INSTRUMENTALISATION OF NATURAL SCIENCES FOR THE RECONSTRUCTION OF ARCHITECTURAL KNOWLEDGE: LISSITZKY, DOESBURG, MEYER, TEIGE

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ABSTRACT

The main idea aimed in this dissertation is to analyze the instrumentalisation process of natural scientific knowledge in a struggle for reconstructing architectural knowledge, between 1914 and 1945. This investigation has been made in the scale of the spreading of this effort in Middle and Eastern Europe in general and has been detailed over the most radical form observed in the left-wing architectural discourses.

Architecture lost its self-legitimate, unitary structure of knowledge it owned pre-modern period, in the modernization process. In this situation, for reconstructing this unitary structure, architectural theorists oriented towards different fields of knowledge, considering their knowledge more reliable than own. With this struggle, some architectural discourses sustain the old, some presented synthesis proposals, from the end of nineteenth century, some were in the assertion of entirely transforming the architectural knowledge. This struggle gained a new dimension by means of the revolutionary social context formed after the First World War. Especially, in left-wing avant-garde discourses, assigning 'a new beginning,' 'a new architecture' which can reconstruct a new world was aimed. These discourses have oriented natural scientific knowledge to justify/legitimize their statements and have established a problematic relationship with it.

Consequently, this dissertation explains the mechanisms through which architecture implants natural scientific knowledge into its own studies, and presents the transformation that adapted knowledge undergoes. In this way, the problematic relationship between the knowledge of architecture and natural sciences as a result of instrumentalisation is analyzed. This analysis focuses on the discourses of four architectural theorists: Lissitzky, Doesburg, Teige, Meyer.

ÖZET

Bu çalışmanın amacı, 1914-1945 arası dönemde, mimarlık bilgisini yeniden inşa etme çabası içerisinde, doğa bilimsel bilginin araçsallaşma sürecinin analiz edilmesidir. Bu inceleme, bu çabanın genel olarak Orta ve Doğu Avrupa'daki yayılımı ile sınırlandırılmış, en radikal şekli ile somutlaştığı sol eğilimli mimarlık söylemleri üzerinden detaylandırılmıştır.

Modernleşme sürecinde mimarlık bilgisi modern öncesi dönemde sahip olduğu bütüncül, kendiliğinden meşru yapısını kaybetmiş, sonrasında ise mimarlık bu yapıyı yeniden kurma çabası ile kendi bilgi alanından daha güvenilir gördüğü bilgi alanlarına yönelmiştir.

Bu çaba altında, kimi mimarlık söylemlerinde geçmişi devam ettirme çabası görülürken kimilerinde geçmişle sentezler önerilmiş, 19.yy'ın sonlarından itibaren ise mimarlık bilgisini tamamen dönüştürme çabasında olunmuştur. Bu çaba, 1.Dünya savaşı ile birlikte oluşan devrimsel sosyal bağlam çerçevesinde farklı bir boyuta taşınmış, özellikle sol avangard mimarlık söylemlerinde "yeni" bir başlangıca işaret edilerek, kendi tanımladığı "yeni" dünyayı, yaşantıyı inşa edecek, bütüncül yapıda, evrensel bir "yeni" mimarlık amaçlanmıştır. Böylesi amaçlar edinen "yeni" mimarlık söylemleri kendilerini gerçekçi/meşru kılma yolunda bir taraftan kendi bilgi alanından çok farklı yapıdaki doğa bilimlerinin bilgisine yönelmiş, problemli bir ilişki kurmuştur. Kesinlik, evrensellik, güvenilirlik, gerçeklik, devrimsel olma özellikleri ile doğa bilimsel bilgi mimarlık bilgisinin problemlerine çözüm olarak görülmüş ve kullanılmıştır.

Bu bağlamda tezde, doğa bilimsel bilginin hangi amaçlarla, hangi tür mekanizmalar aracılığı ile mimarlık bilgisine katıldığı ve bu süreçte bilginin nasıl bir dönüşüme uğradığı analiz edilmiş, araçsallaşmanın doğal sonucu olarak mimarlık bilgisi ile doğa bilimleri arasındaki problemli ilişki açığa çıkarılmaya çalışılmıştır. Çalışma dönemin dört avangard ismi Lissitzky, Doesburg, Teige ve Meyer üzerinden detaylandırılmıştır.

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CHAPTER 1

INTRODUCTION

The aim of this thesis is to analyze the process of instrumentalization of the natural scientific knowledge, in the struggle to reconstruct a unitary architectural knowledge in the avant-garde architectural discourses of Middle and Eastern Europe between 1914 and 1945.

Starting from Vitruvius, architectural knowledge has been in relation with different fields of knowledge. The form of this relationship has differentiated during the period beginning with Renaissance. In order to examine the structure of architectural knowledge during the period that this study focuses on, this transformation and its causes should be comprehended. This comprehension is essential in terms of questioning the different forms of relationship that architectural knowledge has established with different disciplines and areas of knowledge throughout history. Within the scope of this transformation, two points are especially significant. One is the change in the structure of architectural knowledge. The other is the change in the social state of architectural discipline.

In connection with the mythical worldview, architectural knowledge involved only the knowledge of "building" until the fifteenth century. Based on the continuity extending from the past, this knowledge used to have a validity that was not questioned or challenged. There was no differentiation between architectural theory and architectural practice. As architectural practice sustained its meaning as "poesis," theory only served to explain and justify practice. Starting with the Renaissance; the architect who freed himself from theological determinism reached the consciousness that he had the power to transform the physical world. Subsequent to Alberti's distinction between architectural theory and practice; architecture has become a primarily intellectual activity, with an ordered structure created by the practice that followed theory.

By the end of eighteenth century, scientific thought was accepted as the only way in expressing the truth. The belief that the metaphysical reality of nature could be expressed through observation had been replaced by a material world that consisted of objects totally detached from their symbolic content. This transformation has led to the

formation of a problematic relationship between thought and action, theory and practice in architecture. As a result, architecture has been reduced to pure technique or decoration.[1]

Focusing on the differentiation, another important point to discuss is the change in the social state of the profession. The architect traditionally used to be the master builder and craftsmen before the fifteenth century. After the fifteenth century, this role has transformed into an intellectually oriented individual, the member of a profession demanding intellectual power. In the historical process towards modernity, architectural knowledge has lost its traditional –and consequently self-legitimate structure. Positioned against the society with its demand for intellectual power, architectural theorists have started to search for a basis of architectural legitimacy as it previously had in the pre-modern world.

From the beginning of nineteenth century; architectural theory, which was under the influence of technological progress and industrialization, has been reduced to the formulation of rules that would make architectural practice more efficient and economical. Starting with Durand, the major objective of architectural theory has been to attain an autonomous, self-sufficient, specialized and pragmatic structure. Due to the viewpoint that restricted the creative talent of the architect with constraints of economy and feasibility, the architectural product has acquired a language formed by the assembly of simple geometric forms as building elements abstracted from their symbolic meaning. As a consequence of the technology-based worldview; strict distinctions have formed between objective truth and subjective truth, mind and body. Parallel to this transformation, architectural theory has also experienced the distinctions between science and art, reason and poetry, architecture and engineering. Within this context, the relationship between the theory and practice of architecture has reached a critical point.

During the pre-modern period, the mythical aspect of architecture used to provide the unity, consistency and validity of architectural language. Subsequent to the deterioration of this condition during the modernization process, theoretical problems started to generate in architecture especially after the eighteenth century, such as the "In which style should we build?" problem in Germany.[2] Aiming to re-establish a basis of

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[1] Alberto Perez-Gomez, **"**Introduction", in *Architecture and the Crisis of Modern Science,* (the MIT press, London, 1983), p: 11.

[2] Perez-Gomez, *ibid*, p: 12.

authority for architecture, theoreticians have focused on its historical origins. However, the unitary structure of architecture has not been achieved until the twentieth century. At the turn of the century, architecture has partially digressed from its orientation towards historicism.[3]

Within the political, social, economical and ethical upheavals of the century and the chaotic structure of the nineteenth century architecture created by the historicist approaches based on individual experimentation; some architects such as Schinkel, Gottfried Semper, Carl Bötticher and Hermann Muthesius started the search for a new intellectual source independent from traditional sources.[4] This approach, which appeared in connection with *Jugendstil, Moderne* and *Art Nouveau* movements at the turn of the century, aimed to establish the necessary foundations to restore the pre-modern unitary structure of architecture.[5] The major objective of these movements was to establish the connection between technological developments, construction and arts. Their theoretical basis was the advanced art theories developed in connection with psychological and physiological perception; such as Heinrich Wölfflin's "Psychology of Form," Schmarsow's "Phenomenological," Robert Vischer's "Theory of Empathy" as well as Frankl and Riegl's theories.[6] The corresponding architectural movements have expressed themselves through "natural order." It was believed that the "unified human culture" could be achieved by using nature metaphors and defining a unity between technology and nature. For instance, according to Art Historian Georg Bötticher, the formation of the modern style would be possible with art primarily oriented towards nature.[7]

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[3] Henry-Russel Hitchcock and Philip Johnson summarized failure of these seeking and the causes in "the International Style"; "The nineteenth century failed to create a style of architecture because it was unable to achieve a general discipline of structure and of design in the terms of the day. The revived "styles" were but a decorative garment to architecture, not the interior principles according to which it lived and grew."Henry Russell Hitchcock and Philip Johnson, *The International Style*, (New York: W. W. Norton & Comp., 1995; 1932).

[4] Harry Francis Mallgrave and Eleftherios Ikonomou(eds), *Empathy, Form and Space : Problems in German Aesthetics, 1873-1893*, (Santa Monica: The Getty Center for the History of Art and Humanities, 1994) p:3.

[5] Mitchell Swarzer, *German Architectural Theory and the search for Modern Identity*, (Cambridge: Cambridge University press, 1995), pp: 215- 216.

[6] Mallgrave and Ikonomou, *Empathy,Form and Space,* p: 3.

[7] Swarzer, *German Architectural Theory and the search for Modern Identity*, p: 226.

Starting from the nineteenth century, architecture has lost its role as the designative of style-based transformations, leaving its place to fine arts at the turn of the century. New approaches that have generated after 1905; such as Suprematism, Purism, Neo-plasticism and cubo-futurism have focused on the explanation of new methods applicable for spatial arts rather than technical developments that only covered figurative arts. In its search for a new aesthetic basis, architectural theorists have been oriented to these new methods as well.[8]

This process of transformation in the structure of architectural knowledge can be considered as the responses to the decomposition of the pre-modern unitary structure of architecture and the break in architectural epistemology. Some of these responses overlook this break and focus on sustaining the old with a nostalgic approach. Being aware of the break, some responses propose models of synthesis in a reconciliatory manner while others radically focus on the total transformation and reconstruction of architectural knowledge. Discourses based on the radical transformation of architectural knowledge have proposed new formulations during the post-war period; such as *Neues Bauen, Neu Sachlichkeit, Rationalism, Functionalism and Constructivism.*

This struggle for reconstruction in art and architecture has acquired a new meaning with the revolutionary social context in Central and Eastern Europe that has generated after World War I, especially with the influence of the Russian Revolution. For the left-wing architects and artists, revolution has become an instrument for legitimizing their social ideals and search for a new beginning.[9] Within the discipline of architecture, the definition of "the new world" has been formulated, and a new beginning appropriate to this "new world" has been sought:

> Le Corbusier; *Vers une Architecture* (Toward a New Architecture); Theo van Doesburg, Towards a Newly Shaped World (1921); Theo van Doesburg, *Der Wille zum Stil: Neugestaltung von Leben, Kunst und Technik* (The Will to Style: The Reconstruction of life, art and technology) (1922) ,"

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[8] Selim O. Khan-Magomedov, *Pioneers of Soviet Architecture: The search of New Solutions in the 1920s and 1930s*, (New York: Rizzoli, 1987), p: 61.

[9] Susan Buck-Morss, *Dreamworld and Catastrophe: The passing of Mass Utopia in East and West*, (MIT, 2000). Translated by Tuncay Birkan as *Rüya Alemi ve Felaket: Doğuda ve Batıda Kitlesel Ütopyanın Tarihe Karışması*, (İstanbul: Metis yayınları, 2003), s: 56-81. Éva Forgács, "Art and Revolution", in Timothy O. Benson, Éva Forgács, *between worlds: a sourcebook of central european avant-gardes, 1910-1930*, p:201-203. Victor Margolin, *The Struggle for Utopia,Rodchenko, Lissitzky,Moholy-Nagy 1917-1946,* (Chicago: University of Chicago press., 1997), pp:1-3.

Hannes Meyer, "*Die neue Welt* (The New World)" (1926); Karel Teige, "A New Century-A New Architecture",1924...

Considering other stated objectives in architecture such as "to construct a new social order, to organize a new life," it is possible to observe an endeavor towards formulating a new social role.[10] In other words, architecture has formulated a definition of the unitary world and has taken over the utopic mission of organizing this unitary structure. Architectural discourses of the period are dominated by the efforts to construct a universal/unitary system that is capable of expressing the new world reality and organizing this "whole." These new architectural formulations have made use of the knowledge of natural sciences in order to justify and legitimize their statements. Consequently, the instrumentalization of the knowledge of natural sciences shows the kind of "unity" sought in architecture. The form of the relationship between architecture and the knowledge of natural sciences varies in terms of the objective(s) of architecture, the sources of connection and the means of implanting the knowledge to architecture. In various aspects, natural sciences have been considered a source of legitimization in architecture.

The first aspect to consider is directed at the argument of "a new architecture." The technological progress and theories developed in physics and biology at the turn of the century have been represented as the scientific evidence of the existence of the new world reality in architectural discourses. Thus, "a new architecture" appropriate to the new reality has been sought.

Another aspect is directed at the fundamental characteristics of the new architecture. Based on the belief that theories and laws of natural sciences explain that the "new world reality" has a dynamic character; associated concepts such as "dynamism," "continuity" and "reality" have been perceived as concepts defining the new architecture. In other words, theories and concepts explaining this dynamism have been used as the scientific support for "dynamic architecture." Besides; other characteristics of science such as universality, exactness and objectivity have been used as the fundamental concepts in the process of constructing a unitary system in architecture. These concepts of science have contributed to the efforts to define a universal and objective creative process and thus attain "a unitary new image of the world" while describing a universal architecture that would organize "the unity of life."

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[10] Peter Bürger, *Theorie der Avantgarde* (Frankfurt am Main: Suhrkamp,1974). Translated as *The Theory of the Avant-garde*, Michael Shaw, (Minneaapolis: University of Minnesota press, 1984)

Another important aspect of discussion in the orientation of architecture towards natural sciences is the ways and means through which the relationship has been established. It is possible to state that the knowledge of natural sciences has been used in architecture through theories, concepts and methodology.

Theories, concepts and methodology of natural sciences have been adopted by architecture through various mechanisms. As the structure of the knowledge of natural sciences is fundamentally different from architecture, the connection between them can only be metaphorical. In other words, through its instrumental way of thinking, architecture has made use of the knowledge of natural sciences in various ways; such as interpreting to redefine, establishing analogies or simply as a reference. Consequently, the uncovering and analysis of these mechanisms is considered as the fundamental studies that will provide a basis for the examination of the structure of architectural knowledge.

In the architecture of the period between 1914 and 1945, it is possible to observe the revolutionary claim to totally transform architectural knowledge. The major objective of this approach is to re-assemble the unitary structure of the pre-modern period. At this point, architecture has been oriented towards the knowledge of natural sciences; considering its knowledge more reliable than its own. Although the unitary pre-modern structure of architecture has been unrecoverably lost, these efforts have succeeded to confirm their validity at that period; with the social reasons that they have acquired and the persuasive mechanisms that they have made use of. However, with the failure to achieve the expected social consequences, they have lost their validity and plausibility.

Consequently; this dissertation aims to analyze the process of instrumentalization of the knowledge of natural sciences in the avant-garde architectural discourses of Central and Eastern Europe between 1914 and 1945, focusing also on how this knowledge has been used and how its validity has been proved. In this respect, the dissertation comprises of three chapters.

Chapter 2 examines the problem of establishing the relationship between architecture and natural sciences at the turn of the century, until the period that this study focuses on. Starting from the second half of nineteenth century, Gottfried Semper (1803-1879) and Eugène-Emmanuel Viollet-le-Duc (1814-1879) have made use of the knowledge of architectural sciences in constructing their own theories of architecture. These theories are significant because they can be considered the initial examples of the

architectural approach towards natural sciences within a scientific context. Consequently, these theories constitute the origin of the problematic of establishing the relationship between architecture and natural sciences. With the avant-garde role he has taken over during the late nineteenth century; the architect, who aimed to reconstruct social life and architecture, has adopted the objective and progressive qualities science as the basis for the solution of these problems. He has perceived the knowledge of sciences such as psychology, physiology, biology and anthropology as the new sources of architectural knowledge. The major objective at the turn of the century has been to construct a rationalized architectural knowledge by means of scientific methods. Consequently, this chapter aims to discuss the efforts to construct a scientific basis for architecture during the period between late nineteenth century and 1914.

The third chapter focuses on the general explanation of the endeavor attain a unitary structure in architectural knowledge and how this endeavor has been justified scientifically, during the period between 1914-1945. Architectural discourses have been interested in various aspects of natural sciences. In this sense, this chapter has been structured to discuss the different aspects of natural sciences that architectural discourses have been interested in and taken as a model. Through the discussion of the various aspects, "to construct a new universal architectural knowledge" has been explained as the real objective of architectural knowledge common to all approaches.

Architectural discourses have been concerned with the theories and concepts of natural sciences during the periods that this study focuses on. Major instruments of unification and justification that architecture has made use of during this period are mainly Einstein's Relativity Theory and the related 'space-time continuum and fourth dimension' concepts in physics, and the 'biocentric universal system' theories of Jacob van Uexküll and Raoul Francé in biology.

Architectural discourses have also been concerned with the methodology of natural sciences. Especially after the mid-1920s, scientific methodology has been adopted as a model in architecture, in order to establish a universal language.

In architectural discourses, the major objective of this orientation towards science is "to construct a new architecture." Within the discipline of architecture, this objective is explained through concepts such as "the new world," "the new universe" and "the new life." The definitions of these concepts are legitimized by natural sciences. As a result, the third chapter focuses on the objectives of architecture in establishing this

relationship with natural sciences, and explains the characteristics of natural sciences through which this relationship is established.

In the fourth chapter, the scientific approach of the new left-wing architectural discourses in Central and Eastern Europe is explained, discussing the media and mechanisms through which the knowledge of natural sciences has implanted to architectural knowledge. Within the revolutionary social context of Europe during and after World War I, left wing artists and architects have taken over – or been given – the social role of reconstructing the society. Within the endeavor to realize this utopic mission; architects have taken a revolutionist position, trying to formulate universal and unitary architectural discourses that would re-organize and reconstruct social life, society, and the world. As discussed in Chapter Three, these theories have been legitimized through the knowledge of natural sciences.

As a consequence of the metaphoric nature of the relationship that architectural discourses has established with natural sciences, the knowledge of natural sciences has been used in architectural discourses by means of different mechanisms such as interpretation, adaptation, analogy and reference. Consequently, the fourth chapter can be considered as an analysis of how the knowledge of natural sciences has contributed to architectural discourses; also covering the initial objectives of establishing this relationship. This analysis further focuses on the discourses of four avant-garde European architects of the period: Russian El Lissitzky, Dutch Theo van Doesburg, Czech Karel Teige and Swiss Hannes Meyer. These architects is considered significant in terms of providing a basis for discussing the different aspects of the relationship of architecture and natural sciences. These names have been determined with reference to their contribution to the explanation of the following points that are essential to this thesis:

- In which fields of natural sciences architectural discourses have been interested. Orientation towards the knowledge of physics; as in the discourses of El Lissitzky and Doesburg, Orientation towards the knowledge of biology; as in the architectural theories of El Lissitzky and Hannes Meyer.
- The different ways that architecture makes use of the knowledge of natural sciences The use of concepts and theories of science; especially as in the discourses of El Lissitzky, Theo van Doesburg and Hannes Meyer.The use of the methodology of science, especially as in the discourses of Karel Teige and Hannes Meyer.

- The different mechanisms through which the knowledge of natural sciences has contributed to architectural knowledge As a reference, through adaptation, through interpretation, by transforming the original meaning, by deriving new meanings…

- The different types of formulations in architecture that instrumentalize the knowledge of natural sciences in order to attain the common objective of formulating a universal architectural knowledge. El Lissitzky's "the new expression of space," Theo van Doesburg's " a new style for architecture," Karel Teige's "a method for architecture," Hannes Meyer's "the new theory of building."

- The orientation of left-wing architectural discourses towards natural sciences; and the diffusion of this orientation throughout Central and Eastern Europe. The discussion of the interaction between the architects from different geographies.

As a result, this dissertation aims to analyze the different aspects of the instrumentalization of knowledge of natural sciences in architecture, discussing how knowledge has transformed throughout this process. The study discusses the efforts to reunify architectural knowledge in response to the schism formed by modernization; focusing on the new left-wing architectural discourses of the period between 1914 and 1945, with reference to the discourses of four representatives of avant-garde architecture of the period.

CHAPTER 2

ARCHITECTURE AND SCIENTIFICATION ON THE THRESHOLD OF A NEW CENTURY; A QUESTION OF THE INTERACTION BETWEEN ARCHITECTURE AND NATURAL SCIENCES

In general, the threshold of a new century to art and architecture might be recognized as a period of transition from the history-based approaches of the nineteenth century into twentieth century visions of abstract. The theoretical discourses in architecture, which have shown a tendency towards historicism in the mid-eighteenth century in order to reconstruct the unitary structure of architectural knowledge of pre-modern era, also has attempted to achieve an objectivity through modern science and technology while trying to respond to the changes and transitions resulting from modernity. Consequently, nineteenth century architecture, which has reflected the contradictions between "the ideals of the pre-modern era" and "the facts of the modern world," has happened to posses a multi-identity based on "individual experimentation." Accordingly, it has been also a component of the political, social, economical and ethical chaos of the era. As a solution, architects including Karl Friedrich Schinkel (1781-1841), Gottfried Semper (1803-1879), Carl Gottlieb Wilhelm Bötticher (1806-1899), Viollet-le-Duc (1814-1879), John Ruskin (1819-1900), Otto Wagner (1841-1918), Louis Henry Sullivan (1856-1924), Hermann Muthesius (1861-1927) had been in search for new unconventional arguments where they could postulate their ideas.

The attempts to offer some solutions for architecture in that 'crisis' has centered around science/scientific as a source and they have aimed at implanting theories, concepts and methods derived from biology, physics, psychology, anthropology and sociology into architecture. "Scientific objectivity" has been recognized as a means to reconstruct architectural knowledge whose traditional order has been stripped by modernity. Accordingly, architectural discourses' tendency toward natural sciences can be seen as an attempt to instrumentalize the natural-scientific knowledge in order to (re)unify architectural knowledge. Similarly, different proposals on "the unity in

architecture" (structure-function-art, technology-art, art-life...) have been also introduced.

Architecture's interest in nature gains a scientific aspect with the emerging of biology as a science in nineteenth century.[11] Consequently, architecture's interest in nature (imitating nature) in pre-modern world, which centered around metaphysical and religious concepts, also has altered. Accumulating more scientific epistemology from nature, architectural discourses focus on natural laws. In this context, Caroline Van Eck, in her study ***"****Organicism in nineteenth-century architecture,"* where she questions the relationship between the nature and architecture, underlines two figures particularly: Gottfried Semper and Eugène-Emmanuel Viollet-le-Duc. Semper's utilization of the biological theories of Cuvier and Darwin in his "*eine reine Baulehre* (pure theory of architecture)," and Viollet-le-Duc's utilization of the methods of physics and biology in his argument of "the unity of architecture" are among the first examples indicating architectural discourses' tendency towards "natural-scientific knowledge."[12]

Semper's architectural theory is a proposal for the unification of the arts and industry. He believes that contemporary design problems are the outgrowth of historical problems. For him, to analyze how the "art of building" copes with the new technological methods, historical models should be studied. Semper focuses his studies on understanding the rules regulating the development of individual architectural forms. Like many other nineteenth century theorists, Semper believes that the laws in the order of nature may well be adapted in the creation of architectural forms. He focuses on the laws rather than the forms of nature. Consequently, he attempts to distinguish architecture from the other forms of art. Semper discusses the idea in a lecture, "*Entwurf eines Systems der vergleichenden Stillehre"* in 1853, as:

> "The art of building creates original forms, which are not determined by models in nature. It creates them **in accordance with the same laws which nature follows and which are founded on purposiveness.** In this respect, [architecture] differs completely from its sisters, the plastic arts, which use

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[11] The term "biology" introduced in 1802 by Lamarck. Especially, Eck emphasizes the importance of the insights offered 'comparative anatomy' and 'zoological taxonomy' in this shifting approach to nature -from philosophical and religious to scientific. Caroline van Eck, *Organicism in nineteenth-century architecture : An inquiry into its theoretical and philosophical background*, (Amsterdam: Architectura & Natura Press, 1994), p: 214.

[12] Van Eck, *Organicism in nineteenth-century architecture*, pp: 216-235.

> forms of nature in order to represent ideas, and become intelligible only through the use of what was already created."[13]

Semper attempts to introduce the basic principles/elements by which the theory of building produces architectural forms, by the similar way the natural laws create the natural forms;

> "Should we not conclude by analogy, when considering the immense richness of nature and the great variety in all her simplicity, that it is the same with the creations of our own hands, with the works of art? **Like the works of nature, they are connected to each other by a few fundamental thoughts,** which have found their simplest expression in some original forms or types."[14]
> "The theory of building will lead to the realization that in the same way that nature, for all her abundance, is thrifty in her motifs, in the same way that **she modifies the few basic forms or principles** a thousand fold according to the evolutionary stage reached by living beings as well as according to varied living conditions…**in the same way architecture too is based on a few standard forms and principles,** which through constant reappearance make possible infinite variations that are conditioned by the particular need of each case as well as by many other circumstances."[15]

Referring to Baron Cuvier's classification of the animal kingdom,[16] Semper puts forward a classification of works of art. He defines " 'types' as 'original forms prescribed by need,' which he identifies with his four basic elements."[17] In the same

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[13] Gottfried Semper, *Entwurf eines Systems der vergleichenden Stillehre* (1853), in Hans and Manfred Semper (eds.), *Kleine Schriften*, Stuttgart, 1884. Quoted in Caroline van Eck, *ibid*, p:230. Emphases added.

[14] Semper, *Entwurf eines Systems der vergleichenden Stillehre* (1853), in Hans and Manfred Semper (ed.), *ibid*, p: 228. Emphases added.

[15] Semper, "A Critical Analysis and Prognosis of Present-Day Artistic Production", preface to "Theory of Formal Beauty (1856/1859), quoted in Wolfgang Hermann, *Gottfried Semper: In Search for Architecture* (Cambridge, MA: The MIT press, 1984), p: 259. Emphases added.

[16] The French Georges Cuvier (1769-1832) has been one of the leading biologists of the time, he has worked and thought at the recently created Muséum d'Historie Naturelle.
"Cuvier's typology consisted of a division of the animal kingdom into four distinct *embranchements* on the basis of the general form of the nervous system, because he considered that organ as essential for the functional integrity of the organism. These *embranchments* or plans of organization were: vertebrate, mollusk, articulate (insects, crustacean, etc.), and radiate (starfish, jellyfish, etc.)." Eck, *Organicism in nineteenth-century architecture*, p: 231.

[17] Semper, *Kleine Schriften*. Quoted in Hanno-Walter Kruft, *A History of Architectural Theory;from Vitruvius to the present,* (London; Zwemmer; New York: Princeton Architectural Press, 1994), p: 313.
"'Types' are defined by Semper as 'original forms prescribed by need,' which he identifies with his four basic elements. Four basic materials lead to four basic techniques, which lead in their turn to the four basic elements of architecture." Kruft, *ibid*, p:313. "To Semper, the stages of architectural evolution and tradition emerge from the ways in which these four elements are produced in historical

study, Semper argues that Baron Cuvier's method might serve in the creation process of the architectural form. In addition, through Cuvier's method, Semper expresses his argument of "the development of style" which he also defines as a problem of *Topica:*

> "It could be important to designate some of these fundamental types of artistic forms and to follow their gradual progress...Such a method, similar to the one followed by Baron Cuvier, when applied to art and especially to architecture, would at least help to gain a clear survey of the whole field and perhaps even the basis of a theory of style and a kind of *Topica* or method of invention, which could lead to some knowledge of the natural process of invention." [18]

In conclusion, Semper's theory aims at comprehending "the variety of works of art" with the help of scientific models and organizing a system to guide the process of creation.[19] Charles Darwin's ideas of "biological evolution" apparently influence Semper in his view of the change in building styles. For Semper, building styles develop "according to the laws of natural breeding, of transmission and adoption. Thus the development is similar to the evolutions in the province of organic creation."[20] According to Norman Crowe, a similar influence of Darwin is also apparent in Viollet-le-Duc's discussion of "medieval art as an organism": "[medieval architecture] develops and progresses as nature does in the creation of beings; starting from a very simple principle which it then modifies, which it perfects, which it makes more complicated, but without ever destroying the original essence."[21]

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situations according to changing needs due to climate, natural surroundings, building materials, technology, social relations, and radical dispositions. All technical skills regarding building and the other applied arts emerge and are organized around these elements: ceramics, the hearth; water and masonry works, terrace; carpentry, the roof; and textiles, the walls or enclosure." Swarzer, *German Architectural Theory and the search for Modern Identity*, p: 105.

[18] Semper, *Entwurf eines Systems der vergleichenden Stillehre* (1853), quoted in Van Eck, *Organicism in nineteenth-century architecture*, p: 228.

[19] Semper arrives at the formula: Y= F (x, y, z etc) by the analogy with Cuvier's method. This formula demonstrates Semper's basic idea for the creation of artistic forms. Y?= the work of art (F) and variable factors (x, y, z etc) which are effective on the constitution of the characteristics of 'style'(materials, regional, ethnological, climatic, religious and political conditions, personal influences. Kruft, *A History of Architectural Theory*, p: 313.

[20] Semper, "Development of Architectural Style", trans. by John W. Root, in the Inland Architect and News Record 14 (1889), p:76. Quoted in Norman Crowe, *Nature and the Idea of a Man-made World*, (Cambridge: The MIT press, 1995), p:149.

Viollet-le-Duc's theory "is firmly rooted in the French tradition of rationalist appreciation of Gothic architecture because of its structural ingenuity, rather than its religious, nationalist or picturesque associations."[22] He does not imitate the Gothic forms, instead he is concerned with analyzing its rational principles. And he believes these principles could serve as the basis for a new style, by the use of new materials and techniques. The focus of Viollet-le-Duc is 'the unity of nature.' Although, like Semper, he refers to the concepts linked to the theories of remarkable biologists of the time, like Cuvier and Geoffroy, he is mostly concerned with analyzing 'the unity of nature' with the laws of mathematics and physics in scientific terms. Like Semper, Viollet-le-Duc argues that architecture should adapt the laws of nature into its working methods:

> "Architecture is not an imitative art at all…The art of building is a human creation; but such is our inferiority that, in order to obtain that creation, **we are obliged to proceed just as nature does in her works, by using the same elements, the same logical method;** by observing the same submission to certain laws, and the same transitions."[23]

In conclusion, Viollet-le-Duc argues that "the unity found in nature" may well serve to the notion of "unity in architecture." Accordingly, he associates the "unity in architecture" with "structure" and "the means and ways of construction";

> "The law of unity, therefore, is in the first place based on structure, whether in a hut or in the Pantheon in Rome. Nature does not proceed differently, and it is more than foolhardy to search for laws other than those she has established, or rather, it would be to try to withdraw from these laws, when we are part of it...In one word, creation is unity; chaos, the absence of unity."[24]

In the second half of the nineteenth century, the argument of "architecture should imitate nature" and the consequent interest in scientific theories are not only limited to the theories of Schinkel, Semper and Viollet-le-Duc. The architectural interest in the laws of nature is also an important theme in the American nineteenth century

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[21] Viollet-le-Duc, *Dictionnaire raisonne de l'architecture française du XI au XVIe siècle*, (10 vols, Paris 1854-1868) vol.8, p:495. Quoted in Crowe*, ibid,* pp: 149-150.

[22] Van Eck, *Organicism in nineteenth-century architecture*, p: 235.

[23] Viollet-le-Duc, 'Style', *Dictionnaire* (1866), vol.8, p:476. Quoted in Van Eck, *ibid,* p: 235. Emphases added.

[24] Viollet-le-Duc, 'Unité', *Dictionnaire*, vol.9, pp:339-340. Quoted in Van Eck, *ibid,* p: 238.

architectural treatise. The Praque-born Leopold Eidlitz (1823-1908), the American John Wellborn Root (1850-1891) and Louis Sullivan (1856-1924) are the very important architects associated with the assertion of the study of nature's laws instead of the architecture of the past. The common point in those theories is that the concepts of "function" and "structure" should be accepted as starting points in architectural design.

At the end of the nineteenth century, art and architecture has led to a stage where the theories has centered around forming a new language of architecture and reflecting the social life of society. Thus, the main purpose is defined as "artistic" and "social" reconstruction. Emphasizing the necessity of the change and improvement, the theories in art and architecture has attempted to reject "the old" and come up with "the new." That avant-garde role of art first appears in 1820's in Claude Henri de Saint-Simon's utopist-socialist discussions. Matei Calinescu, in his "*Five Faces of Modernity*," discusses Saint Simon's ideas of assigning avant-garde role to the artist in the new order of society. For Calinescu, Saint-Simon "regarded artists, along with scientists and industrialists, as naturally destined to be part of the trinitarian ruling elite in the ideal state." [25] Saint Simon discusses the idea in his "*Lettres de H.de Saint-Simon à Messieurs les Jurés* (1820)" as; "New mediations have proved to me that things should move ahead with the artists in the lead, followed by the scientists, and that the industrialists should come after these two classes."[26] For Simon, the artist, being a leader, is not only responsible for foreshadowing the future but also creating it[27]:

> "...in this great undertaking the artists, the men of imagination will open the march: they will take the Golden Age from the past and **offer it as a gift to future generations**; they will **make society pursue passionately the rise of its well-being**, and they will do this by **presenting the picture of new prosperity**, by making each member of society aware that everyone will soon have a share in enjoyments which up to now have been the privilege of an extremely small class; they will sing the blessings of the arts, eloquence, poetry, painting, music; in a word, they will develop the poetic aspect of the new system."[28]

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[25] Matei Calinescu, *Five Faces of Modernity: Modernism, Avant-Garde, Decadence,Kitsch, Postmodernism*, Rev. Ed. Matei Calinescu (Durham: Duke University press, 1987; 1977), p: 102.

[26] Quoted in Calinescu, *ibid*, p:102 .

[27] Calinescu, *ibid*, p:102.

[28] Claude-Henri de Saint-Simon, "De l'organisation sociale (1825), in Oeuvres de Saint-Simon et d'Enfantin, XXXIX, (X), Réimpression photomécanique de l'edition de 1865-79 (Aalen: Otto Zeller, 1964), pp:137-138. Quoted in Calinescu, *ibid*, pp:102-103. Emphases added.

Calinescu discusses that the term "avant-garde," with its artistic rather than military connotations, was first used by Olinde Rodrigues, a close friend of Saint-Simon. He attempts to justify it with a study of Rodrigues, *L'Artiste, le savant et ı'industriel* published in 1825. In the study, Rodrigues states that:

> "It is we, artists, that will serve **as your avant-garde**; the power of the arts is indeed the most immediate and the fastest. We have weapons of all sorts: when we want to spread new ideas among people, we carve them in marble or paint them on canvas; we popularize them by means of poetry and music; by turns, we resort to the lyre or the flute, the ode or the song, history or the novel; the theatre stage is open to us, and it is mostly from there that our influence exerts itself electrically, victoriously. We address ourselves to the imagination and feelings of people: we are therefore supposed to achieve the most vivid and decisive kind of action; and **if today we seem to play no role or at best a very secondary one, that has been the result of the arts' lacking a common drive and a general idea,** which are essential to their energy and success."[29]

Viollet-le-Duc's conception of architecture focuses particularly on social elements rather than technical and formal ones. Viollet-le-Duc recognizes architecture as a direct expression of the social structure. In his study, *Dictionnaire"* he clarifies "building" in terms of technological and social principles:

> "To build, for the architect, is to use materials according to their properties and their essential nature, with the express intention of fulfilling a purpose by the simplest and strongest means; it is furthermore to give the built structure an aspect of permanence, fitting proportions, subject to certain rules imposed by the human senses, reason and instinct. The methods employed by the builder must therefore vary according to the nature of his materials, the financial means at his disposal, the particular requirements of each kind of building, and the culture into which he has been born."[30]

By 1870's, the avant-garde theory has led to a stage where "the revolution in art" also means "the revolution in life." The term "avant-garde" has appeared mostly in a political context in the mid-nineteenth century. During The Paris Commune of 1871, with Arthur Rimbaud, the term "avant-garde," while still preserving its political

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[29] Olinde Rodrigues, *"L'Artiste, le savant et I'industrielesl,"* Opinions littéraires, philosophiques et industrielles (Paris: Galérie de Bossange Pére, 1825), p:331. Quoted in Calinescu, *ibid*, p: 103. Emphases added.

[30] Viollet-le-Duc, *Dictionnaire*, vol. IV, (1859), p:1. Quoted in Kruft, *A History of Architectural Theory*, p: 283.

meaning, has also gained a literary-artistic meaning.[31] The term attempts to deny "the institution of art", in which it is also commonly used, and adapt art into the daily life again.[32] Hence, the artist of the new avant-garde have been concerned with dismantling the binding formal traditions of art.

Serving to a dual responsibility, art and architecture have struggled for possessing a scientific identity in their attempts for reconstruction. Renato Poggioli in *Teorie dell'arte d'avanguardia* explains the interaction between the "avant-garde" and "scientific(ism)" as: "The avant-garde thinker or artist is, at any rate, particularly susceptible to the scientific myth..."[33] The objectivity of science and its innovative features appeals to the avant-garde artist and the architect who longs for "the new" and try to accomplish a "universal organization." Accordingly, the aesthetic theories formed in psychology, physiology, biology and anthropology have been also studied closely by architectural theorists, which is quite apparent in, Robert Vischer (1847-1933), Conrad Fiedler(1841-1895), Heinrich Wölfflin (1864-1945), Adolf Göller (1846-1902), Adolf Hildebrand (1847-1921), August Schmarsow (1853-1936)'s aesthetic theories to define "science of art (*Kunstwissenschaft*)."

Robert Vischer, in *Über das optische Formgefühl* (On the optical sense of form) published in 1873, introduces his theory based on the concept of *Einfühlung,* which is not even clearly defined in the psychological literature of the late nineteenth century. *Einfühlung* (The theory of Empathy),[34] which focuses on the role of physiology in conditioning sensory and emotional responses, has help the evolution of the idea of space in architecture at the time. For instance, after Visher, the theory of Empathy is "considered by Theodor Lipps (1851-1914), as a scientific theory of beauty, promised

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[31] Calinescu, *Five Faces of Modernity*, p:112.

[32] Peter Bürger, *Theorie der Avantgarde*, p: 104.

[33] Renato Poggioli, *Teorie dell'arte d'avanguardia* (Società editrice il Mulino, 1962). Translated as *The Theory of Avant-garde,* Gerald Fitzgerald (Cambridge, Mass.: Harvard University press, 1968), p:21.

[34] "Fundamental to his theory of empathy is the distinction he makes between sensation and feeling. The former is simply the body's physical response to outside stimuli; the latter presumes mental or emotional activity. Sensation can also be divided into 'immediate sensation' (*Zuempfindung*)and 'responsive sensation' (*Nachempfindung*). The former is the direct sensory response to external stimuli; while responsive sensation involves the activity of nerves and muscles. Vischer illustrated these two processes with the example of two types of seeing. Simple seeing is a relatively unconscious accommodation of visual stimuli that sets in motion "nerve vibrations." Scanning is a more focused level of seeing that takes place when the eyes become active and begin to explore the boundaries of form. A third and "higher" level of seeing in Vischer's theory engages the representational or imaginative activity of mind." Harry Francis Mallgrave and Eleftherios Ikonomou, 'Introduction", in *Empathy, Form and Space : Problems in German Aesthetics, 1873-1893*, p: 22.

an explanation of artistic feeling and pleasure through an analysis of how a subject relates to an object by the act of visual perception."[35] Lipss's influence can be seen in the architectural writings of Richard Streiter, August Endell, and Henry van de Velde.[36]

Conrad Fiedler's artistic theory centers around the notion of "visibility." Fiedler distinguishes between the two different modes of experience: perceptual and conceptual cognition. Perceptual cognition is based on "visual experience," while the conceptual one operates through a process of abstraction.[37] Hence, "visibility" is no dull contemplation or perception of form but an active seeing in which the images become clarified as form and acquire their unique expression.."[38] On the other hand, Fiedler recognizes it as the highest artistic task in the spiritual creation of form.[39]

Das Problem der Form in der bildenden Kunst (The Problem of Form in Fine Arts) by Adolf Hildebrand also has had an influence on the evolution of the idea of space at the end of the nineteenth century. The basic theme of Hildebrand's essay is the relation of form to appearance. He distinguishes between the two different ways of seeing: visual and kinesthetic vision or vision in motion. In visual vision, objects are received when the eye is at rest and the body is confined to one distant position in which the object is perceived as a single unified/complete impression. In other words, the eye only perceives a unified and planar object. In kinesthetic vision or vision in motion, objects are received when the eye is converging at one point and the body is in movement. The eye is required to take in different standpoints in order to receive the whole object. In moving around the object, the eye receive the impression of three-dimensionality. Based on this distinction, Hildebrand separates "the inherent form," which is the physical reality, from "the effective form," which is relative and depends on the variable factors, "illumination, environment, and standpoint of the beholder."[40]

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35 Swarzer, *German Architectural Theory and the search for Modern Identity*, p:233

36 Mallgrave and Ikonomou, 'Introduction", in *Empathy,Form and Space*, p:29.

37 Mallgrave and Ikonomou, *ibid*, p: 30.

38 Mallgrave and Ikonomou, *ibid*, p:31. The concept of 'visibility" (Sichtbarkeit) first developed in Fiedler's essay of 1876, *Über die Beurteilung von Werken der bildenden Kunst* (On Judging Works of Visual Art).

39 Swarzer, *German Architectural Theory and the search for Modern Identity*, p:202.

40 Mallgrave and Ikonomou, 'Introduction", in *Empathy,Form and Space*, pp: 36-37. Cornelis J.M Van De Ven, "Concerning the idea of Space: The Rise of A New Fundemental in German Architectural Theory and in the Modern Movements Until 1930," PhD Diss., University of Pennsylvania, 1974, pp: 105-108.

Hildebrand's kinesthetic vision is important in that it has associations with space theories in the architecture of 1920's, including Theo van Doesburg's concept of "space-time" and Lissitzky's theory of "imaginary space". Yet, one of the basic differences is that the concept of "space-time" relates to the knowledge of psychology, whereas the theory of "imaginary space" centers around the science of Physics.

The aim of Heinrich Wölfflin is to explain architectural form as the visible expression of psychic emotions. In his doctoral dissertation "*Prolegomena zu einer Psychologie der Architektur* (Prolegomena to psychology of architecture)"(1886), Wölfflin comes up with the question "How is it possible that architectural forms are able to express an emotion or a mood?"[41] In his dissertation, which has the effects of the psychological studies of Hermann Lotze, Wilhelm Wundt and Johannes Volkelt, "while not denying the importance of such factors as material, climate, and purpose in the generation of form, Wölfflin argues that they are less influential than the general feeling for form (Formgefühl) directing artistic creation, and that it is the task of a psychology of architecture to explain the effect that form evokes in its pure or abstract sense."[42] Wölfflin's remarks on "a personal psychology of form" evolves in a method dealing with the study of art history. He is interested in "how the philosophy of history is to be made 'exact' by the development of psychology."[43] In *Kunstgeschichtliche Grundbegriffe* (Principles of Art History) published in 1915, Wölfflin comes up with a system through which he attempts to explain all visual experiences: "art history becomes the science that methodically analyzes the formal aspects of style.'[44]

Besides, all the theories concerned with "aesthetics," such as August Schmarsow's *Raumgestalteria* (the creatress of space), Alois Riegl's Kunstwollen (the concept of Artistic Volition), Adolf Göller's psychological explanations etc., at the end of the nineteenth century can be recognized as "the search for the universal laws governing artistic formation and stylistic evolution, the attempt to establish an

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41 Heinrich Wölfflin, *"Prolegomena zu einer Psychologie der Architektur," in Heinrich Wölfflin: Kleine Schriften* (Basel: Benno Schwabe, 1946), pp:13-47. Quoted in Mallgrave and Ikonomou, "Introduction", in *Empathy, Form and Space*, p: 42.

42 Harry Francis Mallgrave, "Introduction" in Otto Wagner, *Modern Architecture: a guidebook for his students of this field of art,* (Santa Monica, CA: The Getty Center for the History of Art and Humanities, 1988), p:23.

43 Mallgrave and Ikonomou, *Empathy,Form and Space*, p:48.

44 Van De Ven, *Concerning the idea of Space*, p: 120.

expository *Kunstwissenschaft*."[45] In other words, those theories can be studied as an attempt to control "the world of art" with a few scientific principles in order to form a unique artistic language in modern culture.

Parallel to the movement of *The Kunstwissenschaft* in Germany, the studies of art history and the description of styles has emerged in England and France as well. The scientific approach to aesthetics in France originates in the works of Comte, Taine and Véron. "Taine states its objectives clearly in the first of his lectures on The Philosophy of Art, delivered in 1864, and thus antedating the German leaders in *Kunstwissenschaft.* Hennequin, Galabert, and others in the nineties outlined further approaches to scientific aesthetics, such as *esthopsychologie*, or aesthetic psychology. In England, Grant Allen's *Physiological Aesthetics* (1877) becomes a landmark in the scientific approach."[46] Another example is Banister Fletcher's *History of Architecture on the Comparative Method*, first published in 1896.[47]

In the last quarter of the nineteenth century, artists and architects, in order to postulate their theories in scientific terms, try to apply them to the theories derived from natural sciences. Among those reference theories, Charles Darwin'in "Evolutionary Theory" seems to be the most distinctive. Being translated into German in 1860 and later into Russian in 1864, Darwin's *On the Origin of Species* becomes an important reference in art. Especially, Germany has become the center of the evolutionary theory in Europe.[48] In the late 1880s, Darwin's evolutionary theory's leading architectural exponent in Germany is the architect Georg Heuser. For Schwarzer, Heuser's theory of architecture at the time has effects of Darwinism and his original Semperian orientation. His essay, *Keime eines neuen Baustils* (Embryo of a New Building Style) published in 1888, clarifies his ideas of that point. In the same essay, Hauser emphasizes that "one looks for a genealogy of artistic thinking, the rise and disappearance of ornamental

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[45] Mallgrave and Ikonomou, *Empathy,Form and Space*, p: 40.

[46] Thomas Munro, "Aesthetics as Science: Its Development in America," The Journal of Aesthetics & Art Criticism, Vol.IX, (march, 1951), pp:184-185.

[47] *History of Architecture on the Comparative Method* "gives a comparative analysis of the Gothic, Classic, and Renaissance styles in regard to general plans, walls, openings, roofs, columns, mouldings, and ornament, with many concrete examples and a discussion of geographical, geological, climatic, religious, social, and historical influences on style", Munro, *ibid*, p: 185.

[48] Charlotte Douglas, "Evolution and the Biological Metaphor in Modern Russian Art", Art Journal, (Summer, 1984), p:153; Mallgrave, "Introduction," in Otto Wagner, *Modern Architecture,* pp: 21-22.

forms out of natural necessity."[49] Schwarzer, in his study *Darwinistisches über Kunst und Technik* (Darwinian Reflections on Art and Technology)[50] in 1890, states that Heuser's definition of art turns out to be "a natural organism." Schwarzer expresses that view of Heuser as: "He contended that art is a blossoming of nature and utterly subject to its laws...Heuser advanced the Semperian notion that the evolutionary ornamental forms in building styles had great similarities to developments in the kingdom of organic creatures."[51] In summary, Schwarzer argues that Heuser tries to define *Formgedanken* (formal thoughts) of humans and emergence of natural forms in the same terms. Another theorist, Mallgrave, also argues that Heuser defines art according to the evolutionary laws in nature. He expresses that as:

> "Changes in architecture come about through a process of natural selection. Initially, new materials and technologies are treated in ways learned from other materials and purposes, yet gradually new variations appear; the more variants or options there were to choose from, the more correct will be the new method of treatment. If the results are unsatisfactory, a process of crossbreeding methods and techniques would take place."[52]

In general, the theories mentioned above seem to serve as a basis for those widely accepted projects known as *Moderne*, *Jugendstil* and *Art Nouveau* in Europe since 1890's. They has happened to define various unities between art, technology, nature and social needs with the knowledge of different subjects like physiology, psychology, and biology. Accordingly, they has aimed at achieving a new harmony of art and the modern life and creating the forms of a new social life. Henry van de Velde (Belgium), Victor Horta, Hector Guimard (France), Otto Wagner (Austria), Joseph Olbrich, Joseph Hoffmann, Fedor Shekhtel (Russia) has centered their arguments around "anti historicism," "the search for the New" and "the construction of the forms of new social life." For instance, Henry van de Velde's theoretical endeavors are for defining a new unity between art and the naturalistic conditions of modern life. Velde argues that the concepts of "mechanical productivity" and "natural productivity" have

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[49] Georg Heuser, "Keime eines neuen Baustils", Deutsche Bauzeitung, 22 (1888), p:529. Quoted in Mitchell Schwarzer, *German Architectural Theory and the search for Modern Identity*, p: 198.

[50] Georg Heuser, "*Darwinistisches über Kunst und Technik,"* Allgemeine Bauzeitung, 55 (1890). Quoted in Mallgrave, "Introduction" in Otto Wagner, *Modern Architecture*, p: 18.

[51] Schwarzer, *German Architectural Theory and the search for Modern Identity*, p: 198.

[52] Mallgrave, "Introduction" in Otto Wagner, *Modern Architecture,* p: 22.

features in common. Besides, he comes up with the idea that the question of "how the driving forces of nature create natural forms" might lead to an answer for "What artistic forms can new technology produce?" Velde also believes technological reality is a part of modern society. Therefore, he attempts to achieve "the unity of art with nature and technology" which fits into the modern world. He recognizes "ornament" as a means for defining such a unity. Schwarzer, in his study *German Architectural Theory and the search for Modern Identity,* discusses that Heinrich Wölfflin's doctoral dissertation, *Prolegomena zu einer Psychologie der Architektur,* is likely to influence Velde's theory of ornament. Similar to Wölfflin's argument, Van De Velde states that "ornament brings the sleeping masses of constructional form to life."[53]

By 1900's, the movements of *Moderne*, *Jugendstil* and *Art Nouveau* has begun to be criticized by some German theorists, like Adolf Loos and Hermann Muthesius, for not liberating themselves from the "stylistic thinking." Those theorists has offered rational solutions which have been rooted in science and technology, or rather the realities of the modern life. Those ideas are important in that they act as a catalyst in reconstruction of architecture in entirely scientific terms.

On the other hand, a Viennese architect Otto Wagner takes his place among the first theorists to study/review "scientific objectivity" in the theory of architecture in 1920's. Wagner proposes a new style which would have no truck with historicism.[54] He proposes a view of architecture as the expression of modern life. In his major text on architecture, *Moderne Architektur*,[55] Wagner says:

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[53] Schwarzer, *German Architectural Theory and the search for Modern Identity*, p:229.

[54] Mallgrave wrote about the historical importance of Wagner's rejection of architectural eclecticism that "Wagner was the first European architect to state publicly his break with the past". Also, he explained his position initially was not entirely unequivocal. Bunu *Moderne Architektur'un* editionlarındaki farklılaşmalarla açıklar: "In the first edition of 1896 he sometimes professes a willingness to accommodate aspects of historical language of form, to rework or modify elements of the traditional vocabulary to meet modern demands. By the third edition of 1902, however, he is adamant that a radical break with the past has to be made and a new beginning sought. For example, a reference in the first edition to "furthering our inherited traditions" is deleted in the second edition.of 1898. ın commenting on the new shapes created by modern technology, Wagner says in the first edition, "They all recall the forms of past times…"; the second edition reads, "They scarcely recall the forms of past times…"; the third edition is emphatic, "They do not recall the forms of past times…" ". Otto Wagner, *Moderne Architektur* (Vienna: Verlag von Anton Schroll&Co., 1896). Translated from the third edition, 1902 as *Modern Architecture*, Harry F. Mallgrave, (Santa Monica, CA: The Getty Center for the History of Art and Humanities, 1988), pp: 30-31.

[55] *Moderne Architektur* (Modern Architecture) appeared in four editions (1896, 1898, 1902, 1914). Wagner changed the title of the text to *Die Baukunst unserer* Zeit (Architecture of Our Time) in the fourth edition.

> "One idea inspires this book, namely THAT THE BASIS OF TODAY'S PREDOMINANT VIEWS ON ARCHITECTURE MUST BE SHIFTED, AND WE MUST BECOME FULLY AWARE THAT THE SOLE DEPARTURE POINT FOR OUR ARTISTIC WORK CAN ONLY BE MODERN LIFE." [56]

Wagner argues that science, technology and man's practical tendency are basis for modern architecture. In the text, Wagner writes that "THIS NEW STYLE, REPRESENTING US AND OUR TIME, MUST CLEARLY EXPRESS A DISTINCT CHANGE FROM PREVIOUS FEELING, AN ALMOST ALL-ENCOMPASSING APPEARANCE OF REASON IN ALL OUR WORKS."[57] He asserts that 'new methods of construction, new materials, new human tasks and viewpoints' have always given birth to new styles. He writes:

> "EACH NEW STYLE GRADUALLY EMERGED FROM THE EARLIER ONE WHEN NEW METHODS OF CONSTRUCTION, NEW MATERIALS, NEW HUMAN TASKS AND VIEWPOINTS DEMANDED A CHANGE OR RECONSTITUTION OF EXISTING FORMS."[58]

Wagner defines the modern movement as "a reunification of constructional materiality and art." In other words, he recognizes the unification of utilitarian and artistic principles as the basis of the modern movement. For Wagner, "composition" is the beginning of each architectural creation. He writes that "Every composition is essentially influenced by the material to be used in the construction and the technology to be employed. Composition must clearly reveal the material of construction and the technology used."[59] Wagner arrives at the conclusion: "Something impractical cannot be beautiful."[60] Wagner's notion of "composition" also aims at saving the society from 'individualism' and 'fragmentation.' For Wagner, straight line and smooth surface are basis for the architecture of a new democratic society:

> "One result of our democratic existence, into which the masses are made to fit, with their cry for cheap and healthy homes, and the enforced frugality of

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[56] Wagner, *Moderne Architektur*, p: 60.

[57] Wagner, *Moderne Architektur*, p: 79.

[58] Wagner, *Moderne Architektur* p: 74.

[59] Wagner, *Moderne Architektur* p: 83.

[60] Wagner, *Moderne Architektur* p: 82.

> their lives, is the uniformity of our apartment blocks, which will inevitably become prominent in the urban scene of the future…In every city the number of residential blocks will far exceed that of public buildings, and their juxtaposition in rows will produce a series of uniform, elongated strips alongside the streets. By widening our streets, modern town-planning has turned this uniformity into monumentality…When designing the façade of a modern apartment block, an architect is compelled to accept a flat surface interrupted by a large number of identical windows, with perhaps a protective surrounding cornice and at the most a crowning frieze and a porch…"[61]

Adolf Loos's functional theory is one of the main references in theories of architecture which is trying to adapt a scientific methodology in 1920's. Basically, Loos's theory opposes to "the unity of art and industry" that is advocated by the movements of *Jugendstil* and *Moderne*. Therefore, Loos's theory is critical of the Viennese *Moderne* and its artists' Secession even though he appreciates their initial struggles for liberating themselves from "stylistic historicism."[62] According to Loos these attempts are completely individualistic and they are not concerned with the public good. They are in contradiction with the facts of daily life and the needs of modern life. Finally Loos avoids the current artistic movements concerned with 'style' and 'form.' Quite radically, he separates modern architecture from the other forms of art. He isolates architecture from ornamental practices which he defines as the products of artistic movements. For Loos, art is subjective and devoid of purposes; whereas, architecture should be concerned with the purpose. In the essay *Ornament und Verbrechen* ('Ornament and Crime'),1908, Loos writes:

> "Am I saying that a house has nothing to do with art, and that architecture is not to be reckoned among the arts? Indeed I am. Only a very small part of architecture belongs to art –tombstones and monuments. Everything else that serves a particular purpose must be excluded from the realms of art."[63]

In the direction of the assessment of the buildings' truthfulness and direct expression of their function, Loos regards the use of ornament as an 'architectural crime.' He then asserts that a cultural development led away from ornamental practices: "The evolution

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[61] Wagner, *Die Baukunst unserer* Zeit ,quoted in Kruft, *A History of Architectural Theory*, pp:321-322.

[62] Schwarzer, *German Architectural Theory and the search for Modern Identity*, p: 238.

[63] Adolf Loos, "*Ornament und Verbrechen*," 1908, quoted in Kruft, *A History of Architectural Theory*, p: 366.

of culture is synonymous with the removal of ornament from utilitarian objects."[64] And he emphasizes that it is a crime in human life, economic and cultural respects: "Not only is ornament produced by criminals but it also commits a crime itself by causing grave injury to human health, to the natural economy and hence to cultural development."[65] In conclusion, Loos argues that "ornament" cannot be recognized as "an expression of modern culture"; therefore, creating a new "ornament" does not help architecture the slightest in achieving that goal. Loos comes up with the solutions of 'plain' and 'simplicity': "every age had its style, is our age alone to be refused a style? By style, people meant ornament. Then I said, Weep not! See, therein lies the greatness of our age, that it is incapable of producing a new ornament. We have outgrown ornament, we have fought our way through to freedom from ornament."[66]

In contrary to Loos's objection to the unification of art and industry, to merging the aesthetic demands of art and utilitarian demands of architecture, the architect Hermann Muthesius advocates that objective technological creation conducts to artistic creation: "new tasks require new aesthetic laws with new standards and new foundations." Like Loos, Muthesius criticizes *Jugendstil* and the Viennese *Moderne* for their failure to banish stylistic historicism. He asserts that modern architectural form must be created from the real life. He attempts to integrate the technology based aesthetic into architecture: "The form of construction calculated to be the most concise…the most concise form of expression of what is structurally correct… makes a definite impression on the receptive beholder."[67] 'Purpose, material, and construction' are the basic guiding concepts for architects in the emergence of a new style:

> "If one wishes to take proper account of the conditions of the age, one must first take account of the conditions that govern each individual art object. The initial task of the applied arts today is to become fully aware of the purpose of each individual art object and to develop the form consistent with this purpose. As soon as one turns one's attention away from the superficial imitation of the art of the past, and as soon as the real situation

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[64] Loos, "*Ornament und Verbrechen"* 1908. Translated by Michael Bullock as "Ornament and Crime," in Ulrich Conrads (ed), *Programs and Manifestoes on 20th century Architecture* (Cambridge: The MIT press,1994 [1964]), p: 20.

[65] Loos, "Ornament and Crime," in Conrads, *ibid*, p: 21.

[66] Loos, "Ornament and Crime," in Conrads, *ibid*, p: 20. Emphases added.

[67] Hermann Muthesius, *Die Einheit der Architektur. Betrachtungen über Baukunst, Ingeniurbau und Kunstgewerbe*, Berlin, 1908. Quoted and translated by Kruft, in *A History of Architectural Theory*, p:369.

> has been grasped, other requirements will present themselves. Every material demands to be treated in its own particular way…Design according to purpose is thus married to design according to character of material, and considerations of material lead to the construction appropriate to the material. Purpose, material, and construction provide the modern craftsman with the only directives he need follow."[68]

Muthesius explains the main objective of *Deutscher Werkbund*, of which he is one of the founders, in parallel terms with his own concept of "unitary": "The aim of the Werkbund is to ennoble the work of the craftsman in the collaboration of arts, crafts and industry, through education, publicity and a united response to relevant questions."[69] For Muthesius, the aim of the applied arts is social: "The goal of the applied arts today is to re-educate our social classes in the paths of uprightness, truthfulness and personal simplicity as citizens."[70] Therefore, as based on his argument of the unity of applied arts and architecture, the same purpose serves to architecture as well. Besides, the principles of "uprightness, truthfulness and simplicity" lead architecture.

Dutch architect Petrus Berlage is one of the early theorists whose studies are reviewed closely by the supporters of the theory of "scientific functionalism." Like Muthesius, Berlage is concerned with the reconcilability of architecture and industry. Also, he considers technology based aesthetic in architecture. In contrary to the vision of *Werkbund,* for Berlage, architecture is not a practical art; it is a fine art. He attempts to relate architectural practice to the demands of the social life. His rationalist theory of architecture, "practical aesthetics," is influenced by Semper and Viollet-le Duc.[71] Their thoughts on 'style' are critical for Berlage. Berlage asserts that order or regularity is the

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[68] Hermann Muthesius, 'Die Bedeutung des Kunstgewerbes', Dekorative Kunst X, 1907, pp: 177-92. Quoted and translated in Kruft, *ibid*, p: 368.

[69] Quoted in Kruft, *ibid*, pp: 369-370.

[70] Hermann Muthesius, 'Die Bedeutung des Kunstgewerbes', p:44. Quoted in Kruft*, ibid,* p: 368.

[71] In"Thoughts on Style in Architecture," Berlage notes that: "in the final analysis it is clear that philosophy is able to draw its conclusions only from appearances. Human ideas can be defined a priori, but art cannot be prescribe.
In this respect the great practicing architects such as Viollet-le-Duc in France and the already-mentioned Semper in Germany are better teachers in that their major works, *Le dictionnaire raisonné de l'architecture* and *Der Stil in den technischen Künsten* (Style in the technical arts), offer practical aesthetics –aesthetics that one can use." p: 136 Original source: Hendrik Petrus Berlage, *Gedanken über Stil in der Baukunst* (Leipzig: Julius Zeitler, 1905). Translated by Iain Boyd Whyte as, "Thoughts on Style in Architecture," in *Hendrik Petrus Berlage: Thoughts on Style*, Introduction and translation by Iain Boyd Whyte and Wim de Wit, (Santa Monica Ca: Getty Center for the History of Art and Humanities, 1996), p: 136.

fundamental principle of style and architecture should be determined to a certain order. Like Semper and Viollet-le Duc, Berlage argues that the laws of Nature should be guide the works of architecture: "we are moved by the laws that govern the whole universe, the laws according to which it was formed, and by which it must perpetually develop. We tremble in awe at these laws, tremble at the consistency with which the universe is ordered, and which penetrates infinity right down to the invisible particle."[72] Berlage attempts to come up with "universal laws" applicable to "the works of art." Accordingly, he defines the "unity of art and science" as: "In the future art and science will once again complement each other to such degree that the result will be an architectural work of art."[73] In conclusion, Berlage clarifies "preconditions" which determine the method and lead architects to a new art:

> "1. The determination of an architectural composition should be carried out on a geometrical basis.
> 2. The forms of earlier styles should not be copied
> 3. Architectural forms should also be of a geometrical nature, freely conceived, but developed in the most simple, *sachlich* way, following the same scheme as the ground plan and elevation."[74]

Berlage asserts that the architect should consider the demands of the new social democratic spirit. He recognizes rational architecture (*vernünftgie Konstruktion*) as "the social equality of all men".

> "Rational construction can become the basis of the new art. Only when this principle has not merely prevailed but has also been put into general application, shall we stand at the gate of a new art. This will be the moment at which the new universal spirit [*Weltgefühl*], the social equality of all men, will be manifested."[75]

These attempts in architecture on the threshold of a new century justify themselves socially in regard to the purpose of unifying "architectural production" and " cultural context," and such a purpose can be achieved by a definition of "style." In other words,

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[72] Berlage, *Grundlagen und Entwicklung der Architektur: Vier Vorträge gehalten im Kunstgewerbemuseum zu Zürich* (Rotterdam:W.L.&J.Brusse; Berlin:Julius Bard, 1908). Translated as, "The Foundations and Development: Four Lectures Delivered at the Kunstgewerbemuseum" by Iain Boyd Whyte, in *Hendrik Petrus Berlage: Thoughts on Style*, pp: 186-187.

[73] Berlage, ibid, p: 207.

[74] Berlage, ibid, p: 245.

[75] Berlage, "Thoughts on Style in Architecture," in Berlage, *Thoughts on Style,* p: 150.

the purpose is to achieve a "common architectural expression" through "objectivity" and " truthfulness" in addition to technological and natural laws.

Boris Nikolaev is a representative of the rational approach in Russian architecture. His theory of "creating the from of artifacts" is one of the radical theories in that rational approach. Nikolaev argues that the laws in nature should be observed in order to manage a rational architectural style:

> "Form must be as varied as the endless diversity of conditions that generate it. The only "style" that the designer must pursue is the style of nature, where nothing is superfluous, where everything has meaning and serves the underlying idea...only these principles can create a new architecture that will be a step forward and not a mere marking time."[76]

Catherine Cook discusses that in analyzing 'the endless diversity of conditions," Nikolaev draws an analogy with a chemical model.[77]

Through a rational approach, based on "scientific objectivity," from 1914 to 1920 architecture has underwent various studies which might seem "anti-rationalist" in their early stages. In this period led by Cubism, Futurism, Expressionism, Neoplasticism and Suprematism, a revolutioanry reconstruction in architecture has been the main objective. The theories and concepts of modern natural sciences has been accepted as instruments to justify the argument of "a new architecture," and to provide architecture with new approaches in the construction of that desired "new architecture."

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[76] Catherine Cooke, *Russian Avant-garde theories of art, architecture and the City*, (London: Academy editions, 1995), p: 11.

[77] Catherine Cooke asserts that Nikolaev used the Moscow philosopher and engineer Peter Engelmeier's chemical model. And she explains the analogy: "ın Engelmeier's model there were four 'classes of impulse' underlying any 'technological act', or design, and their relationship could be described by analogy with 'that single formula, $C_mH_nO_pN_q$… by which the chemist describes ant one of the infinite number and diversity of natural bodies.' Where the organic substance in nature comprised differing proportions of carbon, hydrogen, oxygen, and nitrogen, the 'technological act' or 'intention' could be seen as comprising certain proportions of 'Truth, Beauty, Good and Utility'(istina, krasota, dobro and pol'za), and described by the general formula $I=T_mB_nG_pU_{q.}$ 'Unlike in chemistry', as he observed, these components may have negative values, when they would stand for degrees of Falsehood, Ugliness, and moral or physical Harmfulness. When all coefficients m,n,p,q, have the value '+infinity', the act is 'sublime', and when they have the value '-infinity', it is utterly pernicious. When three of the four coefficients are zero we have the discreet fields out of which design is synthesized, and which by most people, then as now, are far better understood than the synthetic act itself. 'Thus the relations $I=T_m$, $I=B_n$, $I=G_p$, $I=U_q$', represent respectively 'pure science, pure art, pure ethics with religion, and pure technology in the utilitarian sense.' Another set of 'familiar' cases occurs when one coefficient is extremely large but the rest are still greater than zero. Then we ' have applied science, applied art, applied ethics' –which is effectively politics-' and 'applied technologies'. the infinite variety of relationships between these factors could be conceived on the model of chemical valency. This imaginative model meant that factors influencing the form of artifacts had been analyzed with unusual breadth in Russia before the task got a political orientation". Cooke, *ibid,* p: 11.

CHAPTER 3

OBJECTIFICATION OF ARCHITECTURAL KNOWLEDGE BY THE USE OF SCIENTIFIC KNOWLEDGE IN PERIOD BETWEEN 1914-1945

The orientation of architectural discourses to natural sciences acquires a revolutionary character subsequent to World War I. Starting from the mid-nineteenth century, new theories discovered in natural sciences have been used as the scientific basis of architectural theory; as observed particularly in the works of Semper, Viollet le Duc and Sullivan. In contrast with the heterogeneous structure of nineteenth century architectural theory, attempts to establish a homogeneous and international structure dominated the architectural discourses during and after World War I. Architectural discourses formulated as the extension of art theories such as Cubism, Futurism, Dadaism, Neo-plasticism and Suprematism; as well as the discourses that generated within the context of Functionalist, Rationalist and Constructivist theories all focused on the necessity to construct a new and universal architecture. Aiming to legitimize this assertion through the knowledge of nature sciences, architecture has tended to explore the various features of scientific knowledge.

One of these tendencies is the new reality conception science presents. Architecture appears to focus the assertion of the necessity to construct "a new architecture" on the problematic of expressing "a new reality." By means of the scientific and technological developments (discovery of X-Rays, micro-cameras, energy theories, relativity theory...) at the turn of the century, the existing realities have been made interrogative and the unprecedented realities have been discovered. Thus, architectural discourses has attempted to define 'a new reality of a new world' by these improvements. In other words, the necessity of the re-construction of architecture in an order considering the "new reality" has been claimed. As a result, the avant-garde architectural discourses has formulated the demand on "a new architecture" as searching the response of "the new reality" in architecture as "the new reality - the new world and the new architecture."

Made explicable and visible by science and technology; features of the new reality such as dynamism and continuity have been used to establish an aesthetic language in architectural discourses, becoming tools in representing "the new image of the world." The interest of architectural theory in natural sciences focuses on features such as certainty, objectivity and universality of science. These features of science have provided a valid basis for architecture in search for a universal solution. In other words, the unitary system of nature has constituted a trustworthy model for architecture in establishing a complete and universal structure. Consequently, the features of the system as well as the theories and concepts that explain the system have been accepted as utilizable in formulating architectural knowledge. At extreme, this interrelation has led to the reconsideration of architecture as a scientific field. Especially after World War I, these theories have been used to support architecture that aimed to organize a unity of life. Based on the social realities of the post-war period, the need to reorganize the society has become a common discussion in the avant-garde architectural discourses. Due to its leading role in the solution process, architecture had to be reconstructed. Within this reconstruction, architecture has been defined as a scientific field, taking science as its methodological model. Consequently, fundamental features of science such as reality, exactness, objectivity and internationality have been regarded as a model to organize "a unity of life" for architecture.

Knowledge of natural sciences has taken part in architectural discourses through various mediums and mechanisms. In some discourses, conditions and analogies with the theory have been established to redefine meaning. In others, architecture has been identified as a scientific discipline, taking scientific methodology as its model. As a result, various theories differing in formulation have been utilized in architecture; such as "the new architectural style," "the new theory of building," "the new space conception" and "the new architectural form."

3.1. The Implantation of Concepts and Theories of Physics to Architectural Knowledge

The use of Relativity Theory and its associated concepts [such as space-time (continuum) and fourth dimension] in architectural discourses makes it possible to state

that theories and concepts of physics have been used as tools of architecture starting from 1914 and particularly after World War I. During the post-war period, numerous studies have been done in physics, all of which can be considered scientific revolutions; especially Albert Einstein's Special Theory of Relativity and his formulation on all types of uniform motion dated 1905, Hermann Minkowski's explanation of Relativity Theory with the formulation of space-time continuum dated 1908, and Einstein's proof that relativity is valid for non-uniform motions such as acceleration and gravitation dated 1916.[78] By the early 1920s, these works had become popular in many European countries; drawing attention from various fields of art; including literature, cinema, music, sculpture and painting as well as architecture.[79] The effects of Relativity Theory

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[78] "The principles of Einstein's Special Theory of Relativity were set forth in an article, 'On Electrodynamics of Moving Bodies', in the *Annalen der Physik* during the summer of 1905. Einstein introduced his discussion by citing two problems faced by physicists at the end of the nineteenth century. These were the anomalies created in Maxwell's equations for electrodynamics by distinctions between rest and motion, and the failure of all attempts to establish the existence of the ether by measuring the relative motion of the earth through it, thereby also determining a kind of 'absolute velocity' for the earth. Declaring the idea of absolute rest meaningless and thus rejecting the notion of a fixed ether against which the velocity of the earth could be measured, Einstein revealed the 'ether drift' experiments as attempts, in fact, to measure the absolute velocity of a system by purely internal measurements. Newtonian physics had long before proved the impossibility of mechanical experiments within a system ever being able to detect the uniform motion of that system. Now Einstein extended this principle of relativity to include the electrodynamics and optical phenomena by which his predecessors had hoped to measure the velocity of the earth. Henceforth, no uniform motion could be considered absolute, and all velocities would have to be measured in relation to another body in order to have any meaning.
Along with the relativity of velocity, Einstein also postulated at the beginning of 1905 article that the velocity of light in a vacuum is a constant, c, and is independent of any motion on the part of its source. With the velocity of light a constant, and the elimination of a stationary ether leaving no one frame of reference to be considered absolute, all systems moving uniformly with respect to each other become equally valid. The laws of nature will remain consistent from system to system, and transitions from one system to another can be affected by the equations known as the Lorentz transformations. In Einstein's usage of the equations, both distance, measured in the direction of motion, and time will be modified as the velocity of the system varies and thus are relative rather than absolute quantities…
In September 1908 Hermann Minkowski delivered a lecture entitled "Space and Time" before the 80th Assembly of German Natural Scientists and Physicians at Cologne. Minkowski's first words were revolutionary: 'The views of space and time which I wish to lay before you have sprung from the soil of experimental physics, and therein lies their strength. They are radical. Henceforth space by itself, and time by itself, are doomed to fade away into mere shadows, and only a kind of union of the two will preserve an independent reality. " The purpose of Minkowski's formulation of a four-dimensional continuum with three dimensions of space and one of time was to synthesize the points of view of all observes after Einstein had made them relative in 1905. In the equation $dx^2+dy^2+dz^2-c^2dt^2=ds^2$, which was the mathematical representation of Einstein's premises, Minkowski discovered that he could describe the location of a point-event in a four-dimensional continuum. Using the word substance to refer to every participant in the continuum, he proposed individual "world lines", whose paths are determined by dx, dy, dz, and dt." Linda D. Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art,* (Princeton, N. J.: Princeton University press, 1983), pp: 354-356.

[79] Einstein's Relativity Theory became widespread with the articles published in scientific or non-scientific journals in different countries beginning especially from 1919s. Einstein emerged as a celebrity only in November 1919, when the findings of an English astronomical expedition to photograph the May 1919 eclipse were announced at the Royal Society in London. After 1919 in Europe also in the United States a certain number of articles on the subject of Relativity theory were published. In Europe a certain number of articles on the subject of Relativity theory had also appeared before 1919. A brief notice of Minkowski's 1908 lecture on "Space and time" did appear in France in the *Revue Scientifique* in March 1909. In 1911, *Scientia*, the international scientific periodical published in part in Paris, included an article, which discussed Einstein's Special Relativity and Minkowski's space-time world. Henderson, *ibid*, pp: 358-359.

can be observed in the discourses of artists such as Naum Gabo, Abton Pevsner, Malevich, El Lissitzky, various members of *De Stijl*, J. J. P. Oud, Theo van Doesburg, Cornelis Van Eesteren and Buckminster Fuller. In the field of architecture, the theory has been influential especially on the Constructivist Movement and *De Stijl*.

In fact, the concepts and theories of physics, including the concept of "fourth dimension" can be observed in discourses before the 1920s. In addition, nineteenth century energy theories in physics have also drawn attention from different branches of art. During this period when architecture fostered from art theories, this orientation in arts has also been influential on architecture. Due to the influence of non-Euclidian and n-Dimensional Geometry theories of mathematicians such as Georg Friedrich B. Riemann, Nikolai I. Lobachevsky and Henri Poincaré[80] and the concept of "Fourth Dimension" together with "Hyperspace Philosophy"[81] have been used as means to achieve a new expression of reality in Cubist, Futurist, Suprematist and Neoplasticist art theories. In "*Les Peintures Cubists: Médiations Esthetiques*" published in 1913, the Cubist poet Guillaume Apollinaire refers to the concept of "Fourth Dimension" as a geometric order that contributes to the plasticity of the art object.[82] Based on Poincaré's definition of the three types of space (visual, tactile and motor), Gleizes and Metzinger present the theory of "pictorial space": "To establish pictorial space, we must have recourse to tactile and motor sensations, indeed to all our faculties. It is our whole personality which, contracting or expanding, transforms the plane of the picture."[83]

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[80] for the theories of Lobachevsky, Riemann, Poincaré, and the other works on Non-Euclidean geometry in the nineteenth century, see; Henderson, *ibid,* p:3-43

[81] the works of hyperspace philosophers Englishman Charles Howard Hinton and Russian Peter Demianovich Ouspensky became the most important references for art and architecture, see, Henderson, *ibid*, pp: 25-31, 238-255.

[82] "The new painters do not propose, any more than did their predecessors, to be geometers. But it may be said that **geometry is to the plastic arts what grammar is to the art of the writer.** Today, scientists no longer limit themselves to the three dimensions of Euclid. The painters have been led quite naturally, one might say by intuition, to preoccupy themselves with the new possibilities of spatial measurement which, in the language of the modern studios, are designated by the term: the fourth dimension". Guillaume Apollinaire, *Les Peintures Cubists: Médiations Esthetiques* (Paris: Eugène Figuière, 1913), Translated as *The Cubist Painters; Aesthetic Mediations 1913*, L. Abel, p: 13. Emphases added. Initially, Apollinaire explained this idea at a lecture given at Exposition d'Art Contemporain on 25 November 1911.

[83] Gleizes and Metzinger, *Du Cubisme*, (Paris: Eugène Figuière, 1912), p: 17. Quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, p:82. This thought is similar to Poincaré's differentiation of perceptual space, tactile and motor. He explains that; "Tactile Space-Motor Space-"Tactile space" is still more complicated than visual space and farther removed from geometric space…Motor space would have as many dimensions as we have muscles". Quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, p: 82.

However, as a solution to their major concern, "the representation of a new expression of reality"; they refer to Non-Euclidian theories:

> "It is evident...that we are opening a new path, that we are indicating a new expression of reality." [84]
>
> "If we wished to tie the painters' space to a particular geometry, we should have to refer it to the non-Euclidean scholars; we should have to study, at some length, certain of Riemann's [sic] theorems."[85]

Consequently, it is possible to state that Pictorial Space theory has been interpreted as the simultaneous representation of different appearances of an object, and used in painting in order to constitute a concrete expression of style: "Then the fact of moving around an object to seize from it several successive appearances, which, fused into a single image, reconstitute it in time, will no longer make reasoning people indignant."[86]

During the early period of Dutch avant-garde group *De Stijl*, the concept of "fourth dimension" has been used in the Neo-Plastic Theory of Piet Mondrian, the founder of the group, with the influence of other members of the group such as Theo van Doesburg, Bart van der Leck and Georges Vantongerloo. Within the context of his theosophical viewpoint, Mondrian sees the "true vision of reality" in the "unity of the spiritual and the material".[87] He questions this unity through the relationship between "form (material) and space (spiritual)"; claiming that his ideas are supported by the energy theories in physics: "Since modern science has confirmed the doctrine of

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[84] Gleizes, as quoted in André Arnyvelde, "Contribution à l'historie du cubisme", Gil Blas, 2 Jan.1912. Quoted in Henderson, *ibid*, p:76

[85] Gleizes and Metzinger, *Du Cubisme*, p: 17. Quoted in Henderson, *ibid*, p:93

[86] Gleizes and Metzinger, *ibid*, p: 36. Quoted in Henderson, *ibid*, p: 90. According to Henderson "such a technique was actually described by Poincaré in *La Science et l'hypothèse.* In that work, specific instructions are given by Poincaré for representing a four dimensional object." Henderson quoted from this work to prove similarities between Poincaré's theory and Cubist's pictorial space: "We can even take of the same figure several perspectives from several different points of view…Imagine that the various perspectives of the same object succeed one another, and that the transition from one to the other is accompanied by muscular sensations. Here there is nothing unpicturable, and yet these sensations are precisely those, which would be felt by a being possessed of a two-dimensional retina who could move in space of four dimensions. In these sense we may say the fourth dimension is imaginable." Henderson, *ibid*, p:84-85

[87] Mondrian says that; "The oneness of positive spiritual and negative material is happiness. Therefore, the more the positive and the negative are united in one nature, the greater the happiness". Quoted in John George Hatch, "Nature's Laws & the Changing Image of Reality in Art & Physics: A Study of the Impact of Modern Physics on the Visual Art, 1910-1940," PhD Diss., University of Essex, 1996, p: 244.

Theosophy that matter and force (spirit) are one, there is therefore no reason to separate two".[88] These assertions of Mondrian constitute a significant example of the way he interprets and uses the explanations on "the essence of matter" (studied particularly by Michael Faraday and Clerk Maxwell)[89] within the geometric language of the Cubist Theory. This discourse of Mondrian has also influenced the early approach of van Doesburg. Based on a common conceptual framework with Mondrian, van Doesburg also makes use of the mathematical knowledge of Poincaré. Van Doesburg defines Apollinaire and Severini as the producers of new art as he says: "The early death of the poet Guillaume Apollinaire took away a committed defender of the will to produce a new art but, filling his place, Gino Severini..."[90] On the other hand, he has an approach similar to Mondrian's: "...modern science had not only taught it De Stijl the permanence of energy, it had shown the identity of energy and matter and had already hinted at the possibility of the creation of matter out of energy."[91] With the influence of Lissitzky, the interest of van Doesburg has been directed to Relativity Theory during the mid 1920s. He has made use of the dynamic space concept formulated with the "Elementarist Theory" and implemented the concept in architecture. This approach has become widespread throughout Central Europe with the *De Stijl* Movement.

The influences of this movement in painting on architecture can also be observed in the works of Oud. In the article "Cubism, Futurism, Modern Architecture," Oud draws attention to the importance of this movement for the future of architecture:

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[88] Hatch, *ibid*, pp: 247-248. for detailed knowledge about the relationship between Mondrian's theory and theories of physics see, Hatch, *ibid*, chapter 3, pp: 241-293.

[89] These theories deviate from Newton's "the theory of the universe as composed of solid matter in absolute space." They explain that "solid matter is composed of fields of energy and the essence of matter was non-matter." Albert Einstein explains this advance as, "…in the minds of physicists space remained until most recent time simply a passive container of all events, playing no part in physical happenings itself. Thought only began to take a new turn with the wave theory of light and the theory of electromagnetic field of Faraday and Clerk Maxwell. It became clear that there existed in free space conditions, which propagated themselves in waves, as well as localized fields, which were able to exert force on electrical masses or magnetic poles brought to the spot. Since it would seem utterly absurd to attribute physical functions or states to space itself, they invented a medium pervading the whole of space, on the model of ponderable matter—the ether…" quoted in Hatch, *ibid*, p: 249.

[90] Quoted in Allan Doig, *Theo Van Doesburg: Painting into Architecture, theory into practice*, (Cambridge: Cambridge University press, 1986), p: 37.

[91] Hans L.C. Jaffé, (ed), *De Stijl:Extracts from the magazine,* (London: Thames& Hudson, 1970), p: 113. Quoted in Hatch, "Nature's Laws & the Changing Image of Reality in Art & Physics", p: 5.

> ”It is becoming clearer that the new movement in painting is going to develop in the direction of a high and monumental art. Modern attempts appeared to have reached an impasse, but it is beginning to manifest itself again, and at the present time the attention of architects may again be turned that way because this painting is going to be of more importance to them in the future than was the case in the foregoing period.”[92]

Similar to the Neoplasticist Theory, the Suprematist Theory of Russian Kazimir Malevich also explains new realism based on the energy theories in physics. Interpreting the statements on the existence of matter in these theories, Malevich uses them as the scientific sources in constructing his own theory;

> “Scientific proof...tells us that matter does not disappear...” [93]

> “Solid matter does not exist in nature. There is only energy...Much has been written about this in scholarly treatises by eminent people, and I need not elaborate on this idea. I want only to point out that this notion was the impetus for breaking up the visual complexity of a solid and dividing its mass into the separate energies of the colors of Suprematism.”[94]

As these quotations indicate, Malevich has established resemblances with matter related theories in physics (being composed of indivisible particles, particles being held together by electro-magnetic fields and the continuity of matter) and referred to them in his own theory; with statements such as “the tension between separate energies of colors,” “the movement of color as energy,” “the magnetic gravitation of one Supremacist element to another,” and “certain magnetic interrelations of form.”

In its search for dynamic form generated by the problem of *dinamismo plastico* that it has formulated, the Futurist theory indirectly makes use of the concept of Fourth Dimension. In his *Pittura Scultra Futuriste* published in 1914, Boccioni states his critiques about the geometric approach to Fourth Dimension in the Cubist discourse and presents his interpretation of the concept:

> “..Instead of the old-fashioned concept of sharp differentiation of bodies, instead of the modern concept of the Impressionists with their subdivision,

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[92] Oud, “Cubism, Futurism, Modern Architecture”, *Bouwkundig Weekblad*, XXXVII, no 20 (16 Sept. 1916), p:156. Quoted in Doig, *Theo Van Doesburg: Painting into Architecture*, p:39.

[93] Kazimir Malevich, “God in Not Cast Down”, (1920; pub. 1922). Quoted in Hatch, “Nature’s Laws & the Changing Image of Reality in Art & Physics,” p: 139.

[94] Malevich, “Futurism-Cubism”(1921). Quoted in Hatch, *ibid*, p: 134.

their repetition, their rough indications of images, we would substitute a concept of dynamic continuity as unique form. And it is not by accident that I say form and not line, since dynamic form is a species of fourth dimension in painting and sculpture, which cannot exist perfectly without the complete affirmation of the three dimensions that determine volume: height, width, depth.

I remember having read that Cubism with its breaking up of the object and unfolding of the parts of the object on the flat surface of the picture approached the fourth dimension...**Rather, this procedure is nothing but the transcription onto the surface of the canvas of the planes of the object that its accidental position prevents us from seeing. It is a rational procedure,** which exists in relativity, not in an intuitive absolute. **The integral notion of the object exists, with this procedure, in the three concepts of height, width, depth, thus, I repeat, in the relative, in the finite of mensuration.** If with artistic intuition it is ever possible to approach the concept of a fourth dimension, it is we Futurists who are getting there first. In fact, with the unique form that gives continuity in space we create a form that is the sum of the potential unfolding of the three known dimensions. Therefore, **we cannot make a measured and finite fourth dimension, but rather a continuous projection of forces and forms intuited in their infinite unfolding.** In fact, the unique dynamic form that we proclaim is nothing other than the suggestion of a form in motion, which appears for a moment only to be lost in the infinite succession of its variety.

In conclusion, we Futurists give the method for creating a conception more abstract and symbolic of reality, but we do not define the fixed and absolute measure that creates dynamism."[95]

Boccioni's theory influenced by Bergson's Hyperspace Philosophy has also been carried to the field of architecture especially by the two Italian architects Antonio Sant'Elia and Filippo Tommaso Marinetti. In their "The Manifest of Futurist Architecture," the architects refer to *dinamismo plastico* as one of the basic characteristics of new architecture.

"An architecture so conceived cannot give birth to any three-dimensional or linear habit, because the fundamental characteristics of Futurist architecture will be obsolesce and transience. 'Houses will last less long than we. Each generation will have to build its own city.' This constant renewal of the architectonic environment will contribute to the victory of 'Futurism' already affirmed with 'Words in Freedom,' 'Plastic Dynamism,' 'Music

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[95] Boccioni, *Pittura scultura futuriste (Dynamismo plastico)* (Milan: "Poesia", 1914), p: 196-99. Quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, pp: 110-111. Emphases added.

without Bars,' and 'The art of Sounds,' a victory for which we fight without pause against the cowardly worship of the past ."[96]

With the influence of art, architectural discourses were oriented towards nineteenth century theories of mathematics, physics and hyperspace philosophy until 1920s. This tendency later shifted towards Einstein's Relativity Theory after the theory became widespread. For the architectural discourses in search for "the expression of a new reality," Relativity Theory has been the newest scientific support. Consequently, it is possible to state that architectural discourses of the period have used Relativity Theory and the related concepts of space-time (continuum) and four-dimensionality as means of legitimizing the assertion of "a new reality." As the search for "a new architecture" has been scientifically legitimized, the theory has been indicated as a source for the solution of the problem.

In his article "*Sur la peinture et l'architecture*" published in *De Stijl* in 1918; Bart van der Leck, one of the co-founders of *De Stijl*, expresses this problem as follows: "Which *(modern reality)* demands and necessitates the defining of a new image of the human experience of time and space...of finding the precise image of the new spirit of the century…new image of the human experience of time and space..."[97]

In their "*Realisticheskii Manifest*" published in Moscow in August 1920; Russian Constructivists Naum Gabo and Anton Pevsner present "space and time" as the fundamental concept that describes the new reality of life. This idea also involves the statement that art should be constructed in accordance with this reality:

"The growth of human knowledge with its powerful penetration into the mysterious laws of the world which started at the dawn of this century...
No new artistic system will withstand the pressure of a growing new culture until the very foundation of Art will be erected on the real laws of Life...
Space and time are the only forms on which life is built and hence art must be constructed...
The realization of our perceptions of the world in the forms of space and time is the only aim of our pictorial and plastic art."[98]

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[96] Antonio Sant'Elia/Filippo Tommaso Marinetti: Futurist architecture, 1914. Quoted in Conrads (ed), *Programs and Manifestoes on 20th century Architecture*, pp: 34-38.

[97] Bart van der Leck, "Sur la peinture et l'architecture (On Painting and Architecture)", *De Stijl* 1918. Quoted in Hatch, "Nature's Laws & the Changing Image of Reality in Art & Physics," p: 258. Italics added.

[98] Naum Gabo and Antoine Pevsner, "The Realisic Manifesto" (1920), in John Bowlt (ed), *Russian Art of the Avant-Garde Theory and Criticism 1902-34* (London: Viking press, 1988), pp: 209-212.

In his manifest titled "*Die neue Welt* (The New World)" published during his period at Bauhaus, Hannes Meyer defines Einstein as one of the "saints" of the era and puts forward "the concept of space and time" as the essential characteristic that presents "the new world."[99]

An additional use of Relativity Theory and related concepts in architectural discourses can be encountered in the various formulations of "a new architecture". As stated above, the problem had been defined as "the reconstruction of a new architecture" that was responsive to the circumstances of the "new reality". As a reflection of this statement; it has been advocated in architectural discourses that "new reality" is a dynamic reality and thus, " new architecture" should also possess a dynamic character. At this point, the "space-time continuum" and "fourth dimension" concepts has been taken as guide in architectural epistemology. The general tendency in architecture has been the promotion of the concept of "time" as an architectural value, taking "space-time continuum" as a reference. Using the concept of time identical to the concept of movement, theories of art and architecture have often referred to "the fourth dimension," "the fourth dimension as time in the space-time continuum of General Relativity" and "four dimensional spatial effects" as a new form of expression. In "Language of Vision," György Kepes defines dynamic reality as follows:

> "We are living a mobile existence. The earth is rotating; the sun is moving;...forms are appearing and disappearing; and man, who is experiencing all this, is himself subject to all kinetic change. The perception of physical reality cannot escape the quality of movement. The very understanding of spatial facts, the meaning of extension or distances, involves the notion of time -a fusion of space-time which is movement. 'Nobody has ever noticed a place except at a time except at a place,'said Minkowsky in his Principles of Relativity." [100]

By the early 1920s, Malevich also perceived the Relativity Theory as the scientific explanation of the "new reality" in the world.[101] In "Non-objectivity"; he explains this general approach together with his acceptance of "time as the fourth dimension":

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[99] Hannes Meyer, "Die neue Welt," *Das Werk* 7 (1926), pp: 205-224. Translated as; "The New World," in Claude Schnaidt (ed), *Hannes Meyer: Buildings, Projects and Writings,* (Teufen: Verlag Arthur Niggli, 1965), pp: 91-95.

[100] György, Kepes, *Language of Vision,* (Chicago: Paul Theobald publ., 1951 [1944]), p:170.

[101] Initially, Malevich was interested in the four dimensional geometry of the object and had utilized color as an instrument for creating dynamic expression in composition. Malevich's this approach has

> "Thus the world's mind has built the reality of the universe, but, in order to be physically aware of this, it created three principles: gravity, negation and relativity-that is all that it was possible to invent for the time being, and to check the invention by means of observation and experiment...The main basis of the new painterly science has disclosed a new circumstance: time, and has called it the fourth dimension of the object..."[102]

Both Malevich's earlier manifestations and his statements on the Suprematist theory during the 1920s have been influential particularly on the Russian artist-architect El Lissitzky. Lissitzky has conducted works on the architectonic implications of the theory, initiating a shift towards architecture in Malevich's discourse as well. These studies oriented to architecture have continued within the *UNOVIS* group. The scientific language of Suprematist Theory has also been influential in the works of Lissitzky. Re-formulated under the effect of the Relativity Theory during the mid 1920s, this language has constituted the basis of the "imaginary space" theory; becoming widespread among Russian constructivists and diffusing throughout Europe via the International Constructivist Movement.[103]

A different interpretation of the Relativity Theory can be observed in the discourse of the Russian Constructivist Naum Gabo. Gabo believes the expression of dynamic reality can only be achieved through real (not illusionary) movement. He clarifies that the concrete expression of "time" is possible only with kinetic movement; "to bring Time as a reality into our consciousness, to make it active and perceivable we need real movement of substantial masses removable in space."[104]

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changed by the Relativity theory. This transformation has also affected Lissitzky's interpretation of Suprematist theory. Khan-Magedov explains this process as; "the further development of Malevich's Suprematism after the Revolution made geometric planes even more important as elements of pictorial composition, and colour was relegated to a secondary role. Colour-free dynamic Suprematist compositions began to appear in which the organization of space was based on geometric figures. By this stage, Suprematism had virtually lost all connection with painting, as a result of its rejection of colour and its reduction to black and white planimetric figures. In the next stage, volumes and stereometric compositions pointed the way to Suprematist architecture." Khan-Magedov, *Pioneers of Soviet Architecture*, p: 63.

[102] Malevich, "Non-Objectivity" [1922-1925]. Quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, p: 292.

[103] see, chapter 4.

[104] Naum Gabo, "Sculpture: Carving and Construction in Space" (1937). Quoted in Hatch, "Nature's Laws & the Changing Image of Reality in Art &Physics," p: 328. In an interview, in 1956, Naum Gabo expresses his idea over sculpture as follows: "Constructive sculpture is not only three-dimensional, it is four-dimensional in so far as we are striving to bring the element of time into it". "Russia and Constructivism: An Interview with Naum Gabo by Arbam Lassaw and Ilya Bolotowsky" (1956). Quoted in Hatch, *ibid*, p:337

The space theory that the architectural historian Sigrified Giedion has explained in relation with the Cubist Theory can be mentioned as another example of the connection between the Relativity Theory and architecture.[105] Through the concepts of "relativeness, simultaneity and fourth dimension," Giedion expresses the similarities between the concept of space in Einstein's theories and the Cubist conception of space. With reference to the similarities, he develops the assertion of "a new conception of space":

> "**Space in modern physics is conceived of as relative to a moving point of reference, not as the absolute and static entity of the baroque system of Newton.** And in modern art, for the first time since the Renaissance, **a new conception of space leads to a self-conscious enlargement of our ways of perceiving space. It was in Cubism that this was most fully achieved.**
> The cubists did not seek to reproduce the appearance of objects from one vantage point; they went round them, tried to lay hold of their internal constitution. They sought to extend the scale of feeling, just as contemporary science extends its descriptions to cover new levels of material phenomena.
> Cubism breaks with Renaissance perspective. It views objects relatively: that is, from several points of view, no one of which has exclusive authority. And in so dissecting objects **it sees them simultaneously from all sides** – from above and below, from inside and outside. It goes around and into its objects. Thus, to the three dimensions of the Renaissance which have held good as constituent facts throughout so many centuries, **there is added a fourth one – time. The poet Guillaume Apollinaire was the first to recognize and express this change, around 1911**....
> The presentation of objects from several points of view introduces a principle which is intimately bound up with modern life –simultaneity. It is a temporal coincidence that **Einstein should have begun his famous work, *Elektrodynamik bewegter Körper*, in 1905 with a careful definition of simultaneity**."[106]

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[105] Also, Walter Gropius was interested in the connection between the Relativity Theory and (dynamic) architecture. In the essay "Design Topics," Gropius claims that: "Relativity....In fact the designer –if he masters these means – can create illusions which seem to belie the facts of measurement and construction....Many of us still live innocently in a static three-dimensional world of Newtonian conception which has long since collapsed. Philosophers and scientists have replaced that static conception by a dynamic picture of relativity. In today's design terminology, this profound change has been acknowledged by what we call "space-time" relations. Science has discovered the relativity of all human values and that they are in constant flux. There is no such thing as finality or eternal truth according to science....Accordingly, **the element of time, introduced as a new fourth dimension,** begins to penetrate human thought and creation." Walter Gropius, "Design Topics", *Magazine of Art*, December 1947. Quoted in Walter Gropius, (planned and edited by Ruth Nanda Anshen), *Scope of Total Architecture*, (NewYork: Harper & Brothers pbl., 1955), pp: 29-33. Emphases added.
Walter Gropius expresses a similar idea in "Preface" in László Moholy-Nagy, *The New vision and Abstract of an Artist*, (New York: George Wittenborn, 1964 [1947], pp: 5-6.

Art historian Paul Laporte has attempted to found a parallel connection. In "Cubism and the Theory of Relativity" published in 1945, he expresses this connection: "In both, the old mode of paying attention to body or mass while taking the manner of observation for granted, was abandoned. Instead, attention was paid to relationships, and allowance was made for the simultaneity of several views...space and time formed a space-time continuum which, in turn, was but a form of human experience..."[107]

These studies can be evaluated as attempts to define a medium of scientific legitimation for the new language in being constructed in arts and architecture. However, these statements have also been regarded as unrealistic by Albert Einstein himself. Einstein's response to Laporte, dated 1946, can be considered a clear expression of his viewpoint. Einstein's statements are considerable, as they express that there can be no direct connection between the Relativity Theory and its interpretations in arts and architecture.

> "I find your comparison rather unsatisfactory. If I disregard the practical value of science I do see a similarity between the scientific and the artistic activity... a work of art can be experienced and evaluated as such only by those in whom the respective traditional modes of connection are alive. For these modes of connection there is no other sanction than their living existence...
>
> Now, as to the comparison in your paper, the essence of the Theory of Relativity has been incorrectly understood in it, granted that this error is suggested by the attempts at popularization of the theory. For the description of a given state of facts (*Sachverhalt*) one uses almost always only one system of coordinates. This logical demand, however, has nothing to do with how the single, specific case is represented. A multiplicity of systems of coordinates is not needed for its representation. It is completely

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[106] Sigfried Giedion, *Space, Time, and Architecture, The Growth of a New Tradition*, (Cambridge: Harvard University pr., 1967 [1941]), p: 436. Italics are original. Emphases added.
Also, art historian Paul Laporte discusses the relationship between Cubism and Relativity Theory. In the article "Cubism and Science," published in 1949, Laporte claims that: "It may very well be argued…that the introduction of non-Euclidean geometry into physics on the one hand, and the breaking away from occidental perspective on the other hand, are correlative movements in the evolution of the western mind. Furthermore, the new pictorial idiom created by cubism is most satisfactorily explained by applying to it the concept of the space-time continuum. That this explanation is legitimate is at least indicated by Apollinaire's references to non-Euclidean geometry and the fourth dimension…
The integration of non-Euclidean geometry with the fourth dimension is a constituent factor in contemporary physics. This happened in painting (Einstein, Special Theory of Relativity, 1905; Minkowski, 1908; Picasso's first cubist picture, Les Demoiselles d'Avignon, 1906-07). Quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art* , p: 353.

[107] Paul Laporte, "Cubism and Relativity," *Art Journal* 25, no.3 (Spring,1966), p: 246.

> sufficient to describe the whole mathematically in relation to one system of coordinates.
> This is quite different in the case of Picasso's painting, as I do not have to elaborate any further. Whether in this case, the representation is felt as artistic unity depends, of course, upon the artistic antecedents... of the viewer. This new artistic 'language' has nothing in common with the Theory of Relativity." [108]

3.2. The Implantation of the concepts and theories of Biology to Architectural Knowledge

Considering Ernest Haeckel's statements at the turn of the century, Jacob van Uexküll's *biologische weltanschauung* dated 1916 and Raoul Francé's studies during the 1920s; it is possible to state that the biology theories of the early century presented a biocentric world view. In the arts and architecture of this period, the influences of these theories can be observed in various Avant-garde discourses, especially in the works of early Weimar artists and the International Constructivist Movement. The cosmos theories developed in biology at the turn of the century have been used as a scientific source and support for arts and architecture by leading avant-garde artists of the period, including Paul Klee, Wassily Kandinsky, Schlemmer, Adolf Behne, Moholy-Nagy, Mies van Der Rohe, Erno Kallai, Hannes Meyer and El Lissitzky. One of the major reasons of the tendency of architecture towards biocentric epistemology is the universal models that the biology theories present, an their appropriateness to the architectural theories of the period aiming "to organize the unity of life." Moholy-Nagy, a member of Bauhaus, draws attention to the necessity of "the unity of life" in 1923:

> "with its ramifications and its fragmenting action in every field, specialization had destroyed all belief in the possibility of embracing the totality of all fields, the wholeness of life. Since, however, the Gesemtkunstwerk is only an addition, albeit an organized one, we cannot be satisfied with it today. What we need is not the Gesemtkunstwerk, alongside and separated from which life flows by, but a synthesis of all the vital impulses spontaneously forming itself into the all-embracing Gesamtwerk (life) which abolishes all isolation, in which all individual accomplishments

[108] Laporte, *ibid*, p: 246.

> proceed from a biological necessity and culminate in a universal necessity."[109]

In the article, *Abstracte Kunst,* Kandinsky expresses his belief in "the unity of life" as; "Yes I agree that essentially or eventually everything is one unity."[110] It is claimed that the biology theories presenting "the unity of life" should be valid for architecture as well. Art and architecture are considered as parts of this universal system and nature:

> Klee (1923); "The artist today is more than an improved camera...He is a creature within the whole, that is to say, a creature on a star among stars. (He) cannot do without his dialogue with nature, for he is a man, himself of nature, a piece of nature and within the space of nature." [111]
>
> El Lissitzky (1924); "Our work is not a philosophy and not a system for acquiring cognition of nature, it is a limb of nature..."[112]

The common idea is that laws of nature that are valid for all parts of the universal system should also be valid for architecture. In the article *Biologie und Kubismus* published in the Activist journal *Die Tat* in 1916, Behne has argued that the biocentric theorist Jakob von Uexküll's model concerning organic development in nature should be applicable to artistic production.[113] The most common theory that scientifically supports this idea is the work of Austro-Hungarian biologist Raoul Heinrich Francé (1874-1943). The two books that Francé has published; *Die Pflanze als Elfinder* (The Plant as Inventor) dated 1920 and the two volume *Bios: Die Gesetze der Welt* dated 1921 have attracted great attention in the fields of art and architecture.[114] In January

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[109] Quoted in Oliver Botar, "Prolegomena to The Study of Biomorphic Modernism: Biocentrism, L.Moholy-Nagy's "New Vision" and Erno Kallai's Bioromantik," University of Toronto, PhD, 1998, p: 438.

[110] Kandinsky, "Abstracte Kunst", *Die Cicerone* 17, 1925, p:647. Quoted in Botar, *ibid*, p: 327.

[111] Botar, "Prolegomena to The Study of Biomorphic Modernism," p:164.

[112] El Lissitzky, "Nasci", *Merz*, nos.8, 9, Hanover April-July 1924. In Sophie Lissitzky-Küppers, *El Lissitky:Life, Letters, Texts,* (London: Thames and Hudson, 1983), p: 351.

[113] Botar, Prolegomena to The Study of Biomorphic Modernism , p:305.

[114] "Francé spent the winter months in Weimar from 1919 to around 1924, years that the Bauhaus was located there, and a period, which coincided with the peak periods of his literary production, his fame, and his influence, despite the fact that he was ambivalent towards the Bauhaus itself. Sometime between 1923 and 1926, Francé moved back to his native Austria, to Salzburg. The outbreak of war made it necessary for them to flee Croatia (Crotia). Francé returned to Hungary this time, dying in Budapest of his ailments in October of 1943, four months before the German occupation." Botar, *ibid*, pp: 213-214.

1923, Paul Westheim published a part of *Die Pflanze als Elfinder* in *Das Kunstblatt*, the Berlin based art periodical. In the same year, in *Die Aktion*, Raoul Hausmann published an article about Francé. Quotations from the same book have been published in the double issue of Kurt Schwitters' magazine *Merz* dated 1924, which has been co-edited by Lissitzky.[115] In his book *Der Raum als Membran* published during his period at Bauhaus; Siegfried Ebeling emphasizes the importance of Francé's *Technische Leistungen der Pflanzen* for the future of architecture or in other words, the science of architecture.[116]

In its most general expression, Francé's theory is a proposal of a total system in which biological thinking would be applied to all spheres of human endeavor: "the biocentric way of thinking appears now not merely as a possible, but as the only possible way to order experience (...i.e. nature), to make it useful to us and the other parts of the ecosystem we inhabit, in short, as the only possible way to live."[117]

Within the scope of the architectural interest in this system proposal, one of the most significant points is the assertion that laws of nature are also valid in human practice.[118] Moholy-Nagy explains his approval of Raoul Francé's theory, declaring its acceptance within the Bauhaus curriculum: "Francé's bio-technique, which we shall teach in the New Bauhaus, is an attempt at a new science which shows how natural

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[115] *Das Kunstblatt,* vol 8 no.1(January 1923). *Die Aktion*, vol.XIII no.25/26 (15 July 1923). *Merz* vol 2 no. 8/9 (1924).
"The Library of Ludwig Mies van der Rohe assembled between the wars which focused on literature that, as architectural historian Fritz Neumeyer put it, "followed a nature-philosophical-biological conviction" which reflected "that coordination between nature, physics, and philosophy that had evolved in the twenties." "In addition to Francé's mentioned books, Mies owned works of zoology and plant science by Hans Andre, Leopold Bauke, Frederik J.J.Buytendijk, Hermann Drechsler… ın addition to these scientific works, Mies owned the works of the designers who were interested in biocentric epistemology: design theorist Ebeling's *Der Raum als Membran*, and Ernst Kropp's *Wanlung der Form*, a workpopular among members of the Deutsche Werkbund in the 1920s which traced on the naturamorphic analogy in all fields of design, including architecture…" In addition to these main sources Mies also owned many other works connected with the biocentric epistemology in his library. Botar, *ibid*, p:228-229.

[116] "...[Dass] das treffliche Buch von Raoul Francé 'Technische Leistungen der Pflanzen'… von der Architekturwissenschaft der Zukunft grossere Beach-tung finden wird". Siegfried Ebeling, *Der Raum als Membran*, 1926, p: 30. Quoted in Botar, *ibid*, p: 417.

[117] Raoul Francé, "Die Welt als Erleben" (1923), p: 24. Quoted in Botar, *ibid*, pp: 184-185. Francé repeats similar idea in the same essay such as; "Es liegt also in Wesen des Biologi-schen, dass jedes Erlebnis und die Summe aller Erlebnisse: der Bios, als ein Ganzheitskomplex erscheint, der aus Teilen besteht, die einander irgendwie zugeordnet sind". Quoted in Botar, *ibid*, pp: 178-179.

[118] Francé expresses this idea in "Die Pflanze als Erfinder" published in 1920 as; "Das Weltgesetz erzwingt es, dass zuletzt die Technik des Organischen und die des Menschen identisch sind. Quoted in Botar, *ibid*, pp: 395-396.

forms and designs can be translated without great difficulty into human production. This means that nature's ingenious forms can be reduced to technical ones."[119]

The use of biological epistemology in architecture not only provides a scientific basis for the existence of the "dynamic reality" that architecture aims to express; but also contributes to the solution sought for the problem of "dynamic reality." The theories of biology explain the dynamic cycle of nature with a detailed approach exploring even micro-scale details. In arts and architecture, these theories have provided the opportunity to scientifically support the assertions "dynamic reality-(a new) dynamic architecture/art". In this context, artists in search for an expression of dynamism have taken natural dynamic processes as their guide for this solution. They have claimed that characteristics related to natural processes and the natural laws explaining them should be valid for architecture as well. Frederick J. Kiesler's statements in "Art and Nature" can be considered as an example of this approach: "Nature too is nothing but a single great organization of unities. The difference: nature is in flux, art's creations are static. The more art creations give themselves up to the principal of flux, the more they deviate from art and approach nature."[120]

Another characteristic that provided the orientation of architecture towards natural processes was the "autonomous" nature of the creative process. The autonomy within the creative process was considered appropriate for the process of establishing a common universal language in architecture. The ideas of Klee can be considered an example of this approach:

> "The inner impulse is the urge that leads to production... Nature is creative, and we are creative. Nature is creative down to the minutest scale and since the briefest scrutiny suffices to discern that, we too have begun on a small scale, emulating nature, it has been easy, under nature's guidance, to recognize our own creativity."[121]

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[119] László Moholy-Nagy, "The New Bauhaus and Space Relationships (1937)." Originally published in *American Architect and Architecture*, CLI (December, 1937). Quoted in Botar, *ibid*, p: 105.
Sibly Moholy-Nagy, also explaines Moholy-Nagy's relation with Francé in her biography of Laszlo; "he accepted the sharing of his life as biological law because it was *bios* --the interaction of vital impulses, that stimulated man to work for his emotional fulfillment". Quoted in Botar, *ibid*, p:309.

[120] Kiesler, "Art and Nature," 1930, in S. Gohr and G. Luyken (eds), *Frederick J.Kiesler: Selected Writings*, (Verlag Gerd Hatje, Sttutgard, 1996) p: 20.

[121] Quoted in Botar, "Prolegomena to The Study of Biomorphic Modernism," p: 341.

Frederick J. Kiesler establishes similarities between the creativity in art and nature; "...both *(art and nature)* have the same laws of creation, the organization of many diverse elements into an unshakable unit."[122] In a similar context, Moholy-Nagy draws attention to the necessity of questioning functionalism through analogies established with natural processes; explaining his idea with reference to Francé's idea on the autonomous processes in nature:

> "every process has its necessary form, which always results in functional forms. They follow the law of the shortest distance between two points; cooling occurs only on surfaces exposed to cooling; pressure only on points of pressure; tension on lines of tension; motion creates for itself forms of movement –for each energy there is a form of energy."[123]

Schwitters conceives the work of art as a component of the natural process. He focuses on this idea as he says: "If you can see the essence of a work of art then it appears to you...as a unity...as a thing that grows out of itself...and which does not differ in essence from other...entities in Nature."[124]

Within the scope of the orientation of architecture towards theories of biology; another issue of concern has been the expression and aesthetization of the "new dynamic reality" that architecture aimed to construct. Based on the dynamism of nature, architectural discourses have focused on the search for dynamic form; conceiving natural forms created through natural processes as the source of the solution for architecture. In "*Iskusstvo v tekhnika,"* Vladimir Tatlin draws attention to the formal problems in Constructivist architecture and proposes to take natural forms as a basis in order to overcome these problems:

> "The "Constructivists," also operated with materials, but secondarily, for the sake of their formal tasks... "Constructivism", in inverted commas, did not reckon in its work with the organic connection between material and concentration...in the qualitative sense there really exist certain other

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[122] Kiesler, "Art and Nature," 1930, in Siegfried Gohr and Gunda Luyken (eds), *Frederick J.Kiesler: Selected Writings*, p: 20.

[123] Moholy-Nagy, "Design Potentialities" (1944), in Richard Kostelanetz (ed.), *Moholy=Nagy an Anthology*, p:82. Originally published in Paul Zucker (ed.) *New Architecture and City Planning: A Symposium*, (New York: Philosophical Library, 1944).

[124] Kurt Schwitters, "Art and the Times," *Ray*, 1927. Quoted in Botar, "Prolegomena to The Study of Biomorphic Modernism," p: 297.

> variations of curved forms and tension in the material in this field than there do in the forms of architecture.
> I believe, however, that the use of curved surfaces, and experimental work on this, are also inadequately developed... [therefore]
> The lack of variation in the forms...leads to a limitation in the use of materials...(An artist's] duty to solve the technical problem with the help of new relationships in the material...; he will try to discover a new, complicated form...
> I have selected the flying machine as an object for artistic composition, since it is the most complicated dynamic form...My apparatus is built on the principle of utilizing living, organic forms."[125]

Architectural discourses have considered biocentric epistemology as an instrument to establish the unity between "life and art/architecture". Taking the processes of "natural life" and their order of operation as a model, all studies have tried to conceptualize architecture as a part of this natural process – life. Architectural discourses of the period opposed the absolute domination of machinery, which was seen as an obstacle in the establishment of unity. With the belief that technology is a part of the natural process and thus a part of the whole; concepts such as "biomechanic" and "biotechnic" have been formulated in some discourses. At this point, especially "the unitary nature of technology" theory within the Biocentric System proposal of Francé [*Bios*][126] provided a scientific ground of legitimization for architecture. This approach can be observed in "Language of Vision" by Kepes:

> "Having achieved the scientific mastery of...nature and its ordering into a one-sided technological dimension, man was searching for renewed contact with the pulsation of the dynamic forces of nature processes. He recognized that scientific technological progress needed to be reevaluated in biological

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[125] Tatlin, "Iskusstvo v tekhnika (Art Out into Technology) (1932)", in Stephen Bann, *The Tradition of Constructivism* (New York: The Vıkıng Press, 1974) pp: 172-174. Emphases added. First published in the catalogue *Vystavka rabot zasluzhennogo deyatelya iskusstv* ,1933. "The text was written in 1932 to explain and justify the new glider, or Letatlin (from the Russian letat: "to fly"), which was being exhibited in Moscow together his works." Bann, *ibid*, p: 171.

[126] "Francé maintained the unitary nature of technology: all *Technik*, including that found in nature and that produced by humans, is part of the same universal natural system of perceived "nature": the Bios. Francé maintained, furthermore, that the Bios is built up of combinations of seven basic gepmetric forms, or Grundformen: crystals, spheres, planes, rods, ribbons, spirals, and cones." Botar, *Prolegomena to The Study of Biomorphic Modernism,* p: 409.
"There are only seven forms! They are the basis of architecture, of the parts of an engine, of crystallography and chemistry, geography and astronomy, of art, of industry –of the whole world. And the world teeming with life has produced no other possible forms." Raoul Francé, *plants as Inventors,* (New York: Albert and Charles Boni, 1923), p:11. Quoted in Botar, *ibid*, pp: 409-410. Originally published as *Die Pflanze als Erfinder* (Stuttgart: Kosmos, Gesellschaft der Naturfreunde, 1920). Emphases added.

> dimensions...The artist rediscovered nature. But he turned away from the naturalistic representation of the forms of the trees, flowers, and animals, and took as his new subject-matter the visible processes of the growth."[127]

El Lissitzky and Hannes Meyer are the two important figures whose works can be considered as examples of how biocentric epistemology has taken part in architectural discourses. Aiming to achieve dynamism in architecture, Lissitzky has experienced with the dynamic realities in nature. In his functionalist – constructivist theory, Meyer has tried to formulate a unity that accepts "building process" as a part of the natural order.

3.3. The Implantation of Scientific Methodology to the Architectural Knowledge

The methodological orientation of architecture towards natural sciences can be considered a fundamental shift in the position of architecture, from an artistic discipline to a field of science. Starting from the mid 1920s, initially as a part of the Constructivist discourse; many avant-garde artists including Alexei Gan, Moisei Ginzburg, Vesnin and Rodchenko from the Soviet Union; Hannes Meyer and Hans Witter from Germany, Karel Teige, Karel Honzik and Vit Obrtel from Czechoslovakia; Mart Stam and J.J. Oud from Holland. As a common general assertion, these discourses focus on the need to reorganize the society against the chaotic social structure of the post-war period. In architecture, this manifestation has occurred as a belief that an absolute, universal and homogeneous approach should be formulated in order to respond to the intensive construction activity. Subsequently, scientific approach has been adopted as a solution of these architectural problems, followed by the formulation of the assertion "architecture as science". This assertion involves the definition of the architect as a scientist and the work of architecture as an experimental laboratory study. In the process of achieving its fundamental objective of constructing a total and unitary society, architecture has adopted the fundamental features of science such as exactness, objectivity and rationality in order to improve its social validity. In the editorial statement of *Vesch/Gegenstand/Objet*, this idea has been expressed as; "The new art is

[127] Kepes, *Language of Vision*, p:196.

founded not on a subjective, but on an objective basis. This, like science, can be described with precision and is by nature constructive. It unites not only pure art, but also all those who stand at the frontier of the new culture."[128]

This approach can be most explicitly observed in the Soviet Constructivist discourses. The general assertion is that new architecture should proceed with the program of scientific functionalism formulated within the context of Constructivist theory. In other words, 'constructivity' and 'functionality' are the concepts that have confirmed "the organization of a new way of life" as the basic mission of the architect. One of the representatives of Constructivism in Europe, Dutch Mart Stam explains this belief as:

> "Each new task gives us the chance to abandon aesthetic considerations, to forget beauty of external proportion and to study the project from a purely functional point of view...Best things are always those remarkable only for their unpretentious righteousness. The important element in any undertaking is not that which betrays its creator, the designer, but only what is functional and impersonal."[129]

In parallel with these ideas, the definition of "architecture as art" has been rejected. Considering the framework for the social responsibilities of the architect, it has been claimed that the architect cannot act as an artist with formal considerations. In its most concrete form, these ideas have turned into manifestations and slogans in *Konstruktivizm* by the Russian Constructivist Alexei Gan:

> "We declare uncompromising war on Art!
> DEATH TO ART!"[130]

Within this approach, it has been claimed that the working process of an architect should be identical with the working process of a scientist in order to achieve "scientific functionalist" solutions. This statement can be considered as an attempt to formulate a

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[128] Statement by the Editors of *Vesch/Gegenstand/Objet,* De Stijl, vol.V, no.4, 1922. Quoted in Bann (ed), *The Tradition of Constructivism*, p:63.

[129] Mart Stam, "Op zoek naar een abc van het bouwen (In Search of the ABC of Building)", in *Het Bouwbedrijf*, Amsterdam, no.3 (1926). Quoted in Sima Ingberman, *International Constructivist Architecture, 1922-1939*, (Cambridge, MA: The MIT press, 1994) p:20.

[130] Alexei Gan, *Konstruktivizm*, (Tver, 1922). The excerpt from *Konstruktivizm* is translated in Bann (ed.), *The Tradition of Constructivism*, pp: 33, 36.

universal definition of the creative process in architecture. Alexei Gan explains the adoption of scientific and experimental methodology in architecture as; "From laboratory work the constructivists have passed to practical activity."[131] In his article "Results and Prospects" Moisei Ginzburg expresses a similar idea: "Questions of architectural design within the terms of constructivism must at all costs be raised and analysed under laboratory conditions."[132] In "*Konstruktivizm kak metod laboratornoi i pedagogicheskoi raboty*"; Ginzburg explains the role of scientific methodology in Constructivist Architecture:

> "Methodologically, in order to subject the whole productive process of the architect to evaluation, Constructivism has recourse to many other scientific disciplines and uses the laboratory method, of separating out one reaction, that is of taking one integral process'- in today's jargon, one subsystem- into temporary isolation from the others, in order to get the most favorable conditions for analyzing it."[133]

In one of their statements, the Russian Constructivist group *OSA* repeat that modern architecture has accepted scientific research as its working method; explaining this condition in relation with the social role of architecture: "OSA brings together people closely bound by a single ideology and conducts collective-theoretical scientific research and practical work on a well-defined plane in a struggle against inertia and survivals from the past." [134]

Czech architectural historian Karel Teige, with his assertion "Architecture as pure science"; and the Swiss architect Hannes Meyer, with "the theory of new building" he tries to achieve through the "Scientization of Architecture" can be considered as significant representatives of this approach in Europe.

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[131] Gan, *Konstruktivizm*, in Bann, *ibid*, p: 42.

[132] Moisei Ginzburg, "Results and Prospects" (1927), in Tim & Charlotte Benton, with Dennis Sharp (eds), *Form and Function*, (Norwich: Fletcher & Son ltd., 1980), p:160.

[133] Moisei Ginzburg, "Konstruktivizm kak metod laboratornoi i pedagogicheskoi raboty (Constructivism as a method of laboratory and teaching work), "Sovremennaia arkhitektura- SA", (Contemporary architecture), 1927. Quoted in Catherine Cook, *Russian Avant-garde theories of art, architecture and the City*, (London: Academy ed, 1995), p:102. Emphases added.

[134] extracts from OSA's statement to the Art Department, Chief Administration for Science, People's Commissariat for Education, 1926. Quoted in Khan-Magomedov, *Pioneers of Soviet Architecture*, p: 595.

The effort to establish a unitary and universal language in architecture is common to all forms of orientation of architecture towards natural sciences. Subsequent to the social role that architecture has acquired during the post-war period and the "Reconstruction of Revolutionary Architecture" assertion of left-wing architects; this effort has transformed into a radical discourse. Within the context of Constructivist architecture, this approach has been influential on the avant-garde discourses in Soviet Union as well as Central and Eastern Europe.

CHAPTER 4

SCIENTIFIC APPROACH IN THE LEFT-WING DISCOURSES OF "NEW" ARCHITECTURE IN MIDDLE AND EASTERN EUROPE, 1914 - 1945

4.1. Application of Scientific Approach to the Left-wing Discourses of Architecture in Europe between 1914 – 1945

During and after the World War I, a revolutionary social context in Central Europe[135] has come into existence to serve as a basic means for the left-wing avant-garde artist to introduce their own artistic discourse to a larger audience.[136] Under the influence of Russian Communist Revolution in 1917 and later the 1918 Revolution in Germany, the idea of the "revolutionary art-architecture" has appeared as a basic argument in the studies/discourses of those leftist artists[137] in some Eastern European

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[135] "The end of World War I in November 1918, spelling the fall of the German and the Austro-Hungarian empires, created revolutionary situations in Germany and Hungary. (The states of Czechoslovakia, Poland, and the Kingdom of Serbs, Croats, and Slovenes [renamed the Kingdom of Yugoslavia in 1929] were, among other new states, also established in this historical instance.) The 1918 revolution in Germany leading to the establishment of the Weimar Republic and the Hungarian Commune in 1919 were both connected to the Russian Revolution of 1917 through the participation of Communists and by widely circulating leftist ideas." Éva Forgács, "Art and Revolution" in Timothy O. Benson and Éva Forgács (ed), *between worlds: a sourcebook of central european avant-gardes, 1910-1930*, p: 201.

[136] Susan Buck-Morss, *Rüya Alemi ve Felaket, Doğuda ve Batıda Kitlesel Ütopyanın Tarihe Karışması*, pp: 56-81.

[137] John Bowlt summarizes the effects of October Revolution on Russian art such as; "The revolution of October 1917 affected Russian art immediately in two ways: on the one hand, it undermined or destroyed all cultural groupings; on the other, it gave impetus to the leftist currents that, in certain governmental circles, were accepted as both the herald and the mirror of the social metamorphosis". Bowlt, *Russian Art of the Avant-Garde*, p: xxxiii.
Also, Khan-Magedov explains how the revolutionary approach in art/architecture was developed after 1918; "In 1918, Lenin put forward a plan for monumental propaganda: art was to be used for agitational purposes and monuments were to be erected to prominent revolutionaries and cultural figures in accord with the demands of the revolutionary masses. Lenin proposed to involve the creative intelligentsia in producing an agitational art with a new content. 'The Streets are our brushes. The squares, our palettes', declared Mayakovsky at that time. Many painters, architects, sculptors and

countries including Hungary, Poland, Czechoslovakia together with the ones in Russia and Germany where the revolutions took place. Referring particularly to the situation in Soviet Union, Swiss architect Hans Schmidt explains the situation as: "The Victory of the October Revolution brought to the forefront a number of young architects who identified with the aims of the Revolution. Taking up the cudgel in the fight with the older generation of architects they apparently were bringing about the triumph of modern architecture." [138]

Before the First World War, the new creative trends were already been formulated as a reaction to the past. The art theories such as expressionism, cubism, futurism, which appeared at the end of 1900s, has been defined as "the rejection of the past" and "a new cult"; therefore, these art theories has become the center of "a new language in architecture" for the avant-garde artists. As explained in Chapter 3, since the end of nineteenth century, mentioned art theories have adapted the concept and theories, introduced by the scientific and technological discoveries, as references rather than the visible surface of nature. Consequently, these concepts and theories has reinforced the 'new architecture' discussions of the left-wing architects during and after the First World War. They have been taken as the origin for the 'new' by the avant-garde groups. With the experience of industrialization and a faith in scientific progress, those groups has attempted to achive "a universal cultural and social renewal." For instance, Filippo Marinetti's "Manifesto of Futurism" (1909), based on the scientific and technological advances, argues that "he past static concept of time and space" should be abandoned and, he replaces it with "dynamism." Besides, in "The Manifesto of Futurist Architecture" (1914), Antonio Sant'Elia expresses his belief that "dynamism" can be practiced with assistance of machinery. As a result, with the project he names as 'Futurist City,' he attempts to create the revolutionary changes in cultural life through science and technique: "We must invent and rebuild the *Futurist* city: it must be like an immense, tumultuous, lively, noble work site, dynamic in all its parts; and the Futurist house must be like an enormous machine…Everything must be

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poets involved themselves enthusiastically in designing decorations for public festivals, streets and squares, mass theatrical performances, propaganda trains etc. the decorations in Moscow's Red Square in Petrograd by Altman, and the streets and squares of Vitebsk by Chagall and Malevich were highly effective". Khan-Magomedov, *Pioneers of Soviet Architecture*, p: 14.

[138] Hans Schmidt, "The Soviet Union and Modern Architecture". From: *Die Neue Stadt*, VI-VII, Frankfurt/M. 1932, p:146-48, in El Lissitzky, "*Rußland, Die Rekonstruktion der Architektur in der Sowjetunion,"* 1930. Translated by Eric Dluhosch, *Russia: An Architecture for World Revolution*, (London: Lund Humphries, 1970), pp: 218-222.

revolutionary. We must exploit the roofs, utilize the basements…"[139] Futurist theory has been widely regarded as a destructive and negative trend. Accordingly, it has become a main argument for those architects aiming revolutionary changes in cultural life. Besides Futurist theory, new trends such as Dutch Cubism, German Expressionism, Malevich's Suprematism, Mondrian's Neo-Plasticism, and Cubo-Futurism have been influential in the Middle and Eastern European architecture.

After the First World War, the October Revolution in Russia has provided architecture with an official legitimacy in its revolutionary approach and the idea of a coming world revolution promulgated by the Soviet Russian state has become influential in the new discourses of architecture. With the argument of "a new world-a new architecture," a new architectural expression of a new world and the endeavors in constructing "a new social order/a new way of life" has emerged in architectural discourses. Consequently, the effort of implantation of the scientific theories, concepts or methods to architectural knowledge serves these two purposes. On the other hand, "revolutionary" scientific theories and concepts has been recognized as the main elements of the architectural language to express "the new world." Concurrently, scientific methods have been seen as the basic tools for offering rational solutions for the primary problems of architecture -economic chaos, a drastic shortage of building materials, a lack of funds, an acute lack of housing, the collapse of the urban municipal economy- which are the results of the First World War.

Since 1920s Constructivism has became the most important movement in Middle and Eastern Europe architectures in that it enables avant-garde architects to question the idea of "revolutionary architecture" in its most radical terms. In the Foreword of the catalogue of the First Exhibition of Russian Art, David Shterenberg states that:

> "the Revolution threw upon new avenues for Russia's creative forces. It gave the artist the opportunity to carry this ideas into the streets and the squares of the towns and thus to enrich his vision with new ideas. The decoration of towns, so changed by the Revolution, the demands of the new architecture naturally called into existence new forms of creation and construction."[140]

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[139] Antonio Sant'Elia/Filippo Tommaso Marinetti: Futurist architecture, 1914, in Ulrich Conrads (ed), *Programs and Manifestoes on 20th century Architecture*, p: 36.

[140] David Shterenberg, "Foreword", in (Exhibition catalogue, Berlin: Van Diemen Gallery, 1922). Translated by Nicholas Bullock in Bann, *The Tradition of Constructivism*, p: 71.

The remarks which appears in one of the editorial texts in *SA*, the publishing organ of OSA, clarifies it as;

> 'There is no other field of artistic labour in which the events of October produced as decisive, as categorical a revolutionary change as in architecture. The October Revolution embodied the significance of a new historical phenomenon of unprecedented sweep and scale and was destined to demolish by its very nature the outdated principles of pre-Revolutionary architecture...
>
> The abolition of private ownership of land provided the widest possible opportunities for the new planning of cities and settlements, while the generally positive and creative trends introduced by October brought forth the idea of Constructivism as an idea of life-building and life-organizing labour, in place of the ornamental and decorative varieties of old art."[141]

The quotation, briefly explains the aim of constructing a universal architecture which can organize and constructs the social life while creating "the new image of the world": "The architect will then feel himself to be not a decorator of life, but its organizer."[142] To achieve such a unitary system, architecture primarily introduces various unities that necessitate the system above mentioned; the unity in art/architecture-life, life-culture-art/architecture, technology-culture-art, art-society...

> "The artists of today have been driven the whole word...and therefore have taken part from an intellectual point of view in this war against the domination of individual despotism. They therefore sympathize with all who work to establish international unity in life, art, culture, either intellectually or materiality." [143]

> "Organize according to real life!
> Plan the victorious procession of the Revolution!
> ...That only October has given us new, tremendous ideas that demand new artistic organization." [144]

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[141] Alexander Vesnin and Moisei Ginzburg(eds), Editorial on 'The Tenth Anniversary of October,' (SA, 1927, nos.4-5, p:111). Quoted in Khan-Magomedov, *Pioneers of Soviet Architecture*, p: 595.

[142] Moisei Ginzburg, *Stil'i Epokha*, 1924. Translated as *Style and Epoch,* Anatole Senkevitch, (Cambridge: the MIT press,1982), p:113.

[143] Manifesto 1 of *De Stijl* 1918, in Conrads, *Programs and Manifestoes on 20th century Architecture*, p: 39.

[144] *Lef* Declaration: "Tovarishchi, formovshchiki zhizni", *Lef* (Moscow), no.2, April-May 1923, pp: 3-8, in Russian, German, and English. Translated as "Comrades, Organizers of Life!", in John Bowlt, *Russian Art of the Avant-Garde*, pp: 199-202. This translation is based on the English version, pp: 7-8.

> "The introduction of art into life...the inseparability of the problems of art and the problems of society." [145]

The assertions clearly indicate that architecture has undertaken the duty of organizing this unity through a description of a "unitary world." Thus, the endeavor of architecture to create an objective language can be seen as a struggle for constructing a unique system to organize this unity. Similarly, avant-garde architects and artists, in order to achive such a system, recognizes the vitality of the revolutionary and universal characteristics of natural scientific knowledge. Scientific methodology is also recognized as a path/method for architecture/art. This view in the discourses of left-wing architects, especially in regard to the Russian Constructivist movements, is also reflected in the discourses in Middle and Eastern Europe by the congresses, journals and the international activities of the artists.

4.2. The rising "scientification" in Middle and Eastern European Architectures

During and after the World War I a number of different collaborative groups of left-wing architects and artists has appeared in Middle and Eastern Europe. They have expressed the argument of the revolutionary art/architecture in different aspects.

In Germany, The *Arbeitstrat*, established in late 1918, has expressed the idea of eradicating the boundaries between architecture, painting and sculpture.[146] The *Novembergruppe* (November group), founded in Berlin in 1918, has welcomed all modern art theories such as cubist, futurist, expressionist. The *Novembergruppe* has attempted to offer artists an active role in the organization and building of cultural life.[147] Dutch group the *De Stijl*, founded in 1917, has come up with a new kind of visual art, Neoplasticism, in the early periods. The painters in collaboration with

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[145] Editorial from Blok (Warsaw), no.6-7, 1924, translated in Bann, *The Tradition of Constructivism*, p:106.

[146] Éva Forgács, "Art and Evolution", in Timothy O. Benson and Éva Forgács (ed), *between worlds*, p: 201.

[147] Éva Forgács, "Art and Evolution", in Timothy O. Benson and Éva Forgács (ed), *ibid*, pp: 201-202.

architects has attempted to transfer the tectonic or structural qualities of painting into three-dimensional space. In Soviet Union, Futurists has gathered around the *Pervy zhurnal russkikh futuristov* (First Journal of Russian Futurists), in 1914. Their revolutionary approaches has influenced contemporary artistic activities, including architecture, especially in regard to the role of art in the new social order and the solution of formal problems.[148] The *UNOVIS* group, established by Kazimir Malevich, has operated during the years 1919-1922. *UNOVIS* members has attempted to practice Suprematist ideas in architectural design.[149] *Sinskulptarkh* (1919-20), renamed as *Zhivskulptarkh* at the end of 1919, has aimed at synthesizing all spatial arts. The works of *Sinskulptarkh* artists may be regarded as an attempt to introduce the methods of Cubist sculpture into architecture in the search for new means of expression apart from that of the older classicists.[150] In Czechoslovakia, Cubists has founded *Tvrdošíjní* (Stubborn Ones or Obstinates) in 1918. Many artists of the group are in fact prospective members of *Devětsil*, which is believed to be the most remarkable avant-garde group in international constructivist movement.[151] Lajos Kassák, a forerunner of the Hungarian avant-gardes in 1915, has started an extremely political avant-garde periodical *A Tett* (The Action) in which he has reflected his futurist views. *Ma* (Today), which Kassák has started in 1916 as a replacement of *A Tett* (The Action), has reflected his visions of Cubism and Expressionism together with his futurist remarks. In 1920s, the journal has become one of the main speakers of international Constructivism.[152]

Since 1920s, Constructivism has turned out to be the main revolutionary architecture movement in Russia. During 1920-1924, *INKhUK* (Institute of Artistic Culture) and *VKhUTEMAS* (the Higher State Artistic Technical Studios) in Moscow has stood as two important centers where the Constructivist theory has been formulated. The members of both institutions have attempted to emerge a new aesthetic language

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[148] Khan-Magomedov, *Pioneers of Soviet Architecture*, p: 61.

[149] Khan-Magomedov, i*bid*, p: 67.

[150] Khan-Magomedov, *ibid*, pp: 67-69.

[151] Karel Srp, "*Tvrdošíjní* [Obstinates] in Prague," in Timothy O. Benson and Éva Forgács (ed), *between worlds*, p: 195.

[152] Éva Forgács, "The Activist in Budapest," in Timothy O. Benson and Éva Forgács (ed), *ibid,* p: 149. Forgács, "Between Cultures: Hungarian Concepts of Constructivism," in Timothy O. Benson, *Central European Avant-gardes: exchange and transformation, 1910-1930* (Cambridge, MA: The MIT press, 2002) p: 150.

appropriate to the new social needs and ideological situation. The first Working Group of Constructivists has appeared in March 1921 with Aleksei Gan at INKhUK. The artists of the group, Gan, Alexander Rodchenko, Varvara Stepanova, Vladimir and Georgy Stenberg, Konstanin Medunetsky, Karl Ioganson, has aimed at "promoting the Communist expression of material values. The declared intention is to pass from laboratory work to real activity and practical experimentation."[153] Alexander Vesnin has started to formulate the basic principles of architectural Constructivism in his studio in the *VKhUTEMAS*. The early Constructivist architecture later has become based on the concepts of his non-presentational compositions.[154] The publishing of Aleksei Gan's book *Konstruktivizm* in 1922 can be regarded as the first attempt to formulate the constructivist ideology.[155]

Figure 4.1. Cover of Alexei Gan's *Konstruktivizm* (Constructivism), (Tver, 1922). Designed by Gan.
(Source: Bann 1974), p: 34.

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[153] Khan-Magomedov, *Pioneers of Soviet Architecture*, p: 147.

[154] Khan-Magomedov explains that "(for Vesnin) the artist should neither represent nor interpret existing objects, but should create things that were new; that every object should structure perception; that the order of an object was determined by the rapid tempo of modern life and its mathematically accurate rhythm, by its component materials and by its effectiveness; and that whatever an artist made should be construıctive without any vestige of representation." Khan-Magomedov, *ibid*, p: 153.

[155] Bowlt, *Russian Art of the Avant-Garde*, p: 217; Bann, *The Tradition of Constructivism*, p:33.

Afterwards, Russian Constructivism happens to be "antiart." Towards the mid 1920s, Constructivist avant-gardes such as Alexander Vesnin, Moisei Ginzburg, and Viktor Vesnin has criticized the perception of Constructivism for being a purely external style, and by the end of 1925, they has started *OSA* (Union of Contemporary Architects). In *OSA*'s periodical, *SA, Sovremennaya architektura* (Contemporary Architecture), they have expressed the re-formulated principles of the Constructivist theory. Furthermore, they have explained their approach that bases "the scientific methodology" in the center of the "architectural theory" quite radically. By organizing the first exhibition in 1927, the first conference in 1928 and the first congress in 1929, they have had a chance to introduce their ideas to larger audiences.[156]

By 1922 the idea of Constructivism has begun to spread into the Central and other East European countries. In that period, with the organization of various congresses, meetings, exhibitions, and periodicals, the avant-garde names has had a chance to express their common opinions either individually or in various discussion groups. Thus, the endeavor to construct a universal language in the scope of Constructivist discourse has been carried out in an international platform. The Congress of International Progressive Artists, organized by the Young Rhineland group in May 1922 along with the other groups including *Dresden Secession*, *Novembergruppe*, in Düsseldorf, is a key event in the formation of International Constructivism.[157] Russian Lissitzky, Dutch Van Doesburg and German Hans Richter, who are among the participants in the congress, are also the ones to form the International Faction of Constructivists. The congress papers (Statements by the editors of *Veshch / Gegenstand / Objet*, by the De Stijl Group, by the Constructivist Groups of Rumania, Switzerland, Scandinavia, and Germany, by the International Faction of Constructivists) has been published in *De Stijl* after the congress expresses the aims of that new tendency. As commonly stated in the studies, while the fundamental characteristics of science, "universality, reality, objectivity" are validated for architecture/art, it is also believed that the aims like " organizing the whole life, creating the new way of life, creating the new reality…" can be fulfilled by artists only if scientific working methods are used.[158]

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[156] Khan-Magomedov, *Pioneers of Soviet Architecture*, pp: 156-194.

[157] Among the prominent artists attending in the Congress were Wassily Kandinsky, Theodor Däubler, Oskar Kokoschka, Else Lasker-Schüler, Stanislaw Kubicki... "A Short Review of the Proceedings," from *De Stijl*, vol.V, no.4, 1922. Translated by Nicholas Bullock, in Bann, *The Tradition of Constructivism*, p: 59.

For instance; Hans Richter, as a representative of the constructivist groups of Rumania, Switzerland, Scandinavia, and Germany, states that:

> "we should choose exhibitions, magazines, and congresses as a means of reorganizing society. But if we are so far advanced that we can work and make progress collectively, let us no longer tack between a society that does not need us and a society that does not yet exist, let us rather change the world of today. In the sureness of our mission we represent a real force that has yet to be felt."[159]

After the congress different avant-garde groups has come up with their own manifesto as a response to the statements in the congress. The manifesto, "*A bésci MA-csoport állásfoglalása ahaladó művészek első, Düsseldorfban tartott kongresszusához* (The Stand taken by the Vienna Ma Group toward the first Düsseldorf Congress of Progressive Artists),"[160] published in the Hungarian magazine *MA*, is one of those manifestos to be mentioned.

El Lissitzky has played a crucial role in the introduction of Constructivist theory into Central and other East European countries. He has arrived in Berlin from Moscow in the end of 1921. He and the Russian writer Ilya Ehrenburg has edited the Berlin magazine *Veshch/Gegenstand/Objet* whose two issues appeared in March and May 1922. The journal which has included parallel texts in Russian, German and French has been used as a means of propaganda of Constructivism in Berlin. In addition to the announcements/advertisements for various art activities, featuring the interviews with Cubist Fernand Legér and Italian Futurist Gino Severini, and the essays of Theo van Doesburg, Corbusier, and Punin, the editorial in the first issue of journal has defined the responsibility of such a publishing as: "Objet will take the part of constructive art, whose task is not to adorn life but to organize it."[161] The other important publication of

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[158] The statements appeared in *De Stijl*, vol.5, no.4, 1922. translated by Nicholas Bullock, in Bann, *ibid*, p:63-69.

[159] "Statement by the constructivist groups of Rumania, Switzerland, Scandinavia, and Germany," originally published in *De Stijl* vol.5, no.4, 1922. Translated by Nicholas Bullock, in Bann, *ibid*, p: 67.

[160] This statement originally published in *Ma*, vol.8, no.8(August 30, 1922). Translated by John Bátki as "The Stand taken by the Vienna Ma Group toward the first Düsseldorf Congress of Progressive Artists", in Timothy O. Benson and Éva Forgács (ed), *between worlds*, pp: 400-401.

[161] El Lissitzky and Ilya Ehrenburg, "The Blockade of Russia Is Coming to an End," An editorial in *Veshch / Gegenstand / Objet*, (Berlin), no.1-2, March-April 1922. Translated in Bann, *The Tradition of Constructivism,* pp: 53-57.

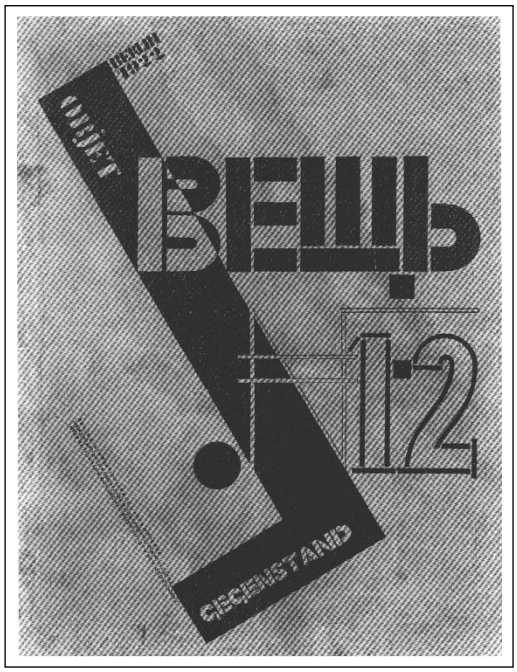

Figure 4.2. Cover for *Veshch-Gegenstand-Objet*, vols. 1-2, Berlin, 1922. Cover and typography by El Lissitzky. (Source: Tupitsyn, 1999), p:10.

Figure 4.3. First page of Veshch-Gegenstand-Objet, no.3, 1922. (Source: Lissitzky-Küppers, 1980), p: 166.

Constructivists in Berlin is the magazine *G-Gestaltung* (Formation) started by Hans Richter in July 1923. The first issue of the journal has featured Doesburg's article, "Elemental Formation." The third issue has been focused on the problems of international constructivism: industrialization of production, the standardization of production problems, universality.[162]

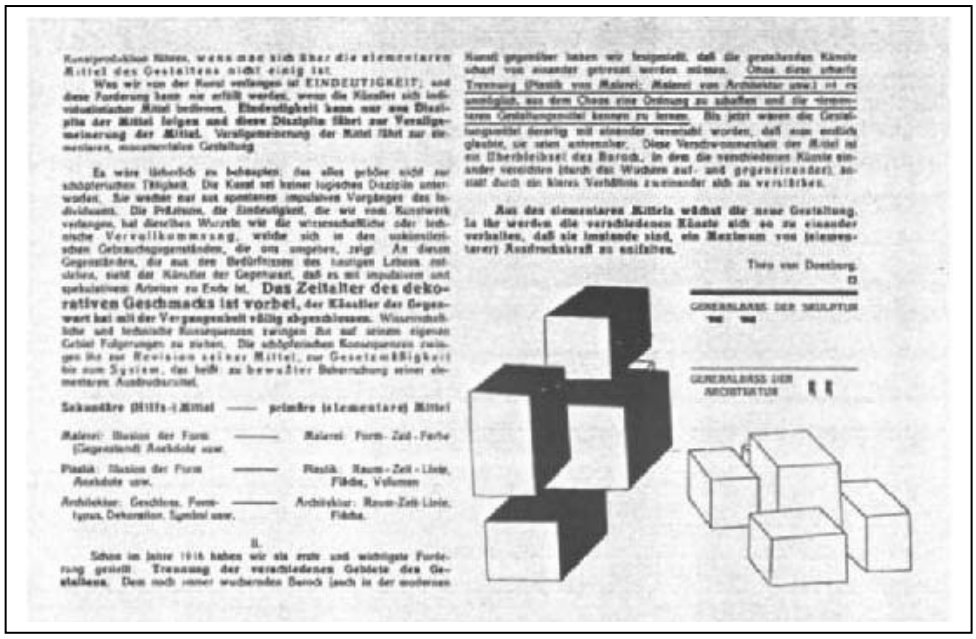

Figure 4.4. Page from the first number of G, July 1923, showing part of Van Doesburg's manifesto "Elemental Formation."
(Source: Bann 1974), p:92.

Erste russische Kunstausstellung (The First Exhibition of Russian Art), held in November 1922, at the Galerie van Diemen in Berlin, is one of the most important organizations in regard to introducing the work -posters, architectural designs, paintings, constructions- of Russian avant-gardes such as Gabo, Tatlin, Rodchenko, Lissitzky, to the West. The exhibition was watched and well was received internationally. The published comments of the exhibition in the Berlin magazines *Das Kunstblatt*, *Die Weltbuhne*, the Hungarian magazines *Ma*, *Akasztoott Ember* (Hanged Man), *Egység* (Unity), and Yugoslavian magazine *Zenit* are only just a few of the

[162] Bann, *ibid*, p: 90. Editorial from *G* (Berlin), no.3, June 1924. Translated by Stephen Bann, *ibid*, pp: 93-96.

remarks to be published in the international press.[163] Afterwards, the same exhibition has been moved to Amsterdam to help new connections between Van Doesburg, De Stijl Group members and Russian artists. Similarly, another important event is the exhibition of El Lissitzky's Proun Space, at *The Grosse Berliner Kunstausstellung* (Great Berlin Art Exhibition) in 1923.

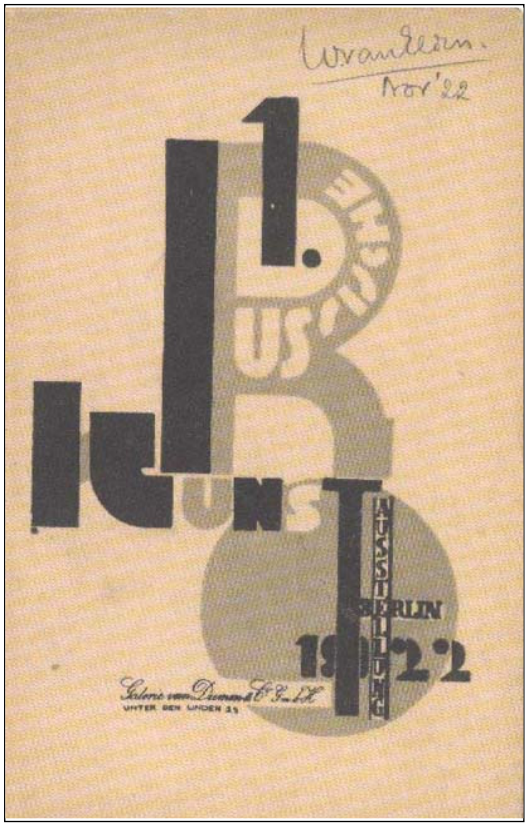

Figure 4.5. Program cover for *Erste russische Kunstausstellung* (The First Exhibition of Russian Art), held in November 1922, at the Galerie van Diemen in Berlin.
(Source: Lissitzky-Küppers, 1980).

[163] Paul Westheim, "Die Ausstellung der Russen," *Das Kunstblatt* (November,1922).Translated by David Britt as "The Exhibition of Russian Artists" *in* Timothy O. Benson and Éva Forgács (ed), *between worlds*, pp: 405-408.
Adolf Behne, "Der Staatsanwalt schüzt das Bild," *Die Weltbuhne,* no.47 (November 23,1922). Translated by Don Reneau as "On the Russian Exhibition", in *ibid*, p: 408.
Lajos Kassák, "A berlini orosz kiállításhoz," *MA*, no. 8, (December 1922). Translated by John Bátki as "The Russian Exhibit in Berlin", in *ibid*, pp: 409-410.
Ernő Kállai, "A berlini orosz kiállitás," *Akasztoott Ember,* vol.2 (February 15, 1923). Translated by John Bátki as "The Russian Exhibit in Berlin" in *ibid*, pp: 410-412.
Alfréd Kemény, "Jegyzetek az orosz művészek berlini kiállításhoz," *Egység*, (February 4, 1923). Translated as "Notes to the Russian Artists' Exhibition in Berlin," in *ibid*, pp: 413-414.
Branko Ve Poljanski, "Kroz rusku izložbu u berlinu," Zenit, vol.3, no.22 (March 1923). Translated by Maja Starčević as "Through the Russian Exhibition in Berlin", in *ibid*, pp: 414-416.

In Germany, apart from Berlin which has been an intersection of international activities, Weimar and Dessau has become important centers with the help of Bauhaus school. After the first one in Dusseldorf, Weimer has hosted the Second International Congress of Constructivists and Dadaists in September 1922.

One of the first voices of Constructivist propaganda in Germany is Dutch Theo Van Doesburg. With the journal *De Stijl* which he edited in Weimar, Doesburg has expressed his and *De Stijl* Group's argument of a new objective and universal art/architecture in 1921 - 1923. In the same journal other avant-garde artists -Hans Richter, Werner Graeff, Lissitzky, Moholy-Nagy has published their theoretical essays concerning the Constructivist theory in Germany.[164]

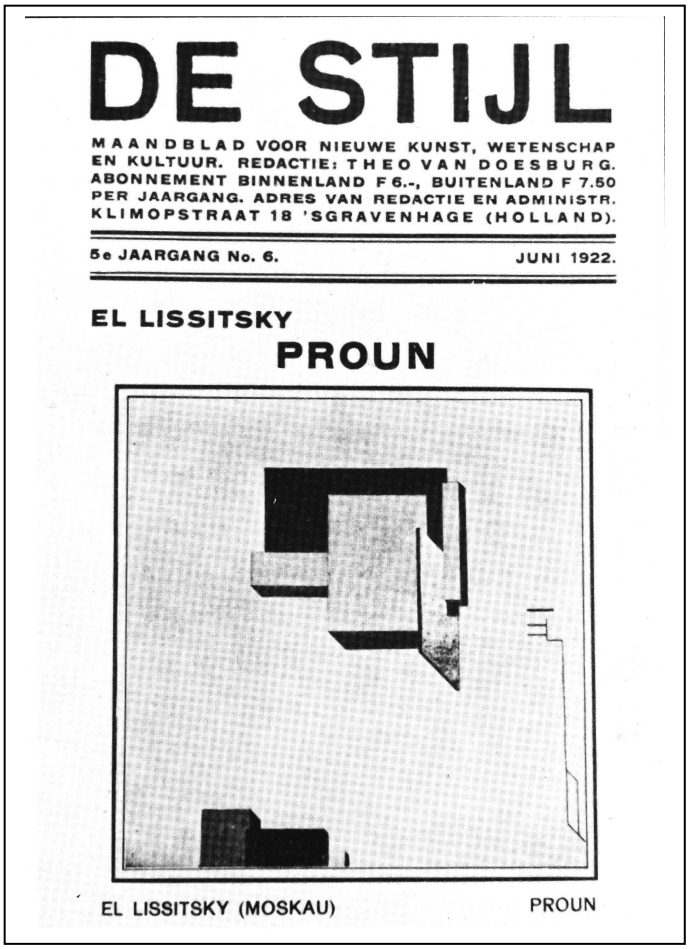

Figure 4.6. Cover of De Stijl, v/6 (June, 1922) illustrating El Lissitzky's Proun 1C of 1919. (Source: Tupitsyn 1999).

[164] Margolin, *The Struggle for Utopia*, p: 48.

In Czechoslovakia, international avant-gardes has gathered in *Devětsil* group. The exhibition of *Moderního Uměni* (Bazaar of Modern Art) organized by the group in Prague in 1923 has included the work of artists in the early years of *Devětsil* together with the modern work of new artists and the work of the American artist Man Ray. In 1924, the condensed version of the exhibition has taken place in Brno. In the preparation phase of the exhibition, Karel Teige, who is a leader of the constructivist movement in Czechoslovakia, has send an instruction that included the slogans to be used in the exhibition, to Artuš Černik. Karel Teige explains the prerequisites of the modern architecture with one of the slogans: construction-economy-purpose-standardization-collectivism.[165] The ideas of *Devětsil* avant-garde has been expressed through many journals and magazines including *Devětsil, Život II* (Life), *Disk, Pásma* (Zone), *Stavba* and monthly *ReD* (Review of *Devětsil*).

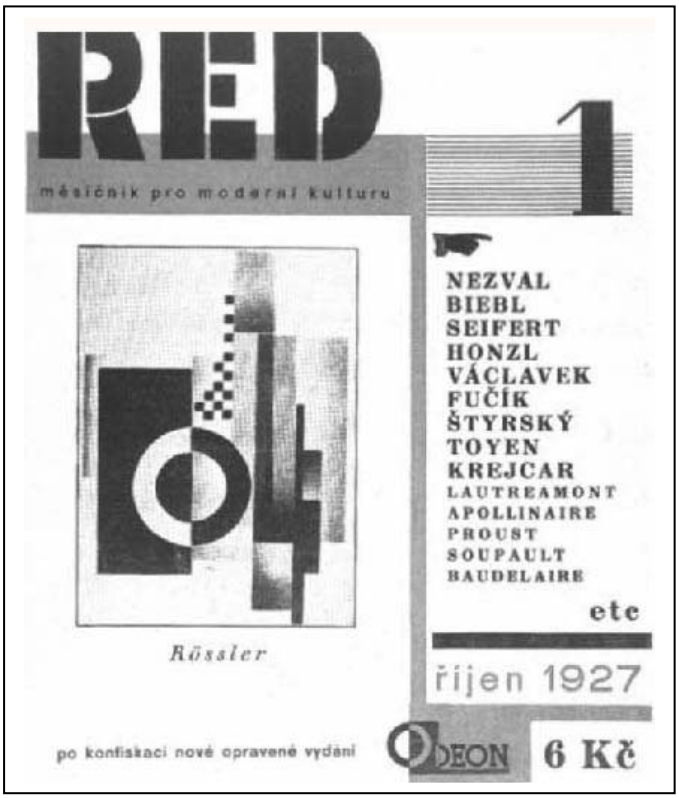

Figure 4.7. Cover design for *RED*, (vol.1, no.1), by Karel Teige.
(Source: Benson 2002), p: 118.

[165] Karel Srp, "Karel Teige in the Twenties: The Moment of Sweet Ejaculation", in Dluhosch, Eric and Svacha, Rostislav (eds.), *Karel Teige; L'Enfant Terrible of the Czech Modernist Avant-Garde*, (Cambridge: the MIT press, 1999), p: 27.

By 1920s, they has had operated like centers through which especially Prague and Czech avant-garde artists communicate with the artists in other countries.[166]

Hungarian avant-gardes has had an active role in the development of International Constructivism. After the fall of the Hungarian Soviet Republic, Hungarian avant-gardes has continued working in Vienna and Berlin. Hungarian artists and theorists including Moholy-Nagy, László Péri, Ernő Kállai, Lajos Kassák and Alfréd Kemény has had a decisive role in the new movement. Kassák has published the Vienna series of *Ma* whose members had already kept in touch with Russian artists who has featured Russian Constructivism. Kassák and Moholy-Nagy has published *Buch neuer Künstler* (Book of New Artists) to reproduce Constructivist works."[167] Ernő Kállai has become one of the most important critics in Berlin. Béla Uitz split from *Ma* and has published *Egység* (Unity) which has tended to interpret Constructivism as " strict, pragmatic, and proletkult." [168]

Constructivist movement has appeared in Poland in 1923 with the Exhibition of New Art in Vilnius. The Exhibition catalogue presents the close relation between art and social revolution..[169] The constructivist avant-gardes including Katarzyna Kobro, Henryk Stażewski, Władysław Strzemiński, has centered around the *Blok* group and *Blok* magazine. Polish artists seem mostly influenced by the works of Russian avant-

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[166] "In the spring of 1923 Alexander Archipenko arrived for the Prague reprise of his traveling exhibition, put on by *Devětsil*; at the end of the same year Ilya Ehrenburg, considered the spokesman for Soviet Constructivism at the time, came at the invitation of *Devětsil*. In 1924-25 the Architects' Club in Prague and Brno held a series of lectures on new architecture with the participation of the world's foremost architects –Pieter Oud, Walter Gropius, Le Corbusier, Adolf Loos, and Theo van Doesburg. In spring 1926 Klee exhibited in Prague. In October 1928 Le Corbusier lectured at the invitation of *Devětsil* at the Osvobozené theather, and Teige conducted him around Prague." Lenka Bydžovská, "Prague," translated by Andrée Collier Záleská, in Timothy O. Benson, *central European avant-gardes*, p: 86.

[167] Timothy O. Benson, "International Constructivism in Germany and Austria," in Timothy O. Benson and Éva Forgács (ed), *between worlds*, p: 386.

[168] Timothy O. Benson, ibid, p: 386. "The second issue presented the most detailed and focused survey of Russian Constructivism published to date, incorporating material that Uitz and Kemény had collected in Moscow the previous year. It included the first translation of the "Program of the Working Group of Constructivists," photographs of work by Stenberg and Ioganson, and an installation view of the Obmokhu exhibition that was different from the one published in Objet. The issue also contained a full, albeit unattributed, translation of The Realistic Manifesto." Christina Lodder, "Art into Life: International Constructivism in Central and Eastern Europe," in Timothy O. Benson, *central European avant-gardes*, p:185

[169] Christina Lodder, *ibid*, p:188. Piotr Piotrowski, "Poland," in Timothy O. Benson and Éva Forgács (ed), *between worlds*, p: 488.

gardes. The texts of avant-gardes such as Theo van Doesburg, Kazimir Malevich, and Kurt Schwitters has been published.[170]

Figure 4.8. Cover of Blok no.2, 1924. (Source: Benson 2002), p: 112.

Also, the art historian Irena Subotić explains that *Zenithism*[171] founded in Zagreb in 1921, has been influnced by Constructivism since 1922. According to Subotić, Ljubomir Micić who is the founder of *Zenithism,* seem influenced by the work of

[170] Piotr Piotrowski, "Poland," in Timothy O. Benson and Éva Forgács (ed), *ibid*, p: 488.

[171] Zenithism is one of the most radical movements of the new tendencies which were formed after the Russian Revolution. Irena Subotić says about the Zenithism that: "Zenithism saw itself as a post-Expressionist movement, and initially developed as a sort of cosmic primitivism. As stated in the first Zenithist manifesto, "Expressionism, Cubism, Futurism are dead. We are an extension of their lineage –to higher ground. We are their synthesis, but as an arrow pointing upwards, a reincarnation- the plusexistence of their philosophical ideas"(Zenit no.I, 1921). Zenithism promoted "barbarism" in art and culture, and the personified expression of this primitivism was the Barbarogenius, a primeval man of great power who comes from the mystical East in order to fight against the rational West". Irena Subotić, "Zagreb," translated by Maja Starčević in Timothy O. Benson and Éva Forgács (ed), *ibid*, p: 283.

Russian avant-gardes -especially El Lissitzky and Ilya Ehrenburg- during his visits to Germany in 1922.

Figure 4.9. Cover design for Zenit, no.17-18, 1922, by El Lissitzky.
(Source: Benson 2002), p: 258.

Subotić also discusses the influence of the Constructivist work on other Zenithist artists with the examples of the works of Lissitzky and Malevich on Jo Klek, Alexander Rodchenko's on Mihailo S. Petrov. As a result, Subotić maintains that the most recent Zenithist manifestos bear the traces of Constructivism and 'production art'.[172]

The four avant-garde figures, who come up with a detailed analysis of how the struggle for the use of science/scientific is carried out and how it is received in the Middle and Eastern Europe in order to justify/clarify the objective of Left-wing avant-gardes to construct the new/revolutionary architecture, are Russian El Lissitzky, Dutch Theo Van Doesburg, Czech Karel Teige, and Swiss Hannes Meyer. These four figures,

[172] Irena Subotić, "Zagreb/Belgrade," Translated by Maja Starčević in Timothy O. Benson and Éva Forgács (ed), *ibid*, p: 504.

in one aspect, are considered important in regard to their contribution in introducing the efforts of the left-wing architects in adapting the knowledge of natural sciences to "architectural knowledge" and in realizing how those efforts alter in time. Besides, they are also considered important in regard to the role they played in generalization of "Scientification" in Middle and Eastern Europe.

El Lissitzky formulates the problem of "the new expression of space" in order to verify his argument of "Revolutionary architecture." The theory of space, which he seems to contemplate under the influence of the Supremacist theory, indicates how the concepts and theories derived from natural sciences are instrumentalized. Lissitzky benefits from the knowledge of physics and biology as a scientific element in various ways while he postulates his theory. That approach becomes effective around Europe through Lissitzky's activities. Lissitzky happens to be the first artist introduce the Russian avant-garde discourse to the West. The journal *(Veshch-Gegenstad-Objet*), he publisheds with Ilya Ehrenburg in 1922 in Berlin, turns out to be a means of propaganda of the Constructivist discourse in the West.

Theo Van Doesburg presents the Elementarist theory in the same track with the argument of a new architecture which is formulated as a problem to create a new style for architecture. The emergence of Doesburg's theory is one of the most distinctive examples showing how the concepts of physics are practiced in architecture. Doesburg becomes one of the representatives of Constructivism in Europe by founding *De Stijl*.

Karel Teige attempts to make architecture entirely scientific in accordance with the Constructivist discourse. The approach of Teige explains the way architecture deals with science or the scientific. At that point, the tendency is not towards any concept or theory, but it is towards the scientific methodology, and Teige is one of those theorists to discuss that approach most critically. Besides, Teige is a remarkable figure to clarify the essence of the Constructivist movement spreading in Europe. Again, Czech Karel Teige, in his journeys to Soviet Union and European countries shows a great interest in the constructivist works of artists like Hannes Meyer, Mart Stam, Hans Wittwer, and El Lissitzky . In periodicals *Stavba*, in which he takes place in the editorial, and *RED*, which he starts, Teige publishes the translated articles of Meyer. In addition, Meyer invites Teige to Bauhaus in 1930 to deliver a series of lectures.

In Hannes Meyer's argument of "new architecture," formulated as a problem in "the new theory of building," his discussion of the scientific functionalist architecture theory centers around the scientific methodology as Teige's discourse does.

Furthermore, Meyer's theory is important in that it demonstrates how the theories in biology are used in architecture. Meyer is one of the most important supporters of the Constructivist architecture in Europe. He undertakes important missions in the spread and introduction of the Constructivist architecture in Europe. Meyer works as an administrator in Bauhaus between 1927 and 1930, and starts to work as an instructor in Soviet Union in 1930, in the years 1931, 1932, 1933, 1936 he organizes seminars in Scandinavia, Denmark, Germany, Switzerland and Czechoslovakia and he participates in many constructivist organizations in different countries.

4. 2.1. Scientification in El Lissitzky's "the New Expression of Space"

Lazar (El) Lissitzky (1890-1941), in respect of his social-political discourse, has became one of the most "larger than life" or rather avant-garde figures of twentieth century bearing the titles of "designer," "publisher" and " lecturer" for his studies in painting, graphic design and architecture. He has apparently managed to place himself among the leaders of the international avant-garde as a consequence of his studies and contacts in different countries such as Russia, Germany and the Netherlands.

Until 1919, Lissitzky carried on his studies as a graphic artist in conservative terms. At that time, he had the chance to have his paintings displayed, and his book illustrations drew a lot of attention. By 1917, when the Revolution took off, Lissitzky had become one of the most remarkable names in the field. After the pressure of the Char regime concluded with the 1917 Revolution, becoming an active figure in artistic activities in Russia, Lissitzky continued his pro-government propaganda for the newly formed government.[173] His coming to Vitebsk School of Arts as a professor of architecture and the head of the school of applied arts on the offer of Dean of Marc Chagall[174] in 1918, and then meeting Kasimir Malevich caused Lisstzky to undergo a

[173] "He designed the first flag "the Central Committee of the Communist Party of the Soviet Union (VtsIK), which was ceremonially carried across Red Square by members of the Government on 1 May 1918. During, this time of unrest Lissitzky was constantly traveling from place to place. He had successfully assisted the 'Art Commision' in Kiev, and placed all his energies and talents at the disposal of the new Government of Workers and Peasents." Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, p: 20.

considerable change in his studies of Art. In that school, under the influence of Malevich's Suprematist Theory mixed up with his own architectural background Lissitzky began his abstract productions.[175] His experimental studies, later called *PROUN* (Project for the Affirmation of the New), were his first studies to reflect foundations of his discourse/views in architecture.[176]

"Constructing the new world" is the main objective of Suprematist theory, and it is quite clear in the manifesto of "*UNOVIS*"[177] group which has started on the ideas of Malevich and whose remarkable members include Lissitzky, Yermolaeva, Kogan, Chashnin;

> "May the overthrow of the old world be imprinted on your palms."
>
> "We affirm suprematism as the new constructivity of the forms of the world."[178]

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[174] "In august 1918 Marc Chagall became the Art Commissar of Vitebsk, a position to which he was appointed by Anatoly Lunacharsky, head of the People's Commissariat of Enlightenment. Located within the Pale of Settlement, Vitebsk had a cultural milieu which consisted of many Jewish artists and intellectuals but was not composed of them exclusively. Chagall, whose position as a major Jewish artist had recently been confirmed by the publication of a book on his work, headed Vitebsk Popular Art Institute, where he hoped to make students aware of avant-garde currents while simultaneously encouraging them to develop a modern Jewish style. Most of the teachers Chagall brought in were Jews. These included Robert Falk and Ivan Puni, as well as Lissitzky, who most likely arrived from Kiev in the spring of 1919 to direct the studios for printing, architecture, and graphic arts." Margolin, *The Struggle for Utopia, Rodchenko, Lissitzky, Moholy-Nagy 1917-1946*, p: 28.

[175] Lissitzky had started his architecture education in "Technische Hochschule" in Darmstadt, Germany (1909-1914). He ended his education in Riga Technological University in Moscow (1918) which he returned from Germany because of the war. Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, pp: 16-19

[176] In 1919 Marc Chagall invited Lissitzky to return to his home town to become professor of architecture and head of the applied arts department. Lissitzky-Küppers, *ibid*, p: 20. In Vitebsk, in between autumn 1919 and spring 1921, he produced his first abstract studies (drawings, paintings, posters,) under the influence of Malevich's Suprematist theory. For information on the effect of Malevich on Lissitzky's studies. Peter Nisbet, "El Lissitzky in the Proun years: A Study of his work and thought, 1919-1927," PhD Diss. Yale University, 1995. Chapter I, pp: 34-114. Hatch, "Nature's Laws & the Changing Image of Reality in Art & Physics," pp: 143, 146-148.

[177] "In November 1919, on the insistence of the leftist leaders in the Vitebsk arts school, Malevich was called from Moscow. When Malevich arrived in Vitebsk, he already had the beginnings of a plan of activities and events to apply Suprematism in the social sphere. By the early 1920, he gathered around him a group of faculty and the students who established their own collective within the Vitebsk arts school and called it UNOVIS (Affirmation of what is new in art). Margolin, *The Struggle for Utopia*, p: 28. Members of the central committee were: Malevich, Lisstzky, Yermolaeva, Kogan, Chashnin… They established various organizations in Moscow, Petrograd, Smolensk, Samara, Saratov, Perm, Kaluga and Borisov with the goals of affirming the new art. Nisbet, "El Lissitzky in the Proun years," pp: 43-44.

[178] Nisbet, "El Lissitzky in the Proun years", p: 43.

Diverting from the "nationalist" approach prior to Lissitzky, Suprematism has adapted a "universal" approach. Before coming to Vitebsk, Lissitzky had worked in some Jewish cultural organizations in various different ways and worked on graphics for books for Jewish children, which lasted till the end of 1919. That he has abandoned the interest in folk culture and served to universal purposes instead is easily observed in his works in Vitebsk. [179]

His essay written in 1920 for the *UNOVIS* year book, "*Suprematizm mirostroitel'stva* (Suprematism in World Reconstruction)" reflects his adapted universal discourse and refers to his architectural attitude as well; "we shall give a new face to this globe...we are capable of grasping the idea of a whole town at any moment with any plan the task of architecture... the artist has set about the construction of the world –an activity which affects every human being..."[180] In the same article, Lissitzky also emphasizes that 'individualism' of the old world must be abandoned; "We left to the old world the idea of the individual house individual barracks individual castle individual church. We have set ourselves the task of creating the town."

Lissitzky associates the art-architecture theory with the problem of "the (re)construction of the new world". One of the reasons why Lissitzky does so is 'the Revolution';

> "We are presenting here a few stages of a vital process, which was first generated by the Revolution and is still not five years old. In the course of this period the high demands made by the cultural revolution have taken root in the feeling and consciousness of our new generation of architects. It has become clear to our structural engineer that through his work he is participating, as an active collaborator, in the construction of the new world."[181]

> "October 1917 marked the beginning of the Russian Revolution and the opening of a new page in the history of human society."[182]

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[179] For Lissitzky's Jewish concern see; Lissitzky-Küppers, 'Life and Letters', in *El Lissitzky: Life, Letters, Texts*, pp: 15-20.

[180] El Lissitzky, "Suprematizm mirostroitel'stva," 1920. Translated as "Suprematism in World Reconstruction" in Lissitzky-Küppers, *ibid*, pp: 332-334.

[181] El Lissitzky, "Ideological Superstructure" (1929), in Lissitzky- Küppers, *ibid,* p: 375.

[182] El Lissitzky, *Rußland, Die Rekonstruktion der Architektur in der Sowjetunion*, (Vienna: Verlag Anton Schroll&Co., 1930). Translated as *Russia: An Architecture for World Revolution*, Eric Dluhosch, p: 27. The text dated 1929.

Thus, for Lissitzky, 'Revolution' is the ultimate determiner which justifies and enables him to define 'the new world". Lissitzky assigns the architecture the duty of 'building' the new world since he sees architecture as a basic form of art. His ideas expressing that architecture is a basic form of art can be recognized in his first essay he wrote in Vitebsk while he was a lecturer there. In the essay, Lissitzky states that architecture embodies the universal frames of all other genres of art. For Lissitzky, in the "new world," art is well aware of "order," "organization" and "activity" existing in its very nature. Among forms of art, architecture is recognized as a leading art and consequently draws the attention of society.[183] Lissitzky's ideas on the social role of architecture regarding the problems/reality/necessity of constructions in the postwar era appear in more radical terms by 1929. His essay 'Ideological Superstructure' exemplifies that clearly:

> "We are striving in our architecture as in our whole life to create a social order, that is to say, to raise the instinctive into consciousness. The ideological superstructure protects and safeguards the work. As substructure for the renascence we have to undertake in architecture, we named at the outset social-economic reconstruction."[184]

Taking such a social responsibility, what the architecture should do to fulfill it is clear; "The task was clear -it consisted in elevating architecture in terms of its artistic and pragmatic values to a level consistent with the values of our own age."[185] Thus, Lissitzky appears to have formed a general basis to justify his own theory of architecture that is to form a kind of architecture which will enable itself to construct the "new world" on the expectations/norms of the new age. For that reason, in his manifestos, Lissitzky is believed to have structured his discourse with the definitions among which are 'the *new* age/world/art-architecture,' 'World *Revolution, Revolution* in art-architecture, social-economic *revolution* and *'(re)construction* of World/ architecture, social-economic *reconstruction*. That emphasizes itself quite strongly in the titles of manifestos 'Suprematism in world reconstruction (1920)' and '*Rußland, Die*

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[183] El Lissitzky, 'Novaya kul'tura (The New Culture),' 16 August 1919. Quoted in Nisbet, "El Lissitzky in the Proun years," pp: 48-49.

[184] El Lissitzky, "Ideological Superstructure" (1929), in Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, p: 376.

[185] El Lissitzky, *Russia: An Architecture for World Revolution*, p: 30.

Rekonstruktion der Architektur in der Sowjetunion (Russia: An Architecture for World Revolution) (1930)'. Therefore, for understanding Lissitzky's discourse utterly, re-definition of the main elements of it (*new, revolution, (re)construction*) is important.

The place and importance of the concept of 'Revolution' in the discourse of Lissitzky stems from it's being a beginning point. Even though he has not referred to the concept directly, in his autobiographic essay 'The Film of El's Life," published in 1928, Lissitzky emphasizes his belief in beginning-'revolution';

> "In Moscow in 1918 there flashed before my eyes the short-circuit which split the world in two. This single blow pushed the time we call the present like a wedge between yesterday and tomorrow. My efforts are now directed to driving the wedge deeper. One must belong on this side or on that –there is no mid-way." [186]

Likewise, in one of his essays in 1930, he defines October 1917 as a new page in the history of society. Lissitzky believes that the date/occasion also defines a beginning for the architecture, as well.[187]

Another concept/concepts Lissitzky underlines quite often in his manifestos is/are '(re)construction'. While Lissitzky gives the concept of 'construction' the meaning of 'building, composing' as in the 'the construction of World/space/objects…' on one hand, he uses the concept of 'reconstruction' to define 'a new order' on the other. In other words, he does not point at a mere activity of 're-construction.' Hence, the architect is enabled to extend his/her responsibility in all aspects of life in forms of *'(re)construction* of World/architecture, social-economic *reconstruction'*:

> "In order genuinely to fulfill our task in the world, we must strive to accelerate the rate of growth and force it ahead. This is possible only if we not merely further improve and develop what has been handed down to us, but also make a completely new start. Not only construct but reconstruct. We are reconstructing industry, we are reconstructing agriculture….The new architecture does not develop to a further stage a tradition that has been interrupted; rather it stands at a beginning and no longer must merely construct. Its task is to comprehend the new structures of life, in order to

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[186] El Lissitzky, "The Film of El's Life" (1928), in Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts,* p: 329. For similar determining see; Margolin, *The Struggle for Utopia*, p: 23.

[187] El Lissitzky, *Russia: An Architecture for World Revolution*, p: 27.

> participate actively through corresponding forms of construction in the wholesale coming into being of the new world."[188]

While Lissitzky states architecture's responsibility in reforming the society, in his essay 'Ideological Structure' he clarifies the necessity and justification of that particular "responsibility": "…Therefore by 'reconstruction' we understand the conquest of the unexplained, of the 'mysterious,' of the chaotic…"[189] Thus, being given the assignment of "reconstruction," for him, the architect can transform a chaotic life full of erratic incidents into a "new order."

Another main concept in Lissitzky's epistemology, "the new," also naturally results from his arguments in "the state of beginning" which is based on the Revolution: abandoning the past.

Lissitzky's discourse is rooted in the definition of the "new world" and it serves as a justifiable ground for his assertion "to construct the new world." While Lissitzky explains the necessity of that ground referring to the 1917 Revolution and the improvements in social-economical structures following the Revolution, he also recourses to more concrete reasons (scientific and technological) for architectural practice, on the other. Lissitzy's early manifestos, in particular, emphasizes that his interest in scientific and technological advances are just due to never-before experienced sensations caused by new discoveries:

> "My life is accompanied by never-before-experienced sensations. When barely five years old, the rubber tubes from an Edison phonograph are stuck in my ears. Aged eight, I am running after the first tramcar in Smolensk. All the farm horses bolt out of town to escape this work of the devil. A few years on and there in Germany are Zeppelin air-bladders flying above my head and aero planes turning somersaults as they loop the loop." [190]

In his essay "The film of El's Life (1928)," Lissitzky has pointed out that in addition to the these improvements, the visual perception has changed and has been revised by new technologies such as lenses, reflective cameras, cinematography, X-ray photograph,

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[188] El Lissitzky, *Rußland, Die Rekonstruktion der Architektur in der Sowjetunion*, translated as "Russia: The Reconstruction of Architecture in the Soviet Union, in Bann, *The Tradition of Constructivism*, p: 141.

[189] El Lissitzky, "Ideological Superstructure"1929, in Lissitzky-Küppers, *El Lissitzky: Life ,Letters, Texts*, p: 377.

[190] El Lissitzky, "The Film of El's Life" (1928), in Lissitzky-Küppers, *ibid*, p: 329.

new technology as well. Therefore, Lissitzky seems to be heading for a new definition of "reality" which he intends to construct. For Lissitzky, the change in the perception which is caused by discoveries in the fields of science and technology brings about a new "reality";

> "New inventions, which will enable us to move about in space in new ways and at new speeds, will bring about new reality. The static architecture of the Egyptian pyramids has been superseded –our architecture revolves, swims, flies. We are approaching the state of floating in air and swimming like a pendulum. I want to help discover and mould the form of this reality."[191]

The theory of architecture which Lissitzky shapes in order to materialize "the new reality" grounds itself epistemologically on the disciplines of both physics and biology.

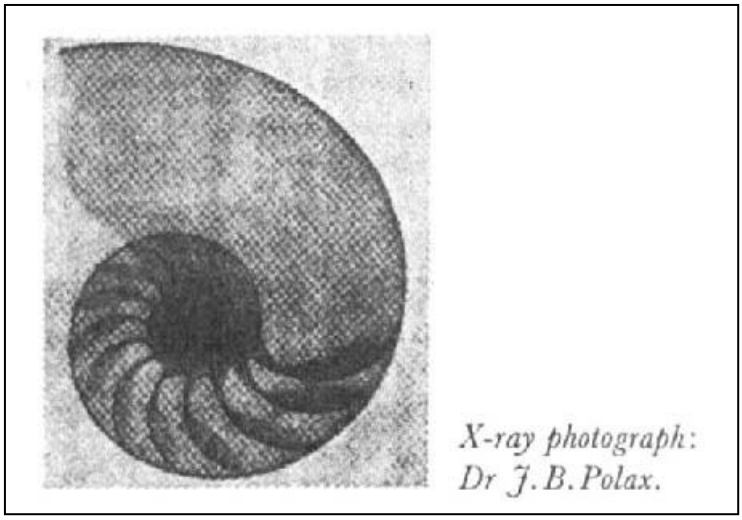

Figure 4. 10. X-ray photograph from El Lissitzky's essay "*K. und Pangeometrie*," in Europa-Almanach, Carl Einstein and Paul Westheim (ed.), (Postdam, 1925). (Source: Lissitzky-Küppers, (1980), p: 356.
Lissitzky is interested in the visual perception of the 'real world.' He says that "our minds have a certain capacity for comprehension; by the technical means we increase that capacity, but for the present this is just a multiplication of data and still not a fundamental change…For example:…we see the transition of curvature from the two-dimensional into the three dimensional, but the transition of the three-dimensional curvature into the Four dimensional is a factor which neither our sense of sight nor our sense of touch can grasp." El Lissitzky, "K. und Pangeometrie,"in Lissitzky-Küppers, *ibid*, pp: 355-356.

[191] El Lissitzky, "The Film of El's Life" (1928), in Lissitzky-Küppers, *ibid*, pp: 329-330

4.2.1.1. Instrumentalization of the concepts and theories of Physics for the aim of conceptualization of "Imaginary Space"

Lissitzky believes that constructing a "new reality" is possible by through producing a new space conception; therefore, he centers the "spatial idea" in the essence of his own theory of architecture; "An architectural work originates…, only when the whole comes to life as a spatial idea…"[192]

Apparently, Lissitzky's ideas on space concept, which has originated in his 'PROUN' studies in 1919, refers to the most important theories and concepts (Relativity theory, space-time continuum) of the period. PROUNS which he has defined as 'interchange station between painting and architecture' in his essay "The Film of El's Life (1928)" are actually an attempt to accomplish 'a new expression of space.'

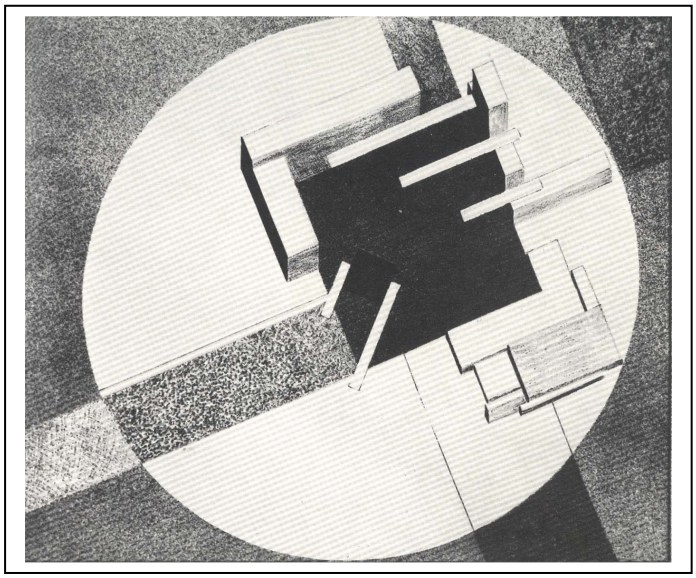

Figure 4.11. Lissitzky's sketch for Proun 1E, *The Town*, 1921.
(Source: Lissitzky-Küppers, (1980), p: 121.
Peter Nisbet claims that "Lissitzky used this configuration of forms, with slight variation, consistently when he needed to refer to urban centers," Nisbet, "El Lissitzky in the Proun years," p: 71.

[192] El Lissitzky, "Ideological Superstructure"1929, in Lissitzky-Küppers, *ibid*, p:376

In other words, for Lissitzky, 'a new expression of space' serves as an effective means for constructing 'the new reality'. His main objective is apparent in the title of his essay, "PROUN Not world visions, But –**world reality"** written in 1920.[193]

Lissitzky's response to the problem of "a new expression of space," is based on the perceptive effect of the physical space rather than being an attempt to form a new physical space, and it is human centered. In that sense, it is not possible to mention a situation which differs from the traditional one; nevertheless, the way he forms the concept and his related references has enabled Lissitzky to discuss a new concept of space. At this point, "Relativity theory and space-time conception" in physics is Lissitzky's main reference while attempting to give credibility to his theory of space. In fact, when compared to the interest and discourse of those avant-garde artists, Lissitzky is seemed much more cautious in his approach to the same theory and concepts. Besides, Lissitzky also has criticized the approach of his counterparts:

> "In the vital urgency for expansion of art and of form, some modern artists, some of my friends, are thinking of building new, multi-dimensional, real spaces, into which one can go for a walk without an umbrella, and where space and time are interchangeable, are brought into one unity. In this they have based their ideas, in a flexible, superficial way, on the most modern scientific theories, without acquiring any knowledge of them (multi-dimensional spaces, the theory of relativity, the universe of Minkowski, and so on). But artists who are producing something may be permitted all their theories, provided their work is positive. Up to the present time the only positive thing in our field of activity has been the direction of the expansion; but thanks to the attractions of scientific theories being incorrectly grasped, the work itself is still inadequate.."[194]

Nevertheless, Lissitzky's approach to the issue is not towards rejecting that tendency but making a more accurate/precise use of it.

Initially, Suprematist theory and Malevich has had an influence on Lissitzky's interest in the theories and concepts of physics. Based on his ideas rejecting Newton's concept of "space," Malevich has expressed Suprematist theory by applying to the concepts in physics including fourth dimension, gravity, magnetism etc.[195] For example,

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[193] El Lissitzky, "PROUN Not world visions, BUT- world reality" (1920), (*De Stijl*, year V, no.6, June 1922). In Lissitzky-Küppers, *ibid,* pp: 347-348.

[194] El Lissitzky, "K. und Pangeometrie", in Europa-Almanach, Carl Einstein and Paul Westheim (ed.), (Postdam, 1925). Translated as "A. and Pangeometry," in Lissitzky-Küppers, *ibid*, p: 355.

he presents the idea of "fourth dimension" in one of his works displayed in a futurist exhibition in 1915: "pictorial realism of a Boy with a Knapsack: Color Masses in the Fourth Dimension," and in his essay, "Non-Objectivity," he points out that the construction of reality centers around three principles one of which is relativity: "Thus the world's mind has built the reality of the universe, but, in order to be physically aware of this, it created three principles: gravity, negotiation and relativity..."[196]

The pillars of Lissitzky's theory, his response to the argument of " a new expression of space," are "movement" and "human perception." Yet, since he was not satisfied with or rather didn't need those concepts, Lissitzky prefers to express himself by the concepts of "fourth dimension and space-time conception."

Lissitzy explains the "new reality," which he intends to form, through the concept of "movement" and its derivatives. He clarifies the reality of the new world with "dynamism" in his various essays. The reality based on "dynamism" is emphasized together with "speed, tempo, rhythm, movement, dynamism" in different aspects in those essays. Referring to those concepts, Lissitzky also brings about the pace of evolution in the society: "In the world of today, Russia is moving at record speed. This is manifested even in the name of the country: -Russia, RSFSR, SSSR"[197] and in his some other essays, Lissitzky also emphasizes the movement of new technological machines and their consequent reflections in life:

> the second invention –screw, propeller. The continuous rolling changes into continuous gliding. … A new energy must be released, which provides us with a new system of movement…[198]
>
> Edison phonograph...Zeppelin air-bladders...aero planes...The tempo of my movements hither and thither increases day by day.[199]

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[195] Malevich's interest in scientific knowledge is varied. For the relationship between the art of Malevich and the fourth dimension, see: Henderson, *the fourth dimension and non-euclidean geometry in Modern Art*, pp: 274-294. For Malevich's interest in the energy theories, see, Hatch, "Nature's Laws & the Changing Image of Reality in Art & Physics," pp: 121-132.

[196] Malevich, "Non-Objectivity"(1923-1925), quoted in Henderson, *the fourth dimension and non-euclidean geometry in Modern Art*, p: 292.

[197] El Lissitzky, "Architecture in the USSR", (*Das Kunstblatt,* no.2, February 1925) in Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, p: 371.

[198] El Lissitzky, "Wheel –Propeller and what follows", (*G*, no.2 Berlin, september 1923), in Lissitzky-Küppers, *ibid*, p: 349.

[199] El Lissitzky, "The Film of El's Life", 1928, in Lissitzky-Küppers, *ibid*, p: 329.

Accordingly, Lissitzky attempts to define a new dynamic world / a new dynamic reality. In search for the reflections of the reality, of the "new world," which he explains in those terms, Lissitzky comes to the argument that a dynamic architecture should be constructed in similar terms. He clarifies the argument in the essay titled "The Film of El's Life", with an unscientific analogy: "The static architecture of the Egyptian pyramids has been superseded –our architecture revolves, swims, flies. We are approaching the state of floating in air and swimming like a pendulum."[200]

According to Lissitzky, in order to accomplish the objective, the duty of architecture, and art is to shape the ideas that give the "the new world" its dynamic character: "There the revolution in art began by giving form to the elements of time, of space, of tempo and rhythm, of movement."[201] Hence, what Lissitzky states is important in respect for gathering the basic concepts (time, space, movement), which have been utilized to achieve a new "expression of space." Lissitzky attains his desired idea of "a new expression of space" through his theory described as "imaginary space".

The theory is clarified in his article "*K. und Pangeometrie*," [202] published in Europa-Almanach in 1925. In the article, Lissitzky describes the differences in the space conception in its historical evolution referring to some works of art. Later in the same article, Lissitzky explains the "imaginary space" that shows how he instrumentalizes the theories of "relativity" and "space-time" in his discourse. Where Lissitzky explains his theory under the subtitle "imaginary space" opens with: "Our visual faculty is limited when it comes to the conception of movement and indeed of the whole state of the object…"

Pointing out as above, Lissitzky brings about a problem of visual expression by the concept of "movement." For him, a part of the problem has been solved thank to movie techniques; "for example: disconnected movements separated by periods shorter than 1/30 of a second create the impression of a continuous movement."[203] Yet, the

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[200] El Lissitzky, "The Film of El's Life", in Lissitzky-Küppers, *ibid*, p: 330.

[201] El Lissitzky , "Architecture in the USSR", 1925, in Lissitzky-Küppers, *ibid*, p: 371.

[202] English translation of the title is "A. and Pangeometry". 'A' is the short form of "Art." El Lissitzky, "A. and Pangeometry", in Lissitzky-Küppers, *ibid*, pp: 352-358

[203] Movie techniques are important for Lissitzky in scope of proposing a solution for the problem of "the impression of a continuous movement". Lissitzky was especially interested in the works of Viking Eggeling. He wrote in a letter, in the period he stayed in Moscow from June 1925 to July 1926, (September, 15, 1925) that "I have devoted a short article to Viking Eggeling is unequivocal: it represents the transition from two-dimensional studio composition, with a mere illusion of the third

solution provided by movie techniques does not satisfy Lissitzky, because in terms of three dimensional space conception, the movie is not capable of creating a material expression/effect: "the film is only a dematerialized projection of the plane and makes use of only one property of the visual faculty."

At this point, while Lissitzky points out another visual expression which can be explained with the concept of movement, he also points out that material object/objects (elementary bodies) forming another imaginary object through the concept of "movement." In other words, Lissitzky speaks of a way of achieving the material effect that he is working on. This is a new "expression of space" that Lissitzky sides with. For him, it is possible to perceive various effects using our different visual agents.[204] Lissitzky defines that effect, which is limited by the duration of the movement as "a-material materiality." A close analysis of the last part of his essay, where he discusses the bases of the "imaginary space," indicates the scientific references of his theory. In the same essay, Lissitzky explains four different forms of the expression of space," the last of which is "imaginary space," with their numerical corresponding:

> **"planimetric space;**….."ıts space is the physical two-dimensional flat plane"… elementary numerical progression (1,2,3,…)
>
> **perspectival space; …"**Perspective has comprehended space according to the concept of Euclidean geometry as a constant three-dimensional state"… geometric progression (1,2,4,8,16…)"

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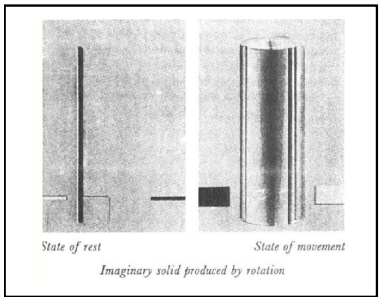
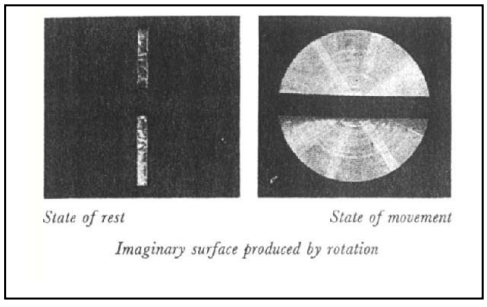
dimension, to the illusory three-dimensional picture of the cinema screen with its actual fourth dimension (that of time)." Lissitzky-Küppers, 'Life and Letters,' *ibid*, p:67.

[204] Lissitzky supports his argument with following examples. The first example he announces as "imaginary surface produced by rotation" represents the two-dimesional plane effect a linear element possesses with movement, and the second, as "imaginary solid produced by rotation" represents the three dimensional object effect of a linear element possessed with movement. El Lissitzky, "A. and Pangeometry," in Lissitzky-Küppers, *ibid*, p: 357.





Before explaining the third form, "irrational space," Lissitzky speaks of scientific bases. Emphasizing that the Euclidean concept of space has been overthrown by Lobatschewski, Gauss, and Riemann, Lissitzky points out its effects in Art (impressionism, cubism, futurism). Yet, for Lissitzky, the best response to the change is Malevich's Suprematist theory that brings about the concept of "irrational space":

> "The establishing of the square, □, by K.Malevich (Petersburg 1913) was the first manifestation of expansion in the set of A(RT)…
> The sol,idly coloured □ stamped out in rich tone on a white surface has now started to form a new space."
> **irrational space:** In this space the distances are measured only by the intensity and the position of the strictly-defined colour-areas. The space is arranged in the simplest directions – vertical, horizontal, or diagonal. It is a positional system. irrational numbers √2=1.41…)."

According to Lissitzky, the space concept of Suprematist theory which he has revised as "irrational space," has provided a base for a process leading up to the construction of the "imaginary space." Lissitzky attempts to clarify the new expression of space through the concepts of four and multi dimensionality of mathematics and physics. In his seminar, "New Russian Art," on the Kestner Exhibition[205] he organized in 1922, Lissitzky states that the possibilities for the artist to adapt the surroundings into "the new world" have changed and that the way of expression should change accordingly as well. For Lissitzky, the change can be achieved with a four dimensional expression of an object: "…he *(the artist)* no longer stood in admiration in front of the object, but moved all round it, that is to say he absorbed and then endeavored to represent his impression –not only in three but in four dimensions."[206]

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[205] In 1922 in Hannover he was accepted to the Kestner-Gesellschaft founded by Kurt Schwitters, and with the support of Dr. Alexander Dorner, the director of the *Niedersächsisches Landesmuseum*, he organized his first individual exhibition. "Dorner and Sydow, prompted by the success of the exhibition, made up their minds to commission Lissitzky to do a portfolio of lithographs as a New Year gift for the members of the Society. Lissitzky accepted this commission and promised to come to Hanover to carry out the work." Lissitzky-Küppers, 'Life and Letters,' *ibid*, p: 34.
"*Kestner-Gesellschaft* society, which for a while played an important part in fostering the new art, had been founded on 10 june 1916 in the most diffucult period of the war. Hanover was a strait-laced, conservative provincial town, and Dr. Brinkmann, the director of the *Kestnermuseum* and of the civic art gallery, had resolved, with the support of his assistant Dr Paul Erich Küppers and the director of the school of arts and crafts, von Debschitz, to arrange exhibitions independently, freed from the dictatorship of the civic authorities." Lissitzky-Küppers, *ibid*, p: 26. Lissitzky gave this lecture to Kestner-Gesellschaft on 6 March 1923.

[206] El Lissitzky, "New Russian Art: a lecture"(1922), in Lissitzky-Küppers, *ibid*, p: 337. Italics added.

With the concept of "four dimensionality," Lissitzky seems to point out the necessity of a new expression of object which differs from, or rather transcends, a mere "three-dimensional" expression. Yet, he does not clarify the contents of the concept. Nevertheless, in the following chapters of the same essay, "New Russian Art," he explains how Suprematism accomplishes that expression of space: the movement effect arising from the relationship between the planes in different colors gathered on a diagonal axis on infinite space. Accordingly, the new impression of space, which Lissitzky defines as "four dimensional expression," is just made up of a visual illusion. Lissitzky has attempted to transform the new conception of space from two-dimensional

Figure 4.12. El Lissitzky's designs for programme cover for the First Russian Art Exhibition, 1922. (Source: Lissitzky-Küppers 1980), pp: 157,158

painting plane to three–dimensional architectural space in his PROUNs: "I created the Proun as an interchange station between painting and architecture."[207]

In his essay "PROUN Not world visions, BUT–world reality," while Lissitzky clarifies his PROUN space in detailed Suprematist terms, his argument of "illusionary

[207] El Lissitzky, "The film of El's Life" (1928).in Lissitzky-Küppers, *ibid*, p: 329.

space," defined as four dimensional, still exists. Lissitzky mentions about the perceptional tensions originating from gathering pieces. Consequently, owing to this perceptional illusion, Lissitzky has believed that a new expression of space to be created in the unity of the human movement:

> "Combining the effects of the various forces produces a new kind of result in the Proun. We saw that the surface of the Proun ceases to be a picture and turns into a structure round which we must circle, looking at it from all sides, peering down from above, investigating from below. The result is that the one axis of the picture which stood at right angles to the horizontal was destroyed. Circling round it, we screw ourselves into the space."[208]

Lissitzky continues in his essay, "K. und Pangeometrie," stating that the definition of the "irrational space," which is explained with irrational numbers, is not sufficient as far as mathematics is concerned. Arguing that mathematics creates imaginary numbers going beyond irrational ones, *[imaginary space: imaginary numbers: (*$\sqrt{-1=i}$)], he questions how art [A(rt)] responses to the new issue. Realizing that spatial equivalents of imaginary numbers, created by mathematics, cannot be achieved, Lissitzky refers to the theory of Relativity as a possible solution: [209]

> "…Our minds are incapable of visualizing this, but that is precisely the characteristic of mathematics- that it is independent of our powers of visualization. Hence it follows that the multi-dimensional spaces existing mathematically cannot be conceived, cannot be represented, and indeed cannot be materialized. We can change only the form the form of our physical space, but not its structure, its three-dimensional property. We cannot really alter the measure of curvature in our space; that is to say, we cannot transform the square and the cube into any other stable form…"**The theory of relativity offered proof that the measurements of space and time are subject to the motion of the systems in question.** According to this theory a person can die before he was even conceived. This example runs in reverse sequence to our way of thinking, and this being so we must follow the laws of our senses."[210]

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[208] El Lissitzky, "PROUN Not world visions, BUT- world reality" (1920), in Lissitzky-Küppers, *ibid*, p:347.

[209] see, Hatch, "Nature's Laws & the Changing Image of Reality in Art & Physics," p: 182.

[210] El Lissitzky, "K. und Pangeometrie (A. and Pangeometry)" (1925), in Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, p: 355. Emphases added.

Lissitzky's interest in the theory of Relativity is human perception-centered. Lissitzky aims at attaining a perception of space to express his unity of "space-time."[211] Consequently, Lissitzky questions the interaction between "space" and "time" again referring to the theory of Relativity:

> "**Space and time** are different in kind. Space in our physical science is three-dimensional. In time, however, one cannot wander into depth, height, breadth; **time is one-dimensional**. **We differentiate between three-dimensional, physical space and the multi-dimensional mathematical spaces**. There is but one time, both in physics and in mathematics."

Following that analysis, Lissitzky underlines two basic features of the "space" and "time" which he sees as unified. For him, the existence of "space" depends on objects; whereas, "time" is always constant and progressive. What makes his point remarkable is that while Lissitzky emphasizes the continuity of the "time," which he defines as unbreakable, he points out "inseparability" and " breakability" features of the objects in space:

> "…We know no space outside of objects and no objects outside of space. To form space means to form objects. Objects can be resolved into elements. Time is constant, it cannot be decomposed into elements. Space factors are divergent, time factors are sequential…"

The problem Lissitzky faces at this stage is how to express time in physical terms. At this point, Lissitzky replaces the "continuity of time" with "movement" as a physical corresponding. Hence, he attains a physical definition of "space-time/movement continuity": the body which are composed by separated objects at rest, reaching a new unity by movement: a temporary (imaginary) spatial perception. In fact Lissitzky points out the indicators of this argument in the first chapters of his essay, "PROUN Not world visions, But world reality" in 1920;

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[211] Hatch explains Lissitzky's interest in "space-time continuity", by his art works. According to Hatch the most distinct example is Proun G7 (1923: Kunstsammlung Nordrhein-Westfalen, Dusseldorf). "in the studies for this work which date back to around 1919-1920, we find clear evidence of Lissitzky's literal copying Hermann Minkowski's space/time continuum diagram, illustrated in his seminal essay "Space and Time"(1908)." Also Hatch mentions about the effect of the Minkowski's diagram on Lissitzky's other works including the cover design of Broom (vol.2, no:3, june, 1922), the image of "the new" in the Figurine portfolio, Victory Over the Sun (1920/21); Proun 43." Hatch, "Nature's Laws & the Changing Image of Reality in Art & Physics," p: 182.

> "In this way Proun goes beyond painting and the artist on the one hand and the machine and the engineer on the other, and advances to the construction of space, **divides it by the elements of all dimensions**, and **creates a new, many-faceted unity** as a formal representation of our nature."[212]

With the "*Prounen-Raum*"[213] he designed for the *Grosse Berliner Kunstausstellung* (Great Berlin Art Exhibition) in the summer of 1923, Lissitzky discusses the three dimensional "imaginary space" for the first time. In the first edition of Journal *G* (July 1923), started by Hans Richter and Werner Graeff, Lissitzky explains how he has structured *Prounen-Raum* in detail. Lissitzky gives priority to the spatial qualities of *Prounen-Raum*: "Room-space (*Raum*) is not there for the eyes alone, is not a picture; it must be lived in."[214]

Besides, for Lissitzky, another important point is that the Room is an exhibition venue and the organization of such a venue should differ from any other living space. Consequently, Lissitzky reaches a definition of the problem, which he can apply to his own theory of space: designing a space for people in motion. Lissitzky's design works out with the organization of elementary forms and materials (objects; lines, flat surfaces and bar, cube, sphere, and lack, white, gray, and wood; and surfaces which are spread flat on to the wall and surfaces which are placed perpendicular to the wall) in order to direct the movement of the man.

Lissitzky's similar three-dimensional studies continues in the exhibitions of Dresden (1926) and Hannover (1928). In his essay about the rooms he designed for those exhibitions, Lissitzky states that the purpose of such rooms is to activate the man. The solutions to the problem, offered in his essay, are not any different from the ones in Berlin. What he points out is the rhythmic organization of the "objects" so as to cause an "optical illusionary movement" in the synthesis of the movement of the man.

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[212] El Lissitzky, "PROUN Not world visions, BUT- world reality (1920)", in Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, pp: 347-348. Emphases added.

[213] "Prounen-Raum" is used with different English translations in different sources; *Prounen-Raum* as Proun Room, in Küppers-Lissitzky, *ibid*, p:365; *Prounen-Raum* as Proun Space, in Lissitzky, *Russia: An Architecture for World Revolution*, p: 138.

[214] El Lissitzky, "Proun Room, Great Berlin Art Exhibition", in Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, p: 365. Originally published in *G*, Berlin July 1923.

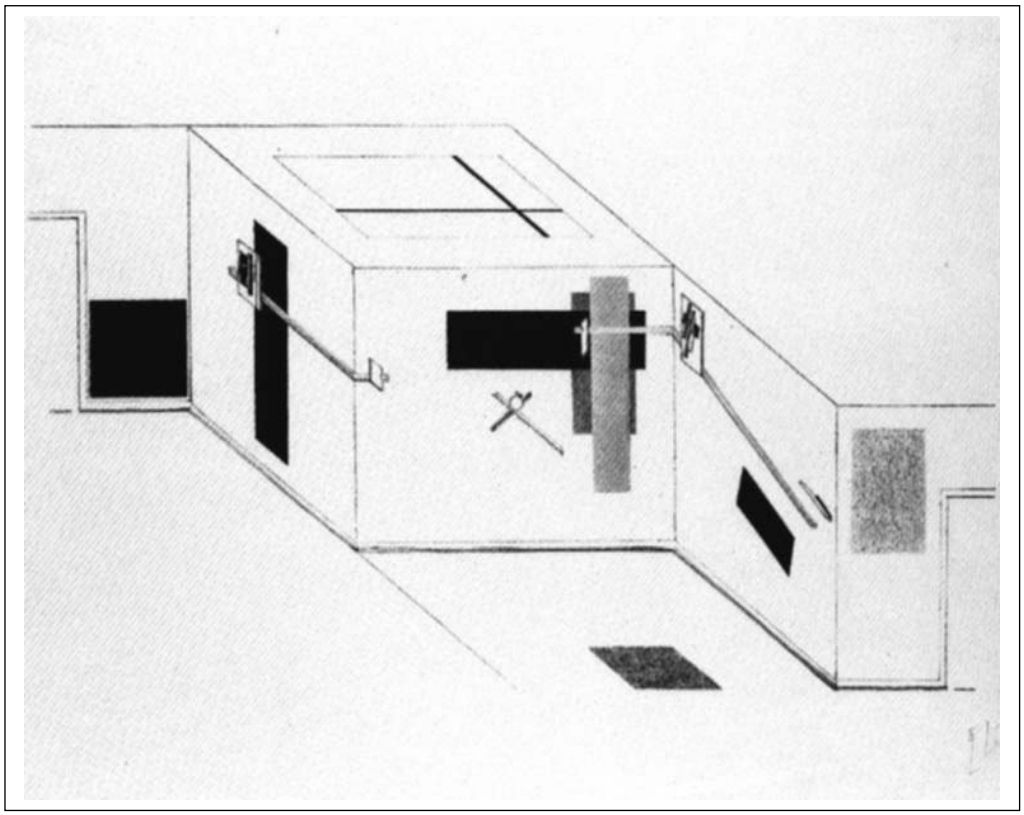

Figure 4.13. *Prounen-Raum*, for the *Grosse Berliner Kunstausstellung,* 1923. (Source: Tupitsyn, (1999).

Lissitzky explains it as: "with every movement of the spectator in the room the impression of the walls changes-what was white becomes black and vice versa. thus an optical dynamic is generated as a consequence of the human stride. This makes the spectator active."[215]

[215] El Lissitzky, "Exhibition Rooms," in Lissitzky-Küppers, *ibid*, p: 366.

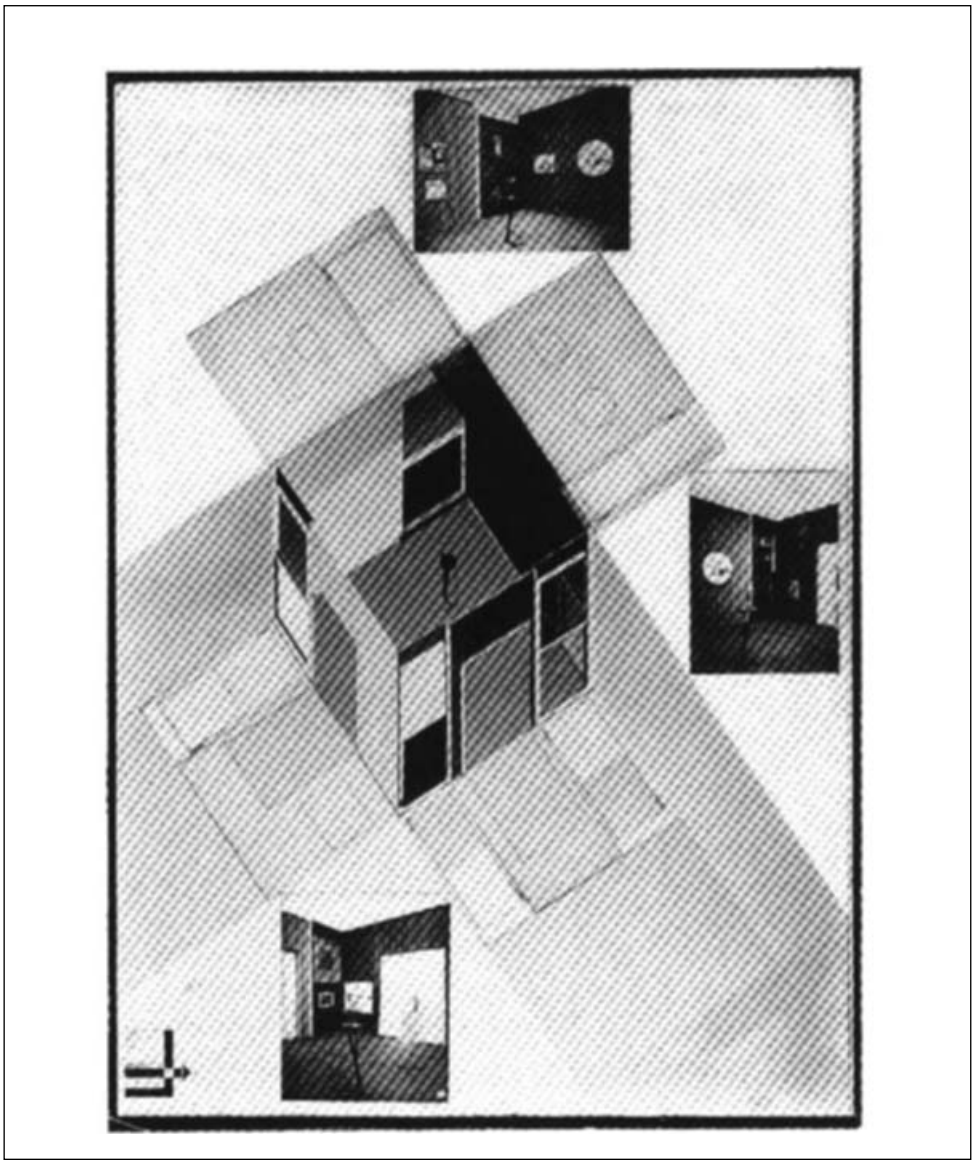

Figure 4.14. Lissitzky's design for *Raum für konstruktivistische Kunst* (Room for Constructivist Art) at the International Art Exhibition. (Source: Tupitsyn 1999), p: 22.

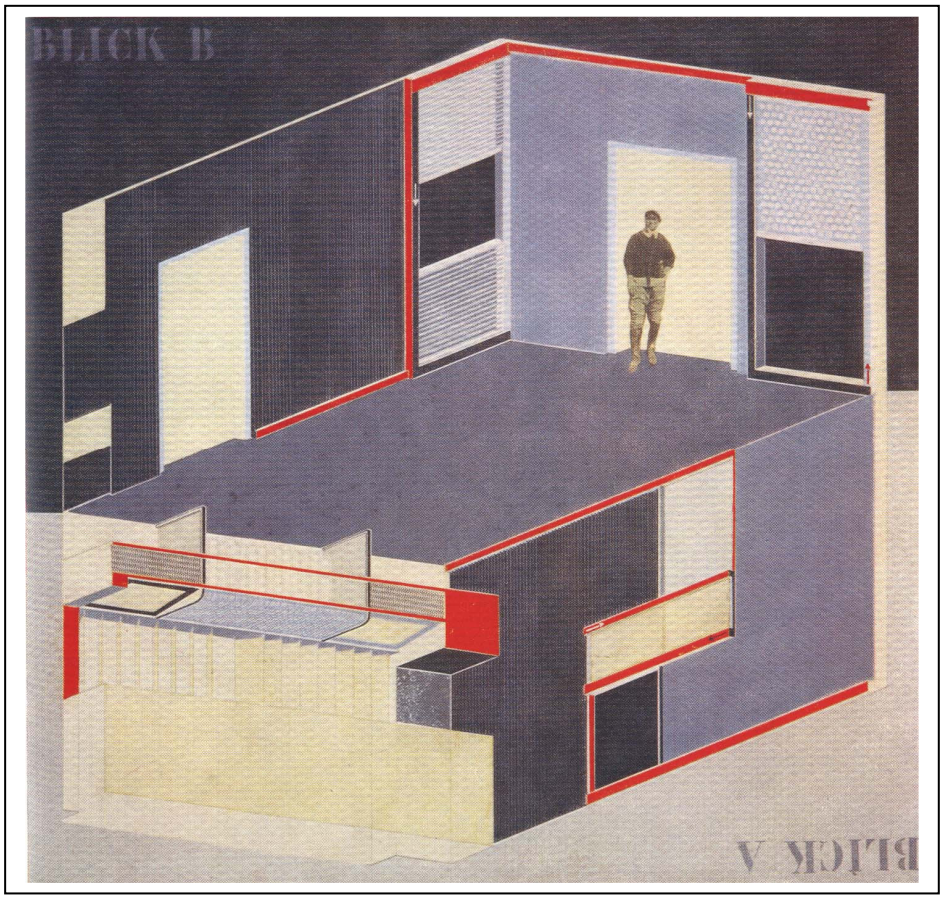

Figure 4.15. El Lissitzky's design for the second Exhibition Room. Hanover, 1927-28.
(Source: Lissitzky-Küppers 1980) p: 175.

4.2.1.2. El Lissitzky's Biocentric epistemology

Apparently, Lissitzky also refers to a biocentric epistemology in order to clarify / justify his discourse in constructing the new reality which he points out as the main characteristic of the new world. Accordingly, Lissitzky attempts to respond to this problem of "art-architecture" by referring to the realities of nature. That approach of Lissitzky is an effect of the studies/ attempts by his counter avant-gardes trying to unify "life" and "art," Lissitzky also tries to justify his discourse in social terms.

Under the influence of those ideas, Lissitzky points out references to some natural facts in his discourse. Yet, those references vary in the nature of the biocentric epistemology and in the use of the information. They are sometimes related to the

natural characteristics defined by biology and sometimes to an argument which is brought about by a particular theory. Lissitzky utilizes them by analogies or only as a reference.

One of the points in Lissitzky's tendency toward the biocentric epistemology seems to be his opposing attitude toward modern world's unquestionable confidence in machinery. That attitude is also apparent in his initial essay, "*NASCI*," in *Merz* Journal which he edited with Kurt Schwitters in 1924. The essay opens with "We have enough of perpetually hearing MACHINE MACHINE MACHINE MACHINE when it comes to modern art-production."[216] Lissitzky denies the central position of machinery in art. He argues that machinery only serves as a means to discover nature. Therefore, he doesn't approve of the idea that machinery isolates the man from nature:

> "The machine is no more than a brush, and a very primitive one at that, which portrays a view of life on the canvas. ..
> The machine has not separated us from nature; through it we have discovered a new nature never before surmised…"[217]

Accordingly, Lissitzky comes up with metaphorical connections between Nature and Art. Those connections indicate Lissitzky's interest in nature in respect to its organic process and the biocentric epistemology which explains that process. His interest in the organic process appears in two aspects one of which is related to the dynamic characteristic; whereas, the other one is to do with the "universal" ones, and those two aspects are the main points of the new architecture that Lissitzky discusses.

Lissitzky is into the universal features of the organic process in order to be able to utilize it as a universal solution to the problem which art and architecture face. According to Lissitzky, universal laws of nature and the scientific studies in the organic growth of nature should be applicable to the works of art as well: "Modern art, following a completely intuitive and obvious course, has reached the same results as modern science. Like science, it has reduced the form to its basic elements, in order to reconstruct it according to the universal laws of nature;…"[218]

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[216] El Lissitzky, "NASCI," (*Merz*, nos 8, 9, Hanover April-July, 1924). In Lissitzky-Küppers, *ibid*, p: 351.

[217] El Lissitzky, "NASCI," in Lissitzky-Küppers, *ibid*, p: 351.

[218] El Lissitzky, "NASCI," in Lissitzky-Küppers, *ibid*, p: 351.

One of the issues that Lissitzky emphasizes quite often is how the process of creativity can be activated. Lissitzky comes to a solution by drawing a similarity between the artist's creation process and the universal process of nature. In a seminar in 1921, while he explains the necessity for the conformity of the process of the artistic creation (as the creator of Proun) and the universal laws of nature, Lissitzky refers to some examples from nature:

> "creative intuition which creates its own method and system outside mathematics and outside engineering designs, but according to laws which are just as organic as the growth of the flower"[219];

in the essay, "Suprematism in World Reconstruction" (1920), he defines the work of Art with references to the similarities in living human organisms:

> "(artistic) work must be accepted as one of the functions of the living human organism in the same way as the beating of the heart or the activity of the nerve centers…"[220];

in the essay "Architecture in USSR" (1925), he draws a similarity between the "building" and the "organic growth" while he sides with the universal art;

> "Let us have something universal, something clear and simple. Thus a square is simple, or a glass cylinder…Organic growth is a simple thing-so is building, architecture."[221]

One of the best examples showing the association of the natural laws with the works of art appears in his letter published in ABC Journal in 1925. In that letter, while Lissitzky compares the basic elements of nature with the elements of design, he also compares the process of design to the process in nature:

> "The Proun creator concentrates in himself all the elements of modern knowledge and all the systems and methods and with these he forms plastic elements, which exist just like the elements of nature, such as H(hydrogen) and O(oxygen), and S(sulphur). He amalgamates these elements and obtains acids which bite into everything they touch, that is to say, they have an effect on all spheres of life."[222]

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[219] Nisbet, "El Lissitzky in the Proun years," p:151.

[220] El Lissitzky, "Suprematism in World Reconstruction," 1920, in Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, p: 334.

[221] El Lissitzky, "Architecture in USSR", 1925, in Lissitzky-Küppers, *ibid*, p: 372.

[222] El Lissitzky, "a letter," ABC, Beiträge zum Bauen, Basle, 1925. In Lissitzky-Küppers, *ibid*, p: 358.

For Lissitzky, the dynamic feature of "organic growth" stands as a remarkable feature of instrumentalization in that it supports his argument of the "dynamic world" in scientific terms, and it presents concrete realities for a formal expression that he is attempting to accomplish in art and architecture. Lissitzky's preference in the use of natural terms and concepts like "organic growth, the growth of the flower, the living human organism, the beating of the heart" in his essays underlines the dynamism in the organic process. Lissitzky explains the dynamic process with the concept of "becoming" in the foreword for *NASCI*:

> "Modern art, following a completely intuitive and obvious course, has reached the same results as modern science. Like science, it has reduced the form to its basic elements, in order to reconstruct it according to the universal laws of nature; *every form is the frozen instantaneous picture of a process. Thus a work is a stopping-place on the road of becoming and not the fixed goal.*"[223]

With the statement "*every form is the frozen instantaneous picture of a process*," Lissitzky sees the work of art (like work of science) as a part of natural process. As a consequence, the concept of "becoming" also makes the title of an issue of *Merz* Journal where Lissitzky's interest in biocentric epistemology can be traced to the fullest; *NASCI*.[224]

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[223] El Lissitzky, "NASCI", in Lissitzky-Küppers, *ibid*, p: 351.

[224] NASCI is a Latin word with the meaning "becoming" or "coming into being." Botar, Prolegomena to The Study of Biomorphic Modernism, p: 425. NASCI; in German 'Nature': i.e. to become or to develop, means everything which develops, forms and moves itself out of itself by its own power." Nisbet, "El Lissitzky in the Proun years," p: 171.

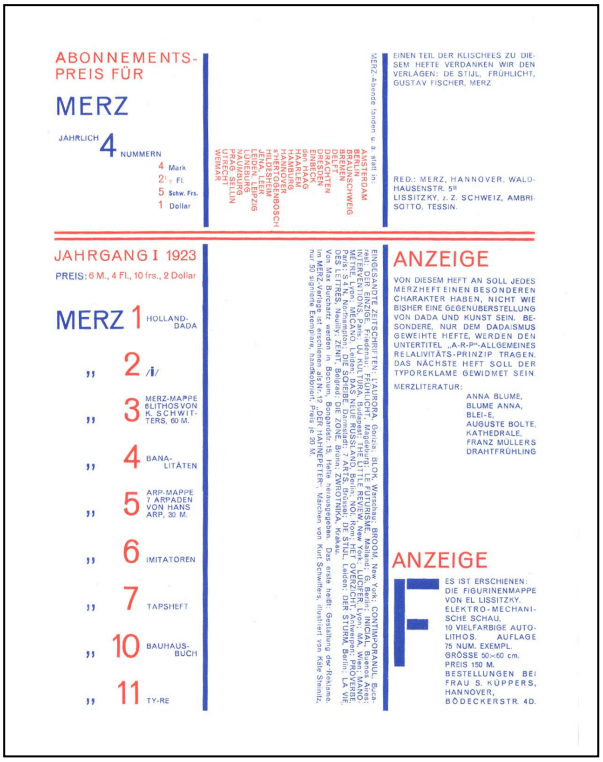

Figure 4.16. Front and back cover of the periodical *Merz*, nos 8, 9, April-July, 1924, Hanover. (Source: Lissitzky-Küppers 1980), pp: 204, 205.

Biologist R. H. France's influence on Lissitzky is apparent in Lissitzky's tendency towards biocentric information and towards opposing to the technological monarchy. That interest is even more clear in his letters.[225] In those letters, Lissitzky has showed his intentions to contact with Francé. Besides, in two of his essays for two special editions of *Merz* Journal in 1924, Lissitzky has quoted from the works of Francé;

> "the crystalline, the sphere, the plane, the rod, the strip or band, the screw and the cone" as the seven "basic technical forms of the entire world. They are sufficient for all the processes of the entire world system to be led to their optimum. Everything that exists is surely combinations of these seven fundamental forms. They are the be-all and end-all of architecture, of mechanical elements, of crystallography and chemistry, of geography and astronomy, of art, of technology, indeed of the whole world."[226]

Not only does Lissitzky quotes ideas from the study of Francé, he has also presented some images which have nothing to do with art or architecture. For instance, in a chapter, where he argues the functions of nature, Lissitzky includes a photograph of a bone from Francé's book, "*Bios*," with the photographs of two architectural works, he has also used a photograph of a crystal which Francé has recognized as one of the seven forms structuring the universe.[227] Regarding to those quotations and images from Francé's study, it can be said that Lissitzky refers to the theory of Francé in order to be able to justify a unified creative process which is recognizable in the entire world.

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[225] "I think that, of the large proofs (on yellowish paper) of the oscillating form, there are only two still there. Braunweiler would be glad to have it, for I know the story –if it is reproduced in Kunstblatt and now in Nasci, everybody will want to have it, so please do not sell any more for the time being. Be quite sure you buy the book by Francé called Bios, I should very much like to make personal contact with him. We must find out his address without fail. When Nasci is finished, I will send him a copy with a dedication…From Lissitzky's letter (Ospedale, Locarno, 10 March 1924). in Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, p: 46.
…thank you for Francé's address. I will write to him when *Nasci* is ready and when I have read Bios. From Lissitzky's letter, Orselino, 23 March 1924. in Lissitzky-Küppers, *El Lissitzky: Life, Letters, Texts*, p: 47.

[226] this quotation are used in the form of Peter Nisbet's usage. Nisbet, "El Lissitzky in the Proun years," p: 173.

[227] Nisbet, *ibid*, pp: 173-174.

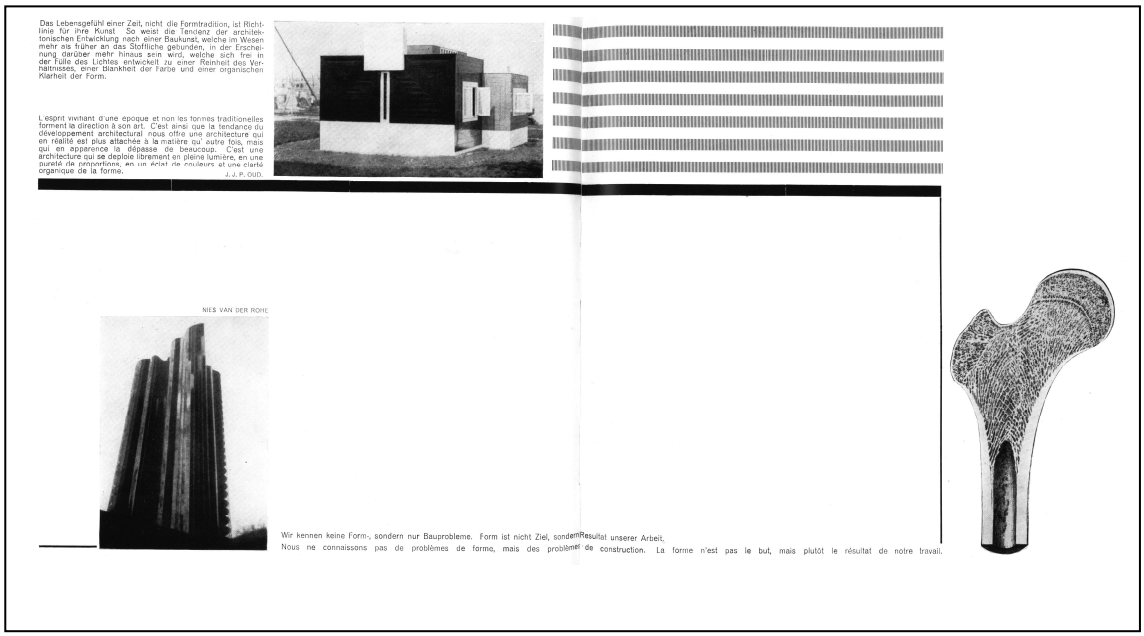

Figure 4.17. Pages from the periodical *Merz*, nos 8, 9, April-July, 1924, Hanover. (Source: Lissitzky-Küppers, (1980), pp: 206- 207.
Lissitzky places the photographs of two buildings by Mies van Der Rohe (a skyscraper proposal) and J. J. Oud, and the thight-bone on the same page.

4.2.2. Scientification in Theo van Doesburg's "a new style for Architecture"

The influence of the works of Einstein, Henri Poincaré and Lorentz on Theo van Doesburg's theory of art and his architectural identity in *De Stijl* group, founded in 1917, is noticeable. Doesburg has utilized the consequent theories and concepts (relativity theory, space-time conception, four-dimensionality)of the scientific studies in order to define a new reality which brings a new architecture and also to justify his eventual architectural discourse, known as "elementarist theory of architecture," in more scientific terms. While concepts have been utilized to justify the need for constructing a new architectural theory (the need for constructing a new reality, the need for the creation of a new style), they have also been utilized to define the tools to help the transformation of theory into practice.

Although Doesburg states that he has adapted various different discourses in different stages in the process of constructing the "Elementarist theory,"[228] it's seen that Doesburg's aim of scientification of his theory/theories has not changed.

Doesburg forms his discourse in a way that serves for his argument underlining the necessity to reconstruct "the unity of life, culture, art and technology." Hence, he sees the plastic expression of a "new unity of life" as the main problem in forming his theory of art-architecture. In other words, the basic problem is "to create a new style." Doesburg's endeavor is to construct an objective-universal system which brings a common language to be used in all forms of art in order to express "a new unity of life." According to Doesburg, different genres of art have common characteristics in their essence, and the only difference is the means of expression of them. Therefore, the objective system should deal with those common characteristics:

> "The content of all arts is the same. Only modes and means of expression are different."[229]
>
> "architecture as well as painting and sculpture, and for that matter even music, literature, and dance, display certain common features... all the arts in the final analysis have the same problem to solve, whether on their own or together."[230]

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[228] Doesburg which is one of the founders of the De Stijl group, states his ideas on the pre-De Stijl period and on how this period ended in his "Painting: from composition to Counter- Composition" essay which was published in 1926;
"In 1912 under the title "Attempt at A new Art Criticism," I published my first essays on the new art. I tried to measure my own development of art and came to recognize the universal as the new content of art and the straight line as the new means of expression. These two elements in my opinion, lead to a new style.
I ended this period with an abstract composition that was an abstraction of natural form (Girl with Buttercups). In 1916, after my release from military service, I founded, not without enthusiasm, De Stijl. If the war had not prevented it, I would have started De Stijl in 1914, for I resumed in 1916 where I had left off in 1914, although my work and views may have been purified and sharpened in the meantime. In an article 'From "Nature" to "Composition"', (which appeared in De Hollandsche Revue), I summarized my views in a series of illustrations –abstractions of a subject- and showed how I evolved from naturalistic to pictorial composition". Theo van Doesburg, "Schilderkunst: van kompositie tot contra-kompositie", (*De Stijl*, VII, nos 73-74, series XIII, 1926), p:17. Translated as, "Painting: From Composition to Counter-Composition", in Jaffe, *De Stijl:Extracts from the magazine*, p: 201.

[229] Van Doesburg, *Grundbegriffe Der Neuen Gestaltenden Kunst,* The Baushausbücher series, vol. 6, 1925. Translated as *Principles of Neo-Plastic Art,* Janet Seligman, (London: Percy Lund Hump.& Co ltd., 1968), p:14

[230] Van Doesburg, "From 'Nature' to 'Composition'"(1919), quoted by Allan Doig, *Theo Van Doesburg: Painting into Architecture, Theory into Practice*, p: 5.

> "To construct a new thing, we need a method, that is, an objective system. If we discover the same qualities in different things, we have found an objective scale…"[231]

Doesburg's definition of art, an expression of the conflict between "spiritual" and "material" existences, indicates how he has formulated the problem of "style." In his early *De Stijl* years, Doesburg believed that the possibility of constructing a "new style" is a matter of reconciliation of the either side of the conflict. After the mid 1920s, Doesburg's view seems to have changed. Unlike his early discussions, he believes that the solution is to be found in the expression rather than the reconciliation of the contradictory.

The reasons underlying the creation of a "new style" and how Doesburg deals with the problem of "style" in his theory of art has explained in his lecture " *Der Wille zum Stil Neugestaltung von Leben, Kunst und Technik* (The Will to Style: The Reconstruction of life, art and technology), in Weimar in 1921.[232] Although the seminar is a reflection of his point of view, formed in his early years in *De Stijl*, the argument he comes up with in that seminar constitutes the framework of the theory of architecture that he is attempting to achieve. In that point, Doesburg clearly states that he perceives the production of style as an expression of the reconciliation between the struggling "spiritual" and " material" existences. Hence, "style" is a collective expression of the balance between the opposite poles.(Nature-Spirit, the Feminine-Masculine principles, Negative-Positive, Static-Dynamic, Horizontal-Vertical...).

In his essay, *"Der Wille zum Stil,"* Doesburg has tried to explain the idea that has been the basis of the theory of art throughout history (from the Egyptians to the present day) in the creating of styles in respect to various "nature-spirit" interactions.[233]

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[231] Van Doesburg, and Cornelıs Van Eesteren, "Vers une construction collective (1923)", (*De Stijl*, vol.VI, no:6-7,1924). Translated as "Toward a Collectıve Construction" in Stephen Bann, *The Tradition of Constructivism*, p: 117.

[232] the lecture given by Doesburg in Weimar was also given in Jena and Berlin. The lecture was published in 1922 in the February and March issues of *De Stijl* (vol.V, no:2, pp:23-32, no.3, pp:33-41).
"Doesburg visited Berlin in December 1920, he met Walter Gropius, founder of the Bauhaus, decide to visit the school in Weimar, and then returned to settle there in april 1921. Van Doesburg would have liked a teaching position at the Bauhaus but wasn't offered one. Instead, he chose to combat the romantic and nostalgic tendencies he perceived there by setting upa studio and offering a course in De Stijl principles, which he ran from March to July 1922. he also continued to edit his journal and gave public lectures in which he propounded his definition of a new elemental art language and its relation to the contemporary world." Margolin, *The Struggle for Utopia*, pp: 47-48.

The interactions mainly dwell upon the maintenance of the balance between "nature" and "spirit". According to Doesburg, in the final stage [Neoplasticism (Neue Gestaltung] a kind of balance is achieved by the two : *Cessation of polarity.* Doesburg's idea can be summarized as the utilization of "the knowledge of contrasts" in order to achieve a universal style/harmony/balance that can reflect the unity of art and life.

Doesburg justifies his argument of the style, defined as harmony, balance, unity, with idea of "new consciousness of life." In his essay, *Von der neuen Ästhetik zur materiellen Verwirklichung* (From the New Aesthetic to Material Realization)," it has been explained as "Our new consciousness of life demands the destruction of duality, feels the need for *unity*, for an indivisible, universal reality..."[234] Doesburg makes it possible to discuss a new reality of nature, claiming that "the new consciousness of life" is gained through the developments in science and technology. As a result, "a new style" should express the "new reality."

In "*Der Wille zum Stil*," Doesburg clarifies the change in this expression style (the expression of the reconciliation between the extremes; "nature-spirit") in its process from the past until *Neue Gestaltung* today.[235] He emphasizes that "unconscious

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[233] "instead of theory of rise, expansion and decline, I prefer the concept of a continuous evolution. This continuous evolution is one of the spirit in life and art, but in space and time it takes the form of rise, expansion and decline.
This leads to the conclusion that every new growth contains the seeds of decline, but every decline offers the possibility of a new rise…The whole system of evolution depends on increasing spiritual depth, which causes a revaluation of all values." Van Doesburg, "Der Wille zum Stil: Neugestaltung von Leben, Kunst und Technik", (*De Stijl*, V, no 2 (February 1922), 23-32; V, no.3 (March 1922), pp: 33-41. Translated as "The Will to Style: The Reconstruction of life, art and technology," in Jaffe, *De Stijl:Extracts from the magazine*, p: 149.

[234] Doesburg explains the meaning of "Duality" at footnotes as; "duality means the generally accepted concept of an imaginary, spiritual world in sharp contrasts to a concrete, material world". Van Doesburg, "Von der neuen Ästhetik zur materiellen Verwirklichung" Weimar, 1922 (*De Stijl*, vol.VI, No.1, pp:10-14), translated as, "From the New Aesthetic to Material Realization," in Jaffe, *ibid*, p:181.

[235] Doesburg, explains this development with a scheme; "the two horizontal lines represent the polarities of nature, at the top, and spirit, at the bottom, at their furthest extremes. The gradual reconciliation of these two forces is shown by the triangle, which contains the types of cultural development. The letters, from right to left, signify as follows: E=Egyptians, G=Greeks, R=Romans, M0Middle Ages, R=Renaissance, B=Biedermeier, IR=Idealism and Reform, NG=Neoplasticism *(Neue Gestaltung)* , the epoch which is beginning now. The hatched central line represents the golden mean, the absolute identity of the dual forces of nature and spirit.(Continuous evolution.) the zigzag line within the triangle represents the actual position vis-à-vis the polarities occupied by the artistic and cultural life of each epoch in turn." Van Doesburg, "*Der Wille zum Stil*," in Jaffe, *ibid*, p:150.

creators"'s style of expression, which is made up of image and symbols, has been replaced by that of "conscious creator" and the "plastic form"(direct expression). On the other hand, stating that the existing styles of the "plastic expression" still cannot form a new balance/ a new style, Doesburg attempts to justify the grounds of his own theory:

> "These forms of expression (Romanticism, Impressionism, Cubism, Futurism, Expressionism, Purism, etc.) which show very clearly the struggle for a new balance, a new harmony in the polar elements of life, were experimental because their dominant feature was the spontaneity of nature, though in an abstract form. For this reason it was quite impossible for them to produce a general, architectonic, organically constructive, artistic statement....they were not able to forge a universal collectivist form of expression, not able to create a style."[236]

For Doesburg, the importance of those "isms," which he defines as "the experimental movements," is the discovery of "the power of pure means of expression;…; "colour in painting, mass in sculpture, space in architecture, pure sounds in music, and so on."

Doesburg's most remarkable scientific basis for his argument for the "new consciousness of life" or the definition of "a new reality" is the theory of Relativity and its consequent concept of "space-time". In his essay, "*Der Wille zum Stil*," Doesburg defines "space-time" as a problem of new expression of space in art.

> "as a result of the scientific and technical widening of vision a new and important problem has arisen in painting and sculpture beside the problem of space, and that is the problem of time. In earlier periods in art history the problem of space was dealt with by arranging forms next to each other in perspective; similarly an advance towards the solution of the problem of time was made by placing figures one after another. Exact expression, true

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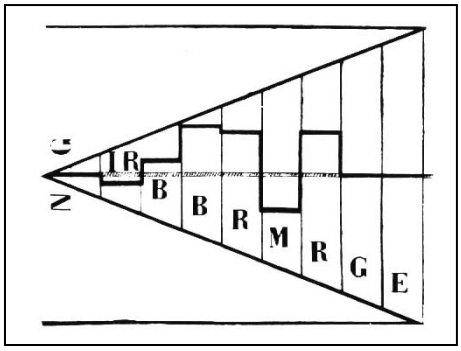

Figure from, <u>*De Stijl:Extracts from the magazine*</u>, Hans L.C. (Jaffé, ed), (1970), p: 150.

[236] Van Doesburg, *ibid*, p:152.

> balance between the impetus of space and time, was made possible only by mechanization of the surface of the picture."[237]

Accordingly, he emphasizes the changes caused by the concept of "space-time" in the modern life as: "You will know just how the mechanical control of the forces of nature and the conquest of space and time affect our daily lives if you have ever used the telegraph, the telephone, an express train, a car, an aeroplane, and so on."

Doesburg defines the features of his theory of art together with the features of the new style as an opposite of the old: "certainty instead of uncertainty, openness instead of enclosure, clarity instead of vagueness, Religious energy instead of faith and religious authority, Truth instead of beauty, Simplicity instead of complexity, Relationship instead of form, Synthesis instead of analysis, Logical construction instead of lyrical constellation, Mechanization instead of manual work, Plastic form instead of imitation and decorative ornamentation, Collectivism instead of individualism etc."

While constructing the "new style," Doesburg is also in search for a form to express it. In a process concluded with the "Elementarist Theory," Doesburg seems to propose various styles of expression accompanied by various theories. Yet, the importance of the process is due to Doesburg's insistence on the scientific justification of his theories. In order to justify his theories, Doesburg utilizes "relativity theory," "space-time continuum," "fourth dimension" as the means of different purposes and different contents.

4.2.2.1. Theo van Doesburg's Elementarist Theory of Architecture

4.2.2.1.1. Instrumentalization of the concepts and theories of Physics for the aim of conceptualization of "Elementarist Theory of Architecture"

Doesburg's search for a solution to the problem of "the expression of the new style" has stemmed from "Neo-Plasticism" in the early years of *De Stijl*. Doesburg

[237] Van Doesburg, *ibid*, pp: 154-155

argues that a theory, tailored for painting, may well be a solution in architecture as well. In his essay, "The Struggle for the New Style" in 1929, Doesburg discusses those early studies in *De Stijl*:

> "It is unquestionably the architectonic character of their pictures which finally enabled the more radical painters to convince the public that their endeavours were serious, and not only to influence the developing architecture but also to dictate the way towards collective construction.
> In 1917, however, things had not got as far as collective construction, although certain painters, in collaboration with architects (Van der leck with Berlage, myself with Oud, etc.), were attempting to transfer their ideas about painting…into three-dimensional space, instead of onto canvas. The idea of a **universal stylistic idea** was **already latent in the attempt to forge an organic link between architecture and painting."**[238]

Doesburg's argument on painting is related to his search for a new spatial expression in different dimensions. In "On looking at New Painting,"[239] Doesburg analyzes the new form of expression in painting. In the essay, Doesburg compares two works produced with the composition of multi-dimensional and multi-colored (gray, black, white) orthogonal figures. Referring to the comparison, he clarifies two different spatial expressions one of which involves a "balanced relationship," while the other does not. Doesburg defines the former as "an expression of the real spirit of the age." Emphasizing the "balanced relationship," Doesburg, really, points out a visual/ illusionary impact of the movement. He defines the impact as a non-two dimensional "aesthetic spatial effect" of a two dimensional order. Doesburg's definition corresponds to the definition of "moto-stereometric form of expression" which he tries to justify with a scientific fact; (four dimensionality):

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[238] Van Doesburg, "The Struggle for the New Style"(1929). Quoted in Doig, *Theo Van Doesburg: Painting into Architecture*, p:1. Emphases added.

[239] Van Doesburg, "On looking at New Painting" (1919), (*De Stijl*, vol.II,NO.9, P.102), in. Jaffe, *De Stijl: Extracts from the Magazine*, pp: 127-131.

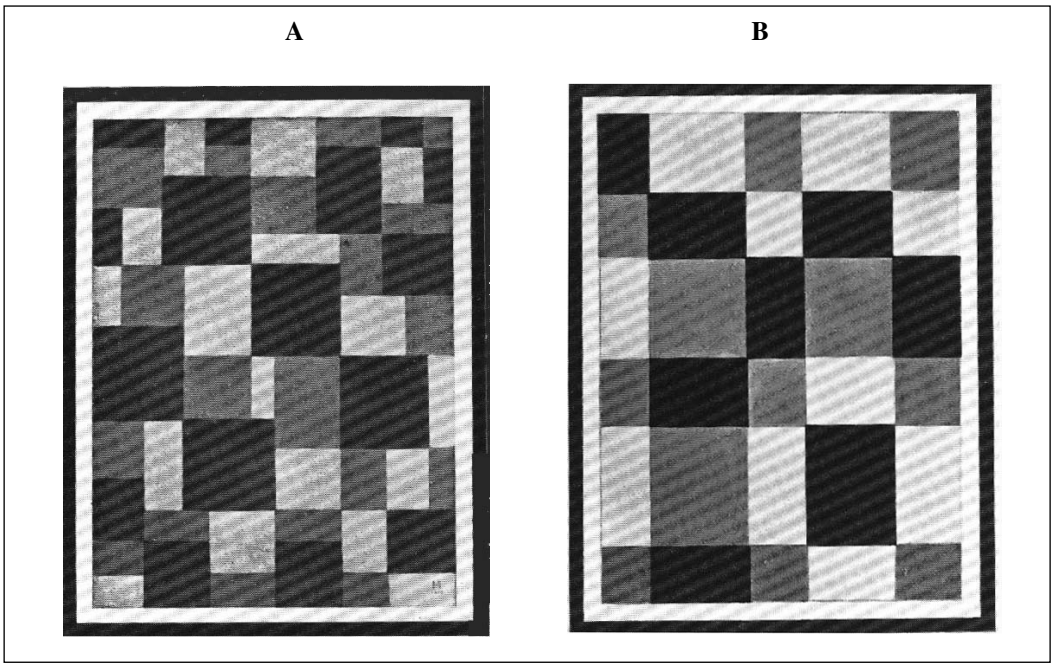

Figure 4.18. Vilmos Huszar, A- Composition in Grey, B-Uncomposed planes, 1918. Doesburg compares the two works in the essay "On Looking at New Painting." (Source: Jaffé 1970) p: 128.

> "…Man as the appearance of utmost internality, of spirit, does not possess any point in front, at the side or the back, no fixed point at all towards which he could define a dimension. This explains why in expressing the spiritual, in making spirit an artifact, he will be forced to a moto-stereometric **form of expression.** This moto-stereometric form expression represents the appearance of a 4-n dimensional world in a world of three dimensions." [240]

Doesburg has been under the influence of the scientists Henri Poincare, Lorentz and the futurist painter Severini while he has utilized the concept of "four dimensionality" in his theories. Doesburg seems well aware of mathematical theory of Relativity formulated by Poincaré and Lorentz. He is particularly into four dimensional geometries. The "moto-stereometic" concept that Doesburg has utilized is also related to Poincare's concept of "motor-space." Doesburg has published Severini's discussions on "four dimensional" geometries with references to Poincare in the journal *De Stijl*.[241]

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[240] Van Doesburg, "Grootmeesters der beeldende Kunst (Great Masters of Plastic Art)," (Eenheid, no:392, 8 Dec.1917). Quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, p: 314.

Apparently, Doesburg's interest in four dimensionality in that period is particularly geometry-based. He states that the style of spatial expression in painting may well be applicable to architecture. In his essay, "From 'Nature' to 'Composition,'' Doesburg explains the idea that the common problem of Painting, Sculpture and Architecture is the "balanced relationship":

> "We can see that architecture is gradually turning away from the arbitrary and picturesque, the capricious and disorderly, and is turning towards constructive necessity and mathematical order, in a word the monumental. For years the same has been true of painting and sculpture. the result is that all the arts in the final analysis have the same problem to solve, whether on their own or together. This problem is the problem of *balanced relationship*, of *creative harmony*."[242]

With the theory of "painting-in-architecture," Doesburg tries to provide architectural space with a similar 'aesthetic spatial effect' which is used in painting. According to Doesburg, the interaction between the impacts of the architecture's "closed relief," resulting from its "constructional property," and the painter's "open relief" leads to the creation of a new 'aesthetic spatial effect,' which shows Doesburg's attempts to form a "dynamic reality." As Doesburg points out "In this opposition, in this complementary relationship of architecture and painting, of plastic form and flat colour, pure monumental art finds its basis."[243] In his essay, published in *De Stijl*, he explains the applicability of this spatial effect in architecture;

> "The ascending staircase, the breached walls, the side benches and the bench in the upper passage all have a logical functional importance which, comprised in a single organic form, is plastically externalized. This form produces, from whatever side it is seen, a surprising rhythmical effect.
>
> Both in the composition of the tiled floor and in the painting of the doors, etc., an aesthetic spatial effect through destruction has been achieved by

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[241] "In a Sept.22, 1918 letter to the poet Antony Kok, Van Doesburg wrote that he had read Henri Poincare's *New Mechanics* and E.Cohn's *The Physics of Time and Space* and, furthermore, recommended that Kok read "the Relativity theory of Professor Lorentz. Also, the Severini's "La peinture d'avant-garde" was republished in De Stijl in 1918 and he discusses geometries of four dimensions with reference to Poincare". Hatch, "Nature's Laws & the Changing Image of Reality in Art & Physics," pp: 264-265.

[242] Van Doesburg, "From 'Nature' to 'Composition'"(1919), quoted in Doig, *Theo Van Doesburg: Painting into Architecture, Theory into Practice*, p: 5.

[243] Van Doesburg, "Notes on Monumental Art with reference to two fragments of a building", (*De Stijl*, vol. II, no.1), pp: 10-12, in Jaffe, *De Stijl: Extracts from the Magazine*, p: 101.

> other means, i.e., by means of painting-in-architecture. It is true that the floor is the most closed surface of the house and therefore demands, from an aesthetic point of view, a counter-gravitational effect by means of flat colour and open spatial relationships..."[244]

In his essay, "Painting: From Composition to Counter-Composition" (1926), Doesburg has associated his search for "painting-in-architecture" with his works in the early years of *De Stijl*, and he has defined that period as "the period of Classical abstract composition." He has stated that he abandoned that approach in 1924; "In 1924, with the white-black-grey composition illustrated in this issue, I ended what I now regard as the period of Classical abstract composition."[245] As indicated in the title of the essay, Doesburg sees "Counter-Composition" as a new expression of the "style." Accordingly, with Counter-Composition, Doesburg forms "Elementarism" as an "ism."

Elementarist theory doesn't change Doesburg's main objective which is constructing "a new reality." He expresses this idea occasionally in the manifesto titled *Elementarism* in *De Stijl*;

> "ıt is absolutely necessary for a new orientation that we recognize this increasing need for reality in its development from an isolated abstract-religious culture that is no longer suited to our nerves.
>
> The struggle which began with Elementarism is concerned with the following: to destroy completely the illusionist view of the world in all its forms (religion, stupor of nature and art, etc.,) and yet, at the same time, construct an elementary world of exact and splendid reality." [246]

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[244] Van Doesburg, *ibid*, p: 102.

[245] Van Doesburg, "Painting: From Composition to Counter-Composition," in Jaffe, *ibid,* p: 201.

[246] Van Doesburg, "Elementarism" (fragment of a manifesto), (*De Stijl*, vol. VII, no.78), p:82-87, in Jaffe, *ibid*, pp: 215-216.

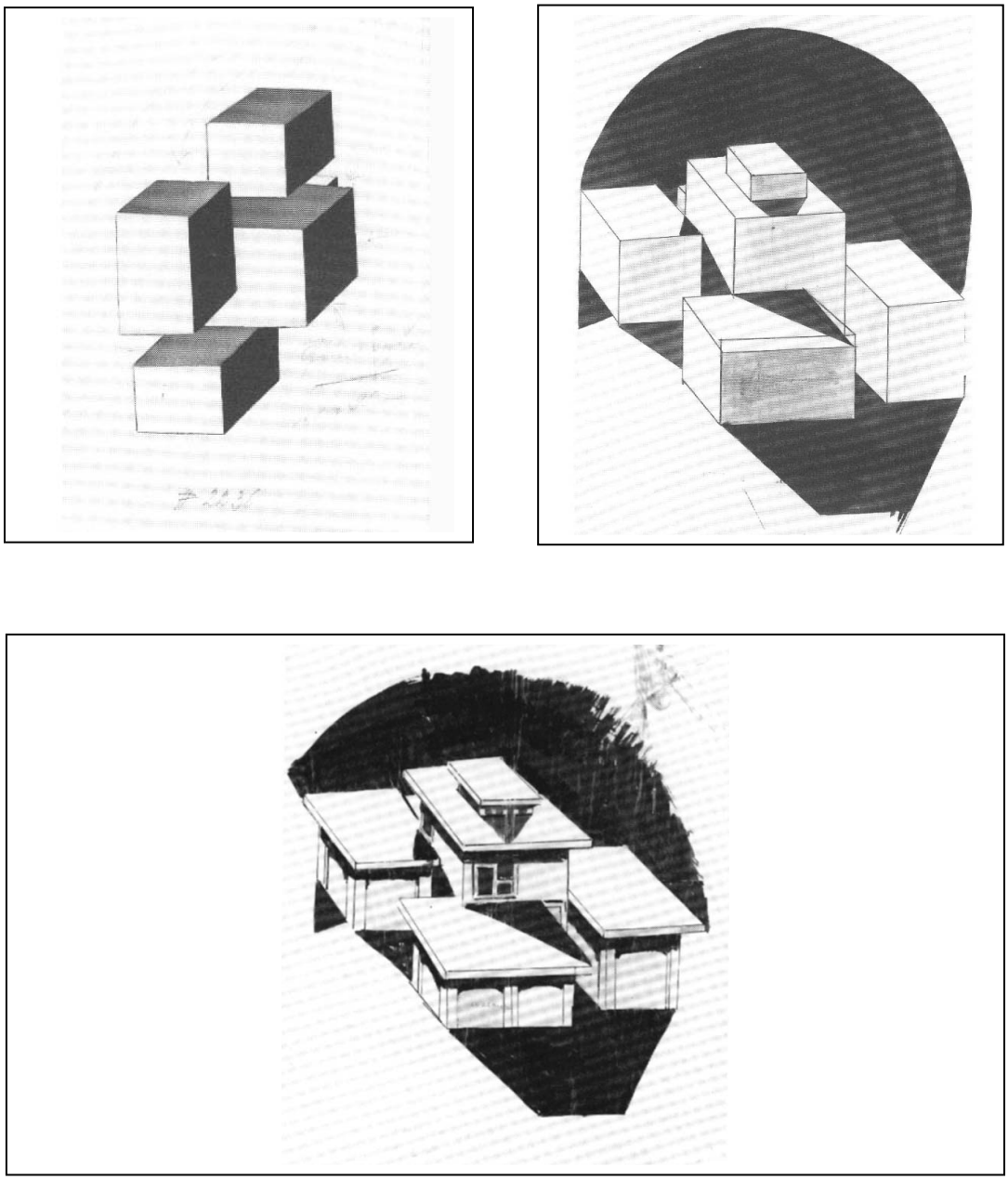

Figure 4.19. Van Doesburg's works, based on geometrical forms, in his early priod. Top left, Composition with five cubes, 1923. Top right, Pavilion for relaxation refreshment in the middle with 4 open verandas, 1923. Bottom, Elementary means of architecture, 1923. (Source: Doig, 1986), pp: 202-203.

In order to emphasize the need for reality Doesburg argues that people should be concerned about the reality itself rather than the indirect expression of the reality: abstraction (in Neo-Plasticism):

> "Elementarism, moreover, is real instead of abstract.
> In relation to visual forms of expression such as painting and sculpture, the concept of abstract is highly relative. Abstraction belongs to one of those spiritual operations in which (in contrast to the spontaneity of the emotions) certain (aesthetic) values were isolated from real things. Nevertheless, when these values became visual and were applied as a pure constructional means, they became real. Thus the abstract was associated with the real, thereby demonstrating the relative nature of the concept.
> The expression 'abstract-real' (Mondrian) was, therefore, a happy invention. But, for a new orientation, we can rest content with real.
> The age of abstraction is past."[247]

With the Elementarist theory, Doesburg emphasizes "dynamism" the same way he does in the period he calls "Classical abstract composition," and he recognizes the "dynamic reality" as the main obstacle. The most important difference appears in the means to justify his argument of "reality."

Doesburg attempts to express his Elementarist discourse referrring to Einstein's theory of Relativity. In other words, referring to Einstein's theory of Relativity, Doesburg tries to come up with a new definition of " reality" on which he can ground the problem of "expression" to justify the Elementarist theory in scientific terms. In his essay, "Painting: From Composition to Counter-Composition," Doesburg discusses "relative nature";

> "Although there exist no objective and absolute laws, independent of an ever-deepening and changing way of thought (which, if they did exist, would lead to dogmatic rigidity) –no fundamental, objective truths, no universal truth- the specific gravity of our spirit has nevertheless become calculable.
> If optical vision had not changed into a more-than-sensuous, a super-sensuous vision, our age would never have produced the courage to see spirit in matter."[248]

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[247] Van Doesburg, "Schilderkunst en plastiek: over contra-compositie en contra-plastiek- Elementarisme", (*De Stijl*, VII, nos 75-76, series XIII, 1926), pp: 35-43. Translated as "About Counter- composition and Counter-sculpture. Elementarism", in Jaffe, *ibid*, p: 207.

[248] Van Doesburg, "Painting: From Composition to Counter Composition", in Jaffe, *ibid*, p: 203.

Defending that this reality brings about a new concept of space, Doesburg emphasizes the need for a new plastic concept. Consequently, he leads to a theory based on the concept of "space-time":

> "Just as the longing to enrich our concept of space by means of mathematics continually enriches our power of imagination (intuition or conciousness) with a new dimension by assuming a new direction in relation to the direction already known, so also does the urge towards enrichment of our concept of plasticism make our consciousness accessible to a new polarity, but on a completely different and higher plane than the earlier, Classical polarity between nature and spirit."[249]

Doesburg claims that the expression of a new space (to express the unity of space-time), resulting from the theory of Relativity, is applicable to architecture as well; thus, he centers his studies around architecture. Apparently, Doesburg's focus on the concept of "space-time" and theory of Relativity is noticeable in his seminars in Weimar in 1921.[250] Yet, the formulation of his theory as a new form of expression (Elementarist theory and counter-compositional expression) emerges by 1924.

Doesburg formulates "Elementarism" as an approach opposing to all,"dogmatic, one-sided, absolute...," plastic views of the past. Coming with such an approach, Doesburg studies similarities between "Elementarism" and " Relativism":

> "Elementarism is to be regarded, therefore, as the synthesis of the new plastic consciousness of the age. The 'isms' of the last decades have mostly perished either because of their one-sided, dogmatic limitations, or because of compromise or chauvinistic tendencies. They no longer have any force or value for renewal.
>
> Elementarism finds its equivalent in Relativism, in the latest researches into matter and in the phenomenological propositions relating to the unlimited, yet latent, power of human intelligence. Opposed to all religious dogmatism, the Elementarist sees in life only a transformation perpetuelle and, in the creative subject, a contrasting phenomenon."[251]

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[249] Van Doesburg, *ibid*, p: 205.

[250] In this period, he also produced some architectural projects. In 1922-1923, Doesburg collaborated with a Dutch architect, Cornelius van Eesteren, whom he met in Weimar in 1922. Hatch, "Nature's Laws & the Changing Image of Reality in Art & Physics," p: 272.

[251] Van Doesburg, "About Counter- composition and Counter-sculpture. Elementarism" in Jaffe, *De Stijl: Extracts from the Magazine*, p:210.

The approach of Doesburg also implies that the subject is determining and active in the perception of "reality"(experiencing reality): "the elementarist denies emphatically any objective influence, he is aware that everything became, becomes and will become reality through the subject, who recognizes it...The artist's life consciousness led through emotion..."[252] Accordingly, Doesburg denies "traditional absolution in any forms " and claims that a "uniform" plastic impact is not manageable;

> "Elementarism preaches the total destruction of traditional absolution in any form (the nonsense about a rigid opposition as between man and woman, man and god, good and evil, etc.) The Elementarist sees life as a vast expanse in which these life factors are constantly alternating with one another. The positive differences are only imaginary, and yet have become completely neutralized and uniform as reality. The Elementarist opposes to this uniformity the absolute concept of a universal movement. It even includes his personal ego. Thus neither does it give plastic expression to a fixed point, while consciousness as a product or goal of life occupies an elementary position (fulfillment of consciousness)."[253]

Doesburg theorizes the search for a solution to the problem of "a new expression of space" in order to express the "dynamic reality" in two aspects, which clarify how Doesburg bases his theory on science. Utilizing "time" as a "modern element of Plasticism," he emphasizes the "dynamic plastic expression in art", and he expresses the theory by the concept of "space-time" in order to justify his theory scientifically. In his "Elementarist manifesto," Doesburg argues that he bases "time" in his theory as "a modern element of Plasticism";

> "**Elementarism has recognized Time as a modern element of plasticism**... in consequence, synoptical effects also acquired a fundamental importance…Elementarism is an exclusively universal method of plasticism and production. It is opposed to all compromise as well as to alt dogmatic one-sidedness. It is to be conceived as the most vital means of expression of the modern spirit. It is the product both of Neoplasticism and of a new orientation in the modern scientific and technical spheres." [254]

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[252] Van Doesburg, "Elementarism" in Jaffe, *ibid*, p: 216.

[253] Van Doesburg, "Elementarism" in Jaffe, *ibid*, p: 217.

[254] Doesburg explains the meaning of "synoptical" in the footnotes of the essay as: "simultaneous visual summation of the different parts beloning to a whole." Van Doesburg, "About Counter-composition and Counter-sculpture. Elementarism", in Jaffe, *ibid*, pp: 209, 212. Emphases added.

On the other hand, in order to offer a solution for the problem of "expressing the dynamism," Doesburg attempts to define the problem as "an anti-static visual expression." While explaining the impact, to be called "visual motion," Doesburg refers to the scientific concept of "four dimensionality." In his essay, "*L'Evolution de l'architecture moderne en Hollande*(1925),"[255] Doesburg exemplifies his formulation of "the concept of time" as "the unity of space-time." In the essay, in which he discusses the basic elements of the new architecture, Doesburg, with an emphasis on time, justifies his argument that "the unity of time and space" is one of the basic elements; "10. SPACE AND TIME - The new architecture takes account not only of space but also the magnitude *time*. Through the unity of space and time the architectural exterior will acquire a new and completely plastic aspect. (Four-dimensional space-time aspects)." [256] Doesburg clarifies the concept of "time" with the movement of people; "Through this relationship of 'dynamic man' to space, a new notion was established in architecture, the notion of time."[257] In the course of that particular "movement," Doesburg questions the formation of a "visual movement effect/impact" (to free from the pull of gravity).

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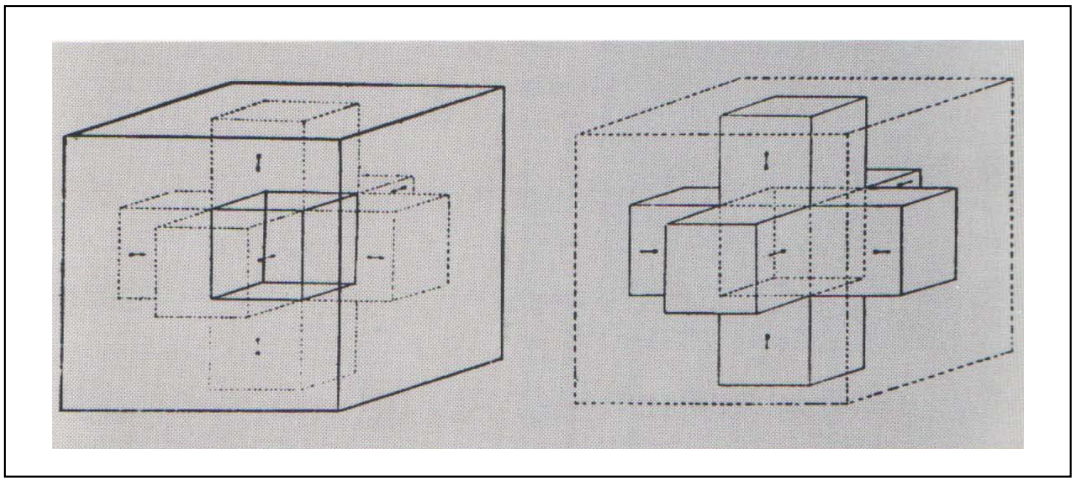
[255] Doesburg, at first, listed sixteen considerations basic to the new architecture in the article titled "Tot een Beeldende Architectuur," published in De Stijl in 1924. Van Doesburg, "Tot een Beeldende Architectuur", De Stijl, vı/6-7 (1924). Translated as "Towards a plastic architecture", in Ulrich Conrads, *Programs and Manifestoes on 20th century Architecture* , pp:78-80.
When the article was published in L'Architecture Vivante as "L'Evolution de l'architecture moderne en Hollande," Van Doesburg added a seventeenth point. Van Doesburg, "L'Evolution de l'architecture moderne en Hollande," L'Architecture Vivante, Autumn and Winter 1925, (14-20), p:19. Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, pp: 324-325.

[256] Van Doesburg, "Towards a new architecture", in Conrads, *ibid*, p:79.

[257] Van Doesburg, "Space-Time and Color", (De Stijl, xv/87-9, 1928). Quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, p: 326.



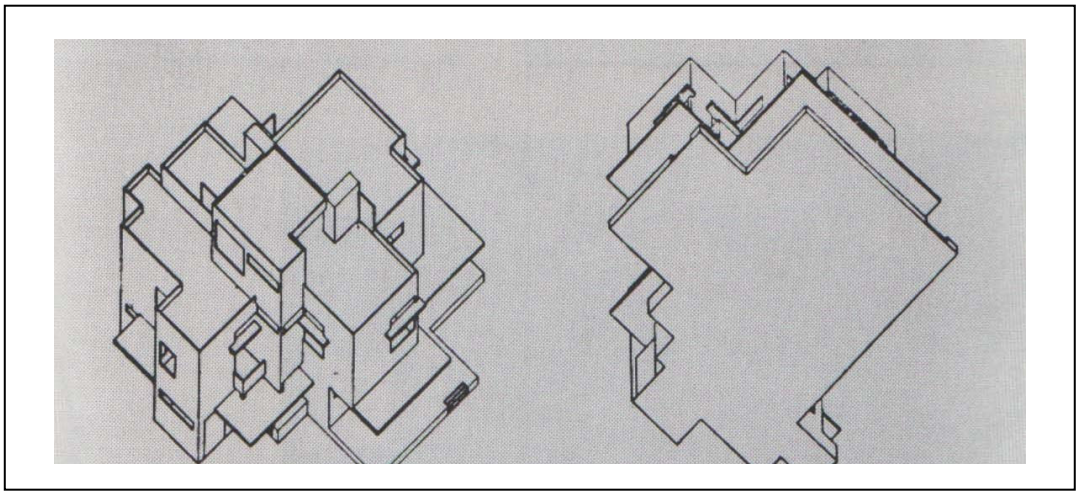


Fig.4.20. The images from Doesburg's "*L'Evolution de l'architecture moderne en Hollande*," *L'Architecture Vivante,* 1925. Above, illustration cube and hypercube; below Theo van Doesburg and Cornelis van Eesteren's a project for a private house, 1923. (Source: Henderson, (1983).

Doesburg's discourse, which recognizes time as an architectural value, is not any different from his early ideas expressed in "*Der Wille zum Stil*" in 1922.[258] The

[258] Van Doesburg, "The Will to Style: The Reconstruction of life, art and technology", in Jaffe, *De Stijl:Extracts from the magazine*, pp: 154-155.

analysis of the concept of "Counter (or anti-static) composition," is important to comprehend Doesburg's theory. Doesburg attempts to construct an architecture with a visually dynamic character. Accordingly, he argues that static features of architecture might be altered, and he tries to explain it. He also claims that architecture may attain a dynamic character by changing its static structure, which is subject to gravity, and its orthogonal plastic impact which connects itself with the static structure;

> "Orthogonal composition, in which extreme tension, horizontal-vertical, was neutralized, retained –as a relic of Classical composition- a certain homogeneity with the static nature (load and support) of architecture.
> Counter -(or anti-static) composition has freed itself completely from this homogeneity. Its contrasting relationship with architecture is to be compared (but at another level) with the contrasting relationship between white, flat architecture and gray, curved nature."[259]

In the thirteenth item-*Astatique* of his essay, "*L'Evolution de l'architecture moderne en Hollande*," Doesburg indicates the underlying motives of his search for a new plastic expression in architecture (visual dynamism by the opposition to the force of gravity), and he also discusses how to maintain such an argument (anticubic organization) in scientific terms (time as a fourth dimension):

> "the new architecture is anticubic, in other words, its different spaces are not contained within a closed cube. On the contrary, the different cells of space (balcony volumes, etc., included) develop excentrically, from the center to the periphery of the cube, **so that the dimensions of height, width, depth, and time receive a new plastic expression.**
> Thus, the modern house will give the impression of floating, suspended in air, in opposition to the natural force of gravity."[260]

Fundamentally, Doesburg propose a composition in which the surfaces of different colors are composed in a diagonal scheme. Yet, the formulation of the proposal and his endeavor to justify it scientifically leads to a new discussion for a new theory. Initially, Doesburg's theory is a diagonal scheme defining the compositional order of surfaces clearly. Yet, in theory, the scheme is accepted/formulated by Doesburg as a basic

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[259] Doesburg footnoted that he used "orthogonal" as the equivalent of the "vertical." Van Doesburg, "About Counter- composition and Counter-sculpture. Elementarism", in Jaffe, *ibid*, p:208.

[260] Van Doesburg, "L'Evolution de l'architecture moderne en Hollande,"quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, p: 324. Emphases added.

element to achieve a dynamic impact in fourth dimension versus static one which is based on a "horizontal-vertical interaction."[261]

In his theory, the next point is creating the color. He formulates color as a basic element to achieve a "dynamic plastic impact in four dimensions in the field of time-space." In his manifesto, published in *De Stijl*, Doesburg discusses his intentional "plastic expression" referring to "Elementarism" and the concepts of "space-time" and "four dimensionality" ;

> "Elementarism rejects the demand for an absolutely static state which would lead to rigidity and cripple creative potential.
> Rather than denying the existence of time and space, Elementarism recognizes these factors as the most elementary of a new plasticism. Just as Elementarism tries to bring the two factors, statics and dynamics (rest and movement), into a balanced relationship, so equally does it strive to combine these two elementary factors, time and space, into a new dimension. **While the expressive possibilities of Neoplasticism are limited to two dimensions (the plane), Elementarism realizes the possibility of plasticism in four dimensions, in the field of time-space.**
>
> **Elementarism opposes to the orthogonal method of plasticism**, that is homogeneous with natural construction, a heterogeneous contrasting, labile method of expression by means of sloping planes relative to the static, perpendicular axis of gravity.....

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[261] The meaning of the "diagonal" is related with Doesburg's "visual philosophy." Doesburg sees "diagonal" as a visual expression of the "spirit" in the "spirit-nature" contradiction. He states the idea clearly;
"On the one hand, he t concept of 'counter-composition' is opposed to Classical –albeit abstract-composition and to the Classical plastic concept.On the other hand, it is opposed to the fundamental universally prevailing structural elements of nature and architecture.
Of course, the latter were important for development....but man has only recently discovered himself and his own age. It is our age which has produced the need for contrast. The latter was realized not only in the external manifestation of colour and matter plasticism, but also and chiefly in the tempo of life and in the technique of the daily mechanical functions of life, such as standing, circulation, driving, lying, sitting- in fact, in everything that comprises the content of architecture.
The vertical walls of our dwelling, the horizontal planes of floor and ceiling, and the intermediate vertical and horizontal planes, table, chair,cupboard, bed, etc., are sufficent proof of this. These movements, in so far as they were connected with industry, have now been taken over by machines.
In short: we execute our physical movements in the horizontal-vertical direction.
Through the continual repetetion of these natural movements they have become more or less mechanical. Our spirit plays no part in it. Our spirit,...opposes this natural 'mechanism' and assumes a completely new dimension...
Horizontal-vertical (H.V.) is the fundamental content of physical, real and optical nature. The Classical principle of art was to bring these two into plastic unity through equilibrium, but this principle proved inadequate to express the modern spirit, which is characterized by the need for the sharpest contrast of nature, physical structure and of every symbolic romanticization of the latter".
Van Doesburg, "Painting: From Composition to Counter-Composition", in Jaffe, *ibid*, pp: 202-203.

> If Neoplasticism has already (and rightly) rejected symmetry, associated with our natural organic structure, it also lay in its line of development to reject orthogonalism, associated with our natural organic structure, as the only possible means of expression. This is what **Elementarism does, when, through the suppression of a rigid static state, it arouses in us a new spiritual movement, accompanied by a new optics**."[262]

Therefore, Doesburg replaces an 'expression based balanced relationship" with a "non-balanced counter-composition," a theory previously postulated by him; "Elementarism opposes to the balanced relationship composition of Neoplasticism: non-balanced counter-composition as a phenomenon of a time-space tension of colour, line or plane, always in opposition to the natural and architectural structure."[263] Doesburg transforms the element of "color" into an element of "design" which is another agent to achieve the impact of a four-dimensional expression in visual dynamism:

> "15.COLOR-….The new architecture uses color organically. Color is one of the elementary means in rendering visible the harmony of architectural relationships. Without color, proportional relationships do not have a living reality. **It is by color that architecture becomes the fruition of all plastic researches in time as well as in space**…with the birth of modern architecture the painter-constructor found his true field of creative action. **He organizes color aesthetically in space-time and makes a new dimension visible plastically**…"[264]

In the early period, in the essay, "*Der Wille zum Stil*," Doesburg argues that expressing the unity of "space-time" in architecture can be achieved only by the use of color ;

> "In modern architecture the problem of colour and space is the most important, indeed it is the most difficult problem of colour and space is the most important, indeed it is the most difficult problem of our age. In my opinion the solution will be found only in a monumental synthesis. A reconciliation between impulses of space and time can be effected only in chromo-plasticism, that is, in treating three-dimensional space as a painter's composition."[265]

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[262] Van Doesburg, "Painting and Sculpture[Elementarism(Fragment of a Manifestop)]", in Jaffe, *ibid*, pp: 213-214. Emphases added.

[263] Van Doesburg, "Painting and Sculpture[Elementarism(Fragment of a Manifestop)]", in Jaffe, *ibid*, p: 215.

[264] Van Doesburg, "Towards a plastic architecture." Quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, p: 325. Emphases added.

While Doesburg defines "color" as "matter" and "independent energy": "Elementarism rejects the modulation of color, that had its origin in illusionism. Each color possesses, as pigment, as matter, an independent energy, an elementary force".[266] He also focuses on the dynamism resulting from the contrasts between the unifying energies of color: "For the plastic architect, it is essential to experience the differences of energy among the various materials in order to achieve, by means of the various contrasts in energy, the pure plastic expression of color which has been established by painting."[267] Yet, Doesburg explains it within the concept of "space-time"; "the new architecture permits color organically as a direct means of expressing of relationships within space and time."[268]

His submission to the definition of "color" as "matter" and " independent energy" is also rooted in Physics. In his essay "From the New aesthetic to Material Realization"(1922), Doesburg clarifies the effects of the visual energy/movement of "color" in terms of physical theories concerning the substance of matter:

> "Thanks to advances in physics, our age has seen not only the shattering of the belief in matter as a solid body, but also, in art, the acceptance of matter as, in essence, energy.
>
> It is fundamentally important for the creative architect to recognize the differences in energy between different materials, so that he can use these differences, to realize what painters have indicated in the basic material of creative art: Color."[269]

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[265] Van Doesburg, Der Wille zum Stil: Neugestaltung von Leben, Kunst und Technik", in Jaffe, *De Stijl:Extracts from the magazine*, p: 161.

[266] Van Doesburg, "Schilderkunst en plastiek: over contra-compositie en contra-plastiek-Elementarisme", in Jaffe, *ibid*, p:211

[267] Van Doesburg, "The New Aesthetic and its Realization" (1922), in Jaffe, *ibid*, p: 181.

[268] Van Doesburg, "Towards plastic architecture"(1924), in Conrads, *Programs and Manifestoes on 20th century Architecture*, p: 80.

[269] Van Doesburg, "The New Aesthetic and its Realization" (1922), in Jaffe, *De Stijl:Extracts from the magazine*, p: 181.

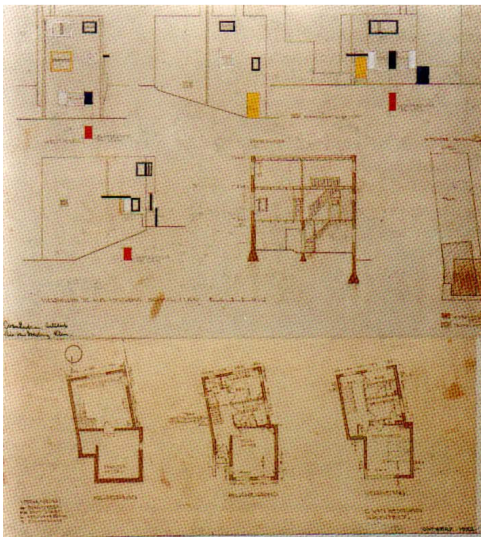

Figure 4.21. Van Doesburg's color scheme of Cornelis van Eesteren's house, Ablesserdam, 1924. Elevations, cut-away and plans. (Source: Overy 1991).

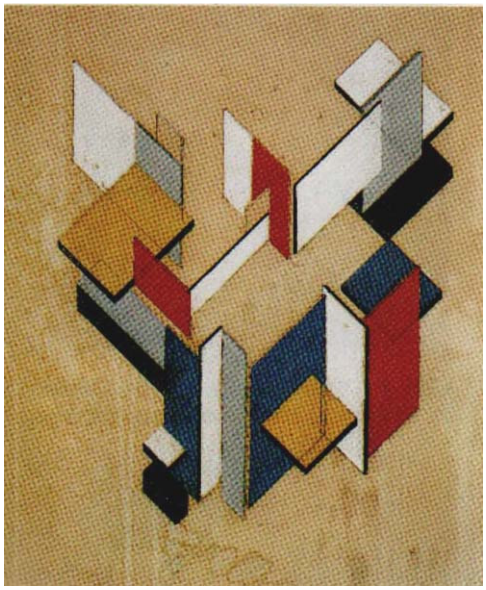

Figure 4.22. Van Doesburg's color design for Ciné Dancing, Aubette, Strasburg, 1926-28. (Source: Overy 1991).

In Doesburg's formulation of the diagonal scheme, two factors are effective. On one hand, he formulates the diagonal scheme as a "plastic expression of time" that he recognizes as the fourth dimension. In other words, the diagonal is the path through which "visiual motion" operates. On the other hand, the diagonal is formulated as one of the basic elements to achieve a "dynamic" impact which opposes to the "static" one as a result of the "horizontal-vertical interaction"; "adds to orthogonal, peripheral composition a new diagonal dimension. Thereby dissolving in a real manner horizontal-vertical tension. Introduction of sloping planes, dissonant planes in opposition to gravity and static architectural structure."[270]

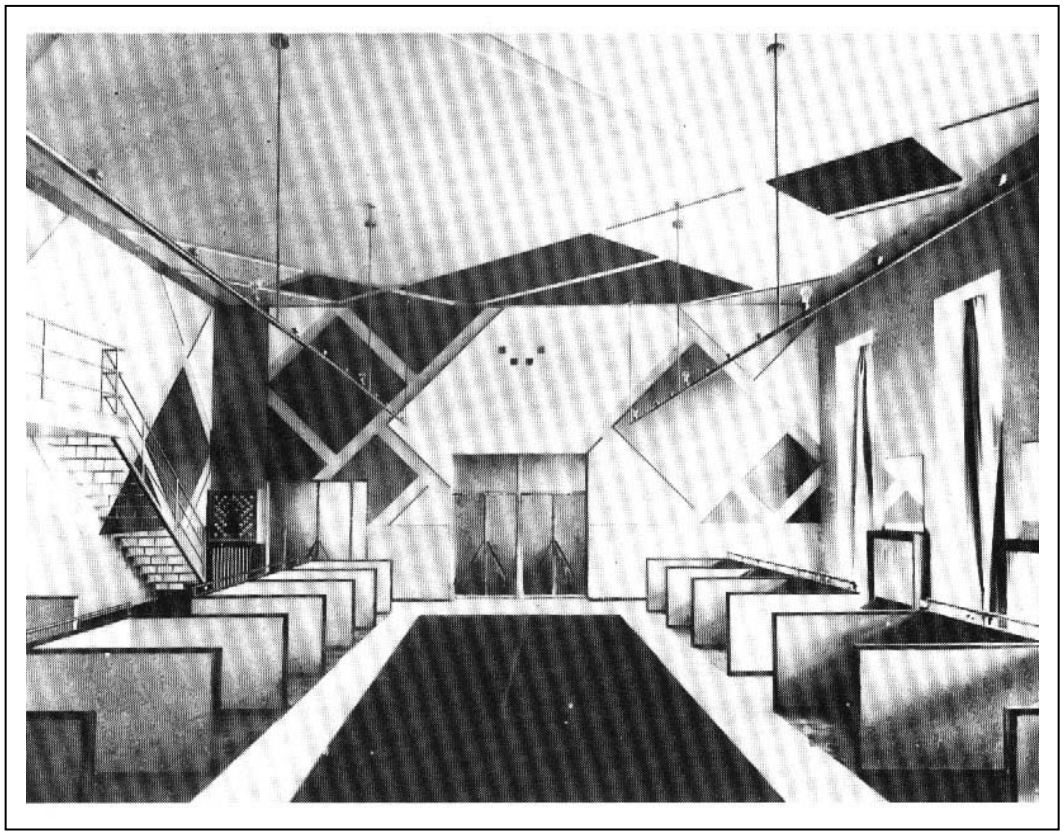

Figure 4.23. Van Doesburg's Colour scheme for the *Grande Salle Face Côté Bar et Foyer*, 1927. (Source: Doig, 1986), p: 188.

[270] Van Doesburg, "Schilderkunst en plastiek: over contra-compositie en contra-plastiek- Elementarisme", in Jaffe, *ibid*, p: 209.

Afterwards, Doesburg has questioned the expression of "space-time continuum" which is based on the composition of surfaces, and then he has attempted to offer a solution through film techniques;

> "The attempt to create, through film technique, the dimension of time lacking in static pictures leads only to frustration, because those coming from a tradition of painting consider the projection screen a canvas. Experiments of this kind (Eggling) go no further than moving graphic design. What has been offered us up to now as abstract film was based on the erroneous idea that the projection surface was equivalent to the picture surface of traditional painting."[271]

For that reason, he has attempted to provide the "projection surface" with a "multi-dimensional" characteristic. In order to achieve that, Doesburg brings about the "hypercube." Accordingly, he discusses the possibility of discharging Euclidean statistics in search for achieving a dynamic visual effect during the process of "movement":

> "the second stage will form this crystalline space through color, orchestrated by means of movement. The spectator will look into a completely new world, he will be able to follow the whole process of this dynamic light-sculpture like the orchestral work of Schönberg, Stravinsky or Antheil. From this it follows that the spectator space will become part of the film space. The separation of 'projection surface' is abolished. The spectator will no longer observe the film, like a theatrical presentation, but will participate in it optically and acoustically. For the film of the future is not a constant and mute from like painting, but a new expressive possibility simultaneously optical and phonetic…
>
> The new experiments, geometrically oriented, succumb to laws of an almost architectural structure for a multidimensional film space. Thus, more scientific than artistic, they prepare the way for an orchestration of film to be developed in totally new and unsuspected dimensions."[272]

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[271] Van Doesburg, "Film as Pure Form," Die Form, IV (15 May 1929). Quoted in Henderson, *The fourth Dimension and Non-Euclidean Geometry in Modern Art*, p: 332.

[272] Van Doesburg, "Film as Pure Form," Quoted in Henderson, *ibid*, p: 333.

4.2.3. Scientification in Karel Teige's "A Method for Architecture"

Karel Teige has recognized architecture as a science in his theory of architecture which dated back to 1923.[273] Karel Teige's "architecture as a Science" argument involves his ideas centered around the theory of architecture, the works of architecture and the definition of "the architect." The discourse seems to serve to the idea of creating a socialist order as a consequence of a chaotic, capitalist one caused by the World War I.

Teige, in general, explains his search for a new order with his ideas on the necessity of " a new organization of the world." His proposition aims at constructing a "unitary" and "rational" system which involves all aspects of life and organizes them. In other words, it is an idea focusing on the necessity of an organization of "the world" and "life". In his essay, Teige discusses the purpose as "a plan for the new world," "a programming of life" and " an organization of life." For Teige, in order to achieve that purpose, architecture should undertake a pioneering role, and such a role requires a certain theory.[274] Hence, Teige has attempted to postulate a theory to offer architecture a new path/method.

Obviously, Teige justifies his own architectural argument with the definition of "a new world." Creating a new world and basing it on an intellectual background are the main objectives of his discourse. The initial indications of that idea are apparent in "*Obrazy a předobrazy* (Figurations and Prefigurations)," his first text on Modernism; "normally, the end of culture would signfy the end of world…but for our era, it signifies

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[273] "Until the summer of 1922, architecture was peripheral to Karel Teige's activities. In the texts written between 1919 and 1922, he occasionally mentioned Czech cubist architectural projects…Teige's system of ideas went through one such fundamental transformation in the period from 18 June to 12 July 1922, when he made a trip to Paris. " Teige met Corbusier and Amédée Ozenfant in Paris and he was affected by their Purist work. Rostislav Švácha, "Before and after the Mundaneum: Karel Teige as theoretician of the architectural Avant-Garde," in Eric Dluhosch, R. Švácha, (eds.), *Karel Teige; L'Enfant Terrible of the Czech Modernist Avant-Garde*, (Cambridge, MA: the MIT press, 1999), pp: 108-111.
In 1923 he joined to *Stavba* (Building) magazine's editor group. He published the essay, "K nové architektuře (Toward a New Architecture)," in 1923 under the influence of Le Corbusier's purism. In the essay Teige defined Corbusier's Vers une Architecture study as "a sign of a new dawn of the architectural era".. Teige, "K nové architektuře," Stavba 2 (1923), pp: 179-183. Translated by Irena Žantovská Murray as "Toward a New Architecture," in *Modern Architecture in Czeschoslavakia and either Writings*, (Los Angeles: the Getty Res.Inst., 2000), pp: 309-315.

[274] Karel Teige, *Nejmensi byt*, (Prague:Vaclav Petr, 1932). Translated by Eric Dluhosch, *Minimum Dwelling*, (Cambridge, MA: the MIT press, 2002) p: 399.

a new beginning. It is for this reason that we must create a new concept of the moral and intellectual map of a new world and of genuine humanity…"[275]

Teige justifies the definition of "a new world" in different aspects one of which is the new social-economical situation after the World War I, and the second one is the developments in science and technology. Consequently, Teige leads to the discussion of "A New architecture-A New Century." Accordingly, he tries to determine the responsibility of architecture which is supposed to construct "a new world" based on the rational/accurate solutions offered by science and technology as a reaction to fragile social and economical structure; "New architecture in Czechoslovakia… is naturally grounded in an international context. Its task, like the task of contemporary architecture in all countries, is to build a new world."[276]

Influenced by the Hegelian view of history, Teige's new theory of architecture has been centered around the idea of "destruction of the old" and "construction of the new". In his essay, "*Nové omni proletářské*" (1922) Teige discusses;

> "developmental continuity… does not constitute mechanical progression; development occurs in conditions of contradiction and builds up an authentic synthesis in the midst of the tensions brought about by (the Hegelian concept of) thesis and antithesis. The ensuing synthesis in turn emerges as the thesis for the following period, antithetically focused in relation to the previous period." [277]

Consequently, in Teige's architectural discourse "the new" rises on "the old." In this process, developments in science and technology has been recognized as stimulating elements. Therefore, in order to build his own ideas, Teige has showed an interest in the criticism of "the old" as well.[278] For example, one of the most remarkable

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[275] Karel Teige, "Obrazy a *předobrazy*," Musaion 2 (1921), p:51. Quoted by Eric Dluhosch**,** Introduction, *Nejmenši byt*, p: xvii.

[276] Karel Teige, "Moderni architektura v Ceskoslovensku", Mezinarodni soudoba architektura 2 (1930, p:5-291). Translated by Irena Žantovská Murray as "Modern Architecture in Czeschoslavakia" in *Modern Architecture in Czeschoslavakia and either Writings*, p: 277.

[277] This text is an introduction of Devětsil's *Revolučni sbornik Devětsil* (Revolutionary Anthology of Devětsil) (Praque, 1922),p:5-22. Quoted by Karel Srp, "Karel Teige in the Twenties: The Moment of Sweet Ejaculation," in in Eric Dluhosch, R. Švácha, (eds.), *Karel Teige; L'Enfant Terrible of the Czech Modernist Avant-Garde*, p: 17.
Devětsil has become the focal point for intellectual, literary, artistic, heather, and architectural activities of the young left avant-garde in Czechoslovakia between the years 1920 and 1931. Teige has been the spokesman of the group. Eric Dluhosch, Rostislav Švácha, (eds.)**,** *ibid,* p: 350.

studies of Teige to clarify how he theorizes his ideas, "*Modern architektura v Československu* (Modern architecture in Czechoslovakia)," opens with the criticism of the nineteenth century.[279] Similarly, in the first chapter of his "*Nejmenši byt* (Minimum Dwelling),"[280] with a detailed history of the issue of "Housing," Teige attempts to offer solutions to the problem of housing which he recognizes as the most important problem in architecture.

Teige's main criticism of the architecture in the nineteenth century is that it cannot serve the facts/ needs of "the new world"; conversely, it associates with the past. While Teige brings about a criticism of the "nationalistic" (as a follower of "historicism") approach, he recognizes the developments in science and technology as inevitable facts of the new world, and he criticizes architecture for not being able to respond to those developments. In his study, *Modern Architecture in Czechoslovakia*, Teige has clarified his argument with examples and comparisons.

In his study, Teige's comparison of the architectures in the imperial age and the post imperial age is remarkable in that it helps to realize how Teige attempts to theorize an order in architecture. According to Teige, the Imperial Style was capable of bringing rational answers to the forms of the era. Likewise, architecture was able to reply the conflicts of the era by providing a unity of construction and architectural form. As an example in engineering, Teige points out the suspension bridges in Zatec, Loket, Prag and Strakonice which he defines as "utilitarian works." He points out that in succeeding

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[278] Eric Dluhosch explains in the Introduction of *Nejmenši byt* that: "Because Teige relies on the dialectic of the "thesis" of destruction and its "antithesis" of construction, the early chapters, which trace the history of popular housing form medieval times to the twentieth century, must be considered merely as a prelude to the book's final "synthesis", which wholly dedicated to the development of a rationale, as well as a detailed program, for the worker's collective dwelling". Erich Dluhosch, "Teige's Minimum Dwelling as a Critique of Modern Architecture", in Erich Dluhosch and Rostislav Švácha, *ibid*, p:147
According to Jean-Louis Cohen; "His (Teige's) view of history, undeniably Hegelian in its sense of progress, presents a rational process impelled by the evolution of technology and of knowledge." Cohen explicits that Teige's defined ideas show similarities with "the neopositivism of the Vienna Circle". Jean-Louis Cohen, Introduction, in *Modern Architecture in Czeschoslavakia and either Writings*, p:11.

[279] In 1924, Teige wrote an article with similar title, ("Moderní česká architektura, Veraikon 10, nos.11-12, (1924):113-33). The manuscript of "Modern Architektura v Československu" was completed in 1927-28. He published the final text with same changes, as the second volume of the journal MSA (Mezinárodní soudobá architektura [International Contemporary Architecture]) in 1930.

[280] Some parts of the "Nejmenši byt (Minimum Dwelling)" which was published in 1932, had been written before. "Minimální byt a kolektivní dum (The Minimum Dwelling and the Collective house)", Stavba 9 (1930-1931). Teige presented a lecture on the subject of the minimum dwelling during the Third CIAM Congress in Brussels, which contains many of the points made in his subsequent book. Erich Dluhosch, "Teige's Minimum Dwelling as a Critique of Modern Architecture", in Erich Dluhosch and Rostislav Švácha, *Karel Teige; L'Enfant Terrible of the Czech Modernist Avant-Garde*, p:187.

periods, the unity is broken and architecture is directed by the "vacuous," the theories of the old. Consequently, architecture diverted from its realistic aspects and produces decorative-exaggerated "agglomerations" like the church of Cyril and Methodius, the church of Saint Ludmila...[281] Accordingly, Teige discusses the stream of 1850s in which was showed a tendency towards the Gothic Style; "The consequences –academic Gothic and the unfortunate restorations of historical monuments- were pernicious. This disoriented era imposed Gothic forms on modern materials and constructions, where they lacked all sense and made a ludicrous impression."[282]

In order to base his argument of constructing the new architecture, Teige presents the problems/facts of accommodation, health, the increasing crime rate in Urbanism as results of Capitalism and Industrialism. Teige relates such problems/facts to his "form-based" efforts about the problem of "style" in the nineteenth century.[283] Consequently, he discusses an architecture full of contradictions, indefiniteness which he defines as "false" and " spiritless." In addition, as indicators of the new theory of architecture which opposes to "the corrupting situation," Teige names the practitioners of the international movement in different countries: H.P. Berlage (Holland), Henry van de Velde (Germany), Otto Wagner (Austria), Jan Kotéra (Bohemia), Victor Horta (Belgium), L.H. Sullivan (America). Nevertheless, for Teige, that attempt cannot lead to an ultimate solution for the problem whose reasons are given in his study, *Modern architecture in Czechoslovakia*. In the study, he emphasizes the contradictory points between the approaches of those practitioners and the new architectural theory itself. For example, for Teige, Henry van de Velde's ideas of "architectural aesthetics," reflected in mechanics and engineering, are rooted in the romantic theory of *Einfühlungstheorie* (theory of empathy). In Otto Wagner's architectural theory, defined by the definition of "something useless cannot be beautiful," the concept of "style" has implications of the history. As a result, Teige argues that some successors of Wagner led to "electric forms."[284] Hence, he denies the idea that those practitioners are the creators of "the new architectural style." For him, modern architecture should not an

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[281] Teige, "Moderni architektura v Ceskoslovensku" in *Modern Architecture in Czeschoslavakia and either Writings*, p: 62.

[282] Teige, *ibid*, p:67.

[283] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, pp: 59-90; and Teige, *Nejmensi byt*, esp. ckapter: 2-7.

[284] Teige, "Moderni architektura v Ceskoslovensku" in *Modern Architecture in Czeschoslavakia and either Writings*, p: 93.

interrogation of a new stylistic formula: "modern architecture is not a question of some kind of new stylistic formula the new architecture is a great discovery conditioned by the needs of contemporary civilization and production, a solution with far-reaching cultural, social, and economic consequences." [285]

According to Teige, one of the reasons for the chaotic situation in architecture is that it cannot respond to the developments and technology as engineering does in shaping the century. For Teige, it is an age of science and technology, and the current ideas / theories should be modified accordingly;

> "Our era is the era of science and technology. First it has, sometimes rather rudely, chased religion out of its studies. Consistently and sincerely it has renounced all mysticism. Fired by an ideal, it has declared itself materialist, with all the consequences. It has gamely waved the banner of positivism. This is the time of experiments. We have no more confidence in religion; we have confidence in science. The scientists believe that they can install a paradise on earth with their work. This paradise they call a civilization of technology. In the science of laboratories we have discovered radium, X-rays, serums. As a result of discoveries made by pure science under a microscope, gigantic and far-reaching revolutions have taken place in production. Thanks to them, applied technology brings about ever-new inventions. As a result these discoveries, we modify our opinions over and over." [286]

Teige believes the existence of such an architecture is possible through the ideas of "revolutionary renewal"; therefore, he denies all history-based references which do not conform to the facts of the age. For Teige, solutions to those problems require radical and wide-scale suggestions which are derived from realistic needs and purposes. Thus, for Teige, the duty of "modern creators"[287] is not "improvement" but "renovation," or rather "revolution". That explanation enables him to clarify his ideas once again; "It is therefore necessary to revolutionize architecture and architectural work, **even if only on a theoretical and hypothetical basis; it is necessary to collaborate on a new organization of the world. Architecture is above all an**

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[285] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p:116.

[286] Teige, "Konstruktivismus a likvidace 'uměni'." Disk 2 (spring 1925):4-8. Translated by Irena Žantovská Murray as "Constructivism and the Liquidation of 'Art' in *Modern Architecture in Czeschoslavakia and either Writings*, p: 337.

[287] Teige defines that he mainly sees "modern creators" as constructivists who support Marxist Sociology and theory in relation with socialist world. Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p: 297.

organizational process."[288] Therefore, Teige attempts to "revolutionize" architecture whose main objective is to reorganize the world. He discusses the necessity of building architecture on new foundations: "The need to reconstruct Europe placed new tasks and new demands before architecture. To meet them, architecture first had to be set on a new basis. The old formalist architecture –as-art stood helpless before these new tasks."[289]

In order to "revolutionize" architecture, Teige recognizes "Constructivism" as a starting point. "Constructivism is a beginning and a sign of new architecture, a spring board for the new culture and civilization."[290] He underlines the universal purposes of Constructivism to support his own aims;

> "Constructivists make no proposals for a new art, but rather they propose a plan for the new world, a program for new life. They do not realize aesthetic theories; they create a new world. They come with a proposal of a new globe. They want to reconstruct the world on a new basis, oriented toward a more just social equilibrium. They deny en bloc all classicisms and romanticisms, all artistic and aesthetic isms." [291]

His main aim is to analyze the Constructivist ideas in all aspects in order to come up with an hypothesis for the future practice. In the conclusion part of his study, *Modern architecture in Czechoslovakia*, Teige clarifies his purpose as;

> "Our task is to foretell, on the basis of our knowledge of the present state, what things might be like in the future but also how the present derived from the past. I wanted to express the current program of constructivism and to show the process through which the Czechoslovak avant-garde came to constructivism….I have tried to outline the theory and, where future perspectives seemed possible, even the direction of modern architecture, to analyze its technical, social, and historical conditions rather than chronicling the facts or attempting a relative assessment of individual designers. My interpretation of the new architectural movement –constructivism, which I supported and toiled for from the beginning- is naturally subjective and hardly free of personal sympathies or of obstinate opposition. Against the

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[288] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p: 298. Emphases added.

[289] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p: 159.

[290] Teige, "Konstruktivismus a likvidace 'uměni," in *ibid*, p: 331.

[291] Teige, "Konstruktivismus a likvidace 'uměni," in *ibid*, p: 333.

canvas of modern architecture in Czechoslovakia I have erected the constructivist theses." [292]

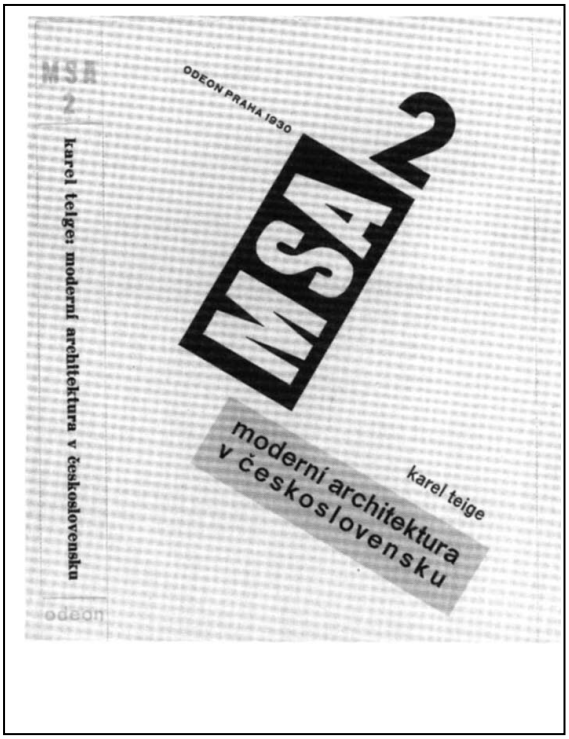

Figure 4.24. Cover of *moderni architektura v československu*, designed by Karel Teige. *Mezinarodni soudoba architektura 2* (1930). (Source: Teige, 2000), p: 26.

Figure 4.25. Cover of *Nejmensi byt*, designed by Karel Teige. (Source: Teige, 2000), p: 42.

[292] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p: 301.

4.2.3.1. Karel Teige's Constructivist Architecture Theory; "Architecture as a Science"

Teige has believed architecture should liberate itself from the styles and forms of the past and should focus on "the purpose" to fulfill the requirements for reconstructing Europe. In the new century, for Teige, the modern individual-man prefers "the functionalist works of engineering" to "decorative and formalist productions." Therefore, in the new age, anything which is irrational and purposeless is subject to rejection. For Teige, Science helps with providing solutions to the problems in architecture, and he attempts to base architecture on scientific works; "The new architecture is the true embodiment of the new spirit, the core of creative talent. It is wholly rooted in modern science, mathematics, and continual experimentation."[293]

Teige's definition of "architecture as a science" is comprehensible in the recognition of his theory based on the definition "architecture as a pure science." Pointing out that architecture has undergone a metamorphosis from the "craft" to "science."[294] Teige defines architecture as a "pure science," and he emphasizes that issue constantly. Putting an emphasis on "pure science," Teige underlines the importance of the theory. Accordingly, referring to the knowledge of "pure science," Teige tries to justify the need for a new architectural theory to organize the world. Teige's distinction of the "pure science" and "applied sciences" clarifies his argument. In a sense, Teige is interested in a theory capable of bringing a new technology. In his study, *Modern architecture in Czechoslovakia,* Teige clarifies the idea in terms of Constructivist theory as follows;

> "Constructivist architecture is in fact a "pure" science; building technology is an applied science. Rather than adjust a new idea to an old machine, constructivist architecture invents a new machine for it. **As a pure science it emphasizes the importance of theory as well as the inevitability of criticism**." [295]

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[293] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p: 91.

[294] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p: 289.

[295] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p: 295. Emphases added.

Teige reviews the idea in two other chapters of the same study referring to Constructivist theory and defining "technology" as an "applied science" which merely serves as a means to lead to the goal:

> "The program of constructivist architecture envisages a building form that suits all the economic, social, technological, industrial, and cultural needs of the era….Building means to organize space and fixing its disposition so as to best contribute to the evolution of life. New technologies and materials, however important, are only means to an end…"
>
> "New technologies and materials are an important precondition, but constructivist architecture uses them merely as a means to an end." [296]

According to Teige, the theory directs the "new technology" for its own purposes; "'Pure' science and 'pure' research will guide the new technologies as well as the new practice."[297] In the conclusion of his study, *Modern architecture in Czechoslovakia*, Teige clarifies the outlines, the importance and the necessity of a new architectural theory as a "guide";

> "Architecture as science, above all as "pure" laboratory science, which precedes particular applications and technologies, the science of society and its organization, the science of the comprehensive plan-has as its auxiliary sciences not just statics, technology, statistics, and hygiene but also sociology, philosophy, national economy, physiology, psychology and aesthetics. The theory as a plan, as a guide, is doubly important at a time of historical upheavals: all revolutionaries have understood this. Theory revolutionizes, it awakens new technology. Practice unguided by a clear vision and a clear schedule easily fossilizes- unfinished ,exhausted, self-sabotaging." [298]

In Teige's studies, it is obvious that in order to justify the theory of "architecture as pure science," the Constructivist argument of architecture is not art is considerable. [299] Teige denies all streams of art , all 'isms' that, according to him, relates to take past and

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[296] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, pp:163, 291.esp. chapters; "The Advent of Constructivism" and "Toward a theory of Constructivism".

[297] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p: 299.

[298] Teige, "Moderni architektura v Ceskoslovensku," in *ibid*, p: 302.

[299] The theory of "architecture as pure Science," is also valid for discourses of Alexander Rodchenko, Vlademir Tatlin, ve Aleksei Gan who are the forerunners of the Russian Constructivism. For comparing see; Khan-Magedov**,** *Pioneers of Soviet Architecture*, pp: 146-195.

cannot serve to the needs /requirements of the present; consequently, he emphasizes the necessity of a new architectural theory. Teige's essay, "*Konstruktivismus a likvidace 'uměni'* (Constructivism and the Liquidation of 'art')," published in 1925, is remarkable in that he argues the idea to a great extent. In the essay, Teige discusses that Constructivism has nothing to do with searching for a new artistic style; "Constructivism is not concerned with some new artistic formula for the basic reason that it is not concerned with art at all." [300] Teige turns it into a slogan; "Liquidation of Art. With constructivism we proceed to a regular liquidation of art".

Adolf Loos's influence on Teige is recognizable in his argument.[301] In his essay, *Modern architecture in Czechoslovakia*, a particular chapter on Adolf Loos is included. For Teige, that Adolf Loos devaluates the theory of 'the artistic conception of architecture' is his most remarkable contribution to architecture. Accordingly, Teige quotes from Adolf Loos while opposing to the idea of "decorative art" and "ornamentation in architecture." For example, while discussing the artistic aspects of architecture, Teige quotes from Loos;

> "Only a very small part of architecture belongs to art: the tomb and the monument. Everything else, everything that serves a purpose, is excluded from the realm of art. Architecture is not art, because the tomb and the monument, those abstract architectures, are not really a part of architecture at all but rather a pure, absolute, even nonfigurative sculpture."[302]

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[300] "Constructivism was the discovery of 1922. The exceptional international recognition that it enjoyed in Germany during that year would certainly not have escaped Teige's notice." "Here, Adolf Behne played an important role. He had shown Teige the material he brought back from Moscow in 1923, thus helping to open his eyes to the early achievements of Soviet architecture." "From 15 october to 13 November 1925, Teige traveled to Moscow and Leningrad as a member of a delegation of Czech intellectuals belonging to the *Společnost pro hospodářské a kulturní sblížení s novým Ruskem* (Society of economic and cultural friendship with the new Russia)." In here, "he collected so much material and established so many contacts that he became the best informed expert on contemporary Soviet Culture and architecture outside the Soviet Union." *Moderni architektura v Ceskoslovensku* has written after Teige's visit to Russia.
R. Dačeva, appendix: Chronological Overview- Dates, Events, Manifestoes, and Books, in Erich Dluhosch and Rostislav Švácha, *Karel Teige; L'Enfant Terrible of the Czech Modernist Avant-Garde*, p:360; Rostislav Švácha, "Before and After Mundaneum," in Erich Dluhosch and Rostislav Švácha, *ibid*, p: 118. Srp, "Karel Teige in the Twenties," in *ibid*, p: 24; Cohen, Introduction, in *Modern Architecture in Czeschoslavakia and either Writings*, p: 34.

[301] Teige accepts Adolf Loos as the forerunner of modern architecture, not as "representative". "Moderni architektura v Ceskoslovensku," in "*Modern Architecture in Czeschoslavakia and either Writings*, esp.chapter: Adolf Loos, pp: 115-140.

[302] Adolf Loos, "Architektur", 1910. Quoted by Karel Teige, "Moderni architektura v Ceskoslovensku", in, *ibid*, p: 129.

In addition, Teige supports Loos's discourse with Loos's comparison of "the new" and "the old". For Loos, "traditional works of art" have already been consumed.

> "Up until the nineteenth century the artist and the craftsman were one. Works of art were used and consumed. In today's world, something of that sort would be considered simply barbaric. Industry and technology have removed themselves, one after the other, from art."

Teige recognizes the characteristics of "the new architectural theory," which Loos presented in 1897, as very identical those of the recent constructivist theory.

Teige denies all "artistic" aspects of architecture in order to justify his theory, and he attempts to strengthen his argument in various aspects. He disapproves of many architectural approaches which claim to be the effects of "the new architectural theory". According to Teige, those architectural 'isms,' in their essence, connect themselves with the concepts / ideologies of the past; "If you want to, you can find cubism, orphism, futurism, and impressionism in the work of the old masters." [303]

In his study, *Modern architecture in Czechoslovakia*, Teige discusses Cubism which, he believes, was born in 1910s as a response to the studies of Loos and Kotera. In the same study, he also analyzes the representative styles / forms which he has observed in Prague. Teige also emphasizes that Cubism, which opposes to the decorative and folkloristic features of Secessionism, is a representative of pure formalist approach in architecture. According to Teige, plasticity and the movement of masses are the focus of Czech Cubist architecture, and he emphasizes that it is connected to the past; "the cubists heralded a return to baroque thinking and possibly even (because of its dramatic qualities) to baroque form."[304]

For Teige, the approach of Cubist Architecture towards four dimensionality and the non- Euclidean is incomprehensible in architecture, and he defines such approaches as "formalist play and caprice." The dynamic impact that Cubic architecture tries to provide is a fallacy resulting from "romantic aesthetics";

> "Interpreting and expressing the movement of architectural compositions, the fluctuations of plastic forms, is the fallacy of a perverse romantic aesthetic and Einfühlungstheorie. This Einfühlungstheorie reigns in the

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[303] Teige, "Konstruktivismus a likvidace 'uměni," in *ibid*, p: 333.

[304] Teige, "Moderni architektura v Ceskoslovensku," in "*Modern Architecture in Czeschoslavakia and either Writings*, p: 141.

> aesthetics of van de Velde, as well as in the aesthetics of Czech cubist architecture. This romantic delusion culminated in the fantastic formal anarchy of German expressionist architecture…"[305]

Karel Teige also analyzes the studies of Le Corbusier, who has been represented as an important figure of the new architecture, with his criticism of Cubism, or rather Czech Cubism. According to Teige, although the works of Le Corbusier and Cubists differ in their design approaches, they share some common features of art. Teige's ideas on the studies of Le Corbusier are clear in his essay, "*Mundaneum*," published in *Stavba* magazine in 1929[306] *and in Nejmenši byt,* published in 1932. In the essay which his presents his ideas on Le Corbusier's "*Mundaneum*" project, designed in 1927, Teige claims that the project cannot be recognized as a product of modern architecture. In the same essay, Teige provides detailed information about the project and he criticizes it; "The Mundaneum illustrates the fiasco of aesthetic theories and traditional prejudices, of all dangers of the slogan "house palace"…"

Teige argues that although the project has structural details of modern architecture, it is the whole work that provides an archaic effect in respect to planning site. He also states that axonometric perspectives of the project creates the impact of images as if they were taken from an archeological site. He criticizes the monumental features which make the project "artistic." The monumental identity results from the

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[305] Teige, "Moderni architektura v Ceskoslovensku", in, *ibid*, p: 145.

[306] Teige's "Mundaneum" is a critical essay over the project of Le Corbusier's project for the competition of the League of Nations at Geneva building in 1927. "Mundaneum," was originally published in Stavba 7, no:10 (1929), pp: 145-155. Translated by L.& E. Holovsky and L.Dolezel as "Mundaneum" in M. Hays, *Oppositions*, (NewYork: Princeton Architectural Press, 1998), pp: 589-597.
"amongst the permeated submissions to the competition were projects by both Le Corbusier and Hannes Meyer. It is well known that the jury's decisions were set aside, and that the building commission was instead awarded –by a committee of diplomats- to a group of Beaux-Arts architects. The storm of indignation which this event caused among the advocates of modern architecture, was one of the major factors leading to the founding of CIAM in 1928." George Baird, "Architecture and Politics: A Polemical Dispute, A Critical Introduction to Karel Teige's "Mundaneum," 1929 and Le Corbusier's "In Defense of Architecture," 1933," in Hays, *ibid*, p: 586.
Le Corbusier has answered the criticism of Teige in the essay titled "In Defence of Architecture." It was originally published in Stavba 2, Prague, 1929. Quoted in Hays, ibid, pp: 599-612.
Teige became an internationally known member of Czech architectural avant-garde as a consequence of this polemic. Both essays has been published in the fourth issue of Oppositions magazine in 1974. *Oppositions*, no:4 (fall 1974) pp: 589-614.
Also, "a wider campaign which was led by Mart Stam, Hannes Meyer, and El Lissitzky aimed either directly against Le Co busier or more generally against the aestheticizing, nonfunctional principles of his work. M. Stam, "M-uméni (M-art)", RED 2 (1928-1929):122-123; H.Meyer, "Stavět (to build)," in Teige, *Mezinárodní soudobá architektura,* 80-84; El Lissitzky, "Idoly i idolopoklonniki (Idols and idolaters)", Stroyitelnaya promyslennost 5 (1927-1928), pp: 11-12." Rostislav Švácha, "Before and After Mundaneum," in Erich Dluhosch and Rostislav Švácha, *Karel Teige; L'Enfant Terrible of the Czech Modernist Avant-Garde*,, pp: 120, 138.

theory of "Golden Section," based on the styles and the use of geometrical forms of the past. For Teige, Le Corbusier's approach is rooted in the idea which recognizes architecture as the "queen of Arts";

> "…Architecture as "art" cannot free itself from the Hemmung of antiquarianism. It remains in the tradition of Michelangelo. It looks to historical architecture for formal conceptions. It uses the Golden section and other compositional recipes, and draws these proportion is small reproductions with lines so thick that in fact they can make several meters of difference to the harmony of such proportions." [307]

Teige summarizes all architectural mistakes of the Mundaneum Project in one single word: **composition.** At this point, Teige supports his ideas with the assertion of Hannes Meyer. [308] According to Meyer, art is totally a composition.[309] Teige clarifies the point as;

> "The Mundaneum is composition; the expression of ideological and metaphysical imagination. For this visual metaphysics, which aims at "the highest things, the things of the spirit," at the "Godly mission of architecture," practical utilitarian aspects mean very little. The rectangular main precinct in the proportions of the Golden Section; major communication routes creating axes also in Golden Section; the pyramid marking symbolically and monumentally the points of the compass; all this shows that a priori aesthetic speculations were at the root of the architect's work, rather than analysis of real conditions. This is the composition of a city…"[310]

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[307] Karel Teige, "Mundaneum," in Hays, *Oppositions*, pp: 596-597.

[308] Teige became interested in the studies of left-wing circle of constructivist architects such as, Hannes Meyer, Mart Stam, Hans Wittwer and El Lissitzky from the ABC magazine's framework. "The first contacts were probably made during the fall of 1928, when Meyer tried to engage Teige to lecture at the Bauhaus. Teige gave a series of seminars in 1930, in the Meyer's administration period in Dessau Bauhaus with Meyer's invitation. The culmination of his regular reporting on the activities of the Bauhaus was the appearance of a long-planned special issue of the periodical ReD, which also contained a translation of Hannes Meyer's programmatic essays "Bauhaus und Gesellschaft (The Bauhaus and Society)"...From 1929 onward Meyer regularly visited Czechoslovakia, where he represented lectures and established personal contacts." K. Spechtenhauser and D. Weiss, "Teige and CIAM," in Erich Dluhosch and Rostislav Švácha, *Karel Teige; L'Enfant Terrible of the Czech Modernist Avant-Garde*, pp: 235-237.

[309] According to Jean-Louis Cohen, "publicly, Teige allied himself with Hannes Meyer; but his article on the subject for *Stavba* of April 1929 was largely based on Lissitzky's critique in the November 1928 issue of *Stroitel'naia promyshlennost*." Jean-Louis Cohen, Introduction in *Modern Architecture in Czeschoslavakia and either Writings*, p: 17.

[310] Teige, "Mundaneum", in Hays, *Oppositions*, p: 596.

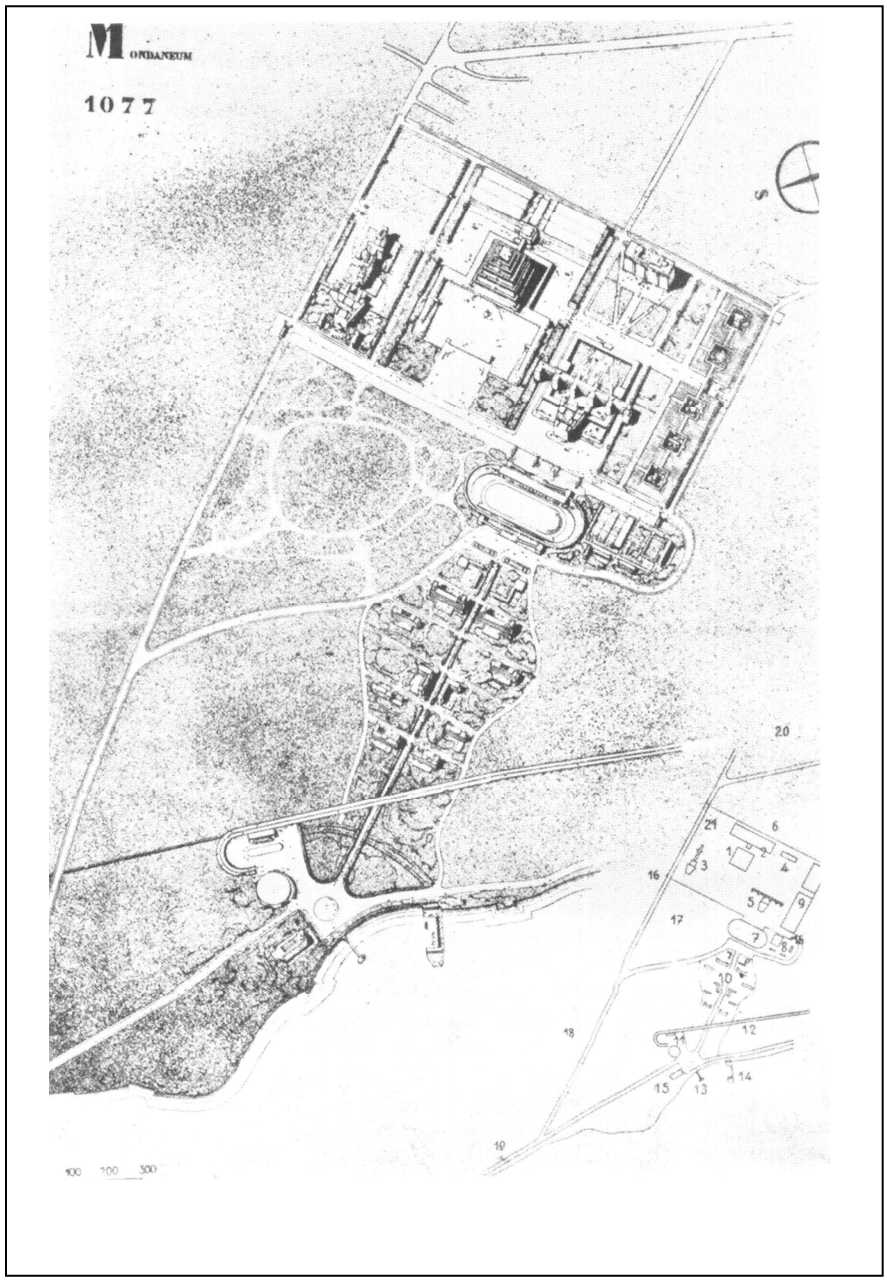

Figure 4.26. Mundaneum, Geneva, Le Corbusier and Pierre Jeanneret, architects, 1929. Site layout. (Source: Hays 1998), p: 590.

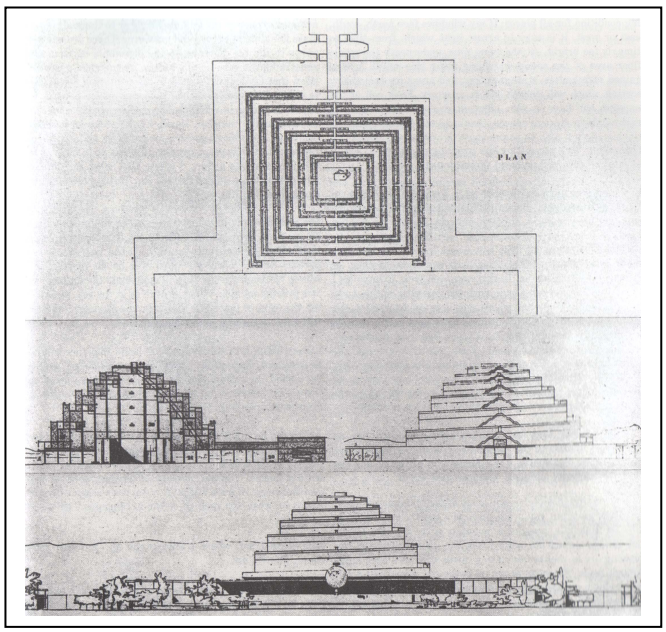

Figure 4.27. Mundaneum, Geneva, Le Corbusier and Pierre Jeanneret, architects, 1929. Plan, section and elevations.
(Source: Hays, 1998), p: 609.

For Teige, the basic elements of constructing the new architectural order, which the tries to explain through his argument of architecture as pure science, are "materiality, logic, functionality, economy, and purpose". Teige's definition, "the path of modern scientific architecture of functionalism" enables those concepts to guide architecture accordingly.

In his proposition for a scientific method, Teige defines the architect as a scientist whose duty is to provide "the new social order":

> "…we see in the architect not a craftsman working on commission from his clientele but scientist who analyzes the essential problems in their purity, without regard to existing class postulates; a scientist who is aware of the relationship between his work and the other areas of human productivity; who understands life's order." [311]

> "The architect is not the author of new forms of beauty but a social engineer, a social benefactor and organizer; not a subjective poet but a scientist and an inventor."[312]

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[311] Teige, "Moderni architektura v Ceskoslovensku", in *Modern Architecture in Czeschoslavakia and either Writings*, p: 297.

[312] Teige, "Moderni architektura v Ceskoslovensku", in *ibid*, p: 139.

In his definition where he denies the artistic duties/responsibilities of the architect, Teige emphasizes that the ultimate solution can be achieved with the guidance of scientists whom he recognizes as "specialists":

> "If constructivism defines architecture as science, nevertheless it emphasizes both creative intuition and invention as conditions sine qua non of architectural work. Such architecture, which refutes artistic and artisanal dilettantism, demands specialists and inventors. A perfect specialist realizes perfect products and responds to existing needs. An inventor knows how to awaken new needs; he is part of the revolutionary force that foments evolution." [313]

Therefore, for Teige, a response to the current problems can be provided by a scientific approach of the architect performing as a "scientist." Teige, who defines the theoretical problems of the new architecture as "laboratory issues," believes that application of scientific methods, or rather experimental and hypothetical methods, are needed in order to provide solutions for the problems. In his study, *Modern architecture in Czechoslovakia*, Teige states that the theory of Constructivist architecture is a hypothesis of a "new socialist housing" and "the city," and it aims at offering solutions to prospective architecture in the future: "Experimental, hypothetical studies of new urban systems and living forms will serve as a prognosis, based on detailed analyses: a precise diagnosis of the present state of affairs, tested by historical probability."[314]

Therefore, Teige seems to have been searching for a futurist solution through a scientific method which can offer accurate solutions resulting from "modern experimental/laboratory studies";

> "Just like any other scientific work, architectural reasoning is surely not obliged to concentrate exclusively on current problems alone, or to study problems only with an eye to the demands of the present, or to accommodate merely momentary needs. Such an approach to research would never be able to recognize those elements that would point practice and technology in new directions, lead to new discoveries, and open new horizons."[315]

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[313] Teige, "Moderni architektura v Ceskoslovensku", in *ibid*, p: 294.

[314] Teige, "Moderni architektura v Ceskoslovensku", in *ibid*, p: 299.

[315] Teige, *Nejmenši byt*, p:324.

Teige's argument for the necessity of a scientific approach is supported by his criticism of the theories concerned with the current problems of "housing-sheltering" and "urbanism," in his study "*Nejmenši byt* (Minimum Dwelling)." According to Teige, the architectural solution can only be achieved with the guidance of a pre-determined scientific study defining social and economic activities. Accordingly, investigating the problem of "housing" scientifically and offering scientific solutions require a scientific approach. Otherwise, architecture cannot reach solutions for its future practice;

> "Even if it is true that more often than not modern architectural work is guided by unscientific and incorrect methods, such work has nevertheless contributed many important insights and discoveries in its search for new solutions in housing and the city. Any attempt at a deeper analysis of these processes and problems, studied objectively and as independently as possible from the subjective position of each respective author, must necessarily lead to scientific(materialist) results."[316]

Teige's argument of the issue is clear in his criticism of Sant' Elia's *Futurist City* and Tony Garnier's *La Cité industrielle* (1900) projects, recognized by Teige himself as projects claiming to have potential solutions for the future. Teige discusses that Sant' Elia's offered solution is an argument which responds to the facts of the day, and Teige underlines its importance; "…Sant'Elia had a good grasp of the rapid evolution of cities and their civilization, …The merit of Sant'Elia's projects is that he resolved the problem of the relationship between buildings and the street, meaning city traffic…and offered many more concepts."[317] Nevertheless, despite the agreeable points of Sant Elia, Teige defines Sant Elia as a "futurist utopist" since his projects lack scientific methods. Similarly, Teige criticizes Tony Garnier for not being able to offer any solutions due to his inability in providing any scientific, realistic assumptions.[318]

On the other hand, in his study, "*Nejmensi byt*," Teige represents his theory of "*Koldom*(Collective House)" as an proposal for the prospective problem of "housing." The theory of *Koldom* denies the idea of "family house" which he sees as an element of bourgeoisie. His major aim is to consider all technical, sociological, economical and architectural aspects of the problem in order to fulfill all social, cultural and

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[316] Teige, *Nejmenši byt*, p: 11.

[317] Teige, *Nejmenši byt*, pp: 140-141.

[318] Teige, *Nejmenši byt*, p:140.

psychological requirements; “The content of a dwelling is embodied in the biological, social, and cultural needs of its inhabitants, including their spiritual and physical well-being and –ultimately- quality of life.”[319]

In the study, the means of scientific approach is actively utilized in order to accomplish *Koldom*. Among those are statistics resulting from scientific calculation methods, quantitative solutions of mathematical calculations, tables, diagrams and data graphics. [320]

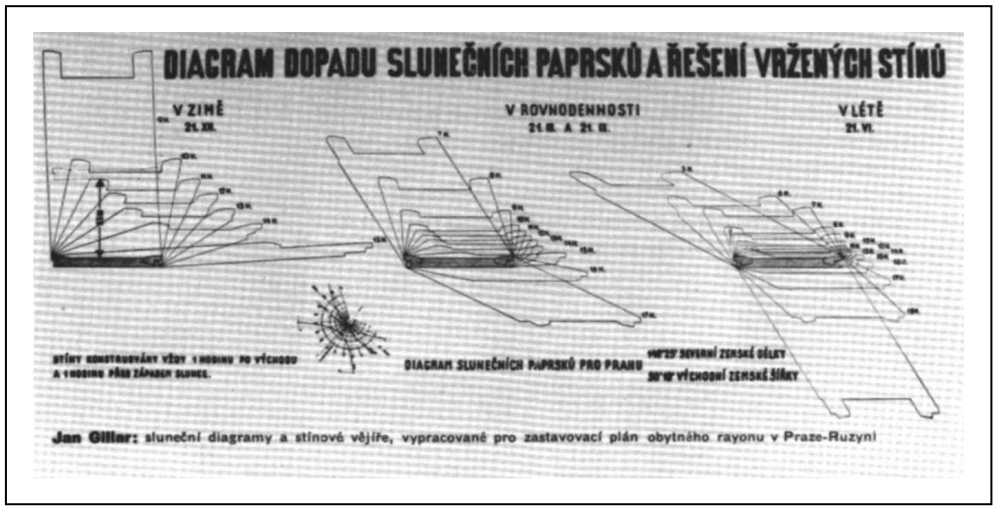

Figure 4.28. Jan Gillar’s scientific diagram of sun angles and the solution of cast shadows for the housing district in Praque-Ruzyn, 1932. From *Nejmensi byt,* Teige, 1932. (Source: Teige, 2002), p: 311.

[319] Teige, *Nejmenši byt*, p:18.

[320] Teige’s collective dwelling was used a model by the architect Jan Gillar in his projects for collective houses for workers cooperative Včela in 1931, in his design for a small apartment district in Praque-Ruzyn in 1932. Teige, *Nejmenši byt*, esp. chapter: 13.

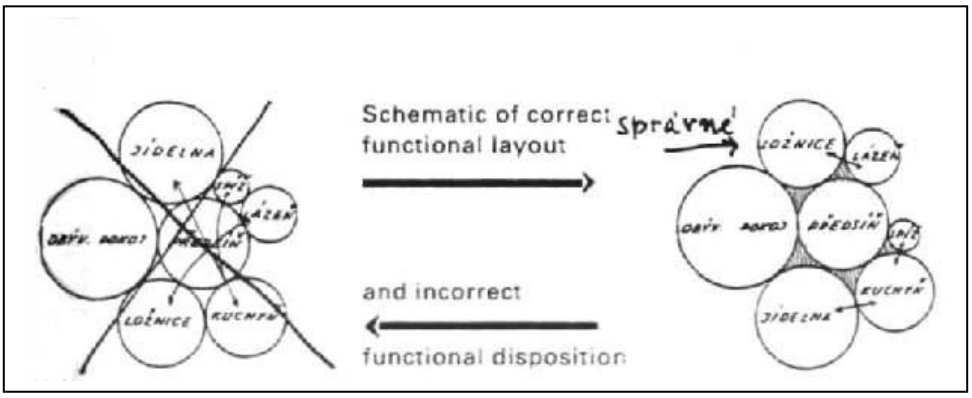

Figure 4. 29. A scheme from Kare Teige's *Nejmensi byt,* 1932.
(Source: Teige, 2002), p: 216.

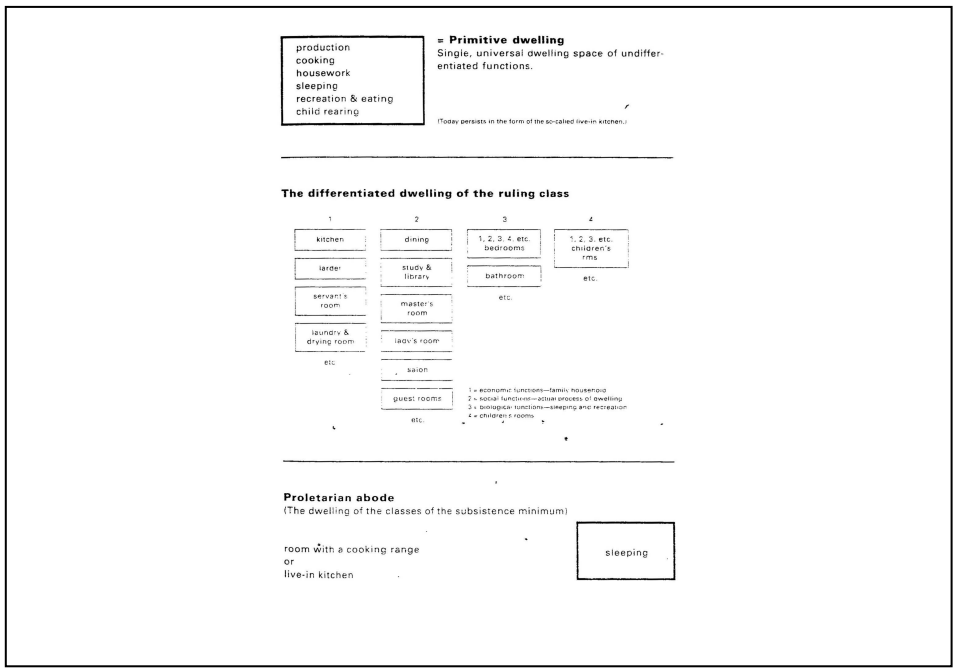

Figure 4.30. An analytic study for the differentiated dwelling of the ruling class. From *Nejmensi byt,* Teige, 1932.
(Source: Teige, 2002), p: 15.

Teige's discourse of "architecture as science" involves some contradictions the first of which is that Teige sees architecture as a "scientific/objective" study while his argument puts emphasis on "the identity of the man," which is presented in his study with the contradictory concepts of "pure science/creative science," "scientific intuition/creative intuition," "architect as specialist/architect as inventor." In his study, *Nejmenši byt*, opposing to the idea of architecture as pure science, Teige argues that architecture should become a "creative science;"

> "…we must rid modern architecture and architectural criticism of its current deference to artistic exclusivism and its fixation on the genius of this or that creative personality and break the stranglehold of passing taste and fashion. …..What is needed today is its transformation into a creative science that will not only accommodate the material needs of society but also show how to change the world and create the conditions for restoring the value of productive work."[321]

Teige recognizes the definition of "artistic intuition," which deals with the creative aspects of architecture, as a concept belonging to the past. He explains the reasons referring to the formalist problems in the past. For Teige, the main question is the "purpose." In the study, *Modern architecture in Czechoslovakia*, Teige emphasizes that those formalist problems are due to "artistic intuition" and defines them as; "Seeking new and fantastic forms that do not derive directly from the purpose of the object but that are born of the caprice of *artistic intuition* is as damaging and inadmissible as using historically decorated forms and ornaments in the manufacturing of modern objects." [322]

On the other hand, in the same study, Teige discusses the necessity of the "scientific intuition." He states that without "scientific intuition" all we can reach are "imitations" since any production or creativity cannot materialize without "scientific intuition";

> "…Scientific intuition: without it science is not science but merely trade, bureaucracy, pedantry. Without it there is no productivity. Without invention there is no creation, only imitation. Architecture in which creative intuition has not divined the unknowns and imponderables –those factors

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[321] Teige, *Nejmensi byt*, p: 183.

[322] Teige, "Modern Architecture in Czeschoslavakia" in *Modern Architecture in Czeschoslavakia and either Writings*, pp: 152-153.

> that cannot be addressed by mechanical, rational thinking- is neither architecture nor science but craftsmanship, building without spirit." [323]

The dual structure of Teige's discourse is an argument against particular manifestos about mechanical advances and technology. He emphasizes that architectural problems are not basically related to the problems in technology, which reflects his view on the idea that "machinery is the basic need of the era." In *Nejmenši byt*, he states that "architectural creation" is not a mere mechanical solution and he comes up with the proposition of " organic synthesis";

> "Constructivism, which embodies in its program the most radical refutation of idealistically colored metaphysics, does not conceive of architecture merely in a "vulgar", practical, or mechanical way; it sees architectural creation not merely as a mechanical sum of various functions to be served by a building but as an organic synthesis."[324]

In relation to the concepts such as "creative science, scientific intuition, scientific creativity," Teige searches for possible solutions leading to the scientific approach. Furthermore, considering those possibilities, he attempts to reach an "optimal" solution which is applicable only through "scientific intuition." Teige attempts to clarify it with the creation process in machinery. In *Modern architecture in Czechoslovakia*, Teige draws comparisons between the "creation process in machinery" and "that in architecture," and he states that the origin of the both is rooted in mathematics. Hence, Teige argues that "mathematical (scientific) intuition" rather than "mechanical logic" is more important to ascertain a rational solution; "To ascertain the optimal result (implicitly the most beautiful), to anticipate it, is the task not of mechanical logic, but of mathematical intuition…"[325] Teige reconsiders the same idea similarly in *Konstruktivismus a likvidace 'uměni'*. [326] The utopist theory which Teige tries to come up with is an idea that seems to be leading to a " universal creativity" where the principles of "elementary" and "mechanical" logic have no effects.

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[323] Teige, "Modern Architecture in Czeschoslavakia" in *ibid*, p: 294.

[324] Teige, *Nejmensi byt*, p: 25.

[325] Teige, "Modern Architecture in Czeschoslavakia" in *Modern Architecture in Czeschoslavakia and either Writings*, p:294.

[326] Teige, *"Konstruktivismus a likvidace 'uměni'*," in *ibid*, p:339.

Another contradictory point in Teige's discourse appears in his idea of "the individual/man." He states that architecture should deal with psychological and social features of the man. In *Modern architecture in Czechoslovakia*, Teige clarifies the idea by criticizing the approach which confines architecture in a definition of "building craft";

> "If architecture is indeed science, the same kind of significance should not be assigned to individual originality that it had in the domain of "liberal arts"…Constructivism that limits itself to an understanding of architecture as mere technology and that ignores its psychological and social aspects discredits the deep meaning and universal impact of constructivism and of architectural reform; it reduces discovery and high-quality design to banality. Robbed of its universality, limited to the structural aspects of building, without a revolutionary perspective and a social plan, constructivism is a fragmentary, invalid, and half-hearted movement…"[327]

Yet, contrary to his ideas mentioned above, Teige remarks that the features of the individual should be organized in accordance with a uniform rational plan. The idea becomes apparent in his descriptions of the "objective/duty/responsibility of the architect" by the concept of 'architectural content' in the study, *Nejmenši byt*;

> "By "architectural content" we mean the organization vital, individual and collective life processes, including industrial type production facilities that will be installed in certain buildings, as well as the organization of the psychological processes of man, to the extend that the architecture of a building is capable of exerting an influence on them." [328]

Therefore, Teige's discourse involves a "homogeneous" and "standardized" individual portrayed in utopist terms. "Man" serves to be a means to support Teige's idea of "humanizing character;" whereas, becomes a tool in measurement;

> **"Man should be decisive factor here; man, who is the measure for all tailors and all things, a new, open, loyal, cheerful, convivial** man. We are talking about buildings that are made to the measure of man, about humanizing architecture –not about some new "constructivist art." [329]

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[327] Teige, "Modern Architecture in Czeschoslavakia" in *ibid*, pp: 262-263.

[328] Teige, *Nejmensi byt*, p: 18.

[329] Teige, "Modern Architecture in Czeschoslavakia" in *Modern Architecture in Czeschoslavakia and either Writings,* p:291. Emphases added.

In *Modern architecture in Czechoslovakia*, discussing "humanity" as being the main objective of architecture, Teige implies what he means with "humanizing architecture," which is, in fact, "a rational organization of social life; "The goal is humanity, a constant that changes little: an architecture on a human scale, a norm and a type. Constructivism is therefore concerned not only with the reform of architecture but with the correct –more humane, *more rational- organization of social life.*"[330] Therefore, the idea of "humanizing architecture," which forms his socialist proposal of transformation of society, consists of idealized human types(stereo-types) and the organization of their way of living in terms of "scientific" and "functionalist" views.

The influence of the "poetic vision" can be observed in the dual structure of Teige's discourse. Coming up with the argument of "Architecture as a Science," Teige does not deny art in its fundamental terms, but he sides with the idea of the "new art". After his intercourse with "poetism" through Vitězslav Nezval in 1923, Teige argues that Art cannot isolate itself from an ordinary daily life. In his essay, "Poeticism," published in July 1924, Teige states the idea as; "Professionalism in art can not continue. If the new art, and that which we shall call poetism, is an art of life, an art of living and enjoying, it must become, eventually, a natural part of everyday life,…"[331] Teige explains the association of the idea with the constructivist discourse as "Poetism is the crown of life; constructivism is its basis." Therefore, it can be said that the social validity/ acceptability of the idea is rooted in his argument that "the post-war depression (syndrome)" in the individual is something that should be dealt with as well: "Humanity has emerged from the war tired, troubled, bitterly robbed of illusions, unable to feel desire, to love, to lead a new, better life." [332]

Resulting from this poetic vision, when compared to similar approaches of Constructivists and Functionalists, Teige's discourse has been seen distinctive by some of architectural theorists. In other words, the argument of "architecture as science" could have been recognized as a part of neither a "the purely mechanistic rationalism

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[330] Teige, "Modern Architecture in Czeschoslavakia," in *ibid,* p:163.

[331] Teige, "Poetismus", Host 3 (July 1924), pp: 197-204, translated by Alexandra Büchler as; "Poetism", in Eric Dluhosch and Rostislav Švácha(eds.), *Karel Teige; L'Enfant Terrible of the Czech Modernist Avant-Garde*, p: 66.

[332] Teige, "Poetismus", in Eric Dluhosch and Rostislav Švácha (eds.), *ibid*, p: 70.

and spiritually empty utilitarianism of the German-inspired *neue Sachlichkeit*," nor "Constructivist functionalism of the Soviet avant-garde." [333]

4.2.4. Scientification in Hannes Meyer's "the New Theory of Building"

Hannes Meyer's architectural discourse of "The New Theory of Building" has been fundamentally rooted in the intensions for adapting architecture into the "living reality of the world." According to Meyer, in order to achieve the goal, architecture should consider that reality and fulfill its duty of "building" accordingly. In most detailed terms, Meyer defines the duty as giving our new world a new shape. Thus, "The New Theory of Building" is a suggested idea for the architect to fulfill his architectural duty, and the proposal gains validity/acceptability by means of science. Therefore, understanding the theory of Meyer requires a comprehension of "the new world reality" that he mentions and his definition of the duty of "building."

Meyer's manifesto, "*Die neue Welt* (The New World)," [334] published in 1926, is quite remarkable in that he defines "the new world reality" quite clearly in it. In his essay, he has emphasized scientific and technological developments particularly. He states that the developments in science and technology and the new forms of the knowledge cause changes in the established values and experiences. Accordingly, he tries to base his ideas on it;

> "The flight of the "Norge" to the North Pole, the Zeiss planetarium at Jena and Flettner's rotor ship represent the latest stages to be reported in the mechanization of our planet. Being the outcome of extreme precision in thought, they all provide striking evidence of the way **in which science continues to permeate our environment.** Thus in the diagram of the

[333] for example, in the essay "Teige's Minimum Dwelling as a Critique of Modern Architure" Eric Dluhosch explains that: "This (Teige's) functionalism is not the same as the Neue Sachlichkeit of the German avant-garde, or the Constructivist functionalism of the Soviet avant-garde. Teige conceives it more as a stimulating force, destined to awaken "positive emotional forces" in the psyche of the dweller, to be perceived as nothing else but the awakening of a new sense of beauty as an 'epiphenomenon of function'." Erich Dluhosch, "Teige's Minimum Dwelling as a Critique of Modern Architecture", in Erich Dluhosch and Rostislav Švácha, *ibid*, p: 152.

[334] Hannes Meyer, "Die neue Welt", Das Werk 7 (1926), pp:205-224. Translated as; "The New World", in Claude.Schnaidt (ed), *Hannes Meyer: Buildings, Projects and Writings*, (Teufen: Verlag Arthur Niggli, 1965), pp: 91-95.

present age we find everywhere amidst the sinuous lines of its social and economic fields of force straight lines which are mechanical and scientific in origin. They are cogent evidence of the victory of man the thinker over amorphous nature. **This new kind of knowledge undermines and transforms existing values. It gives our new world its shape……**
The simultaneity of events enormously extends our concept of "space and time", it enriches our life. We live faster and therefore longer. We have keener sense of speed than ever before, and speed records are a direct gain for all..."[335]

Figure 4.31. Illustrations from "*Die Neue Welt*," Hannes Meyer, 1926. (Source: Hays 1999), p: 235.

In addition, he states that the developments in science and technology has raised a consciousness for the new world: "The steadily increasing perfection attained in printing, photographic and cinematographic processes enables the real world to be reproduced with an ever greater degree of accuracy." On the other hand, emphasizing that those developments help the formation of universal values, Meyer introduces one of the main arguments in his theory; "universality":

[335] Meyer, "Die neue Welt", in Schnaidt, *ibid*, p: 91. Emphases added.

> "Radio, marconigram and prototelegraphy liberate us from our national seclusion and make us part of a world community...
> Biology, psychoanalysis, relativity and entomology are common intellectual property: Francé, Einstein, Freud and Fabre are the saints of this latterday. Our homes are mobile than ever. Large blocks of flats, sleeping cars, house yachts and transatlantic liners undermine the local concept of the "homeland". The fatherland goes into a decline. We become cosmopolitan."

In this way, Meyer justifies the definition of "the new world" and two basic features of his theory "internationality" and "truthfulness" in scientific terms. Accordingly, he defines the duty of architecture as "forming the new world in new terms of reality." Meyer urges his argument with the statement that "the knowledge of the modern world denies the knowledge of life in the past";

> "Yesterday is dead; Bohemia is dead. Dead are atmosphere, colour values, burr, mellow tones and random brush-strokes. Dead the novel: we have neither the suspension of disbelief nor the time to read. Dead picture and sculpture as images of the real world: in the age of films and photos they are a dissipation of effort and the endless "beautification" of our real world through the interpretations of "artists" is presumptuous. Dead is the work of art as a "thing in itself", as "art for art's sake": our communal consciousness will not tolerate any individualistic excesses.
> The artist's studio has become a scientific and technical laboratory, and his works are the fruit of incisive thinking and inventive genius." [336]

In fact, Meyer's theory is centered around the problem of "presentation" of the age in universal terms. In the formation of Meyer's theory, the purpose, defined as "adaptation to the living reality of the world," serves as a mere agent in order to ensure credibility. To achieve the purpose, Meyer recognizes "scientific methodology" and "biocentric knowledge" as foundations of his theory.

[336] Meyer, "Die neue Welt", in Schnaidt, *ibid*, p: 93.

4.2.4.1. Hannes Meyer's the Functionalist Theory of Architecture; "Building"

Although Meyer might be concerned about the practical aspects of architecture in "The Theory of Building" concerning the responsibilities, his theory seems to have a wider range of contents. In the essay, "*Bauhaus und Gesellschaft* (Bauhaus and Society)," published in 1929 while he was an administrator in Bauhaus,[337] he explains the Theory of Building: **"**This theory of building is not a theory of style. It is not constructivist system, it is not a doctrine of technical miracles. It is a system for organizing life, and it likewise clarifies physical, material and economic concerns."[338] As mentioned, with the theory, Meyer aims at organizing the whole life. Meyer's definition of the concept of "building" enables him to come up with this argument. Meyer defines the concept of "building" as "a process of organization" which involves different aspects (social, technical, economic, psychological) of life. He discusses the definition repetitively in his manifestos in order to represent it as one of his main arguments:

> "Building is the deliberate organization of the processes of life...
> Building is only organization: social, technical, economic, psychological organization." [339]

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[337] Hannes Meyer had been appointed as master of architecture in 1927 in Bauhaus. (from April 1,1927 to March 31, 1928). In between 1927 and 1930 he worked in Dessau Bauhaus as an administrator. The Dutch Mart Stam, the German Ludwig Hilberseimer, the Dane Edvard Heiberg, the Austrian Anton Brenner and the Swiss Hans Wittwer were also worked in Bauhaus in this period.
Meyer summarizes this period in the essay "Bauhaus Dessau, 1927-1930"(1940) as; "The following period, during which the architect Hannes Meyer was director, was notable for the emphasis placed on the social mission of the Bauhaus, for the increased role of the exact sciences in the curriculum, for the suppression of the painter's influence, for co-operative development of the workshop units, for making on-the-job instruction the basis of workshop theory, for developing types and standards to meet the people's needs, the democratization of the studies and for closer collaboration between the students, the workers' movement and the trade unions. This second period in the history of the Bauhaus came to an end on August 1,1930 when a new wave of reaction led to the dismissal of the Director and the expulsion of a number of students." Meyer, "Bauhaus Dessau 1927-1930." A survey in the Mexican periodical 'Edificacion,' no.34/1940. Translated as "Bauhaus Dessau 1927-1930" in Schnaidt, *ibid*, p: 107.

[338] Meyer, "Bauhaus und Gesellschaft," *Bauhaus*, no.1/1929. Translated as "Bauhaus and Society" in Schnaidt, *ibid*, p: 101.

[339] Meyer, "Bauen," Bauhaus, year 2, no.4/1928. Translated as "Building" in Schnaidt, *ibid*, p: 97.

> "Building is the social, psychological, technical and economic organization of the processes of life."[340]

Defining "building" as above, Meyer explains that he deprives it of the features of art. He introduces the concepts of "function" and "construction" as the main focus of his theory. Meyer believes that giving "the new world" a new form can only be achieved by the use of contemporary means. Meyer denies the means used by art because he recognizes them as the agents of the past. Instead, he replaces those agents of the past with the "function" and "construction" which, he claims, is responsible for the existence of "industrial fairs, grain silos, music halls, air ports, office chairs, standard goods" that he accepts as an evidence of the new age. In his essay, "*Bauen*", published in the Bauhaus periodical when he was an administrator at the Bauhaus Dessau, Meyer clarifies his idea with an emphasis on his contradictory ideas of the features of art;

> "All things in this world are a product of the formula: function times economics.
> So none of these things are works of art:
> All art is composition and hence unsuited to a particular end.
> All life is function and therefore not artistic."[341]

Accordingly, he defines "building" as a technical process;

> "Building is a technical not an aesthetic process. "[342]

> "Building as a technical procedure is therefore only a partial process. The function diagram and economic programme are the main guiding principles in a building scheme."[343]

The process, which Meyer endorses, is based on the idea of "pure construction." In "*Die neue Welt*," Meyer expresses the idea as "Today we have new building materials...We organise these building elements into a constructive unity in accordance with the purpose of the building and economic principles... Pure construction is the characteristic

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[340] Meyer, "Bauhaus und Gesellschaft ", in Schnaidt, *ibid*, p:103.

[341] Meyer, "Bauen," in Schnaidt, *ibid*, p: 97.

[342] Meyer, "Die neue Welt", in Schnaidt, *ibid,* p:93. Meyer, "Mein Hinauswurf aus dem Bauhaus," Das Tagebuch (the Berlin periodical), August 1930. Translated as "My Dismissal from the Bauhaus" in Schnaidt, *ibid*, p:103.

[343] Meyer, "Bauen," in Schnaidt, *ibid*, p:97.

feature of the new world of forms."[344] Meyer recognizes "pure construction" as a basic element which provides the new architectural theory with an international characteristics;

> "Constructive form is not peculiar to any country; it is cosmopolitan and the expression of an international philosophy of building. Internationality is a prerogative of our time."[345]
>
> "these constructive forms have no native country, they are the expression of an international trend of architectural thought. Internationally is a virtue of the period."[346]

As clarified in his definitions, Meyer believes "truthfulness," which is one of his main endorsements, can be achieved through a "pure constructional and functionalist architectural approach." Meyer's ideas of the main theme of the project , "The Palace of the League of Notions" which he designed with Hans Wittwer, reflects his concept of the "pure construction and function" together with an expected attitude in practicing that particular idea;

> **"**As a supranational organization the League of Nations is a novelty and without precedent. First and foremost on its programme is the elimination of the underhand methods of obsolete secret diplomacy and their replacement by the public debate of international questions in an open assembly of the representatives of all the member nations. **It is the aim of the League of Nations to fight against the practices of an outworn nationalism and to strive to give the comity of nations a new form in an inter-state organization serving specific purposes.**
> Any attempt to give architectural expression to such a body must presuppose that it is nerved by the will **to attain truth** –if the intentions of the League of Nations are sincere, then it cannot possibly cram such a novel social organization into the straitjacket of traditional architecture....**The building of League of Nations will be designed with their purpose in mind and not as an exercise in stylistic composition.** Such a philosophy requires the assembly hall to be constructed as an enclosed **space whose features depend primarily on acoustic factors and on calculations based on scientific principles…**
> Our League of Nations building **symbolizes nothing.-**Its size is automatically determined by the dimensions and the conditions of the

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[344] Meyer, "Die neue Welt," in Schnaidt, *ibid*, p: 93.

[345] Meyer, "Die neue Welt," in Schnaidt, *ibid,* p: 93.

[346] Meyer, "Bauen ," in Schnaidt, *ibid*, p: 95.

programme. As an organic building **it expresses unfeignedly** that it is intended to be a building for work and co-operation. This building does not seek an artificial link….**This building is neither beautiful nor ugly. It asks to be evaluated as a structural invention."**[347]

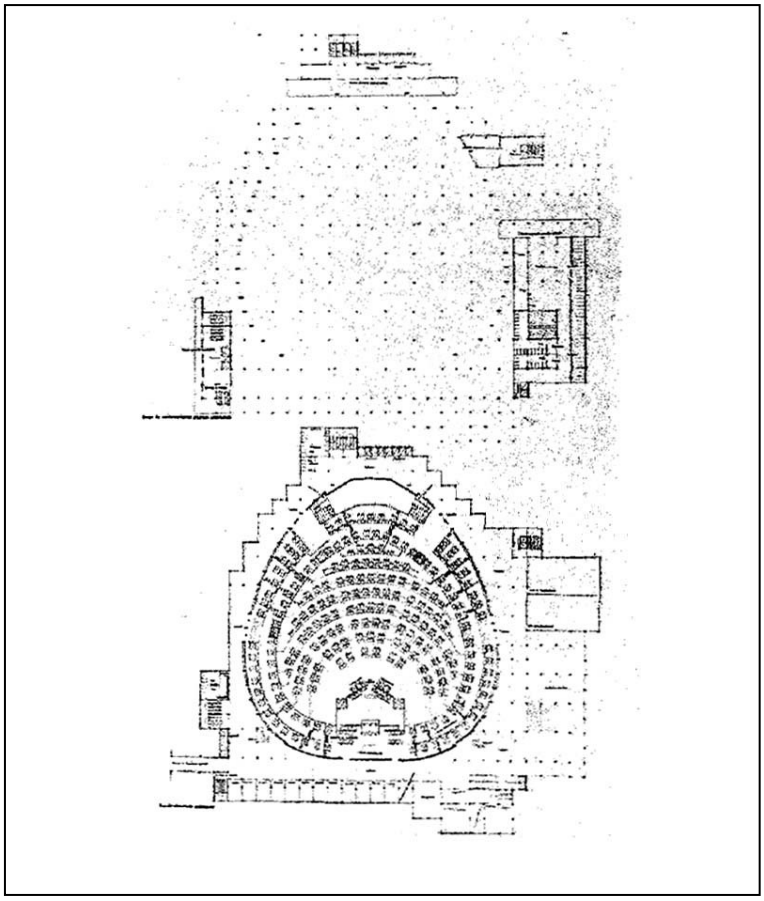

Figure 4.32. Project for the Palace of the League of Nations, ground and mezzanine plan.
(Source: Hays 1992), p: 161.

[347] Hannes Meyer produced architectural projects with Swiss architect Hans Wittwer since 1926. The project was prepared for the competition announced by "The League of Nations" for the Genova, President's Building (April 1926- January 1927). "Projekt für den Völkerbundpalast, Genf, 1926-27" includes Meyer's explanations about the project. Translated as "Project for the Palace of The League of Nations, Geneva, 1926-1927," in Schnaidt, *ibid*, p: 23. Emphases added.

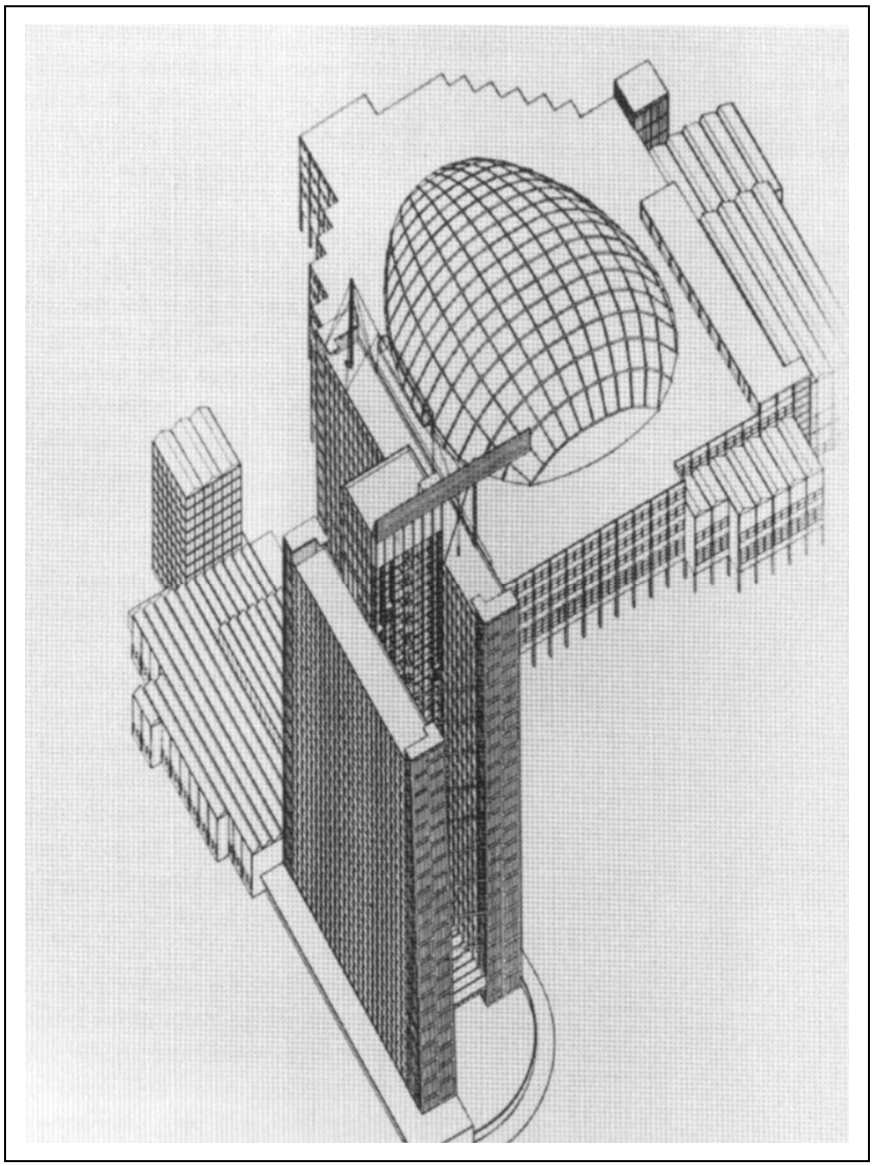

Figure 4.33. Project for the Palace of the League of Nations, Geneva, 1926-27. Hannes Meyer, in collaboration with Hans Wittwer, architect. Axonometric view of the overall site. (Source: Schnaidt 1965), p: 33.

Therefore, in a utopist approach, with his theory of "building," Meyer attempts to introduce a theory of a unified "organization" concerned with the theoretical and practical aspects of architecture in universal terms. In order to practice that organization, Meyer presents "scientific methodology." In other words, he attempts to present architecture as science (scientization of architecture); "architecture is no longer the art of building. Building has become a science. architecture is building science."[348]

Meyer also aims at organizing a homogeneous society with the help of "scientific objectivity." In the essay, "*Bauhaus und Gesellschaft*," published in *Bauhaus* magazine, Meyer explains the idea in terms of "Bauhaus" as "the ultimate aim of all Bauhaus work is to bring together all vitally creative forces so as to give harmonious shape to our society."[349] He argues that the idea can be practiced only through a homogeneous building practice based on his idea of " pure construction and function" which results in the idea of "organizing society and building practice according to the same objectives/ values". In his essay on the project of "Freidorf housing estate" (1919-1921), Meyer explains his argument of the "unified organization" as;

> "Just as the unrestful multiplicity of forms in the modern urban scene is merely a reflection of the confusion resulting from the conflicting intentions of its individual inhabitants, so the layout of the Freidorf estate is simply the outward expression of its inner spirit ...Thus the strict principles of the inner structure find their counterpart in the taut organization of the outside; the unanimous spirit of the inhabitants is mirrored in the uniform shapes of the houses; the union of wills in achieving a proper co-operative society is reflected in the homogeneity of the style and colouring of the houses and the harmony of the building elements; the solidarity of outlook is reproduced in the overall plan. An attempt at symbolism, then? It is more than that: it is a

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[348] Meyer, "Über marxistische Architektur (On Marxist architecture)" in Meyer, Bauen und Gesellschaft, 1931, p: 92-97. Partial English translation in Schnaidt, *ibid*, p:31. In "Über marxistische Architektur" Meyer explains thirteen principles of Marxist architecture.
Meyer has been a member of Pan-Russian Society of Proletarian Architects (VOPRA) in between 1931-1933. "This organization formed in 1929, pressed the claims of the orthodox Marxist interpretation of architecture as the only true creed and waged embittered war on two other associations, ASNOVA and SASS, which represented the two main trends of Soviet architecture. As it can be seen, Meyer's ideas stated in his essay are opposite with the ideas of this group, especially the ones on the importance of psychological impact. Because, the architects of VOPRA criticized the members of ASNOVA for basing the psychological and ideological power. They saw their task as a deliberate artistic shaping of space. SASS (Section of Architects of Socialist Building) represented the constructivist and functionalist line of thought, which held that form was the automatic result of function and construction." Schnaidt, *ibid*, p: 29.

[349] Meyer, "Bauhaus und Gesellschaft," Schnaidt, *ibid*, p: 99.

> struggle for the truth. For the simplicity, equality and truthfulness that underpin the community also underpin the building works."[350]

In the quest for a scientific identity of architecture, Meyer also discusses the necessity of scientific approach in architect's working methods and designing process. Meyer recognizes "intuition," a basic element in the process of designing, as a formalist concept and denies it in regard to the idea that "intuition" might obstruct the process of homogeneous formation; therefore, he replaces it with the study of "scientific building." Meyer aims at grounding architectural design on science.

In his study in which he criticizes his dismissal from Bauhaus, he explains his endeavor during that time; "I taught the students the connection between building and society, the path from formal intuition to scientific building research."[351] Meyer's effort is clear particularly in his critical articles about the administration of Walter Gropius in Bauhaus. One of the points Meyer criticizes is the approach towards "designing" in Bauhaus at that time. Meyer argues that particularly at the end of 1920's Bauhaus has a formalist view in "designing", which is a remarkable diversion from its original socialist view. Meyer emphasizes that one of the main reasons for that is the lack of a scientific background. He discusses that Bauhaus does not happen to involve any scientists among its founders. Meyer argues that Bauhaus might achieve a socialist characteristic only through integrating the role of "exact sciences" into its architectural curriculum, which briefly explains his attempt to benefit from the social reliability of science. In his administration in Bauhaus, Meyer includes science lesson into the curriculum and recruits scientists of different studies, which is an effect of his scientific approach. In the essay, "*Mein Hinauswurf aus dem Bauhaus*," Meyer expresses his struggle as:

> "It became my aim to place design on a scientific basis and there were some fundamental changes in the curriculum of the institution. The constructional engineer joined forces with the industrial consultant. The new appointments to the Bauhaus staff indicated the course that had been set:…I

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[350] Freidorf housing estate, near Basle (built 1919-1921) was the first housing project in which Meyer used the modular system for the first time. Meyer, "Siedlung Freidorf, bei Basel, 1919-1921,"includes Meyer's explanations about the project. Translated as "Freidorf housing estate, near Basle, 1919-21" in Schnaidt, *ibid*, p:5.

[351] Hannes Meyer, "Mein Hinauswurf aus dem Bauhaus," in Schnaidt, *ibid*, p: 103. This writing is a letter of Meyer which has been sent to Oberbürgermeister Hesse (ex-director of the Bauhaus), written about expel of him from Bauhaus.

wanted to guard against the danger of our activities becoming pseudo-scientific."[352]

In detail, Meyer defines a "scientific process" which leads to a designing where "pure construction" and function" appear as outstanding features. The analytical process, defined by Meyer, stands for the beginning of a designing process based on a scientific analysis (the scientific analysis of architectural program) which is run by the recognized standards, and where the requirements are determined scientifically. Meyer believes that such a process is the main point for accomplishing a homogenous and objective solution. In a letter he wrote to Walter Goupis in 1927, Meyer expresses the idea as ;

> "I have condensed into one drawing the design sent to L. Moholy. I should be pleased if the relevant lighting calculations were published with it...I believe that we must if possible base our new designs which arise from functional building, on building science, in order to counter the otherwise justified complaint about the lack of objectivity."[353]

In his essay, "How I work"(1933), Meyer explains, in detail, how that scientific process can operate. Initially he focuses on the start of the designing process:

> "**My designing work is continually analytical.** At the beginning of my architectural career I found that the sketches embodying the flights of my architectural imagination as it was at that time were a *stumbling block* when I was designing. Today I try to approach the design –and induce my associates to approach it- entirely without any prepossessions or preconceived ideas. My preliminary sketches consist of innumerable analyses in diagram form drawn on the smallest possible scale on a standard pad of squared paper.
> Whenever possible the designing brigade should seize the opportunity of putting together the detailed building programme themselves since it provides a good chance to make a joint analysis of the problem facing them…
> **This analysis of the building programme must be carried out scientifically and systematically, for it is the ultimate basis of the design.**

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[352] Meyer, "Mein Hinauswurf aus dem Bauhaus", in Schnaidt, *ibid*, p: 103.

[353] Letter of 28 March 1927 from Hannes Meyer, Basel, to Walter Gropius, Dessau. Quoted by Adrian Forty, "Diagramming the New World, or Hannes Meyer's "Scientization" of Architecture", in Peter Galison, EmilyThompson (eds), *The Architecture of Science*, (Cambridge, MA: the MIT press., 1999) p: 248.

> For this reason I always have its results graphically represented in the organization diagrams.....” [354]

Meyer explains the forming period of the design in four steps;

> The project then takes shape as brigade work in four stages:
> Stage 1: Diagrammatic representation of the building programme in which spaces of a similar kind are grouped together and the analytic features indicated (usually on a scale of 1:500 or 1:1000)
> Stage 2: Standardization of all spaces of the same kind and laying down of standard types for all vitally important individual spaces (scale 1:100 or 1:200) in the process of which the results of the overall analysis are collated.
> Stage 3: Diagrammatic plan of the entire building programme on a uniform scale (usually 1:500) showing the organization and the most appropriate grouping of spaces and the connections between them. …
> Stage 4: Working out of the draft of the building with all economic, technical and architectural factors. The building organization plan is strictly observed. The draft plan is drawn on the smallest possible scale and in a tersely standardized form. I also make an analysis of the building site independently of that of the building programme…

Meyer’s clarification of the stages is followed by a technical instruction of how to complete the drawing stage. He particularly speaks of the standards he applies: standard equipment usage, standardized drawings…

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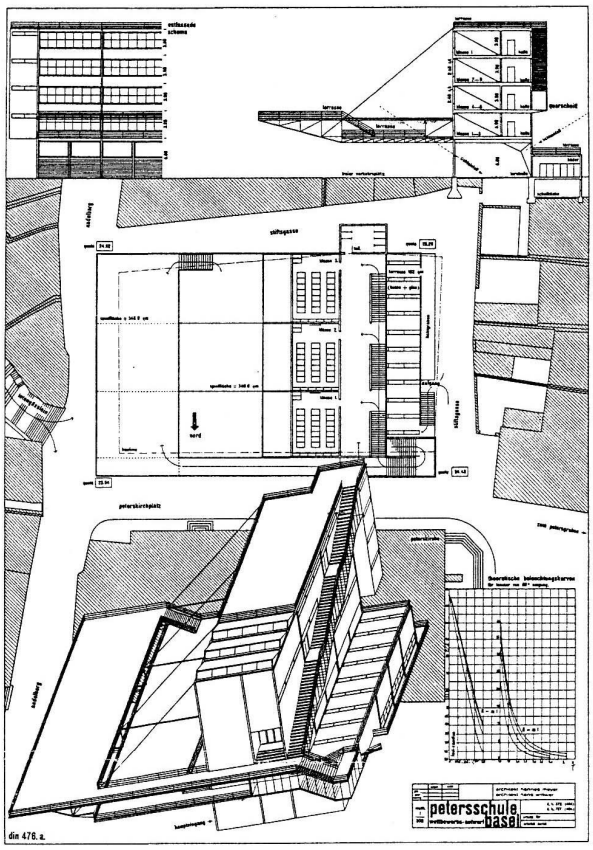
[354] Meyer, “How I work”, Architektura CCCP, No.6/1933, Moscow, Quoted by Schnaidt, *Hannes Meyer: Buildings, Projects and Writings*, p: 27. Emphases added. After the Bauhaus period Meyer went to USSR. He explains the reasons of this decision clearly, as; “I am going to work in the USSR where a truly proletarian culture is being hammered out, where socialism originates and where the society exists for which we have fought here under capitalism”, quoted by Schnaidt, *ibid*, p:27.
In the period Meyer has stayed in Moscow, until the 1936 summer, he has worked in different jobs as an architect and instructor. Also, in this period, he has given various seminars in Scandinavia, Denmark, Germany, Switzerland, Czechoslovakia . In June 1936, he has returned from Moscow to Switzerland and produced some projects in Switzerland.



architekt hannes meyer basel/bauhaus-dessau
architekt hans wittwer basel

die petersschule basel

(wettbewerbsentwurf **1926**)

die aufgabe:

neubau einer 11 klassigen mädchen-volksschule mit turnhalle, zeichensaal, schulbad und suppenküche etc., 528 schülerinnen. sinnwidriger traditioneller schulhaus-bauplatz im altstadtgebiet von basel, im schatten hoher randbebauung, schlecht belüftet und im hinblick auf das umfangreiche bauprogramm mit 1240.0 qm gesamtfläche erheblich zu klein. übliche überbauung ergibt max. 500 qm schulhof, mithin 1.0 qm tummelfläche pro schulkind.

das ziel:

keine schulkrüppel! anzustreben wäre ausschließliche oberlichtbeleuchtung aller schulräume (vergleiche die resultate von fall 1 und 2 der beleuchtungsberechnung) und die bestimmung eines neuen baugeländes nach maßgabe planvoller stadtentwicklung. gegenwärtig erscheint die verwirklichung solcher forderungen aussichtslos, und es ergibt die auseinandersetzung mit dem alten schulhaus den umstehenden kompromiß.

der vorschlag:

größtmögliche entfernung des schulbetriebes von der erdoberfläche in die besonnte, durchlüftete und belichtete höhenlage.

im erdgeschoß nur schulbad und turnbetrieb im geschlossenen raum. die verbleibende hoffläche wird dem öffentlichen verkehr und dem „parking" freigegeben.

an stelle eines hofes sind 2 hängende freiflächen und alle oberflächen des gebäudekörpers der jugend als tummelplatz zugewiesen, im ganzen 1250 qm sonnige spielfläche, der altstadt entrückt.

freitreppe und verglaste treppe verbinden, parallel geführt, spielflächen und innenräume.

das eigengewicht des hauskörpers ist nutzbar verwendet und trägt an 4 drahtseilen die stützenlose eisenkonstruktion der 2 schwebenden freiflächen.

die gebäudekonstruktion als eisenfachwerkbau auf nur 8 stützen und mit diesem außenwand-querschnitt: aluminiumriffelblechverkleidung — bimsbetonplatten — luftlamelle — kieselgurplatten — luftlamelle — glanzeternitplatten.

bautechnische ausstattung: eiserne kippfenster, aluminiumblechtüren, stahlmöbel, flure und treppen mit gummibodenbelag.

rechnerischer nachweis der beleuchtungsstärke aller schulräume

fall **1**) östliches seitenlicht aller klassenzimmer.
fall **2**) shed-oberlicht des zeichensaales.
fall **3**) zweiseitiges seitenlicht der turnhalle.

berechnung der beleuchtungsstärke auf tischhöhe

fall **1**) klassenzimmer mit senkrechter fensterwand. (östliches seitenlicht.)

berechnet wird nur die beleuchtungsstärke für den ungünstigsten arbeitsplatz (P), dieser befindet sich in der vom fenster entferntesten reihe an der rückwand.

berechnungsverfahren nach higbie:

daten für die formel:

abstand des punktes P vom fenster	a = 5,1 m
länge des fensters	m = 10,2 „
abstand des oberen fensterrandes von der tischfläche	f = 2,4 „
„ „ unteren „ „ „ „	f′ = — — „
beleuchtungsstärke des fensters	b = 100,0 ftcdl.

$$Ep = 50\left[\operatorname{tg}^{-1}\frac{(10{,}2)}{5{,}1} - \frac{5{,}1}{\sqrt{5{,}1^2+2{,}4^2}}\cdot\operatorname{tg}^{-1}\left(\frac{10{,}2}{\sqrt{5{,}1^2+2{,}4^2}}\right)\right] = 486{,}0\ \text{lx},$$

$$Ep' = 50\left[\operatorname{tg}^{-1}\frac{(10{,}2)}{5{,}1} - \operatorname{tg}^{-1}\frac{(10{,}2)}{5{,}1^2}\right] = 435{,}0\ \text{lx},$$

beleuchtungsstärke im punkte P = Ep − Ep′ = 41,0 lx
(12 hefner-lux /lx′ = 1 footcandle).

lichtverlust durch gegenüberliegende gebäude etc. wird auf grund empirischer werte festgestellt, hier beträgt er für alle stockwerke etwa 5 v. h.

die beleuchtungsstärke im punkte P an ort und stelle erreicht einen um etwa 40 v. h. höheren wert (zufolge der rückwürfe des lichtes an decke und wänden).

die leitsätze der D.B.G. verlangen für les- und schreibräume eine mittlere beleuchtung von 50—60 lx. die vorgesehene fensteröffnung gewährt also auch dem dunkelsten arbeitsplatz eine ausreichende beleuchtung. nahe der fensterwand ist die beleuchtung 10 mal stärker und in zimmermitte 4 mal stärker als im punkt P. die durchschnittliche beleuchtung beträgt etwa 180 lx, bei einer fensterfläche von etwas mehr als $^1/_3$ der bodenfläche.

fall **2**) shed-oberlicht des zeichensaales.

berechnet wird die beleuchtung in jeder shed-axe.

berechnungsverfahren nach higbie und levin.

daten für die formeln:

abstand des punktes P_1 von der fensterfläche	a_1 = 2,5 m
„ „ „ P_2 „ „ „	a_2 = 5,6 m
„ „ „ P_3 „ „ „	a_3 = 8,6 m
(diese abstände horizontal gemessen) „	
länge des fensters	m = 11,0 m
abstand des oberen fensterrandes von der tischfläche	f = 3,3 m
„ „ unteren „ „ „ „	f′ = 2,6 m
(diese abstände in der fensterebene gemessen).	
beleuchtungsstärke des fensters	b = 100,0 ftcdl.

$A_1 = \frac{a_1}{f} = 0{,}75$, $A_1' = \frac{a_1}{f'} = 0{,}96$, $A_2 = \frac{a_2}{f} = 1{,}70$,

$A_2' = \frac{a_2}{f'} = 2{,}15$, $A_3 = \frac{a_3}{f} = 2{,}50$, $A_3' = \frac{a_3}{f'} = 3{,}30$,

$B = \frac{m}{f} = 3{,}30$, $B' = \frac{m}{f'} = 4{,}20$.

die beleuchtungsstärke in jeder shed-axe, erzeugt durch das zugehörige fenster, ist gleich dem unterschied zwischen den beleuchtungswerten von fenstern der höhe f und f′.

aus dem diagramm ergibt sich

beleuchtungsstärke in P_1 = 56—39 = 17 × 12 = 204 lx. = E_1
„ „ P_2 = 13— 9 = 4 × 12 = 58 „ = E_2
„ „ P_3 = 5— 3 = 2 × 12 = 24 „ = E_3

die gesamtbeleuchtungsstärke in P_1 = E_1 = 204 lx.
„ „ „ P_2 = $E_1 + E_2$ = 262 „
„ „ „ P_3 = $E_1 + E_2 + E_3$ = 286 „

diese werte sind um weniger als $^1/_3$ voneinander verschieden, gegenüber dem vielfachen beim seitenlicht. die durchschnittliche beleuchtung beträgt etwa 250 lx bei einer fensterfläche von etwa $^1/_4$ der bodenfläche.

fall **3**) zweiseitiges seitenlicht der turnhalle.

berechnet wird die beleuchtung an den beiden längswänden und in der saalmitte.

beide längswände mit 2 m hohem fensterfries auf die ganze länge und unmittelbar unter der decke.

berechnungsverfahren nach higbie: (wie bei klassenzimmer mit seitenlicht).

daten für die formel: (P nahe längswand ost).

abstand des punktes P vom fenster (ost)	a_1 = 2,0 m
„ „ „ P „ „ (west)	a_2 = 9,0 „
länge des fensters	m = 23,0 „
abstand des oberen fensterrandes von der tischfläche	f = 4,5 „
„ „ unteren „ „ „	f′ = 2,5 „
beleuchtungsstärke des fensters	b = 100,0 ftcdl.

beleuchtungsstärke durch fenster (ost) = 249 lx
„ „ „ (west) = 29 lx

lichtverlust durch gegenüberliegende gebäude, ostseite = 5 v. H.
„ „ „ „ westseite = 12 v. H.

gesamtbeleuchtung in P = 253 lx.
daten für die formel: (P nahe längswand west).

abstand des punktes P vom fenster (ost)	a_1 = 9,0 m
„ „ „ P „ „ (west)	a_2 = 2,0 „
(die anderen werte wie oben).	

beleuchtung durch fenster (ost) = 29 lx
„ „ „ (west) = 249 lx
lichtverlust: ostseite = 5 v. h., westseite 27 v. h.
gesamtbeleuchtung in P = 212 lx.
daten für die formel: (P in saalmitte).
abstand des punktes P vom fenster (ost und west gleichviel) a = 5,5 m
(die anderen werte wie oben).
beleuchtung durch fenster (ost und west gleichviel) = 110 lx.
lichtverlust: ostseite = 5 v. h., westseite 13 v. h.

gesamtbeleuchtung in P = 195 lx.

Figure 4.34. Hannes Meyer's Petersschule Project as published in *Bauhaus* 2, 1927, with scientific calculations of the lighting system's effects. (Source: Hays 1992), p: 112.

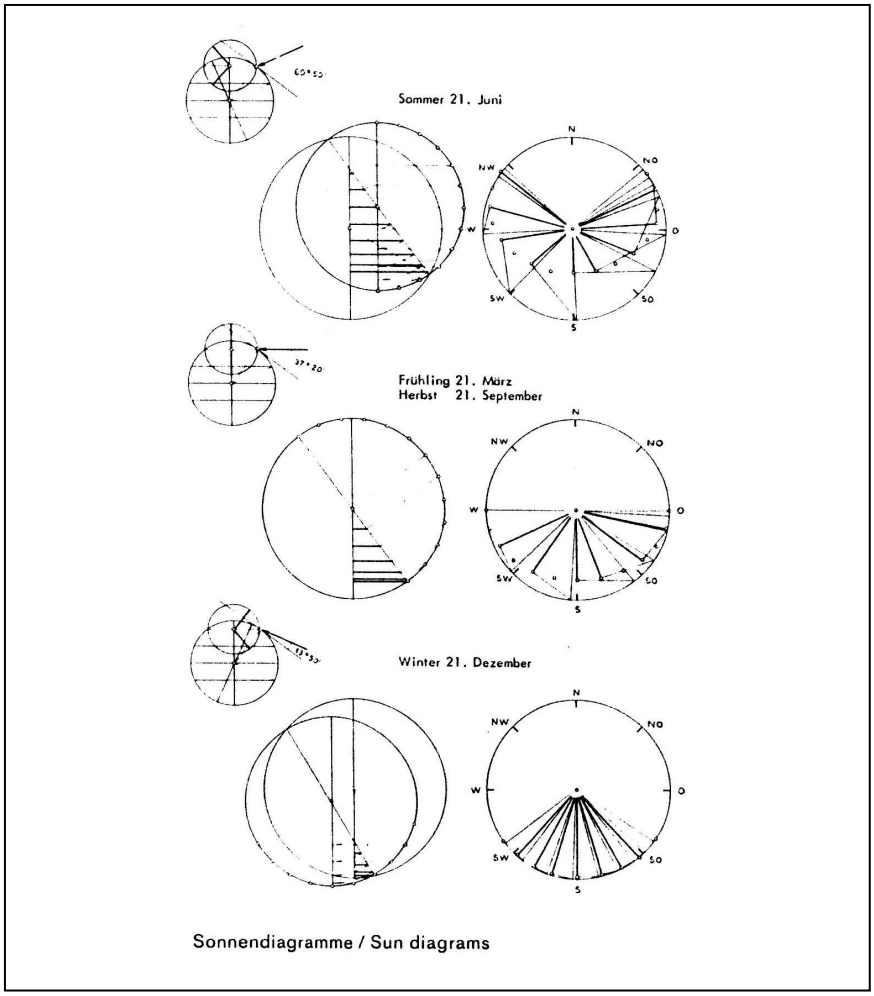


Figure 4.35. Sun diagrams for Federal School of the General German Trade Unions Federation, Bernau near Berlin, 1928-30. (Source: Schnaidt 1965), p:43.

Meyer's explanations concerning the process of designing is an indicator of his search for a standardized process of designing. Hence, Meyer aims at reaching a scientifically valid, universal, and collectivist solution resulting from a universal process of designing which he explains in terms of standards. Meyer utopically believes such a solution might reflect the structure of a homogeneous society. Basically, what Meyer intends to get at is to provide a "perception" of homogeneous society. Therefore, he denies all the practices that might interfere with the formalist effect of "homogeneity" which, he believes, is to be attained through a scientific process. One of the examples of the idea appears in his explanations concerning his project of *Siedlung*

Freidorf (Freidorf Housing Estate), in which Meyer explains the reason for a single color painting of buildings as ;

> "The uniform of a single colour for the paintwork of every house is artistically rooted in the essential nature of our co-operative. Houses painted in different colours would have evoked the differences and distinctions of lower middle-class life and suggested different dates of construction. Hence the colour is simply an expression of concord, and unity of architecture is partnered by unity of colour."[355]

4.2.4.1.1. Hannes Meyer's Biocentric epistemology

"The Theory of Building," a functionalist- constructivist theory analyzed seriously and scientifically by Meyer, is also rooted in a biocentric epistemology for its justification. In a seminar in San Carlos Academy in 1938, Meyer has stated that "He *(the architect)* must be conversant with biological sciences."[356] Meyer defines the process of reaching "pure construction" as a "biological process" as well as a "technical" one. He has expressed the idea in "*Bauen*," published after he joined Bauhaus;

> "**Building is a biological process. Building is not an aesthetic process**. In its basic design the new dwelling house becomes not only a piece of machinery for living in but also a biological apparatus serving the needs of body and mind. The modern age provides new building materials for the new way of building houses:...
> we organize these building materials on economic principles into a constructive whole.....
> **Thinking of building in functional and biological terms as giving shape to the living process leads logically to pure construction… Pure construction is the basis and characteristic of the new world of forms**."[357]

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[355] Meyer, "Siedlung Freidorf, bei Basel, 1919-1921," in Schnaidt, *ibid*, p: 5.

[356] Quoted by Schnaidt, *ibid*, p:55. Italic is added. In 1938, Meyer traveled to America and Mexico to attend "the International Congress on Town Planning" in Mexico. In June 1939 Meyer accepted an invitation to become director of the newly formed Institute for Town and National Planning of Mexico. he has taught there until june 1941. then , until 1949, he has continued different duties, in 1949 he returned to Switzerland. Schnaidt, *ibid*, p:53.

[357] Meyer, "Bauen," in Schnaidt, *ibid*, pp: 95-96.Emphases added.

With his argument of "the biological process," Meyer defines a process which operates on physical and mental needs of the individual. Accordingly, he emphasizes that "building" is not a mere mechanical order. The idea has been repeated in Meyer's essay "Bauhaus Dessau," where he expresses his ideas of a process in which biological agents rather than biological ones are effective and contribute with "depth" and "richness" in architecture;

> "In our building course we developed a "functional building" which, contrary to popular interpretation, was something much more than the "purely technical". It was our hope to give added depth and richness to architecture by an analysis of the social situation and a careful study of all biological factors, special attention being paid to the mental factors involved in the way people organized their lives."[358]

Coming up with the ideas mentioned above, Meyer attempts to form a unity between "life" and " architecture" through natural facts and processes. In the essay, "*Bauen und Gesellschaft*," published in Bauhaus Magazine in January 1929, Meyer clarifies "unity" with the concepts of " harmony" and "balance." He explains the idea by comparing it with the examples from the "natural harmony;"

> "**All life is an urge towards harmony**. **Growing means striving after the harmonious enjoyment of oxygen + carbon + sugar + starch + protein.** Work means our search for the harmonious form of existence....**the ultimate goal of all Bauhaus work is to bring together all vitaly creative forces so as to give harmonious shape to our society...**the new theory of building is an epistemology of existence. As a theory of design it is the song of songs of harmony. As a theory of society it is a strategy for balancing co-operative forces and individual forces....its basis is the recognition of the living space and the knowledge of the periodicity of the process of living. ..**its creative media are**...**the results of biological research. Because this doctrine of building is close to life's realities** its theses are constantly changing: because it finds concrete existence in life, its forms are as rich in content as life itself. "richness is all."[359]

The designer's aesthetical concern is excluded in the transformation of the "process" into "product." In utopist terms, Meyer reinforces the idea of a natural

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[358] Meyer, "Bauhaus Dessau 1927-1930." A survey in the Mexican periodical 'Edificacion,' no.34/1940. Translated as "Bauhaus Dessau 1927-1930" in Schnaidt, *ibid*, p: 113.

[359] Meyer, "Bauhaus und Gesellschaft", in Schnaidt, *ibid*, pp: 99-101. Emphases added. Meyer's idea is also expressed in "Mein Hinauswurf aus dem Bauhaus," in Schnaidt, *ibid*, p: 103.

autonomous process like in the biological one; "Individual form, building mass, natural colour of material and surface texture come into being automatically and this functional conception of building in all its aspects leads to pure construction." [360] Yet, Meyer's ideas above do not sound very realistic when it comes to his worries about formalist aesthetics. In the essay, "How I work", Meyer claims that the study of "building" ought to be organized in accordance with three aspects one of which is "psycho-artistic element." In the same essay, while he explains the standardization of the drawing process in designing, he also discusses the aesthetic effect which can be obtained through his suggested technique; "This design is proof that a standardized drawing can produce a lively and **artistic effect**." [361]

Meyer, here, focuses on "the perceptional impact," or rather "psychological impact" as Meyer calls it, of the concrete product. In his essay, "*Die Neue Welt*," referring to the developments in science and technology, Meyer claims that the new age has a new "perceptional expression." He states that it is a common indicator of Modernism. Similarly, he argues that "cognitive and perceptual concepts" in architecture should be revised following such a transformation. "Rhythmical arrangement, the harmony of proportion, cellular-modular arrangement..." are only some of the means Meyer utilizes, hoping that they might provide the expected common effect. Therefore, while Meyer defines "building" as a biological process, he also emphasizes that the process of "life" should involve a psychological organization; "Building is the social, psychological, technical and economic organization of the processes of life."[362] Extracted from his essay, "*Über marxistische Architektur*," the following clearly explains the physical factors in Meyer's "building" process together with the utilization of the elements to provide a "unity of common aesthetics." A particular point in his essay, "*Über marxistische Architektur*," is a good example for Meyer's use of psychological agents and unity of common aesthetics in his "building" process;

> "In line with the Marxist maxim that "being determines consciousness" the socialist building is a factor in mass psychology. Hence towns and their

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[360] Meyer, "Die neue Welt," in Schnaidt, *ibid*, p: 93.

[361] Meyer, "How I work", quoted by Schnaidt, *ibid*, p: 27. Emphases added.

[362] Meyer, "Bauhaus und Gesellschaft," in Schnaidt, *ibid*, p:103

> buildings must be organized psychologically...The individual sensibilities of the artist-architect must not be allowed to determine the psychological effect of the building. The elements in a building that have a telling psychological effect (poster area, loud-speaker, light dispenser, staircase, colour etc.) must be organically integrated so as to accord with our profoundest insights into the laws of perception."[363]

Thus, in Meyer's constructivist and functionalist approach, reinforced with the facts of the biological process, the aesthetic features of the final product is the basic issue. This, in a sense, is accepted as Meyer's proposal of "functionalist aesthetics." Yet, Meyer has rather expressed his concerns through social and biological facts than express them directly. He has introduced the psychology factor as on of the main points in his argument by emphasizing that psychology factor is a natural component in the biological process.

The influence of the modern biological studies on the formation of Meyer's argument has been a matter of discussion. In his statement in "*Die Neue Welt*," he has named two important figures of the age in biology- Francé and psychology- Freud; "Francé, Einstein, Freud and Fabre are the saints of this latterday,"[364] which can be seen as an indicator of the influence of at least those two figures on Meyer. Yet, the influence has appeared more clearly in some other cases. The influence of El Lissitzky and Francé on Meyer has been apparent in his studies published in *ABC* Magazine as well. Some studies of Lissitzky on "biocentric epistemology," like his essay "Element and Invention" and one of his letters in which he has explained the relationship between the "creative process" and "the natural process," has been published in an issue of *ABC* Magazine edited by Meyer. Particularly, biologist Francé's "formation of thoughts" as a proposal to enable biocentric thought to determine all human activities has similarities with Meyer's argument of "harmony of life" which he attempts to achieve through his theory of "building". In addition, Francé's formation of "*Bios*" as "the sum of all experiences " resembles Meyer's discussion of "perceptional expression." [365]

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[363] Meyer, "Über marxistische Architektur (On Marxist architecture)," quoted by Schnaidt, Introduction, *ibid*, p:31.

[364] Meyer, "Die neue Welt," in Schnaidt, *ibid*, p: 91.

[365] Botar, Prolegomena to The Study of Biomorphic Modernism. Esp. chapter 4, pp: 427-430 and chapter 5, pp: 552-569.

CHAPTER 5

CONCLUSION

This dissertation studies and analyzes the architectural endeavors in reconstructing architectural epistemology with the knowledge of natural sciences between the years 1914 and 1945. The study has been made in the scale of the spreading of that particular effort in the Middle and Eastern Europe in general and presents the details of the most radical forms observed in the left-wing architectural discourses at that period.

The interaction between architecture and the knowledge of natural sciences varies in the orientation of the knowledge and adapting that knowledge into architecture. At that period, the interest of architecture is in biological and physical knowledge, and architecture is in relation with different aspects of that knowledge. Architecture is interested in the concepts and theories of physics and biology. Energy theories in physics, and especially Einstein's "Relativity Theory" and the related "space-time continuum" and "fourth dimension" concepts, the universe theories produced by scientists such as Uexküll and particularly Francé are all used in architectural epistemology. Besides, architecture is concerned with the methodology practiced in those sciences as well. Particularly from the middle of 1920s, it appears as an important matter of argument that scientific methodology is applicable to architecture as well. Therefore, this dissertation attempts to clarify how architectural discourses make the use of those concepts, theories, and methodologies of natural sciences in order to reconstruct a unified architectural knowledge that architecture sacrificed to the modernization process.

Two points are important in adapting the knowledge of the natural sciences into architecture. The first one is concerned with the various ways showing how architecture implants that knowledge. The other one is about the mechanisms /organs through which architecture implants the knowledge of natural sciences.

One of the mechanisms /organs through which architecture uses the knowledge of natural sciences is the justification of the argument of "a new architecture" scientifically. In the architectural discourses the need for a new architecture is

expressed with the argument that architecture should be reconstructed according to the new reality of the "new world." At that point, how architecture justifies the definitions of "the new world" and "the new reality" of its own world is important: the theories, concepts and the methodology of the natural sciences in question become the instruments of justification in architecture. With the use of the theories and concepts in physics, a diverse, dynamic, changeable definition of "new" reality , different from the observed materialistic one, comes into existence. This definition is supported by the concepts of "living processes," "living organisms" in biology. Thus, "the expression of the new reality" is introduced as the main problem in architecture; in fact, it aims at constructing an architecture to reflect "the new image of the world."

Another form of architecture in adapting the knowledge of natural sciences is the use of natural scientific knowledge for definition of "new (dynamic) architecture" with its features appropriately, in more utilitarian aspect. In the architectural discourses a "dynamic architecture" fitting into "the new reality" is tried to be defined. Consequently, the scientific concepts and theories legitimating the new reality are used as the main instruments in constructing the dynamic architecture. That is how Lissitzky and Doesburg use the knowledge of biology and physics in their attempts to postulate their theories of " a dynamic architecture." At the same time, it seems a big struggle to make that "dynamic architecture" universally accepted in the assistance of a scientific methodology. Especially from the mid 1920s, that approach is accepted in its most strict terms in Constructivism: an objective and universal architecture with the intervention of scientific methodology. Thus, this dissertation tries to explain that architecture is in contact with the knowledge of natural sources through different utilitarian forms and objectives.

Another important point in implanting the knowledge of natural sciences into architecture is the mechanisms through which architecture adapts the knowledge into its own discourse in its relation with natural sciences. Architecture deals with the concept or theory irrespective of its content, and recognizes that concept or theory just as a reference as in Hannes Meyer's use of modern scientific theories and concepts for justification of "The new World/reality-the new architecture" assertion.

Architecture deals with the concept or theory in different ways like interpreting it, abstracting it from its actual context or, attributing it new meanings, freely. For instance, El Lissitzky relates the concept of "space-time continuum," to the Theory of Relativity in his "imaginary space theory." Interpreting the concept as "space-movement

continuum," Lissitzky attempts to base it his argument of "a dynamic expression of space" in scientific terms. Similarly, Doesburg, in his "Elementarist theory," reviews the concept of "space-time" from a totally different aspect. Yet, the use of "space-time" in his theory provides Doesburg with nothing but the justification of the idea that the object in motion has a different space perception. In other words, for the architect, the concept of "space-time" serve as a means to justify his attempts to come up with a new plastic expression of "the new world" and "the new reality."

Architecture uses the concepts or theories by establishing parallelisms. For example, Hannes Meyer defines a unity between the biological process and the process in the architectural work by drawing parallelism similar to the universal system proposals.

In architectural epistemology, scientific methodology is used by adapting as in Karel Teige's assertion of "architecture as science." Teige, by adapting the scientific methodology to architecture, attempts to make the architectural knowledge entirely scientific. A similar attempt is apparent in Hannes Meyer's "theory of building".

Hence, this dissertation explains the mechanisms through which architecture implants the knowledge of natural sciences into its own studies, and also explains the transformation that adapted knowledge undergoes. Accordingly, the dissertation argues that the implantation of "natural-scientific knowledge" into architecture is unrealistic and impractical, which is expressed/clarified through contradictory assertions in architectural discourses including "creative-scientific process, creative - (natural) autonomous process, individual life-communal life, individual-mass psychology...

As a result, architecture deals with the knowledge of the natural sciences with an effort to accomplish a structure of "unitary knowledge" that might organize the entire world and life in the period. With its revolutionary, universal, objective and exact characteristics, "nature-scientific knowledge" is recognized as one of the main pillars in the reconstruction of architectural epistemology. In this dissertation the instrumentalization process has been analyzed with an effort to study its consequences and the problematic relationship between the architectural knowledge and natural sciences.

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