Cenotaph to Newton
Etienne-Louis Boullée

Jennifer Clegg
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Amir Ameri
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"Sublime mind! Prodigious and profound genius! Divine Being! Newton!" These exuberant exclamations regarding Isaac Newton from Etienne-Louis Boullée's 1780 *Architecture, Essai sur l'art* may initially seem strange, but to fully understand why a French Enlightenment architect would be waxing poetic about a dead physicists, we must first gain an awareness of the social, political and philosophical context of the time, and to do that we must travel back to ancient Greece and beyond.

Throughout history, the ancient Greeks have been thought to represent a pinnacle of human thought and reason, placing emphasis as they did on the individual and attainment of knowledge, and specifically in relation to the built environment. Innumerable architectural treatises have extolled the exemplary qualities of the stone orders, harmony of proportion and optical superiority of ancient Greek architecture. Following the Greeks, the Romans were heavily influenced by the principles of Greek philosophy and architecture, although they made their own significant contributions to the field by creating new forms and enhancing existing building techniques with the addition of arches, domes and concrete construction methods, among others. Things changed with the rise of Christianity throughout the Roman Empire, and focus shifted from that of individual thought and reason to a more religious nature, which was mirrored in the built world of churches and monuments. Several hundred years later, the Renaissance of the fifteenth century brought about a renewed interest in humanist thought and a rediscovery of both Greek and Roman antiquity, which proved to be a strong source of inspiration and influence on numerous aspects of society, including art and architecture, for the better part of four centuries (Braham 9).

In the early part of the eighteenth century, Renaissance architecture had transformed from what was initially a fairly austere interpretation of classical ideas into Baroque and Rococo styles, characterized by dynamic movement and a high degree of ornamentation. According to art historian Emil Kaufmann, "in baroque architecture a dominant movement flows through a building and is reinforced by each part of that building. Every detail has to find an echo in every other detail, in an unbroken current. The result is that the decorative elements perpetually compete with one another for attention. …The end product was rococo, which seemed to deny that stone was really stone at all. The style exhausted itself; a renewal was needed" (Lamagny

13). While the Renaissance and Rococo movements were less evident within French architecture, the French historically taking a narrower path when it came to the interpretation of classical architecture, this renewal of style was nevertheless very much experienced within France and came in the form of Neoclassicism.

Coinciding with this renewal of style was a new social and intellectual movement, known today as the Enlightenment, which in some ways was a continuation of Renaissance humanist ideals, but also took into account the recent Scientific Revolution, where numerous discoveries concerning mathematics, physics and the universe as a whole were made. In addition, new attitudes regarding the essential "goodness" of man and the power of reason were introduced by philosophers such as John Locke and Jean-Jacques Rousseau (Trachtenberg 376). There was a growing idealist belief within society that rationalist thought and subsequent action could offer new means of improving humanity. This movement not only had a significant impact on forthcoming political revolutions, but on various cultural aspects of society, including art and architecture.

Amidst the focus on reason and scientific discovery that were hallmarks of the Enlightenment, there was also a strong undercurrent of non-rationalism, which manifested itself in the cultural phenomenon known as the Picturesque and the Sublime. The idea of the Sublime was initially conceived by a Roman-era Greek literary critic who stated that, "the Sublime does not persuade audiences but rather transports them out of themselves... For true greatness is something that enriches the thoughts, something that is hard, if not impossible to gainsay, something that leaves an enduring, indelible memory" (Guerlac 275). This notion of the Sublime was given an aesthetical connotation in the eighteenth century, most notably by the British and Prussian philosophers Edmund Burke and Immanuel Kant. According to Burke, sources of the Sublime were "productive of the strongest emotion which the mind is capable of feeling" (Lopez 45), and one experiences the Sublime through encounters with the awesome grandeur of Nature (Etlin 120). With regard to architecture, Burke stated that light was an important characteristic, and that structures meant to produce an idea of the Sublime should be dark and gloomy. Similarly, Kant wrote that experiences of the Sublime were more than merely beautiful, and stated that, "the Sublime moves, the beautiful charms" (Lopez 45).

In France, the Neoclassicism movement within architecture occurred in four distinct phases: Structural Neoclassicism, Archaeological Neoclassicism, Radical Neoclassicism, and Revolutionary/Visionary Neoclassicism. Structural Neoclassicism was articulated in the built work of architects such as Jacques-Germain Soufflot and his church of Ste-Geneviève, and in the written work of Père Laugier, a Jesuit priest who was the most significant architectural theorist of the mid eighteenth century (Trachtenberg 394). In his most influential book, Essai sur l'architecture of 1753, Laugier argued for a reform of architecture that was founded on the absolute ideal of Vitruvius's "primitive hut", from which he claimed that all architecture should be based. Consisting of four trees, which served as supports, holding up a lintel and roof comprised of logs and branches, Laugier argued that these elements of the primitive hut were the foundation for the exclusive use of the column, entablature and pediment. He further elaborated that architecture should have a clearly visible support system directly beneath it, and therefore did not approve of structural systems such as arcades, cantilevers and arch supports. Based on his writing, it seems likely that Laugier was influenced by the prominent philosophers of his day, including that of Jean-Jacques Rousseau, who advocated for a return to the purity of the natural primitive state of humankind (Braham 48-49).

Another important French classicism theorist of the time, Jacques-François Blondel, who was a prominent architectural teacher in Paris, was also a proponent of the writing of Vitruvius and a strong advocate for a return to what he considered to be the great traditions of seventeenth-century French architecture. At his school, he taught "the early simplicity, beauty and proportions of ancient architecture", and regarded the famous French architect François Mansart as "the god of architecture" (Braham 37-38). In addition to arguing for the structural legibility of a building, Blondel also maintained that a building should say something about its typology, mostly through its massing as opposed to any decorative elements, an idea that was further elaborated by later theorists of the Revolutionary Neoclassicism phase (Etlin 14).

The next phase of Neoclassicism, Archaeological Neoclassicism, somewhat overlaps with that of Structural Neoclassicism, and was a result of the recent archaeological discoveries made regarding ancient Greek and Roman architecture. The goal of this phase was that of "magnificence, solidity, and clarity of antique models with the traditions of French Classicism"

(Trachtenberg 394). Architect Ange-Jacques Gabriel's Petit Trianon of 1761 best exemplifies this phase of Neoclassicism with its clear inspiration of Greek architecture in the form of harmonious proportions and elegant detailing, combined with French Neoclassical elements such as cubic geometry and restrained articulation of the facade.

It was within this context that Etienne-Louis Boullée entered the architectural profession. Born in Paris in 1728, as the son of an architect employed by King Louis XV, Boullée initially studied painting under Jean-Baptiste Pierre, however he was later compelled by his father to pursue architecture and thus became a pupil of Jacques-François Blondel (Montclos 11). As a student of Blondel, Boullée became familiar with French Classical works, and even wrote in his 1780 *Essai sur l'art* about his admiration for the east front of the Louvre which was considered by many to be the best examples of French Classical architecture. The architect responsible for the east front of the Louvre, Claude Perrault, was the leading French architectural theorists of the previous century who advocated for a return to rationalism within the profession (Trachtenberg 394).

Another important influence on Boullée as a student was that of Jean-Laurent Legeay, a French architectural author and teacher who traveled extensively throughout Europe and was considered by some writers of the time to be a major influence on the revival of classicism. Legeay spent several years in Rome, and while there he created numerous engravings of Roman architecture that were popular with his students upon his return to France. Also during his stay in Rome, he met the engraver Giovanni Battista Piranesi, who some historians speculate is partially in debt to Legeay for the artistic inspiration of his renowned 1756 depictions of ancient Roman ruins. Legeay conveyed to his students an alternative point of view from that being taught by Blondel, which included an appreciation of Roman antiquity and a less rationalist and more imaginative approach to architecture (Braham 53). Legeay is also credited with introducing perspectival drawings into architectural education in France, with the intention of better conveying design ideas. This drawing technique created a new relationship between orthographic and a more imaginative type of drawing that conveyed artistic feeling in the manner of Piranesi (Montclos 29). Both the teaching of Legeay and the engravings of Piranesi were directly responsible for the large number of French architecture students who travelled to

Rome to study at the Academy there, which in turn had a significant impact on architectural designs in France during the latter part of the eighteenth century.

Boullée himself never travelled to Rome, or really anywhere outside of Paris, but he was familiar with, and most likely greatly influenced by, the work of Piranesi. Rather than travelling, when he was only eighteen Boullée began teaching at the Ecole des Ponts et Chaussées where he was a favorite among the students and was known for his enthusiasm (Lemagny 16). In 1762 he became a second-class member of the Royal Academy of Architecture, and a first-class member in 1780; during the French Revolution he became a founding member of the Institut de France in 1795. Boullée's earliest work consisted of mostly interiors, beginning with the decoration of the Chapelle du Calvaire in St-Roch (Braham 111) where his theatrical lighting design won both praise and condemnation, and even set design which he completed for Jesuit fathers at the College Louis-le-Grand (Montclos 28).

In the 1760's, the next phase of Neoclassicism, Radical Neoclassicism, emerged in the work of architects such as Marie-Joseph Peyre, Charles de Wailly, and Jacques Gondoin. Both the general air of passionate idealism found throughout society at the time and the visionary work of Piranesi became more evident in this phase of Neoclassicism, particularly in the work of Gondoin who was a personal friend of the engraver. This idealism "compelled architects toward an uncompromising purism and the favoring of forms more sever and even larger-scaled than those of antiquity itself" (Trachtenberg 397). The Radical Neoclassicism of Peyre and de Wailly is best illustrated in their joint design of the Théâtre-Français, completed in 1770, with its purity of form and minimal embellishment. As for Gondoin, who is considered to be the most daring of the Radical Neoclassicist, his École de Chirurgie, completed in 1775, was considered at the time to be the masterpiece of eighteenth-century architecture (Trachtenberg 398). For the design of the Anatomy Theater portion of the building, Gondoin took inspiration from the ancient Roman theater, and even created a coffered, domed ceiling complete with half-oculus, similar to that of the Pantheon. Also of note was the street façade and colonnade that "defied the entire French tradition—e.g., the Louvre" with its straight line that intentionally lacked pavilions and failed to break up the massing (Trachtenberg 399).

Around this time, from 1762-1774, Boullée's work was mostly comprised of both interior and exterior domestic architecture, including small Châteaus and town houses, and was characterized by an adherence to French classical themes in the manner of Mansart. He also competed unsuccessfully for larger commissions within the public sector, such as for the Hôtel des Monnaies (Royal Mint) in 1762, which he lost to Jacques-Denis Antoine despite winning first place in the design competition for the project at the Academy of Architecture. His most famous project from this period was a town house built for the Marquise de Brunoy in 1774. It is believed that he was highly influenced by Soufflot in the temple theme that he applied to the domestic setting (Braham 112), although he took this concept further and pushed the limits of French Classicism by actually crowning the garden side with a truncated, stepped pyramid topped by a statue of Flora (Figure 1), a move that brings to mind ancient Egyptian architecture (Montclos 18).

Two themes that Boullée explored during this time, which had an impact on his later work, include that of overhead lighting and the relationship between nature and architecture. On overhead lighting, Boullée incorporated skylights into his work as a means of bringing in natural light while allowing for an uninterrupted façade, which he stated was to prevent "that thinness of effect which comes of having too many openings….that make the piers too narrow, so that the house is reduced to a kind of lantern of intolerable monotony" (Montclos 19). Boullée also used skylights in order to create a sense of "diffusion and illusion" within his buildings by employing a double dome similar to that of Mansart and his church of the Invalides.

Regarding his exploration of the relationship of nature and architecture, it is believed that he had a strong interest in landscape architecture, however very few landscape designs, besides those at the hôtels he designed in Paris, have been attributed to him. One of his most notable landscape designs is that of the garden at the Hôtel de Brunoy. The garden façade "sprang to life" and was seamlessly incorporated into the landscape (Braham 113), and in order to allow uninterrupted sightlines from the street to the house, Boullée sunk the front garden paths below ground level and covered them with greenery, a move that earned the garden mention in the local guidebooks of the time (Montclos 20).

One can hardly discuss Boullée's work at this time without also mentioning that of one of his most notable contemporaries, Claude-Nicolas Ledoux, as the trajectory of his designs closely mirrors that of Boullée's. Following with prominent architectural theorists of the time, it was crucial to Ledoux that the function of his buildings was recognizable, specifically in regard to the formal qualities of the structure (Trachtenberg 399). One of his most notable buildings, which exemplifies the progression from Radical Neoclassicism to Revolutionary/Visionary Neoclassicism, is the unbuilt project for the River Inspector's House (Figure 2), which was part of his ideal city of Chaux. Entirely geometric and monumental in scale, the structure was firmly integrated into the natural surroundings and consisted of a single cylinder resting on a cubic base; the building was designed to have the river running directly through and pouring out from it. Though purely conceptual, the design showed a clear break from the historically inspired designs of Neoclassicism seen so far, and was a telling sign of ideas to come, both later in the eighteenth-century and beyond.

As the phases of Neoclassicism moved firmly into the stage of Revolutionary/Visionary, it's important to note a few things regarding the changing social and political climate of the time. The influence of Jean-Jacques Rousseau had grown, and ideas from his 1762 *Social Contract* regarding the unquestioned rule of kings versus the inalienable rights of the people had taken hold. He also contributed to the movement of non-rationalism with his writings on the "life of the sentiment", specifically in regard to the effects of nature and feelings related to the perception of nature. Influence from England also played a part in the cultural climate of the time, bringing to France such influences as the English Landscape Garden, the Picturesque and the Sublime, as well as the idea of melancholy as it related to architectural ruins (Trachtenberg 400). In 1774, Louis XVI came to power and with his reign came corruption and exploitation, which caused additional unrest among the people of France. In 1789, the French Revolution began and marked ten years of upheaval that caused major disruptions across all aspect of life in France, including art and architecture.

Around this time, Boullée moved from designing mostly domestic architecture into the realm of public works, and in 1775 was appointed Chief Architect to Comte d'Artois, the kings brother, a post he gave up in 1777, and in 1778 was appointed to the post of General Controller

of Buildings at the Hôtel des Invalides. In 1780 he remodeled the former Hôtel de la Force into the Prison de la Grande-Force, and was also invited by the Director of Buildings to submit a design for the remodeling of the Palace of Versailles. His design for Versailles was not chosen, however he was appointed to the position of Controller of Buildings at the Ecole Militaire at this time (Montclos 117). He continued unsuccessfully to submit proposals for additional prominent public works, including those of the church of the Madeleine, finishing the church on the Montagne Sainte-Geneviéve after Soufflot died in 1780, and the rebuilding of the Palais-Royal after in burned down in 1781 (Montclos 23).

Despite Boullée's unsuccessful attempts to win public work commissions, the conceptual projects that he produced during this time, for teaching purposes as well as to elucidate his theories, are what made him one of the most visionary architects of his time. Consisting of numerous unbuildable designs as well as written theories, Boullée pushed the principles of Neoclassicism well past their known limits with his compositions of purely geometric forms that were severe in their lack of adornment. In addition to being influenced by ancient Roman architecture, Boullée seems to have been strongly inspired by the highly geometric forms of ancient Egyptian, pre-Columbian American and Near East ziggurat architecture, which he stated were capable of producing "the image of immutability" (Montclos 35). These influences were seen in his work as early as the modified temple design for the Hôtel de Brunoy. Many of Boullée's conceptual drawings seem to have been inspired by actual public work buildings being commissioned in France at the time, such as those for his Projects for an Opera House, Museum, and Royal Library. However, the relative buildability of these designs is questionable and varies greatly.

Incorporating ideas absorbed from Blondel regarding the form of a structure speaking to its typology, Boullée took this concept a step further and attempted to illuminate the *character* of a building through the feeling it might evoke with its formal composition (Etlin 15). In his theoretical writing he elaborated on this concept and explained in his "theory of bodies" that certain formal characteristics had the ability to stir our senses, specifically that "circular bodies please our senses because of their smooth contours; angular bodies are displeasing because of the harshness of their forms; bodies that crawl over the ground sadden us, those that rise into

the sky delight us and those that stretch across the horizon are noble and majestic" (Montclos 38). Of the various geometric forms, Boullée seems to have been most taken with that of the sphere, whose perfect symmetry and roundness could best be enhanced by various lighting conditions. Of the sphere he stated that, "of all bodies, it offers the largest surface to the eye, and this lends it majesty. It has the utmost simplicity because that surface is flawless and endless" (Trachtenberg 407). In addition to employing the use of multiple basic geometric forms, Boullée also incorporated elements such as freestanding columns, the circular drum, the ring colonnade, and the dome into his designs (Etlin 106).

Boullée's conceptual drawings have been described as "occupying an ambiguous position midway between painting and architecture" (Braham 111), and indeed they give the impression that he never truly gave up on becoming a painter, despite his long career in architecture. An important element of the designs is the atmosphere in which he portrays them, and it is here that we most prominently see his interest in creating a Sublime architecture, and why some consider his work to be the visual contemporary to Edmund Burke and Immanuel Kant's writing (Lopez 45). Through the use of strong side-lighting, Boullée employs what he termed the "architecture of shadows", a concept he claimed to be the inventor of after an experience he had on a walk in the woods at night. On this walk, the shadow cast by the moon onto the trees made "the most profound impression" upon him, of which he stated: "I realized, then, the somber things of nature. What did I see? A mass of objects cast in black under a dim pale light. To my eye, nature seemed to be dressed in mourning. Arrested by these feelings, I decided to apply them to architecture from that moment on" (Lopez 46). He later wrote that the most powerful architecture was not three-dimensional forms or two-dimensional images, but the "illusory forms of darkness they create" (Trachtenberg 406). Several of Boullée's conceptual projects are for funerary monuments, and one has to wonder if these designs were entirely inspired by mournful shadows, or if the shadows simply helped elucidate the character of his chosen typology. In addition to the use of hard light and shadows, Boullée combined other elements such as ominous clouds, ant-like humans, and a far-away perspective to suggest otherworldly power and mystery and inspire a sense of terror and awe in his visionary architecture.

In 1784, Boullée created what is arguably his most famous design, that of the Cenotaph to Newton. Boullée, who had portraits of both Copernicus and Newton hanging in his study (Montclos 40), was greatly influenced by recent cosmological discoveries and seems to have been particularly in awe of Newton for his mathematical calculations regarding the movement of planets and the shape of Earth. Even though Newton is known for discovering that the earth is not in fact a perfectly round sphere, Boullée stated that, "O Newton! If by the range of your vision and the sublimity of your Genius, you have determined the shape of the earth, for my part I have conceived a project to envelope you with your discovery" (Braham 116), and then chose to use the form of a monumental sphere resting in the drum of a cylindrical base in his design. The exterior of the spherical form represents the earth while the hollow, temple-like interior is meant to act as a planetarium with the shrine for Newton at its base. At the time, construction of such a monumental building would not have been possible without major modifications to the design, which demonstrates the importance to Boullée of establishing his theories to both his students and the larger architectural community of the time rather than actually having his designs built.

Surrounding the exterior of the structure are concentric rings of colonnaded trees on three separate levels: four rows on a round, stylobate-like platform, accessed by a monumental staircase, another four rows atop the main drum-base level, and two more rows atop a smaller cylindrical drum ring that surrounds the sphere. The trees are cypress, which are associated with mourning in Greek and Roman culture. Entrance to the cenotaph is accessed via the monumental staircase, then through a semicircular opening on either side of the base of the cylindrical drum (Figures 3 and 4). Once inside, you travel through a long, seemingly unlit tunnel that eventually moves up in elevation and takes you to the center of the sphere, at which point you climb through an opening onto a platform, atop which sits the empty sarcophagus of Newton. Boullée stated that his intention was to place Newton in the heavens, and from where the sarcophagus sits, the whole of the interior of the sphere is open to you, like an enormous sky where the interior lighting condition is in stark contrast to reality, further enhancing a feeling of other worldliness. Pierced into the shell of the sphere are numerous tiny openings, which during the day create "the illusion of stars suspended in the infinite universe" (Lemagny

28), and at night, an enormous light in an armillary sphere that hangs from the ceiling is lit up and provides the effect of a day in full sun (Figures 5, 6, 7). Within this vast expanse of space, only Newton's sarcophagus is able to anchor the viewer, which according to some scholars is meant to act as an analogy to Newton's most renowned discovery, the force of gravity. (Etlin 122).

Boullée died in Paris in 1799, just a few months before the end of the French Revolution. Much like the events that led to the French Revolution itself, Boullée's revolutionary designs "challenged an order which had been accepted by all Europe for three centuries" (Montclos 43) and have had a lasting impact on architects ever since. The immediate influence on his students could be seen in work that was produced in the nineteenth century, and later his theories regarding geometric forms, architecture as it relates to nature and concepts of the sublime were used by twentieth century architects, notably Le Corbusier, Frank Lloyd Wright, Louis Kahn and Aldo Rossi, the latter of whom paid homage to the architect by translating his treaties into Italian (Montclos 44). Some scholars speculate that his monumental designs also provided inspiration for the symbolic architecture of various political powers, including that of the Soviet Union and the Third Reich. Positive or negative, the visionary concepts, theories and exclamations offered by Boullée will likely continue to inspire new architectural ideas and revolutions for generations to come.

Images

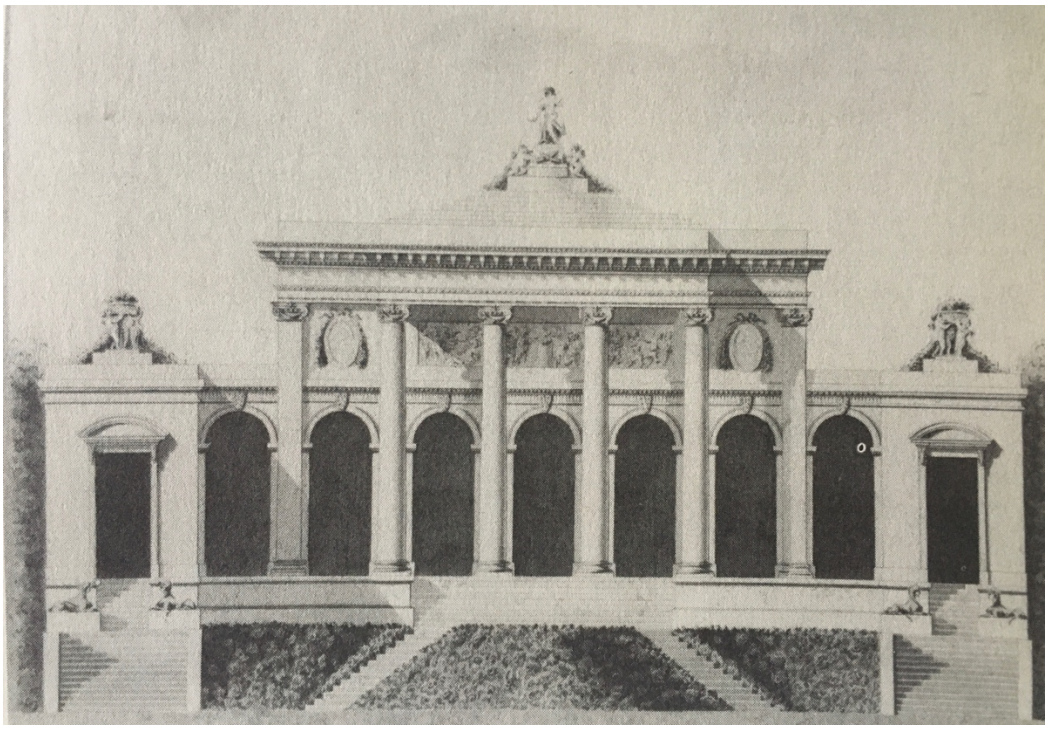

Figure 1

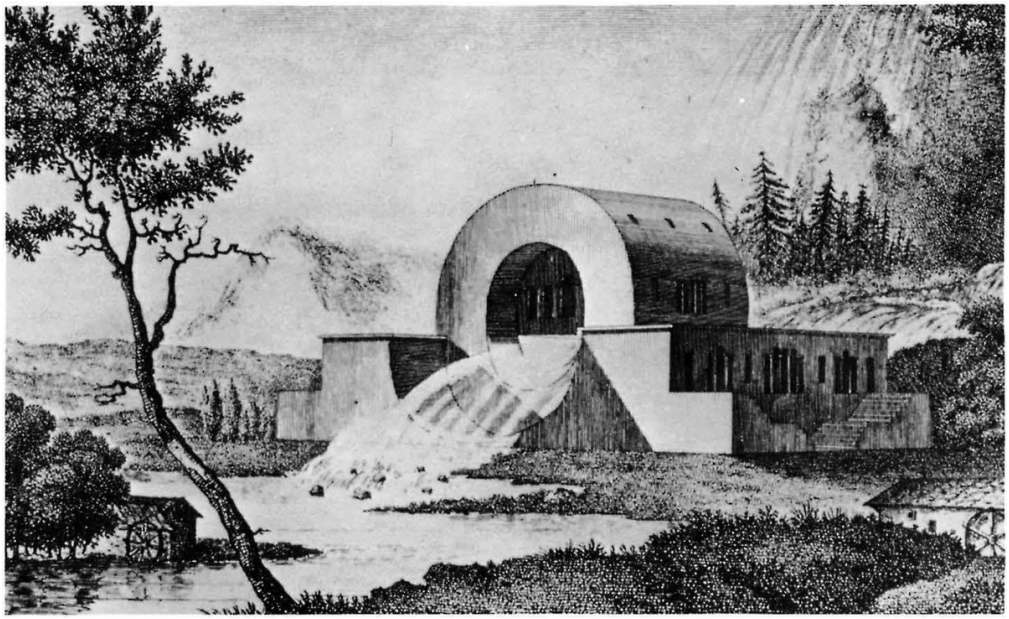

Figure 2

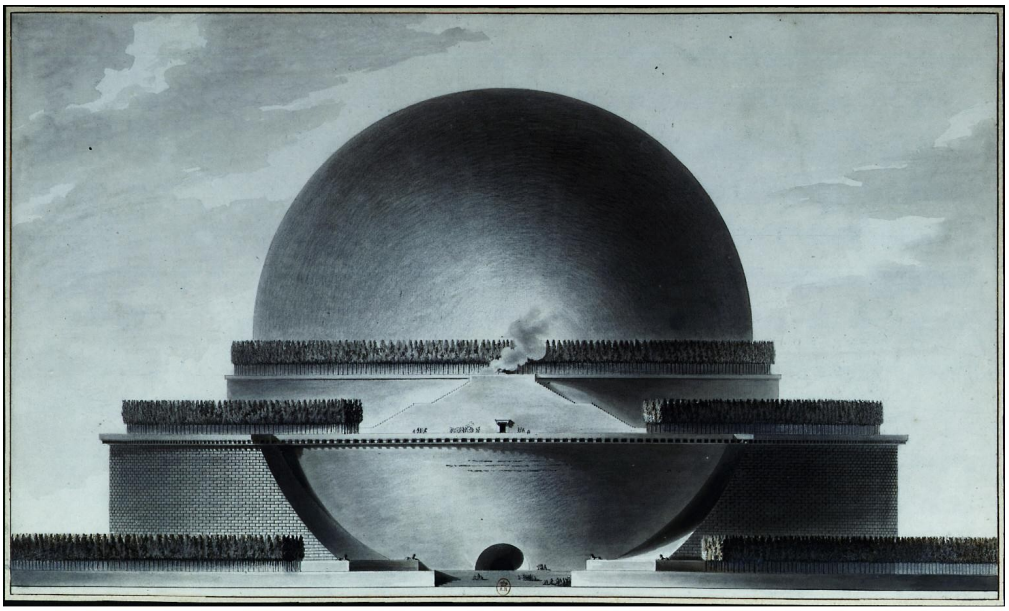

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Figure 3

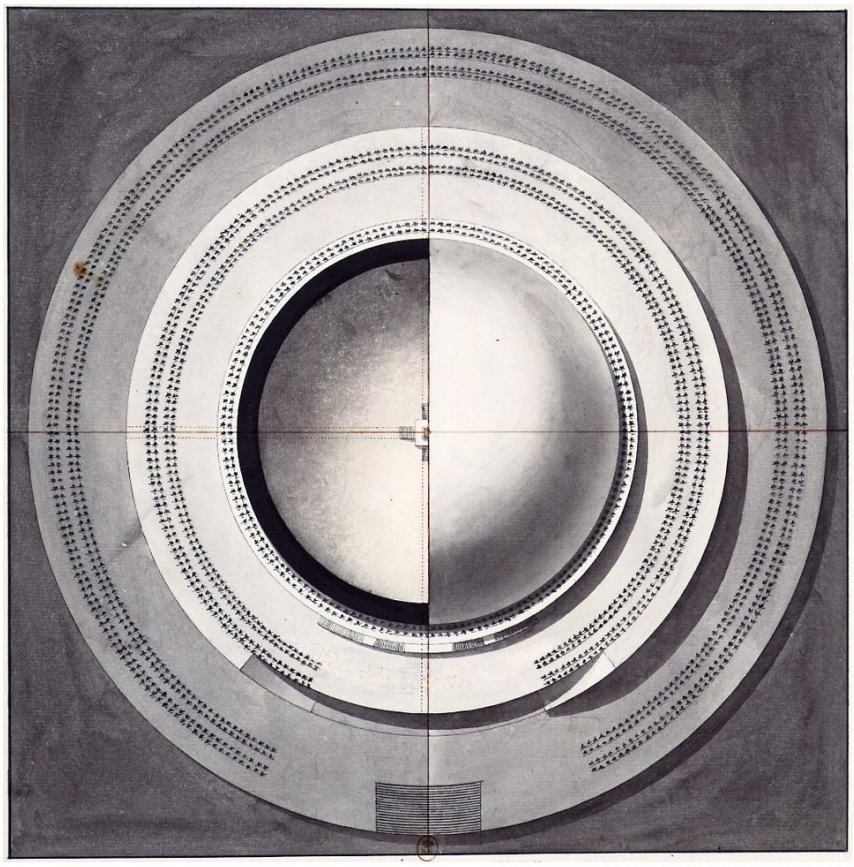

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Figure 4

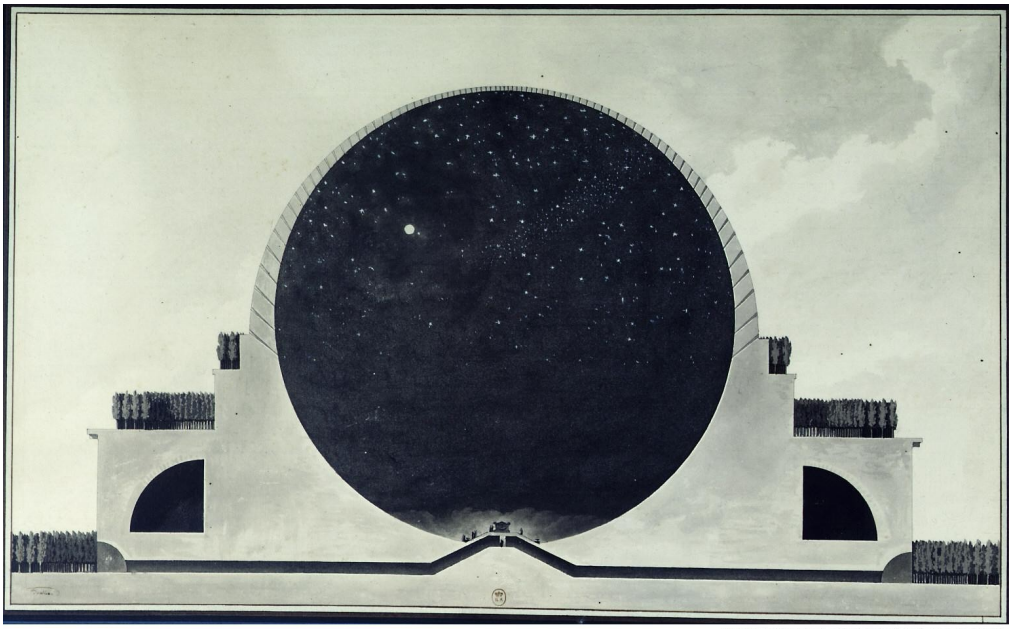

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Figure 5

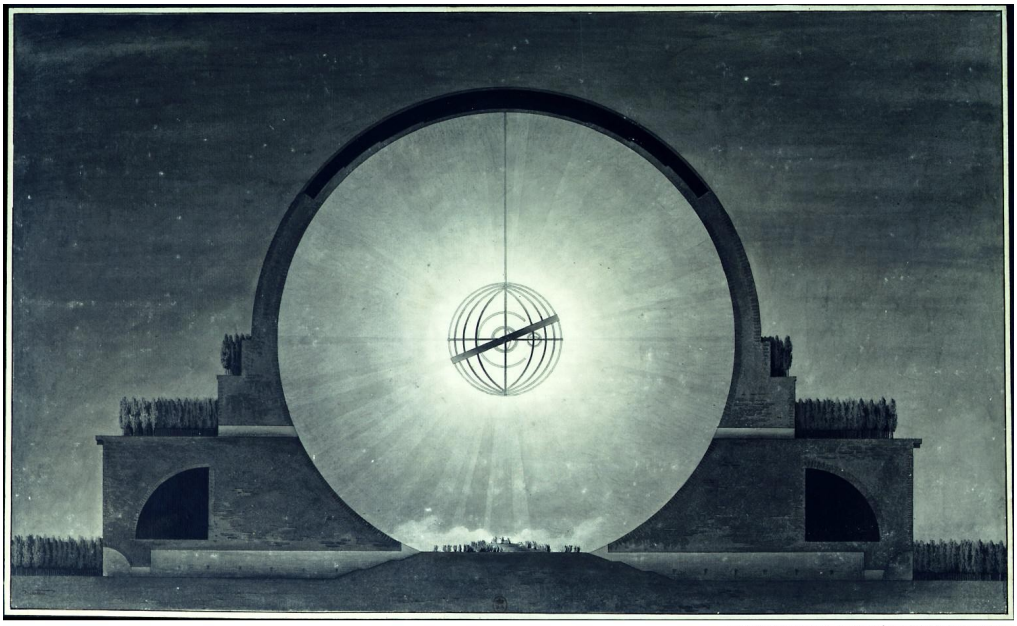

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Figure 6

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Figure 7

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