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JUDAISM, EINSTEIN AND MODERN
ARCHITECTURE

ORIGINAL SCIENTIFIC PAPER
UDC 72.01:72.036

JUDAIZAM, EINSTEIN I MODERNA
ARHITEKTURA

IZVORNI ZNANSTVENI ČLANAK
UDK 72.01:72.036



FIG. 1. ERICH MENDELSON, THE EINSTEINTURM (EINSTEIN TOWER), CONCEPT 1917, BUILT 1919-1921, POTSDAM
SL. 1. ERICH MENDELSON, EINSTEINOV TORANJ, KONCEPT 1917., IZGRADNJA 1919.-1921., POTSDAM

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JUDAISM, EINSTEIN AND MODERN ARCHITECTURE

JUDAIZAM, EINSTEIN I MODERNA ARHITEKTURA

ADOLF LOOS
ALBERT EINSTEIN
JUDAISM
MODERNISM
SPACE-TIME

ADOLF LOOS
ALBERT EINSTEIN
JUDAIZAM
MODERNIZAM
PROSTOR-VRIJEME

This paper establishes links between Judaic heritage, Einstein's ideas, and modern architecture. It analyses the influences of Judaism on Albert Einstein's notions of *space-time*, *theory of relativity* and *quantum mechanics*, and discovers their impact on the concepts of 20th century architecture, such as Adolf Loos' *Raumplan*, Erich Mendelsohn's *speed and energy* and Sigfried Giedion's *Raumzeit* and *simultaneity*. The impact of László Moholy-Nagy and El Lissitzky is also dealt with. The paper shortly discusses some post-modernists and deconstructivists, who applied further Judaic concepts in their theories and buildings during the *fin de milleneum*.

Članak uspostavlja vezu između židovske tradicije, koncepata Alberta Einsteina – kao što su *prostor-vrijeme*, *teorija relativiteta* i *kvantna mehanika* – i moderne arhitekture, odnosno otkriva primjenu tih koncepata u teoriji arhitekture 20. stoljeća. U članku se ponajprije sagledavaju primjeri *Raumplana* Adolfa Loosa, *brzine i energije* Ericha Mendelsohna te koncepta *Raumzeit* odnosno prostorno-vremenske simultanosti Sigfrieda Giediona. Utjecaj Lászla Moholy-Nagya i El Lissitzkog također je predmet članka, kao i daljnji elementi judaizma koji se primjenjuju u teorijama i zgradama nekih postmodernista i dekonstruktivista na kraju 20. stoljeća.

INTRODUCTION

UVOD

Modern architecture proclaimed a total break with architectural history, yet in practice it had much deeper roots in the past than is commonly referred to.¹ Its real novelty was in embodying a new cosmology, based on scientific discoveries, among which the most prominent are related to the physicist Albert Einstein. In turn, his scientific concepts were also rooted in some religious teachings, most importantly in Judaism and Jewish thought. Einstein's cultural significance lies in synthesising physics and religious tradition in creating a new cosmology to be expressed in arts and architecture in the entire twentieth century, but most prominently during the formation of modernism between 1910 and 1930. Einstein's achievements and their artistic/architectural implementation represent probably one of the most substantial impacts of Jewish heritage on Western cosmology exerted by a single person, not counting the influence of Jesus Christ and his followers.

Direct Judaic and Jewish cultural inspiration was marginal to European culture until the times of the Enlightenment and French Revolution. Judaism's influence on Western civilisation was indirect, through Christian interpretations of the Old Testament; direct Jewish impact was negligible during the aforementioned period. When using the term *Judaic*, I shall refer in this paper to Judaism as a religion and its philosophical implications. When using the term *Jewish*, I am referring to a wider notion, in which Jewish implies not only

ideatic roots of the Jewish people in Judaism, but Jewish historic experience, thinking and attitude. Thus, Jewish is a term which involves certain elements of peoplehood, collective memories, thinking, and attitude beyond just religious and philosophical implications of Judaism. Judaism, the oldest surviving monotheistic religion, spanning over three thousand years, strongly influenced later Christianity, Islam and the Baha'i Faith, as well as secular Western ethics and civil law after the Enlightenment. Judaism is an ethical monotheism with the belief that God is one, ubiquitous (not a group of anthropomorphic figures residing on the Olymp or the Walhalla), and concerned with the actions of humankind. He is the creator and regulator of the universe. The character of God has far reaching consequences for architecture and the arts: He has no body, He is free from all the properties of matter, and there can be no (physical) comparison to Him whatsoever. This immateriality and living, always-changing character excludes representation, as expressed in the Second Commandment, in which representation is termed "carved image". A carved image is by itself final and limited and cannot represent the living, infinite and ubiquitous God. Moreover, any visual representation asks for caution, as it may serve as an object for worship (idolism), challenging the singularity of the God, the One. However, there is no total image-ban in Judaism, but an expressed reluctance towards the visual, including spatial markers, which puts the arts and architecture created by or for the Jews into a very special position until modernism.

Enlightenment and modernity opened up European culture for alien civilizations, i.e., supplemented its Greco-Christian foundations with elements of Islam, Buddhism, Hinduism, etc. Jewish Emancipation and contribution to Western culture coincided with this process. During the 19th century Western art gradually abandoned the naturalist paradigm, which contradicted the image-ban or image-reluc-

¹ It is enough to point to Palladio's influence on Le Corbusier's villas or Schinkel's impact on some of Ludwig Mies van der Rohe's buildings, or the influence of the Finnish vernacular found in Alvar Aalto's architecture.

² Similar iconoclasm characterizes other, newer religious traditions, like iconoclasm in Christianity, the image-ban in Islam or some facets of Buddhism.

³ Certainly, Aristotle's aesthetics was not the only theoretical basis for Western architecture. His principle of *horismennon*, or limitedness, was partly abandoned in the Gothic or Baroque period and Romanticism, as well as in Art Nouveau, which also renounced some of its elements. Still, Western architecture until the period of colonialism was still largely governed by the principles of Aristotle's aesthetics.

⁴ This will lead to the popularity of oriental style, which in most cases represents a significant departure from Aristotle's aesthetics in abandoning the tectonic principle of architecture.

⁵ Doric column male body, Ionic column female body, etc.

tance of Judaism², fearing idolism, and opened the floor for Jewish contribution to gentile arts. Similarly to the arts, Western architecture was also based on Greco-Christian tradition, tectonic narrative and structural ornament, actually on Aristotle's aesthetics, up to mid-19th century.³ Its gradual transformation made it acceptable for the purpose of sacred architecture serving Judaism.⁴

Jewish influence on European architecture emerged in the period of Historicism, although this was not based on a Jewish initiative. Christian societies wanted to differentiate synagogues from churches and numerous gentile architects suggested the use of oriental style, suitable for the "Asiates of Europe", as the Jews were often labelled. Besides this ideologically coloured consideration, some other, practical reasons were relevant too: almost all neo-styles were already in use for Christian sacred and profane architecture, save the oriental style, which was, thus, on the one hand free – used only for zoos and other exotic genres – and on the other, it was also considered a second class genre suitable for a not entirely accepted confessional minority. By the absence of plastic, sculpturally shaped decoration, the "carved image" having explicit referents⁵, it was also suitable for the Jewish/Judaic tradition.

Moreover, the oriental style successfully fitted in into modern metal structure. Sir Christopher Paxton, the creator of the Chrystal Palace for the 1851 World Exhibition in London, invited Robert Owen Jones, the specialist in oriental style to decorate some parts of that vast building.⁶

Mid-19th century oriental style synagogues introduced a new architectural language that significantly departed from Western architecture in its appearance. These synagogues were covered with a colourful decorative layer concealing tectonic-structural reality. Ideologically, oriental style referred to the identity of medieval Spanish Jews, their co-existence

6 Jones (1808-1874) was an architect who served in the British consulate in Granada and researched the Alhambra, publishing his findings in his seminal book *The Grammar of Ornament* (1856), one of the most exploited "architectural catalogues" of the 19th century.

7 Gottfried Semper's *Bekleidungslehre* (theory of cladding) delivered the suitable philosophical base and justification. Interestingly, it was Semper who created the first partly oriental style synagogue in Dresden, as early as 1838. See: KLEIN, 2008

8 For the formal and architectural links between oriental style and Secession see: KLEIN, 2006: 117-134.

9 WEISBERG, 1986: 77

10 Dreyfusards (most well-known Anatole France, Henri Poincaré and Georges Clémenceau) were people who stood on the side of the Captain Alfred Dreyfus in 1894, who was accused for high treason in a major anti-Semitic scandal in France, and later, in 1906 he was acquitted.

11 BÉDOIRE, 2004



FIG. 2. ADOLF LOOS, STEINER HAUS, 1910, VIENNA
SL. 2. ADOLF LOOS, KUCA STEINER, 1910., BEČ

and mediation between Christian and Muslim cultures. The oriental or neo-Moresque style was offered by Christians in order to give the Jews a special architectural spell, which facilitated the establishment of the new genre, synagogue architecture, hitherto a visually rather non-distinct, mostly "functional" type. Unintentionally however, "oriental style" became a milestone of European architectural history in paving the way to Viennese Secession. Flattened façades, covered with repetitive, intensely coloured decoration replaced traditional 3D façade treatment, the "carved image" based on the traditions of the Renaissance and Neoclassicism. This geometrical, colourful surface decoration that largely avoided visual representation was very suitable to the aniconic Judaic heritage and synagogue function, which since mid-19th century needed architectural prominence.⁷

Oriental style, used extensively between 1860s and 1880s, eventually transfigured into Secession in Central Europe, retaining its Jewish patronage.⁸ Thus, just a couple of decades after the introduction of neo-Moresque synagogues, in Art Nouveau and Secession the question of Jewishness re-emerged and extended the discussion about Jewish identity from synagogue architecture to the entire artistic output of a the period. The critic Arsène Alexandre, writing in *Le Figaro*, sensed in Art Nouveau "the smell of the Englishman, the Jewess or the cunning Belgian".⁹ Octave Mirbeau, well-known author and Dreyfusard,¹⁰ also in *Le Figaro*, came to a similar conclusion. The new style, he wrote, was an expression of English and Belgian lasciviousness and mischief-making, mingled with Jewish morphine addiction, or a pleasant salad of all three poisons.¹¹ Karl Kraus reported from the

FIG. 3. ADOLF LOOS, STEINER HAUS, 1910, VIENNA, FLOOR PLAN

SL. 3. ADOLF LOOS, KUCA STEINER, 1910., BEČ, TLOCRT

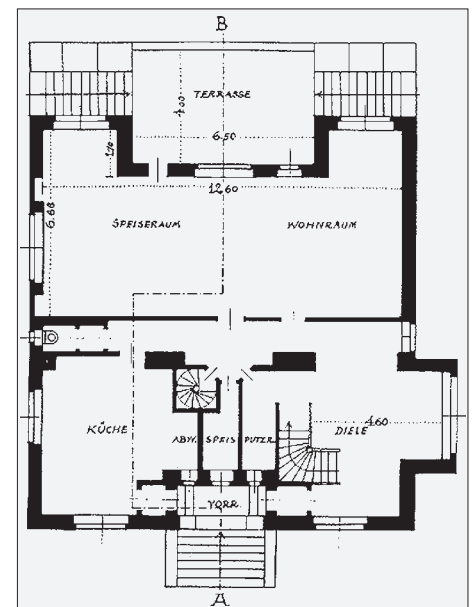


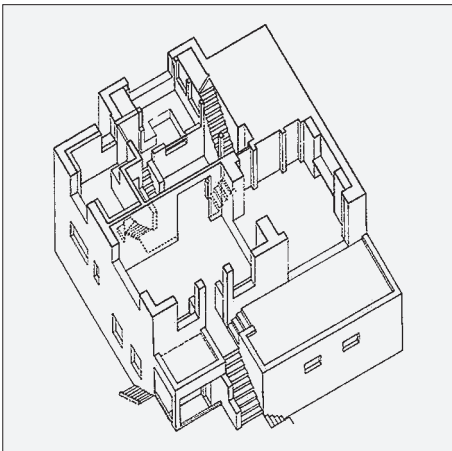


FIG. 4. ADOLF LOOS, VILLA HANS UND ANNY MOLLER, VIENNA, 1926-1927

SL. 4. ADOLF LOOS, VILA HANSA UND ANNY MOLLER, BEČ, 1926.-1927.

FIG. 5. ADOLF LOOS, HANS UND ANNY MOLLER VILLA, VIENNA, 1926-1927, AXONOMETRIC

SL. 5. ADOLF LOOS, VILA HANSA UND ANNY MOLLER, BEČ, 1926.-1927., AKSONOMETRIJA



Paris World Exhibition that the French considered Viennese Secession as *goût juif*, expression of Jewish tastes.¹² By Jewish tastes gentile public and critics meant a departure from Western principles of *structural ornament* and *truth to material*¹³ in favour of an independent decorative surface layer covering the buildings. This cover up was related to the supposed "Jewish insincerity", their penchant for concealing things and the joy for *play*, for *hide-and-seek*.

Adolf Loos, the Viennese architect, essayist and enfant terrible, related Viennese Secession to the kaftan, the traditional Jewish black garb that covered up all the bodies of pious Jewish men. Had Loos lived in our times, he would have spoken about the *burka*, the Muslim counterpart of the traditional Jewish couture. The burka would have expressed better this idea of covering up the human body or the body of architecture with a colourful layer of floral or geometric decoration that conceals actual building material and structures.

PROTO-MODERNISM

PROTOMODERNIZAM

After the floral, lush and very colourful Art Nouveau called Secession in Austria-Hungary, arts and architecture changed again swiftly. By roughly 1905-1907 architecture cooled down to the late or geometric Secession – from Otto Wagner's and Josef Maria Olbrich's colourful decorativeness to Josef Hoffmann's restrained geometric ornament – and started to adopt some expressions of *purism* in the hands of Adolf Loos.

Today almost all architectural historians emphasize the great influence of Adolf Loos on the evolution of proto-modernist purist architecture and eventually modernism proper. Loos was the first to openly condemn decoration and to promote the significance of architectural space – both ideas seminal to the ideology of modernism and both deeply rooted in the Judaic/Jewish heritage. Loos' essay titled *Ornament and Crime (Ornament und Verbrechen, 1908)* linked the ornament to idol carving, an idea that strongly coincided with a radical reading of Judaic image-ban, resulting from the Second Commandment. He advocated the abolishment of any kind of decoration in architecture, labelling it as slavery to idols, primitivism and Paganism, adding that "we have outgrown ornament; we have fought our way through to the freedom from ornament. See, the time is nigh, fulfilment awaits us. Soon the streets of the cities will glisten, like white walls, like Zion, the holy city, the capital of heaven. Then, fulfilment will come."¹⁴

His messianic sentences originate from his commitment to liberate architecture from the

ornament, which is not just a simple cover up of the buildings, but, as we have seen, something with a deep cultural message. In his essay *Die Emanzipation des Judentums* he links the garish decorative surface to the pitfalls of Jewish emancipation, the yearning of upper middle-class Jews to become accepted part of the gentile society, followed sometimes by grotesque efforts to surpass the Christians.¹⁵ In this context, however, it is not just the Jews who are being liberated, but the whole mankind, just as the patriarch Abraham's destroying of the idols was not a "private business of the Jews" but the liberation for all subsequent monotheist traditions.

By removing the telling and entertaining decorated surface, some new content had to be offered as a substitute. The obvious candidate was *space*: intangible, "abstract", lacking a clear figural appearance, and comprehensible by its *boundaries* and in *time* only. Both these concepts, both limitation/infinity and time, are highly relevant for Judaism. The shift of priority in architecture from material and its surface to space aligns with the Judaic heritage, as a shift from the holiness of material, or the idols, towards the holiness of God, i.e., the holiness of space.¹⁶ The relevance of time will be discussed later.

Adolf Loos was the first to apply a *space-centred* view to architecture with his concept of *Raumplan*, as early as 1912, which will become the tenor of modernism after World War One. The concept of *Raumplan* means that the architect is primarily concerned with creating space – not façades, columns, arches, decorations, etc. – and moving/leading people in this space. Space is not just an interval, as between two Greek columns, but becomes a positive "almost tangible entity", which is then wrapped up by material. Interestingly, furnishing the internal spaces in the interiors of Adolf Loos is centrifugal, activities shift into the perimeter of this space, leaving the centre empty, or "spatial", emphasising the

¹² KLEIN, 2009: 91-124

¹³ The basic principle of Western architecture, as understood by the leading German neo-Classicalist, Friedrich Schinkel.

¹⁴ LOOS, 1900

¹⁵ Loos wrote: "Jews, who long since put aside their caftans, are glad to be able to slide back into them. For these Secession interiors are only caftans in disguise, just like the names of Gold and Silberstein, or Moritz and Siegfried. One can still recognize them by them. (...) That would bring us back to the same patch. In the new ghetto. And these unfortunates believe that they are emancipating themselves from Jewishness with Olbrich or Siegfried. Just eating ham is not enough." Loos, 1997: 291

¹⁶ God is often conceived as an all-encompassing entity, space. Jewish Mysticism is not alone in seeing the divine as space: Thomas Aquinas, Zen and Sufism have in common the perception of the divine as infinite or holy nothingness or vacancy, i.e., *space*. Therefore we have, already before modernity, space-centred architecture of early mo-

emptiness as the most important feature, similarly to the emptiness in Japanese architecture – both with important cosmological messages. Movements in this space are not axial, they don't lead towards a centre any more, but are rather casual and in effect rather complex.

Of course, space has always played an important role in architecture, particularly in such spiritual periods like Gothic or the Baroque. Space was almost always an integral part of planning, even though apparently only structural elements were designed carefully. However, space was treated as something *in-between* and *not* as an *independent entity*. It was the work of Adolf Loos in which creating space became an *ideology* for the first time in Western architecture, an element to be expressed by using special design techniques, which let space to come to the fore as an independent entity, which may be followed by the bearing structure and partition walls, or may not. Sometimes interior space spills over the perimeter of the building, bulges out from the façade, as for instance in the case of Loos' Villa Moller in Vienna from 1928.¹⁷

In technical-structural terms, the concept of *Raumplan* meant that the regular rhythm of walls and ceilings had to be abandoned and space tailored freely, according to the function; walls, usually undecorated and white, just served as limiting elements of space. The bearing structure and decoration were relegated into a second rank, behind space as the most significant element. Importantly, it was not only the width and the depth of space that varied in the plan, but the height too. The *Raumplan* was Loos' effort to rethink the traditional 2D plan-based configuration of space within a predetermined volume and to extend it into a free 3D disposition. Loos tried to design each room individually, with the height most appropriate for it. The result was a 3D spatial plan consisting of small, volumetric rooms connected by short staircases,

sques, Gothic churches and the Katsura Rikyu in Kyoto, for instance. However, these ideas have never surfaced as ideologies for architects before the 20th century. The great achievement of Einstein and Loos has been the conceptualisation and updating of *religious teachings* for an *architectural ideology* to be followed.

¹⁷ This spilling over can also be related to Japanese Buddhist monasteries or Islamic architecture.

¹⁸ Loos was very hostile towards the idea of photographing his interiors, insisting that photography gives a frozen impression of something living/changing and thus falsifies the original spatial-temporal experience.

¹⁹ "The religion of the future will be a cosmic religion. It should transcend a personal god and avoid dogmas and theology. Covering both the natural and the spiritual, it should be based on a religious sense arising from the experience of all things, natural and spiritual and a meaningful unity. Buddhism answers this description. If there is any religion that would cope with modern scientific needs, it would be Buddhism." RYAN, 2007.

a sort of spatial *labyrinth* that could be comprehended only in *time*; there was no other way to understand space than to move through it, i.e., to involve time into the architectural experience. This is a great historical innovation in Western architecture.¹⁸

It is true that, historically, architectural spaces also involved time, like in the churches, which required walking through the nave and transept in order to reach the apex of spatial experience. However, even without this going along the nave one would get a good guess about the space of the church, just looking from a vantage point with a good view into the nave and isles. The same applies to mosques – either early ones with a forest of columns (Al-Aqsa, Jerusalem, 1035; Koutoubia, Marrakesh, 1184-1199) or those of the Ottoman period (Blue Mosque, Istanbul, 1609-1616), or many synagogues (Worms, 1034; Prague Altneuschul, 1270; Dohány Street Synagogue, Budapest, 1854-1859). Not so with the interiors of Loos; in order to experience them one must pass through all corridors/staircases and stationary spaces – architecture becomes a spatial experience, a 3D adventure, a concept that would be taken by Le Corbusier's best villas in the 1920s and 1930s, albeit without the variable height.

This shift of architectural priorities from material to space cannot be explained by technical achievements of architecture only. Such a major shift originates almost always from changes of cosmological foundations in a civilisation: from man's comprehension of the universe and his position in it. Architecture, creating habitat, has always been a sort of recreation of the universe in small, of which architects may be aware or may not.

The link between Loos' concept of space – along with overall modern architecture – and the Judaic heritage, was the Jewish-born physicist Albert Einstein, whose ideas paved the way to Loos' theories and practice. While Loos was a gentile, surrounded by Jewish friends, students and clients, Einstein was Jewish, religious, even if he did not follow directly strict Jewish observance. Although he advocated the abolishment of a personal God, as conceived in traditional Judaism, and followed a more Spinoza-like line (*Deus sive natura* – God or nature), and although he paid a great tribute to Buddhism as the only system which would be able to harmonize with the new scientific outlook¹⁹, his insistence on God still remains Jewish. We shouldn't forget that Buddhism operates without God – be it personal or non-personal; that ultimate reality is the holy emptiness, which poses considerable difficulties for Westerners, as it clashes with their individualism, self-determination, etc. Einstein repeatedly spoke about the *One* (not *zero* as in Bud-

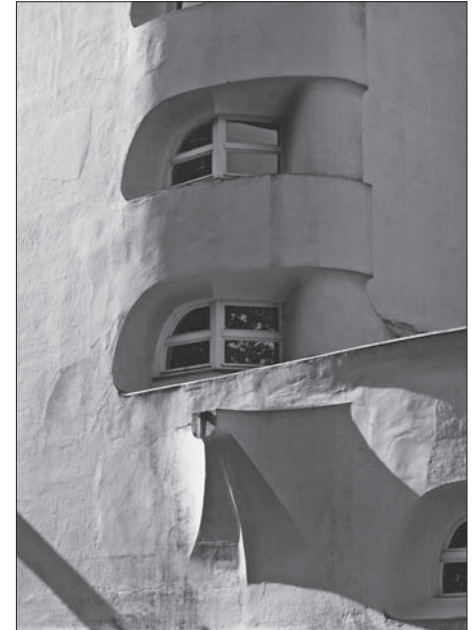


FIG. 6. ERICH MENDELSON, THE EINSTEINTURM, PROJECT 1917, BUILT 1919-1921, POTSDAM, FACADE DETAIL
SL. 6. ERICH MENDELSON, EINSTEINOV TORANJ, PROJEKT 1917., IZGRADNJA 1919.-1921., POTSDAM, DETALJ PROČELJA

FIG. 7. ERICH MENDELSON, THE EINSTEINTURM, PROJECT 1917, BUILT 1919-1921, POTSDAM, INTERIOR
SL. 7. ERICH MENDELSON, EINSTEINOV TORANJ, PROJEKT 1917., IZGRADNJA 1919.-1921., POTSDAM, INTERIJER





FIG. 8. ERICH MENDELSON, MOSSEHAUS, 1921-1923, BERLIN
 SL. 8. ERICH MENDELSON, MOSSEHAUS, 1921.-1923., BERLIN

dhim), and the *He*, who does not throw dice.²⁰ Moreover, Einstein spoke very enthusiastically about mysticism as the most "beautiful emotion" and the "power of all true art and science".²¹

Both Judaism and Buddhism were essential in delivering basics for modern architecture and its space-centred philosophy.²² Still, Buddhism's agnosticism and defying (or reluctance) to verbalize ideas, kept it away from creating ideologies and theories of architecture – acting more as an inspiration for practical architectural design – leaving Judaism to take the ideological lead via Einstein's theories.

ALBERT EINSTEIN'S CONTRIBUTION

DOPRINOS ALBERTA EINSTEINA

Early 20th century witnessed significant scientific discoveries, or new concepts that were yet to be experimentally proved. Major shifts in science and cosmology were offered by the already mentioned Albert Einstein, who introduced new theories in physics that were indirectly linked to the Jewish thinking or Judaic heritage. Some other thinkers of Jewish origin also "updated" elements of the ancient Jewish heritage: Karl Marx's Communism recalls traditional Jewish Messianism; Henry Bergson's *durée* brings to mind Jewish concepts of time; Jacques Derrida's Deconstruction evokes the idea about the multiplicity of readings in Jewish text-interpretation, etc.

Einstein's, and indirectly Judaism's, influence on architectural theory started in 1905, the

year when his first paper on special relativity appeared, titled "On the Electrodynamics of Moving Bodies". This paper introduced the special theory of relativity, a theory of *time*, *distance*, *mass* and *energy*, notions from which the most important catchwords of modern architecture emerged. Einstein's thinking in theory of *time* centred more and more on the relation between *space and time*, and Hermann Minkowski²³ realized by 1907 that the special theory of relativity could be best understood in a *four dimensional space*, in which *time and space* are not separated entities but connected. By his scientific intuition he created a hypothesis on the space and time unity, to determine a geometric structure of that space-time entity. In 1908 Minkowski stated that in the four-dimensional world one point has four coordinates: three of them are space coordinates which define the event location, and the fourth coordinate is the time of that event. This four-dimensional space is called an *event space* or *Minkowski space*.

However, the logical sequence of discoveries in experimental and theoretical physics that actually led to the aforementioned conclusions were not the only initiators of the space-time breakthrough. In it was Einstein's personal contribution too. He himself remarked that his slow development and backwardness in childhood helped him in developing his theories. "The normal adult never thinks about space and time. These are thoughts that I have thought about when I was a child. But since my intellectual development was retarded, as a result of which I began to wonder about space and time only when I had already grown up. Naturally, I could go deeper into the problem than a child with normal abilities".²⁴

Moreover, it was not just Einstein's problematic childhood, but also some exposure to Judaism that was responsible for the development of his ideas of space-time. There is

²⁰ Complete quotation: "Quantum mechanics is certainly imposing. But an inner voice tells me that it is not yet the real thing. The theory says a lot, but does not really bring us any closer to the secret of the 'old one.' I, at any rate, am convinced that *He* does not throw dice." <http://astro.berkeley.edu/~jsilv/quotes.html>

²¹ FRANK, 1947.

²² Theosophy also had a limited influence via the Dutch movement *De Stijl*.

²³ Minkowski was also Jewish; his concepts are rooted in the Judaic thought.

²⁴ FOX, 2002

²⁵ By the age of twelve, Einstein had attained in his own words a "deep religiosity". He reached the conviction that much of the stories in the Bible could not be true. Yet he said: "I want to know how God created this world. I am not interested in this or that phenomenon, in the spectrum of this or that element. I want to know His thoughts, the rest are details." FOX, 2002



FIG. 9. ERICH MENDELSON, MOSSEHAUS, 1921-1923.
BERLIN, FACADE DETAIL
SL. 9. ERICH MENDELSON, MOSSEHAUS, 1921.-1923.,
BERLIN, DETALJ PROČELJA

FIG. 10. ERICH MENDELSON, SCHOCKEN LIBRARY, 1934,
JERUSALEM, INTERIOR
SL. 10. ERICH MENDELSON, SCHOCKENOVA KNJIŽNICA,
1934., JERUSALEM, INTERIJER

no evidence that Einstein would have read Maimonides (Moses ben Maimon, 1135-1204), who was also occupied with the problem of space and time. There is no evidence either that Einstein would have ever studied medieval Judaism. What is certain, however, is that he did have a sort of religious period.²⁵ It is highly unlikely that encountering Judaism he would not have come across the idea of space-time interpreted by Maimonides or just by his own intuition.

Linking space to *time* – instead of tying space to *place* (space around something tangible or between tangible surfaces) – means the dethronement of *topos*,²⁶ its banishing from cosmology and consequently from architecture too. Similarly, *limitation* has also lost its significance – no wall limits space anymore; space becomes infinite, or to use a traditional Hebrew notion *ein sof* (without/no end) – one of the most important attributes of God as conceived in Judaism. Hence, the most basic ideological elements of modernism are closely related to the Judaic heritage.²⁷ These propositions started to take hold in architectural modernism of the 1920s, but their full swing occurred only by the end of the 20th century in Deconstruction.

²⁶ By *topos* I mean the Greek notion of place, a fixed spot in a real physical extension. *Topos*, relating to a certain place is a basic element of architecture of the classical antiquity.

²⁷ Einstein's quantum theory for which he obtained the Nobel Prize is often related to Jewish mysticism. The Kabbala sees the universe as little bits of dark matter which are surrounded and held together by a light called *ein sof*; quantum theory sees universe as little particles with positive and negative and neutral charge which are surrounded, and held together, by four forces: gravity, electromagnetism, strong, and weak. Further parallels yield to comparison.

²⁸ Tolerating opposites is one of the main virtue of Jewish thinking in the context of Western thought, and for some gentiles this is also the most disturbing feature of Jewish culture.

²⁹ BRANOVER, 2004

EARLY MODERNISM

RANI MODERNIZAM

Einstein's concepts with their roots in traditional Judaism continued to influence ideologies of architecture in the interwar period. Along with earlier ideas about space-time reflected in Loos' architecture, Einstein's mature theory of relativity further revolutionized architectural thinking, leading ideologies of architectural design in the period of the Bauhaus and the International Style.

Einstein discovered the *quantum*, a landmark break with the classical understanding of physics. In 1909, Einstein suggested that one must find some way to understand *waves* and *particles* together. And this is the point where his quantum theory touches upon the Jewish tradition. Einstein's insistence on the fact that light possesses a dual nature, i.e., the unification, in one entity, of two *opposite concepts* – of a particle of matter and of a wavy motion – resembles teachings of Jewish mysticism. This is a rather philosophically complex matter and here will be given just a simplified interpretation. The Kabbalah uses light as a metaphor for the power of God. It speaks in terms of the *Or Ein Sof* – the Infinite Light. One of the principles of faith is that God is omnipotent and may carry *opposites*.²⁸ The fact that light possesses a dual nature and can carry an opposite makes it the perfect metaphor for Divine energy. In this third stage of the development of the light theory it becomes apparent that this unification of two concepts underlines the unity of God within creation.²⁹ This new idea became the basis of the new fundamental theory of quantum mechanics from which architectural ideologies profited greatly in the early modern period. In modern architecture, buildings become the interplay of space and matter, as fundamental opposites, and they bathe in light, which was a recurring idea of many modernists, spelled out quite often by Le Corbusier too.



FIG. 11. PETER EISENMAN, MEMORIAL TO THE MURDERED JEWS OF EUROPE, COMPETITION 1999, CONSTRUCTION 2003-2004, BERLIN, PASSAGE BETWEEN STONES

SL. 11. SPOMENIK ŽIDOVSKIM ŽRTVAMA FAŠIZMA U EUROPI, NATJEČAJ 1999., IZGRADNJA 2003.-2004., BERLIN, PROLAZ IZMEĐU KAMENIH VOLUMENA

In November 1915, Einstein presented his theory of general *relativity*. The theory of relativity transformed space into time, or the "spatialized" time (time and space being equivalents). It is appropriate to speak not only of a "space-time continuum", but one can no longer refer to a "universal time" and an "absolute space". The properties of *space-time* depend on the *speed* at which a moving object travels, and at speeds approaching the speed of light, space-time "contracts" around the moving object. But the time of relativity, like that of classical physics, remains reversible. Such a cosmological shift couldn't remain in the sphere of science: it found its way into theories and practices of modern architecture and art.

While Loos' *Raumplan* as an exemplification of space-time was still "slow" – he did not play with the idea of approaching the speeds that would change the constants of space-time – the Jewish born modernist architect, Erich Mendelsohn, went further and increasingly spoke about speed and the 4th dimension of his spaces. The idea of speed was prevalent in the period around World War One; futurism and expressionism used that notion quite frequently, but in the case of Mendelsohn it was much more than that. Mendelsohn had had personal contacts with Einstein,³⁰ and, being susceptible to abstract thinking and eager to establish a theoretical basis for his architectural decisions, he felt entitled to disseminate Einstein's ideas, to translate them to architectural "space and time".

Astrophysicist Erwin Freundlich³¹ introduced Mendelsohn to the basics of Einstein's theory. Mendelsohn enthusiastically incorporated these ideas into his thinking. The equation of matter and energy ($E = mc^2$) had captured his imagination and since then he would explain his concepts by the latent energy of the masses and volumes.³² He was also fond of speed, as mentioned, and used to express it in connection with his project of the *Einstein-turm* in Potsdam, 1920-1922, and of the *Mossehaus* in Berlin, 1921-1923,³³ both paradigmatic buildings that linked Einstein's physics with modern architecture.

In *Mossehaus* Mendelsohn implemented the idea of speed and the idea of relativity.³⁴ The design highlighted the rounded corner of the building adding a canopy over the ground floor and five broad bands of curved widows. The new building added two stories at the sides of the old and three at the corner. The street entrance on the corner was elaborate since it was the part of the building perceptible by pedestrians. In the *Mossehaus* Mendelsohn worked for the first time with the *different perceptions* that passers-by would have of the building according to their means

of transportation, exemplifying Einstein's theory of relativity, albeit on a very small scale – the speed of the pedestrian and the car driver were far from approaching the speed of light. Still, the idea is there, the different ways of perception and the notion of relativity and of duality.

The theory of relativity indirectly contributed to the idea of de-centring and de-personalisation. Not an architect by profession, but very influential for the Bauhaus and the whole course of modernism, was László Moholy-Nagy, the Hungarian-Jewish born artist, critic and photographer. Walter Gropius, the founder and head of the Bauhaus, hired him in 1923, after sacking the expressionist artist Johannes Itten. It was Moholy, who steered away the Bauhaus from expressionism and ushered it into modernism proper. His famous design via telephone, *Telefonbilder* (1922), attracted Gropius, who saw the future in the de-personalization of arts, for which the famous crosses stood for. Moholy created these pieces of art using the colour chart of a company and the phone, without touching the "piece of art". Moholy was also fond of light, abstraction and movement. Not with particular philosophical aspirations, but with a lot of energy he propagated the principles of modern industrial design and architecture. In his theories, particularly leanings and preferences one recognizes his Jewish roots – abstraction, light, play, involvement of time (movement), which echo Einstein's preoccupations too.³⁵

Taken by Einstein's theories, El Lissitzky,³⁶ another Jewish artist, wrote in his essay "Prouns" (project for the affirmation of the

FIG. 12. PETER EISENMAN, MEMORIAL TO THE MURDERED JEWS OF EUROPE, COMPETITION 1999, CONSTRUCTION 2003-2004, BERLIN, VIEW TO THE SKY

SL. 12. SPOMENIK ŽIDOVSKIM ŽRTVAMA FAŠIZMA U EUROPI, NATJEČAJ 1999., IZGRADNJA 2003.-2004., BERLIN, POGLED PREMA NEBU



³⁰ It is known that his wife Louise played chamber music with Einstein. She played the cello, Einstein the violin. Reportedly, when in good form, Einstein violin playing was quite decent.

³¹ Also written Erwin Finlay-Freundlich (1885-1964), was a working associate of Albert Einstein. Due to his partial Jewish origin and his Jewish wife, he was interned to Russia during World War One, and due to Nazism he left Germany for Istanbul, Prague and Scotland. After retiring, he returned to his native Wiesbaden.

³² Mendelsohn's wife's friend, Erwin Finlay-Freundlich, was one of the first to learn about and support Einstein's endeavours. He planned to measure the bending of light during a solar eclipse and published the first book on relativity in 1916.

³³ Many later considered Mendelsohn's early oeuvre to be expressionistic, a condemnation in the 1920s and 1930s, which may be true, but its ideological impact is undeniable and absolutely necessary for the further course of architectural modernism also in formal terms.

³⁴ Bedoire analyses Erich Mendelsohn's *Mossehaus* for the *Berliner Tageblatt* and stresses the link between the theories of two Jewish scientists, Albert Einstein and Hermann Minkowski, vis-à-vis Mendelsohn's dynamism of the *Mossehaus*. BEDOIRE, 2004: 280

³⁵ Moholy did not refer to his Jewishness until the Nazi threat, but then his correspondence with Alvar Aalto revealed his inner identity. (Archives of Studio Aalto, Tiilikmäki 20, in Munkkiniemi/Helsinki)

new) in 1920: "Methods which were once employed in particular branch of art, knowledge, science, philosophy, are now being transferred into other areas. This is happening, for example, to the four coordinates of Minkowski's world; length, width, height, and the fourth one, *time*, are being freely interchanged."³⁷ Lissitzky's ideas echo not only Einstein's theories, but some universalistic ideas too, insofar as he connects sciences with arts. Such a universalism, transfer of ideas from one medium to the other is also characteristic for Jewish thinking.

During the mid-1920s Lissitzky extended Malevich's "cosmic spatial fourth dimension" to *relativity's* new concept of space-time. Lissitzky preserved Suprematism's freedom from orientation, but in contrast to Malevich's planes of colour floating freely in an absolute white space, Lissitzky in *Proun 30T* (1920) figures a *relational space* created and curved by complex shapes within it.³⁸

Interestingly, Einstein's theories took Lissitzky away from painting and led him to architecture, as far as space and its representation were concerned. His sentence "The image is not a painting, but a structure around which we must circle, looking at it from all sides, peering down from above, investigating from below" clearly illustrates this shift.³⁹

In his essay *Art and Pangeometry* he espoused: "the multi-dimensional space existing mathematically cannot be conceived, cannot be represented, and indeed cannot be materialized".⁴⁰ Lissitzky's formulation of something that 'cannot be conceived, cannot be represented, and indeed cannot be materialized' echoes the way YHVH, or the Lord, is



FIG. 13. PETER EISENMAN, MEMORIAL TO THE MURDERED JEWS OF EUROPE, COMPETITION 1999, CONSTRUCTION 2003-2004, BERLIN, GENERAL VIEW

SL. 13. SPOMENIK ŽIDOVSKIM ŽRTVAMA FAŠIZMA U EUROPI, NATJEČAJ 1999., IZGRADNJA 2003.-2004., BERLIN, POGLED

referred to in the Judaic heritage, having also important spatial implications. In some interpretations, the Lord is an all-encompassing space and as a matter of fact infinite. The wish to render architectural space open, directing toward infinity, becomes clear from his sentence: "In the space allotted to me I have not conceived the four walls as retaining or protective walls, but as optic backcloths for the works of art. That is why I decided to dissolve the wall surfaces as such."⁴¹ Freedom and the idea of unlimited in particular, rhyme with the notion of *ein sof*, discussed earlier.

By 1923 he began to incorporate time and motion into exhibition space (Proun Room) and set his viewer into motion through which he perceived the geometrical shapes mounted on walls. This procedure shifted primary attention from *tangible form* to *intangible space*, to *movement* and thus, to *time*. One can interpret this move as accepting Einstein's cosmology and, indirectly, as a further step in Judaization of visual arts. Lissitzky himself had a strong Jewish identity. He began his career illustrating Yiddish⁴² children's books, promoting Jewish (mainly Yiddish) culture in Russia, which just had repealed its traditional anti-Semitic laws.⁴³

On numerous Lissitzky's paintings, even not related thematically to Judaism, one encounters Hebrew or Yiddish quotations or symbols. El Lissitzky's illustration for *Shifs Karta* (Boat Ticket), 1921-1922⁴⁴ two Hebrew characters (פ) dominate the centre of the image, "*pei nun*", an acronym for *po nikbar*, "here lies buried", usually seen on Jewish gravestones before emancipation and sometimes after it too. Apter-Gabriel interprets the two Hebrew let-

³⁶ Originally his name was Eleazar Markovich Lissitzky (1890-1941). He shortened Eleazar to *El* (אֵל), which in Hebrew means God.

³⁷ GALISON, HOLTON, SCHWEBER, 2008: 115

³⁸ GALISON, HOLTON, SCHWEBER, 2008: 115

³⁹ <http://www.theartstory.org/artist-lissitzky-el.htm>

⁴⁰ GALISON, HOLTON, SCHWEBER, 2008: 116

⁴¹ <http://www.theartstory.org/artist-lissitzky-el.htm>

⁴² Yiddish, the language of Ashkenazi (German) Jews, is a mixture of High German language, Hebrew and Aramaic with the infusion of Slavic and traces of Romance languages, written in the Hebrew alphabet from the right to the left. It had developed from about the 10th century in the Rhineland and then spread to Central and Eastern Europe and eventually to other continents. Yiddish is also used in the adjectival sense to designate attributes of Ashkenazic Jewish culture: Yiddish cooking, Yiddish music. *Yiddishkeit* refers to the culture of these speakers.

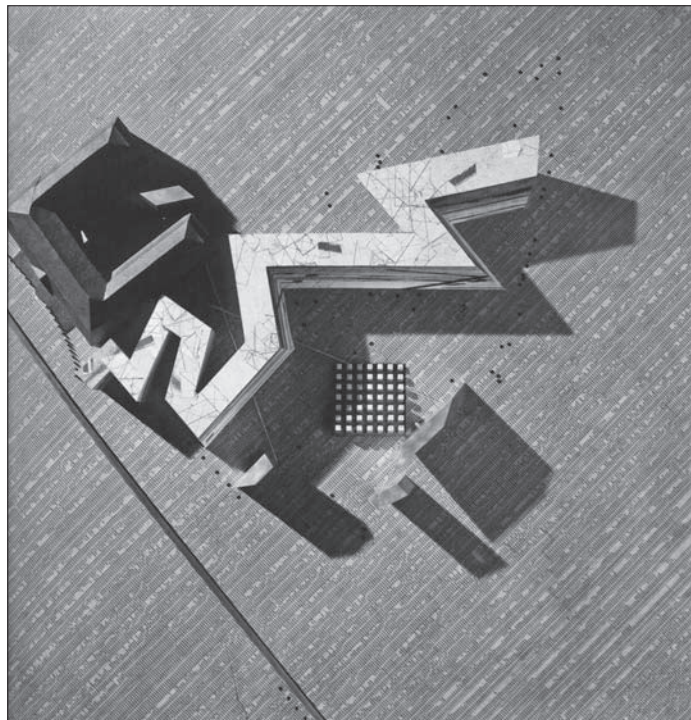
⁴³ A deeper encounter followed in the French capital, during the contacts with the Paris-based group of Russian Jews led by the sculptor Ossip Zadkine, a lifetime friend of Lissitzky since early childhood, who exposed Lissitzky to conflicts between different groups within the diaspora.

⁴⁴ El Lissitzky, illustration for *Shifs Karta* (Boat Ticket), 1921-1922, Indian ink and collage on paper, 43.5 x 24.1 cm, in Ilya Ehrenburg's *Six Stories with Easy Endings* (Moscow and Berlin: Helikon, 1922). Jerusalem, The Israel Museum, The Boris and Lisa Aronson Collection, purchased through a bequest from Dvora Cohen, Afeka.



FIG. 14. DANIEL LIBESKIND, JEWISH MUSEUM, 1992-1999
BERLIN, PRELIMINARY STUDY WITH ALEATORIC SHAPES
SL. 14. DANIEL LIBESKIND, ŽIDOVSKI MUZEJ, BERLIN,
1992.-1999., STUDIJA S ALEATORICKIM OBLICIMA

FIG. 15. DANIEL LIBESKIND, JEWISH MUSEUM, 1992-1999
BERLIN, MODEL
SL. 15. DANIEL LIBESKIND, ŽIDOVSKI MUZEJ, BERLIN,
1992.-1999., MAKETA



ters painted on a black hand as a stamp of farewell to the Old World,⁴⁵ including the Jewish prerevolutionary world, in embracement of more universal and revolutionary values, actually a modern Jewish Messianism, of which the new fourth dimensional, Einstein-Minkowski-an cosmology is an organic part.⁴⁶

Lissitzky visited numerous synagogues and studied their wall painting. His sketch of Sagittarius was copied from the ceiling of the synagogue of Mohilev in Belarus.⁴⁷ He observed that on some synagogue wall-paintings one can encounter a surrealist combination: birds with human eyes. His fascination with the eye, painted independently from the context of the human face, shows up on his paintings, most important of which is El Lissitzky's Self-portrait (Constructor), of 1924.⁴⁸ This eye is related to the idea of divine providence.

Both Moholy and Lissitzky were fond of film as a medium, because it involved beyond 3D space time too. Their enthusiasm for film is also related to the idea of light, photography, instead of drawing/carving. Light is not exclusively part of Jewish mysticism – as the divine light – but of other mysticisms too, but the way in which Moholy and Lissitzky treated light was closer to the Jewish heritage than to others.

Finally, after Lissitzky, Mendelsohn and Moholy, it was Sigfried Giedion,⁴⁹ the Czech-Jewish-born Swiss art historian, the most important theoretician of early modern architecture, who summarized many theoretical achieve-

ments of the period, in order to create an ideological base for architectural practice. He also emphasized the significance of space-time for modern architecture. His space-time concept largely followed that of Einstein's and Minkowski's), but he also pointed to the influ-

⁴⁵ APTER-GABRIEL, 2010: 101-104

⁴⁶ Today, hailing the Russian Revolution and early Soviet period sounds controversial, but for a modern artist of the time the removal of the oppressive Tzarist regime represented a great relief. Moreover, the old regime was anti-Semitic, limiting the civil rights of the Jews, and Communism's ideology looked promising for the Jews before the onset of Stalinist dictatorship, when it degraded into an Asiatic and Orthodox despotism.

⁴⁷ El Lissitzky made drawings of frescoes from the eighteenth-century Mohilev synagogue, and published with his *Reminiscences* (1923) in the early Jewish art journals *Milgroym* (Yiddish) and *Rimon* (Hebrew), both meaning *pomegranate*. With these drawings he intended to prove the existence and to preserve Jewish folk art, a basis for intended modern Jewish style. See the entry on Lissitzky in the YIVO Encyclopedia. http://www.yivoencyclopedia.org/article.aspx/Lissitzky_El

⁴⁸ APTER-GABRIEL, 2010: 101-114.

⁴⁹ Sigfried Giedion (Prague, 14 April 1888 – Zürich, 10 April 1968) was a pupil of Heinrich Wölfflin, but soon adopted modern thinking from the physics and cosmology of Einstein. As the first secretary-general of the *Congress International d'Architecture Moderne* he was extremely influential in modernism's evolution and spread. He taught at the MIT and Harvard University. His ideas and books, *Space, Time and Architecture*, and *Mechanization Takes Command*, were very influential. Giedion was one of the key figures of CIAM in La Sarraz in 1928, becoming the General Secretary of the association until its unofficial dissolution in 1957.

⁵⁰ Although highly influential, this connection between the Bauhaus' corner and cubist paintings of Braque and

ence of the fourth dimension in Cubist paintings, i.e., representation of the same object from different viewpoints. He did this while explaining the corner of the Bauhaus workshop wing by Walter Gropius.⁵⁰ This idea of changing viewpoints and their interplay can be found in the traditional synagogue interior as well. Perhaps the synagogue is the most widespread sacred interior with a changing focus during the service. The synagogues namely has two foci: the bimah – the reading pulpit near the midpoint of the space – which is the focus of attention during the reading of the Torah; and the Ark, which is on the eastern side and contains the Torah scrolls, represents the eternity of Jerusalem during prayer. This dynamism sets apart the synagogue interior and its service from its Christian/Muslim counterparts, which have closely set foci and thus more or less lasting visual direction of the believers. Synagogue interior is related to the idea of changing viewpoints in the metaphoric sense too in terms of different and simultaneous interpretations, which is deeply in the Jewish tradition.

Giedion emphasized that the theory of relativity splits absolute and permanent time continuity and implicates the idea of *simultaneity*, which surfaces in the representational mode of Cubist paintings and in modern architecture, often condemned by the enemies of the avant-garde as Jewish, due to the origin of some of its protagonists and its departure from traditional Western ways of representation.⁵¹

Picasso is a bit problematic, and it reflects Giedion's view of architecture from an art historian's perspective.

⁵¹ Marc Chagall the "Hasidic Cubist", Modigliani, Chaim Soutine, Jules Pascin, Jacques Lipschitz, Moise Kisling, and Chana Orloff, etc. However, it would be a gross mistake to interpret Cubist painting or modern architecture as a Jewish undertaking. Only some of their roots point to elements of Judaic heritage, which was irritating to the cultural conservatives aligned along the lines of Euclidean geometry and Aristotle's aesthetics.

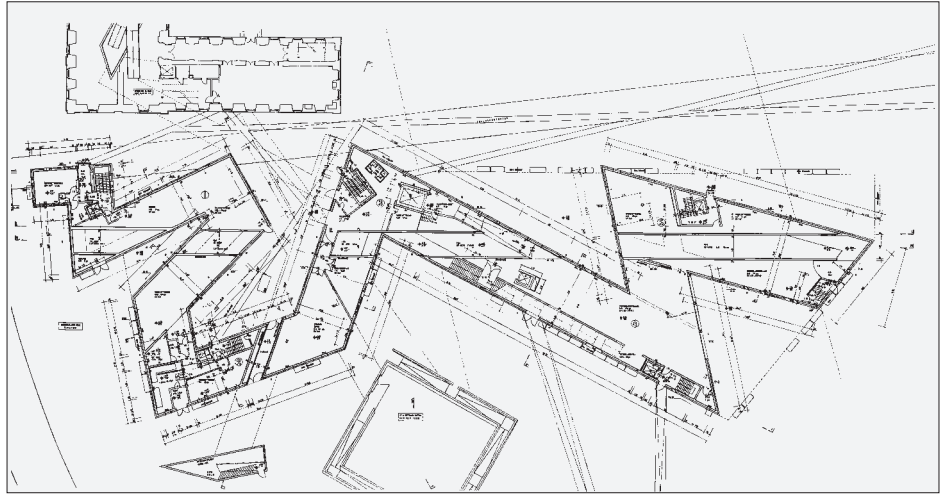
⁵² GIEDION, 1941.

⁵³ Around 1410-1415 Brunelleschi rediscovered the principles of linear perspective, known to ancient Greeks and Romans, but forgotten during the Middle Ages. With these principles, one can paint or draw using one, or two, or maximum three vanishing point(s), toward which all lines on the same plane converge, and objects appear smaller as they recede into the distance. It means that contrary to medieval representation, in which Christ appears larger than others on an image or relief due to his significance, using Brunelleschi's technique the size of figures is determined by their position in space. The symbolic depiction – used by children and in primitive art – has been replaced by an exact one in which space becomes a structuring element.

⁵⁴ It is remarkable that stepping back from perspective re-establishes pre-Renaissance representation technique, but not so much in a static, everlasting symbolic way, but rather in a manner that emphasizes time and changes in it.

⁵⁵ Interestingly, Nikolai Ivanovich Lobachevsky's *Geometriya* was published outside Russia in 1909, while the original appeared in *Вестник Казанского университета*, 1829-1830.

⁵⁶ *Paris Through the Window*, 1913. Solomon R. Guggenheim Museum.



Giedion visited the Bauhaus Week in 1923, and there he laid the foundations of a lifelong friendship with Walter Gropius, as well as with the Modern Movement and the praxis of modern architecture. His ideas, developed during the 1920s and 1930s, can be found in his magnum opus, *Space, Time and Architecture*.⁵² In this book, under the subtitle "The Termination of the Perspective", Giedion celebrates the departure from the traditional 3D representation in painting introduced by Filippo Brunelleschi (1377-1446) during the Renaissance,⁵³ a practice that was based on the philosophy of *centre* – the firmly set viewer on the one hand, and the remote vanishing point(s) on the other. Refusing the Renaissance representation is a sort of de-centering of the universe, which is related to the Einsteinian view, as Giedion will admit later.⁵⁴

Giedion surmises that in the 19th century the tool of linear perspective started to disappear from painting due to the evolution of the new, non-Euclidean geometry, called Bólyai-Lobachevsky geometry, around 1830.⁵⁵ More importantly, Giedion maintains that the essence of space resides not in the *optical infinity* anymore, such was the case in the Gardens of Versailles for instance, but in the *infinite possibilities* of its *internal relationships*. This is an almost structuralist idea, which is rooted in many traditional systems of thought, such as the Jewish heritage, but other, Eastern cultures as well; for instance, Japanese thinking is equally significant in this respect. Giedion maintains that in order to understand space, one must move through it and mentions the Tour Eiffel and its spiral staircase that enabled people to experience the interplay between interior and exterior space. The same Tour Eiffel was a subject of interest for the young Marc Chagall too and many others.⁵⁶

Giedion maintains that space in modern physics becomes comprehensible only vis-à-vis a

FIG. 16. DANIEL LIBESKIND, JEWISH MUSEUM, 1992-1999
BERLIN, PLAN

SL. 16. DANIEL LIBESKIND, ŽIDOVSKI MUZEJ, BERLIN,
1992.-1999., TLOCRT



FIG. 17. DANIEL LIBESKIND, JEWISH MUSEUM, 1992-1999
BERLIN, ELEVATION
SL. 17. DANIEL LIBESKIND, ŽIDOVSKI MUZEJ, BERLIN,
1992.-1999., PROČELJE

FIG. 18. DANIEL LIBESKIND, JEWISH MUSEUM, 1992-1999
BERLIN, FACADE DETAIL
SL. 18. DANIEL LIBESKIND, ŽIDOVSKI MUZEJ, BERLIN,
1992.-1999., DETALJ PROČELJA



moving vantage point and not as an absolutely static unity of Newton's Baroque system. Giedion thus echoes a relativistic, actually a Judaic view.⁵⁷ He emphasizes that all this widening of the notion of space occurred in modern art too, for the first time in Cubism.⁵⁸ Giedion finds the roots of modern art and architecture in the idea of *space-time simultaneity*, based on Einstein's *Electrodynamics of Moving Bodies* from 1905, and the already quoted work of Minkowski on space-time.⁵⁹

Although Giedion did not come to cosmological conclusions, the clue for all these physical theories lies in the idea of *de-centring* and *dislocating* in the universe, or in other words, in *destroying fixed spatial markers*, and *making human existence uprooted, fluid and dispersed in time* – indeed very Jewish propositions, referring to the historic experience of the Jewish people and their habitual thinking. This fluidity involves abolishing hierophanies⁶⁰ and idols rooted in one place, in favour of the idea of omnipresence of the divine, as suggested in Judaism for the first time. The roots of this thinking go back to ancient times, that of Abraham in the Old Testament, whom God ordered the idols – spatial and ideatic markers – to destroy. Moreover, Abraham existed mainly in *time* during his wanderings rather than in comprehensible space, space around a place, or space between places.⁶¹ Some four millennia later the same ideas of de-idolising and dislocating would become the tenor of Peter Eisenman's deconstructivist architectural theories in the late 1980s. However, it was premature for early modernism to embrace these far-fetched Judaic ideas that constitute the core of Deconstruction. These ideas could surface only in times of the late 20th century. Still, Sigfried Giedion was a pivotal architectural theoretician who helped operationalizing leading ideologies of his time for the architectural practice, translating the period's cosmology into architectural space and composition, establishing the connection between physics, fine arts and buildings. Charles Jencks assumes that *Space, Time and Architecture* is the "deepest and most effective" formulation of modern architectural history until its first refutation by Bruno Zevi's *Towards an Organic Architecture*.⁶²

Period public reaction to the Einsteinian cosmology and architectural ideologies originating from it was mixed, with some explicitly hostile overtones on the side of some cultural conservatives and dictatorships. The cosmological horror of the Nazis caused by the new Einsteinian world is reflected in their dismissive labelling it as "Jewish physics".⁶³ The artistic output related to the cosmological shift also irritated the Nazis,⁶⁴ who introduced the term *die entartete Kunst* (degenerate art). Similarly, the Soviet-Russian notion of *bour-*

geois art or simply *formalism* highlights the harshest opposition to Modernism in a Communist manner.⁶⁵ In both cases it was the lack of traditional, easy readable content/message and open-ended meaning, as well as the impossibility to control the new artistic output that worried the political class mostly. Not surprisingly, Nazi and Stalinist architecture reinstated the Euclidean geometry and closed spaces, as well as definite limitations of space and other elements of Aristotle's aesthetics. They also reaffirmed spatial hierarchy and the centre, which in public spaces marked the place of the leader, i.e., the *Führer*, the *Duce* or the *Велик Учитель*, the great teacher, "camerad Stalin". However, totalitarian regimes are not alone in this tendency; many so-called democratic societies resisted the modernist outlook, cosmology and art based largely on Einstein's cosmology, using extensive decoration, centres in their architectural plans and closed volumes, thus producing some sort of modernist classicism, as for instance the opus of Auguste Perret, or American Art Déco, etc.⁶⁶

AFTER EARLY MODERNISM

NAKON RANOG MODERNIZMA

While being the avant-garde and noble opposition to the mainstream society in the inter-war period, after 1945 modernists became actual rulers of architectural design and urban planning, what eventually led to their fall and to the transformation of modernism into structuralism and regionalism in the 1950s and 1960s, until the overall radical renunciation of modernism in the postmodern period

57 Discussing the same problem from different aspects, using parallel argumentations instead of 'one single truth' is very much part and parcel of Judaic textual heritage as seen in the Talmud and rabbinic responsa. Wandering of the Jews, and encountering different cultures and people, enabled them to see things from different angles and to follow an investigate different possible scenarios parallelly.

58 GIEDION, 1941: 280

59 GIEDION, 1941: 281

60 Hierophany, or manifestation of the sacred, is bound to a place, thus designates a special place, a sacred one, which departs from normality and breaks up the uniformity and neutrality of spatial expanse.

61 Geographically, his journey was from the ancient city of Ur to Canaan, but touching on many centres of the Eastern Levantine world, including parts of Egypt.

62 JENCKS, 1969: 255

63 Nazi physicists, most notably the Nobel laureate Johannes Stark, attempted to discredit Einstein's theories. Ironically, it was him who earlier asked the then still rather unknown Albert Einstein to write an article on the principle of relativity in the *Jahrbuch der Radioaktivität und Elektronik*, in 1907. While working on his article, Einstein initiated a line of thought which would eventually lead to his generalized theory of relativity, making him world famous.

64 The gist of the Nazi regime was hierarchy and centralization, with the Führer on the apex on the pyramid. The insistence on *place* and *Vaterland* stood in stark contrast to the Jewish experience, particularly the experience in Exile, practically without a firm geographical place and a *Führer*. The Nazi regime was so totalitarian that it im-

in the late 1970s and 1980s, and the ensuing Deconstruction.

Judaic thought, Jewish theoreticians and architects, played a remarkable role in establishing modernism, but they contributed to its overcoming and dismantling too. It would be interesting to analyse what caused this change of heart. One may ask: Is it a contradiction that Jews contributed to the dismantlement of modernism equally ferociously as previously to its establishment? Have Jews changed? Certainly not. It was modernism itself that had changed in the meantime, its revolutionary impetus transformed into a permanent practice, supported by political elites of the welfare states. It had frozen into an icon and became an idol. And Jews simply tend to attack any established style, any icon, or permanent genre – be it academicism, Art Nouveau or established modernism. They are always strong in de-construction, de-idolization, interpretation and re-interpretation. No wonder that we find them in late modernism (Louis Kahn, Oscar Niemeyer) and structuralism (Hermann Herzberger, Alfred Neumann, Zeev Rechter, Moshe Safdie, Zvi Hecker), neo- and post-modernism (Richard Meier, Michael Graves, Robert A. Stern, Frank O. Gehry, Stanley Tigerman), just as in deconstruction and folding (Peter Eisenman, Daniel Libeskind), and so on. Anyhow, late- and post-modernism were equally warmly welcomed by Jewish architects and public as modernism had been half a century earlier.

The impact of Einstein's theories on architecture did not stop with the demise of modernism, as was already mentioned. General rela-

tion continued to influence the architecture of the last two decades in of the 20th century. In general relativity, gravity is no longer a force (as it was in Newton's law of gravity) but is a consequence of the curvature of space-time. Therefore gravity ceases to be the basic content of architecture to be accommodated and expressed; the idea of anti-gravity began to provoke important architectural implications. Such a proposition was revolutionary for architecture, which from then on started to negate gravity, tectonics, climaxing in deconstruction and folding, as well as in other non-tectonic movements.⁶⁷

tivity continued to influence the architecture of the last two decades in of the 20th century. In general relativity, gravity is no longer a force (as it was in Newton's law of gravity) but is a consequence of the curvature of space-time. Therefore gravity ceases to be the basic content of architecture to be accommodated and expressed; the idea of anti-gravity began to provoke important architectural implications. Such a proposition was revolutionary for architecture, which from then on started to negate gravity, tectonics, climaxing in deconstruction and folding, as well as in other non-tectonic movements.⁶⁷

Many theoretical foundations of deconstruction rest on Judaic foundations too: the notion of in-between (people following Judaic-Jewish tradition in the context of the Christian or Muslim environment); Diasporic experience (being dispersed, not belonging to a firm physical/geometrical framework); dislocation (being expelled from the homeland, the Land of Israel, moving between places and environments); the grotesque (avoiding in visual representations the magnificent, the adorable, the ideal/idolic and opting for the faulty, ridiculous, unrealistic, as in many traditional representations in Jewish art from medieval manuscript illuminations or Haggadot,⁶⁸ up to paintings of Marc Chagall) and "distorted buildings" of Peter Eisenman, Daniel Libeskind and many others; permanent becoming in architecture or the "architecture of becoming" as Peter Eisenman terms it (architecture which does not represent a finality as Greek temples have been, but architecture in change, which is accidental and unfinished. Frank O. Gehry's use of "as found" in his own house in Santa Monica); creative reading, or as Eisenman puts it, the *écriture* (multi-layered reading of a primary text, *Urtext*, in which every new reading is creative, different and layers upon another one – the long Talmudic tradition of interpretation and reinterpretations).

Modernist ideologies gradually undermined some historic basics of architecture and eventually blurred its boundaries vis-à-vis painting, sculpture, installations and performance. At the same time these ideologies became also self-destructive, prompting their own periodical renewal and replacement with new ones, and requested the discovery of new inspirational sources and technological solutions.

CONCLUSION

ZAKLJUČAK

Early modern architecture and its theory were influenced by new scientific concepts and discoveries, originating partly also from religious teachings, among others from Judaism.



FIG. 19. DANIEL LIBESKIND, JEWISH MUSEUM, 1992-1999 BERLIN, INTERIOR

SL. 19. DANIEL LIBESKIND, ŽIDOVSKI MUZEJ, BERLIN, 1992.-1999., INTERIJER

FIG. 20. DANIEL LIBESKIND, JEWISH MUSEUM, 1992-1999 BERLIN, STAIRCASE

SL. 20. DANIEL LIBESKIND, ŽIDOVSKI MUZEJ, BERLIN, 1992.-1999., STUBIŠTE



⁶⁵ By Communist I mean here Soviet-Russian Communist, or Chinese Communist, i.e., the "Asian" version of Marxist notions that suffered from a radical simplification and profanation in its implementation by dictatorships.

⁶⁶ Kenneth Frampton titles his chapter that deals with these genres *The Architecture and the State*, and includes in it period French and American architecture. In: FRAMPTON, 1982: 210-223

⁶⁷ Challenging gravity appears in the works of gentile architects too: Peter Zumthor, Jacques Herzog & Pierre de Meuron, Zaha Hadid, Rem Koolhaas, etc.

⁶⁸ Haggadot is the plural of Haggadah, illustrated Jewish text that sets forth the order of the Passover service in Jewish homes. Reading the Haggadah at the table is a fulfillment of the Scriptural commandment to each Jew to "tell your son" of the Jewish liberation from slavery in Egypt (14th Century B.C.E.) as described in the Book of Exodus from the Old Testament.

All these made up a new cosmology and created a new architectural conception of space, which replaced or supplemented traditional concepts, which hitherto derived from Euclidean Geometry, Aristotle's aesthetics, Newtonian mechanistic world and generally the metaphysics of the Greco-Christian cultural paradigm. Elements of Judaism were mediated by some gentiles, like architect Adolf Loos, but mainly by Jews – physicists Albert Einstein, Hermann Minkowski, Erwin Freundlich; architects Erich Mendelsohn, Richard Neutra; theoreticians/artists Eliezer Lissitzky, László Moholy-Nagy, Sigfried Giedion, Bruno Zevi, etc. – and supported by numerous Jewish clients, such as Goldmann & Salatsch, Lilly Steiner, Gertrude Stein, Solomon Guggenheim, Fritz Tugendhat, Edgar Kaufmann, Margaret Stoneborough-Wittgenstein, etc., to name just a few.

The new concept abandoned old priorities, like locating and limiting space (closed walls, centres, and symmetry)⁶⁹ and propagated space and space-time (Maimonides, Einstein, Minkowski, Giedion), relativism, simultaneity and de-centring (Einstein), internal-structural relationships (Cabbala), dialogue (Martin Buber). These tenets were blended, arranged and processed in order to create a strong theory that would sweep away anything that did not fit into its framework.

Modernist ideology was criticized and dismissed by cultural conservatives, totalitarian regimes, and eventually – when it lost its creative power and flexibility – by Jewish and other theoreticians and architects as well. It was dismissed by all those who tried to revive the idea of the avant-garde since the 1970s, using new ideas, formal and structural solutions, like the New York Five, Deconstructivists, and many others all over the world. Thus, Judaic impact and Einstein's influence on architecture of the 20th and 21st centuries are not limited to architects of Jewish descent or practice, but involves many others, regardless of their cultural background or affiliation to particular movements. Modernism became global in spiritual and architectural terms. Einstein's cosmological shift in its historic perspective and architectural effects compares to the shifts between Greco-Roman and medieval, or medieval and Renaissance, or Renaissance to Baroque cosmologies. Einstein's breakthrough was prompted by physical discoveries, by Judaic heritage, together with its mysticism, and other mysticisms like the Buddhist, towards which Einstein also showed great sympathy. Still, the concept of *space-time* and *relativity*, as conceived by him, points mostly towards Judaism itself.

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SOURCES

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ILLUSTRATION SOURCES

IZVORI ILUSTRACIJA

- FIGS. 1, 2, 6, 7, 8, 9, 10, 11, 12, 13, 17, 18, 19, 20 Photo by: Author
- FIG. 3 http://www.greatbuildings.com/cgi-bin/gbc-drawing.cgi/Steiner_House.html/Steiner_House_Plan.jpg
- FIG. 4 A.I.A-Inv. 2445
- FIG. 5 <http://www.google.hu/url?sa=t&rct=j&q=&esrc=s&source=web&cd=12&ved=oCGAQFjAL&url=http%3A%2F%2Fhabitatii.files.wordpress.com%2F2011%2F03%2Fmoller-house1928-e28093-adolf-loos.pptx&ei=EuKzUNmvO8zAswbW44DYCw&usg=AFQjCNEmvEGFhZHetjOwAHpPT-ujpaV1KQ&sig2=HBHLHgb2fhbXsMFQAlz4nQ>
- FIG. 14-16 Author's archives

⁶⁹ Buddhism and Japanese architecture exerted a similar effect on modern architecture, filtered through the opus of Frank Lloyd Wright.

SUMMARY

SAŽETAK

JUDAIZAM, EINSTEIN I MODERNA ARHITEKTURA

Članak uspostavlja vezu između židovske tradicije, koncepta Alberta Einsteina – kao što su prostor-vrijeme, teorija relativiteta te kvantna mehanika – i moderne arhitekture, odnosno otkriva primjenu tih koncepta u teoriji arhitekture 20. stoljeća. Članak pritom ide dalje od većine sličnih priloga koji proučavaju Einsteinov utjecaj na modernizam. Ovdje se naime analiziraju njegovi korijeni u judaizmu i time se njegov doprinos stavlja u širi kulturno-povijesni kontekst. Ovaj članak potvrđuje da Einsteinov doprinos modernoj umjetnosti i arhitekturi ne proizlazi samo iz njegovih otkriva u području fizike i lansiranja nove kozmologije već i u obnovi elemenata judaizma i židovske tradicije. Ovdje se tako osvjetljava utjecaj židovskog naslijeđa na arhitekturu 20. stoljeća, a to ukazuje na to da brojna učenja modernizma o prostoru i kozmologiji zapravo nisu „moderni”, nego su samo pali u zaborav tijekom zapadne kulturne povijesti koja se oslanjala najviše na grčko-kršćansku tradiciju. Ovaj članak ispituje utjecaj judaizma i židovske misli na modernizam iz šire perspektive.

Naime moderna je arhitektura proklamirala bezuvjetan raskid s naslijeđem, načelima i elementima povijesti arhitekture pa se ukazala potreba za novim duhovnim i oblikovnim izvorima. Tradicijski su teorije arhitekture bile najčešće refleksivne, koje su na osnovi dobrih primjera, zapravo „receptata” (primjerice Vitruvija i Albertija), određivale tijek razvoja arhitekture određenog razdoblja. No kako je modernizam u 20. stoljeću odbio tradiciju, nove perspektivne teorije, nastale ex nihilo, te nove metode projektiranja preuzele su vodstvo u arhitekturi.

Članak zastupa tezu da je to bio trenutak kada su upravo judaizam i židovska misao počeli utjecati na arhitekturu Zapada; nova kozmologija, koja je proizašla iz Einsteinovih koncepta „prostor-vrijeme”, teorija relativiteta i kvantna mehanika – svaki donkle vezan za židovsku misao – iznjedrili su *Raumplan* Adolfa Loosa, brzinu i energiju Ericha Mendelsohna, kao i *Raumzeit* odnosno prostorno-vremen-

sku simultanost Sigfrieda Giediona, koji su činili jaku ideologiju u arhitekturi koja je bila na snazi sve do sedamdesetih godina 20. stoljeća. Osim duhovnih izvora, ovi potonji uključuju moderno slikarstvo, tradicionalnu japansku arhitekturu, a u određenoj mjeri i islamsko, američko pretkolumbijsko i afričko graditeljstvo. Među duhovnim izvorima moderne arhitekture zauzimaju značajno mjesto Einsteinove teorije – zapravo nova kozmologija koju je njegova fizika stvorila – i židovska tradicija, uz budizam, antropozofiju i druga mistička učenja.

Jedan od najznačajnijih prodora moderne arhitekture jest *Raumplan* Adolfa Loosa, koja tretira prostor kao nezavisan entitet, osnovni element planiranja, a ne kao posljedicu, poput intervala između tektonski planiranih stupova, zidova, stropova, kao tijekom povijesti zapadne arhitekture. *Raumplan* obilježava korjenitu promjenu u prioritetima arhitekture, pomak od materijala prema prostoru, koji je u izravnoj vezi s Einsteinovim pojmom *Raumzeit*, prostor-vrijeme, proizašlog iz specijalne teorije relativiteta. Einsteinovo poimanje vremena pak vodi svoje korijene iz judaističke tradicije – Židovi kao nomadi u doba Abrahama, a često i kasnije, doživljavaju prostor ponajprije kao vremenski tijek, a ne kao entitet oko jednog središta ili između određenih tocaka. Židovi, kada i žive na istomu mjestu, žive u vremenu – od jednoga blagdana do drugoga. Einstein je u mladosti imao svoje religiozno razdoblje kada je intenzivno razmišljao o vezi između prostora i vremena prema konceptima židovskog filozofa Maimonida.

Najjasniju vezu između Einsteinovih učenja – kvantne mehanike i teorije relativiteta – nalazimo u djelima Ericha Mendelsohna, židovskog arhitekta koji je pripadao prijateljskom krugu velikog fizičara. Njegov prvi značajni projekt, Einsteinov toranj u Potsdamu, služio je za pokuse vezane za Einsteinovu teoriju. Građevina negira tradicionalnu tektoniku i svojim aerodinamičnim oblicima podsjeća na prometalo – podmornicu, lokomotivu. Kod Mos-

sehausu u Berlinu Mendelsohn pokušava primijeniti Einsteinovu teoriju relativiteta, doduše – u vrlo malom mjerilu. Neki se elementi zgrade uočavaju kada čovjek pješaci, a neki drugi iz automobila, tj. elementi percepcije mijenjaju se promjenom brzine kretanja.

U kozmološkom pogledu teorija relativiteta negira fiksne točke gledišta i osobe (čovjeka) kao središta, a to je jedan od najvažnijih elemenata modernih prostora, pored gubljenja dobro definiranih granica i implementacije slobodnoga vremenskog tijeka. Ti su elementi također vezani za judaizam.

Članak proučava i utjecaj Einsteina na umjetničke židovskog podrijetla, Lászla Moholy-Nagya i El Lissitzkoga. Ovaj posljednji često se koristio židovskim simbolima i – to je još važnije – govorio je o „relacijskom prostoru” koji pokazuje ideju povezanosti slično teoriji relativiteta. Pod Einsteinovim utjecajem Lissitzky se odvojio od tradicionalnog slikarstva i počeo je tretirati sliku u prostoru koju promatra s raznih strana, odozgo i odozdo i u prolazanju, tj. u vremenskom tijeku. U svom eseju „Umjetnost i pangeometrija” Lissitzky govori o multidimenzionalnom prostoru koji se ne može pojmiti, predstaviti, a kamoli materijalizirati – definicija koja podsjeća na opis Boga u judaizmu.

Poslije, nakon Drugoga svjetskog rata, moderna gubi svoju snagu kao kulturna paradigma i kao arhitektonski izraz. U postmoderni i dekonstruktivizmu pojavili su se brojni arhitekti židovskog podrijetla: Robert A. Stern, Richard Meier, Leon Krier, Frank O. Gehry, Peter Eisenman, Daniel Libeskind i drugi, koji su dalje obogaćivali suvremenu arhitekturu s elementima tradicije judaizma i elementima židovske misli, sa ili bez ukazivanja na te korijene. Njihov je utjecaj daleko prešao konfesionalne granice, postavši glavno odredište arhitekture na kraju tisućljeća. Članak završava analizom židovskih elemenata u strukturalizmu, postmodernoj i dekonstruktivizmu.

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