

# Alteration of visual representation of space in different historical epoques

Bogdan Chernyakevich

Aalto ARTS

## Biography

Bogdan is a doctoral candidate at the Department of Art in Aalto University, Helsinki, Finland and a member of the Artists Union of Saint Petersburg in the Department of Graphics. Since obtaining a Masters Degree in Spatial Design at The University of Art and Design Helsinki Bogdan has been engaged in the research, theory and practice of art, architecture and graphic design. Alongside specialisms in professional practice he has taught in the State Stieglitz Academy of Art and Design. As a doctoral candidate he partakes in academic life through writing, conferences and active research, he continues to work as a graphic artist, engaging in group and individual exhibitions. A creative practitioner, his interests are broad and his nature is inquisitive, investigating relevant practical, theoretical and cultural reference points, encompassing the contexts of modern, contemporary, ancient and historical art as well as contemporary architecture and graphics, inclusive of broader practices in two and three dimensional design.

## Abstract

**This article addresses the question of the alteration in the representation of space through different historical époques, starting from prehistory up to the present day. The investigation questions an artist's subjectivity or objectivity in the depiction of objects and space within various cultural traditions. The purpose of this text is to follow in greater detail and accuracy the nature of the**

**visual models laying behind different artworks and the reasons for alteration and modification. The writing analyzes the preconditions and factors influencing these alterations in the depiction of space across historical, cultural and disciplinary contexts. The review begins from the establishment of ancient cultures such as Egypt and China and follows the development in representation of the environment across forms of paintings and drawings through eras such as Antiquity, the Middle Ages, the Renaissance, and the Dutch Golden Age to a present day. The article scrutinises the potentialities for visual representation of the same object through different methods and forms of calculation. The article presents an argument seeking to highlight the analogy between historical artefacts and contemporary understanding of the space in its structural terms. It discusses questions of objectivity within various types of spatial representation and the objects contained within these spaces and indicates why certain visual models of representation are more familiar or common than others.**

## **Keywords**

**Representation of space, subjectivity, objectivity, visual models, perception of the world, perspective, oblique projections, Cartesian co-ordinate system, spherical space, realism, imitation, art history, contemporary art, illusionistic art.**

As a doctoral student and teacher in Art Academy, the author was captivated by the way education often teaches students to depict volumetric space based on one or two-focal point perspective in certain segments for specific purposes within the wider general picture of representation. Space can be presented in such a broad range of different modes as in the forms

of isometric, axonometric, oblique projections, frontal and side views, perspective, reverse perspective, one-point perspective, two-point perspective, three-point perspective, four-point perspective, zero-point perspective, and even as a spherical space. Can it be argued that some of these modes are more adequate to a human eye than others? Are they equally objective in terms of true perception of the world? How do they differ across cultures and how did they evolve over time? Why there are so many variations in this perception of space?

The subject of representation modes in the arts is well established, though little cumulative reflection on the subject can be found in a single source. In fact, initial study finds that fragments of knowledge are scattered across different texts covering a wide range of themes and disciplines. The subject of visual representation is discussed separately by art historians, perceptual psychologists, philosophers and scientists of physics, optics, geometry as well as mathematics, but seldom in one paper covering and connecting these different strands. With these facts in mind, this is an attempt to unite the disorganized information and present the subject of alterations of visual representation as a singular, wholistic exploratory text.

It is suggested therefore that discussing the phenomenon of alteration in the means and forms of conveying the world around us through the artworks from different époques and cultures. The influence and evolution of art through the centuries to the present day, in terms of the representation of space and inter-relationships. There are many publications on the depiction of space and objects, yet few of these question of alteration in the visual representation of space occurring in the evolution of art with any scrutiny. The attempt here is to approach this subject in terms of the visual language of art, and in doing so, endeavouring to highlight key issues concerning any depiction in both scientific and artistic terms. With this in mind, this works offers information concerning different questions related to the preconditions that formed the tradition of life-like resemblance in art.

*Why the way we see the world differed across cultures and historical periods? Why we*

*needed research and experimentation to understand the way the visual world is structured? How scientific findings reshaped artistic practice and the resulting which direction it was led? What were the reasons for the decline of realistic art during the late 19th and 20th centuries? How many forms of depicting space and objects are there and are some more adequate than others? Does the world we perceive individually have similar objective qualities for everyone ? Can we indeed say the world has a certain objectivity that can be shared by most people? And finally in summary, are there different ways to represent space and objects that are equally objective?*

These many questions emphasise the multi-faceted problems of seeking the different qualities in depiction of the environment. In other words, are modern day human beings nearly the same as the ancient people of Egypt or China who depicted the world in different historical periods so significantly different? Many more questions arise, from the philosophical to the practical, as the investigation continues but first to define the boundaries in argumentation.

To start the discussion it is essential to understand how the idea of resemblance to the world around has evolved in the traditions of art. First of all, it is vital to acknowledge that a realistic type of art appeared relatively later than concepts of art itself. Though one can say that in Stone Age one can find images of humans and animals they are still inherently based on anthropomorphic characters (Mithen, 1998, p. 480), and hard to identify, thus suggesting a wide breadth interpretation. Many types of art were significantly detached from ‘copying’ reality and mostly presented themselves as geometric ornaments such as in protogeometric pottery of Greek Dark Ages circa 900 BC – 700 BC (Snodgrass, 1973).

The evolution of a realistic tradition is usually associated with higher levels of social organization present in cultures such as ancient Egypt, ancient China and the period of Classical Antiquity. The traditions of ancient India and ancient America must also be considered but certain serious limitations in our knowledge of these spheres have to be taken into account

(Crawford & Kelley, 2012). Therefore, it is logical to focus on the cultures where extensive research exists to reveal key structural elements in evolving a concept of the depiction of life around in forms of art. For these concerns and this purpose here consideration is given to the reasons and the need for copying reality, that appeared in first ancient cultures.

By example, in ancient Egypt to provide a deceased person with an afterlife a copy of the life that existed had to be provided. This idea of duplicating reality went so far that it included not only pictures with scenes of a person's earthly life, but copies of valuable objects, and items belonging to the deceased and could even include replicas of the whole houses or palaces with living rooms, bedrooms and even a toilet (Smith & In Smith, 1956). In the underground tomb of Djoser, a complex chamber system was discovered that recreated the whole palace of the pharaoh within the entombment (Firth, Lauer, Quibell & Egypt, 1935).

This reality needed comprehension & categorization and resulted in specific types of images known as the canon of Egyptian art. According to conventional rules of this canon people and objects were depicted as frontal views with a posture of shoulders and torso positioned towards the picture plane and the rest of the body positioned in profile. Space relationships were mostly defined by the overlapping of one figure or objects over the others. To a certain extent, one can relate these types of images in modern terms as belonging to the frontal parallel projections though of course with certain limitations. Though it is indeed much more relating to parallel projections than any attempts at the depiction of perspective.

Another specific feature of visual representation of ancient Egypt culture is the combination of several varied scales and different types of views within the same image. For example, the work 'Deceased Being Towed in a Boat' (fig.1) is an image of the garden of Rekhmire from Tomb of Rekhmire circa 1504 BC –1425 BC, The Eighteenth Dynasty of Egypt (Kuhrt, 2006). The image presents a garden with a rectangular pool surrounded by trees and several figures including a boat with the deceased, it is a funeral ceremony and of significant interest

to questions around the perception of the space. The pool is depicted from the top as a master plan but trees, building façade, and all figures are depicted as side views or frontal projections attached to the top view of the pool. It looks much as volume unfolded into a two-dimensional drawing, it is a mode of depiction that is strongly connected to the system of beliefs of ancient man. A so-called “discretive” mind where seemingly disassociated or scattered types or parts of the world can be combined into singular image or bas-relief (Boljshakov, 2018, p. 15). Thus, the image and the pool do not look inconsistent, it has several clear parts united into a singular system, with this in view, it is not incoherent despite the amount and combination of strange image parts. Moreover, if one looks at the Egyptian master plan of the garden with the pool, it would be possible to relate this image to the tradition of modern architectural drawings. A mode where different types of views, projections of various scales can be allocated to the same sheet alongwith side views attached to floors or master plans to ease legibility. In a similar vein as in Egypt, image volume can be unfolded into series of flat images corresponding with the main object of the plan such as the pool situated in the middle of the image from Rekhmire Tomb. Consequently, in architectural practices, it is constructed for the purpose of a clearer understanding of the objects and space relationships with accurate dependence on measurements and details. Although for non expert or professional these drawings might look unusual, absurd, and unclear, as can be said of the image of the Egyptian garden with the pool.

Expanding the subject further to other cultural examples in the depiction or recreation of space, we have to highlight several facts about ancient Chinese tradition. Similarly to ancient Egypt, the tradition of realistic depiction and necessity to replicate human environment is rooted in the cult of the deceased, to continue existence in an after-life it was necessary to recreate the living environment. The most explicit example of this in Chinese tradition is the burial of Emperor Shi Huang of Qin dynasty (Portal & Kinoshita, 2007). The Emperor was buried with a whole army where each clay or bronze copy of a soldier was based on inherent real life features

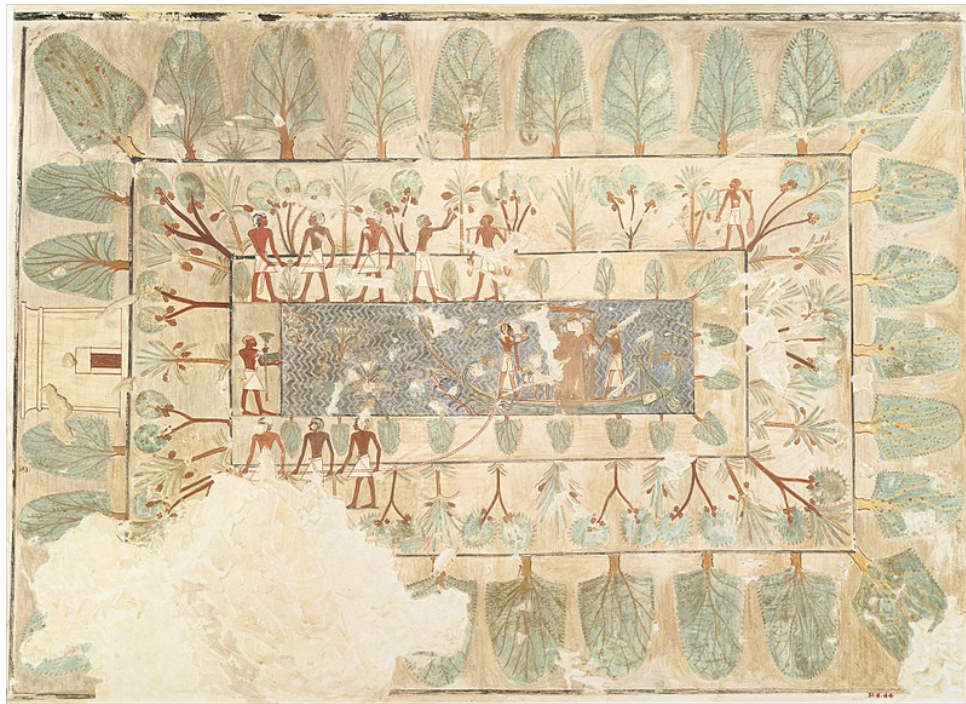


Figure 1. Deceased Being Towed in a Boat, Tomb of Rekhmire The Eighteenth Dynasty of Egypt circa 1504 BC – 1425 BC.

of each individual soldier in service.

In terms of depiction of space in two-dimensional mode, Chinese as well as Japanese art traditions utilized the so-called oblique perspective. Though it might bring the impression of perspective, it in fact relates more to parallel projections, since it misses any kind of vanishing point. These parallel projections incorporate certain turning angle that allowed a volume to be revealed. In this case, such a method in the depiction of volume is rather more axonometric than perspective. In this type of depiction one can acknowledge the example of a Song dynasty watercolour painting of a mill in an oblique perspective of the 12th century (fig.2). Such a tradition of depicting the space, objects, and people remained very stable in Chinese and Japanese arts. Only in the 20th century under the influence of European culture did Asian traditions change their standards and conventions (Weston, 2004).

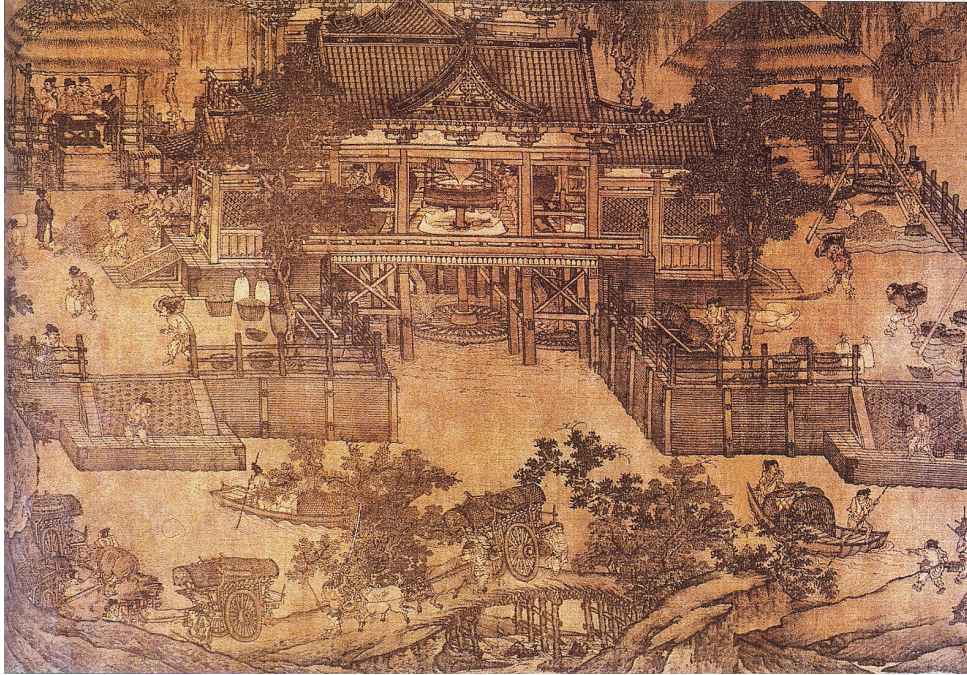


Figure 2. A Song dynasty watercolor painting of a mill in an oblique perspective, 12th century.

Already at this point, we consider why ancient Egypt and ancient China that share so many similar cultural and religious characteristics typical for the early periods of civilization had resulted in such different approaches to convey three-dimensional environment in two-dimensional forms. No any literature sources or explanation model exists and as such it seems these queries will remain part of the buried history.

So to move forward and continue through these historical observations and uncover further connections. The next key element in a start point for research in understanding how the world is structured is the culture of Antiquity and its philosophical or more appropriately concepts, and ideas. Those that formed the basis for the evolution of the whole of European art and the period of the Renaissance in particular.

Ancient Greece inherited many features from older cultures. And the ancestor-worship still played a significant role in the life of the ancient Greeks, it did not result however ideas of



copying life for the purpose of providing an afterlife for the deceased. Unlike other ancient cultures, in Greek or Roman cultural traditions copying or depicting an environment was perceived not as a utilitarian need but as a virtue. The ability to create life-like similarity with real life made artists approaching almost the position of God with his endless possibility for creation. This notion can be shown by Ovid's famous narrative poem *Metamorphoses*, in which sculptor Pygmalion falls in love with a statue he had carved (Morford, Lenardon, & Sham, 2011). From above it follows that the Greeks formulated the important notion that recreating an environment, objects, and people were not a functional necessity but a space for open competition and public observation. Thus, the purpose of art was to wonder, to compete and to attract maximum public attention. These standards were making the artist a very important figure in the society. In other words, exactly in Antiquity, the idea of competition and improvement formed key elements for progress and development, it was, in many ways a crucial factor in the rapid development of European art. In support of this assumption, it is worth mentioning the trend of artistic challenges that one finds, innumerable Greek and Roman myths and anecdotes describing competition among artists. For example a competition between the two famous Greek painters Zeuxis and Parrhasios was described by Pliny the Elder in his *Natural History*. Zeuxis painted grapes so realistically that the birds flew down to peck at them. Parrhasios accepted the challenge for creating incredible similarity with real objects and he painted a curtain that looked so natural that when Zeuxis asked Parrhasios to draw the curtain aside was surprised that the curtain is not real. Zeuxis was defeated by mastership of Parrhasios (Mansfield, 2007). The value of the realistic depiction and ability to deceive the human eye is also emphasized in another Pliny's story where again in the centre of it stays Zeuxis. This time he paints a portrait of a boy with grapes. When the birds came for grapes and Zeuxis lamented that he painted the grapes better than a portrait of the boy. He thought that if the portrait of the boy would be so realistic, the birds will be frightened to descend for picking up the grapes (*Natural History*, 35:66). One more story of

Pliny the Elder describes renowned court painter of Alexander the Great - Apelles of Kos and an art competition for the best “portrait of horse”. Apelles of Kos witnessing that the contest is biased and full of intrigue. Thus, to make contest equitable he suggested letting real horses judge. The horses reacted only on Apelles’s work that made him win the competition (Natural History, 35: 95). These types of myths and anecdotes are typical not only for ancient Greek and Roman tradition but also can be found through the whole line of European art evolution. For instance, is well-known the story of Giotto who deceived Cimabue into trying to waft an illusionistic painted fly away. As a result, these conceptual formulas and general vector of art as such imminently started to address the question of how the world is built. How can I realistically depict it? What are the principles of true representation of the space? Already in staging Aeschylus’s tragedies in Athens and Agatharchus around 470 BC, we can find the first pieces of evidence to approach the problem of depicting the space scientifically. A Roman author and architect Vitruvius in his multi-volume work *De architectura* describes this event and continues by saying that the decorations for the play were designed by a self-taught painter from Samos who incorporated in his decorations special techniques called *skenographia* and also wrote the treatise on that titled *Commentarius*. Another two artists Anaxagoras and Democritus being inspired by the work of this master decided to approach this subject in a more scientific way. Hence, Vitruvius relates the elaboration of knowledge of perspective to the names of Anaxagoras and Democritus (Stansbury-O’Donnell, 2015, p. 255-256). We can only lightly evaluate the degree of scientific findings of these painters due to the absence of any artefacts. Initially one can acknowledge here documentary evidence of the first attempts to analyze our visual environment in a systematic way. But luckily we possess a great example of a perfectly-preserved wall paintings in Pompeii where one can judge a great degree in understanding of space with almost correct one focal point perspective. Especially in The fourth Pompeian Style (fig.3) abounding with architectural elements and constructions, such as the Golden House (The *Domus Aurea*)

landscaped palace built by Emperor Nero in Rome in c. 64-68 AD (McKay, 1998, p. 157). Centuries passed to understand fully the perspective and the way it is structured, the Greeks formulated the important concept underlying the evolution of European art where competition and the position of an artist as an intellectual and scientist was inherent through centuries of development.

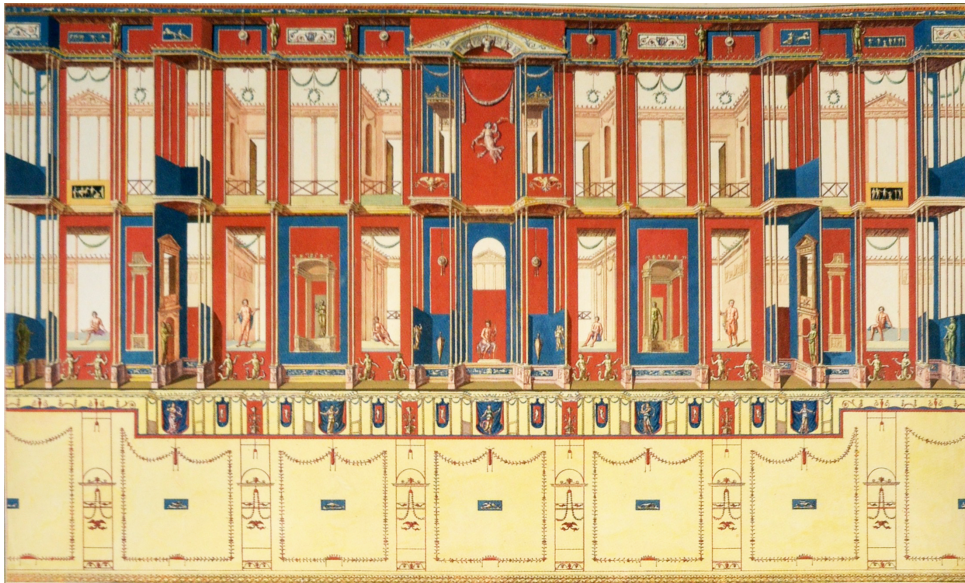


Figure 3. The style of wall paintings in Domus Aurea (Golden House), built by the Emperor Nero in the heart of ancient Rome in c. 64-68 AD. drawing by Vincenzo Brenna *Vestigia delle Terme di Tito*, 1775-1777.

If ancient cultures offered such forms of representation of spaces as frontal projections in Ancient Egypt, parallel projections as in Ancient China and Japan, and even remarkable attempts to replicate one focal point perspective in Ancient Greece and Rome, the period of the medieval times in Europe suggested something very extraordinary and unusual. The method of depicting reality in the feudal era was indeed unique. This is the Reverse perspective or so-called Byzantine perspective (Deregowski, Parker, & Massironi, 1994, p. 5-13), (Hopkins, 1998, p. 157). Strange though it may seem after the attempts of the ancient Greeks and Roman masters in the development of art to be interrupted during Migration Period and brought to the

table an unusual eye for modern representation of the space. If in classical perspective one focal point or two focal points lie on the horizon line positioned far away in front of the viewer, in reverse perspective one finds the horizon line behind the viewer and focal points directed there. Consequently, the more remote objects are from the viewer the bigger they are in reverse perspective (fig.4). Indeed, how could the medieval artist depict objects from behind the viewer? Again a very mysterious question that will lay in the layers of history. Though Rauschenbach (1983, p. 28-30) argues that this type of perspective, as a phenomenon, occurs during observation of the objects with extremely short distances, still it is hard to believe this notion when our spatial experience is so based on photography or video films with dominant perspectives that decreasing objects towards horizon line. But in spite of its unusual features, Reverse perspective is indeed another way to represent the environment. And it is not a question of whether this perspective is incorrect or correct, it is a question of another system of coordinates that replicate spatial relationships. In that sense, reverse perspective has its full right to exist, it does not destroy space proportions but present them in a different form.

By moving forward on the timeline of the evolution of art one notices images of the space much more familiar to the modern eye, the Renaissance. With its scientific approach based on experimentation, this époque brought to life a clearer understanding of perspective as we know it today. Indeed, Renaissance artists were researchers, scientists, men of curiosity and voracious minds. Exactly due to these features, Leonardo da Vinci was considered to be a genius of its time. The idea to return to the findings of Greek and Roman masters, scientists, and philosophers resulted in extensive research of available materials and interpretations of forgotten traditions and knowledge. In such a way, the period of Renaissance anticipated the development of science where artists suggested multiple treatises on all possible subjects. One of the popular themes of research was perspective or “secret science” as it sometimes was called that period. Among many here we can mention such authors as Albrecht Dürer’s *Unterweysung*



Figure 4. Illustration of Ezra in the Codex Amiatinus, 7th century.

des Messung (Four Books on Measurement), or Piero della Francesca De Prospectiva pingendi (On Perspective in painting), Leon Battista Alberti Della Pittura (On Painting) and some others. One of the reasons why the research of perspective was so successful in the Renaissance period is that artists used the experiment as a tool to prove their theoretical hypothesis. Thus, by combining theoretical understanding and testing it on practice helped to discover certain

regularity and laws. For example, Leonardo da Vinci and Michelangelo used camera obscura, Dürer utilized a grid to create a perspective on his picture plane (fig.5). This wide scope of research including experiments, creating special devices, testing theories on practice resulted in the flourishing of the renaissance art. One can find magnificent works affirming a great knowledge of perspectives such as The Last Supper, Mural by Leonardo da Vinci or The Marriage of the Virgin by Raphael (fig.6).

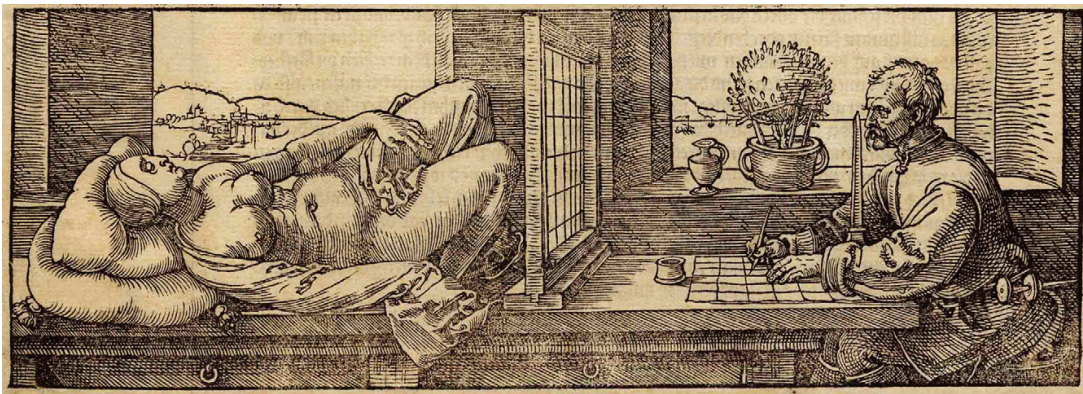


Figure 5. Albrecht Dürer, illustration from *Underweysung der Messung mit dem Zirckel und Richtscheit*, Nuremberg, 1538.

Moreover, the growth of the knowledge of perspective resulted in evolving of particular genres specialized in illusionistic techniques. They had different names such as *di sotto in sù* meaning in Italian "seen from below" or "from below, upward" or *quadrature*. These genres specialized in creating Illusionistic painting on the ceilings or domes of cathedral suggesting dissolve the architecture and create illusions of extra space. Besides, the Renaissance masters managed the problem of applying linear perspective to the concave surfaces of domes which allowed creating unique illusionistic effects. Originated in Renaissance these techniques continued their life in Baroque and Rococo periods using such methods as modified perspective, foreshortening, and other spatial effects and adjustments. Though most of the laws of perspective were discovered during the Renaissance period still new technological innovations



Figure 6. The Marriage of the Virgin Raphael Pinacoteca di Brera, Milan 1504.

expanded this knowledge. This growth of knowledge occurred due to the discovery of the production of lenses, microscope, telescopes, and large flat mirrors (Ilardi, 2007). Indeed, these innovation factors are usually mentioned while describing the flourishing period of Dutch art known as The Dutch Golden Age. Of course, many other factors formed Holland as a progressive art area in Europe but still these technological factors cannot be seen as insignificant. The lens provided to the artists and scientists the new dimensions of seeing and understanding the world. These innovations influenced not only an understanding and vision of space but also re-affirmed the importance of art to some extent. Objects of curved forms, various goblets, and bowls became usual attributes of painting. They allowed the artist to show their virtuosic mastery and deep understanding of space and perspective. The reflection of the author on the surface of a glossy or reflective object or full reflection of a painter in front of a large mirror starts to be a common feature in seventeenth-century Netherlandish still-life paintings. Also, self-portraiture and self-reflection were used by such masters as Antonis Mor, Clara Peeters, Davis Bailly, Peter Paul Rubens, Parmigianino (fig.7).

Furthermore, elaborated knowledge of perspective, understanding of reflections, refractions and light effects, allowed the creation of a special genre, called *trompe l'oeil* (meaning in French "deceive the eye") that gained a great value and recognition in European art. By using shortening perspective and amazing detailing of objects, masters of *trompe l'oeil* achieved the amazing effect of presence. Quite often such types of paintings were luxury items in their own right and could exceed the cost of some of the valuables they depicted (Montias, 1988). Though still-life and landscapes belonged to the lowest genres of art according to the system of art hierarchy their market value and recognition among royal courts were significant (De & Miegroet, 2006). Into the 18th and 19th centuries, scientific understanding of space started to shift towards pure science where an understanding of spatial relationships was a prerogative of descriptive geometry. But what happened with the perception of space and the way painters depicted it? As strange





Figure 7. Parmigianino Self-portrait in a Convex Mirror , Oil on convex panel, diameter 24.4 cm. Vienna: Kunsthistorisches Museum, 1525.

as it may seem when artistic understanding of space reached its peak it started to disassociate from it. Already with post-Impressionists who experimented with colours, in optical effects one can find disassociation from a photo-like realistic representation of the environment. Impression started to prevail over other qualities of painting. Moreover, innumerable art movements at the beginning of the 20th century such as Futurism, Cubism, Suprematism, Dadaism suggested different degrees of deconstruction of conventional realistic tradition based on the Renaissance and later periods of development of European art findings. These movements proposed a wide range of play with space and objects starting from a slight modification of them to complete deletion of space and object as in work and manifest Black Square by Kazimir Malevich. It seemed as the long-lasting realistic tradition formed in the 14th century during the Renaissance had collapsed by the beginning of the 20th century lasting in more or less stable condition

only about six centuries. Of course the tradition of real like depiction did not disappear and continues in such types of art bringing realistic tradition into the new extreme dimensions, as for example in such art movements as Hyperrealism and Photorealism involving techniques of high-resolution photography, airbrush, and acrylics paints (Bredekamp & Stafford, 2006, p. 1-4) but still the moment of dismantling this stable tradition that lasted a relatively long period, is very curious. Through the whole observation, the question arises as to which point did we arrive today in terms of depiction space and object? What is the right way to see the world? Is some mode of depiction is better than others? How can we find ourselves in this world full of spatial interpretation? Here surmise some of the main notions provided in this article. It necessary to admit that the world of representation of space and its objects is a multifaceted phenomenon, as witnessed with the examples of different artistic traditions. Each type of representation of the world around has its regular system and can be converted from one representational system into another. To exemplify this notion, take the example of a simple cube, to unite the historical period with a certain model in the depiction of an object within space. So having the cube one can describe it visually in several ways. First of all, to apply frontal projections when the surface of a cube is parallel to a picture plane. Thus, one will have drawing typical for architecture or industrial design practices (fig.8) including such views as plan, frontal, and side projections. To these type of visual representation to some extent, we can relate the tradition of most of ancient Egyptian images and reliefs. Another type of depiction is parallel projections involving tilting an object towards the picture plane. This is the area of axonometry. If the cube is not parallel to the picture plane and thus projection does not look flat and has a third volumetric dimension. To this category, we can relate the traditions of Chinese and Japanese art, and some works of European art as for example axonometric plan of Port-Royal-des-Champs dated by the 18th century (fig.9). In contemporary practices, various types of axonometry are used in technical drawings and even computer games as for example in the game Q\*bert One. In 1982 it was one

of the first games using a subclass of axonometry - isometric graphics.

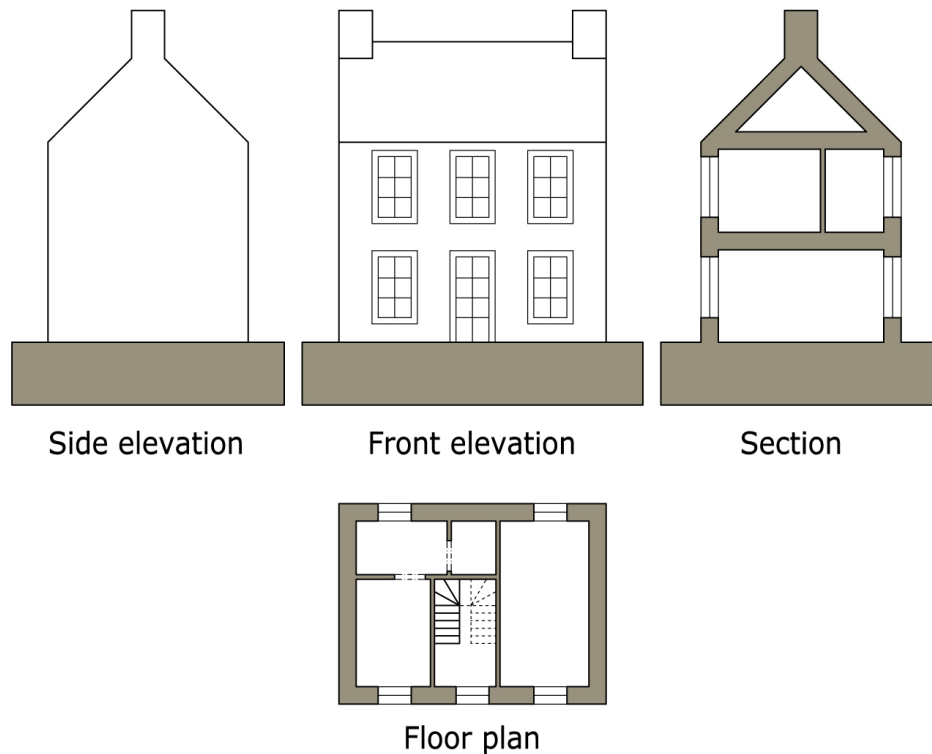


Figure 8. Architectural drawing major projections. *By Bogdan Chernyakevich*

Unlike previous classes of parallel projections including frontal views and tilted angles, here we approach the area of perspective or so-called central projections meaning the availability of one or several focal points. Here starting with perhaps the most seldom type with Reverse perspective being so typical for the Middle Ages. Despite all specificity of this type of representation, it has its conventional rules and inner logic. Thus, an object such as the cube can be presented in reverse mode in such a way that distant parts are bigger than ones closer to the picture plane. The Medieval ages were not only the period of utilizing this type of perspective, for example in early-20th-century avant-garde art movement Cubism sometimes addresses to this method (Howard & Allison, 2011). To this regard it is worth to mention here the painting

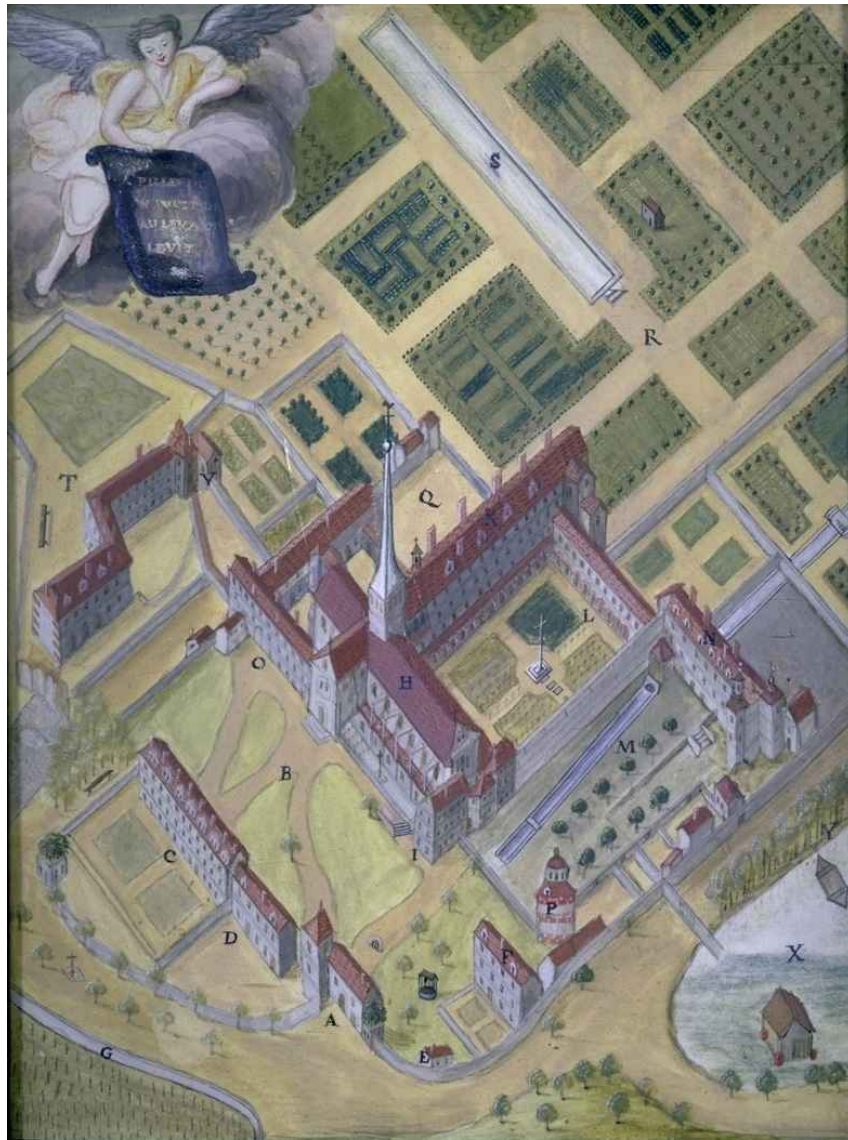


Figure 9. Port-Royal-des-Champs axonometric plan, 18th century.

Reservoir at Horta – Horta d Ebro by Pablo Picasso (fig.10).

Also, in the modern world reverse perspective may find application in animation or visual effects. The next block of perspective types is very common for contemporary eyes. The same cube can be drawn using one focal point perspective, two-point perspective, and three-point perspective. In all types, we witness a phenomenon of a diminishing of the object towards the

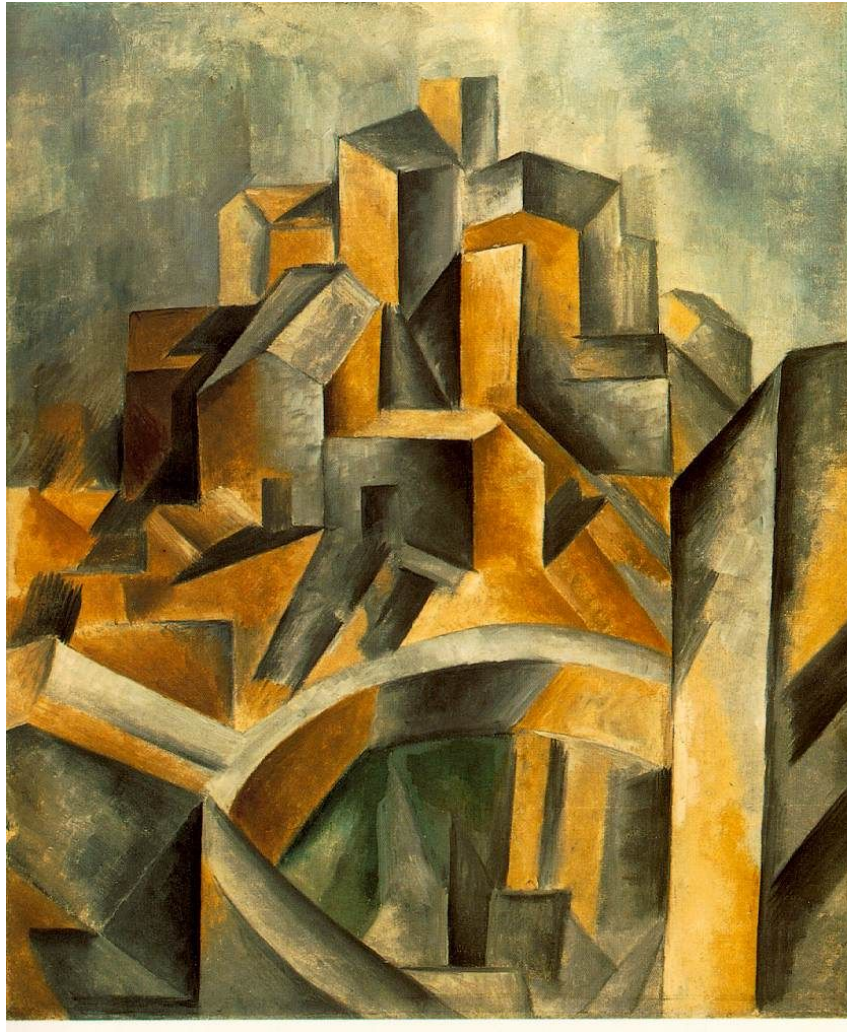


Figure 10. Pablo Picasso Reservoir at Horta – Horta d Ebro 1909.

horizon. To these types of representation of the space one can relate to ancient antiquity thought to take in account certain limitations and spatial errors of the time. The Renaissance paintings and basically all artistic tradition since and until the development of photography and cinema at the end of the 19th century must give credit to the ideas formulated and tested in Renaissance period. One point, two-point, and three-point perspectives seen daily in magazines, television, videogames, and in the cinema. It serves a great tool for showing the space, impression and complexity, for example, the three-point perspective may be used for dramatic effect in movie

productions.

In summary, all these ways to present a simple cube including central and parallel projections that in turn subdivide into categories, still all as a whole present themselves as planar types in the depiction of space. It means that the distance of the line between its endpoints is the shortest. But what if our universe is not flat and exists according not to the planar system but spherical (Tegmark, 2015). This is, of course, a hypothesis but art history offers such visual explanation. Though the shape of the cube is flat and there are no curved surfaces its reflection on the convex surface will be distorted and converted to spherical. This type of presentation was acknowledged on the example of the Dutch art of the 17th century in connection with the invention of the lens. In more contemporary works these types of visualization of space can be found in works by Maurits Cornelis Escher for example in his Lithograph *Balcony* dated 1945 (fig.11). Here the viewer witnesses two focal point perspectives with a spherical one incorporated into the centre of the image.

To draw a line under the forms of representation of the space and inter-relationship, admission that exact and clear comprehension of the regularity of space allowed the existence of so many art directions and genres, involving visual illusion of volumetric space and objects within it. Due to these findings, a critique of the conventional area of understanding in terms of space can be upheld. Creation of such artworks as *Rectangle, Ellipse & Disques* (2010) by Felice Varini or *Perspective Correction* (1968) by Jan Dibbets where individual experience is confronted with the statement of the artist. In other words the argument is that there is no better or more correct way to depict space. Indeed, it can be interpreted in different modes and remain in spatial relation whether it is an area of parallel or central projections, whether it is a planar or spherical system (fig.12). All of them have their right to existence. They enrich our experience of space in its scientific and artistic meaning. It seems that the history of art ascertained for us the fact that the way people saw the environment was not wrong or distorted, it was always an

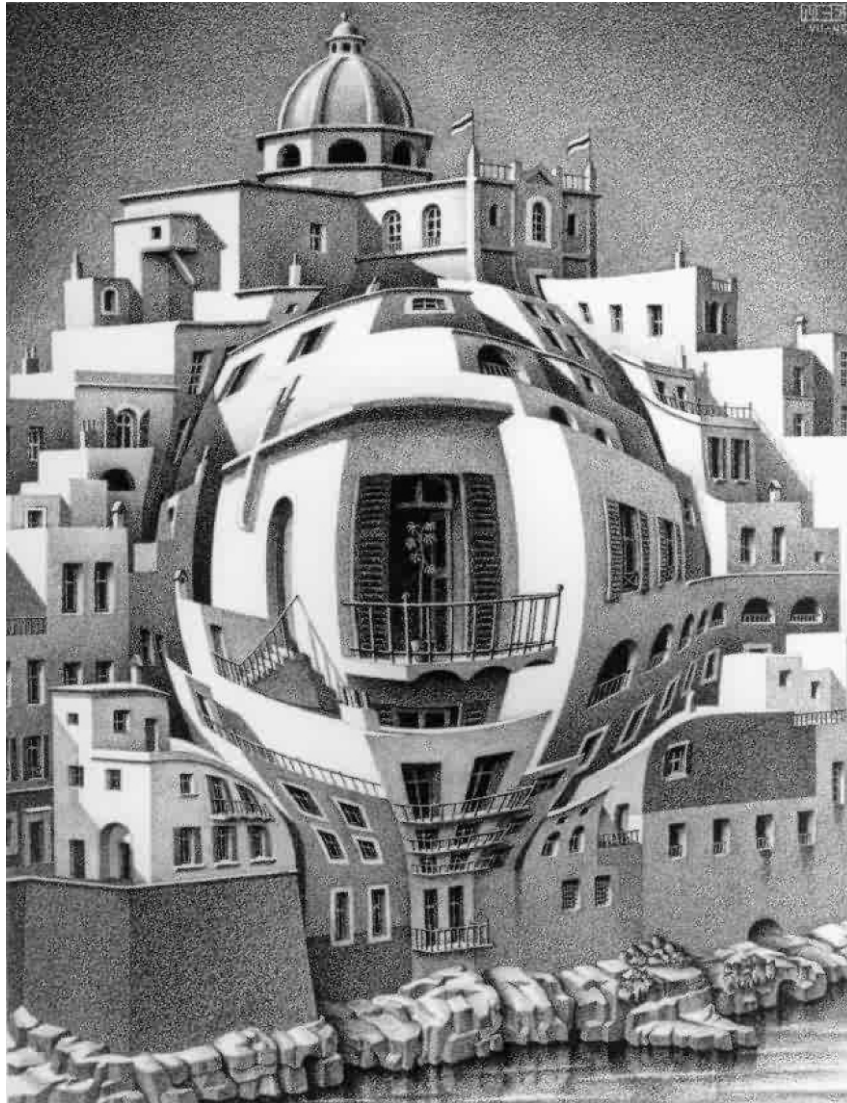


Figure 11. Maurits Cornelis Escher Balcony Lithograph, 1945.

adequate vision according to the conventions of the time. And the collection of this historical experience allowed us to better understand the space we live in and the ways it can be presented visually and the significance of those visualisations.

In drawing the general picture around the alteration of visual models, one can acknowledge the cyclical character of related processes. As highlighted in the text, all historical modes in the representation of space have their subsequent reincarnations, relevant to later conditions. So it

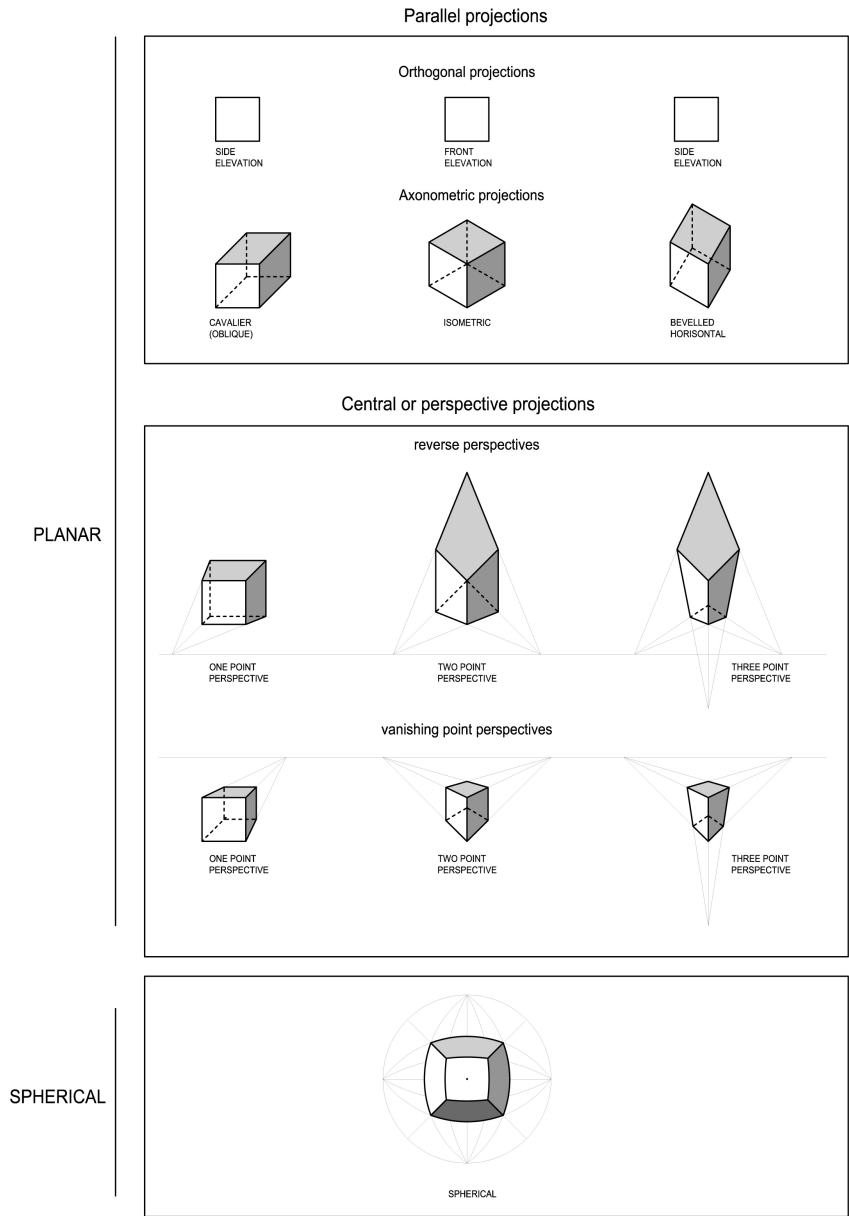


Figure 12. Various modes to represent a cube. *By Bogdan Chernyakevich*

is hard in this context to speak of Hegelian or Kantian principles of philosophy with a linear development of historical processes (Hrenov, 2004, p.52), despite ideas of evolution and progress.



Where visual representation philosophically alters from primitive to advanced historical facts indicates reiterations of visual paradigms in a linear manner. Here the argument is that that these alterations correspond more to the ideas of Vico, O. Spengler, W. Dilthey, G. A. J. Toynbee, and O. Spengler, defending the idea of a cyclical nature of history rather than a gradual linear process of permanent growth and progress. To support this assumption historical facts indicate that certain representational models can evolve in different historical and cultural contexts in spite of major conventional paradigms. For instance, principles of parallel projection, typical for Ancient Egyptian art can be also identified in medieval art, especially with regard to the depiction of master planes in cities or fragments of building arrangements. These are also seen in architectural drafts in a later period that resulted in the concept development of the Cartesian coordinate system. Parallel projections including isometric and axonometric views can be recognized not in the study of ancient Chinese and Japanese art but can also be recognized in western European art, for example in paintings conveying views of fortresses or territories from high above such as in Port-Royal-des-Champs axonometric plan of the 18th century. In latter more recent periods parallel projection occupies a central position from architectural drawings through to the design of computer games and the various representational models of three dimensional computer graphics aswell as in contemporary art installations. In a similar manner reverse or inverse perspective, so typical for Byzantine and Russian Orthodox icons can also be found in vanguard works of the Cubists. In regard to spherical type of rendering of space one can recall works of art of the 17th century with the incorporation of lenses, convex mirrors and complex reflective glass surfaces. The graphic works of Maurits Cornelis Escher, combining a spherical perspective with a linear one or contemporary computer representation media used for example by NASA for projections on curved surfaces such as full dome digital planetarium show ("Solar System Odyssey," 2019). Finally in a foreshortening, linear perspective can be found not only in the western art of Antiquity and period between the Renaissance and the

present but also in such a strict canon art as Egyptian art. According to Rauschenbach (1986a, p.33) dancers and musicians from the richly-decorated Tomb of Nebamun, on the west bank of the Nile at Thebes (dated around the 15th century B.C.) demonstrate a great shift from classical Egyptian canon towards plastic informativeness of space almost indistinguishable from realistic rendering. The metamorphoses of modern art and vanguard art movements of the 20th century and significance of abstract arts classical linear perspective, again found its way in such art movements as Hyperrealism and Photorealism. In summary these listed references reveal not so much progressive character in the alteration of visual representation in art work but more a character of fluctuation. To further support the concept for an alteration of representation in visual fields, one can address ones attention to decomposition of traditional realistic art at the end of 19th and the beginning of the 20th century. A period where multiple art movements remained in a position for the destruction of conventional models in representation of space and objects. In starting from Impressionists a departure from an academic type of depiction began; “Impressionism is important as an example of art in which a rigid system is advocated but one which is dressed up as relative approximation (Turčin, Kandinsky & Kandinsky, 2008, p. 140)”. Furthermore, the manifestos of different art movements such as Italian futurists, Cubists and many others proclaimed this break from the past, tradition and a search for the new. This aspiration for creating a new art resulted in deconstruction of conventional space of linear perspective, as if art has started again from the basics itself. To some extent it explains the fact that artists of new era in turn addressed and related back to the archaic in various art forms. In support of this W. Dilthey (Nelson, 2019, Hrenov, 2004) stated that the world views of people of these new era’s go through the same stages of development as the world views of antiquity. Thus, far this movement towards a new in art at the beginning of the 20th century was somehow directed towards a precultural state where art was searching for its own tools and language. In this vain one can associate theoretical works by Klee, Kandinsky or Malevich with

a proto-vocabulary of arts, where lines, points and plains serve as the platform basis for this new art. Kandinsky named one of his theoretical works *Point and line to plane* (1926) perhaps in relation to a comprehensive idea of these fundamentals elements. Thus, one cannot find in art vanguard movements any advocacy of perspective or other scientific findings as one could in Renaissance treatises by Leonardo da Vinci, Albrecht Dürer, or Piero della Francesca. Consequently the process of alteration in visual fields presented in various art works leads different writers to affirm various positions in this, whether new approaches or well-forgotten old ones. For example Rauschenbach (1983) argues that in various époques people relied on different approaches rather on the visible appearance of the world or to the geometrical acknowledgment of the latter. Panofsky (1991) in his analysis of perspective modifications between the Medieval and Renaissance periods relates to the ideological component. Florensky (Florensky, Mislner & Salmond, 2002) opposes, in his terms, Renaissance and Medieval types of visual cultures that replace one another through the whole evolution of art. Noë (2002) contrasts the snapshot-like visual experience with actual direct contact to the world in the form of information on the retina. In such a way, with all the differences of these listed concepts, most of writers confirm a dual structure of human perception that resulted in the adherence to one or another type of representational model. Consequently perhaps this dual component of perception results in a fluctuation of visual convention, whether it is perspective, isometry or frontal views. All in all these conversations, conventions and theories are simply only parts of a wider picture, that of perception of the reality around us. In this regard contemporary art involved all possible visual formations as part of its development through and during the whole process of a long and somewhat cyclical evolution. This view agrees with Schubart (2003) in that on these wider terms and according to the processes occurring during the 20th century, these can be associated with or considered as transitional. As a result this period can be characterized as quite an agile period as well as seemingly controversial. Indeed, in contemporary art one can acknowledge

co-existence of all mentioned forms of visual representation rather than a single dominant one, from abstract art forms (missing almost any features of volumes) to Hyperplastic art movements (involving precise visual rendering and accurate detailing). Despite the natural habit to gravitate towards one, two or three focal points, this perspective is based on a broad spectrum. The recent explosive diffusion of video and still photography suggests the full variety of these representational modes that are illustrated in the diagram included herewith (fig.12). To summarize the discussion, we have followed the line of an evolving tradition in visual representation and its variations, comparing different types of models, finding parallels within different periods and cultures, so it is clear that there is no better or worse, right or wrong way to perceive the world through artwork. As a result, we arrive at the point, especially considering major alterations in visual paradigms occurring at turning points in ancient cultures and the new Christian era, Antiquity, Medieval times, Renaissance, and contemporary 20th and 21st centuries, where various types of visual representations can and have replaced one another. This helps understand and reveal the reasons behind these modifications using various concepts described by prominent authors in their corresponding fields. Thus, it is argued, by assumption with supporting examples that these alterations to the representation of a world in the form of artworks have a cyclical character. In conclusion and in answer to the initial question posed at the beginning of text is that indeed all modes in representation of the environment are equally adequate to the human eye and objective. Taking in account the broad subject area as well as limitations of current writing in this specific area, highlights the significance of the task at hand. To unfold all aspects in the alteration of visual paradigms throughout different historical periods and cultures requires continued research. However this brief text tries to introduce some of the major shifting points and factors influencing these changes and describes how these different representational modes have formed today's understanding of space not only artistically but also scientifically. Contemporary scientific models in the representation of space involve all types of seeing, and

the word has its origins in the art history of various periods. In such a way, today we use the same principles that were used by ancient man whether it is parallel projections as in Ancient Egypt, axonometric and isometric views as in ancient China or Japan, or perspectives as in Renaissance époque. Thus, the argument highlighted here is that these traditions have been united in a singular model of contemporary science, all are simultaneously present in history and contemporaneity of art and further work should be carried out to understand these relationships.

## References

- Boljšakov, A. O. (2018). *Imitacija v kulture drevnega egipta [imitation in the culture of ancient egypt]*. Saint Petersburg: The State Hermitage Publishers.
- Bredenkamp, H., & Stafford, B. M. (2006). Hyperrealism: One step beyond. *Tate etc*, 6, 1-4.
- Crawford, S. J., & Kelley, D. F. (2012). *American indian religious traditions: An encyclopedia*. Santa Barbara, Calif: ABC-CLIO.
- De Marchi, N. (2006). *Mapping markets for paintings in europe, 1450-1750*. Belgium:Brepols.
- Dergowski, J. B., Parker, D. M., & Massironi, M. (1994). The perception of spatial structure with oblique viewing: an explanation for byzantine perspective? *Perception*, 23(1), 5–13.
- Elder, P., Rackham, H., Jones, W. H. S., & Eichholz, D. E. (1950). *Natural history*. Cambridge, Mass: Harvard University Press.
- Firth, C. M., Lauer, J.-P., Quibell, J. E., & Egypt. (1935). *Excavations at saqqara: The step pyramid*. Le Caire: Impr. de l'Institut Français d'Archéologie Orientale.
- Florensky, P. A. (2002). Beyond vision. essays on the perception of art (W. Salmond, Trans.). *London: Reaktion*.
- Hopkins, R. (1998). *Picture, image and experience: a philosophical inquiry*. Cambridge University Press.
- Howard, I. P., & Allison, R. S. (2011). Drawing with divergent perspective, ancient and modern. *Perception*, 40(9), 1017–1033.
- Hrenov, N. A. (2004). *Ciclicheskie ritmy v istorii, kulture, iskusstve [cyclical rhythms in history, culture, art]* (N. A. Redkol, Trans.). Moscow: Science.
- Ilardi, V. (2007). *Renaissance vision from spectacles to telescopes* (Vol. 259). Philadelphia, PA: American Philosophical Society.
- Kinoshita, H., & Portal, J. (2007). The first emperor: China's terracotta army: Exhibition at the british museum, 13 september 2007–6 april 2008. *Asian Affairs*, 38(3), 371–376.
- Kuhrt, A. (2019). *The ancient near east, c. 3000-330 bc*. London: Routledge.
- Mansfield, E. (2007). *Too beautiful to picture: Zeuxis, myth, and mimesis*. U of Minnesota Press.
- McKay, A. G. (1998). *Houses, villas, and palaces in the roman world*. JHU Press.

- Mithen, S. (1998). The prehistory of the mind: A search for the origins of art, religion and science. *Phoenix*.
- Montias, J. M. (1988). Art dealers in the seventeenth-century netherlands. *Simiolus: Netherlands Quarterly for the History of Art*, 18(4), 244–256.
- Morford, M. P., Lenardon, R. J., & Sham, M. (2011). *Classical mythology*. Oxford University Press Oxford.
- Nelson, E. S. (2019). *Interpreting dilthey*. Cambridge University Press.
- Noë, A. (2002). Is the visual world a grand illusion? *Journal of consciousness studies*, 9(5-6), 1–12.
- Panofsky, E., Wood, C. S., & Wood, C. (1991). *Perspective as symbolic form*. Zone books New York.
- Rauschenbach, B. (1986). *Sistemy i perspekti-vy v izobrazitel'nom iskusstve. obshchaya teoriya perspektivy [systems and perspectives in visual arts. general theory of perspective]*. Moscow: Nauka.
- Rauschenbach, B. V. (1983). On my concept of perceptual perspective that accounts for parallel and inverted perspective in pictorial art. *Leonardo*, 16(1), 28–30.
- Schubart, W. (2003). *Evropa i dusha vostoka [europe and spirit of east]*. Moskva:EKSMO.
- Smith, J. L. (1956). *Tombs, temples & ancient art*. University of Oklahoma Press.
- Snodgrass, A. (1973). Geometric art-bernhard schweitzer: Greek geometric art. pp. 352; 239 plates, 137 figs. london: Phaidon press, 1971. cloth,£ 9· 50. *The Classical Review*, 23(2), 249–252.
- Solar system odyssey - fulldome digital planetarium show*. (n.d.). Retrieved from <https://science.nasa.gov/solar-system-odyssey-fulldome-digital-planetarium-show>.
- Stansbury-O'Donnell, M. D. (2015). *A history of greek art*. John Wiley and Sons.
- Tegmark, M. (2014). *Our mathematical universe: My quest for the ultimate nature of reality*. Vintage.
- Turčin, V. S. (2008). *Kandinsky: Theories and experiments from various years: Across the spectrum: the artist in russia and in germany: Painting, music, theatre, poetry a view from russia*. Libri di Arte.
- Weston, V. (2004). *Japanese painting and national identity: Okakura tenshin and his circle* (No. 45). University of Michigan Center for.