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Modern Artist and his Space: László Moholy-Nagy

1 Introduction

The word »space« does not necessary have a strictly geometrical meaning, i.e. it does not always represent the idea of an empty area. Space considered in isolation is an empty abstraction, but although in one sense this »substance« is hard to conceive of, it is also true that we cannot avoid its »existence«.

Every period in human culture has developed a spatial conception. If we ignore geometry as a direct means for depicting space, one of the powerful methods of explaining space is its articulation. On this basis it can be said that in contrast to »real« space, articulated space is a reality in our sensory experience, i.e. a reality that can be grasped according to its own laws.

In the light of these considerations the evolution and development of modern art can also be recognised in terms of articulated space. Moreover, each modernist artist has been desperately seeking his own vision of space articulation.

Within this framework the Hungarian avant-garde artist László Moholy-Nagy was one of the most versatile. He worked in several media and joined collaborative enterprises rather than being a specialist in just one. His space conception originated mainly through his use of new materials and constructions introduced by the technological revolution.

In this paper I intend to show how his concepts of space are linked with some major ideas of modern physical space and where and how those ideas are presented in some of his art-works.

2 Modern Physical Space

The physical concept of space (and of what is happening »inside it«) actually appeared in the first two decades of the 20th century, mostly through the ideas of Albert Einstein. So-called »modern« physical space differs a great deal from the concept developed by Isaac Newton in *Philosophiae naturalis principia mathematica*. In this monumental work Newton tried to show the very

nature of movement as elegantly as he could; the movement that occurs in an empty space (the fact that movement requires space was already known to the Greek atomists). Nevertheless Newton's space has nothing to do with common sense – quite opposite: it is the identity of an absolute, true and mathematical entity; the absolute and infinite stage according to which all material bodies (or particles) are moving, and in which the forces between them are exerted.[1]

The first difference between this mechanicist view and the contemporary one is shown in the way that forces are described. In the first picture the forces are central, that is, the direction of the force always lies on a straight line between the centres of two material particles (which can be either attracted or repelled) and are independent of particle velocities. All bodies around us are systems of such infinitely small particles, whereas those forces on the micro level can be simply summarized into the macro force of a rigid body (e.g. the gravitational force between Earth and Moon).

In the modern picture, the situation is different. In the second half of the 19th century, new concepts appeared in connection with problems in understanding electric and magnetic phenomena. As Einstein put it: »In physics a new idea has risen, the most important thought after Newton: the field.«[2] To determine the force radiating from a certain mass or charged particle, it is not needed to know the location of all hypothetical bodies around it. We fill empty space with force-lines that show the direction of the force (which is always perpendicular to each force-line) and also its strength (the density of the force-lines is proportional to the force strength). Not material particles or electrical charges, but the space between them is what it matters.

The idea of the field helped physicists to solve the problems of electromagnetic and optic phenomena, and has led Einstein to formulate his *Theory of relativity*. There are actually two theories. The first, *special*,[3] is based on the special relativistic principle: all coordinate systems, moving one upon another uniformly in a straight line, are equal.[4] (This is equally suitable for

[1] We are dealing here with two different concepts of space, e. g. Newton's and Einstein's, but we should not forget that those two scientists were not alone. There were so many others who can't be even mentioned here, even though their ideas are of great importance for an understanding of nature and space.

[2] Albert Einstein, Leopold Infeld, *Die Evolution der Physik von Newton bis zur Quantentheorie*, Rowohlt, Hamburg 1956. (Slovenian transl., MK, Ljubljana 1961, p. 174.)

[3] Albert Einstein, *Zur Elektrodynamik bewegter Körper*, Ann. der Physik 17, 1905.

[4] The second theory, *general relativity*, deals with the problem of gravitation. Here Einstein finally left the realm of Euclidean geometry and turned to mathematical structures developed previously by Georg Riemann. (See: Albert Einstein, *Die Grundlagen der allgemeinen Relativitätstheorie*, Leipzig 1916.) This theory is not our concern now.

the description of natural phenomena.) This means that there can be no difference between events occurring in the same place (space) or at the same time, and others, because there is simply no such – absolute – space or time.

The form of space that Einstein used in this case is actually a combination of space in time, named *space-time*. It is a structure, invented by Hermann Minkowski, in which physical events are defined by four dimensions (three spatial coordinates plus time). Time has been present in physics from Greek times onwards because it is impossible to imagine movement in space without time. But in spite of that, this was the first instance, that time found its place within geometry. Space-time simply means that time has become a formally equal coordinate and that distances between (four-dimensional) events are measured in terms of space and time inseparably.

We should mention another important and influential property of modern space that is not directly linked with its geometrical meaning. Namely the kind of transparency of bodies, or better of matter occupying space. In 1895 Wilhelm Röntgen discovered X-rays that opened another dimension of space – a space inside of solid bodies, where, in the classical picture, there should be no space at all.

And yet another one: in 1911 Ernest Rutherford published his theory, inspired by previous experiments (the scattering of alpha particles on thin golden leaves). He introduced the concept of the atom that consists mostly of empty space. In this picture, a very small nucleus is positioned at the centre of an atom (ten thousand times smaller than the atom itself) with electrons moving around the nucleus in circles like planets around the sun. If a material substance consists of such atoms, all the things around us are mostly made of empty space.

Now we can try to find out how those modern ideas of space are connected with conceptions developed by a modernist artist – László Moholy-Nagy. Let us follow some of his ideas of space through his artistic life.

3 Modern Artistic Space

László Moholy-Nagy was born on 20 July 1895 in Bácsborsod, Hungary. When he was sent to secondary school in Szeged, he developed close relations with some poets and writers, which probably explains why his first interest was in literature. After matriculation in 1913, he registered as a law student in Budapest. But it didn't last long – in 1914 he was called up in the army and sent to the front. In this quite specific situation he started to draw. His naturalistic figures of military life on postcards reveal his lack of educa-

tion in drawing, but also his artistic talent. Wounded in 1917, he became even more serious about painting during his recuperation in Odessa. The young man who, until then, drew postcards as a mere pastime, was now depicting the tired, haggard faces of his fellow soldiers. It was there, in the military hospital that Moholy-Nagy matured into a real artist.

After he returned from the front he became increasingly attracted to Hungarian Activists. Social ideas of this avant-garde movement left their impression on his entire work (e.g. the ideal of »synthetic« art – art in the service of society and conducive to man's external and internal liberation). After the fall of the Republic of Councils Moholy-Nagy left the country. First he went to Vienna and then in 1920 he finally settled in Berlin.

3.1 Realistic Portraits

During his period of wandering, Moholy-Nagy began to paint realistic portraits. These represent his own particular mode of expression even though he had not yet found his own individual style. His representational period was short but important for his future career, which led him to a more abstract mode of expression.

The first discovery, which he regarded as his own, was that of line, and the result of this discovery was a series of portraits in which Moholy-Nagy sought not to copy other painters, but to understand them. Later he wrote in his autobiographical essay: »Through my 'problem' of expressing everything with lines I underwent an exciting experience, especially as I overemphasized the lines. In trying to express three-dimensionality, I used auxiliary lines in places where ordinarily no lines are used. The result was a complicated network of a peculiar spatial quality, applicable to new problems. For example, I could express with such a network the spherical roundness of the sky, like the inside of a ball [...]. The drawings became a rhythmically articulated network of lines, *showing not so much objects as my excitement about them.*«[5]

Moholy-Nagy was lost in the world of modern art and decided to return to the Renaissance, to the period of solid values. Thereafter he studied the drawings of Rembrandt and Van Gogh, where he realised that lines ought not to be mixed with half tones, and that: »[...] one should try to express a three-dimensional plastic quality by the unadulterated means of line; that the quality of a picture is not so much defined by the illusionistic rendering of nature as by the faithful use of the medium in new visual relations«.[6]

[5] László Moholy-Nagy, *The New Vision: From Material to Architecture. Abstract of an Artist*, Wittenborn, Schultz, New York 1947, in: Krisztina Passuth, *Moholy-Nagy*, Thames and Hudson, London 1985, p. 361.

[6] Ibid., p. 360.

Objects are not those which carry the meaning, but the way in which the lines are organised and the relations between them. In the works of other artists – Lajos Tihayi, Edvard Munch, Oskar Kokoschka, Egon Schiele, and Franz Marz – he learned that they regarded nature only as the point of departure. The real meaning lay in their interpretative power. Moholy-Nagy's understanding of this fact resulted at first in his realistic portraits.

His free and energetic lines form complicated networks and they are not drawn to create only a decorative effect. These lines actually scan the surface of the model, the facial wrinkles – curls of the hair, wrinkles of the chin. The understanding of line that Moholy-Nagy adopted was the result of a rational analysis – the line appeared as the basic picture element. Lines that form and construct realistic portraits have become force lines, organised into a diagram of inner forces sharing the emotional charge.

3.2 Glass Architecture

In years 1920-21, although still painting representational pictures, Moholy-Nagy was greatly concerned with achieving a more abstract mode of expression. Berlin was at that time an important avant-garde centre and influenced the young artist in various ways. The two basic influences were those of Berlin Dada and Constructivism, the particular atmosphere of the big city – the industrial landscape, presence of machines, bridges, railway stations, etc. was also very important to him. The industrial civilisation that Moholy-Nagy met in Berlin offered new aesthetic ideals that differed from traditional ones. With the support of avant-garde trends, he adjusted to the new situation and started to explore.

»On my walks I found scrap machine parts, screws, bolts, mechanical devices. I fastened, glued and nailed them wooden boards, combined with drawings and painting. It seemed to me that in this way I could produce real spatial articulation, frontally and in profile, as well as more intense colour effects. Light falling on the actual objects in the construction made the colours appear more alive than any painted combination. I planned three-dimensional assemblages, constructions, executed in glass and metal. Flooded with light, I thought they would bring to the fore the most powerful colour harmonies. In trying to sketch this type of 'glass architecture', I hit upon the idea of transparency.«[7]

Glass architecture appeared as an attempt to paint real objects, seen or found on his wanderings through the land of technology. There he encountered three fundamental ideas that occupied him for the rest of his life: light, space and transparency. His paintings from the years 1920-21 reflect the

[7] Ibid., p. 362.

Picture 1: *Glass Arhitecture III*

atmosphere of the big city: railways, bridges, and machines. He named them simply: *Bridges, Large Railway Painting, The Great Wheel,* and so on. Besides the dynamism of machines and the magical attraction of technology, Moholy-Nagy also discovered the new laws of picture construction.

In 1921 his paintings were concentric, expansive and tending outwards. They were mostly symmetric, with the centre of gravity in the middle plane. The importance of the central area was enhanced with the bare canvas. The brightly coloured, sharply outlined motif stands out against the impersonal light ochre texture of the canvas – it has almost nothing in common with the background. The composition is always centred, sometimes a strong horizontal axis lies in the lower or upper third of the picture. Upward-inclining diagonals float freely in the picture space, not extending as far as the

frame, giving an impression of incompleteness, which is the source of inner tension and dynamism of the picture.

Later, in 1921-22, the whole structure moved out of the horizontal, turned in relation to the lower frame of the picture and aligned with the diagonals. With this change, the earlier balance was disturbed and the motifs, freed from their horizontal attraction, started to soar into the space at their disposal on the surface of the canvas. Different geometrical forms were no longer impenetrable units but transparent elements through which other elements appeared. Through different layers, conveying picture elements, an almost infinite depth of the pictorial space appeared. (Picture 1; *Glass Architecture III*, 1921-22)

The space of the picture had changed completely – the earlier plain canvas background, which contrasted sharply with the motifs, now became a vital component in the whole composition. The background (earlier: empty space) intermingled with motifs (earlier: elements of the picture), one appearing through the other. This was the birth of *Glass Architecture*, the artist's own pictorial world.

In fact, glass architecture had two different meanings for Moholy-Nagy. On the one hand, it was a composition that was very close to the »pictorial« architecture (*Bildarchitectur*) of the Hungarian avant-garde, and on the other, an abstract symbol that was linked to the ideology of the Bauhaus at its outset. This ideology can be clearly recognised in »The Bauhaus Manifesto«, written by Gropius himself: »The ultimate aim of all creative activity is the building! [...] Architects, painters, *sculptors*, we must all return to crafts! [...] There is no essential difference between the artist and the craftsman. The artist is an exalted crafstman. [...] Let us therefore create a new guild of craftsmen without the class-distinctions that raise an arrogant barrier between craftsman and artist! Let us together desire, conceive and create the new building of the future, which will combine everything – architecture and sculpture and painting – in a single form which will one day rise towards the heavens from the hands of a million workers as the crystalline symbol of a new and coming faith.«[8]

This is probably also the reason (or one of the reasons) why Walter Gropius invited Moholy-Nagy to teach in his school of design in Weimar. He started to teach there in April 1923 at the age of only 27. He replaced Johannes Itten in the Preliminary Course and Paul Klee in the Metal Workshop. This was the time when the school had just gone through one of its crises. The main problem was the idealistic, romantic attitude of the

[8] Walter Gropius, »The Bauhaus Manifesto« in Frank Whitford, *Bauhaus*, Thames and Hudson, London 1995, p. 202.

Bauhaus. Vilmos Huszar wrote in September 1922: »Where is there any attempt to unify several disciplines, at the unified combination of space, form and colour? Pictures, nothing but pictures [...].«[9]

Moholy-Nagy's appointment provided clear evidence that Gropius had changed his mind about the kind of institution Bauhaus ought to be. He announced this in a public lecture during the Bauhaus exhibition in 1923 on the theme »Art and technology, a new unity«. If in the early years the emphasis was placed on the investigation of properties common to all the arts and on the revival of craftsmanship, it had now shifted towards the education of a new designer capable of conceiving artefacts to be made by machine. And if other teachers like Wassily Kandinsky wanted nothing to do with it, for Moholy-Nagy the machine was a kind of fetish.

Moholy-Nagy was a brilliant teacher, and his abilities may have caused resentment among those colleagues whose relationship with the students was problematic. But what really was a problem for most of the other Bauhaus teachers was Moholy-Nagy's rejection of everything irrational. They were convinced to some degree that art is a spiritual revelation. In Klee's words: art's purpose was to »render the invisible visible«. Moholy-Nagy's ideas were quite different. He once said to Lothar Schreyer (who was another Bauhaus teacher): »You surely don't believe the old fairy-story about the human soul? What is known as the soul is nothing but a function of the human body.«[10]

During his Bauhaus period, Moholy-Nagy collaborated with Oskar Schlemmer and others on murals, ballet and stage designs; besides painting he was engaged in photography, film and photograms, light and colour experiments, but he also worked in typography and layout. His ideas were close to that of Gropius and together they planned, edited and designed the fourteen *Bauhausbücher* – Bauhaus books which were an attempt to define avant-garde views.

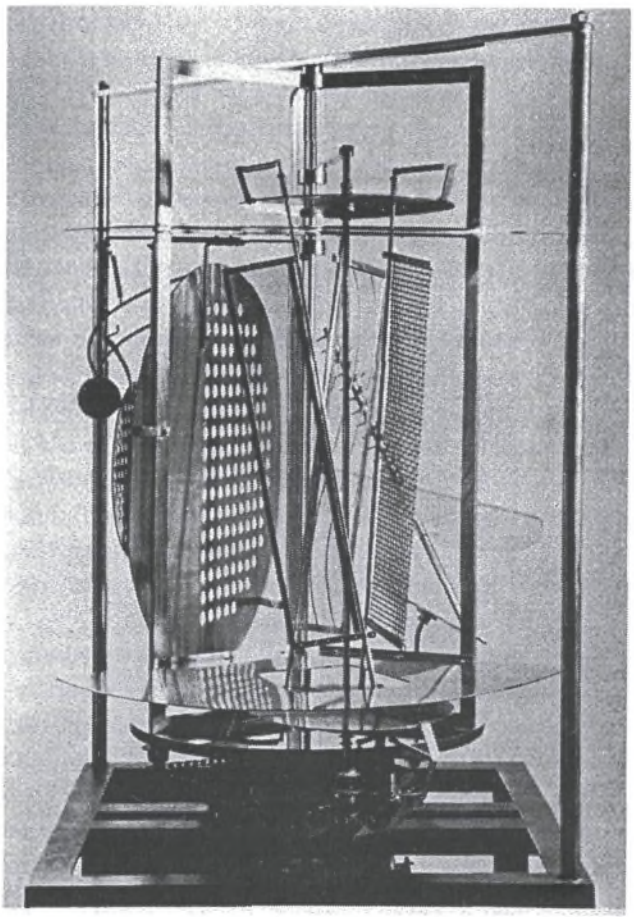
3.3 Light-Space Modulator

Moholy-Nagy left Bauhaus in 1928, following Gropius's example. Two years later, Moholy-Nagy finished his masterpiece, *The Light-Space Modulator* (Picture 2), which represents most of the ideas he developed there. »The *Lichtrequisit* (later often referred to in English as the *Light Prop* or *Light Display Machine*) is one of the finest and most clearly expressed creations not only of Moholy-Nagy's individual artistic aspirations, but of avant-garde new aesthetics of the entire period.«[11] He started to work on the idea in 1922 and it took eight years for technology to be able to follow the imagination.

[9] Cited in Frank Whitford, *Bauhaus*, p. 116.

[10] Ibid., p. 127.

[11] Krisztina Passuth, *Moholy-Nagy*, p. 53.



Picture 1: *The Light-Space Modulator*

Machine art was a tendency typical of the Dada movement and Constructivism. Various kinds of work appeared at that time, including Naum Gabo's *Kinetic Statue: Standing Wave* and Moholy-Nagy's own achievement: *Nickel Sculpture.* They are both real machines only partially, in the details, whereas *The Light-Space Modulator* is something different: a real machine metal and glass structure rotating and moving in space.

The basis of the composition is a rotating disc with three metal frames whose edges meet. The oblique glass spiral placed on the disc traverses an inclined glass plate. Three metal screens with oblique axes and of different patterns, as well as two half perforated metal discs, are also in contact with a lower, rotating disc. When the spiral is set in motion by an electric motor, light is projected on the structure. The light passes through the metal screens

whose position, owing to the rotating movement, is constantly changing. The result is the silhouette projected at a distance of two or three metres.

In his remarks Moholy-Nagy wrote about his sculpture: »Light beams overlap as they cross through dense air; they're blocked, diffracted, condensed. The different angles of entering light indicate time. The rotation of light from east to west modulates the visible worlds. Shadows and reflexes register a constantly changing relationship of solids and perforations.«[12]

The *Light-Space Modulator* embodies the idea of the beautiful machine, but it is at the same time (in a broader context) connected with Bauhaus and mostly with its theatrical experiments. The machine was also the embodiment of the Constructivist ideal and Russian Constructivists planned several such works – Vladimir Tatlin's *Monument of the IIIrd International* is regarded as the symbol of the utopia of the entire period, and Naum Gabo's *Plan of a Radio Station* remained a dream. In 1922 Moholy-Nagy published an article together with Alfred Kemeny: »Constructivism means the activation of space by means of a dynamic-constructive system of forces within one another that are actually under tension in physical space, and their construction within space, also active as force (tensions).«[13]

Moholy-Nagy managed to realise his plan and his work became a mobile, spatial variant of glass architecture. He made use of the same geometrical figures as in his paintings, with approximately the same proportion and distribution. In his pictures he sometimes tried to modulate light by saturating the surface and using glass or aluminium instead of canvas. With the *Light-Space Modulator* he could modulate the beam of light in actuality; the result was a mobile painting that started to inspire the artist himself. He adapted it for the stage as »light prop for an electric stage« and he even made a black and white film in which the real subject is the birth of the *Light-Space Modulator.*

4 Conclusion

Dealing with modernism, there is a question of whether one can find any direct connection between notions derived from separated spheres of human activity (like science and art).[14] Ideas seem to remain separated even

[12] Cited in Richard Kostelanetz, *Moholy-Nagy*, Allen Lane, London 1974, p. 160.

[13] László Moholy-Nagy, Alfred Kemeny, »The Dynamic-Constructive System of Forces«, *Der Sturm*, No. 12/1922; cited in László Moholy-Nagy, *Vision in Motion*, Paul Theobald, Chicago 1965, p. 238.

[14] One of the ideas I wanted to show is the difference between the field of science and the field of art, concerning the development of a concept or notion and personal

if we find them in both spheres and even if they have the same names. One such example is the idea of space-time. We have already mentioned what this idea means in physics. Even though Moholy-Nagy was fully aware of this, for him space-time had a different meaning.

He wrote in his last book, published after his death in 1946:[15] »Since 'space-time' may be a misleading term, it especially has to be emphasized that space-time problems in the arts are not necessarily based upon Einstein's theory of relativity.« He continued with the explanation: »Einstein's terminology of 'space-time' and 'relativity' has been absorbed by our daily language. Whether we use the terms 'space-time', 'motion and speed', or 'vision in motion', rightly or wrongly, they designate a new dynamic and kinetic existence freed from the static, fixed framework of the past. Space-time is not only a matter of natural science or of an aesthetic and emotional interest. It deeply modifies the character of social ends, even beyond the sense that pure science may lead to a better application of our resources.«[16]

His own artistic achievements, mentioned in this paper, can be considered as the development of the same idea – namely the idea of space-time. In Moholy-Nagy's realistic portraits, the dynamism of the pictorial space is included in the force-lines forming an emotional field that corresponds to that of a physical force field. In his glass architecture, the artist forcefully expressed the ideas of transparency and light, and the new vision of space, which is very similar to the new physical ideas of the modern time. In the last example of *Light-Space Modulator*, he constructed a machine that finally embodies the concept of modern physical space and time. His explanation and his works of art can be considered an example of how concepts from different spheres – like that of space – can be understood.

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development of the artist or scientist (researcher). In the first case, that of science, it is more common to follow the development of an idea and to fill in personal achievements, while in the second case, when dealing with art, it seems more reasonable to follow the life line of an individual artist and to fill in the ideas. The consequence of this idea is also the form of the text.

[15] After he left Bauhaus in 1928, Moholy-Nagy started to wander around Europe looking for a new teaching job. In the meantime, he was painting on synthetic materials and transparencies (Plexiglas), experimenting with colour film, design, photograph and so on. In 1937 he was offered and accepted the directorship of the New Bauhaus in Chicago, but the school was forced to close down before the end of the year, so he opened his own School of Design the following year. Moholy-Nagy died of leukemia in Chicago on 24 November, 1946. At the time of his death he was President of the Institute of Design, then having 680 students.

[16] László Moholy-Nagy, *Vision in Motion*, p. 266.