

“Le Nouvelles Inventions pour Bien Bastir et a Petits Fraiz” by Philibert de l’Orme: a New Way to Conceive Wood Roof Covering

Maria Rita Campa

The treatise “Le nouvelles inventions pour bien bastir et a petits fraiz” by Philibert de l’Orme (1514-1570), was published for the first time in 1561 and then inserted towards the back of the “Premier Tome de l’Architecture” in 1568 (fig. 1). It is a milestone in the history of wood inventions as it contains different conceptions of how wood can be used. Anyone who wishes to study wooden roofing has to consider the theories of this French architect.

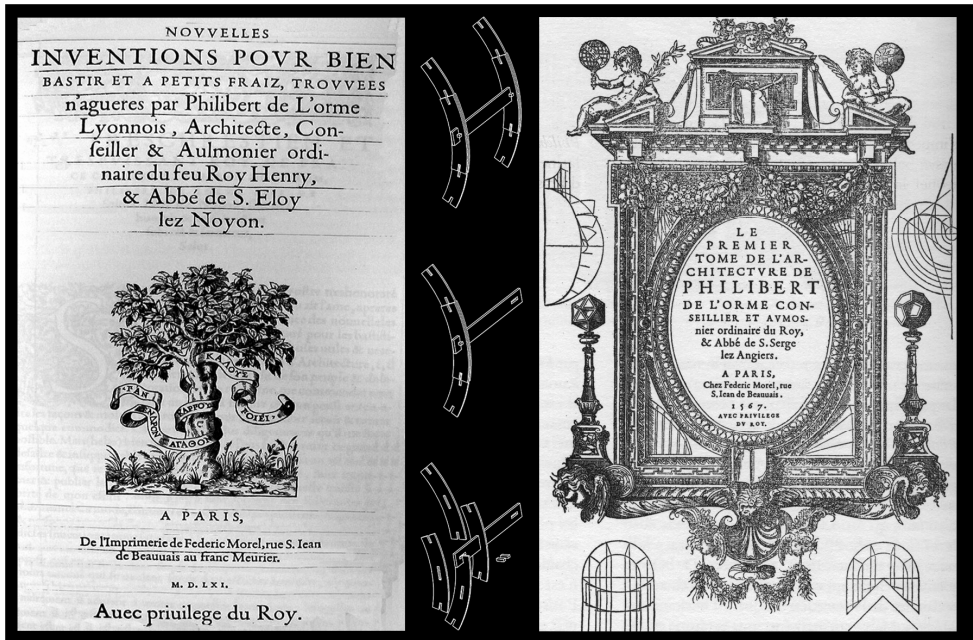


Figure 1. Frontispieces of de l’Orme’s treatises and the components of the *invention*.

PHILIBERT DE L’ORME IN AN HISTORICAL CONTEXT

Philibert de l’Orme was more than just an architect, he was also a counsellor and chaplain to the King Henry II (1547-1559), which he pointed out in all his work.

He worked in a period when France was trying to carve out the top ranking position in the European panorama. Although politically the monarchy by this time was a consolidated reality in France, culturally it had not reached the status it had elsewhere. The Renaissance had taken Italy back to the centre stage of the Arts and Science, making it the destination of the European intellectuals'. De l'Orme himself had been in Italy between 1533 and 1536, to survey antique works and probably again around 1560, after the King's death, seeking to escape the enemies he had made in Paris.

The French Monarchy and Intellectuals sought to catch up with the Italian Renaissance, and great impetus was given to the Arts. The form of the treatise was used extensively to spread and strengthen the new theories expressed. This explains the particular emphasis used by de l'Orme to illustrate his *invention*. And when speaking about the eminence that he would have received abroad, he said that he had already exported his fame to a variety of European nations, Italy included (de l'Orme 1561, Book I, p. 5). De l'Orme avoids indicating sources of inspiration, even though his theories have links with other treatises, and he himself mentions some in a certain passage of the book (de l'Orme 1561, Book I, p. 3v).

It is impossible to fully understand de l'Orme's work without reference to the social-cultural context. The strict relationship with king's court was fundamental to his work, as it commissioned the great majority of his projects. Of particular importance, was the task entrusted to him by the King, as the Superintendent of the shipyards in Normandy and Inspector of the fortifications in Brittany. This experience, together with the analogue of maturity during the visit to Venice, certainly influenced the elaboration of his theories expressed in the treatise.

THE INVENTIONS AND THEIR APPLICATIONS

The roof vaults described by Philibert de l'Orme are always of the same modular basis, which are adaptable to form different shapes and sizes. This module is illustrated at the beginning of the fourth chapter of the first book.

He describes a twin series of shaped wooden boards, put together in a staggered way to give greater resistance to the roof structure, forming the curve of the arch. Every piece of wood has a hole in the centre to allow the insertion of crossbars that bind the arches together. The crossbars are then fixed to the boards by some wooden wedges, called "keys" (de l'Orme 1561, Book I, p. 8v) (**fig. 2**). This base module changes according to the forms and dimensions of the vault. For example, wider spans subsequently require additional variations of the dimensions of each component. De l'Orme suggests the adding of crossbars to the sides of the boards to ensure that they will be adequately formed (1561, Book I, p. 18v).

Another element, which varies in relation to the dimension, is the "rafter end", which is the piece that links the vault to the building. This is used to make the positioning of the tiles easy, and

consequently, better water drainage (de l'Orme 1561, Book I, p. 17v) (**fig. 3**). As these variations are, in the main, the sizes and the number of connections between the components parts, the module does not really vary from the original shape. It is only changed to adapt according to new production processes (de l'Orme 1561, Book I, p. 19v) (**fig. 4**). The carpentries built in this way are used to construct roofs or floors: the latter are treated in the second book of the treatise (**fig. 5**).

With regard to roofs, de l'Orme illustrates the different types of vaults that can be constructed according to the rooms that need to be roofed. Towards the end of the book, he gives different examples of roofs produced by him for King Henry. At the Tournelles Hotel, royal residence in Paris, he made two temporary rooms, the royal mews and for a tennis court. At the Muette of Saint-Germain en Laye, you can find the first example of a roof applying his technique to a very large building. At Anet Castle, there is the carpentry for the park pavilion. At the Tuileries he made the mews. He also planned a dormitory project for the nuns of Montmartre, a project that was, unfortunately, never realized. The work, which he talks about in the 26th chapter of his treatise, was for a bridge over the Senna river that had only one span of about 400 metres wide. The project for a royal basilica was intended to show the potentialities of his small piece carpentry (**fig. 6**).

In the second book he deals with the middle floors that use the same kind of carpentry as the roof, except for significant changes in the curving ray of the beams. But these can become straight by increasing the number of the components. Then over these beam rafters, the flank floors are positioned.

Most of the book, from the fifth chapter on, deals with how the floors can be decorated, after completion of the construction. In de l'Orme's opinion, beams are not particularly attractive things to see. He goes on to show how to decorate the ceiling with plastering or lacunars works.

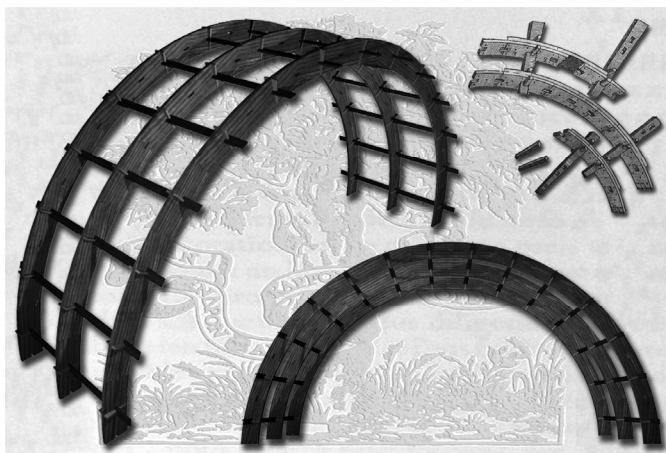


Figure 2. De l'Orme's vault.



Figure 5. De l'Orme's roofs and floors.

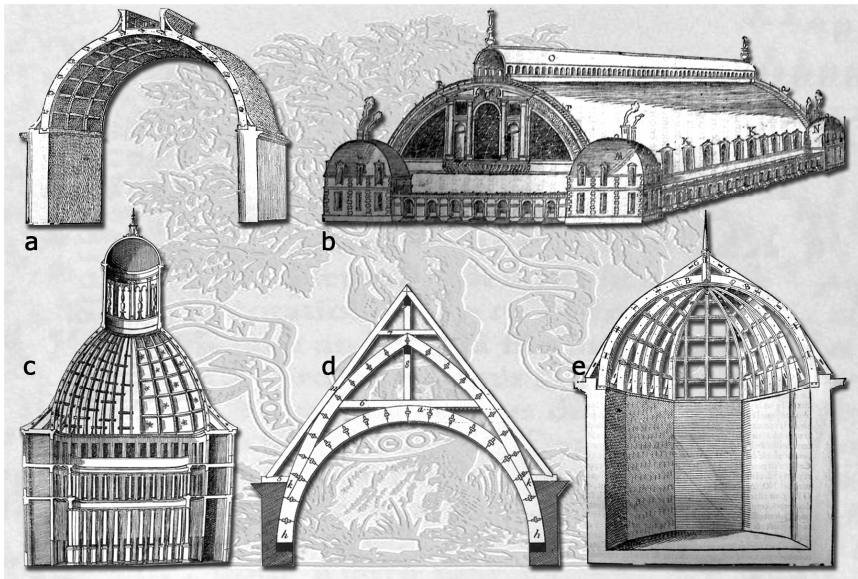


Figure 6. Different examples of roofs produced by de l'Orme: at Anet Castle (a); in the projects for a royal basilica (b) and a dormitory, at the Tuileries (d) and at Saint-Germain en Laye (e).

THE ADVANTAGES OF THE INVENTION

De l'Orme claimed that it was necessary to create a new technique in order to realize wooden vaults, with the main advantage being that the problem of raw materials is sharply reduced. This reduced size of the pieces made the acquiring of appropriate wood much easier. Moreover, the enormous waste of valuable materials is avoided. (de l'Orme 1561, letter to the reader). If we consider the lightness of the roofs of this type, he argues, as the load that rests on the supporting walls is greatly reduced, we can, therefore reduce the wall thickness (de l'Orme 1561, Book II, p. 55v). Furthermore in this kind of carpentry, it is not necessary to use reinforcement or iron rivets for the connections. So overall costs of the work are further reduced, even for the use of slate that is used in a much reduced. He also claims that as there is no need of big lifting equipment either for the building or for the coating, you can make a significant saving on time (de l'Orme 1561, Book II, p. 56). The very strong structure allows the use of every kind of coating, not only slate, as it is adaptable to the features of the location. It is, he thus says, in the author's opinion, an invention that, if applied correctly, can be of great advantage structurally, financially and aesthetically (de l'Orme 1561, Book II, p. 56v).

THE INFLUENCES ON THE FOLLOWING ARCHITECTURE

To understand the extent to which de l'Orme carpentry has influenced architecture since 1561, it is imperative to first consider the life of the French architect, because the success of a literary or architectural work often depends on the personal events of the author's life. After Henry II's death, François II (1559-1560) became king and de l'Orme was no longer high in the Monarchy's favour. He lost his office as royal architect, being replaced by Primaticcio, and was compelled to return to Rome. There, he received from the Pope the decree of appointment as abbot of Saint-Serge d'Angers, the last prestigious favour obtained for him by the dying Henry II. De l'Orme kept this title of abbot of Saint-Serge, which allowed him to have the direction of the works for the fortification of the town of Anger but apart from few other commissions, amongst which the most important being the project for the Tuileries commissioned by Caterina de' Medici, he had very little success as an architect. Even with the proceeding King Charles IX (1560-1574), to whom de l'Orme dedicated the "Nouvelles inventions". Moreover he found he had accumulated a lot of enemies during the period spent at the royal court and this impeded his return to life at court (de l'Orme 1561, letter to the reader). For this reason de l'Orme's works and ideas were not spread in an appropriate way. Considering the influence that his *invention* had on the architecture of the age, an examination of the link between Philibert de l'Orme's work and the gothic culture is needed. It is beyond doubt that the style and the techniques used by de l'Orme are nearer to the medieval vision than to the renaissance classical vision. But, on the other hand, the choice of the raw materials (i.e. wood), refers to a formal and structural conception belonging to the central European area of the renaissance. This is in opposition to a conception typical of the Southern regions more traditionally linked to the medieval use of stone.

It was not by pure chance that the clearest reference of de l'Orme's theories is the architecture of Venice, the most anti-classical city in Italy. The "Nouvelles Inventions" were published during the heights of renaissance age, when all Europe was full of the rebirth of classical culture. It was the period of Vitruvio's and Leon Battista Alberti's studies, and the period in which the rigour of Palladio's architecture started to be successful, before spreading all over Europe. It was not really the right period to encourage the success of a building technique that was more reminiscent of the wooden roofs of the medieval churches, than of the domes by Michelangelo and Brunelleschi! To demonstrate that de l'Orme's treatise had no immediate success, it must be said that Vincenzo Scamozzi in his "L'idea dell'architettura universale" doesn't mention it, even though he writes at length about Italian and foreign architecture of the time. Scamozzi's work was the result of his long journeys around Europe noting architecture, and of his studies about different building techniques. The French treatise wasn't rediscovered until the nineteenth century, during the renewed interest in the gothic when illustrious people, such as Jean Baptiste Rondelet and Armand Rose Emy, referred to it in their works. Then other famous architects, such as Etienne Louis Boullée, actually referred to him.

The Influence of de l'Orme in Italy

Italy with its deep-rooted attachment to the classical models is the less suitable country to accept a completely different cultural tradition. As a matter of fact in Italy there are no traces of the "Nouvelles Inventions" in architecture. And, with regard to the treatment of this work after the Renaissance, there is no evidence of its consideration. This is because the seventeenth century in Italy was the century of Baroque style: a style of excesses, expedients, decorations more than structure. To have some references to the French building techniques we have to wait for the latter half of the eighteenth century, the Enlightenment age. In the Tuscany area a generation of enlightened architects emerged, that was linked to a new culture: the so called "Scienza Nova" by Galileo's appellation. Their principles present a new idea of architecture, which is based on solid resistance and static structure.

A lot of these architects, at that time, were entrusted by the Lords to produce some engineering works. The Jesuit Leonardo Ximenes often built roads and bridges in Tuscany. Anton Maria Ferri was a very good connoisseur of the fortification techniques, and one of his students, Alessandro Galilei, was appointed by Cosimo III. The engineering of the fortifications, and the building of the court, demonstrated the spreading of this new figure that linked the scientific aspects to the artistic and technical one.

In this context, from the half of the eighteenth century, the theories of French enlightenment spread easily and its main members were a reference point for many Italian men of culture. Let's consider, for example, one of the most important work of the eighteenth century in Italy: "I principi di

architettura civile” by Francesco Milizia. In the chapter dealing with the different kinds of woods, they never referred to Vitruvius or Plinius, but to French naturalists (Milizia 1785, Volume III, p. 59). In another chapter, we read some technical notes that reflect an interest in the de l’Orme building technique. It means that in Italy, there was undoubtedly a spreading of his theories, but without any real interest. There was only a cultural exchange between Italy and France (Milizia 1785, Volume III, p. 281).

In order to find closer correspondences with de l’Orme’s treatise we need to pay special attention to another exponent of the Italian architecture culture: the Florentine Giuseppe del Rosso. He supported the spreading in Italy of the French building techniques. In 1789 he published the book “Pratica ed Economia dell’arte di fabbricare” in which he compares the building systems of the two countries: for example, those described by some Italian writers, like Leon Battista Alberti and Vincenzo Scamozzi, with those described by French engineers such as Bernard Forest de Belidor. In 1793, in “Della Costruzione economica delle case di terra”, Belidor promoted the “pisé” technique according to Patte e Cointeraux. In this analysis, the most important work of Del Rosso is “Della facile costruzione de’ ponti di legno per torrenti e piccoli fiumi” dated 1797. Which deals with one span bridges, of course made of small wooden component pieces. This treatise has a lot in common with de l’Orme’s work, but it is uncertain that Del Rosso knew of the French treatise. He stated that he knew of his existence, but he didn’t know it in detail (1797, p. 10-11). However, it seems impossible to believe his words, that the *invention* of del Rosso doesn’t derive from de l’Orme’s “Nouvelles Inventions”. Although at that time, it was difficult to find a recently published book. But Pérouse de Montclos stated that there were some public readings in Italy of the de l’Orme text, and Scamozzi had one in his archives (2000, p. 215). Anyway, the work was not even well known in France, and the same Pérouse de Montclos mentions de l’Orme’s text stating that periodically the Académie d’Architecture made references to it (2000, p. 216).

By the end of the eighteenth century that De l’Orme as a man and as an architect had been rediscovered thanks to the building of the roof of Halle aux Blés. The Halle aux Blés was made according to the principles of carpentry in small pieces. All this happened in 1782, a clear fifteen years before Del Rosso published his treatise. Considering that the Florentine architect worked to spread the French theories in Italy, he must surely have known of de l’Orme, and it is therefore unclear, even implausible, that he never succeeded in hearing of the “Nouvelles inventions”. When his work is analysed, it is clear that there are many common points with de l’Orme’s works. We can affirm that “Della facile costruzione...” is not just a treatise, but it is a handbook. A practical guide for building that doesn’t intend to deal with everything about architecture or to dissert on the philosophical problems linked to it. But it intends only to give practical instruction on a well-defined topic, without taking into consideration any impressive projects.

The *invention* considered by Del Rosso is more substantially an archetype of lamellar wood building. In fact, they match precisely de l’Orme’s boards that instead of being put on their edge,

are laid-out flat, and linked together by iron fasteners (Del Rosso 1797, p. 11-12) (**fig. 7**). An innovative element that contrasts to the French *invention*, in the technique described by Del Rosso, is the tapering of the structure towards the centre. The comparison of the two books highlights various aspects of the work when analysed. First of all, it is immediately clear that Del Rosso's aim was to give an easy instrument that can be also used by a layman, i.e. not fully qualified architects, builders and carpenters. Anyone could apply his *invention* (is not necessary to underline the same aims of de l'Orme as it was also not only aimed at qualified architects). Even the usefulness of the project reflects the Frenchman as his forerunner.

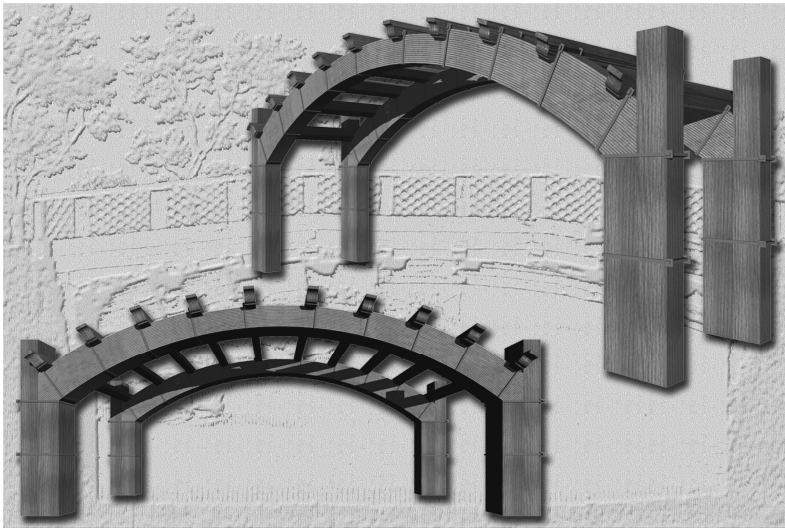


Figure 7. The *invention* of Del Rosso.

The main stated advantage points are, likewise, the easy availability of raw material and the saving in making it (Del Rosso 1797, p. 12, 14). Convinced of the principle according to which a building can be realized by anyone in any context, the author simplifies the rules of the building (1797, p. 15). Like de l'Orme, Del Rosso also takes great pride in the strength of his *invention* (1797, p. 6, 12), and, to give more credibility to his projects, he refers to his experience (1797, p. 13). It is true to say that Del Rosso is ahead compared to de l'Orme in the development of lamellar wood (see the affinity with Emy's patent). But he follows the French architect, in all of the architectural aspects, and wood comes back from being just a poor material, used only to realize something without artistic value, *a simple country thing*. Analysis shows that de l'Orme's treatise had a great influence because he introduced a conception of architecture as an art for everyone, no-longer only for qualified people and for this reason it was necessary to adopt a new language far away from that of Alberti's, which was clearly too theoretical. Generally, Del Rosso took this theme to extremes and his book looks and reads like a handbook more than a treatise on Architecture.

De l'Orme's influence in France

Unlike Italy, the cultural and social French world was surely a more successful field for the spreading and the development of the theories of De l'Orme. Although, the Italian culture and techniques had been the starting point of the "Nouvelles inventions", the revision of these theories was without doubt influenced by the gothic spirit belonging to French culture. If Classical Culture is considered inside Italian Art, then Medieval Culture is inside not only the French world but also all North European countries and the Anglo-Saxon world. It is true that in France they don't think of the Middle Ages as a past age, but as an ongoing living aspect. So it is understandable why Ariosto's and Tasso's works about the knights world were so famous and popular there.

Of course, it was even more evident in architecture, in which gothic culture never stopped having an influence even though only on style or only on critical aspects of the artists. In this way, many critics refer to a survival of the gothic style, in spite of the new classical wave of the Renaissance. If the architecture described by de l'Orme in the "Nouvelles inventions" is analysed, it is evident that it has a clear middle age style: in forms, in aesthetic features, and in the structural aspects, because he had judged positively this building technique. Only at the end of the seventeenth century is the gothic considered as a style and as language. The promoter of this new way of thinking was Claude Perrault who spoke of a "ordre gothique" in contrast to a "ordre antique". It was in this period that, for the first time, the original model of the contrast between a classical vision and a romantic vision could be found. Nowadays it is used to critically classify all human production.

De l'Orme's comments about the gothic structure were made back in 1634 by François Derand in "L'architecture des voutes, ou l'art des traits et coupes des voutes" and, through this work, they influenced all architecture of the seventeenth century. Derand's work was then published again in the eighteenth century by Amédée François Frézier encouraging, in this way, the spread of de l'Orme's theories. To show the gothic style in France during the Renaissance and Baroque Era, it is necessary to refer to a text by Jean François Felibien written in 1699 "Dissertation touchant l'architecture antique et l'architecture gothique" in which gothic works are criticized regarding dimensions, proportions, structural aspects. And also to a text written by the abbot J. L. Cordemoy in 1702 "Memoires critiques d'architecture" in which he judges positively the building aspects of gothic styles but not aesthetic features. Amédée François Frézier agrees with Cordemoy, and, in his "Traité de stereotomie à l'usage de l'architecture" in 1739, praises gothic style for its precision and for the accuracy of the vaults technique, but not for the aesthetic features.

Therefore, at the beginning of the eighteenth century the gothic architecture was appreciated for its structural and functional aspects but not really for its aesthetic features. Not until the end of the eighteenth century, was the gothic style rediscovered and with it De l'Orme's personality and work reevaluated.

De L'Orme in France from the late sixteenth century to the end of the seventeenth century

Between de l'Orme's death and the end of the eighteenth century we know that he was not forgotten in French academic world, but it is not known if his technique was applied in building. In the information from the land register started during Napoleonic age in 1809, we find references to some buildings, mainly houses, made according de l'Orme's technique. This kind of building was quite fragile and breakable: so it is likely that the structures were actually more in quantity, but only a small percentage survived. The reason for the small amount remaining is that, as told in the treatise, the *invention* spread through the workers in poor places, whose buildings were less durable (de l'Orme 1561, Book I, p. 5). As the same author says, the *invention* spread not only in France but also abroad, but not enough information exists to clearly show that examples of these buildings are located only in France. An important example that demonstrates that de l'Orme's *invention* was known abroad is the church of La compagna di Gesù in Cordoba, Argentina. Built starting in 1650, it is part of a bigger building that included the university and the monastery (**fig. 8**).



Figure 8. The church of La compagna di Gesù.

Among the most interesting elements of the building are without doubt the vault and the dome: made to the relevant size and form and, obviously, made of wood. The person charge of the project was the Belgian Father Felipe Lemer, who had spent many years in Europe working in a shipyard and this experience was fundamental for the conception of the work. The considerable dimension of spans and the impossibility to use a roof of a pressing type were the ideal conditions to apply the de l'Orme's carpentries considering also the lack of qualified workers at disposal. The result that can be seen, even today, is a product that surely originated from the French *invention*. However, it

is a little more advanced, for example, in the tri-dimensionality of the work, in contrast with the bi-dimensionality of the French one:

[...] the great difference between de l'Orme and Lemer is that de l'Orme conceives the structure statically and in its surface, on the contrary Lemer conceives it dynamically in the space. To explain it better, if we imagine to overturn de l'Orme's structures we destroy them, on the contrary Lemer's structure can be overturned, inclined and moved and it always remains unbroken. So for this reason we can defy it a roof keel overturned just for the conception that reminds to a structure resistant to any stress, while if it was only a formal reference to the keel Lemer's extraordinary work would be underestimated.

(Laner 2001, p. 15-16)

The work just described demonstrates that de l'Orme's *invention* had a great diffusion, but a very different one from that expected by the French architect: this diffusion was not just through the academic world but also through the world of craftsmanship.

The rediscovery of de l'Orme in France at the end of the eighteenth century

The revival of the gothic style at the end of the eighteenth century produced the rediscovery of the "Nouvelles inventions" applied to all architectural fields. In particular two events contributed to the rediscovery of de l'Orme building technique: the great attention paid to the military during the revolutionary age and, above all, the building of the Halle aux blés in 1783.

After French revolution of 1789, episodes of war broke out continually, and it was necessary to find great open spaces to let the cavalry practice all year round. Engineers, looking for ways to produce big spans, consulted the old books about architecture so rediscovering de l'Orme's building technique. The project revised by General Detournelle following the guidelines of carpentry of the sixteenth century, but published in the nineteenth century, was the point of reference for the building of the riding schools of the First Empire. The most important of these, with 26 metres of span, was in Rennes, at Carrousel quarter, but it has been destroyed. However, two roofs of this kind still exist. The first is the Royal riding school in Saint-Germain en Laye with 8 metres span, and the second one in Fontainebleau, at Sénarmont, with 22 metres of span.

The barracks Rochambeau, at Mont-Dauphin (Hautes Alpes), built between 1819 and 1823 based on Captain Massillon's project according to de l'Orme's design also deserves mentioning. Following the barracks model, all the country areas were soon filled with barns and farms, built in de l'Orme's technique, during the nineteenth century. These building required a great deal of light, and as they couldn't use a lot of materials, the building technique using small pieces satisfy all these

needs. The buildings still standing now, in France, like the Grandlhac and Serc farms, both in Chanac, on the Causse de Souveterre, where these buildings are used as barns and sheepfolds. At first these buildings were constructed with double vaults, as testified by the considerable thickness of the walls downstairs. The superior vault has been rebuilt, without doubt, using de l'Orme's carpentry, because it offered a cheaper solution compared to the rebuilding of the vault. Located at the entrance of Mende, the "Grange de l'Adoration" has the double function of house and barn. Its dimensions are 20.5 m x 7.5 m and all the arches are composed by three wooden boards layered together. It's interesting to consider what kind of wood was used for the building, as it was a type of poplar tree called "carolin". This tree grows near the river Lot, where the predominant winds give it a natural bending structure. To creating the bend that produces the curved board that form the arches of de l'Orme's structure is costly in time and materials. However, this natural bend becomes an advantage because it doesn't cause the waste of material that you would have cutting a curved piece from a straight board. Moreover, if you cut curved pieces from a straight board, you cut towards the contrary direction of the woods grain, weakening it and producing less resistant pieces (fig. 9).

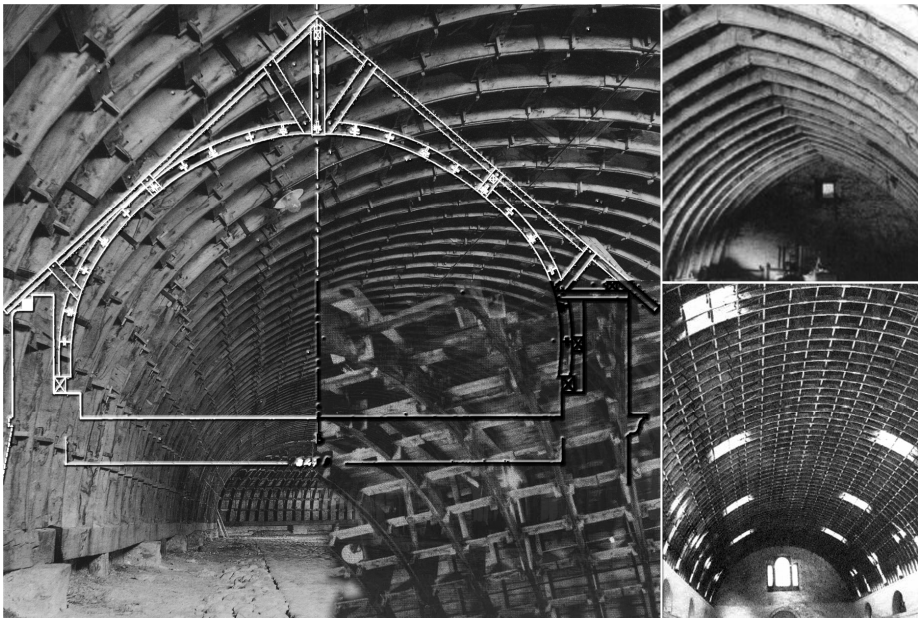


Figure 9. The barracks Rochambeau, the "Grange de l' Adoration" and the riding school of Fontainebleau.

The building analysed so far have been part of architecture that is considered *minor* because it used low cost material, giving more importance to the *utilitas* than to *venustas*. To appreciate de l'Orme's *invention* through building with a clear aesthetic value it was necessary for it to be used in a more public context where it might be seen by a the public at large.

Such an occasion was offered by the building of the Halle au Blé dome in 1783 by Jean Guillaume Legrand and Jacques Molinos. The building had been erected between 1763 and 1769 by Camus and Mézières and it needed a roof that covered a span of 39 metres. For this reason, the two architects thought it best to revive the carpentry illustrated in the “Nouvelles inventions”, constructing a dome with wooden arches joined together at the top by a glass lantern (**fig. 10**). The vault was made more spectacular by glass bands inserted inside the roof so producing an extraordinary lightness. Referring to Arthur Young, he describes it thus:

But by far the finest thing I have yet seen at Paris is the Halle au blé, or corn market: it is a vast rotunda; the roof entirely of wood, upon a new principle of carpentry, to describe which would demand plates and long explanations; the gallery is 150 yards round, consequently the diameter is as many feet: it is as light as if suspended by the fairies.

(Young 1787)

The Halle aux blés became the best example of the qualities of de l’Orme’s carpentry: the lightness and the great building potential. With Halle aux blés, the popularity of the *master builder successor of the middle age* spirit grew enormously. In fact, at the end of the eighteenth century many architects were inspired by de l’Orme and mentioned him in their treatises. Among them were the more famous Etienne Louis Boullée and Jean Baptiste Rondelet. Boullée used the small pieces carpentry in some of his most famous works such as in the dome for the Royal Library, a project of the 1785, and the Hall of the Royal Lottery in 1788. These buildings utilise all the potentialities given by the *invention*.

As evident from the stateliness of the rooms, although in a different way from Halle au blé, it doesn’t keep the carpentry in view, but it is covered with lacunars ceiling as recommended by de l’Orme himself (1561, Book II, p. 44v). What persuaded Boullée to apply his *invention* to his project? It was not, of course, only the production of Legrand and Molinos but his education. Above all a “strict education is necessary to the mechanical aspects of art” (Pérouse de Montclos 1997, p. 21). This was given to him by his father who made him an exponent of the technical renewal process during the later half of the eighteenth century, when forgotten building techniques were being rediscovered. The *visionary* architect grew up according to the principle “Ars sine scientia nihil est” that “had been the first principle of French school since the age of the cathedral” (Pérouse de Montclos 1997, p. 180). The information reported by Montclos must be mentioned, because in his opinion, a Boullée ancestor, Martin Boullée, was de l’Orme’s partner, and he continued to carry out his work on the Tuileries staircase, when de l’Orme died.

It’s not strange that Etienne Louis Boullée was one of the greatest promoters of the rediscovery of de l’Orme’s technique, whose potentialities were exalted by the union of the greatness of his project. From a mere theoretical point of view, the first critique re-examination of de l’Orme’s work

is due to Jean Baptiste Rondelet and his “Art de Batir” of 1802. In truth the portrait that emerges regarding Henry II’s architect is not particularly exalting, because Rondelet aims to dampen the enthusiasm surrounding De l’Orme at the end of the eighteenth century, thus emptying the meaning of his *invention*. On one hand, he tried to demonstrate that the small pieces building system was not invented in “Nouvelles inventions”, but that it had its roots in antique and renaissance Italy. Then on the other hand, he took criticised the *invention*, and underlined its defects.

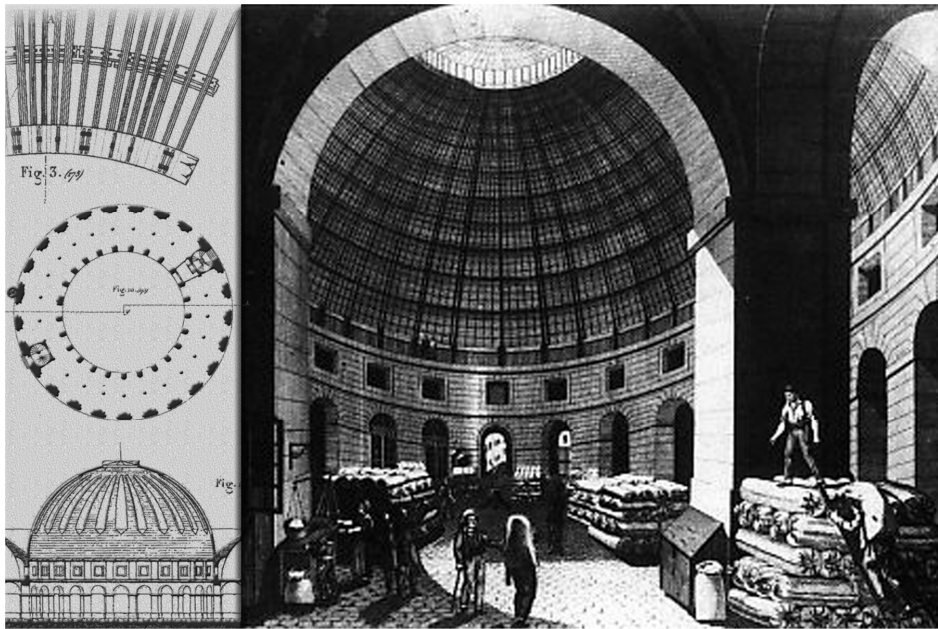


Figure 10. The dome of Halle au blé.

To back his claim that De L’Orme was not the inventor of small-piece wooden carpentry but that it had older origins than 1561, the year of publication of de l’Orme’s treatise, Rondelet tracked down some models in the domes of some churches in Venice. Firstly he pointed out that St. Marco, was made using a double wooden dome and in the Roman centring formed and superimposed double or triple layers of boards. He referred also to Sebastiano Serlio’s work, where small pieces wooden roofs are mentioned. Among these are the vaults of the Tournelles Palace in Paris and some others, seen in Italy, produced by using Vitruvio’s method. Going deeper into the *invention* Rondelet underlined how it is not as cheap as the “Nouvelles inventions” suggested. Furthermore, he contended that the hole in the middle of the boards is not advisable because of thermal expansion, suggesting that it’s better to hook the crosspieces on the sides of the boards, as de l’Orme did with the big size arches. Finally, there is a fine example of *invention* for a small pieces wooden roof, that the author considered more effective. It is a building solution used by Sir Lacase, a building contractor in Paris, who suggested a carpentry similar to de l’Orme’s, but adding two innovative

elements. The first is about the joint between the boards that becomes more elaborated (called by Rondelet “assemblées à trait de Jupiter”). And the second is about the arch profile that suffers from a tapering along its axis (**fig. 11**). Anyway, even if Rondelet criticised his predecessor, the fact that he paid great attention to him in his treatise, gives Philibert de l’Orme a pre-eminent position in the national architectural situation, as a father of the modern French architecture.

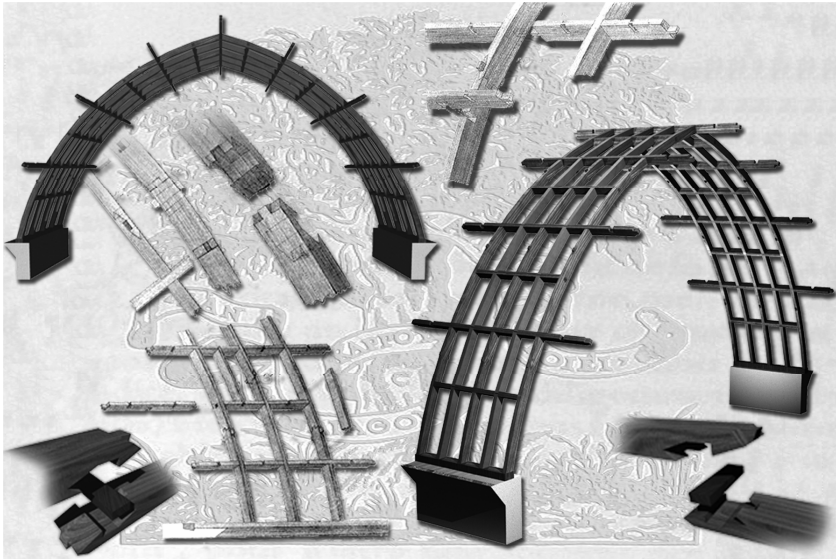


Figure 11. The Lacase’s *invention*.

ACKNOWLEDGEMENT

This study is part of a research that has been carried out with Pamela Aversente, Giandomenico Lobascio and Annamaria Terlizzi, for the final workshop in architecture degree thesis (professor: Claudio D’Amato, tutor: Giuseppe Fallacara) at Politecnico of Bari.

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