Antoni Gaudí, (1852-1926)

Sagrada Família 1883-1926

Key Facts:

Location: Barcelona, Spain.

Commission: Spiritual Association of the Devotees of Saint Joseph, founded 1866 by the bookseller Joseph Bocabella; in 1892 the Association received a legacy of 577,500 pesetas; it continues to be supported by private patrons.

Materials: Reinforced concrete, Montjuïc sandstone, granite, basalt, red porphyry, limestone, travertine, glass, bronze, *trencadis* of Venetian glass and ceramic.

Site and Scale: 130x120m^2 plot, equidistant from nearby rivers, the sea and the mountains inland; 117x82.5m^2 plan, central tower height will be 172.5m.

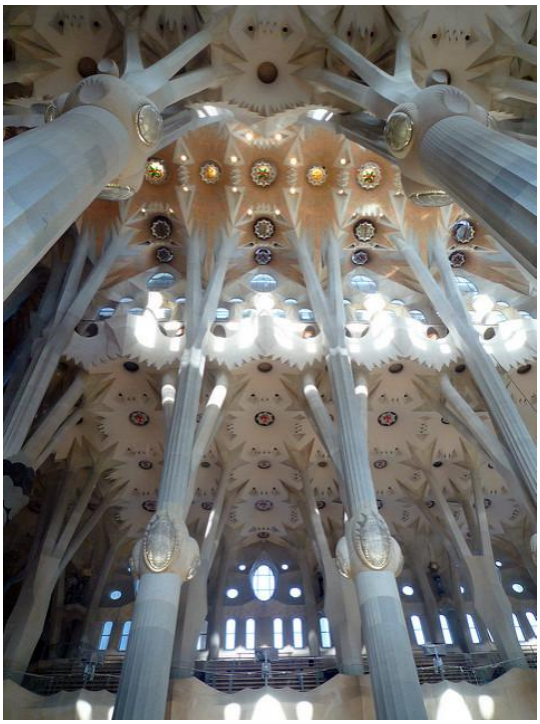
Antoni Gaudi spent 43 years working on the Sagrada Família, and it can be seen as the climax of his architectural career. Although Gaudi only completed the ground plan, one tower and the Nativity façade in his lifetime, the last 12 years of his life were devoted exclusively to making models for the remainder, so that his instructions could be followed after his death. In this work he "achieved a symbiosis between form and Christian symbolism with a peculiar architecture generated from new structures, forms and geometry, but one which included great logic and was inspired by nature." (Jordi Faulí, Head Architect).

1. ART HISTORICAL TERMS AND CONCEPTS

Function: Commissioned as a votive temple, the Sagrada Família was dedicated to Jesus and his earthly parents, who together comprise the ideal model of the Christian family. Its immense towers stand out as beacons of Christian faith whilst the plan, following the tradition of the Gothic Latin Cross for Christian liturgical purposes, encompasses the long nave and aisles for processions and seating of congregation; the east-end apse houses the high altar, a sacred space for mass; two sacristies flank the apse with a choir raised above the aisles. The symbolic function of the plan centres around the notion of the Christian family and community: the apse is dedicated to "Our Lady" and is symbolic of the "belly" of the Virgin Mary; the 4 piers that hold up the entrance to the west Glory façade and the 8 of the transept walls, symbolise the 12 apostles; the 4 piers supporting the crossing tower represent the four Evangelists; the central crossing tower itself, in the core of the church, is dedicated to Jesus Christ; and embraced within the larger outer piers, the smaller

nave and aisle columns represent the larger Christian community - the Catalan, Spanish, European, Asian, African and American dioceses. In addition to the natural motifs used by Gaudi, the church reflects a specifically Catalan Christian identity, at a time of rejuvenation and cultural wealth, which was inextricably tied to its relationship with the land, local fauna and flora.
"It is a jubilant explosion of the triumph of life…, hope for everyone and an invitation to all visitors to adopt an existence which is spiritually united with nature and humanity."(Jordi Fauli)

Style: Catalan *Modernisme,* a movement active in the last decades of the 19th century and the beginning of the 20th century, and was similar to Art Nouveau, Jugenstil, Floreale, Sezession and Liberty movements in other parts of Europe. It promoted the craftwork of ceramicists, blacksmiths and ebony workers, mixing various historicist influences and assimilating innovations in technology and construction. According to Gaudi, *"a definitive transfiguration of the Gothic*", nature was the major source of his inspiration, and in this work is seen the culmination of his highly original brand of "organicism." The Nativity façade, completed by Gaudi himself, features softened edges and sculpted elements, originally modelled by hand. Fluid curvilinear lines smooth the edges of the angular verticality of the church.



Structure and Form: Gaudi took the pre-existing Gothic plan as a starting point, yet made a number of innovative changes by extrapolating from naturally occurring forms. *"He conceived the interior of the church as a huge forest, where the columns would be like tree trunks branching out from capitals into the vaults, through which the sunlight would filter, representing foliage."* (Jordi Fauli) In place of column supports, Gaudi used "structural trees". Gaudi invented a new column with a regular polygonal or star base, the result of the intersection of two helical or Solomonic columns, which, like the natural stem growth, gradually becomes a circle at the upper end. Forming them into hyperbolic arches, Gaudi removed the need for buttressing altogether. The lower columns branch out above ellipsoid nodes (instead of capitals), into two sections, which then branch out at different heights into the highest columns of the central nave and aisle vault. As with trees supporting a vast canopy of leaves, each "branch" inclines perfectly so that they can support a small part of the vault. The areas of vaulting between the "branches" become skylights, reducing weight and enabling "zenithal light" to enter, as from above a tree canopy. For these openings, Gaudi used the hyperboloid for the first time in architectural history. Picking up the maximum light from outside and distributing it to the maximum area within, the hyperboloid is created by two sets of inclined straight lines rotating in a reverse direction at a tangent to the circle. The same shape of hyperboloid (in this instance a solid) was also used to widen the columns at the roof, thus to increase their support capacity, the shape of which has been compared to *"a bone when it widens continuously upon reaching the joint"* (Jori Fauli). The large windows of the naves, also hyperboloid forms that intersect, remove any vertical façade facing, since the walls are created entirely by the meeting of these hyperboloid openings. This creates a sense of movement and unprecedented reflection is obtained. *"The double-curve geometric shapes in all the elements of the windows turn the walls of the Temple into luminous palpitation as if the light, in a way similar to that of water on a stone, had perforated the thickness of the walls through slow and polyform erosion"* (Puig Boada, architect).

Whilst all measurements are multiples of the module 7.5m, creating a harmonious and unified whole, the immense ensemble of 18 towers forms a pyramid structure, appearing like a mountainous crag erupting from the earth.

Ornamentation: As with the interior, nature was Gaudi's central source of inspiration. In the interior, *trencadis* of gold ceramic and glass, following the line of the hyperboloid openings, create reflective starbursts of light in the vaults, whilst stained glass windows create a rainbow play of colour on the internal walls. The exterior abounds with references to local plant and animal forms. The pinnacles on the largest aisle windows are decorated with chestnuts, figs and almonds, apples, peaches, loquats, pomegranates and cherries, placed according to their seasonal fertility and representing the "good work of man inspired by the Holy Spirit". The Apse walls feature gargoyles in the form of animals from the Mediterranean world: snails, serpents, lizards, geckos, salamanders and frogs. The Nativity Façade (the only façade to be completed in Gaudi's lifetime) features a pinnacle of naturally occurring crystalline form (galena, pyrite and fluorite) and is framed by an archivolt bordered by ice stalactites. The Portal of Hope (Left), illustrating the Marriage of Virgin, is rounded off with a crag representing the local Montserrat, whilst the Flight into Egypt features a donkey spotted in the local market and modelled from life. Within the Portal of Charity (centre) the Adoration of Shepherds is accompanied by life size turkeys, cockrels, and wild roses. The pinnacle, in the form of a coloured a cypress tree, symbolises eternal life, regeneration and the love of God, and in which doves (a metaphor for the souls of men) find safety. Below, a pelican feeds its young with its own blood (a Eucharystic symbol), whilst the columns separating the three portals are supported upon turtles (representing the universe) and are topped by palm fronds, "metaphors for the victory that the birth of Jesus Christ means in the world" (Joan Aicart). On the right, above the Portal of Faith, the pinnacle features ears of wheat and grapes (representing Eucharist), whilst beneath, Mary's wounded heart is surrounded by violets (the three leaves of which symbolise the Holy Trinity) and bees that suck the blood and turn it into honey. The great doors, decorated with delicate, bronze flora (lilies, ivy and roses) are interspersed with tiny creatures (such as bees, spiders). Each has its own local resonance and Christian symbolism.

2. CULTURAL, SOCIAL, TECHNOLIGICAL AND POLITICAL FACTORS

Gaudi, the son of a copper-smith, came to Barcelona 1869, the year Spain was thrown into turmoil by major socialist and republican revolts ending with the collapse of the kingdom of Queen Isabella II. In the year he became an architectural student (1874) the First Republic was proclaimed in Madrid, which soon came to an end in 1875, when the monarchy was restored. Political turmoil was accompanied by a growing interest in emphasising the cultural specificity of Catalan identity, regional autonomy from Madrid, and went hand in hand with the Industrialisation of Catalonia in the mid 1800s. Barcelona's city walls had been demolished in 1854, and in 1859 the city was subjected to Ildefons Cerda's new urbanisation programme, "Eixample". Initiated in 1860, it pursued principles of rationality, equity and modern efficiency. Whilst these changes brought the advantages of mass production, steam power and modern lifestyle to the new middle classes, it also meant an abandonment of agriculture, and rural peasants communities lost their personal, irreplaceable craft skills, threatening their culture as well as religious and civic conscience.

3. DEVELOPMENTS IN MATERIALS, TECHNIQUES AND PROCESSES

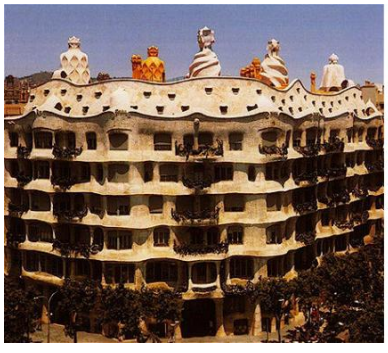
Gaudi was extremely innovative in terms of his technical capabilities. His use of modern materials, such as pre-fabricated and reinforced concrete for the nave and vault support structures. His experimentation with hyperbolic structural arches can be traced back to his earlier work – the Church in Tangiers for Marques de Comillas, his church for the textile workers in Santa Coloma de Cervelló (Baix Llobregat), as well as the vaulting for Casa Mia in Barcelona. To create such an innovative structure, he invented an experimental calculation system: a reverse model of hanging

strings that supported small sand bags. The bags were to the scale of the weight of the roofs and vaults of the church. The strings hung taut, pulled by the weights, and the incline of the strings gave the exact catenary shape of the columns, vaults, facades and windows, but in mirror image. In using the resulting hyperbolic arches he was able to design the immense height of the Sagrada Familia (172.5m), cut through with openings, but without the need for flying buttresses.

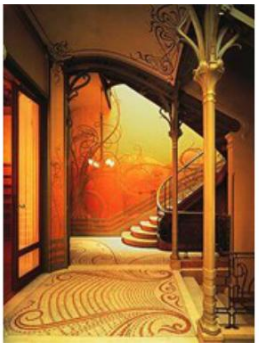
Whilst his use of new technological and structural systems was essential to Gaudi, he also drew on traditional, vernacular Catalonian processes and materials, such as the flat laminated tile vaulting, the decorative *trencadis,* and local Montjuïc sandstone. His enthusiasm for craftsmanship, obvious in the minute hand-moulded details of flora and fauna on the Nativity Facade, can also be seen as a reaction against modern industrial processes and mass production in the name of art and humanity. In this way he aligned himself with artistic movements in Europe such as, in England, the Pre-Raphaelite Brotherhood and William Morris' Arts and Crafts movement. Gaudi read John Ruskin's *Seven Lamps of Architecture* (1849), which argued for resistance against the social, human and aesthetic decay stemming from urban migration from rural areas, and *Dictionnaire raisonne de l'architecture rancaise du XIe a XVIe siècle* (1854) by the architect and historian Eugene-Emmanuel Viollet-le-Duc, which illustrated a deep fascination for the experimental rationality of medieval cathedral builders.

4. WAYS IT HAS BEEN USED AND INTERPRETED BY PAST AND PRESENT SOCIETIES

George Orwell called the Sagrada Família "*one of the most hideous buildings in the world*", and, as a taste for the clean lines of unadorned Modernism spread globally, Gaudi's explosively colourful and decorative work was overlooked. Yet, perhaps he was more influential than at first meets the eye. Gaudi was, in fact admired by the great Modernist architect, Le Corbusier, who, after a visit to Barcelona in 1926, remarked, "*what I had seen in Barcelona was the work of a man of extraordinary force, faith and technical capacity*." Gaudi's hyperbolic paraboloid organic structural systems certainly inspired Eduardo Torroja (1899-1961) and fellow Spaniard Felix Candela (1910-1997); more recently, the Valencian, Santiago Calatrava (b.1951), not only borrowed zoomorphic forms but also the traditional *trencadis* in his Opera House in Valencia (2009). However, Gaudi's blend of technical engineering with attention to natural forms in minute detail, hand-crafted moulding and tile work, has never been superseded.



Gaudi,
Casa Mila 'La Pedrera'
1906-10.
Barcelona, Spain.



Victor Horta,
Hotel Tassel
1893.
Brussels, Belgium.

Santiago Calatrava
Gare do Oriente Railway Station,
1994.
Lisbon , Portugal.

Gaudi clearly saw his architecture as an extension of the Catalonian landscape and its ecosystem. "*All buildings are a product of the earth, like the tree that sprouts from it, and is identified with it.*" (Gaudi) And more recently, Gaudi's work has even been discussed as "proto-Environmental Architecture" in its "*physical expression of an environmental consciousness... in the midst of industrialization*." (Mark Pantano) Significantly, the Sagrada Familia stood at the physical periphery of Barcelona, assuming the moral supremacy of natural settings over the urban core. As Maria Antonietta Crippa states, "*Gaudi succeeded in drawing on profound ecological meanings in architecture. He was simultaneously a traditionalist and an innovator…His contribution encompasses the architecture of the individual building and that of the landscape. In his work there is also a pervasive sense of intense carnal sacrality, which has activated a symbolic and communicative dimension*".

Further reading and links

- Maria Antonietta Crippa, *Gaudi: From Nature to Architecture*, Taschen 2015.
- Jordi Fauli, *The Basilica of the Sagrada Família*, P&M Ediciones, 2016.
- Mark Pantano, *Reading Gaudí's Great Book of Nature: Reconsidering the Peripheral Reception of Proto- Environmental Architecture*, Penn State, 2013. http://repository.upenn.edu/cgi/viewcontent.cgi?article=1006&context=uhf_2013
- Joan Aicart, "Gaudí and Mediterranean Culture." *Quaderns de la Mediterrània* 15 (2011): 101-105. http://www.iemed.org/observatori-fr/arees-danalisi/arxius-adjunts/qm-15-originals/Gaudi%20and%20mediterranean%20culture.pdf
- Sagrada Família official website: http://www.sagradafamilia.org/en/antoni-gaudi/
- Smart History: https://smarthistory.org/gaudi-sagrada-familia/