ARCHITECTURE CLAD WITH ENAMELLED AND GLAZED CERAMICS: COLOUR, SHINE AND SHAPE

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ABSTRACT

Through seven great works of architecture, we shall see how the exceptional qualities of enamelled and glazed ceramics, **colour, shine** and **adaptation to complex shapes**, are enhanced, and how they accompany and fine-tune the architect's idea of the project.

Using these properties, we shall directly relate **Ceramics** and the **Design Decision**. We shall understand when, how and why ceramics, and not another material, enters the **design process** of some of the most representative works of architecture made using this material.

From the Ishtar Gate to Saint Catherine's market, the examples chosen will show us that it is essential to make the material work in favour of the project's functional, physical and aesthetic needs, by choosing it conscientiously. Also, the importance of knowing what has been learned throughout the centuries with respect to both the tradition of ceramics and architecture itself will be highlighted, so that firm steps can be taken, based on the development of what has already been done, reinterpreting and reprocessing the achievements.

1. ORIGINS

Ceramics go beyond the simple interpretation "made of clay", but are to be connected to the history of almost all the peoples of the world, so much so that ceramics date sites and name cultures. Ceramics were invented during the Neolithic revolution, and they were a result of the settling of civilizations, i.e. of humankind's bonding to a particular land. At the beginning, ceramics were made using the clay extracted from the area, making a ceramic the bond between the land they walked on and the direct handling by the craftsman.

Ceramics, as an ancient art, has evolved along with humanity's progress. Nowadays, not even the clay normally comes from the place where the ceramic is made and, in the immense majority of cases, neither does it come from the hands of the ceramicist, but from industrial processes which form the piece. Nevertheless, there may not be any other material that keeps its spirit so intact, despite such a technified manufacturing process.

Two of the now old breakthroughs that led to more aesthetic and plastic possibilities in the world of ceramics were the enamelling and glazing processes. Applied to the terracotta base, these techniques give the ceramic piece special conditions of colour and shine.

Covering the terracotta with a layer of protective enamel or glaze opened up a spectacular range of possibilities, as well as making it waterproof, long-lasting and easy to clean, in which the ceramicist and, by extension, the architect can draw, mould, colour, and shine the surfaces, and combine these features in mosaics, to obtain effects that had not been possible until then.

Ceramics are also extremely easy to mould with three possibilities, manual, extruded and pressed moulding, and the piece made is easy to cut. This, as well as the good physical and chemical functioning of the ceramic pieces with the joints made of mortar or adhesive grouts, allows an exceptional adaptation to surfaces that are not flat.

These features, present in other materials but in an exceptional way in ceramics, are **colour, shine** and **adaptation to shape**.

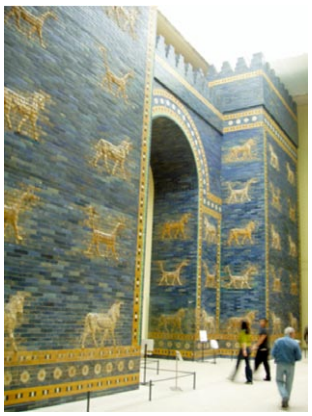


Figure 1. Reconstruction of the Ishtar Gate in Babylon, Pergamon Museum in Berlin.

Ceramics, in all their variants, but perhaps especially in the enamelled and glazed ones, fulfils Steen Eiler Rasmussen's maxim: *"as a general rule, it can be said that materials with poor textural effects improve with a deep embossment, while high-quality materials can take a smooth surface and, in fact, they appear more advantageous with no embossment or any ornament"*.

But while it is interesting to know the qualities of the material (the ingredients), it is more valuable to try to grasp how the architect uses those qualities to enhance, accompany and fine-tune an idea (the recipe).

This requires understanding why architects like Jørn Utzon, Enric Miralles and Antoni Gaudi, among others, relied on ceramics to furnish an image, characterize spaces and provide a special atmosphere for their buildings. It requires understanding what makes ceramics special in comparison with other materials and comprehending how and why they were applied in these works.

In short, it is being able directly to relate **Ceramics** and the **Design Decision**; to understanding when, how and why ceramics and not another material have entered the design process of some of the most representative works of architecture made in that material.

Deep down, it is a return journey, from the architectural design to the identification, classification and evaluation of the qualities of ceramics as a construction material.

It is difficult to say when non-three-dimensional ceramics appeared as a material inseparable from architecture.

A remaining wall precursor is the Ishtar Gate in Babylon, clad with thousands of enamelled bricks featuring bulls and dragons. But there are also others like the mosaics of small pieces of coloured clay that decorated walls and columns in the Assyrian city of Nineveh, possible forerunners of the Greek stone mosaics that would be treated in the Hellenistic period and which would reach perfection in the Roman and Byzantine period.

2. SAINT ESTEVEN OF VIENNA

The first mosaics were possibly not made of stone, but of clay. It is also possible that the first slabs or plates for roofs in Central Europe were neither made of slate or ceramics, but of wood. There are multiple inter-connections, often return journeys, which bring back improvements.

In churches and residential buildings of France, Germany, Austria and other Central European countries with heavy rains, it was the custom to cover roofs with steep slopes with wooden tiles supported on a grid of wooden strips. The typical appearance is the one with a fish-scale structure due to the wide overlaps to prevent water from entering. One of the best surviving groups is in Troyes,

France. It is a material that has aged nobly with a very pleasant texture, but since it is a wood that is exposed to the exterior, it cannot be given colour. Something similar happens with the slate, with a strong appearance but with a monotonous finish. While facades, doors, windows and interiors were becoming more and more complex, the highly visible roofs with steep slopes had to be kept like uniform drapes, in a certain way monotonously, merely used for their function of protecting against the climate.

Figure 2. Detailed view of the roof of Saint Steven's Cathedral, Vienna.

Figure 3. Volume of the roof on the stone facade. Saint Steven's Cathedral, Vienna.

Figure 4. Roofs of the Beaune Hospice, Burgundy, France.

When it was built, Saint Steven's Cathedral in Vienna became the largest structure in the city. Its high, wide roofs would be visible within a radius of kilometres. Virtue arose from necessity, since the wide gable, far from imposing itself and weighing down on the city's huddling houses, became its giant symbol. Its 250,000 tiles drew the city's coat of arms in a mosaic and gave it a colour that it lacked. Far from imposing a continuous solid mass on the square, it was a light, clear decoration against which the pointed Gothic sections were silhouetted.

On this building, ceramics acquired a type of construction that came from wood and slate, but which was totally in its favour. The need for ceramics was rather experimental. It could be thought that the chromatic quality of the material allowed architects to convert what was initially a problem into a virtue: it is possible that, when imagining the effect of the thousands of tiles laid out in mosaic, they gave the roof an even more pronounced slope than necessary for it to become the main feature of the square at the feet of the cathedral.

The same problem occurred, with the same solution, in buildings of the city of Beaune in Burgundy, France, the most representative case being the Hospice.

This wish to incorporate colour into architecture will often be the motive for introducing ceramics.

In the quest to distinguish public buildings from the rest of a city's huddle of houses, the size or the height of tower is often sufficient, but sometimes the grey monotony of a climate or the brownish-grey tone of a city built entirely of the same material requires a touch of colour, a sparkle, something that breaks the rule.

The possibilities of enamelling or through-body colouring allow an indelible pigmentation on a product that is also waterproof. It is true that colour can be incorporated into other materials in the form of paint, but this is temporary, since it does not withstand the inclemency of the weather very well. One only needs to think of the Greek temples, which used to be richly coloured.

3. ESFAHAN, THE BLUE CITY

This is the case of Esfahan in Iran, a symbol of the golden age of Persian civilization. It was designed to amaze the world, with wide avenues and squares.

The use of tiles on walls and floors was already common in the Middle East before the Hellenistic period and it was revived by the Sassanids. The Islamic use of the tile really began in the Abbasid period, but it reached its maximum splendour in Iran after the 18th century. In the first stages, glazed ceramics had hexagonal and star shapes, but then the mosaic technique, with small pieces of cut tiles that were joined together to form rich and complicated drawings, was developed.

In Esfahan, the large public buildings, due to their size but also because of their colour, had to stand out from the rest of the buildings, which were structures with the land's natural colours and were an integral part of the landscape.

In Esfahan, at two ends of the axes of the immense Iman Square (previously the Shah's Square), the mosques of the Shah and Sheikh Lotf Allah stand out from the double row of superimposed arcades because of their intense blue colour, rather than their size. Thus, the so-called blue city has been given its second name from the colour of the millions of tiles that cover the mosques' doors, facades and domes. The dome of the Sheikh Lotf Allah mosque, with warmer tones, changes colour

depending on the sunlight, and goes from cream to pink, taking full advantage of the characteristics of the textures and colours of the ceramics.

Figure 5. Iman Square. In the background, the Sheik Lotf Allah Mosque.

Figure 6. Dome of the Shah's Mosque.

Figure 7. Doorway of the Shah's Mosque.

Figure 8. Detail of the tiles on the Shah's Mosque.

The facades sometimes give the impression of merging with the sky thanks to the blue colour of the cobalt, a blue colour that puts an end to a return journey. Chinese ceramics, a possible precursor of this art, which would have spread from east to west until it reached the Mediterranean, going through Mesopotamia and the north of Africa, would be enriched centuries later by a colour which had been unknown to them until that moment.

Although it is perfectly visible on the facades and on the domes of Esfahan's mosques, with their curved surface, another of the most beautiful features or experimental possibilities of ceramics can be especially appreciated: the shine.

The double-curvature surfaces strengthen this effect, which is even more obvious when the base of the dome is built of unglazed clay.

The small sizes into which the tiles are cut, but above all the studied geometry with which they are put together again, allow the ceramic cladding to be adapted to the difficult shapes of the domes.

The possibility of enamelling or glazing the terracotta allows us an extremely wide variety of tones which depends on the oxides we use, but it also allows us to introduce shine or gloss, a very difficult effect to obtain in other materials. Although wood can be polished or varnished, that finish will not stand up well to the elements. In stone materials, polishing is the process that allows us to shine their surfaces, but we also find ourselves with limitations, since not all stones take it and the weight and necessary thickness of the stone pieces make it impossible for them to be applied on many roofs. Metal can have a high gloss, but the passing of time outdoors causes it to rust, except in some exceptions, sometimes leading to very interesting effects, but, on the way, they make it lose its power of reflection. Glass, which performs well in terms of cost and durability, does not adapt well to sinuous shapes.

4. GAUDI, JUJOL AND TRENCADIS

In 1904, Antonio Gaudi designed a ceramic cladding with a gradient of blue tones in the patio of the "Casa Batlló", with which it blends the light that trickles down its walls.

But it is with so-called *trencadis* that the Catalan architect uses all the possibilities of ceramics, as well as colour. This technique consists of a type of mosaic made with fragments of ceramic scrap or with white china cups and plates joined together with mortar. Good examples of this technique are the chimneys in the Mila and Batllo houses and the dragon in the Güell Park, but the work in which it is best used is perhaps the undulating white that crowns this park's cornice.

Both the trencadis cladding of the bench and the ceilings rose in ceramic, glass and other materials on the ceiling of the hypostyle hall are works of Josep Maria Jujol i Gubert.

The bench is made up of a series of concave and convex modules. The base is made of white trencadis and it is crowned with a ceramic decoration with motifs that are generally abstract, but also with some figurative element like stars, flowers, fish, crabs, etc. This trencadis was built with scraps, tiles, bottles and pieces of dishware. The sinuous shapes of the bench could undoubtedly have been made of

reinforced face concrete, but they would never reflect the light of dusk the way the pink, blue, yellow and green fragments do.

Trencadis uses ceramics *in-situ*, but not in the normal sense of "first I know the place where it's going to be placed, and then I make the piece", but in the fuller and at the same time more intense sense. The architect knows the place and chooses which are the most ideal among pieces that are already made, already used, already consumed and fragmented to draw an outline of a colour painting. The nearby work, in which each particular piece is chosen, is up to the mason, and the pieces are chosen according to how their shape fits in with the pieces that have already been installed. It is not a case of new pieces to be made *in situ*, but of old pieces *in situ* which have already been made the most of, laid out on a drawing, which is carefully designed but also undetermined, a drawing that does not recompose the original piece, but that, along with the extreme possibilities of colour and shine of ceramics, makes the waves of the cornice in the Güell Park vibrate under the changing sunlight. The shine highlights the objective nature of the buildings and the volumes it covers.

Figure 9. Flooring in the palace patio, Sale, Rabat, Morocco.

Figure 10. Undulating cornice of the Güell Park, Barcelona. General view. Antoni Gaudi and Josep Maria Jujol.

As well as the aesthetic value itself of enamelled ceramics, architects highlight their expressive power through contrast.

The white trencadis cladding, with the largest expanse, acts as a neutral background that valorises the coloured background.

On the other hand, the repetition of the sinuous shapes made with stone materials, which are heavier, in the rest of the park brings more to mind a rooting

to the land, which, by comparison, make the waves of the cornice made in trencadis much lighter.

Figure 11. Undulating cornice of the Güell Park, Barcelona. Detail of the trencadis. Antoni Gaudi and Josep Maria Jujol.

Figure 12. Stone balustrade, Güell Park, Barcelona. Comparison. Antoni Gaudi.

In spite of using a new technique with great skill, Gaudi and Jujol did not leap into the void. Of course, they knew the stone mosaics which are so widespread in Rome and Byzantium, but, due to their interests in Eastern and Mudejar architecture, stages through which they went in their professional career, perhaps they were even more aware of the glazed ceramic mosaics with which they clad the mosques in the north of Africa, which are much more expressive in colour than their stone counterparts. This way of practising architecture, which is captivated by what has been done previously, far from being of little creativity, often leads to architectures that withstand the passing of the years much better.

5. OSCAR NIEMEYER: THE LUSO-BRAZILIAN EXPERIENCE

Other geographically far off experiences, but near in spirit, are the ceramic claddings used by Brazilian architects. A particularly outstanding case is the Saint Francis of Assisi Church in the Pampulha complex by Oscar Niemeyer.

Along with Jorn Utzon who designed the Sydney Opera House, the Brazilian architect is one of the few architects who managed to invent iconic shapes and convert them into the symbolic expression of a country or a city beyond their function. Thus, the curved profile of the two domes and the double tower of the National Congress will always be associated with the image of Brasilia. The curved shape will be the general tonic in his architecture and reinforced concrete will be his great ally.

Ceramics appear in his work when he wants to make the shapes lighter, or highlight the small scale. One of the examples is the Saint Francis of Assisi Church, where he uses ceramics to mellow the piece's character by making it less brutal. The

church is located in the Pampulha complex, when Niemeyer begins to experiment with concrete skins. This is also where ceramics appear as a comprehensive cladding material. It is the test of the fantastic pair formed by the concrete skins and ceramics, whether the latter is lost framework as in the case of Guastavino, or as a cladding, in the case of the Brazilian architect.

Niemeyer is interested in tile, partly used as a reminder of the Luso-Brazilian tradition, for design. It is used in other buildings in the Pampulha complex like the yacht club and the casino, but it is in the Saint Francis of Assisi Church where the use of ceramics is more intentional, precise and elegant. As always occurs in architecture, this refinement is preceded by previous experiences.

In the project which was influenced by Le Corbusier and designed by a team of young Brazilian architects led by Lucio Costa and the Ministry of Health and Education in Rio de Janeiro, the basics of architecture of the modern Brazil are provided. Although it follows the Corbuserian precepts, like the raised floor on pilotis, the garden terrace and the water tanks on the roof, the local architects adapt the Swiss' ideas to Brazilian reality. Niemeyer proposes increasing the height of the ground floor, much in line with the graceful architecture he will establish in the future. The space between pilotis must create the feeling that the square runs beneath the 14-floor block. For the inevitable nucleus of vertical communication not to blur that feeling of lightness, it is clad with tiles decorated with curvilinear strokes. Although the idea was taken from Le Corbusier, here it inherits colours and plasticities from the Luso tile tradition, allowing the virtual disappearance of the heavy opaque nucleus of lifts and stairways, thanks to its pattern.

In Pampulha, Niemeyer is already applying his formal exuberance. The church, a controversial building that took 11 years to be consecrated, consists of 4 vaults that intersect among each other and which seem to only lean on the two vaults installed at the ends. These vaults already have the architect's imprints: sinuous lines built and sustained thanks to the qualities of the reinforced concrete. In this work, in contrast to others, there is the difficulty of having a surface which, while it begins in a vertical position, gradually bends to reach the horizontal position, and returns again to verticality. Therefore, there was a problem of sealing and another of maintenance and cleaning. It would be difficult for concrete to solve these aspects. Oscar Niemeyer, in collaboration with the Brazilian painter, Paulo Werneck, devised the cladding of the concrete vaults with a mosaic of square ceramic tessarae in sky blue tones that draws waves in bluish and white tones on the base of the end vaults that bring to mind the mountains located opposite, which provides lightness, shine and persistence to concrete vaults that would otherwise be heavy, dull and dirty. Ceramics also served to solve the sealing, since they quickly evacuate the rain thanks to their smooth finish; maintenance, since it is a rather non-porous and clean material; adaptation to the shape thanks to the small-sized tessarae; and the subtle colouring which provides lightness that is difficult to achieve with reinforced concrete.

This group of vaults is finished at the front with an offset wall clad with tiles in bluish tones, arranged in a 45º grid. This mosaic, designed by Candido Portinari, which reminds us of the one built in the Ministry of Rio de Janeiro, represents religious scenes and, in some way, it is the response of a tropical architecture to the wide glass windows of the European cities of Northern and Central Europe. Here, the need to introduce the precious light, which led the architects of Gothic cathedrals to devise a new way to build, becomes the need to be protected from the sun. The windows are transformed into ceramic mosaics, and both share the nature of being receptacles of religious imagery. The virtual lightening of the sides of the vaults make them seem lighter.

It can be said that Brazilian architecture finds an ally in its taste for sinuous architecture in reinforced concrete, of course, but also in ceramics, a sinuous flat architecture both on the flat and in the third dimension. Ceramic mosaics prove to be an excellent support material for the Brazilian curved line, as much as the land and vegetation are of the gardens of Burle Marx.

Figure 13. "La Ricarda" House, El Prat de LLobregat, Antonio Bonet Castellana.

Figure 14. General view of the Saint Francis of Assisi Church, Pampulha, Brazil, Oscar Niemeyer.

Figure 15. Mosaic of the vault. Saint Francis of Assisi, Pampulha, Brazil, Oscar Niemeyer.

Figure 16. Mosaic of the gable end. Saint Francis of Assisi, Pampulha, Brazil, Oscar Niemeyer.

Figure 17. Mosaic of the gable end. Gymnasium of the Department of Popular Housing, Brazil, Affonso Eduardo Reidy.

Figure 18. Detail of the same mosaic. Affonso Eduardo Reidy.

Figure 19. Mosaic of the ground floor of the Ministry of Health and Education, Rio de Janeiro, Brazil, Le Corbusier, Lucio Costa, Oscar Niemeyer.

6. JØRN UTZON: THE SAILS OF THE BAY OF SYDNEY

The other iconic architect par excellence, the Dane, Jørn Utzon, designed the Sydney Opera House, starting in 1955. The original sketches already show some sail-shaped roofs which clearly refer to the boats that populate the bay. The Danish architect is attracted by the curved and pointed shapes of the nautical sails and their reflections under the sun. We already know the problems which Utzon himself and the Ove Arup engineers faced to be able to build the graceful vaults in a rational and economically adjusted way. In the end, they managed to settle it by taking the geometry of the sail segments from a sphere, allowing the entire surface to have the same curvature. The prefabricated structures made on-site made it possible to raise the sails, but there still remained the problem of their appearance itself according to the original idea of a bright white tense "fabric", and the adaptation to the spherical shape itself. After all the effort of years for devising, calculating and raising the structure, the entire effect could be ruined by choosing a wrong material.

His concern is reflected in the article "Sydney Opera House: The roof tiles", which he originally wrote for "Architecture in Australia" in 1965.

"It is essential for me to find a material with such a quality that it could match the simple and powerful geometry and, this way, emphasize the vigorous shapes". On the other hand, he also attached prime importance to the physical properties of the material: *"Durability and resistance to the climate were the main factors. The roof must also keep its character throughout the years in harmony with the other materials, granite and glass. Finally, the extreme changes in temperature of the Australian climate combined with the problems of roofs of a similar magnitude were decisive factors to be kept in mind".*

The list of materials was, therefore, very limited, and in order to avoid surprises, performance needed to be proven. *"The material needed to have been seen on the buildings of the old world, and have remained undeteriorated for many years, but it should have aged well and acquired a lovely patina, and the only material I've found that meets such demands is the ceramic tile"*. In this article, Jørn Utzon just about defines in a simple and direct way some of the aspects that it is sought to highlight in this paper: the extreme durability of ceramic material, in which the qualities of colour and shine remain.

The response to all these requirements would be an extruded tile, more resistant and rather non-porous, with a size of 5 inches x 5 inches, arranged at 45º. The geometry and the cut of the tile, even though it is much more technified, is what will allow the ceramic cladding to adapt to the double curvature of spheres and domes, just like in Esfahan. In order to be able to control its finish and installation, it is decided to lay the tiles on prefabricated reinforced concrete pieces.

The finish is obtained using two tonalities on the tiles, one bright white, always

on whole pieces, and a matt white-cream colour on trapezoidal pieces that allow them to adapt to the shapes of the sail segments. Their small size and their shine make the sails of the Sydney Opera House have a uniform, light appearance, viewed from a distance, without the spectator having any idea of the heavy structure underpinning the shells.

Jørn Utzon, as Gaudi did previously with trencadis, shows us the possibilities that the tile has for cladding surfaces that are not flat. The small size and the easy moulding of different pieces, limited weight and easy cutting allow exceptional adaptation to almost any surface.

But he is radically different from the Spanish architect in the way he puts the ceramics into place in the building. The trencadis technique, studied as a whole and at the distance, but spontaneous in detail, close up, shows the hand of the architect, of the mason. In the Sydney Opera House, ceramics, rationalized and technified, with two types of finish, are installed on prefabricated panels using automatic procedures that prevent the slight movement stemming from manual installation from ruining the overall effect of sails tensed by the wind.

The visual sensation is of extreme lightness. The smoothness and brightness of the sails contrast with the matt, darker colour, which is more typical of the earth of the platform that makes up the peninsula. This effect was partly inspired by the enamelled ceramic domes and minarets built in Islamic cities like Yazd and Esfahan. The houses and the skirting boards of the mosques rise from the earth without any solution of continuity. This emphasizes the lightness of the domes by contrast.

Figure 20. Clipper on the Aegean Sea.

Figure 21. General view of the Sydney Opera House, Australia, Jørn Utzon.

Figure 22. Mosque and minarets in the city of Yazd, Iran.

Figure 23. View of the sails on the stone base. Sydney Opera House, Australia, Jørn Utzon.

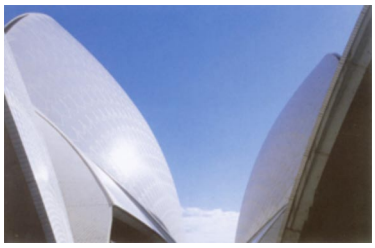


Figure 24. Partial view of the sails, Sydney, Australia, Jørn Utzon.

Figure 25. Detail of the tiles, Sydney, Australia, Jørn Utzon.

Figure 26. Close-up view of one of the sails, Sydney, Australia, Jørn Utzon.

7. MIRALLES AND TAGLIABUE: SAINT CATHERINE'S MARKET

In the restoration and covering of Saint Catherine's market by Enric Miralles and Benedetta Tagliabue, the possibilities of colour and adaptation to the shape of the enamelled and glazed ceramics are also explored. The design of the building, located in the old city quarters of Barcelona, was envisaged from the outset as a place that was open to the neighbourhood, where it was not so easy to distinguish the old from the new, between restoration and new construction. Thus, it was decided to leave the walls of the old market and build a new roof for the complex.

Although the volume of the market is considerable, it is stuck to the ground, and the residential blocks that surround it rise above it. This is why the architects considered an undulating roof as a main operation, designed to be seen from above. Enric and Benedetta designed 3 waves clad in ceramics, which bring back memories of the three vaults of the old market. However, the new vaults are flooded with the colours of the food produce that is sold below. The roof is infected by what is being covered.

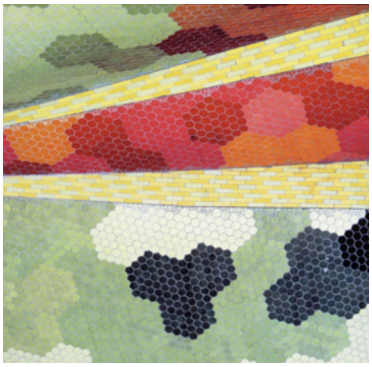
The same reasons of cleanliness and durability that motivated Niemeyer or Utzon led Miralles and Tagliabue to choose ceramics as the cladding material for their vaults.

The ceramics involved are prefabricated hexagonal pieces, fixed to a plastic mesh that adapts to the sinuous shape of the vaults. Each piece is in turn made up of 37 hexagonal small tiles of the same colour, and sixty-seven different colours and 325,000 small tiles are counted on the entire roof, which represent the fragment of a vegetable still life. A hexagonal geometry possibly influenced by breakdowns of Muslim architecture, as in the flooring of the Maghreb.

Basically the same method, but technified and hexagonally modulated, as the one used by Antoni Gaudí, although with one curious note: when the curvilinear geometry of the roof of Miralles and Tagliabue encounters the straighter geometry of the gutters, it resorts to the versatility and adaptation of the Gaudinian trencadis.

The result is a wrinkled "blanket", with the produce displayed on it, which goes beyond the limits of the walls of the old market and which, thanks to the lightness of the materials chosen, wood and steel for the structure and ceramics for the cladding, seems to float on these. In this work, just like Utzon, the architects manage to give an almost textile effect to the ceramics, white and tense due to the action of the wind in the case of the Danish architect, and of a half-spread table cloth full of vegetables in the Barcelona team's work.

Figure 27. Open-air market with vegetables on blankets. Burma.



Figures 28, 29, 30. Roof of Saint Catherine's market, Barcelona.

Figure 31. Hexagonal ceramic flooring Morocco.

8. ARCHITECTURE CLAD WITH CERAMICS

Many centuries have gone by from the Ishtar gate to Saint Catherine's market, and the ways of building have evolved with them. In order to show the qualities of ceramics, works and architects with a marked formality have been chosen (though they in turn leaned on tried and tested architectures) in which the material was taken to the limit. It is at this point where the qualities of enamelled and glazed ceramics are more readily seen.

In the foregoing projects, ceramics have proved to be the best option, given the functional and technical premises and the aesthetic-visual sensation that the

architect wanted to achieve. However, in no case is this simply unqualified praise for ceramics. Each material has its optimum field of expression, and that field is never univocal or clear, and it broadens as construction techniques progress.

For the design architect's work, knowing the weak and strong points of the material, i.e. its possibilities, is of vital importance not just to build, wall up, cover or protect a space, but to strengthen an idea, a sensation, an atmosphere, a scale, a proportion, a weight, etc. thanks to its use. Ceramics, as the construction material they are, participate in the virtues, but also the vices, of Architecture.

For this, it is vitally important both in the world of ceramics and in great architecture to know what has been learned throughout the centuries, to appreciate what has been proved, to re-interpret and to reproduce. Based on the maturity of what has already been done, firm steps may be taken. Thinking, for example, of the relation between Utzon's Opera House and the Iran mosques. Great experts like Le Corbusier, Aalto, Kahn, Utzon and Niemeyer were not characterized so much by "creating" or "inventing" architectures, but by being keen observers of what had already been done, even thousands of years before. Their contribution often consisted of small steps which updated the usual ideas. Small (and not so small) steps, but on firm ground. Rather than inventing, rediscovering.

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