‘Petrification’ of Brussels architecture

An attempted explanation between construction methods, supply of building materials and social context (13th-17th centuries)

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Abstract: Except for religious and aristocratic buildings, most constructions and houses in the initial stages of the former European cities and towns were mainly made of cob and timber. The gradual and complex transformation into stone and brick constructions – the so-called ‘petrification’ – is one of the most important processes within cities and towns. To date, however, this phenomenon has been little studied by historians and archaeologists. How these architectural transformations and their chronology took place is still a matter of conjecture. ‘Petrification’ is nonetheless a significant process: it affects the general aspect of the cities and towns, reflecting an obvious change in the landscape and the evolution in the employed building materials. From a social viewpoint, ‘petrification’ is associated with the way in which houses are interconnected and thus is a reflection of town politics as well as the relationships between neighborhoods. The ‘petrification’ process has also important implications in the organization of urban supplies of building materials. The relationship between town and country has evolved over time in the same way urban market connections with regional and international trade flows underwent changes to meet new urban building needs.
By integrating the different viewpoints of this complex issue we propose to elaborate a first reading method by taking the former city of Brussels (first Duchy of Brabant, then former Low Countries) as an example: building archaeology data will be combined with dendrochronology, dendrology, radiocarbon dating and the rereading of historical sources in order to provide further clarification and to go beyond the traditional history of architecture.

Keywords: Brussels – building materials – architectural changes – multifactorial analysis

> *It was a strange city, and seemed to have been cast up in the valley one winter’s night like some prehistoric creature that was now clawing its way up the mountainside. Everything in the city was old and made of stone, from the streets and fountains to the roofs of the sprawling age-old houses covered with grey slates like gigantic scales. It was hard to believe that, under this powerful carapace, the tender flesh of life survived and reproduced.*
>
> (Ismail Kadare, Chronicle in Stone: a Novel, p. 1)

Defining the ‘petrification’ issue

The ‘petrification’ process emanates from classical studies. The widely accepted theory in the history of Greek architecture is that the earliest temples were made of wood and that the architectural forms of the

original structures had been solidified over time, leading to the well-known Doric order in stone. In short, the wooden structures had turned into stone, hence the use of the term 'petrification' to indicate this change. We must immediately note that the preservation of the primitive wooden appearance in the stone architecture of newer buildings seems to have been predominantly dictated by religious questions (GAGARIN 2010, 210).
In medieval and post-medieval building archaeology in North West Europe the 'petrification' process is considered to be the transformation of cob and timber constructions, especially ordinary houses in town and country, into stone and brick structures. Of course, "petrification" is not a linear phenomenon that inevitably leads to a complete transformation of the original architecture into stone and brick. Some regions and cities do not experience complete "petrification" of their architecture before the industrial era (see *infra*, for some examples). It seems, however, a consistent process in many cities of North West Europe, and particularly in the Low Countries.
At first sight the 'petrification' process appears to be very different from the phenomenon observed by the historians of classical architecture. Medieval and post-medieval 'petrification' process relates predominantly to civil rather than to religious architecture and is more gradual and long-term in evolution. Furthermore, the movement seems to have been spearheaded by the will to minimize fire risk.

The 'Petrification' is one of the most important changes in material culture of former North West European settlements. To date however, this phenomenon has been little studied by historians and archaeologists (LILLEY 2002; SCHOFIELD, VINCE 2005; CLARK 2009). How it occurred, its driving force and its chronology are still quite unclear. To our knowledge, Jean Chapelot and Robert Fossier offered a major insight into the understanding of this complex process, albeit in a rural perspective, in their book: *The village and house in the Middle Ages*. They proposed several main points relating to economic, social and technological components (CHAPELOT, FOSSIER 1985, 280-284):

- The availability of building materials;
- The level of technology with the possible effects of progress in the field of construction;
- These two components affect price levels and lead to financial component;
- Climatic constraints;
- The specific aspects of each settlement according to location (for instance, temporary or long-term settlement, rural or urban housing; whether the area was highly urbanized or not; social visibility in the case of a house in a city centre, etc.);
- Cultural practices, which are determined in part by the complex combination of the previous components.

Access to building materials and their availability are clearly important factors. However, in some areas where stone and/or brick are available this does not systematically mean the 'petrification' process occurred early; local resources are merely possibilities; opportunity was a factor in whether they materialized or not. Climatic constraints are also important, but always in combination with other components: for instance, access to certain building materials, technological aspects related to cultural practices and new functions of the house. A combined explanation is also possible with regards to the insulation capacity of the building materials and whether the occupiers had access to inexpensive fuels, i.e. a timber and cob house has little

thermal mass which means that such a house responds quickly to changes in temperature. When the heating is switched on, the house heats up quickly, but when it is switched off, the house cools down quickly. In this framework, this not a problem when heating fuel is cheap. Brick and stone buildings offer quite high thermal mass. When the heating is switched on, brick and stone materials absorb the heat. The house takes longer to warm up, but it also takes longer to cool down once the heating is turned off. Brick and stone are therefore a good choice when heating fuel is expensive and, in particular, when people stay at home most of the day. A timber frame is more suitable for families who are out most of the day and have easy access to organic fuel (BARDET, CHAUNU, DÉSERT 1971, 21-26). Consequently, climate and geographical location are not to be underestimated: these associated components must be taken into account in each situation. Furthermore, the location can promote or reduce the effect of the other components: for instance, densification of the urban fabric very often leads to an intensified use of the plot with some large plots being divided and the building of houses with corbelled constructions, providing savings in terms of space. It is obviously easier and cheaper to build timber-framed structures than their stone and brick counterparts (HOUBRECHTS 2008; CHARRUADAS 2011).

Consequently, by integrating these various viewpoints and completing them with some elements omitted by the rural medieval focus of Chapelot and Fossier (the aesthetic component, the role of urban authority regulations and the symbolism of stone/brick constructions in the city), we now propose to take the example of the former city of Brussels in the Southern Low Countries (roughly present-day Belgium) to illustrate this complex issue and confront the concept of 'petrification' with the situation of an important North West European town. We believe that this "borrowed" concept needs to be clarified before it can be used by building archaeologists. However, and before going any further, the process of 'petrification' in Brussels should be presented according to current archaeological data.

Archaeological Studies and Laboratory Analysis

Wooden architecture in Brussels

The study of timber-framed structures and the 'petrification' of architecture is still a fairly new field in archaeological research in Brussels. Nevertheless, these construction methods are widely documented by iconography and written documentation from the 15th, 16th and 17th centuries as well as, indirectly, by various edicts enacted by the city, in trying to make away with them (CHARRUADAS, HAGELSTEIN 2004; HOUBRECHTS 2011; CHARRUADAS 2011). According to traditional thinking, the bombardment of Brussels in 1695 by Louis XIV's French troops would have removed the last traces of this wooden architecture. During the bombardment, several thousand red-hot cannon balls were directed at the city and nearly 4,000 houses were destroyed (FIG1). This widespread destruction, followed by a long period of reconstruction, reinforced the ban on corbelled frontages. Two elements, which question the relevance of this presumed end to wooden constructions, can be highlighted. First, it is to be noted that only about one third of the city was really affected by the French bombardment and second, several representations, including a 19th century engraving and some photographs from the beginning of the last century (FIG2), indicate the persistence of

wooden constructions. Nevertheless, we can say that it no longer represented the predominant urban architecture in Brussels. (CULOT, HENNAUT, DEMANET, MIEROP 1992).

Fig. 1– Map of Nicolas de Fer illustrating the bombardment of Brussels in 1695 by French troops of Louis XIV (© Royal Library of Belgium)

Only recently building archaeological studies investigated this issue and were able to demonstrate the presence of material witnesses of timber-framed structures in Brussels and its former rural areas. Every research went hand in hand with dendrochronological studies and, in some cases, AMS 14C analyses. This last dating method was needed when dendrochronology did not achieve results when species other than oak were used – oak is the only tree for which a dendrochronological reference exists in Belgium – or for reasons of wood quality with a difficult-to-date signal (rapid growth and complacency) occurring in the forests of

central and northern Belgium. The research was rounded off by dendrological analyses and a traceological and technological approach to the timberwork. (HEYMANS, SOSNOWSKA 2011)

Fig. 2 – Corbelled wood façade in the Rue des Pierres. Engraving by Emile Puttaert, 1878 (© Archives of the City of Brussels)

Case studies

Fig. 3 – Map of the current Brussels Capital Region with indication of the mentioned sites (© CReA-Patrimoine, ULB)

Many sites still withhold important witnesses of timber-framed architecture, especially in urban areas. In the present article, we will present four urban cases and some rural exemples. They will display different types of buildings and construction methods distinguishing town from countryside. The 'petrification' phenomenon is quite different in each area. Nevertheless, in all cases the presence of an ancient timber-framed structure is not be identified from the outside: 'petrification' changes fundamentally the frontage, by dismantling and totally rebuilding it using solid materials. In general, the plinths are made of stone and the rest of the wall of brick. These substantial transformations usually occur in the 17th century, or in two of the cases, possibly in the 16th century. Unfortunately, extensive restoration works carried out between 1960 and 1970 have seriously transformed the facades and the available restoration files are, in more than one case, incomplete.

Traces of timber structures can be found at the level of the roof frames and more precisely at the truss markings. In the four urban cases, these continuous and consistent markings consequently start at number two. In all cases, the first truss, logically marked with number one, is missing and has to be located in the

front of the house. It consists of a sort of timber 'ghost structure', also observed in other cities in the Southern Low Countries such as Ghent and Antwerp (VAN DER WEEF, HENDRICKX 2000).

In two cases, a dendrochronological dating was obtained: the house called "Brueghel" at 132, Rue Haute was dated between 1540 and 1545 (FIG4) (HOFFSUMMER, MAGGI, WEITZ 2012). The second site, located in the same street at no. 4, goes back to the year 1543 (FIG5) (EECKHOUT 2007). For two other houses (180, Rue de Flandre and 120, Rue de Laeken), a date could not be obtained for the reasons mentioned above. Concerning the house located Rue de Flandre, the cores have been subjected to analysis by AMS 14C. The results indicate a construction dated between the 14th century and the first half the following century (VAN STRYDONCK 2011; VAN STRYDONCK 2013) (FIG6). For all the buildings under review, archaeological investigation indicates that the sidewalls are the first ones to be "petrified" with full brick masonry. The study of the brick bond and the morphology of the bricks offer a wide chronological range between the 15th and the 16th centuries. In the case of the house 180, Rue de Flandre an AMS 14C dating of charcoal residue in the original lime mortar has situated the construction of the sidewalls between 1290 and 1410, roughly the 14th century (FIG7). The next phase sees the construction of the back wall in brick and stone during the 16th century, leading perhaps to what some archaeologists call the "three-quarter house" (BYL, CHARRUADAS, DEVILLERS, SOSNOWSKA 2012). At this point only the frontage is still in timber. This type of structural change is still very common in the 17th century on the main market square of Brussels, the Grand'Place,
and its various corporation houses (MARTINY 1991; HOUBRECHTS 2011). We must question the true extent of this diagnostic and the reality of these 'three-quarter' houses. Research in the city of Ghent has discovered one example of a petrified front facing the street, while the back wall, overlooking one of the local rivers, is still in its timber-framed structure (EVERAERT, LALEMAN, LIEVOIS 1992). What value is attributed to these wooden frontages? What is the meaning of the continuous construction of timber-framed houses on the Grand'Place in the 17th century, while brick architecture developed from the 15th century onwards? As for the symbolic importance of the stone house, the *domus lapidea* – heavily emphasized in the written sources – should it be qualified? Must we apprehend a symbolic value in this discussion, linked with the well-known conservatism of the corporations?

Fig. 4 – Roof frame of the house Brueghel, Rue Haute, no. 132 (© CReA-Patrimoine, ULB)

Fig. 5 – Roof frame of the back house located Rue Haute, no. 4 (© Royal Museum of Art and History, Brussels)

Fig. 6 – Roof frame of the house located Rue de Flandre, no. 180, dated by AMS 14C from the period 1390-1450 (© CReA-Patrimoine, ULB)

Fig. 7 – East Sidewall of the house located Rue de Flandre, no. 180, dated by AMS 14C from the period 1290-1410 (© CReAPatrimoine, ULB).

Three timber buildings were identified in the rural area. Two are dated before the 18th century and one in the 19th century (CHARRUADAS, SOSNOWSKA, coming soon). Two cases explicitly characterize this phenomenon of 'petrification'; first, the small beguinage in Anderlecht in south west Brussels. This site comprises two buildings built in parallel. One contains a timber-framed structure dated by AMS 14C in the early 15th century, making it one of Belgium's oldest timber constructions (FIG8). The building includes two well-preserved facades, four trusses and a division wall (FIG9). The structure is not built in oak but combines ash and Mahaleb cherry *(Prunus mahaleb).* The use of this type of resource remains little highlighted in Belgium. At the end of the 17th century, the ancient timber building was included in a new brick construction. Two facades have therefore been removed and underpinned. The other two façades have been preserved and were incorporated into the new construction. The widening of the west side and the extension of the building to the south necessitated the construction of new structures and a new oak truss to supplement the original frame. The 'petrification' process was deliberately minimized through the maintenance of a series of structures. The constructive logic of adaptation can be seen here; the re-use of older structures is both labor-saving and involves reduced construction costs (CHARRUADAS, SOSNOWSKA, coming soon).

Fig. 8 – Ground floor of the Beguinage of Anderlecht. View of the timber frame dated from the first half of the 15th (© CReA-Patrimoine, ULB)

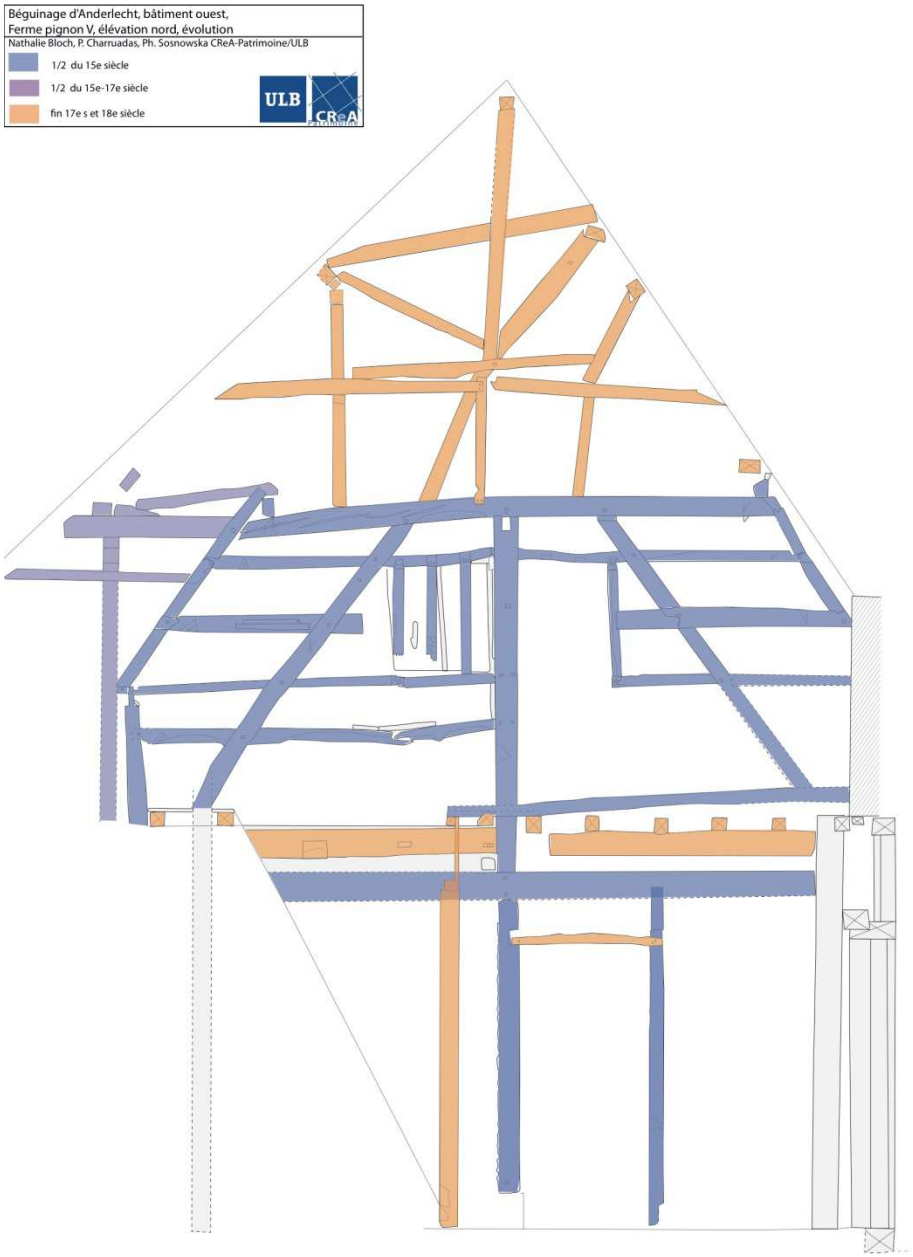

Fig. 9 – Beguinage of Anderlecht. Archaeological record of the timber-framed façade (truss V) with later modifications

A similar process was observed on a farm in Uccle (Ferme de l'Abreuvoir). Using dendrochronology the timber structure could be dated in the last quarter of the 15th century. Probably during the last decade of the 17th century the original structure was petrified with bricks. In this case, only the cob was replaced by brick. The facades have not been removed and the wooden structure has been maintained (HOUBRECHTS, COSTA 2002).

'Petrification' inside houses

If the wooden outer walls were gradually replaced by stone and/or brick, the inner structure remained largely dependent on it for flooring, beams and stairs. The implementation of wood is not restricted to these few

items. Real timber-framed architecture often creates inner spaces in the form of walls roughcast with bricks, boards or lathwork with plaster and cob.

Fig. 10 – Timber-framed structure in the Dewez house, Rue de Laeken, no. 72-75, dated from the period 1789-1799 (© Royal Museum of Art and History, Brussels)

The Dewez house, located at 72-75, Rue de Laeken, is a striking example. The entire house at no. 75 was built around a wooden structure, roughcast with bricks, except for the side walls and the facades. This part of the house was built by Laurent-Benoit Dewez, first architect of the court of the General Governor of the Austrian Netherlands, Charles of Lorraine, between 1789 and 1799 (FIG10) (SOSNOWSKA 2012). It is a genuine timber-framed structure visible on several levels. Similar cases are widespread throughout the city. There even seems to be a constant: 59, Rue des Bouchers, 3, Quai aux Bois de Construction, the Hotel de Merode on Place Poelaert, 38, Rue de la Violette, and 36, Rue des Pierres. We even found these timber-framed walls roughcast with bricks as separation walls between properties and/or houses. This is often the

case for the double houses built during the reconstruction after 1695. Other examples dated to the middle of the 17th century have also been identified. These include a building on the Rue Neuve built between 1623 and 1630 according to the dendrochronological dating of the beams (EECKHOUT 2004).

We must wonder if this type of structure is not the most successful step in the process of 'petrification' as it relates to urban houses during the *Ancien Régime*, before the total replacement of the walls and their reconstruction in hard material.

'Petrification' of Brussels architecture in its global context

It is now necessary to put the case of Brussels in its social, economic and environmental framework. What are the driving forces behind the 'petrification' process?

Urban regulations on fire prevention...

Fire prevention is traditionally the most emphasized component to explain 'petrification' in the former North Western cities and towns. The first urban regulations do indeed seem to have a bearing on this danger and usually stipulate the use of slates, tiles or shingle instead of thatch (DYER 2002, 200; SOSSON 2005, 59-60).

However, in the case of Brussels, this component must be partly dismissed. On the one hand, we do indeed observe the development of sidewalls as firewalls since the 13th and the 14th centuries while the first fire regulations (relating solely to thatched roofs) do not appear before the mid-14th century. On the other hand the prohibition of timber-framed walls (sidewalls, back walls or frontages) appears only from the mid-16th century (CHARRUADAS 2011, Annex 1). At the same time archaeological evidence and graphic representations of the 17th century city centre demonstrate that these regulations were far from being implemented. Moreover, the 1657 edict confirms beyond doubt the existence of division walls between properties constructed with light materials. It stipulates that: "the owners whose properties are located on each side of the lath, walls, hedges, fences and other partition walls must maintain and repair them at common costs." (COUTUME 1883, 102-103 translation from Dutch by the authors).

It is interesting to note that these first urban regulations related to fire appear on sometimes very different dates in the cities of the Southern Low Countries. Cities such as Aardenburg or Bruges in Northern Belgium, formerly part of the County of Flanders, lay down the first regulation to prevent the spread of fires in 1232 (DEZUTTER, RIJCKAERT 1976). In a city such as Lille, in Northern France, formerly part of the same County, the first urban regulations only appear in 1674 (VIGNERON 2007, 60). Within this range, Brussels has a middle position. Apart from the roofs of ordinary houses, fire regulations seem more to have followed a change in material culture rather than have triggered it. However, the chronological differences in the appearance of anti-fire regulations should be further investigated.

…and relating to neighborhood relations and privacy

Urban building regulations do not just pertain to fire risk, but also cover neighborhood relations and privacy. An important regulation in this regard was enacted in 1451. This very long act shows the development of division walls between houses, attesting that the plots are increasingly occupied and the buildings more and more close from each other (DE WAHA 2001). The renewal of this act two centuries later, in the middle of the 17th century, shows that this joining process was then totally finished (COUTUME 1883; CHARRUADAS, HAGELSTEIN 2004).

It is highly likely that population density and the development of streets with terraced houses between the 14th and the 17th centuries led to the transition from wood and cob to brick and stone in cases where those walls were in contact with others (firewalls, see FIG11). The 'petrification' of sidewalls may be more the result of these social regulations than the struggle against fire. In this matter, it is logical that the inner structures of houses were never subject to any regulations from urban authorities. In other words, urban authorities were only concerned with outer walls, sometimes leading to disputes between neighbors, while the rest was left to the owners' choice. This moderation on part of the administration is noted until the 19th century. It explains why there is no contradiction when we observe some buildings dating back to the reconstruction of the city after 1695. For instance a house in the Rue de la Violette preserves an outside staircase connecting two houses, one in front of the street, the other at the end of the plot. The staircase is a timber-framed structure roughcast with brick and dated to around 1700 by dendrochronology (FIG12) (SOSNOWSKA 2006). This implementation is surprising if we take into account the fire damage caused by the French bombardment and the psychological impact on the population after the burning. But it offers therefore a true reflection of the factor mentioned above.

Fig. 11 – Denis Van Alsloot, *The Feast of the Ommegang on the Grand'Place* (detail), 1616 (© Royal Museum of Fine Arts, Brussels). In the left upper part of the picture, we can see some terraced houses with wood façades separeted by sidewalls made of brick and stone

We believe that this explanation by involving the human density factor is satisfactory if the difference in price between wood and brick/stone is reasonable. But what exactly is known about the economic framework of the building trade?

Fig. 12 – Rue de la Violette. Picture of the outside staircase connecting the front and the back house, dated around 1700 (© Royal Museum of Art and History, Brussels)

Economic framework and supplying capacity

Before the modern era, there are scant accounts and therefore few sets of numbers which can be used to compare building construction costs, whether in brick, stone or timber. It is therefore impossible to determine with absolute certainty if the transition from a primarily wooden house to a house with outer walls of stone and brick was influenced by a cost issue (SOSSON 2005). However, some evidence shows that this component has probably influenced the process.

This issue is closely related to the state of the local forests and the available wood supply. The impoverishment of local woodlands is a traditional component to explain the 'petrification' process. It is obvious that any construction method depends primarily on the peculiarities and types of local materials. In the case of timber, these elements depend on the one hand, on the nature of the imported wood (which is not common for large pieces of timber without a good river connection) and on the other, on local forest resources. The geographical location of Brussels is particular and difficult: unlike most northern Belgian cities such as Ghent, Antwerp or Bruges, Brussels is not located on the coast or on a large river that facilitates the importation of timber. However, it does lie near a large forest, called Soignes, covering an area of approximately 10,000 hectares. This forest belonged to the Dukes of Brabant, the lords of the city, and afterwards to the sovereigns of the Southern Low Countries (the Habsburg family). The city of Brussels was naturally the main market for forest products coming from Soignes. But the forest was above all devoted to the exploitation of firewood and the production of charcoal for the heating needs of the cities' population. The woodlands produce timber, of course, but not in a great quantity and also not of sufficiently good quality according to the recent archaeological and dendrochronological studies (CHARRUADAS 2012). The combination of these elements certainly did not enable wood prices to be kept low. And we know that in many cities in the Southern Low Countries, and in particular in Brabant and Flanders which have small forests, the price of firewood and timber underwent a significant inflation from the 16th century onwards in a context characterized by the Wars of Religion (involving significant military spending) and several major surges in urban population (LIMBERGER 2008).
This situation has already been observed elsewhere by specialists in forest and building history. They pointed out that the high costs of road transport made wooden architecture expensive, perhaps as much as brick construction. Timber did indeed come from outside the city, either from the nearest forest of Soignes or further afield. Conversely, bricks were produced in the city or nearby, in ovens belonging to the urban authorities during the 14th and the 15th centuries. Furthermore, the used raw materials (clay and firewood), were much easier to transport (SOSSON 2000; VAN UYTVEN 2004). They clearly show it is erroneous to think that wooden construction was cheaper than masonry. The assembling of the various timber sections required highly skilled workforce and many hours' work. Conversely, brick construction – brick is the modular material par excellence – did not require particular expertise.
According to Andrée Corvol it is therefore natural that the general evolution of construction is characterized by attempts to reduce the use of wood (CORVOL 1984; CORVOL 2010).

Some cities located in areas where forest resources are considerable, seem never to have known a complete 'petrification' process of their architecture. Cities such as Rouen, Dijon or Liège for instance (but also many Germanic, Slave and Scandinavian towns) established in wooded areas or connected by river with major woodlands, seem generally to have retained more of their timber-framed houses (SAINT JEAN VITUS 1987-88; GAUTHIEZ 1993; HOUBRECHTS 2008, 2010; MARSTALLER 2008). Nevertheless, the wood supply component is more complex and does not explain everything. A city such as Cambrai, not far from the large forests of the County of Hainaut (Mormal in particular, located less than 20 kilometres), underwent a 'petrification' process quite similar to that of Brussels and the northern cities of present-day Belgium (BARDET, CHAUNU, DÉSERT 1971, 189-312; NEVEUX 1974). As in Brussels, this can be

probably explained by the high cost of road transport, possibly even by the skidding operations made difficult by the low forest road density, and by the primary function of the Mormal woodlands, the livestock grazzing (DUBOIS 1973).

At this stage we can accept the premise that the combination of demographic, economic and geographical circumstances has promoted the 'petrification' process. However, this hypothesis must be linked to another component that will now be discussed.

Social component and urban activities framework

Some archaeologists have suggested that the transition from a town built in wood to one in brick and stone was related to the evolution of the function of many city houses from the 13th and 14th centuries, which moved gradually from a predominantly agricultural population to a population undertaking dominant market and commercial activities (JANSSEN 1990, 2007). How can this process be connected to 'petrification'? Probably because houses were increasingly becoming places dealing in sales and display, places where people worked during the day and lived in at night. Here not only a symbolic but also a practical viewpoint can be found: houses used night and day where brick and stone are increasingly present were probably less expensive to heat. In an economic context where heating costs were high, the 'petrification' process may have been encouraged; conversely, in the countryside where heating costs were lower, the transition to stone and brick was probably not as much encouraged. However, this assumption tends to suggest that this 'petrification' process happened faster in areas devoted to commercial activities and handicrafts in town centres and along the main access roads, rather than in outlying districts. The development of a GIS project, ensuring the development of spatial data and statistical material, is regarded as an important step for futur inquiries.

The 'petrification' of a part of the outer walls is regularly combined with the preservation of the wooden façade, as we have seen above. This preservation of the corbelled construction in the frontage can be interpreted in several ways. Either these corbelled constructions reflect a determination to make maximum use of internal areas in a context of restricted urban space; or there is a symbolic dimension, that is to say constructions are allowed to overhang the street and dominate the public space; a final explanation is technical and relates to the construction method using small pieces of wood appropriated to one floor – a standard construction method in buildings in North West Europe from the late Middle Ages and during the modern period – the corbelled construction enables the various floors to be better interlocked with each other (SAINT-JEAN VITUS, SEILLER 1998, 79). This two last assumptions would explain, for example, the practice of corbelled constructions in the countryside, often on the main building, in a context where space restriction is not a factor (HOUBRECHTS 2008). In Brussels, we can note that the frontage is often one of the most recent outer walls to be 'petrified' after the sidewalls and sometimes even after the back of the house (CHARRUADAS 2011; HOUBRECHTS 2011). With the development of these corbelled frontages that impeded traffic and constituted overall a form of encroachment of the public space, the urban authorities seem to have enacted some regulations to ban these constructions. Regulations against wooden and

corbelled constructions in house frontages are drawn up in Brussels as in other cities in North West Europe from the 16th century with urban and aesthetic considerations in mind, with the aim of smartening up the city's appearance and to assert the public space (TIJS 1993; CHARRUADAS 2011).

The specific function of many urban houses in the city has certainly encouraged 'petrification' for economic and financial reasons allied to heating costs. Moreover, it has led to the transition of building materials such as wood and cob to materials with a higher thermal mass, such as brick and stone. This interpretation is consistent with the chronological gap between urban and rural 'petrification'. In the country, the situation is markedly different, in an environment with easier access to firewood (in particular with common rights in woodlands) than in the city and, sometimes, with rural buildings combining human habitation and a cowshed under the same roof. The need to invest in buildings where energy needs were less was probably not as necessary in this context. Consequently the first examples of vernacular "petrified" architecture only seem to occur at the end of the 17th century, where the 'petrification' process of the outer walls in the city is nearly completed. Within the town however, from a symbolic viewpoint, it seems that the possibility to "dominate" the street by having a wooden corbelled facade also played a part in the process, but in reverse order; it is perhaps for this reason that the frontages were among the last parts of the buildings to be petrified.

Conclusion and perspectives

Our analysis comprises several recent studies showing that 'petrification', in both town and country, is a large scale, complex and very long-term process (HOUBRECHTS 2008, 2010; TROCHET 2008). This study qualifies the importance of fire in the process, highlighting other components such as access to local resources and some changes in settlement patterns. These new elements come into conflict with constructive habits, including the practice of corbelled façades. The 'petrification' process appears from that point of view as being influenced by numerous components: on the one hand, this complexity must be understood and interpreted in each case; on the other the comparative dimension taking into account a wider geographic scale, must be pursued in order to improve our knowledge of the underlying mechanisms. We must be careful about this point. The diversity of urban constructions is such that it cannot be revealed to us without considerably more archaeological studies. This paper is by way of being an initiation of this process. In the coming years, we hope to improve our knowledge by taking into account new cases revealed by archaeology. At that point, we may then integrate all the data into a GIS project in order to refine some assumptions outlined in this article.

Finally, it might be useful to challenge the concept and qualify the relevance of the term 'petrification'. This process is indeed mainly one of petrified outer walls and to a lesser extent inside walls, which sometimes preserve their timbered structures. Much research remains to be done for a better understanding of this phenomenon and it is our hope that this modest contribution will raise the awareness of archaeologists and historians so this complex but significant issue can be further explored.

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