

TRENCHES, WELLS, AND BOULLÉE'S PYRAMIDS

ALESSANDRO ROCCA

115 TRENCHES, WELLS, AND BOULLÉE'S PYRAMIDS
Ce genre d'architecture formé par des ombres est une découverte d'art qui m'appartient. (Etienne-Louis Boullée, *Architecture. Essai sur l'Art*. Folio 87)

TRENCHES , WELLS , AND BOULLÉE'S PYRAMIDS

The Terrarium is a microworld, an artificial, controlled environment, where the architectural form's geometry and materiality define the climate, light, and space. Therefore, The Terrarium is an interior, a separate place where matter prevails over the void, where stereometry serves to exclude, seclude, isolate, and preserve. Adolf Loos indicated the tumulus as the most effective and synthetic representation of architecture, especially by two factors: the truncated pyramid section, which uses the property of the earth to remain stable until the slope of the wall exceeds approximately forty-five degrees, and the measure, "six feet by three" which contain the dimension of the human body \downarrow . In the Egyptian pyramids, the most impressive and exalted (Rossi 1967) interpretation of the Loosian tumulus, the first character remains, the inclination of the wall necessary to make the accumulation stable, while the reference to the human body (or corpse) is lost and replaced by the immeasurable relation to the greatness of the divine. The pyramids are enigmatic because they are among the few constructions in which the relationship between inside and outside is incomprehensible and can be intuited, but not revealed, only by advancing into the tunnels that cross the darkness of the enormous compact mass. Observing the section of the pyramid of Cheops (aka Khufu), one reads a slender network of paths and rooms that occupies only a minimal part of the uninhabitable volume. The corridors drive to three superimposed rooms: the king's and queen's rooms and an underground, unfinished room about thirty meters below ground level. The access path to the rooms forks shortly after the entrance: the upward path reaches the queen, and further up, the king, the descendant, takes to the underground and mysterious, unfinished room. Ventilation ducts take fresh air to all the rooms, crossing the mass for tens of meters and piercing the monotonous continuity of the external surface in hatches placed over half the height of the building.

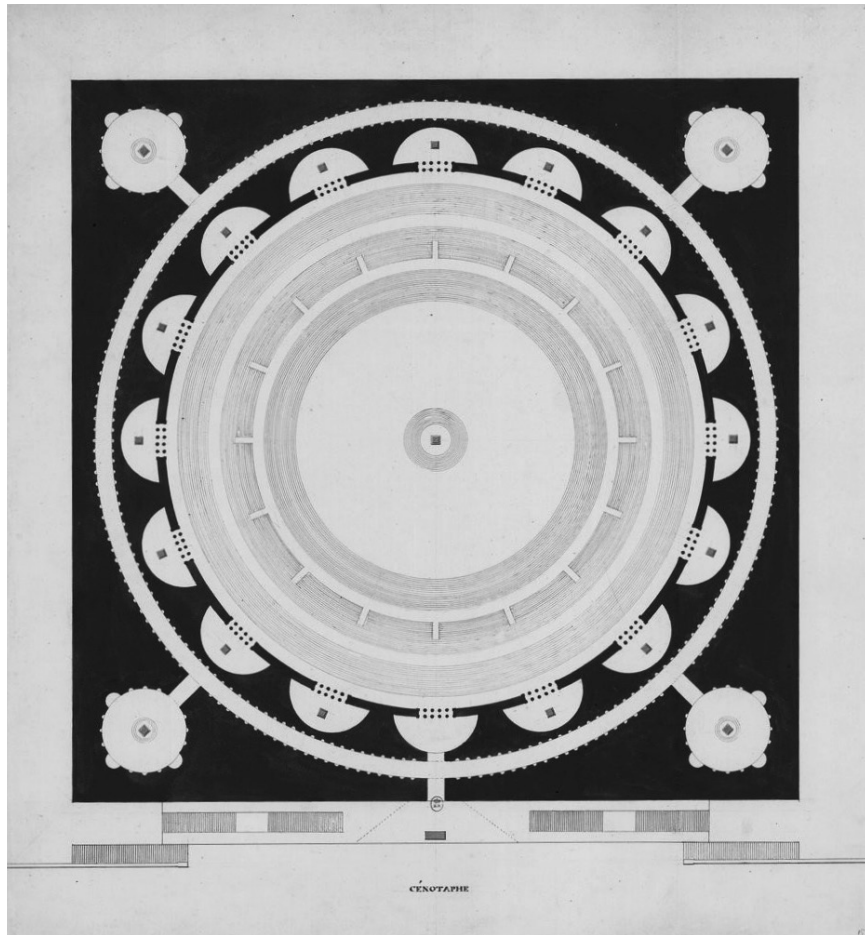
The pyramid crosses the history of architecture with countless reminiscences and reinterpretations. One of the most interesting cases is the project of the *Cénotaphe de Turenne*, designed in 1782, where Etienne-Louis Boullée reformulates the enigma in completely reversed terms.

Proposed as an entry for a consultation launched by the

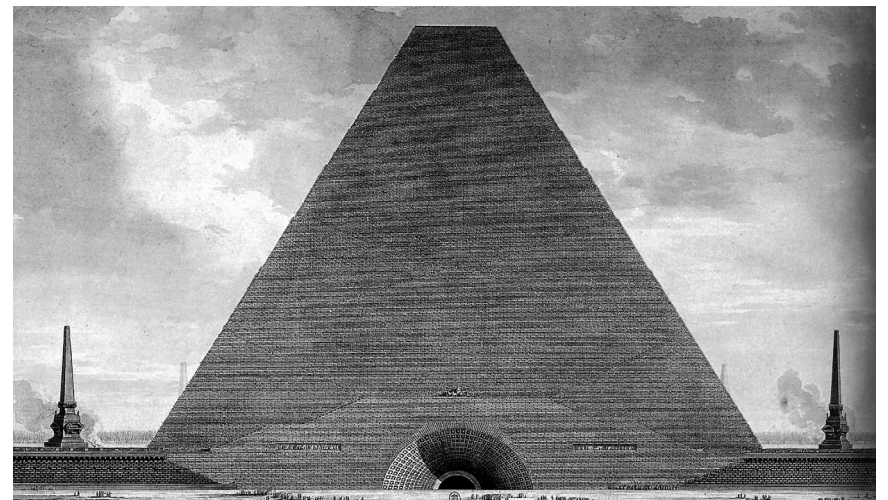
Etienne-Louis Boullée, *Section of the Turenne Cenotaph*, 1782;
Source: Bibliothèque Nationale de France.



Etienne-Louis Boullée, *Plan of the Turenne Cenotaph*, 1782;
Source: Bibliothèque Nationale de France.



Etienne-Louis Boullée, *Elevation of the Turenne Cenotaph*, 1782. Source:
Bibliothèque Nationale de France.



Academy of Architecture, the monument looks like a pyramid, just on the outside. In his text *Architecture, Essai sur l'Art* (Boullée 1953, pp. 105-106), in the chapter dedicated to “Funerary Monuments or Cenotaphs,” Boullée recognizes that “The Egyptians have left us some celebrated examples. Their pyramids are truly characteristic in that they conjure up the melancholy image of arid mountains and immutability”. Moreover, later, he points out that the patriotic value remembered by the cenotaph led him to the Egyptian reference: “I have assumed that the monument where the pyramid as formed by a quadrilateral has been erected in honor of a Hero who has saved his country by winning an important battle, during which he has met his death. The glorious death of the Maréchal de Turenne suggested this to me”. About the choice of the pyramidal shape, Boullée adds another point, strictly architectural: “I have given the pyramid the proportions of an equilateral triangle because it is perfect regularity that gives a form its beauty.” Further on, Boullée specifies: “I will not go into detail with regard to the cone-shaped Cenotaph” and this is a shame because the drawings, powerful and expressive as they are, leave essential aspects of the project in the shade. The plan, somewhat schematic, and the section, much more elaborate and surprising, have a complicated relationship and could correspond to two different buildings. The section displays a vast interior with a conical shape, while the elevation clearly states a pyramidal volume with a square base. The cenotaph has a circular funerary hall, a vast crypt sunken under the ground level, with a diameter of 160 meters (Hwang 2017), covered by a hemispherical dome and surrounded by a theory of semicircular chapels overlooking the central vault with round arches. The dome occupies the lower part of a conical pyramid, which continues upwards as a vast hollow volume, perhaps an acoustic and luminous resonance chamber. The only connection between the crypt and the conical volume is the oculus at the top of the dome. Then, it is difficult to understand why this immense, inaccessible space surmounts the dome.

Furthermore, it is even more challenging to interpret why this conical void is inserted or excavated inside a pyramidal container. Since the section line coincides with one of the two axes of symmetry, the thickness of the masonry that divides the conical interior from the pyramidal exterior is relatively thin. However, if we draw a section, for example, along one of the square's diagonals, we should represent a consistent thickness, probably hollow, between the external wall of the pyramidal envelope and the internal wall of the conical void.

Considering the drawings, Boullée elaborated the com-

position without caring about these four three-dimensional leftovers, which could be solid masonry or further interstitial spaces with other transparency effects. Looking at his other projects, we find a comparable solution in the design for a theater presented in 1781 following the fire that destroyed the Opera House of the Palais Royal. In this case, the roof is divided between a large, lowered vaulted roof and a ceiling with a central cusp. We find the opposite choice in the cenotaph dedicated to Isaac Newton (1784), where the virtual space between the vast spherical void and the square base is a solid mass. The compact mass is pierced by long and thin tunnels, as in the Egyptian pyramids, connecting the external to the lower point of the sphere, the center from which to contemplate the planetarium.

An unusual ambiguity remains in the Cenotaph of Turenne, compared to the Enlightenment programmatic rationalism that permeates Boullée's architecture. Aldo Rossi helps decipher this apparent contradiction between light and shadow, clarity, and obscurity, introducing the category of exalted rationalism: “Conventional rationalism claims to derive the whole process of architecture from principles, while this exalted rationalism, by Boullée and others, presupposes a trust (or faith) which illuminates the system but is outside it” (Rossi 1967, p. XXV).

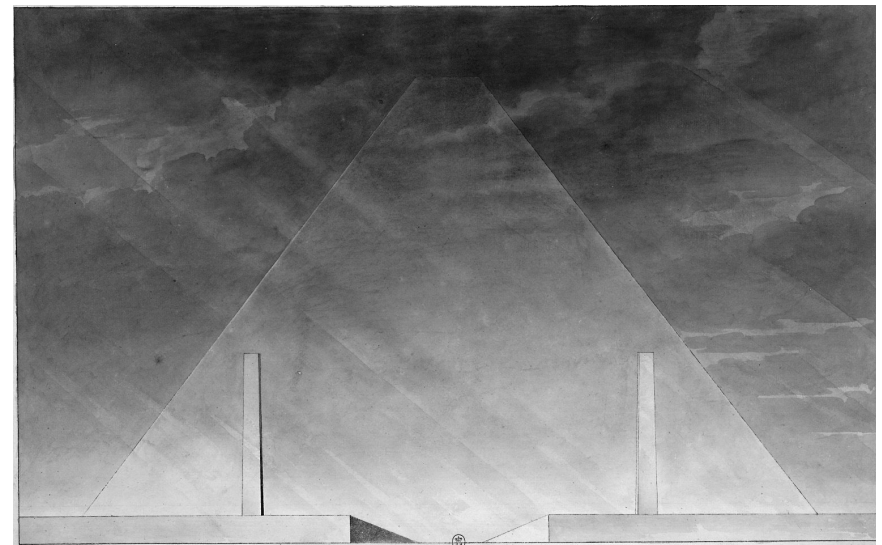
Moreover, it is incomprehensible how Boullée misses emphasizing his bold choice of including a cone inside a pyramid by introducing a geometric and typological hybridization of theoretical solid evidence; it could be a stunning demonstration of the centrality of the primary geometric elements. It is perhaps to bring order to an unresolved contradiction that four years later, in 1786, Boullée designed a *Projet de cenotaphe de style égyptien* in conical shape with a section that reproduces, almost entirely, that of Turenne, while the plan and elevation show a decidedly more coherent and straightforward building, thanks to the elimination of the coexistence of square and circle, in plan, and of pyramid and cone in section. However, in the same series of the Egyptian Cenotaphs appears the design of a pyramid with a square base which reports, on the triangular facade, a series of superimposed vertical elevations, like giant isolated steps, which could be a more elaborate variant of the three mysterious inaccessible galleries engraved on the walls of the pyramid of Turenne.

As it appears evident from the reading of Turenne's section, “the cenotaph was designed without the possibility of admitting the natural light” (Hwang 2014, p. 8), a point that has been explored carefully through virtual modeling processes.

However, doubt remains when observing how three gal-

leries with semicircular sections, strangely ignored by Hwang's modeling, run through the interior of the conical upper part at three different levels and seem to face outwards. Indeed, it is interesting and challenging to imagine the design of the galleries included in the space that separates the cone enclosed in the pyramid from the external wall. These galleries could seem to exist in another building where the conical shape is left naked, without the pyramidal cover. Looking at the elevation, one can read a network of symmetrical diagonal paths that go up the facade and meet at the possible entrances to the circular galleries. In any case, it remains surprising that the oculus, the large opening in the center of the dome, overlooks an immense space entirely, or quite entirely, blind. Boullée's section explains the Turenne interior spaces, inserting a fictional natural light penetrating the darkness from a non-existent source. The cenotaph, a monumental and commemorative version of the sepulcher, is therefore interpreted by Boullée as a modern version of the Egyptian pyramid, a colossal building mostly, even not totally, raised above ground. However, the underground condition of the sepulcher, earthy, chthonic, and humid, where the body returns to the vital cycle through the biological cycle of corruption and regeneration, is denied and replaced by a purely spatial cognition, "the architecture of the shadow" (Boullée 1968, p. 90) where darkness, stillness, and geometry are called upon to represent the absolute nothingness.

Etienne-Louis Boullée, *Cenotaph in the shape of a truncated pyramid*, 1781-93. Source: Bibliothèque Nationale de France.





One of the more significant monuments dedicated to the memory of the First World War's fallen soldiers is the Redipuglia memorial, designed by Giovanni Greppi and inaugurated on 18 September 1938. It is a colossal staircase of twenty-two steps, two and a half meters in height and twelve meters in depth. Embedded in the vertical walls of the steps are the bodies of over 39,800 recognized fallen soldiers, arranged in alphabetical order in niches covered with bronze plates; at the top of the ascent lie the remains of over sixty thousand unknown soldiers in two mass graves. At the foot of and around the memorial are trenches of various types, the armored one, with stone walls and concrete vaults, and others built with less refined technologies and probably more hastily. Other Austro-Hungarian trenches and tunnels, which Italian troops conquered and reused, are found on the hill of Sant'Elia, where the first necropolis of Redipuglia, inaugurated in 1923, was established. The transition from the necropolis to the memorial is based mainly on the reversal of the relationship with the land; the necropolis retraces, after the war, the excavation work undertaken in the battle for the construction of the trenches, a fundamental tool in the Great War, making it regular, architectural, maintaining and expanding a relationship with the land based on the descent into the subsoil. On the contrary, the memorial is an extroverted structure that transcribes the terrain into an architectural dimension, canceling its natural features, which remain irreversibly covered and hidden. In the necropolis, the burial of the bodies enhances the relationship with the ground; in the memorial, the earth is replaced by a series of gigantic stair risers and treads, a purely architectural and serial sequence decorated with sculptural elements and inscriptions, devoid of hierarchies and pauses, ordered according to the mechanical binary rhythm of the staircase, the hypnotic alternation between horizontal and vertical. The natural landscape, the woods that rise on the gentle slopes of Mount Sei Busi, remains as a frame that accompanies the warlike ascent of the terraced steps, like a bucolic context, on the two lateral edges.

In appearance, the memorial seems to have a landscape dimension and perhaps an intention; its visual impact from a great distance is powerful and has a geographical dimension. However, up close, walking the steps, the landscape idea disappears in the face of something more precise and more substantial: an architectural, constructive, and spatial coherence of the artifact, which presents itself as an infrastructure, as a colossal unitary object. The radical aspect, undoubtedly indebted to the futurist utopias and experiments, lies in the complete disregard for any relationship with nature. The memorial of Redipuglia is, in some respects, the premise of the project that Alberto Burri, about fifty years later, will carry out in Gibellina with his *Cretto* (1984-1989), covering with a cement blanket the compacted rubble of the ghost town, destroyed since the earthquake in 1968. As in the memorial of Redipuglia, the entropic, incoherent, wild aspect of the terrain is erased and re-transcribed in geometric, if not correctly, architectural terms. In the Redipuglia trenches, we perceive just the cleared land; in Gibellina, the design follows

the incoherent and tragic chaos of the houses knocked down by the earthquake. We can recognize a further interpretation of Burri's idea in the Berlin Memorial to the Murdered Jews of Europe, designed by Peter Eisenman after an initial collaboration with Richard Serra between 1997 and 2005. Again, the design invents the terrain's structure, matter, and geometry. As in Gibellina, the ground follows the natural trend, but the vertical elements obey, here more than in Gibellina, a purely architectural logic: "The design begins from a rigid grid structure composed of 2,711 concrete pillars, or stelae, each 95 centimeters wide and 2.375 meters long, with heights varying from zero to 4 meters". The exhibition space occupies a limited area of the entire square and remains hidden underground. Crossing the expanse of stelae is, therefore, a completely abstract space-time journey devoid of any geographical and historical reference, a formal synthesis of emotional efficacy but also, in the radical conceptualization, a labyrinth capable of placing a distance between the experience of the visitor and the memory of the Holocaust. Covering the ground, as in the monuments of Redipuglia, Gibellina, and Berlin, represents one of the most disruptive actions for the ecological balance: the infrastructures, starting with the cities themselves, must always at least pose the problem of disposing of rainwater, which they no longer have direct access to the permeable layer. Canals, lamination tanks, and spillways are some elements that guide the waters out of the anthropized space, hide them below ground level, and convey them into safety basins. Therefore, the relationship between water and land represents a theme that the project has always addressed, at least since agriculture has existed. Embankments, basins, cisterns, and irrigation ditches are essential for cultivating the land. The Lombard Canal system plows through the land of the Po Valley, carrying water from river to river, crossing and overlapping the network of waterways that descend from the Alps to the Po. In Milan, there is a plastic representation of this overlap, for example, in the intersection between the Naviglio della Martesana, which carries the waters of the Adda up to the Darsena, and the Lambro, which descends towards the Po, reaching it not far from Piacenza. In the north-eastern edge of the municipal area, not far from Cascina Gobba, the Martesana flows over a bridge that crosses the Lambro in an orthogonal crossing that plastically renders the double structure of the Lombard waters, the natural north-south, and the artificial east-west. One of the most iconic photographic series of the twentieth century is the collection of images that represent, in their nudity and, one could say, poverty, a large number of Water Towers scattered in the European and American countryside photographed over forty years starting from the sixties of the twentieth century. The towers are part of over two hundred collections dedicated to infrastructures and industrial objects such as gas holders and high voltage pylons, always treated according to the comparative principle of typological classification. Even independently of the Bechers' art of classification, the water towers are imposing artifacts, stereometric constructions that give shape to formless matter par excellence. Pillars, partitions, concave surfaces, and abstract volumes free in space remove the water from its

natural destination and keep it up there, isolated, suspended, and preserved, available in case of need, following a management criterion and a precise distribution plan.



Digging and accumulating are two primary actions that become architecture when pursued with explicit formal aims. For the excavation, in addition to the many examples of architecture and underground cities, we can recognize a moment of excellence in the Indian typology of the stepwell, the accessible well which, in many cases, in terms of size and, above all, for its spatial and constructive complexity, becomes a monumental presence exceptional that far exceeds the purely functional purposes of the hydraulic infrastructure. In the most important examples, densely present in the states of Gujarat and Rajasthan, the stepwells are extraordinary inverse architectures that grow downwards in the excavation of the ground and develop by organizing a void through an accurate spatial organization; the paths are vertiginous promenades architectures that allow to experience the difference in height and reach the bottom of the depression, while the walls of the excavation become wings with a theatrical impact, of great design and executive quality (Setti 2022). The most common plants are those with an elongated rectangular shape and the square ones; in both cases, the descent of the excavation necessarily follows a steep stepped profile, and, above all, in the case of the square shape, the stepwell looks like a real, inverted pyramid both in the inversion of top and bottom and in the inversion between full and empty. The vertical section is the fundamental drawing to understand the architecture, quality, and space of the stepwells, precisely the same for the pyramids. The mystery of the monumental constructions of Giza and the Mesoamerican temples is in the vast and inscrutable interior, in the immense mound of earth crossed by slender paths and air wells of which the pyramidal shape, smooth or stepped, is only the casing.



Digging the earth also always means piling up the earth.

As has been investigated by Chiara Pradel's research, the residues of excavation activities, for example, those to house the railway conduits that cross the Alps, produce accumulations of such a volume as to impose substantial changes in the landscapes which stow them; the project articulates in two interconnected but also autonomous actions that proceed in parallel: the excavation activity and the activity of moving, locating and drawing the material withdrawn (Pradel 2022). The process is the reverse of the quarry activity where the goal is not constructing a specific space but obtaining material from the earth. Mining is an intermediate situation where the extracted material is only a part of the material moved, which largely derives from the opening of passages, descents, tunnels, and equipment housed in the bowels of the ground. The accumulation of incoherent materials, ready to become "earth," is recorded following destructive events, such as earthquakes, wars, large-scale demolitions, or the deposit of waste materials, the waste which has become one of the

protagonist themes in the chronicle of the contemporary landscape (Corner 2005; Geroldi 2017; Hutchinson 2017; Lynch 1990; Melosi 2020). The architecture dug into the earth has an ancient military and defensive tradition: the catacombs excavated for early Christians, the secret tunnels that connected the fortifications underground, as in the admirable circuit of Verona (Zorzi 2019), the trenches of the First World War, the bunkers of the Second World War (Virilio 1975), the dystopian translation of daily life in American fallout shelters (Colomina 2006).

Etienne-Louis Boullée, *Cenotaph in Egyptian style*, 1786.
Source: Bibliothèque Nationale de France.

