that find in these materials diverse possibilities of expression along with technical solutions that impress through their aesthetical qualities, details and performance.<sup>1</sup>

Although only rarely benefiting from significant financial resources or advanced technologies, cast iron and iron, whether an intrinsic part of the buildings or just juxtaposed elements added in the attempt to “embellish” the buildings, evidently mark the image of the city at the end of the 19<sup>th</sup> century.

In these conditions, the lack of a siderurgical industry that is able to answer the increasing demand of the market for semi-finite products will be compensated by massive imports from countries with which Romania had signed commercial conventions and that already had tradition in this branch.<sup>2</sup> Generally these treaties have a negative effect on the economy, by introducing an important quantity of merchandise on the market, but will simultaneously provide this industry with raw material, half-finished products, and machinery without which this new branch couldn't have become competitive enough.<sup>3</sup>

In the context of economical transformations that are also distinctive for this era, the metallurgical industry will become an important supplier of elements and constructive sub-ensembles for this new

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<sup>1</sup> Mortu 2015, pp.175-190.

<sup>2</sup> Mortu 2012, pp. 51-68. Of importance is the connection with Austria-Hungary. The development of the Transylvanian siderurgical industry was dependent of the insuring of a continuous production and of an extended market so that the possibility of exporting to a developing market became an unhopd for opportunity.

<sup>3</sup> Ancheta 1904, p. 72; Axenciuc 2008, pp. 203-204.

architecture, but at the same time will become one of the beneficiaries of the new constructive technical solutions. Frequently left hidden between the walls of old establishments, however not lacking importance, the industrial heritage can offer valuable examples of architecture.

Besides, connecting their apparition to the names of engineers or to renowned European factories prove, even in absence, the value and the special importance that they have in the history of the city.

With several exceptions, these buildings have mostly disappeared during the previous century or are in an advanced stage of degradation, due to various causes – from armed conflicts to the transformations imposed by the evolution of industry, or financial interests that are characteristic of present-day society. For this reason most of the information was extracted from authorisation projects, vintage photos and documents kept in the funds of the National Archive, and also from the era's periodicals, and economical and historical studies of the city.

The first enterprises that were considered to fulfil the criteria<sup>4</sup> of a factory can be found at the half of the 19<sup>th</sup> century in the area of Bucharest. The first that is worthy of the name of factory, thanks to “the used machinery and the number of employed workers”<sup>5</sup> is considered to be, according to Constantin Giurescu, the drapery of Nicolae Băleanu, which opened in 1843 in Tunari. “The machinery was brought from Austria; its artisans were German, the workers were Romanian.”<sup>6</sup> It can be presumed that the mentioned “machinery” was manually operated, by using the force of water or animal traction, but probably the high technical level and the organisation imposed by the “German artisans” might have somewhat inscribed it in the category of “high industry”.<sup>7</sup>

Until this moment, numerous workshops and manufactories were mentioned in the documents of the era as factories, without truly fulfilling the minimal conditions for qualifying as such.<sup>8</sup>

In fact the first factories one can truly speak of are those in function after 1853, the year in which the first steam-powered engine was brought in the country, for *Moara lui Assan* (Assan's Mill).<sup>9</sup>

The precarious state of the industry<sup>10</sup> and the difficult outset of the coagulation of heavy industry at the half of the 19<sup>th</sup> century are also highlighted in the *Raportul cu privire la starea actuală a industriei în România* (Report on the current state of the industry in Romania) presented in January 1867 in front of the *Adunarea României* (Romanian Assembly).<sup>11</sup> The lack of qualified personnel (foremen and gaugers) and employees educated in how to organise and work in a factory-scale industrial establishment, the lack of workers specialised in various crafts, the lack of proper technical conditions for performing maintenance of the machinery and equipment that was used, and the lack of sources of raw material supply<sup>12</sup> are four of the factors that the authors of the report consider to be the most important, determining the weak development of this economical branch.

As for the metallurgical industry, other factors that can be added are the lack of an important natural resource and the weak exploitation of the existing ones, the precarious state of the roads that could have

<sup>4</sup> Criteria such as the dimensions of the constructions, the number of workers and the using of machinery in the technological process of fabrication are taken into consideration. The latter is the one that makes the difference between manufactory and factory.

<sup>5</sup> Giurescu 1966, p. 290.

<sup>6</sup> *Ibidem*, p. 290.

<sup>7</sup> High industry (factory production), in the interpretation of the law from 1887, is represented by the establishments that fulfilled certain criteria, such as a minimal investment of 50,000 lei, using machinery and perfected technical processes for fabrication and employing at least 25 workers for at least five months of the year. *Mesuri generale spre a veni în ajutorul industriei naționale*, Monitorul 1887.

<sup>8</sup> “We cannot accord, we consider, the status of ‘factory’ to the sausage company founded by Pațac in 1850, just as the pasta company of Anghel Solacoglu installed from 1828 on the Podul Tîrgului de Afară: both were rather more likely manufactories.” Giurescu 1966, p. 290.

<sup>9</sup> “(...) however, the name of factory can be attributed to the first industrial mill which was set in motion by a steam engine, the Mill of Gheorghe Assan, functioning since 1853.” *Ibidem*, p. 290.

<sup>10</sup> In fact, at this time, the industry was represented only by craft and household industries and in small measure by the manufactories. Ancheta 1904, p. 37; Mortu 2012, pp. 23–44.

<sup>11</sup> *Comisiunea petițiilor* (The Commission of Petitions) that signs the report, had in its componence members such as Lascăr Catargi(u), Mihail Capuțineanu and Mihail Kogălniceanu. ANIC, MLP, File 31/1867.

<sup>12</sup> It can be remarked on this occasion that all that was necessary for the national industry has a foreign provenience (the qualified personnel and the materials and machinery) and are imported at very large prices.

allowed the transport of raw material from imports,<sup>13</sup> the lack of a demand on the market, and also that of substantial financial investments<sup>14</sup> that the branch required, all rendering the sustaining of the coagulation process of such heavy industry impossible.

In spite of these shortcomings, the seventh decade of the 19<sup>th</sup> century witnesses the appearance, at the outskirts of the city, of the first establishments of metallurgical industry that were worthy of the name of factories.

The necessary technology came almost exclusively from imports, a technology that was far more advanced than that of the Principalities, which also evolved in an accelerated rhythm offering an increased yield, conditioned however by the existence of a very large production, thus imposing appreciable financial investments. "(...) the new means and technical and technological procedures demanded large, expensive installations, which reflected in high productivity and low costs (...). This means that the progress in technique and technology dramatically increased the dimensions and cost of the modern production unit."<sup>15</sup>

The bases of the "high industry"<sup>16</sup> as well as its development will require great capital investments,<sup>17</sup> which could only be provided by foreigners and the State, the single owners of important financial resources.<sup>18</sup> Therefore the first factories will be founded on foreign capital and specialists, and will be provided with important machinery and technologies.<sup>19</sup>

This level of technology and invested capital will not always guarantee success. Sometimes the lack of raw material or the appearance of financial issues, the "lack of skill"<sup>20</sup> of the people involved, the lack of a political stability and the commercial conventions with several European countries will bring them to bankruptcy.<sup>21</sup> Therefore, the small number of banks that opened in the sixth and seventh decades of the 19<sup>th</sup> century will resist until the ninth decade, when severe measures for the encouragement of the industry were becoming necessary and will finally be adopted.

*Fonderia și Capsuleria Națională* (The National Foundry and Projectile Factory) (1862) together with the *Arsenalul Armatei* (Arsenal of the Army) (1863) are the first factories with a metallurgical activity founded by the state, which was the sole entity that, in those times, could financially sustain an investment of such amplitude. A more detailed description of the former is made in the *Analele statistice* (Statistical Archives)<sup>22</sup> and offers the image of a factory with perfected machinery, including a rolling mill for "thinning the brass sheet" and "furnaces for hardening brass".<sup>23</sup> "The projectile foundry and smithy" contained four forges with their fires, anvils, hammers and tools,

<sup>13</sup> Pennescu-Kertsch 1909, pp. 24-36.

<sup>14</sup> The entire technology available at that time on the European market offered an increased yield, although conditioned by a large volume of production, which imposed massive capital investments. In case of the metallurgical industry the necessary sums were much above the average values from the other branches of industry, reaching a capital that could have varied according to the factory or the plant's size from several tens of million francs to hundreds of million francs. Axenciuc 2008, p. 33.

<sup>15</sup> *Ibidem*, p. 33.

<sup>16</sup> The high industry (*Industria mare*) is the term that was used by the Law from 1886 and in *Ancheta industrială din 1901 – 1902* (The Industrial Investigation from 1901-1902) and designates the establishments that can be included in the category of "factory", in its current sense.

<sup>17</sup> In the footnotes the capitals that had to be invested in different branches of the industry are analysed, the largest values being registered in the field of metallurgy. For comparative purposes some examples are hereby cited: "Therefore in the decades eight, nine of the 19<sup>th</sup> century, a modern sugar factory, demanded an average investment of 5-8 million golden francs, (...) a petrol refinery costed 2-5 million francs, (...) a siderurgical compound whose minimal capital was over tens of millions of francs, reaching, according to its size, up to hundreds of millions; (...)." *Ibidem*, p. 33.

<sup>18</sup> The main income source in the Romanian Principalities were agricultural activities and their annexed industries, but practicing them at a medieval technical level as well as the agrarian crisis provoked by periods of draught will render the accumulation of significant capital that could have covered such investments impossible. Xenopol 1882, pp. 15-18; Axenciuc 2008, p. 121.

<sup>19</sup> *Effingham Grant et. comp. Belvedere* (The Effingham Grant et. comp. Belvedere Foundry) – 1863, *Tunătoria Lemaitre* (The Lemaitre Foundry) – 1864, *The Fabrica de bere Erhard Luther* (Erhard Luther Beer Factory) – 1869.

<sup>20</sup> "In order to create an industry, firstly, a technical person to run the company is required. And if many of the industries that were created in the country failed at the beginning, the cause was the lack of skill of those that founded them". Theodorak 2003, p. 138.

<sup>21</sup> One of the strangest evolutions was that of the Belvedere Foundry, which in 1865 receives a medal at the Târgul Moșilor exhibition, only to go bankrupt later that year.

<sup>22</sup> *Esposiția 1862*, p. 142.

<sup>23</sup> *Ibidem*.





Fig. 1. The Army foundry marked on the plan made by Major Dimitrie Papassoglu. 1871.



Fig. 2. Advertisement for The Belvedere Foundry, issued December 1863, in the *Românul* newspaper. The products that are mentioned among the vast offer of the foundry weren't yet on high demand on the market, which causes the shutting down of the factory the next year (*Romanul* 7-8 dec 1863, p. 4).

drills, “the iron furnace (*cabilot*)”, and the workshop of the draftsman that “builds in wood models after which the earthen drafts are made”.<sup>24</sup> The factory exhibits its products, in 20<sup>th</sup>–27<sup>th</sup> of May 1865 on the occasion of the National Exhibition of Agriculture and Industry taking place in the houses of Ion Heliade Rădulescu near the *Târgul Moșilor* (Moșilor Fair): “weapons collections, a steam machinery model, a cannon and cast iron pieces”. The existing technology and specialised workers determined the jury’s appreciation, who considers them to be “superior to those created at the Belvedere Foundry”<sup>25</sup> (Fig. 1).

If mentions of these state factories will be found later, in documents from the end of the 19<sup>th</sup> century, a less favourable fate will be that of the first attested private foundry of the country, the factory of the Scotsman Effingham Grant,<sup>26</sup> which was founded in 1863 in Bucharest, at the end of the *Podul de Pământ* (modern day Plevnei Avenue). “Workshop of construction and repairs for all kinds of machinery and works of iron smelting”,<sup>27</sup> the establishment was founded under the name *Effingham Grant et. comp. Belvedere*. The factory’s production was mainly oriented towards agricultural machinery and tools as presented in an article in the newspaper *Românul*,<sup>28</sup> the same that describes the establishment as comprising of two buildings: one for exhibiting the machinery imported from “Angleterre by the famous Ransomes et Sims factory”<sup>29</sup> and the workshop with the necessary equipment for repairing and producing the agricultural machines. At the centre of this workshop there stood the “engine that sets in motion all the machinery that works the iron in the iron workshop and that which works the wood in the wood workshop”,<sup>30</sup> and towards the extremity of the foundry there was the drafting area. The invested capital, the method of organisation, the machinery and the employed workers receive appreciation from the author of the article, who insists on every detail.

<sup>24</sup> *Ibidem*, p. 144.

<sup>25</sup> Țincu 1966, p. 279.

<sup>26</sup> Most of the speciality literary references are connected to the name of the founder Effingham Grant, his wife Maria Rosetti and his brother-in-law, C. A. Rosetti. The same name is linked to the failure of building and setting in function “a steam-powered mill and a mechanical bakery” in Colentina. In order to realise this investment the communal Hall signs a contract with E. Grant in 1862. AN-DMB, PMB, Technical Service, File 20/1863, f. 1.

<sup>27</sup> Publicity in *Românul* 1863, p. 1090.

<sup>28</sup> I. I. 1864, p. 211.

<sup>29</sup> *Ibidem*.

<sup>30</sup> *Ibidem*.

The activity in the foundry is described thus: “At one of the ends on the establishment there is a foundry that in the day of our visit is ready to cast any piece of iron from the largest to the smallest. In the presence of those that had the patience to wait until the iron was melt, all kinds of iron pieces were cast filling everyone with wonder seeing the majesty with which the molten iron flowed and took the shape that the bright mind of the mechanic created.”<sup>31</sup>

The advertisement for the Belvedere Foundry that appears in the same newspaper presents the factory as “ready to make any kind of works with the biggest precision, speed and economy” owing to “using the machines, all set in motion with the engine”. Among the products there were “cast pieces, such as screws, jointers, wheels, and cast objects in general or useful or ornamental objects.”<sup>32</sup> Also here are remembered “a hammer, a pestle (steam-powered) with a great power” which is in the inventory of the establishment and which allows it to honour even “great iron works such as beams, axles of every size and type”<sup>33</sup> (Fig. 2).

This establishment will be dismantled in July 1865, two months after receiving prizes at the exhibition at the *Târgul Moşilor* (Moşilor Fair) for “its collection of machinery” and especially “for the manual and vapour mill, for well-forged spindles, for the wood saw and especially for the initiative of founding the first foundry of the country and spreading lots of foreign agricultural machinery”.<sup>34</sup> One of the causes of bankruptcy may be a bad administration of the available financial resources, but also faulty raw material supply as well as a lack of interest for fabricated or imported products, in conditions of absence of any measures of encouragement for investments in agriculture and industry.

In this context, gaining the definitive status as Capital after the Union of the Principalities represented the key-factor that stood at the foundation of the transformation of Bucharest and its outskirts in the most important industrial centre, afterwards benefiting from an infrastructure that was continuously developing, significant financial resources, and also an important influx of manpower.

The first signs of industrial development in the area of the Capital City will determine a permanent growth of the demand of metallurgical products, whether machines, tools, installations or different elements and constructive sub-ensembles. Along the smaller craft workshops an important place in the market will be occupied by older workshops whose technological level and organising even allowed them a place in the category of high industrial establishments, but also new factories.

During the following decades, under the influence of political decisions, the economical and legislative context and also the development of technologies, they will pass through different changes, which reflect in the industrial architecture that shapes itself in the era.

In the category of factories that activated mainly in the production of metallurgical and tin-ware products is that founded at the initiative of Baptist Gaiser. According to Frédéric Damé, the workshop was founded in 1859 and originally had 5 workers.<sup>35</sup>

In 1886, in the *Anuarul Bucureştiului* (Annual of Bucharest), Baptist Gaiser is mentioned along the category of tinsmiths with his headquarters on 14 Luterană Street, and in a advertisement cassette in the same publication the workshop offers to those interested “Every article for buildings, covering buildings and zinc ornaments, tin and iron sheets”, but also heating stoves or cooking machines.<sup>36</sup>

After adopting, in 1891, the ruling for the expansion of the city centre limits (area I) Gaiser is coerced to move his workshop outside this perimeter. The new placement will be on Griviţei Street, close to the newly delimited central area and at the same time in the immediate vicinity of the *Gara de Nord* (North Train Station)<sup>37</sup> (Fig. 3).

<sup>31</sup> *Ibidem*.

<sup>32</sup> *Ibidem*, p. 212.

<sup>33</sup> *Ibidem*.

<sup>34</sup> Ionescu 1966, p. 170.

<sup>35</sup> Damé 1907, p. 601.

<sup>36</sup> *Anuarul*, f. a., p. 70, p. 151.

<sup>37</sup> AN-DMB, PMB, Technical Service, File 354/1899.





Fig. 3. Facade and section of the Gaiser property. Top: left – the façade of the office building; centre – the workshops building, and right – cross section through the stables. Bottom: Cross section through the office and workshops buildings (AN-DMB, PMB, Technical Service, File 354/1899, f. 4).

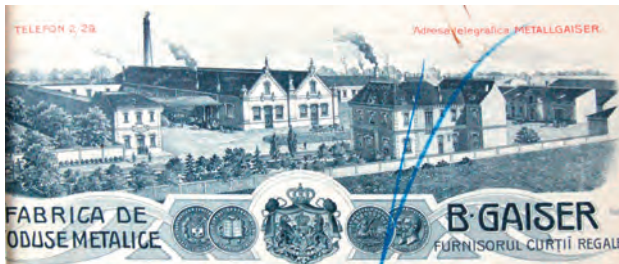


Fig. 4. Header for the B. Gaiser society. It illustrates, in an aerial view, the ensemble of the establishment, with the central area occupied by the volume of the workshops and the other related functions set on the borders of the property. The mention *Furnisorul Curții Regale* (Supplier for the Royal Court) offered the guarantee of quality products and services (ANIC, MIC-DIM, Metallurgy, File 30/1912, f. 1).

An image of the whole ensemble which was taken at the beginning of the second decade of the 20<sup>th</sup> century confirms the solution in the building authorisation project. The supplementary elements of the establishment are also visible in the images presented in the printed catalogue or the ones that formed the header of the documents they issued (Fig. 4). The entire ensemble was comprised of several volumes which were set on the limits of the property. The courtyard was organised around the central building of workshops and offices, the latter being the only still standing today. The volume of the workshops was comprised of two identical halls covered with gabled roofs, which were adjacent and dominated by a slender horn, most likely for the foundry.<sup>38</sup> The proposed architecture doesn't limit itself to resolving the functions – compositional principles and decorative elements give a particular note to the ensemble. It's important to remark that there is a green space between the building with the offices and that of the workshops that configures the reception area for those that entered business with the Gaiser family.

Among the products offered on the market there were zinc ornaments for buildings, doors, horns and ventilators (Figs. 5, 6), articles for bathrooms bathtubs and showers (Figs. 7, 8), and also different kinds of stoves (bathroom stoves, cooking stoves, gas boilers (Figs. 9, 10), all these presented in the three catalogues correspondent to the item categories. In each of them the name of the factory is accompanied by the mention "Supplier for the Royal Court", a title that, in the era, offered the guarantee of the quality of the sold products (Fig. 11).

It's important to remark that this presentation that Baptist Gaiser chooses to display on the Romanian market is in line with the European fashion of the era, which was copied from the other side of the Ocean, where there existed a catalogue architecture that was launched after 1840,<sup>39</sup> and that enjoyed a veritable success. In Romania these are the only examples that were identified in the archives, until the present day. They are also the ones that offer some information on some of the reference works of the factory: the zinc roofs and ornaments of the Royal residences in Bucharest and Sinaia, The Palace of The House of Deposits and Consignments, The Cantacuzino Palace, the Elena Cretzulescu Palace, kitchenware – stoves, ovens, hoods for the home of G. Assan and the Elena Cretzulescu Palace.<sup>40</sup>

Fulfilling the more permissive criteria of the Law for the Encouragement of the National Industry in 1912, the Gaiser factory of metallic products will gain its due advantages. Three years later through a notice

<sup>38</sup> From the product offer, as well as the list of materials that were used in the factory, it can be supposed that the positioning of certain horns in the ensemble corresponded to a cast iron foundry although none of the employees of the factory seemed to have that specialization.

<sup>39</sup> In this year the first catalogue with cast iron products for construction appears: pillars, railings, façade elements.

<sup>40</sup> Catalogul ornamentelor f. a.; ANIC, MIC-DIM, Metallurgy, File 30/1912, f. 30.







Fig.11. Pavilion of the factory of Baptist Gaiser at the Agrarian Exhibition in 1904 (<http://www.imagoromaniae.ro/imagini/pavilionul-firmei-b.-gaiser.html>. Accessed 24 08 2012).



Fig. 12. Advertisement for Erezii L. Lemaître Succesorii published august 1888, in the Epoca newspaper. The offer of products is similar to that of the Belvedere in 1863, but this time the text is completed with their images (Epoca 6 dec. 1898, p. 4).

Romania”.<sup>43</sup> Despite the flattering presentation from the ninth decade, the early days of the workshops were much more modest. This is confirmed by an 1866 expertise published in the “Parliamentary Materials” from 1866 / 1867 and cited by Gheorghe Zane in his book on the Romanian industry.<sup>44</sup> The factory was “in reality made of temporary sheds”, “an old blast furnace”.<sup>45</sup> Despite all these shortcomings the factory will progress, gaining the title of “national foundry” in 1886 and being one of the material suppliers for the Romanian Athenaeum. Relevant in this sense is the entrusting of the Lemaître Factory with the contract for the twelve cast iron columns for this edifice, since the order couldn’t have been fulfilled by the Army Foundry in the imposed deadline<sup>46</sup> (Fig. 12).

In 1898, the newly founded *Societatea Anonimă Metalurgică Română, fostă uzinele Lemaître* (Anonymous Romanian Metallurgical Society, formerly the Lemaître Factory),<sup>47</sup> whose main shareholder was the *Societatea generală Belgiană-Română pentru Transport și Industrie* (Belgian-Romanian General Society for Transport and Industry), will buy the entire Lemaître Factory<sup>48</sup> (Fig. 13).

On the 27<sup>th</sup> of February 1899, the factories will request from the City Hall the emission of a building authorisation for the extension of one of the workshops’ buildings.<sup>49</sup> The ample project proposed the inclusion of the existing workshops in a single building and erecting a new hall adjacent to the former. The first building had a surface of circa 2,950 square meters and an approximate height of 5 meters at the supports of the roof. The transversal section reveals the solution for the roof, with shed-type trusses that discharged part on the existent walls and part on metallic pillars<sup>50</sup> with a circular section (with a medium bay of 3.5 meters and an 8.5 meter span). The superior blooms were made of wood, and the ties and the lattices of metallic bars<sup>51</sup> (Figs. 14, 15).

<sup>43</sup> Lloydul 1884, p. 192.

<sup>44</sup> Zane 1970, p. 170.

<sup>45</sup> *Ibidem* p. 158.

<sup>46</sup> AN-DMB, Romanian Athenaeum Collection, File 5/1886, f. 70, 75, 172.

<sup>47</sup> The complete name of the society inscribed in the constitutive act from the 27th of November 1898. DAC, TI, File 43/1898, f. 28-29 *apud* Manole (coord.) 1991, pp. 68-69.

<sup>48</sup> DAC, TI, File 43/1898, f. 28-29 *apud Ibidem*, p. 69.

<sup>49</sup> AN-DMB, PMB, Technical Service, File 495/1899, f. 1.

<sup>50</sup> The dimensions that result from the plan, compared to other constructive elements, correspond to vertical steel elements. Considering the time in which the building was realized, it can be presumed that pillars were made of cast iron.

<sup>51</sup> Considering the technology for steel mass production available at that time, it can be assumed it was steel.





Fig. 13. Header for the *Societatea Anonimă Metalurgică Română*, fostă (former) *Uzinele Lemaitre*, founded in 1898 with *Societatea generală Belgiană-Română pentru transport și industrie* as major stockholder (ANIC, MIC-DIM, Metallurgy, File 495/1899, f. 1).

The second volume, with a smaller surface of about 1,751 square meters and a height of 8 meters, was covered with a system of triangular trusses also made of wood and metal and that discharged in the interior on two rows of pillars with a circular section,<sup>52</sup> and at the exterior on the perimetral masonry walls that were consolidated with buttresses. On all three spans, the superior sides of the trusses were locally provided with “lanterns” that allowed the ventilation of the space<sup>53</sup> (Fig. 16).

The plan of the city erected in 1911 presents a different contour of the building, which suggests that the project was modified during its building.

In 1912 the factory was organised in eight sections, the cast iron and bronze foundry, drafting, turnery, adjustment, boiler house, smithery, construction locksmithery and tool-shed.<sup>54</sup> The products that were fabricated were most diverse: vapour boilers of different types, reservoirs, water or naphtha towers, different water installations, pumps, machines for transporting waste or sweeping the streets, cesspools, agricultural machinery, but also structures for roofs and railway bridge structures, flower greenhouses and various constructive sub-ensembles etc.<sup>55</sup>

The First World War will cause significant damage, but the contract signed with The Romanian Railways in the ensuing period will impose appreciable investments among which the realisation of a railway that connected the factory to the Filaret Station,<sup>56</sup> and also the extension of the ensemble with two new buildings destined for the locomotive repair workshops.

In the context of these investments, in 1921 the Ministry of Industries is forwarded a file for the granting of privileges according to the law for the encouragement of industries. The site plan presented here comprises of the five existent buildings of the factory and the administrative building, to which there are added, on the north-eastern side of the building erected in 1899, “the locomotive assembly hall” and an assembly hall with forge<sup>57</sup> (Fig. 17).

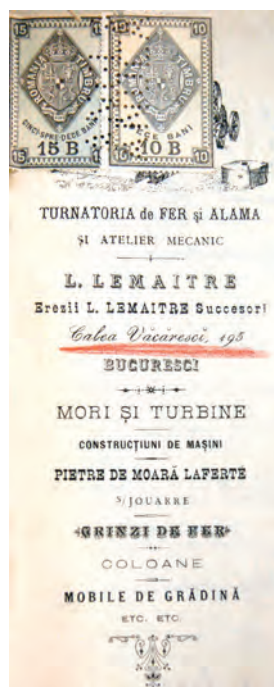


Fig. 13.1. Header for the *Turnătoria de fer și alamă și atelier mecanic Erezii L. Lemaitre Succesorii*. 1889 (AN-DMB, PMB, File 49/1889, f. 112).



Fig. 13.2. Header for the *Turnătoria de fer și alamă și atelier mecanic Erezii L. Lemaitre Succesorii*. 1889 (AN-DMB, PMB, Ateneul Român, File 5/1886, f. 70).

<sup>52</sup> Also in this case, most probably the pillars were made of cast iron, but the dimension of the consoles at their tops can raise some questions regarding the nature of the material and may suggest the using of steel pipes. *Societatea f. a.*, p. 12.

<sup>53</sup> AN-DMB, PMB, Technical Service, File 495/1899, f. 4; *Societatea*, p. 13.

<sup>54</sup> *Uzinele Lemaitre. Societatea Anonimă Metalurgică Română*. ANIC, MIC-DIM, Metallurgy, File 65/1912-1942, f. 3.

<sup>55</sup> *Ibidem*, f. 4.

<sup>56</sup> The request will be submitted at the beginning of 1919 and will be approved after a series of negotiations regarding the financing of the works. In autumn the same year the City Hall will approve “the making of a garage line that connects the railway in the Gas Factory to the Lemaitre Metallurgic Factory in an exceptional and temporary situation, for the needs of the General Direction of the Railways (...) without however accepting to contribute to these works with any money.” *Ibidem*, f. 27.

<sup>57</sup> The drawing is drafted in French and is dated 30<sup>th</sup> of September 1921, Bucharest, ANIC, MIC-DIM, Metallurgy. File 26/1921, f. 3.

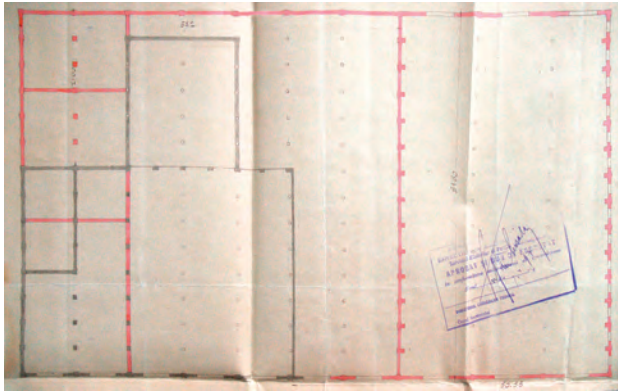


Fig. 14. Project for the extension of the workshops, submitted to the City Hall in 1899. Plan. The considerable surface of the proposed buildings (in red) compared to that of the existent buildings (in black) can be remarked (ANIC, MIC-DIM, Metallurgy, File 495/1899, f. 4).



Fig. 15. Longitudinal section of the entire built volume. The two solutions for the roofing are highlighted. Asymmetrical shed trusses and symmetrical triangular trusses with “lanterns” at their tops (ANIC, MIC-DIM, Metallurgy, File 495/1899, f. 4).

This time, as seen in the justification report, the entire structure will be imported from Belgium,<sup>58</sup> this being the case of a “special type” of collapsible workshops to “serve as example in the country”<sup>59</sup> and whose special characteristic was their “mobility, minimum of used material and minimum of sustaining pillars”.<sup>60</sup>

In the absence of an architectural project, the only documents that can offer any data on the constructive conformity are, at the moment, a few photographs of the new locomotive workshop<sup>61</sup> and the previously mentioned site plan. In this case the image of a metallic structure can be remarked, characterised by the extremely supple proportions of the elements, determined by the characteristics of the steel that was used and the small proportions of the joint details (Figs. 18, 19, 20).



Fig. 16. Pavilion of the *Societatea Anonimă Metalurgică Română*, at the Agrarian Exhibition in 1904 (<http://imageromania.ro/imagini/pavilionul-uzinelor-lemaitre.html>. Accessed 24.08.2012).



Fig. 17. General plan of the *Uzinele Metalurgice Lemaitre* (Lemaître Metallurgical Factories). 1921. At the right side of the plan the position of the locomotive assembly halls is marked, the old hall and the new structure that was to be imported (ANIC, MIC-DIM, Metallurgy, File 26/1921, f. 3).

<sup>58</sup> The building was made by *Les Ateliers Metallurgiques de Nivelles* (a plant that had its headquarters in Brussels), more precisely by the Nivelles workshop of the mentioned company. It had four workshops, of which those in Nivelles for tramways, the one in Tubize for steam locomotives, and the one in Sambre for bridges and steel structures, and another in Manage ([http://fr.wikipedia.org/wiki/Soci%C3%A9t%C3%A9\\_Anonyme\\_la\\_M%C3%A9tallurgique](http://fr.wikipedia.org/wiki/Soci%C3%A9t%C3%A9_Anonyme_la_M%C3%A9tallurgique). Accessed 10.09.2012).

<sup>59</sup> Also in this report, in order to justify the choice of importing the mentioned structure, the very short execution deadline and the wish to avoid any delays are invoked. ANIC, MIC-DIM, Metallurgy. File 26/1921, f. 2.

<sup>60</sup> *Ibidem*.

<sup>61</sup> Societatea f. a., pp. 14-16.





Fig. 18. Interior views from the workshops building. The roofing is made of metallic trusses that discharge on the cast iron pillar (Societatea f. a., BCUB, Unitatea Centrală, VI77/16).



Fig. 19. Interior view from the workshops building (Societatea f. a., BCUB, Unitatea Centrală, VI77/16).

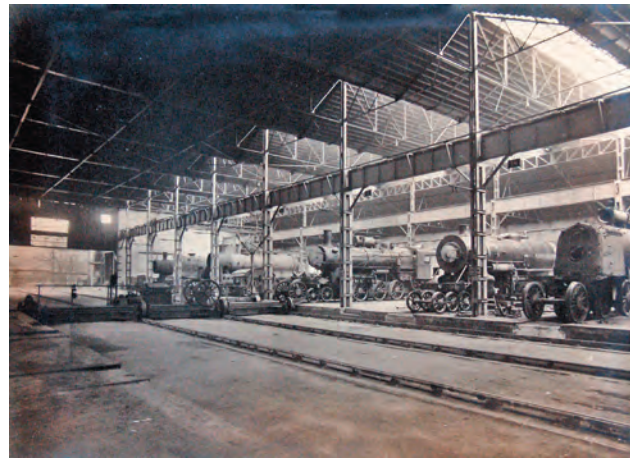


Fig. 20. Interior view from the central area, in the locomotive assembly hall (Societatea f. a., BCUB, Unitatea Centrală, VI77/16).

The surfaces of the two halls are comparable to those erected at the end of the 19<sup>th</sup> century, but, as mentioned in the report, the number of the pillars was significantly smaller, with the bays of the new structure being approximately 7.5 by 13 meters wide. The structure was composed of trusses on the longitudinal direction and latticed consoles on the perpendicular direction. This “skeleton” allowed for the realisation of an envelope with a geometry that was similar to sheds, and that offered the possibility of optimal illumination for the interior space.

A series of information regarding the other buildings of the ensemble and their resolution, but also several constructive details can be extracted from some images of the factory.<sup>62</sup> A lack of unity both regarding their architecture and their structural conformation can be observed, both in the case of the new buildings and that of the interventions. Each building is resolved in a particular manner, wood, steel, and concrete alike being used until that moment.

<sup>62</sup> The identification of the buildings and the places captured in the images was made starting from the dimensions of the bays marked in the 1:500 plan and the vicinities on which there is a certitude.





Fig. 21. Header of the Erhard Wolff factory (ANIC, MIC-DIM, Metallurgy, File 30/1912, f. 53).

Although in some of the images the area of the factory ensemble which they capture isn't identifiable, as a result of the incoherence of the plan and the multiple interventions that were made on the existing buildings, a series of details and particular constructive solutions are revealed.

With the exception of the locomotive hall whose structure was entirely made of laminated steel profiles, the other workshops' roofs are resolved with trusses made entirely of timber or only with their ties and lattices made of very supple laminated profiles, with a small section.

It can be presumed that, according to these observations, steel was used even in industrial buildings, but only when functional and safety factors

demand it. In the same context it can be believed that the decision to import a metallic structure, such as that of the locomotive hall, has been taken because the contract signed with the Romanian Railways imposed the urgent commencement of the repairing works as well as respecting very strict deadlines.

Similar to the other analysed examples, *Societatea Metalurgică Română* (The Romanian Metallurgic Society) will pass through auspicious times, but also crisis periods when it will modify its production profile in the attempt to adapt itself to the new conditions of the market. During the Second World War, the factory will focus on producing ammunition and repairing military vehicles, only to become a motor and compressor factory after nationalisation, under its new name, *Timpuri noi* (New Times).<sup>63</sup>

Among the first and best known factories in the metallurgical industry, that of Erhard Wolff will also follow a sinuous route determined by the frequent changes on the market and the political and economic context. The studies and articles published until today reveal novel data on the history of the factory, its owner and their influence in the development of industry in Romania in general.

The first workshop that Erhard Wolff founded together with Eduard Arbenz<sup>64</sup> in 1877 was located in Ghencea, had eight workers and made warheads for the Romanian Ministry of War. Afterwards, similar to other investors in the industry, Erhard Wolff will attempt to position his workshops close to the railway system that began to develop at the outskirts of the city, so that in 1877 he will move his entire workshop in the immediate proximity of the Filaret Railway Station.

After ceasing the contract previously signed with the army, Wolff re-orientates on household items and various accessories for construction (locks, hinges, padlocks, latches), frameworks,<sup>65</sup> beams,<sup>66</sup> but also a series of hot water installations, with steam or for the oil industry, the latter being the ones that attracted the spectacular development of the factory in the first decade of the 20<sup>th</sup> century<sup>67</sup> (Fig. 21).

By being granted the advantages of the 1886 law,<sup>68</sup> Wolff will gain the possibility of extending his factory, thus adding, in 1894, the workshop of the brass foundry section.<sup>69</sup> The solution that was chosen for the roofing had

<sup>63</sup> Data extracted from the Building File found in the archive of the DITACP-UAUIM, by student Paul Stănescu, led by conf. dr. arch. Constantin Enache.

<sup>64</sup> Both Erhard Wolff and Eduard Arbenz had Swiss origins and settled in Romania in 1876. Chinezu 2011, p. 42.

<sup>65</sup> Among the works made in the factory, the most important are the roofing of the Peleş Castle, the bridges in Topolnița (1906) and Huțani (1910). Iamandescu f. a, p. 3.

<sup>66</sup> Most probably composite beams, in that moment the country didn't have a rolling mill for profiles, the entire quantity of laminated profiles being imported from Austria-Hungary (from the Reșița Factory).

<sup>67</sup> Chinezu 2011, pp. 42-43; Iamandescu f. a, p. 3.

<sup>68</sup> Various facilities were offered to the factory in 1893, 1898, and 1899.

<sup>69</sup> Apart from the foundry building, other buildings will be erected, such as "a chimney for the steam boiler", "a wood or iron-and-wood fencing" and a "systematic outhouse". AN-DMB, PMB, Technical Service, File 36/1894, f. 1.

wooden trusses with skylights at their top, and for the taller section of the building, which also had a partial floor, it will be opted for semi-circular trusses. Similar to other projects the scale of the drawing and the detailing don't offer much technical information, but judging from the proportions of the roofing it can be presumed that metallic profiles were used. This building will be subsequently demolished, most probably along with the extending of the factory after 1941.<sup>70</sup>

A new building with the function of “storage-shed for sheltering the workers and storing iron material”<sup>71</sup> will be erected in 1904 and will subsequently be transformed in the boiler house of the factory.<sup>72</sup> Nowadays the structure of the roofing is resolved on two spans with wooden trusses that discharge on “I”-shaped laminated profiles on two of the building's sides and pillars with a composite section made by two distanced “U”-profiles placed back-to-back that are in the centre. A year later, a new volume will be added on its eastern side. The immediate vicinity of the Carol Park imposed a special treatment that determined the architect to adopt the direction of the existing structure, the spans as well as certain façade elements, resolving the new structure as an integral part of the old. The project that was authorised in February 1905 will have an interior structure with two bays and three spans, of which the one oriented towards the north will also have a partial semi-basement<sup>73</sup> (Figs. 22, 23). In the month of July of the same year an authorisation for the expansion of this building<sup>74</sup> will be requested, resulting in the addition of a fourth span on the southern side. The final structure will have two bays and four spans, and will be made of twelve metallic trusses that discharge on pillars with a composite section, as described above, and that have consoles made of “U”-profiles and thick riveted sheets on their tops, in the area of discharge of the roofing. The blooms of the trusses are also made of “U”-sections between which there are gussets that will ensure the assembly of other components, lattices, mullions, and bracings made of laminated “L”-shaped profiles set back-to-back (Fig. 24).



Fig. 22. Interior view of the building oriented towards the Carol Park, presently unused.

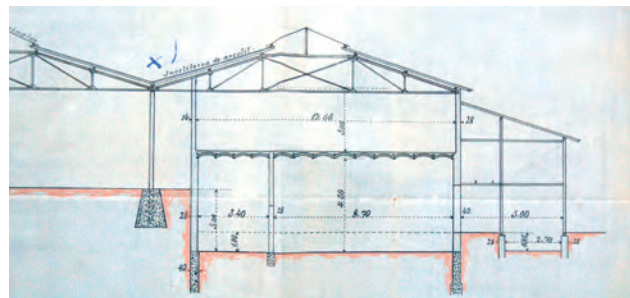


Fig. 23. Transversal section through the northern bay, with a partial semi-basement (AN-DMB, PMB, Technical Service, File 149/1905, f. 4).

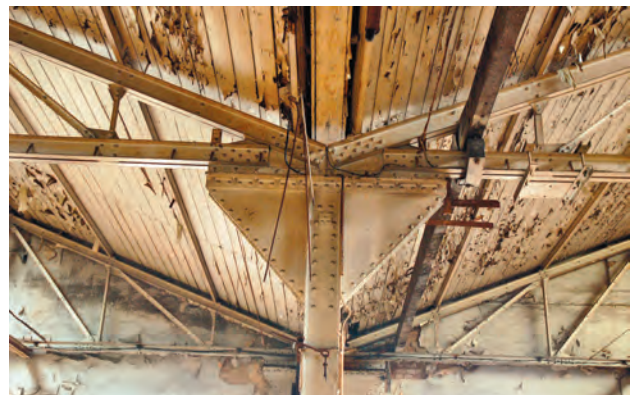


Fig. 24. Detail of the pillar supporting the roofing. The support of the trusses on the pillars is made through thick sheet consoles, the entire ensemble being assembled with rivets.

<sup>70</sup> Bălteanu *et alii* 2007-2009, p. 2.

<sup>71</sup> AN-DMB, PMB, Technical Service. File 90/1904, f. 1.

<sup>72</sup> As seen in the 1905 site plan that accompanies the project for “The expansion of the boiler workshop as well as the making of a separating masonry wall between the courtyard and the street”, submitted for authorization in 1905. AN-DMB, PMB, Technical Service, File 149/1905, f. 4.

<sup>73</sup> AN-DMB, PMB, Technical Service, File 90/1904, f. 4.

<sup>74</sup> Bălteanu *et alii* 2007-2009, p. 2.





Fig. 25. Interior of the semi-basement. The space is covered with small brick vaults and laminated profiles supported by beams and composite pillars.



Fig. 26. Header of *Metalurgia Română Jacques I. Catz*. 1900. The image of the factory ensemble is dominated by the blast furnace of the foundry.

The slab over the semi-basement will be resolved with brick small vaults sustained by laminated “I”-profiles, that in turn discharged on a network of “I” beams set in pairs and discharging on pillars through “capitals” of thick sheets that were riveted on the vertical profiles. The large spans of the structure determined their doubling with a network of beams supported by smaller pillars with a circular section, which also had the purpose of supporting the slab (Fig. 25).

In the same year important changes are made in the organising of the factory caused by the expansion of the railways and the modification of the alignment of Cuțitul de Argint Street. By following two site plans made in February and August, it can be observed that the main building of the factory disappears (in reality only a part of it was demolished), and also several annexes (a shed, an outhouse, two warehouses and a cellar). The plan from August 1905 delimitates the site, in the shape in which it can be seen today, marking the new administrative headquarters erected with “significant expenses”.<sup>75</sup> On the plan the railway emerging from the triage of Filaret Station is also represented, with a ramification that was used for manoeuvring the wagons in the precinct of the factory.

After the death of Erhard Wolff, in 1915, the administration of the entire society will be assumed

by Felix Wolff, the eldest son of the industrialist,<sup>76</sup> whose successors<sup>77</sup> will decide in 1928 to make the factory the property of *E. Wolf Societate Anonimă Română* (E. Wolf, Anonymous Romanian Society).<sup>78</sup> It can be presumed that this final decision was taken because of a lack of sufficient financial resources<sup>79</sup> to sustain new investments and the maintenance on a market which was perturbed by the repercussions of war.

As well in 1928, it is decided to build a new boiler workshop on the print of the old building erected in 1905, with an authorised project signed by arch. I. G. Mayer. Similar with the halls of the Lemaître Factory, the chosen solution is also a metallic structure, with beams and pillars with composite sections, resolved as latticed elements. The variable section of the transversal beams allowed the positioning of slanted glazing with the role of skylights. The supplier of the laminated profiles for the structure of the hall was the Reșița Factory, whose name is printed on one of the profiles that form the pillars of the hall.

As opposed to the rest of the enclosing walls that are made of masonry, the height of the northern façade imposes its reinforcement with laminated profiles. Thus it will be opted for a system similar to that of *pan de fer*, with composite vertical elements that enclose the masonry wall, diagonals of metallic strips and corner profiles used as bracing. The execution of the construction brought modifications to the initial project, partially realised in this stage and finalised in 1941 with a similar structure.<sup>80</sup>

<sup>75</sup> AN-DMB, PMB, Technical Service, File 149/1905, f. 1, 11-17.

<sup>76</sup> Affirmation that could be contradicted by the signatures on the acts emitted after 1915 and that most probably belong to Erhard or Ernest Wolff (E. Wolff). See Chinezu 2011, p. 44; ANIC, MIC-DIM, Electro-technical Metallurgical Industry, File 16/1913, f. 49.

<sup>77</sup> Erhard, Ernest, Werner, Elisabeta, Aurel și Felix. Chinezu 2011, p. 44.

<sup>78</sup> ANIC, MIC-DIM, Electro-technical Metallurgical Industry, File 16/1913, f. 49.

<sup>79</sup> *Ibidem*, f. 40-41.

<sup>80</sup> As can be seen in the file regarding the industrial architectural heritage made by arch. Adrian Florin Bălțeanu, both the building erected in 1928 and that in 1941 have been only partially built. *Ibidem*, p. 6.

Among the specific industries a special place is occupied by the *Societatea Jaques I. Catz și Comp.* (Jaques I. Catz and Comp. Society), founded in 1898<sup>81</sup> (Fig. 26). This, most probably, acquired<sup>82</sup> the *Fabrica de olărie smălțuite ale lui R. H. Oppler* (R. H. Oppler Factory of Glazed Pottery) on Izvor Street<sup>83</sup> together with the *Fabrica Bauer* (Bauer Factory) on Cuțitul de Argint Street,<sup>84</sup> the main object of activity being the production of machine tools, freight wagons, mechanical construction, iron/cast iron and brass foundries, metallic constructions – bridges etc.<sup>85</sup>

The subsequent financial difficulties determine the assuming of the business, in December 1901, by *Metallurgia Română* (La Metallurgie Roumaine), anonymous Belgian society with its headquarters in Brussels.

This society forwarded to the Ministry of Agriculture, Industry, Commerce and Domains, on the 24<sup>th</sup> of November 1900, a report in which it demanded the authorisation for the founding of secondary headquarters in Bucharest, with the objective of “the exploitation of a factory comprising of iron and brass foundry, wagon, bridges construction workshop, material for the exploitation, distillation and transport of petroleum and its derivatives, machine tools, boulonnieres and household articles made of iron and cast iron glazed or covered in other metals.”<sup>86</sup> As can be extracted from a report made by the chief of the Service of Industry, engineer R. Mircea,<sup>87</sup> the factory was divided in two sections: metallurgy “with machines of all kinds, tubes and probing devices, reservoirs and any other iron sheet works, rivets, straps, bolts, studs for railways (...)”<sup>88</sup> and the pottery section in which various household objects were made (glasses, mugs, basins, pots etc) from glazed iron and cast iron. This latter section had enjoyed significant success in the previous year, by “largescale exporting to the Extreme Orient, where the factory of Mr. Katz has managed to be a worthy competitor to the German fabricates (...)”,<sup>89</sup> but in 1900 the production became virtually inexistent, hence the lack of funds and floating capital, and accumulated debt determined the emission of bonds that subsequently allowed the Belgian society to gain possession of the factory.

The conclusion of the report is that the factory is in good functioning condition and considers that along with the *Fabrica Lemaitre* it could “contribute to the fabrication of wagons at least for the railways”<sup>90</sup> and will determine the signing by King Carol I, in December 1901, of the act through which the founding of the secondary headquarters in Bucharest is approved.

Apart from its sinuous history that is similar to other metallurgical establishments of the era, it deserves to be mentioned for its connection to the former factory of engineer A. Bauer, who invests and builds in 1893 what are probably the first industrial halls of the city.<sup>91</sup>

The initial project<sup>92</sup> of the first building of the factory was signed by engineer Joseph Leclair, whose name was found, in the same period, next to that of architect Guy Le Bris, on the project of the *Société Urbaine d’Air Comprimé* factory.<sup>93</sup>

<sup>81</sup> After *Repertoriul nominat al așezămintelor industriale mari in activitate clasificate pe grupe de industrii*. Ancheta 1904, p. 11.

<sup>82</sup> ANIC, MIC-DGM, File 40/1900, f. 9, verso.

<sup>83</sup> On Izvor Street, close to the intersection with Rozelor Street, on the same side as the *Fabrica de bere Oppler* (Oppler Beer Factory).

<sup>84</sup> Identified on the 1895-1899 plan as *Fonderie* (Foundry) and, according to a site plan from 1893 was made of three sections: “heavy” mechanics, fine mechanics and foundry. AN-DMB, PMB, Technical Service, File 28/1893, f. 129.

<sup>85</sup> The header of the company contains an extended list of products of which the ones in the foundry are listed here: machine tools, cogwheels, columns, chandeliers, faucets, pieces up to 10 tons. From the enamel section household items made of iron or cast iron are to be mentioned. AN-DMB, PMB, Technical Service, File 166/1900, f. 1.

<sup>86</sup> ANIC, MIC-DGM, File 40/1900, f. 1.

<sup>87</sup> Report registered on the 1<sup>st</sup> of July 1901. *Ibidem*, f. 9-10.

<sup>88</sup> *Ibidem*, f. 1.

<sup>89</sup> *Ibidem*, f. 10.

<sup>90</sup> *Ibidem*.

<sup>91</sup> It will be followed by the halls of the Lemaitre Factory in 1899, the boiler workshop of the Wolff Factory in 1904. In 1921 the locomotive workshop of the same Lemaitre Factory and the new workshops of the boiler section of the Wolff Factory partially realised in 1928.

<sup>92</sup> AN-DMB, PMB, Technical Service, File 28/1893, f. 133.

<sup>93</sup> In 1891, the same engineer signed along Guy Le Bris the project for the *Société Urbaine d’Air Comprimé* factory in Paris (SUDAC). <http://lafabriquedeparis.blogspot.ro/2011/12/la-sudac-un-siecle-dair-comprime-au.html>. Accessed 5.10. 2013). Here the structure was resolved as riveted sheet-iron frames, with diagonals made of composite profiles after a rectangular section and trusses that held the roofing and the intermediary slab. The particular solution that was adopted here, by positioning the structure at the exterior will be copied in the structure of the first hall of A. Bauer’s factory.



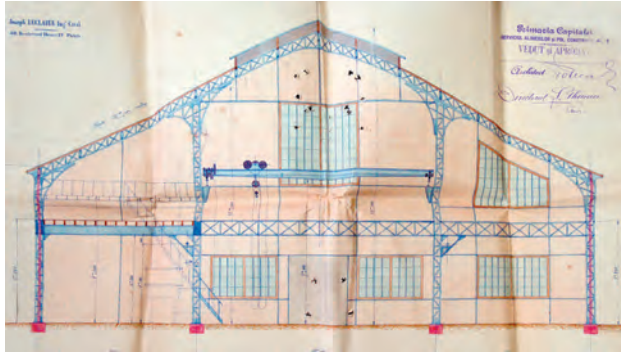


Fig. 27. Transversal section of the first project of the hall. The drawing is signed by French architect Joseph Leclaire (AN-DMB, PMB, Technical Service, File 28/1893, f. 135).

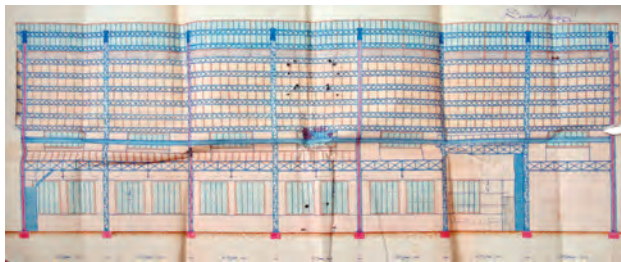


Fig. 28. Longitudinal section of the initial project. It will be modified in the authorisation project, the total length of the building becoming one bay shorter (AN-DMB, PMB, Technical Service, File 28/1893, f. 133).

together through sleepers and diagonals. Each of the pillars had latticed consoles at its top that supported the slanted beams of the roofing.

In the case of the transversal section it can be supposed that “T”-profiles were used for creating the two blooms of the trusses that constituted the templates of the roofing.

What is important to remark is the positioning of the perimeter walls between the structural elements of the building, a particular constructive detail, unused in the industrial architecture of Bucharest, but which is found in the *Société Urbaine d’Air Comprimé* factory in Paris, previously mentioned.

The much smaller dimensions of the “heavy mechanics” workshop (35 x 12 meters) will allow the elimination of any intermediate supports and the choosing of usual laminated profiles for the realisation of the structure, but the enclosing will also be made between the structural elements.

Largely destroyed during the retreat of the occupational forces in the First World War, it will be sold in the 20<sup>th</sup> of April 1920 to the *Societatea de Tracțiune Automobilă din România* STAR (Society for Automobile Traction of Romania). The restoration works of the building in 1919 will be continued in the next period when new installations and machinery will be acquired. The changing of the domain of activity will attract the reorganisation of the factory so that in 1923 there will be four production sections: adjustment and turnery, forge, wood works (carpentry) and bronze foundry, and the society will specialise in automobile repairs, wagons, agricultural machinery, as well as production of car parts.<sup>95</sup> In the aerial photogrammetry of the city from 1927, the surface of the main building of the factory was diminished, occupying only the area corresponding to the foundry, while the second building remained the same.

In the first phase, the building, which was meant to host the iron foundry and fine mechanics workshop, had seven equal bays and developed on a total length of 42 meters, with 28 meters in width. The project draft that was submitted for authorisation most probably suffered several modifications from its first version, since it no longer has the stamp of the French engineer. The solution proposed the development of the hall on six bays 6 meters wide and three spans, the widest of which was 12 meters wide and stood in the centre, and the other two 8 meters wide which were disposed symmetrically from it. The considerable heights of the hall, 15 meters at the apex and 8 meters at the cornice, as well as the heavy loads to which the structural vertical elements<sup>94</sup> were subjected, determined the author of the project to choose the solution of a structure made of elements with composite sections (Figs. 27, 28).

The amount of detail of the project can offer several clues on the types of composite profiles that were proposed for resolving this structural system, but the lack of written information cannot offer a certainty in this sense (Fig. 29).

Both the exterior pillars and the interior had a section made of four “L”-shaped profiles which were set in plan in a rectangular shape, and assembled

<sup>94</sup> The transversal section indicated the existence of a slide bridge in the central span of the factory.

<sup>95</sup> *Ibidem*, f. 87. In 1933 in the Teodorescu guide on the mentioned plot a new factory is represented. Teodorescu 1933.

In the period 1928-1933, the society will cease its activity, being replaced by *Fabrica de carton Asfaltat* (The Mill Board Factory).<sup>96</sup>

At the end of the 19<sup>th</sup> century industrial architecture will suffer significant changes that will reflect the process of transformation through which this branch of the economy was going through. Even so most of the buildings still had wooden roofing on load-bearing masonry walls, without any special technical solutions.

This can be explained by the considerable prices that investments in the drafting, transport and assembly of the metallic structures had, comparatively to those in wood that had much lower prices.

However several exceptions existed, buildings with large spans and surfaces, with constructive details adequate to this type of function having a structure that was partially or integrally made by laminated profiles (slabs, roofing or pillars). Large surfaces covered with trusses, without intermediary supports, lit by skylights and adequately ventilated, fire-resistant roofing and slabs that were resistant to vibrations, impact or humidity,<sup>97</sup> buildings that are representative for the architecture of the city.

With several exceptions the decorative element is virtually non-existent, the aesthetical value of these structures resulting from the accuracy of the detailing and the proportions of the constructive elements.<sup>98</sup>

In spite of the dimensions and the significant financial efforts for their realisation, some of them had an ephemeral existence, disappearing shortly under the pressure of modernising the establishments or radical changes suffered by the Capital City, which was in a continuous process of transformation. Others enjoyed a lengthy existence, constituting themselves as valuable elements of the heritage of Bucharest and occupying a special place in its memory.



Fig. 29. Detail of the pillar supporting the slanted beams of the roofing. All the constructive elements have composite sections made of laminated profiles (AN-DMB, PMB, Technical Service, File 28/1893, f. 135).

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- |                              |                                                                                                                                                  |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| Ancheta 1904                 | ***, <i>Ancheta industrială din 1901-1902. Industria mare, I</i> , București, 1904.                                                              |
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<sup>96</sup> The last mention of the STAR Company is found in the industrial plan of Bucharest in 1928. In the guide made by Constantin Teodorescu in 1933 on the same plot the *Mill Board Factory* is identified. Plan from 1928.

<sup>97</sup> The most identified until the moment of this study are those in the metallurgical industry and the food industry.

<sup>98</sup> Pillars with decorative capitals are only found in some factories. Such a case is the *Bourul Factory* on the Dâmbovița Embankment.



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| DAC                   | <i>Direcția Arhivelor Centrale</i> (Direction of Central Archives).                                                                                                                                                                                                                         |
| DITCP-UAUIM           | <i>Departamentul de Istorie și Teorie a Arhitecturii și Conservarea Patrimoniului, Universitatea de Arhitectură și Urbanism „Ion Mincu”</i> (Department for the History and Theory of Architecture and Heritage Conservation, The Ion Mincu University of Architecture and Urban Planning). |
| MIC-DIM               | <i>Ministerul Industriei și Comerțului</i> (Ministry of Industry and Commerce).                                                                                                                                                                                                             |
| MLP                   | <i>Ministerul Lucrărilor Publice</i> (Ministry of Public Works).                                                                                                                                                                                                                            |
| PMB                   | <i>Primăria Municipiului București</i> (The Municipality of Bucharest).                                                                                                                                                                                                                     |