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## THE SPHERE IN ARCHITECTURE AS AN EXAMPLE OF AN ELEMENTARY FORM

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### KULA W ARCHITEKTURZE JAKO PRZYKŁAD FORMY ELEMENTARNEJ

#### Abstract

This article is an attempt to analyse the use of the sphere in contemporary architecture in connection with first historical examples of designing with the use of this solid figure. The strong form, introduced by architects as a shape with complex symbolism, conveys various ideas contained in design projects. At the same time, the sphere reflects the tendency towards elementarisation of form, replacing figurative architecture with abstraction. Such a phenomenon constitutes a peculiar paradox in connection with the fact that spherical buildings are some of the most famous examples of *architecture parlante* in the Enlightenment.

**Keywords:** architecture parlante, sphere

#### Streszczenie

W artykule podjęto próbę analizy wykorzystania formy kuli w architekturze współczesnej w powiązaniu z historycznymi, pierwszymi przykładami projektowania z zastosowaniem tej bryły geometrycznej. Silna forma, wykorzystywana przez architektów jako kształt o złożonej symbolice, przekazuje różnorodne idee zawarte w projektach. Jednocześnie kula odzwierciedla tendencję do elementaryzacji formy, zastąpienia architektury figuratywnej przez abstrakcję. Takie zjawisko stanowi swoisty paradoks w powiązaniu z faktem, iż kuliste budynki są jednymi z najbardziej znanych przykładów oświeceniowej *architecture parlante*.

**Słowa kluczowe:** architecture parlante, kula

## 1. Introduction

*Das Dasein ist rund, being is round*, Gaston Bachelard wrote in *The Poetics of Space*. At the same time, a traditionally understood architectural structure – consisting of walls and a roof – is an orthogonal space. There are, however, examples of the use of a form in construction that is – apparently – so different from archetypical human dwellings. This form is the sphere – the solid that opposes the force of gravity and the requirements of function. At the same time, the spherical space symbolically corresponds to the first ‘place of residence’ of each person – the human womb. Thus, it is ontologically connected with habitation. According to Rudolf Arnheim, the prototype of an independent dwelling is a bird’s egg [2, p. 55].

Architectural literature does not devote much attention to the sphere in the art of building. Spherical architectural structures are rarely constructed; in most cases, they remain within the realm of utopian projects. While the cuboid is a solid archetypically attributed to buildings (e.g. Laugier’s hut), the form of the sphere is closer to the interior hollowed out in the cave. Analysis of the proportions of the Roman Pantheon reveals the interior that ideally contains a sphere.

However, in both historical and contemporary architecture – such as ‘paper’ *architecture parlante*, Fuller’s high-tech visions, buildings from the twentieth and twenty-first centuries – there are few characteristic examples of spherical structures. The aim of the analysis of architectural literature and the structures themselves, both on the basis of drawings and original descriptions or articles in professional journals, is to answer the question about their ideological origin, design problems related to the spherical shape and the way they are solved by architects.

The research problem addressed in the following paper is the symbolism of the sphere in architecture, from the first examples of its application to contemporary times, and the answer to the question of whether, referring to such an elementary form, the creators of spherical buildings do not keep asking the same questions through their projects, regardless of the time of creation. In the research, a comparative case study was used – an analysis of the number of similar examples that aims to find universal patterns in the design process. According to Richard Foqué, it is the generalisation of individual solutions leading to the creation of contextual knowledge, as contextuality is an inherent feature of architecture [8, p. 212, 213]<sup>1</sup>.

The concepts of elementarity and elementarisation adopted in the article correspond to their meanings used in the Department of Elementary Architecture at the Faculty of Architecture of Cracow University of Technology. This meaning is defined by Marcin Charciarek, describing the range of the academic-didactic subject: “Elementary means basic, original, inseparable (perhaps – modest) – the simplest in thinking and creating fundamental meanings to architecture – through its geometrical and material references. We discover it in specific designing ‘tactics’, but also in theories referring to meanings fundamental to the contemporary – from proto-modern ‘primitive hut’ of Abbé Laugier, stripped of ornaments ‘cave’ of Adolf Loos, Louis Kahn’s ‘preform’, Le Corbusier’s purity and Tadao Ando’s purity of forms” [3, p. 6].

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<sup>1</sup> Case studies as a method of research in architecture and the theory of Richard Foqué has been described by E.A. Niezabitowska [14].

## 2. The sphere as an element of 'speaking architecture'

in a symbolic sense, the sphere is an image of integrity and perfection. Since the time of the Presocratics, it has meant infinity – homogeneous, single, equal to itself only [6, p. 214, 215]. The introduction of this elementary solid into architecture for the first time can be attributed to the architects of the French Revolution: C.N. Ledoux, L.E. Boullée and J.J. Lequeu. In the eighteenth century, the sphere did not appear in detailed designs, but it did in purely conceptual drawings. Its application is related to the issue of uncompromising elementarisation of form in architecture and overcoming the law of gravity.

The overcoming of gravity was achieved at the end of the eighteenth century through the first balloon flights. At the same time, artists began to seek sources of inspiration for the arts in astronomy [18, p. 91; 9, p. 154], which was quite directly reflected in the project for the Cenotaph (Fig. 1) by Étienne-Louis Boullée (1784) – an unconstructed mausoleum for Newton. The building was given the form of a sphere on a massive round plinth with ramps. Its vault was to depict the sky with holes – the stars.

The later Temple of Nature (1793) by the same architect also adopted the form of a variation on a sphere. In this project, two hemispheres are integrated under a flat dome. The semi-circular vault covered a specific 'nest' – a round recess surrounded by a colonnade of the same shape lined with stones – with a mysterious hole towards the 'interior of the earth.' The building has different proportions than the Cenotaph – it is flatter, and the surrounding solid with the colonnade is higher, which makes the central spherical part less visible.

Subsequent architects increasingly 'detached' the Platonic solid from the ground. While in the Cenotaph it was still resting on a plinth, Jean Jacques Lequeu optically concealed the contact of the spheres with the ground in his designs by means of surrounding colonnades with a circular outline. His Temple of Earth (1790) and Temple of Equality (1791) (Fig. 2) are two buildings with a very similar spatial model – single-space model, with a staircase entrance, raised floor and a spherical structure inside. The Temple of Earth sphere is supposed to be a fairly direct symbol of the globe, as indicated by the world map painted on it (and the sky map on the inside).

The design project of the House for a Cosmopolitan (Fig. 2) by Antoine Laurent Thomas Vaudoyer (1783), as Hans Sedlmayr points out, was formed in a similar way. Sedlmayr symbolically justified the form of the structure by linking the silhouette of a cosmopolitan (one 'devoid of roots') with a moveable solid detached from the ground [17]. However, there is a significant difference between Vaudoyer's building and the other projects described here. The House for a Cosmopolitan is divided into five floors interconnected by a round staircase. The rooms were separated and therefore the interior does not reflect the conciseness of the spherical solid. However, Vaudoyer's building can be considered as an anticipation of later tendencies – the attribution of elementary solid forms to residential buildings [4, p. 20]. At the same time, one has to agree with the words by Hanno-Walter Kruft who criticised the project strongly, arguing that even the smallest trace of *le bon goût* was lost here [13, p. 165].

The design for the House of the Farm Guards (Fig. 2) by Claude Nicolas Ledoux (ca. 1770) – also criticised by Kruft for its misguided symbolism – received the purest form of all

the above examples. The sphere without windows was placed here in a rectangular<sup>2</sup> lowering of the terrain, which allowed the architect to show it almost in its entirety. Four door openings on four sides of the sphere flanked with columns lead to the interior of the house, preceded by walkways with stairs running above the lowering. Ledoux achieved the greatest conciseness of the external form of the sphere of all the above buildings<sup>3</sup>. The interior of the house was designed as a three-storey structure divided into regular rooms (nine on the ground floor and the underground floor and eight on the first floor). Inside the sphere, there is a kitchen stove with a high chimney. In the projections and cross section of the building, windows illuminating the rooms were sketched in, which cannot be seen in the perspective view.

### 3. The sphere as the basic form

*Das Dasein ist rund.* It would seem natural that surrealists, for whom habitation symbolised the comfort of foetal life and the basis constituted primitive models of dwelling such as a cave, grotto and hut, should tend towards the form of a sphere. However, these places are characterised by delicacy and tactility of space, whereas buildings in the sphere are characterised by a purist form – cleaning it of all unnecessary elements. At the same time, Platonic solids are associated with the aesthetics that is closer to machine technology than organisms from the living world.

The sphere is the ideal of architectural purity. It ‘fights’ gravity by levelling the difference between the top and bottom and connection to the ground at one point only. Due to this detachment, the building is not related to any particular landscape or history [10, p. 232]. Karsten Harries describes Platonic solids – including the sphere – as forms used in the architecture of ‘spiritual order’. The language of geometry is the universal language of art. It is the language of the spirit<sup>4</sup>. It is geometry, straight lines and basic colours that Harries links with absolute beauty, eternity and timelessness.

Elementary architecture uses the design method described by Aleksandra Satkiewicz-Parczewska as ‘a demonstration of the simplest form’ [16, p. 36–41]: the use of a single free-standing elementary solid shape from the catalogue of ‘compositional archetypes’. According to Satkiewicz-Parczewska, the choice of similar forms accompanies the search for a new vision of the future. It may be added, however, that this mechanism does not concern only contemporary architecture. The eighteenth-century architects from the ‘architecture parlante’ trend also turned to the simplest, natural forms in their search of primordial values [18, p. 92, 93].

Satkiewicz-Parczewska calls the use of the compositional archetypes forms ‘architecture of stillness’ [16, p. 37]. However, in the case of the sphere – referring to the ‘architecture parlante’ trend again – it is difficult to talk about the static form. According to Przemysław Trzeciak,

<sup>2</sup> The lowering has a rectangular shape in the perspective and a square shape in the projection.

<sup>3</sup> This is confirmed in the words by Kruft who points out that the cross section of the building indicates that the residential function was sacrificed in favour of the symbolism of an ideal form [13].

<sup>4</sup> Unlike the carnal language of nature, Harries refers to the thoughts by Plato, Le Corbusier, Hans Hollein and Theo van Doesburg, among others [10, p. 228–233].

buildings in the shape of a sphere or a cylinder in the eighteenth century were supposed to give the impression of being 'free from the gravity forces', free from restrictions, not only as a reflection of scientific discoveries and interests of the Enlightenment period, but also as an expression of rebellion against the formalistic late Baroque and Rococo traditions [18, p. 91].

According to Trzeciak, revolutionary French architects "gained the impression of timeless abstraction and monumental synthesis in which the remnants of tradition, including the ancient one, were almost erased" [18, p. 93]. Harries also raises the subject of timelessness – the struggle mankind is waging against the 'terror' of time [10, p. 228–239] – referring to the architecture of Platonic solids, including the sphere.

#### 4. The sphere in the twentieth century

The sphere of the Lenin Institute (Fig. 3) by Ivan Leonidov (1927) has never been constructed. The glass spherical structure was to be a cinema for up to 4,000 people and a planetarium. It was planned that the room could be divided by means of moving walls. In the drawings, the planetarium building looks as if it was levitating in the air, held only by lines similar to guylines. This method of connecting the spherical building with the ground had never been applied before. The glass form of Lenin's planetarium with a steel frame was supposed to be a metaphor of enlightenment and, at the same time, constitute a universal symbol [7, p. 311]. Its lightness, clarity and ropes bring to mind a balloon – a object detached from the ground instead of a solid structure founded in it.

In Leonidov's project, there is a tower and a horizontal body of an office building next to the sphere of the auditorium. All the solids were composed like the abstract paintings by El Lissitzky. The suprematist compositional means correspond to the mechanistic inclinations of the 'spiritual order' that Harries attributed to the Platonic solids.

The Perisphere (Fig. 4) by Wallace Harrison and J. André Fouilloux (1939) is a pavilion for the world exhibition in New York entitled 'Building the World of Tomorrow'. The project of the ideal city was exhibited inside the white sphere. Together with the cone – The Trylon – the sphere of the Perisphere was a significant exhibition building, visible from afar (the cone was 186 m and the sphere was 55 m tall) – its symbol and the most recognisable structure. Both elements were snow-white, surrounded by a ramp, and the sphere was placed on five steel pillars. Visitors entered the sphere by riding an escalator from the Trylon and overlooked the exhibited city from the moving platforms. The large snow-white solids were to symbolize finiteness and infinity. The architects planned concrete as their finishing material. However, budget restrictions forced them to use gypsum shell plastered with stucco, which rendered the creation of a smooth surface impossible.

Fuller's Biosphere (Fig. 4) in Montreal (1967) is a steel structure with a polycarbonate coating – designed as an American pavilion for the world exhibition<sup>5</sup>. The transparent sphere

<sup>5</sup> Inside the sphere, it was not Fuller but Cambridge Seven Associates Inc. that planned an orthogonal building consisting of platforms and communication elements.

is double-layer. The outer shell (made of spherical triangles) is 76 m in diameter and is 62 m high, and the inner shell (made of hexagons) is about 1 m away from it and connected by steel pipes. Nowadays, the Biosphere covers the orthogonal buildings of the Environment Museum. The buildings were designed by Éric Gauthier as a result of a 1992 competition.

La Géode (Fig. 5) in Paris by Adrien Fainsilber and Gérard Chamayou (1985) is a 3D cinema whose spherical form results from its function. The sphere is 36 m in diameter and has a mirror finish of triangular stainless steel panels. The cinema is a fragment of the Cité des Sciences et de L'industrie, but the form of the sphere was set aside from the main body of the building and placed in a square pool, thus solving the problem of its contact with the ground. La Géode is accessed from the ground floor, under the level of the pool.

Pedro Ramírez Vázquez used a similar concept – a cinema in the sphere – three years earlier (1982) in the Cultural Centre (Fig. 5) project in Tijuana (CECUT). The sphere in Tijuana, however, has a concrete shell. It is adjacent to an irregular symmetrical solid with external stairs, hiding the place where Domo IMAX meets the terrain.

Opened in 1989, the Swedish National Arena (Fig. 6) – the Ericsson Globe building in Stockholm, designed by Berg Arkitektkontor AB, is a spherical building with the world's largest diameter. The steel, concrete and glass structure is surrounded by lower solids. The building is not a full sphere though – it is 110 m in diameter and 85 m high. The white body covered with aluminium plates includes small round and square holes. The whole width of its interior is occupied by the space of the stadium and the stands. The Ericsson Globe building is part of the Swedish Solar System (SSS), a 1:20,000,000 scale solar system model whose components (planets, asteroids, comets, etc.) are dispersed throughout the whole of Sweden<sup>6</sup>. The stadium is a model of the sun.

The sphere of the Holy Trinity Church (Fig. 6) in Geneva, designed by Ugo Brunoni (1994) – a solid clad in granite slabs placed in the outer pool – symbolises the Holy Trinity and life. The interior is illuminated by fourteen windows. The entrance is via a footpath over the pool that leads to the adjacent solid<sup>7</sup>. The position of the sphere in the corner and 'sinking' into the pool means that it is not visible in its entirety. Brunoni placed a geometric tower with a cross on the top of the sphere.

## 5. The new 'form' of the sphere

Structures of spherical forms are also being built in the twenty-first century. Some of these are currently in the design stage or under construction.

The Obama Presidential Library (Fig. 6) concept design by Aras Burak Sen (2015) is a building with a body in the form of a sphere in which eight storeys were given the form of

<sup>6</sup> More about Swedish Solar System in [12].

<sup>7</sup> A characteristic example in which the form of a sphere was also used combined with another solid is the church Chiesa Madre in Gibellina (Italy) by Ludovico Quaroni and Luis Anvers (1972–1987). The white puristic sphere is in the centre of this complex, surrounded by the stairs of the amphitheatre, but in two places, the corners of the solids were 'wedged' into it on a plan similar to squares.



bridges (three on each storey), running in the open space of the sphere in different directions between its vertical axis and shell. Each of the enclosed 'bridges' ends with a hole in the shell of the solid, presenting a different frame of the city. The project received one of the two main prizes of equal importance in the competition for the concept for the Obama Presidential Library. The jury awarded it for the form and its symbolic foundation: monumentality and the operation used by the architect to break up the Platonic solid. The openings in different directions reveal views of varied urban environments. The project also emphasises the fact that each floor is to present one year of Obama's presidency, united in a homogeneous narrative [5]. At the lowest level, bridges (named Bridges of Hope by Burak Sen) form a sign of peace, connecting the library with its surroundings. Below them, an amphitheatre was designed in the crust of the sphere – a place of political debate and free speech – an open space as a fragment of an open-access public space. The amphitheatre is supposed to reflect the essence of democracy<sup>8</sup>.

The Nur Alem building (Fig. 6) designed by Adrian Smith and Gordon Gill Architecture – the Kazakhstan pavilion at 2017 Expo in Astana – is currently the largest spherical building in the world. It is 80 m in diameter and 100 m high. The sphere is made of glass on a steel structure. It is placed on an undulating plinth made of the same material. Owing to the use of bent glass panels, the body of the building is smooth – without unnecessary edges. The building has eight floors, including one in the plinth and seven in the sphere. The ceilings were moved away from the surface of the sphere. They have an irregular undulating outline and leave a void between the floor and the glass cladding. Inside the sphere, the central core constitutes its construction and provides a vertical access system.

The Nur Alem building was designed to create energy. Photovoltaic elements and two wind generators were installed at the top of the sphere. The sphere is indented. The level with the elements that create energy is both a viewing platform and a venue where accompanying events are held. Visitors can observe the city and the advanced infrastructure that creates electricity. Currently, the building serves as the Museum of Future Energy [11].

Two projects under construction, designed by world-renowned architects, use the form of the sphere in different ways: the Berggruen Institute (Fig. 7) by Herzog & de Meuron (Los Angeles, 2015–) and the Academy Museum of Motion Pictures by Renzo Piano (Los Angeles, opening planned for 2019). The spheres, which constitute parts of the structures, differ in scale and form.

The campus of the Berggruen Institute is to be located in the mountains of Santa Monica – on a hill presenting the silhouette of the campus. The building was designed as a contemporary realisation of the monastic space model. The architects considered it to be archetypical for a scientific facility that requires two types of space – a common space and individual work rooms enabling isolation. The body of the building is to take the form of a reinforced concrete grid elevated above the terrain and filled with wooden walls. An important element of the project are two spheres of different sizes. The smaller sphere is to serve as a water reservoir and the larger sphere as a lecture hall. The concrete sphere of the hall was visually 'broken' into two opaque shells connected by a strip of glass.

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<sup>8</sup> The project description in [15].

According to the architects, both of the spheres are designed to reflect the mission of the institute both formally and symbolically as a cultural and ecological message. Jacques Herzog explains their application by the ambivalence of the spherical form, its presence in architecture both as a banal and symbolic element<sup>9</sup>. He also emphasises its ‘artificiality’ – the suggestion of imbalance and acting against nature. At the same time, being an element of utopian architecture since the eighteenth century, it has not yet entered the dictionary of building forms. According to Herzog, the sphere is to be a ‘pure presence’ without the need to be explained [1].

The Academy Museum of Motion Pictures (Fig. 8) in Los Angeles (2019) designed by Renzo Piano will be housed in the existing May Company Building (later renamed the Saban Building) from 1939 and a new spherical building connected to the existing structure with glass walkways on the above-ground floors. Inside the added 38 m high sphere, there is a cinema that will seat up to 1,000 people and a glass-covered rooftop terrace. The sphere was undercut along with the slope of the theatre floor and placed on wide poles so that it does not touch the ground. A part of the sphere protrudes, emphasising the operator’s room. The renderings of the building show material solutions that were not used in previous sphere projects – opaque bright walls made from spherical squares and a glass roof lowered on to them. Owing to this treatment, the transparent part of the sphere moves smoothly into the non-transparent walls below.

## 6. Conclusions

The article has analysed seventeen examples of buildings in the form of a sphere designed in the years from 1784 to 2019. The structures are located in different parts of the world and come from different cultural circles. Seven of the aforementioned buildings have been completed and one is still under construction.

The functions of the discussed structures are mostly related to public utility (only two of them are single-family houses<sup>10</sup>), but they can be systematised into the following groups: a temple or commemorative structure; an auditorium, cinema or stadium; an exhibition

<sup>9</sup> One should agree with the Jacques Herzog’s view. Although the sphere is not a commonly used shape, it is not difficult to find examples of buildings of spherical forms, nowadays, often glass buildings, devoid of a deeper symbolic meaning. The sphere is to be a purely visual treatment in them. Such examples include planetaria (the form justifies the function here), but also Silver Legacy Resort and Casino in Reno (Urban Design Group, 1995) or an element of a shopping centre in Toronto. The Saudi Press Agency (GHI Formwork, 2010), where a map of the world was painted on the outer reinforced concrete crust – it creates a globe – can be considered to be one of the most vivid examples of a banal translation of a spherical form into a building. In turn, in Shonandai Cultural Centre in Fujisawa (Itsuko Hasegawa, 1990), large spheres are accompanied by forms of sloping roofs, creating spatial chaos. The resulting architecture is supposed to bring to mind the natural landscape, and the largest sphere is to symbolise the earth again, which can be seen in a map of the globe painted on its surface.

<sup>10</sup> More single-family houses with spherical forms have been constructed, but they lack purity of form and the tendency towards elementarisation of architecture. Bolwoningen (constructed in the years 1980–1984) designed by Dutch artist Dries Kreijkamp in Hertogenbosch, Netherlands, can be given as an example here.



space or library. Other examples of architecture of spherical forms also have similar functions – these have been identified but not included in the article.

Most of the spherical buildings described above were designed and constructed of three types of materials: concrete, metal (steel or aluminium) and translucent material – glass or polycarbonate on a steel frame. The concrete solid enables aesthetic conciseness (connected with universalism and timelessness) while the transparent elements are associated with ecology and futuristic thinking. In this way, the architects have achieved the purity of the spherical form, opting for transparency or opaqueness. Only one of the above examples has a façade made of granite slabs with clear divisions (Church of the Holy Trinity in Geneva), whereas in two other buildings, the materials were combined – concrete with a strip of glass or concrete with a glass roof around the top of the sphere.

A significant design problem is the planning of the place where the sphere and ground meet. The drawings of the examples from the eighteenth century show a circular base with stairs and a colonnade (in the Cenotaph – a ramp). Only the House of the Farm Guards is solved in a more decisive way; it is placed in a lowering of the terrain. Subsequent examples most often constitute an incomplete solid ‘dug’ into the ground. Two examples are the buildings located in a water pool and two others were raised on a plinth<sup>11</sup> or pillars. The most original solutions were never constructed: the connection of the solid with the terrain by means of ropes in the auditorium of the Lenin Institute and the placement of the sphere in a pit forming an amphitheatre in the Obama Library.

The public function and purity of form are conducive to treating the sphere as a shape corresponding to a tendency towards monumentalisation. Most of the above examples are structures with clean walls that are devoid of ornament. The number of door and window openings has been limited. Although J.J. Lequeu and Vadouyer still used a round colonnade adjacent to the sphere in the eighteenth century, later buildings were usually an attempt to ‘demonstrate the simplest form’ – as Satkiewicz-Parczewska puts it. In two cases, other solids adhere to the buildings, disturbing the purity of the composition – in one case there is also a square skylight. A completely different object is the proposal for the Obama Library Burak San. Here the sphere was ‘broken’ by numerous window openings and vertical slots from which walkways in the form of bridges run out.

Of the examples in which a map of the world has been depicted on the surface of the sphere to form a globe, only the Temple of Earth by J.J. Lequeu has been included in the description. It can be said that in more modern structures of this type, the sphere as a metaphor of the globe is a measure that simplifies architectural symbolism to such an extent that it negatively affects the quality of the resulting architecture. Similar structures have not been analysed.

The analysed buildings confirm the thesis that the symbolism of the sphere in architecture is a timeless and unchanging issue. Both in the eighteenth century and today, the sphere symbolises perfection, majesty, infinity and enlightenment. It has been a universal symbol used in many cultures. Its exterior signified a globe, and its interior, by contrast, a heavenly vault

<sup>11</sup> While most of the buildings constructed in spheres so far have a lower height than diameter, the Nur Alem Building is taller than wider, which has been achieved by placing the sphere on an undulating plinth.

(and also the Holy Trinity, life, 'pure presence'). In the second half of the twentieth century, ecological connotations were added to this symbolism. Only cinemas in spheres do not require justification. The round solid corresponds to the entertainment function in a visible way.

## 7. Summary

It is surprising that despite the initial impression of there only being a few structures to analyse, more and more examples of spherical buildings can be found in architecture. Subsequent examples are being designed or appearing as temporary structures as 'artistic interventions'<sup>12</sup>.

The structures come from different parts of the world and different cultural backgrounds. They have different purposes, which is rarely indicated by their form. However, some functions seem to be particularly suited to the form of a sphere – cinemas, planetariums and other buildings related to culture or science.

The conciseness and timelessness of the spherical form causes that, deprived of all unnecessary adjacent elements, it does not provide any indication of its time of design and possible construction. A feature that clearly differentiates spherical buildings is their material. Since it is not possible to completely detach the sphere from the ground, architects also resolved access to it and, at the same time, contact with the ground in a variety of ways.

The field for the design and construction of spherical buildings remains vast. In the formal richness of twenty-first century architecture, when orthogonal, biomorphic and expressionist forms are used, the sphere combines two worlds of elementary architecture and signifying forms. It is a primordial and symbolic solid. It is relatively rarely used and, at the same time, it does not require justification. It carries universal content.

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<sup>12</sup> An example could be the 'ORB' by Bjarke Ingels and Jakob Lange (2018).

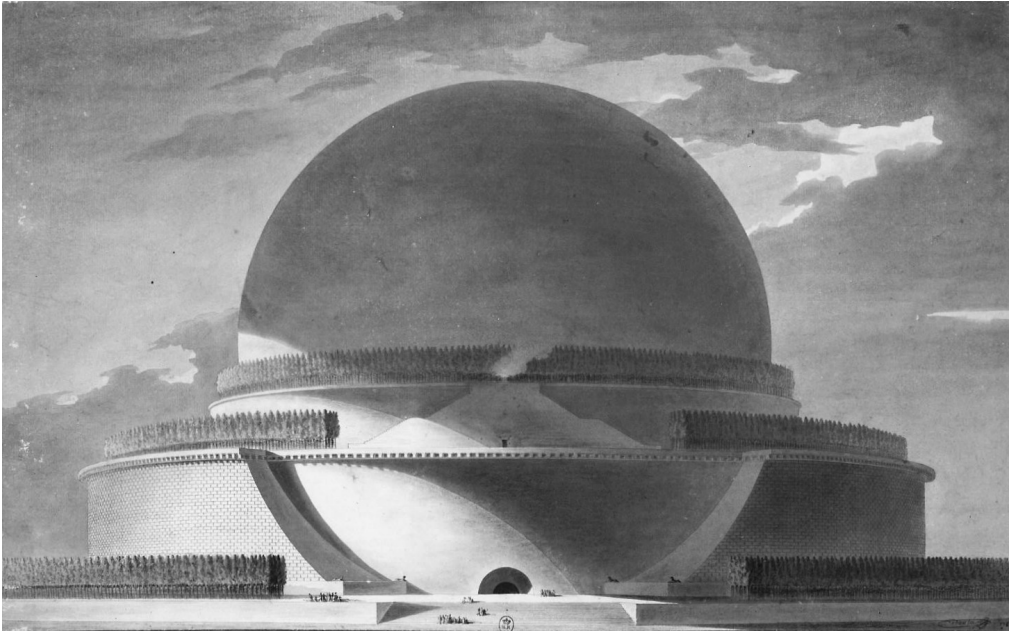


Fig. 1. Cenotaph by Étienne-Louis Boullée (1784), source: Eaton, R., *Ideal Cities: Utopianism and the (Un) Built Environment*, Thames & Hudson, London 2002

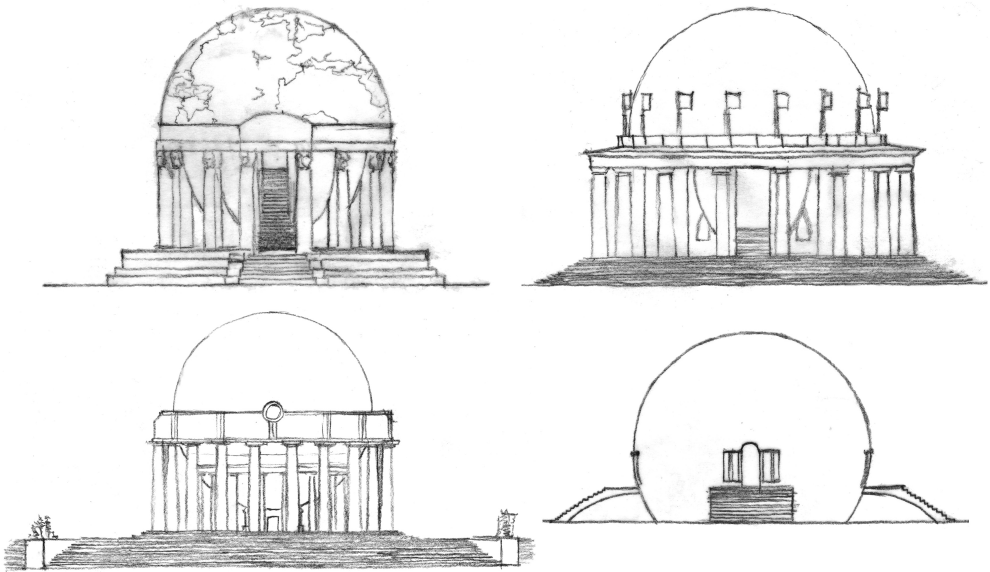


Fig. 2. Top left – Temple of Earth by Jean Jacques Lequeu (1790); top right – Temple of Equality by Jean Jacques Lequeu (1791); bottom top – House for a Cosmopolitan by Antoine Laurent Thomas Vaudoyer (1783); bottom right: House of the Farm Guards by Claude Nicolas Ledoux (ca. 1770), drawing by author

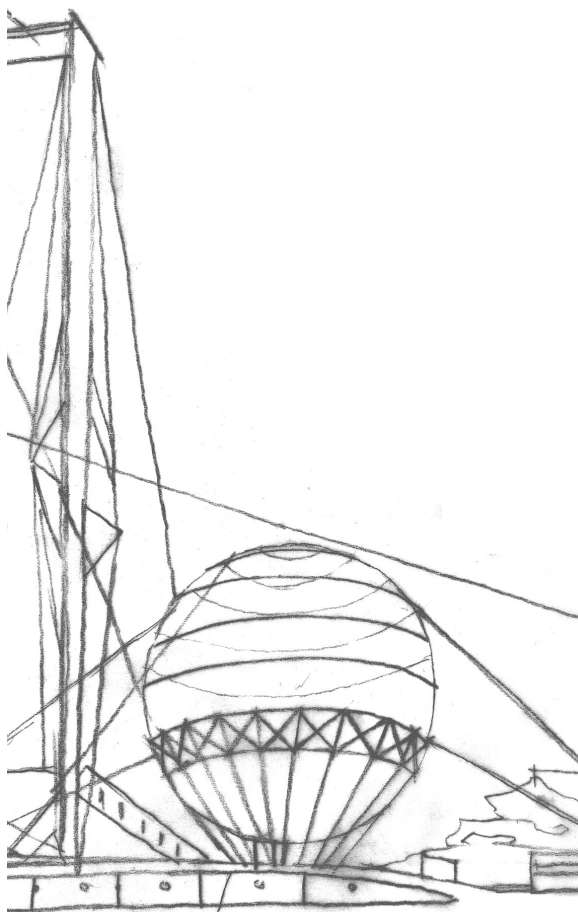


Fig. 3. Lenin Institute by Ivan Leonidov (1927), drawing by author

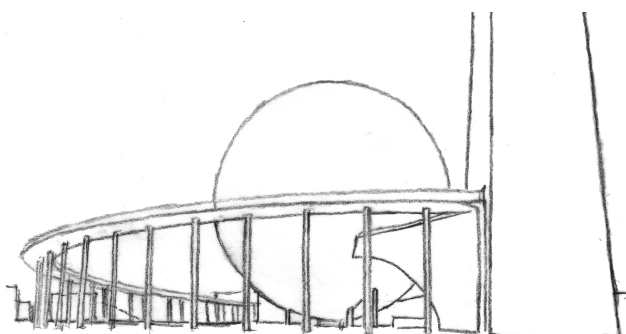


Fig. 4. Left – The Perisphere by Wallace Harrison and J. André Foulhoux (New York, 1939); right – Biosphere by Buckminster Fuller (Montreal, 1967), drawing by author; photo by Ralf Roletschek, [https://en.wikipedia.org/wiki/Montreal\\_Biosphere](https://en.wikipedia.org/wiki/Montreal_Biosphere) (access 23.01.2019)

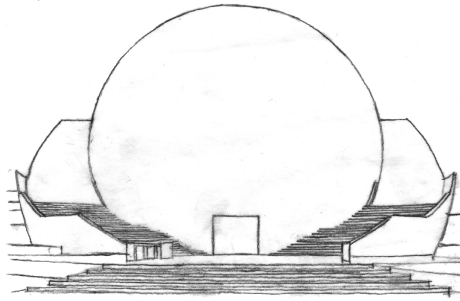


Fig. 5. Top – La Géode by Adrien Fainsilber and Gérard Chamayou (Paris, 1985); bottom – Cultural Centre (CECUT) by Pedro Ramírez Vázquez (Tijuana, 1982), photo and drawing by author

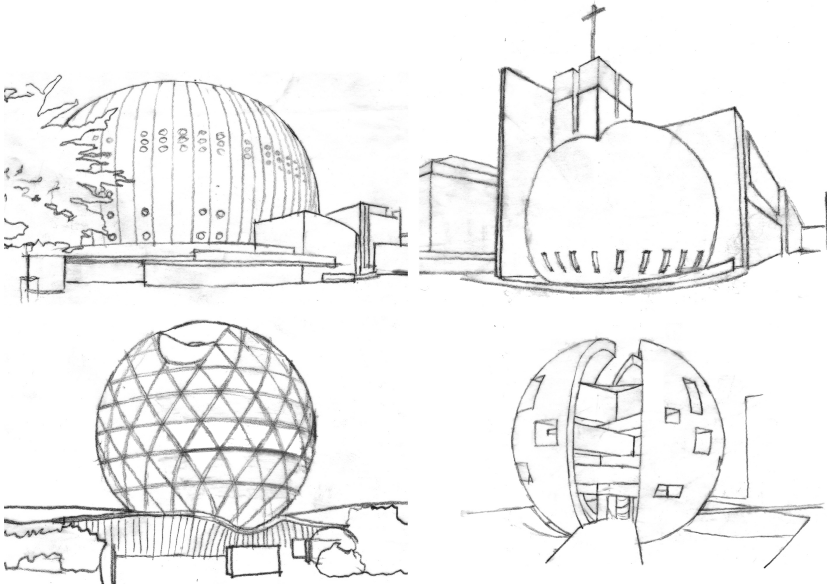


Fig. 6. Top left – Swedish National Arena – Ericsson Globe by Berg Arkitektkontor AB (Stockholm, 1989); top right – Holy Trinity Church by Ugo Brunoni (Geneva, 1994); bottom left – Nur Alem by Adrian Smith + Gordon Gill Architecture (Astana, 2017); bottom right – The Obama Presidential Library by Aras Burak Sen (Chicago, 2015), drawings by author



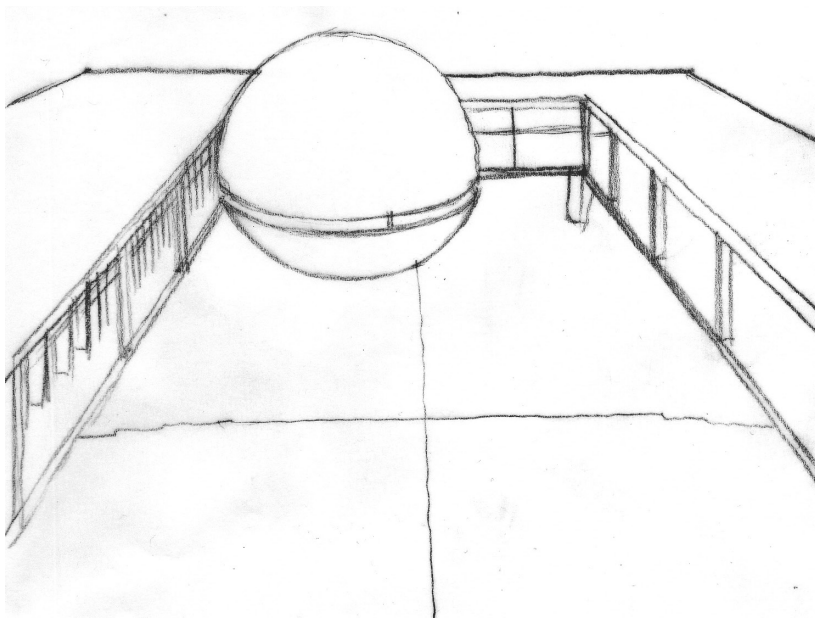


Fig. 7. Berggruen Institute by Herzog & de Meuron (Los Angeles, 2015-), drawing by author

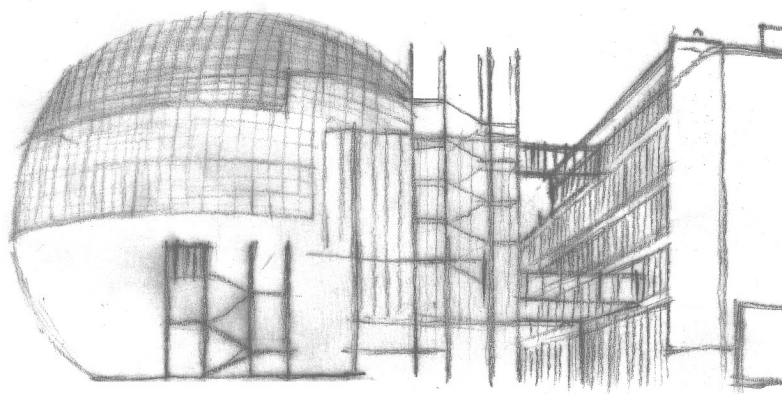


Fig. 8. Academy Museum of Motion Pictures by Renzo Piano  
(Los Angeles, opening planned for 2019), drawing by author



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