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'In the sky with diamonds' of Ronchamp's East Wall: Constellations of Thought[*]

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Abstract

The Chapelle Notre-Dame-du-Haut in Ronchamp designed by Charles-Edouard Jeanneret, also known as Le Corbusier, has been studied, analyzed and explored by architects, theorists and historians ever since it was completed. Despite these studies, scholars have paid little attention to the east wall of the chapel as a unique architectural element. An important and iconic element within this project, it is distinguished by the turning statue of the Virgin Mary set in a cabinet within the wall and surrounded by small openings allowing light into the chapel. While the moving statue had always been part of the original design, the small openings -- the stars -- were not. Somehow and sometime the eastern wall became a sky when, at the beginning of construction, it was a wall. The story began with Le Corbusier's slow design process, which allowed him to develop an evolving vision even after a design was finalized. His creative process allowed him to envision the building as a full scale model, which provided him with freedom to take advantage of new opportunities of designing during construction. This occurred with the east wall. A serendipitous

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moment transformed the project as the scaffolding was removed and about to be finished. The resulting 'as built' changes embedded a unique sacred threshold into the chapel and its east wall. This narrative considers this curious story of how Mary moved from being situated in the wall to becoming part of, and central to, a night sky with diamonds. It also reveals a seemingly lost art of slower building and design.

Preface

My first visit to the Chapelle Notre-Dame-du-Haut in Ronchamp (hereafter identified as "Ronchamp") designed by Charles-Edouard Jeanneret, also known as Le Corbusier, was on a rainy and overcast day. The Chapel, a pilgrimage church, was designed to host services for small gatherings inside, and for large groups of pilgrims outside.[1] After discovering the main entry closed I dodged the rain, taking refuge under trees, making my way to the other side. I entered the north entrance to find myself facing the southern window wall, glowing despite the rainy, overcast sky. Its deeply recessed colored glass dimly lit the interior with Le Corbusier's own painted-on images and script: a raven flying across the glass, a howling man in the moon, the sun, and Mary, and words 'étoile' (star), 'la mer' (sea) and others.

I turned toward the chapel's front, facing the statue of Mary set high on the east wall. I had been curious about this statue, which sits within a glass cabinet and rotates into the chapel or outward, depending if a service is inside or outside. I had hoped to see, even make, her turn. Yet when I faced this east wall, I was surprised. In addition to the statue of Mary, the front wall of the chapel had been transformed from a wall into a perpetual starry night with the statue of Mary situated high in the sky surrounded by 15 tiny stars of light – like diamonds. This star-studded night, which never appeared in Le Corbusier's sketches, drawings, or models, was in the building, obscuring day and creating a perpetual night. My astonishment was not due to what I thought I would see, but rather by what I had never expected to see: a night sky with a constellation of stars surrounding the statue of Mary. So, I wondered, when did the eastern wall transform into an eastern sky? What did it signify?(Figure 1)

Very little has been written about the east wall as a unique architectural element in Le Corbusier's chapel in Ronchamp. Yet, the story about this wall becoming a sky is particularly curious. It began with Le Corbusier's slow design process, which allowed a project to evolve, change, and transform. José Oubrerie, his assistant, described this design process as an "Open Work", the idea borrowed from philosopher Umberto Eco.

Oubrerie, who worked with Le Corbusier on the design of Firminy Church, another slow building that took over 40 years to complete (1960 - 2006), includes a similar reciprocity between a vertical wall becoming a horizonal sky. In Firminy the reversal and reflection of wall/sky represents the constellation Orion; but in Ronchamp, which was the most likely source or model from which the Church at Firminy developed, there is no single or simple meaning.[2]

Both wall/skies recall Le Corbusier's *Poem of the Right Angle*, completed in 1953, the year construction of Ronchamp commenced. The iconography within this iconostasis, as well as the reciprocity between horizontal and vertical within an overall grid, suggests how Le Corbusier came to create his eastern sky in Ronchamp. Similarly, his *Taureau* series of paintings from 1952 share many images found in Ronchamp.[3] As G. Hendricks explains, Le Corbusier's inspiration often resulted when he changed his perspective of a work, viewing them upside-down or flipping them from horizontal to vertical.[4] This method gave Le Corbusier the ability to see his designs as ambiguous and without resolution, allowing projects to emerge yet change as ideas found their place within the overall design. Eco associated such open works to particular types of modern art, such as the music of Karlheinz Stockhausen's Klavierstiick XI and Luciano Berio's Sequence for Solo Flute; the literature by James Joyce, such as *Finnegans Wake*; and kinetic sculpture, such as Alexander Calder's mobiles, that change even after they are complete.[5] The architect's open-ended designing was slow, and demanded patience while moving from concept through construction. The projects were subject to change at any time (to the chagrin of his clients and contractors.) He built a series of unfinished physical models that Le Corbusier scholar Danièle Pauly called "successive approximations of [the] desired object," revealing his process as a "long and patient search" for the design.[6] While Le Corbusier created Ronchamp's basic form and character early, using a crab shell that "lies on the drawing board" that he "picked up" on Long Island" (New York), new ideas continued to emerge that transformed the work even as it was being built.[7]

The Starry Sky

Ronchamp's star filled wall invites multiple interpretations. The scattered openings around Mary suggest a halo. The number (15) and organization of the small openings might have mystical numerological meanings or be a specific constellation of stars. Le Corbusier wrote that "Notre Dame du Haut is a fruit of numbers."[8] If the openings on the wall are stars, one cannot help but wonder if they represent a constellation from a particular night, perhaps an astral pattern of Virgo, Capricorn, Corvus, even Libra at dusk, night, or in the morning?

Le Corbusier, a pseudonym that Charles-Édouard Jeanneret-Gris adopted in the 1920s, comes from the French word *corbeau* - the Raven. Perhaps Corbu referenced himself in the wall as the constellation Corvus, the Raven, with Mary as Virgo, the Virgin in this eastern sky. Images of a raven and Mary both appear in the southern window wall, yet neither constellation match the starry pattern on the wall.[9] Le Corbusier seems to have invented his own starry sky.(Figure 2)

Did Le Corbusier create other walls as starry nights? In 1929, twenty-five years before he began Ronchamp, Le Corbusier drew a starry night over Buenos Aires. Here, in a dark and expansive night sky, reflected in the Rio de la Plata, he depicted five many-storied lit buildings whose windows are a grid of bright dots grouped on a flat plain. Le Corbusier told a related story about this drawing, imagining himself "at the bow of a steamer with all its travelers, also with emigrants about to land at the Promised Land. With a stroke of yellow pastel, I draw the infinite line of lights I had already seen. With the same yellow pastel, I draw the five skyscrapers 200 meters high… streaming with light, surrounded by a vibration of yellow… In the waters of the Rio I draw the lighted beacons, and in the Argentine sky the Southern Cross preceding the millions of stars… all the places of leisure where, finally, the men of Rio have regained the right to see the sky and to see the Sea."[10] (Figure 3)

While the story Le Corbusier proposed to his audience in Buenos Aires differs from Ronchamp, its effect resonates with the starry night on Ronchamp's eastern wall. In Buenos Aires, he imagines occupants of skyscrapers regarding the glittering city and expansive sky reflected in the sea, with the horizontal reflection in the water creating a second city with its starry sky. In contrast, the chapel at Ronchamp, as a singular object atop a hill, presents a vertical reflection. It too is a mirrored and doubled image of a glittering sky embedded in the eastern wall: the inside of the chapel wall created a night sky, only lit by daylight through the pinhole openings, thus day (outside) becomes night (inside). There is an opposite phenomenon at night: when the interior is lit, light from the pinholes projects outside into the night.

Construction of Ronchamp began in 1953, the same year the "Cenotaph of Newton by Night," designed in 1784 by French architect Etienne-Louis Boullée, was first published and made broadly available in France. Boullée's drawings had been in the Cabinet des Estampes of the Bibliothèque Nationale, re-discovered and exhibited in 1939, of which Le Corbusier was familiar. In this speculative design, Boullée created a huge sphere for Isaac Newton's tomb. On the inside of the sphere, he added small openings, creating a dark night sky filled with stars. This vast starry night was only visible during the day, when sunlight passed in through the pinprick-like openings. Boullée explained that "The daylight outside filters through these apertures into the gloom of the interior and outlines all the objects in the vault with bright, sparkling light." He imagined that at night when the interior was lit, the light would project through the 'stars' in the sphere and out into the night sky. Newton's Cenotaph is similar to Ronchamp, which may have inspired Le Corbusier to create his own interior starry night in Ronchamp after studying Boullée's project.[11] (Figure 4)

Le Corbusier's façade to the sky, shaped sometime during the two-year process of construction, was also a re-presentation of a sky facing the congregants as they gathered, meeting Mary, who presided over worshippers. Whereas Boullée's monument was singular and simple in its extraordinary approach to modeling the universe, myriad meanings embedded in Notre-Dame-du-Haut in Ronchamp realized an indescribable and indefinable "ineffable space." Le Corbusier used this concept in 1946, to describe the chapel space as a "moment of limitless escape."[12]

Ronchamp's east façade has been interpreted as a symbol of the story of Mary surrounded by divine light, a constellation of stars, or mystical numerology. The roof of the building has been compared to a crab shell (via Le Corbusier) as well as, according to Robert Coombs, a "neo-Catherist shrine," who traced the Cathar heritage of Le Corbusier's family. Its cave-like form, significant to the Cathars, was part of the Jeanneret / Le Corbusier family heritage. This twinning of Cathar history with the church brings yet another doubled meaning to the project. Coombs shows the significance of a series of numbers, including 15, in a variety of sacred texts. His discussion reveals similarities between Ronchamp and Montsegur, the location of the Cathar martyrdom, and Bethlehem Cave, scene of neo-Cathar ceremonies.[13]

Another interpretation of Ronchamp's intertwining of light and dark might be considered by recalling a scene in Shakespeare's *Romeo and Juliet*, when Juliet, in Capulet's Orchard, cries:

> Come, night; come, Romeo; come, thou day in night;
> For thou wilt lie upon the wings of night
> Whiter than new snow on a raven's back.
> Come, gentle night, come, loving, black-brow'd night,
> Give me my Romeo; and, when he shall die,
> Take him and cut him out in little stars,
> And he will make the face of heaven so fine
> That all the world will be in love with night
> And pay no worship to the garish sun.
>
> Romeo and Juliet, Act III, Scene II, Capulet's Orchard[14]

Romeo describes Juliet through images of light, their love flourishing at night, under stars, the stars "cut out" from the sky as he is born away by the raven -- by Le Corbusier himself -- " [so] that all the world will be in love with night." The statue of the Virgin Mary holding her child, provides another reading of love in night, surrounded by the stars. Might Jeanneret/Le Corbusier refer to himself as night with his signature of the raven and Mary as Juliet and light? Virgin Mary with her child reveals ambiguous associations of love and night, described by Juliet resonate with the Chapel and Mary, who Flora Samuel discussed as an ambiguous figure who symbolized, for Le Corbusier, both virginal and erotic love, symbolized by the Virgin Mary and Mary Magdalene as "two sides of an all-encompassing feminine divinity..."[15] This ambiguity between the virginial and erotic might be interpreted by comparing the southern wall with the east wall, where the east sun cloaks the statue of Mary lovingly holding her child in a night sky while the south filters the "garish sun" through larger and colored openings, casting its light over the congregation. This cloak of light might refer to the Book of Revelation 12:1-2 of the bible, which will be discussed later in this paper.

Constellations of Thought: 'Look! Here are your stars!'

The instant the wall became a sky seems a particularly significant moment, akin to the idea of quickening, when, suddenly, something becomes alive, animated, creating 'fire' or 'heat' of life as well as inspired. In architecture we might refer to quickening as heat generated when concrete or plaster is set or cured. The word also identifies the moment a woman privately feels an imperceptible movement that signifies new life within her womb. German Historian Barbara Duden has described this instance in pregnancy as an exact point, a feeling, which Ivan Illich referred to as "coming alive in the womb."[16] It also recalls the relationship between architecture and birth with Renaissance architect Filarete's comparison of architectural design and construction as a form of birth.

The project took Le Corbusier three years to develop and two years to construct, from 1950 to 1955 when, in June 1955 it was dedicated. He described the design development through language that is similar to the idea of quickening, writing that after tossing "the elements of a problem any which way" he allowed them "to 'float', to 'simmer', to 'ferment'. Then one fine day there comes a spontaneous movement from within, the catch is sprung; …" when he "gave birth" to the idea as a "spontaneous birth" after an "incubation period."[17] Just before birth was movement – his own form of quickening.

But once construction began, the eastern wall remained blank save for the two openings for the statue of Mary with child and a door for the Priest. The tiny star openings were absent. A later interior perspective sketch indicates a scattering of dots around Mary and stars finally appeared in photographs taken just after completion. A photograph of the southeast exterior corner, which reveals both walls, is telling: south wall bright, east in shade: the stars disappear within the darkness of the interior but reappear as deep points set into the bright sunlit wall. In his own book on Ronchamp, two interior perspective sketches indicate openings or stars but disappear on the next sketch of the exterior façade.[18]

The story about the wall becoming a sky returns us to Le Corbusier's "long and patient search" for architecture, which recalls the similar yet different process described by architect Leon Battista Alberti. Alberti, a Renaissance polygot, wrote, in his seminal book on architecture that architects must be patient designers. This was especially important when building physical models. He warned about presenting unfinished building designs as if they were complete. Models, drawings, sketches were necessary to understand a project but they should be presented to clients as plain, simple and unfinished to represent the true nature of the design. Once reaching this stage of design, Alberti suggested that the architect wait, calm down, and spend time to think about the design "until your initial enthusiasm for the idea has mellowed … your judgment is governed by soberer thoughts … time brings to light many observations and considerations that might otherwise have escaped the notice of even the most capable of men."[19] But, for Alberti and subsequent generations of professional architects, once a design was deemed complete and imagined as a future building, all designing stopped so that the building could be quickly built following a carefully choreographed construction process.[20] This is not to say that changes do not occur during construction, but they are generally avoided.

Le Corbusier's "blurred, open process," characterized by the variety of unfinished models ended once the building was completed.[21] Unlike Alberti, Le Corbusier continued to design during construction and seized serendipitous opportunities that were informed by the construction process. We see this in the eastern wall of Ronchamp, where the "stars" materialized during construction.

Construction photographs of the eastern wall reveal that the stars originated from a grid of holes throughout the unfinished eastern wall - holes created by wooden scaffolding used to construct the wall. They were not "cut out" of the sky (recalling Juliet's words) but were part of the original construction process, recalling the previously mentioned grid within Le Corbusier's Iconostasis for his *Poem of the Right Angle*. This 'naked' wall, before covered by its coat of gunite, reveals each star in the 'constellation' lining up with a scaffolding hole. The holes, present in construction photos, show both interior and exterior views of the unfinished building built of rubble. The scaffolding was still intact in the photo of the interior elevation before it was covered.[22] While most of the holes disappeared under the final finish of the building, some remained and were transformed into stars as morning light penetrated the wall, locating Mary in a starry night, like diamonds. Morning becomes night. (Figure 5)

When did this occur? Le Corbusier and a visiting pastor, who was a member of the Commission d'Art Sacré, were at the site as the scaffolding was being removed. The clergyman wondered if the statue of Mary could be surrounded by stars (possibly referring to a crown of 12 stars in Revelations 12, 1, 2 and 5). Le Corbusier, looking at the remaining grid of openings, serendipitously seized this moment before the rubble wall was covered and made a quick interior sketch of the eastern wall. Pauly described this moment when Le Corbusier exclaimed " 'look! Here are your stars!' ... drawing several crosses on one of the pages in his sketchbook, signaling the orifices through which the sun's rays would filter to form a crown of light."[23] Not really a crown, but fifteen holes, sketched around the void built into the wall for the church's late seventeenth century wooden statue of Mary holding her child, became her stars with only a constellation of five stars above the cabinet holding Mary, which might be considered a crown. A crown of twelve stars around a pregnant woman is found in Revelations 12: 1-2 of the New Testament: "A great sign appeared in heaven: a woman clothed with the sun, with the moon under her feet and a crown of twelve stars on her head."[24] She appears in various images of Mary such as Carlo Dolci's Madonna in Glory (1670), with seven and a half stars while Diego Velázquez's *Immaculate Conception* (1618) includes twelve stars around the Madonna. Bible scholar Alice Camille writes that the stars signify Mary's immaculate conception and virginity but historic images that are based on the above passage suggest that the number of stars is always relevant: "... Mary may be embedded in a landscape of stars...her cloak may be covered with a cosmos' worth... A predominance of stars suggests her immaculate conception." [25]

This quick act transformed the wall as well as the statue, which was set high in the wall inside a window-cabinet and attached to a mechanism that allowed it to rotate and face either inside or outside. However, with the addition of the stars, the statue, shadowy and ghostly, became more than the figure who watched the dramatic arrival, gathering, and departure of pilgrims who, in turn, watched her. She

became a figure in a threshold, spinning to address both ways, east and west, being the perfect hostess, holding open her door, while revealing her place within a modern building as a moving icon. She spins in a voided niche, standing within the space of the wall: a gate-keeper, not unlike but certainly not a two-faced Janus-like outpost. An indistinct silhouette in a window, within a threshold, Mary is a measure and model of the past church, the Marian story, as well as the moon, sky, a figure and, at the same time, an apparition within the frame of the wall and, perhaps, the moon in a sky. Is she a balance between earth and sky?

Ronchamp is both in the sky – set on an overlook separated from the ground yet of the ground – and facing the sky. The starry wall allows streams of light to pierce into the sanctuary, in the morning, surrounding the opening that holds Mary. This opening, originally represented by Le Corbusier as a window and open niche high in the wall, is different from the priest's door – elevated yet below the statue of Mary. Mary's space was transformed into a door in a sky once the constellation of stars appeared from the openings built around the scaffolding as the eastern wall was constructed. The result of this intertwining of wall and scaffold holes was an underlying grid of openings.

Scaffolding

In Ronchamp stonemasons used scaffolding to build the east wall from reused stones from the previous church, which had been destroyed by fire. This rubble wall created the great mass of the wall within whose depth was two primary openings: a higher opening for Mary and a lower door opening for priests to walk from the inside to the outside. The depth provided a separate and discernable place neither inside nor outside but a true space between. The Mary statue stayed within this threshold space (made deeper by a frame that projected beyond the limits of the wall) while the priests passed through the wall. The rubble wall held the statue and gave passage to the priests, and held itself up. A separate structure of concrete columns is embedded within the wall to support the roof. Le Corbusier found the stone rubble at the site, which made up the previous church, destroyed in 1944 by the Nazis. Due to their questionable structural integrity, they were reused as infill.[26] The scaffolding, inserted into the rubble wall, built up and around the concrete superstructure, ended below the roof, creating an illusion of the floating roof.

This type of wood scaffolding, held by the wall that was being built, created a grid of holes within the walls. Other types of historic scaffolding were set onto projections built out from and integral to the wall. French architect Eugène-Emmanuel Viollet le Duc described the relationship of scaffolding and construction as codependent: both as scaffolding while acting as scaffolding.[27] Traces of construction processes that remained on buildings were well known, acting as a facade-in-waiting: an exterior surface that would be integrated into a finished building once the client could afford to add its finished face.[28] One such example of this historic practice are carved ornamental projections that, after being used to construct a final facade,

might remain evident on a finished building. But often these projections are removed or disappear once they are covered by the finished façade, keyed onto the body of the building: Pont du Gard and the front façade of San Lorenzo (in Florence) -- S. Lorenzo, still missing its facade which, designed by Michelangelo, only exists as a wooden model. Its unfinished wall remains exposed, including its scaffolding holes.

Ronchamp is the exception where a few scaffolding holes were transformed into stars. Louis Kahn is considered to be the father of this technique, followed by Tadao Ando; both intentionally used marks of formwork within the design of their façades. However, for Le Corbusier this was the result of serendipity – a chance visit to the building during construction coupled with the interpretive in situ conversation with the clergyman was the impetus for change.

Scaffolding stands in for buildings until they stand on their own both literally and figuratively. This is obvious today, where scaffolding designers hide a project undergoing a face-lift by teasing a normally inattentive public to imagine what might be going on behind this mask. Scaffolding designed by Michael Graves covered the Washington Monument in Washington D.C. during two restorations while dressing it in an outer costume that surrounded and protected the monument during construction. It was a second space for workers, machines (hoists and elevators), allowed work to continue, maintained another view of the monument during restoration, yet never touched the Monument. It existed and then disappeared without leaving a trace.[29]

Today architects and designers spend most of their days at the computer, immediately confronted with "buildings" at full scale, whether they are ready or not to see the material implications of their work – when their lines are only lines rather than uneven edges composed of rubble, mortar, holes, marks, and inconsistencies. They are confronted with insubstantial, immaterial lines. Design contractually ends when the contractor begins, and the architect becomes a weekly or bi-monthly "visitor" to the site. It is highly unlikely they might participate in what Le Corbusier confronted daily, with his workers, on site, watching as the scaffolding was being removed. They would most certainly never experience the construction as a full scale model in the way that that Le Corbusier and the visiting pastor experienced the unfinished eastern wall. What is missing from practice today are these thoughtful moments that provide opportunities to pause during design -- when a building finally becomes situated within its own skin (and body) and begins to speak back to the architect who uses chance and serendipitous moments, as revelations of the building become apparent. Le Corbusier with the visiting pastor could identify the hollowed voids as full of sky, stars, or light taking the place of the lost scaffolding to situate Mary in a sky because of his openness. The project was an open work, only after the scaffold disappeared to reveal its own absence through a previously unimagined and unimaginable wall could Le Corbusier transform the two sides of the mirrored Mary wall into night and day.

Le Corbusier recognized traces that remained in the laborers' work and, while walking through the unfinished building one bright morning after the eastern wall was complete but not finished, saw something through the wall. But there is a different plausible scenario. Perhaps he took a late night walk – the

sky was clear and dark and filled with stars. He walked into his roofless building and saw a constellation through the openings – one of his own choosing or one that he recognized – and caught it to surround the opening that would eventually house Mary. It did not happen this way, there does not seem to be a doubled constellation of the sky, rather one of thought born from the eastern wall: an unfinished model constructed at full scale. And the sky and constellation appeared after it was constructed by the workers, requested by the pastor, and invented by Le Corbusier.

Images

Figure 1. Interior looking east and south, Chapelle Notre-Dame-du-Haut in Ronchamp. © Marcia F. Feuerstein , 1998 / 2019.

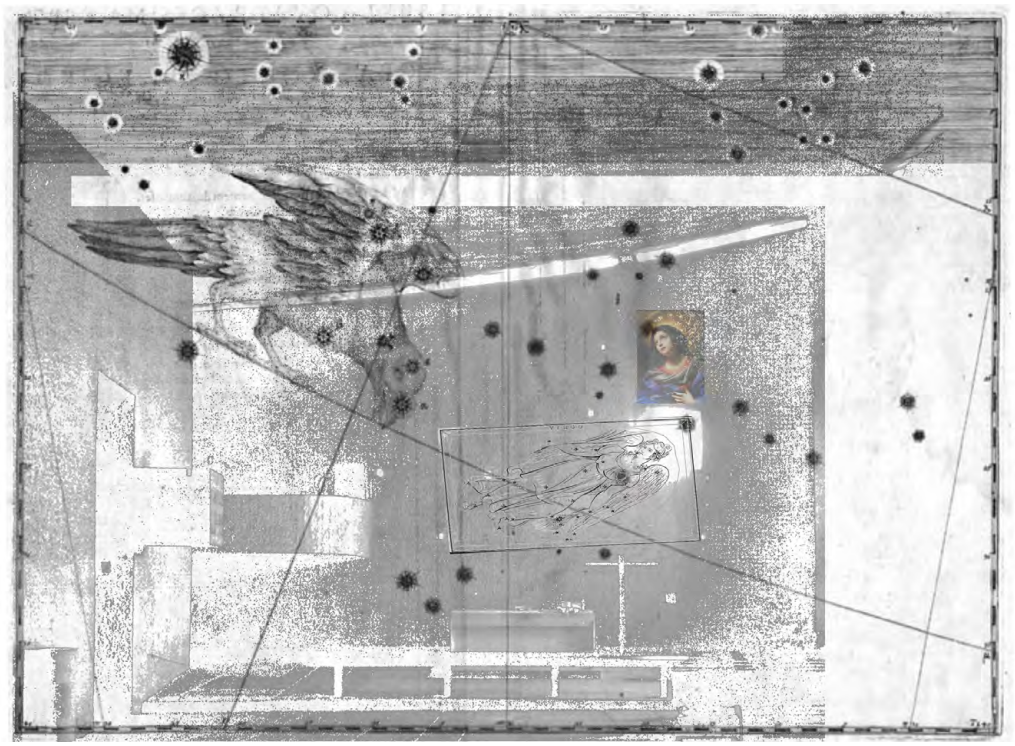

Figure 2. Montage: Eastern interior wall with its own starry sky with Corvus, Virgo and Madonna with a crown of stars. © Marcia F. Feuerstein, 2019 montage based on sampled images including Corvus, Virgo, and Madonna in Glory.

Figure 3. Montage: A starry night over Buenos Aires and the east wall.
Le Corbusier's drawing of Buenos Aires; Mary in Glory. © Marcia F. Feuerstein 2019.

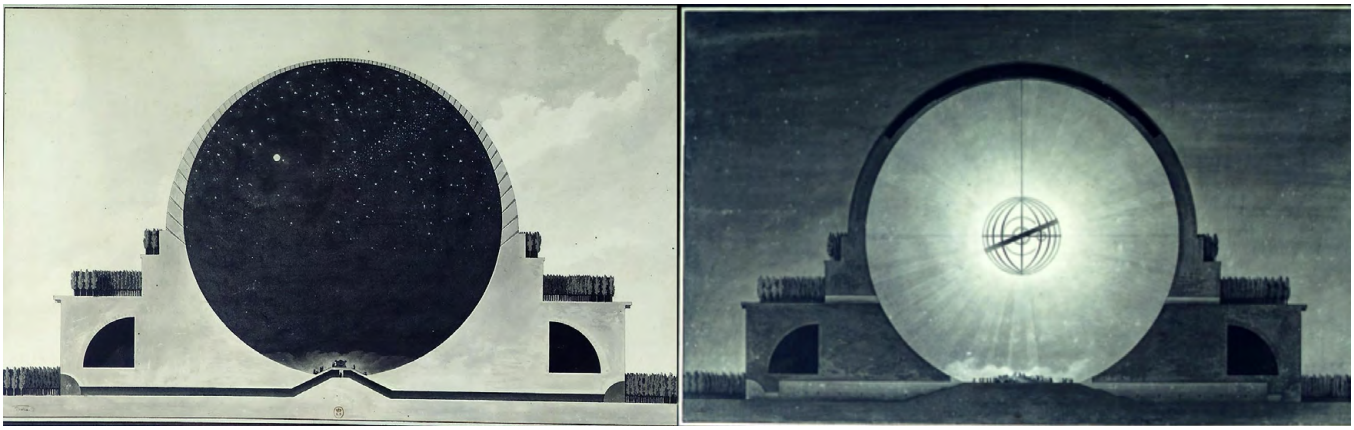

Figure 4. Étienne-Louis Boullée, Newton's Cenotaph day (left) and night (right)
(source of images: left https://gallica.bnf.fr/ark:/12148/btv1b7701015b/f4.item , right https://gallica.bnf.fr/ark:/12148/btv1b7701015b/f5.item , public domain).

Figure 5. Montage: " Look! Here are your stars!" Construction photos with Le Corbusier's sketches overlaid the grid of scaffolding holes. © Marcia F Feuerstein 2019.

Notes

1 Major pilgrimage services are on 15 August and 8 September.

2 Jose Oubrerie, "Architecture before Geometry, or the Primacy of Imagination," *Assemblage* 39 (Aug. 1999): 94-105. Recheck Firminy dates: https://sitelecorbusier.com/en/church/ https://www.archdaily.com/108054/ad-classics-church-at-firminy-le-corbusier

3 Peter Carl's generous comments to an early form of this paper discussed the importance of the taureau and *Le Poeme de L'Angle Droit*. See also Peter Carl, "The godless temple, 'organon of the infinite' ", *The Journal of Architecture*, Vol 10, No. 1 (2005): 63-90. 1360–2365 DOI: 10.1080/13602360500063147 and Peter Carl, "Architecture and Time: A Prolegomena"*, AA Files*, No. 22 (Autumn 1991): 48-65.

4 G. Hendricks, "Le Corbusier's Postwar Painterly Mythologies," in *Le Corbusier, 50 years later*, International Congress, Valencia 18th-20th November 2015, http://dx.doi.org/10.4995/LC2015.2015.828 http://ocs.editorial.upv.es/index.php/LC2015/LC2015/paper/viewFile/828/1312 accessed 10/29/19. See also Le Corbusier, "Sun and Moon," in *Ronchamp*, trans. Jacqueline Cullen, Oeuvre de Notre-Dame du Haut (Germany: Verlag Gerd Hatje, 1957/1991), 123.

5 Umberto Eco. *The Open Work*, trans. Anna Cancogni (Cambridge, MA: Harvard University Press, 1989), 1-23.

6 Daniéle Pauly. *Le Corbusier: La Chapelle de Ronchamp. The Chapel at Ronchamp* (Paris, Basel, Boston, Berlin: Foundation Le Corbusier, Birkhäuser Publishers, 1997), Author's note, fn3, 130.

7 Jean Petit, *Le Corbusier: Texts and Sketches for Ronchamp* (Geneva, Switzerland: René Bolle Reddat, Association Oeuvre de Notre-Dame du Haut, 1965). Fourth English edition, unpaginated.

8 Petit, 1st page. See also Robert Coomb. *Mystical Themes in Le Corbusier's Architecture in the Chapel Notre Dame du Haut at Ronchamp: the Ronchamp Riddle* (Lewiston, N.Y.: Edwin Mellen, 2000).

9 The raven is painted on the southern window and his sketch showing a constellation around the Mary statue is dated June 25, 1957, after the stars were added to the building. Le Corbusier, 1957/1991.

10 Le Corbusier. *Precisions* (Cambridge, MA & London: MIT Press, 1991), 206, 208, 209.

11 Etienne-Louis Boullée, "To Newton", *Architecture, Essay on Art*, Trans. Sheila de Vallée in Helen Rosenau, *Boulée & Visionary Architecture* (London, New York: Academy Editions, Harmony Books, 1976), 107.

12 'The Chapel of Ronchamp," *Architectural Design*,Vol 55, Issue 7/8 (1985): 31 – 40; Le Corbusier, "L'Espace Inducible", *L'Architecture d'Aujourd'hui* (January 1946): 9-10; Le Corbusier, *New World of Space* (New York 1948), 7-9. See also Daniel Joseph Naegle, "Le Corbusier's seeing things: Ambiguity and Illusion in the Representation of Modern Architecture" (January 1, 1996) http://repository.upenn.edu/dissertations/AAI9636188.

13 Coombs, *Mystical Themes in Le Corbusier's Architecture in the Chapel Notre Dame du Haut at Ronchamp: the Ronchamp Riddle,* 106,153. See also Groupe de Recherches Archeologiques de Montsegur et Environs (GRAME), *Montsegur* 13 ans de rechreche archeologique (Lavelanet, 1981), 76.

14 William Shakespeare. *Romeo and Juliet*, Act III, Scene II, Capulet's Orchard. accessed 1/3/2009, http://shakespeare.mit.edu/romeo_juliet/full.html.

15 Flora Samuel, *Le Corbusier: architect and feminist* (Great Britain: Wiley-Academy, 2004), 104-105.

16 Barbara Duden, *Disembodying Women: Perspectives on Pregnancy and the Unborn* (Cambridge: Harvard University Press, 1993); Ivan Illich, unpublished notes from a seminar led by Joseph Rykwert, for the PhD program in Architecture, University of Pennsylvania, 1995.

17 Petit, 5th page; Pauly, 87-88, 93 and foot notes 12, 25, 26.

18 Le Corbusier, 1957/1991. Sketches of east wall 106 (axonometric), 118, 132 and 135 do not include the stars while 133 does.

19 Leon Battista Alberti, *On the Art of Building in Ten Books*, tran. Joseph Rykwert, Neil Leach, Robert Tavernor (Cambridge, MA and London, England: The MIT Press,1988), 35.

20 Alberti, 36-37. Alberti wrote of projects built on time and within budget rewarded the architect when the building "contributes greatly to the dignity of the work and the esteem of its authors," citing two improbable building projects: an entire town built in a week and a temple in 15 days.

21 Oubrerie, "Architecture before Geometry, or the Primacy of Imagination", 94-95.

22 Le Corbusier, 1957/1991, photos, 91, 92. Gunite, the trade name for 'dry gunned' concrete, a mixture of cement and sand with water, then blown through a nozzle and sprayed onto a wall.

23 Pauly, fn. p. 58, 103, sketch p.95.

24 *Holy Bible*. (New International Version, NIV Biblica, Inc, 2011) accessed 10/23/19, https://www.biblegateway.com/passage/?search=Revelation+12%3A1-2&version=NIV.

25 Alice Camille, "In biblical fashion: Some of your favorite Bible characters wear their faith on their sleeves." *U.S. Catholic 83*, Issue 5 (May 1, 2018), https://go-gale-com.ezproxy.lib.vt.edu/ps/retrieve.do?tabID=T003&resultListType=RESULT_LIST&searchResultsType=SingleTab&searchType=AdvancedSearchForm&currentPosition=1&docId=GALE%7CA537031553&docType=Article&sort=Relevance&contentSegment=ZAHI-MOD1&prodId=PPRP&contentSet=GALE%7CA537031553&-searchId=R2&userGroupName=viva_vpi&inPS=true. Many other interpretations include a woman, about to give birth and the crown representing 12 tribes of Israel and the 12 disciples.

26 Pauly, *The Chapel at Ronchamp*, 98. The statue of Mary and child was saved from an earlier church, destroyed in 1913, and the second church.

27 Eugéne-Emmanuel Viollet-Le-Duc, *Lectures on Architecture*, trans. Benjamin Bucknall (New York: Dover Publications, 1987), 49. The newly constructed façade would be used, with light scaffolding designed with iron tie-bar trusses, to hoist materials rather than on heavy wooden timber construction.

28 L. Sprague de Camp, *The Ancient Engineers* (Garden City, NY: Doubleday & Co, Inc. 1963), 178. See also Hacque Heyman, *The Stone Skeleton: Structural engineering of masonry architecture* (Cambridge, UK; New York; Melbourne, Au: Cambridge University Press, 1995).

29 Michael Graves. "A Monumental Task" Interview by Margaret Warner." PBS NEWSHOUR, March 1, 1999, 12:00 AM EDT, http://www.pbs.org/newshour/bb/entertainment/jan-june99/graves_3-2.html accessed 3/10/1999. Michael Graves' scaffolding design, in 1999, for the Washington Monument, took 4 months to erect and cost 1/3 of the entire budget for the restoration. It was reused for a three-year restoration after an earthquake in 2011 caused extensive damage to the Mounument.

About the Author

Dr. Marcia F. Feuerstein, an Associate Professor at Virginia Tech, teaches theory and design. A scholar, architect and author, her images, writings, and photographs have been published in books and journals, including *Ceilings and Dreams* (2019/20), *Confabulations: Storytelling in Architecture* (2017), *Architecture as a Performing Art* (2013) and *Changing Places: ReMaking Institutional Buildings* (1992). Her work considers design through theories of the body, embodiment, performance, and theater. A graduate of University of Pennsylvania (Ph.D.), University at Buffalo (M.Arch.) and Tufts University, Feuerstein is a member of the AIA and a NYS registered architect.