On the Problem of “Reverse Perspective”: Definitions East and West

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Rudolf Arnheim, in an article in Leonardo, wrote, “inverted perspective is a small matter” [1]. I will be using the term “reverse perspective” henceforth, following Christopher Wood’s translation of Panofsky’s Perspective as Symbolic Form [2] and the English translation of Florensky’s collection of essays Beyond Vision: Essays on the Perception of Art [3]. Certainly, most art historians would be aware that “reverse perspective” refers to the principle of organizing space applied in the Byzantine and Byzantining [4] image. In the attempt to describe the phenomenon of reverse perspective, however, a problem starts to emerge, because it becomes clear that different scholars follow different, frequently contradictory definitions.

Below I look at the history of the theory of reverse perspective in the 20th century. The major writings are by German and Russian authors. I have identified six distinct views on reverse perspective that have been circulating in both Western and Russian scholarship, and I point out some of the main problems with them. I then consider two further views proposed by Russian authors that have been left in a fragmentary form but can nevertheless offer valuable insights. The most useful contribution of Russian theory to the subject, I believe, is the suggestion of a pictorial space that is fundamentally different from the three-dimensional space all too frequently taken for granted by viewers accustomed to images in the Western tradition.

What Does “Reverse Perspective” Mean?

The term umgekehrte Perspektive (reverse perspective) was coined by Oskar Wulff at the beginning of the 20th century. In Wulff’s 1907 article [5], several overlapping views on the nature of space in Byzantine art are advanced. According to Wulff, the Byzantine icon is characterized by a summary of perspectives (perspektivischen Zusammenfassung) [6]. The view from above (Niedersicht), or bird’s eye-view (Vogelperspektive), is combined with the frontal view (Gesichtsvorstellung). Figure 1 can be made sense of along exactly these lines of interpretation. The round shape of the lake is due to the view from above, while all the figures are depicted as seen from the side. The bird’s eye-view, which has had a very long history in art and is common for instance in ancient Egyptian art, is rather straightforward to understand in visual terms. The problem arises when Wulff discusses the frontal view. According to the German writer, the artist is mentally drawn inside the pictorial space by the very arrangement of figures and objects, whereby the ones in the distance are shown as larger (instead of smaller, as would happen in natural vision). Therefore, the artist and, by implication, the viewer, adopt an inner perspective (inneren Anschauung), that is, a point of view situated inside the pictorial space, which coincides with the view as it would be perceived by the dominating central figure of the represented action [7]. From this inner point of view, it is implied, the size of objects and the pictorial space will look “right,” as objects further away will appear smaller than those closer to the main figure of the representation. However, Wulff further proposes that the origins of reverse perspective should be sought in classical Greek scenography, which, to cite Proclus (411–485 A.D.), is a branch of optics, which “shows how objects at various distances and of various heights may be so represented that they will not appear out of proportion and distorted in shape” [8]. In other words, when scenography is applied to painting, figures in high places, which, as a result, are seen under a wider angle of vision, are depicted as larger in size in order to counteract the diminution due to the visual angle and the distance of the figure from the beholder. This was a well-known procedure in antiquity, and Wulff rightly claims that it was also employed in Byzantine art.

I consider it useful to provide this brief outline of the main ideas that arise in Wulff’s article, as almost all later writings on reverse perspective come as a response to ideas mentioned by the German author, but the text itself is hard to access (there has been no reprint since 1907). Scholarly interest throughout the 20th century focused on Wulff’s notion of reverse perspective, while it was forgotten that as much as it described the frontal view, this notion referred to only one aspect of space in the icon. As a result, while Wulff saw space in Byzantine art as highly complex, this issue was frequently much simplified by later authors. Furthermore, what also escaped attention was that Wulff’s understanding of reverse perspec-

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tive is contradictory, as it involves two mutually exclusive moments: On the one hand, the inner view thesis refers to the adoption of a viewing position inside the pictorial space; on the other hand, the scenography thesis is clearly based on the vision of a beholder outside the pictorial space. The construction of space in these cases would be completely different.

Some authors, especially in Russia, followed the inner view thesis and interpreted reverse perspective as reversing the laws of linear Renaissance perspective. That icons should be viewed by taking into account this “inside” perspective is a notion much popularized by Boris Uspensky [9]. The most extreme position was probably that adopted by Lev Zhegin [10], which drew out what were in many ways the logical implications of Wulff’s position. Zhegin consistently employed the terminology of the vanishing point in order to explain the phenomenon common in icons whereby objectively parallel lines of objects are represented as diverging in the distance. In the famous apse mosaic of Hagia Sophia in what was then Constantinople, for instance, the lateral sides of the footstool clearly diverge (Fig. 1). From the inner view proposed by Wulff, the parallel lines of the depicted objects would appear to converge, as happens in standard linear perspective, and if these parallel lines were extended they would meet at a vanishing point located in the viewer’s space [11].

Other authors have read Wulff mainly through the lens of his idea of the origins of reverse perspective in scenography. Thus, at one point in his text, Florensky claims that reverse perspective describes the phenomenon whereby “the magnitude of the figures increases as they appear further up the fresco, i.e., the further away they are from the viewer” [12]. A similar interpretation of reverse perspective is advanced in much more recent writings as well, as in the following passage: “Throughout the Middle Ages we observe, however, that the so-called reversed perspective prevails. It has been understood in connection with the idea that one should compensate for distortions when paintings are seen either from far off or high up in architecture” [13]. The artistic phenomenon that these writers refer to was described by Otto Demus as “anti-perspective” or “negative perspective” [14] and as typical of Byzantine church decoration of the classical, middle period (the end of the 9th to the end of the 11th c.). The proportions of figures depicted above eye level and/or on curved surfaces would need to be adjusted (for instance, by elongating the proportions) in order to appear “right” when viewed from the ground. It was this procedure of adjustment that was called by Demus “anti-perspective.”

In other words, two distinct definitions of reverse perspective have emerged from Wulff’s article—the inner view thesis, elaborated into a contrast between “reverse” and linear perspective, and the scenography thesis. A third definition, which could be described as the hierarchical size thesis, was proposed by Karl Doehlemann soon after the publication of Wulff’s article.

In 1910, Doehlemann wrote a short piece in which he challenged Wulff’s view mainly on the grounds that this view presupposes a systematic space, while space in the icon is clearly non-systematic. Not surprisingly, later scholars have revisited this crucial problem, as the debate between J.J. Gibson and Nelson Goodman in Leonardo shows [15]. Doehlemann himself proposed a hierarchical explanation of reverse perspective [16]. The idea that some objects in icons are represented as larger in size even though they are further away from the viewer is due not to the divergence of parallel lines (as Wulff had suggested) but to the practice of depicting hierarchically more important figures as larger in size than less important ones. Doehlemann’s understanding of reverse perspective, although less influential than Wulff’s, is sometimes referred to by later authors. John White, for instance, in his very well-known book The Birth and Rebirth of Pictorial Space (1957), views reverse perspective exactly along these lines, as when he explains that “the difficulty is that variations in figure scale are neither dependent on any spatial relationships within the composition nor upon the relationship of the scene as a whole to the observer” [17]. “The deciding factor,” according to White, “is the invariable importance which, for one reason or another, is attached to each particular figure” [18].

Many authors, however, do not seem to be aware that Doehlemann’s view cannot coexist with Wulff’s. As Erwin Panofsky made clear, the two definitions of reverse perspective profoundly conflict (Panofsky himself took the part of Doehlemann in the debate) [19]. At the same time, Arnheim in his article mentioned above defines reverse perspective as characterized by two pictorial features. The first feature is “the rendering of relative size,” “the alleged inversion of size relations” [20] or, in other words, the set of relations identified by Doehlemann. The second has to do with “the rendering of geometrically shaped planes, hollow enclosures and solids” [21] or, in simpler words, with “the representation of geometrically shaped volumes in a manner contrary to what the rules prescribe” [22] (the “rules” are, presumably, those of linear perspective). Arnheim’s visual examples illustrating this second feature of reverse perspective are borrowed directly from Wulff, as is the main idea. Nothing suggests, however, that if the sizes of objects were hierarchical and symbolic, these sizes could not be determined at the same time by the vision of an inner viewer or, as Arnheim says, by “the way the significant person in the picture would see [the represented objects]” [23]. In other words, Arnheim’s

Fig. 1. The Last Judgement, detail, Cathedral of Santa Maria Assunta, Torcello, Italy; mosaic, Western wall; by permission of the Svetlana Tomekovic Database.
two pictorial features are mutually exclusive.

A fourth view—which I will call “the optical view thesis”—is proposed by a number of studies that have attempted to prove that reverse perspective is somehow true to the way human vision actually functions. In this case, reverse perspective has tended to be understood along the lines of the “inner view thesis” and authors have, as a result, addressed the issue of diverging parallel lines, as in the above-mentioned Hagia Sophia mosaic (Fig. 2). The artistic phenomenon of the representation of objectively straight lines as diverging has been approached by focusing on certain aspects of the highly complex process of natural vision [24]. Thus, for instance, Florensky’s main objective in his comparison of linear and reverse perspective is to prove that, while the former does not take into account certain factors of natural vision, such as memory, the latter does [25]. Arnheim has the same concern for showing the optical veracity of reverse perspective when he refers to “a well known optical illusion” whereby the edges of objects drawn as parallels in reverse perspective appear to the Western viewer, accustomed to strong depth values, to diverge toward the distance. The suggestion is interesting as it draws attention to the idea that the tradition of painting we are used to ingrains certain expectations within us, and in this case Western viewers “see divergences where Easterners see parallels” [26]. Following a similar line of thought, a more recent article in Perception makes a case for “the presence of divergent perspective in the perception of obliquely viewed objects” [27]. In other words, the authors offer an explanation of reverse perspective as corresponding to the way in which vision functions under certain conditions, more specifically when objects are viewed from an oblique angle. The two experiments reported showed that the larger the viewers’ displacement and the more oblique the angle, the more intensively convergent would be the sides of the presumably objectively rectangular object. In this way, “an obliquely viewed rectangle is perceived as a divergent trapezium” [28], as happens in numerous representations of simple geometrical objects such as the footstool in the Hagia Sophia mosaic.

All four, clearly very different, definitions of reverse perspective—the inner view thesis, the scenography thesis, the hierarchical-size thesis and the optical view thesis—have been in circulation throughout the 20th century and up to present. None of them, I believe, adequately describes the phenomenon under our attention. What is perhaps most striking is the application of terminology devised to describe Renaissance mathematical perspective to the categorically different phenomenon of space in Byzantine and Byzantine images, a problem we addressed in a joint article with Martin Kemp [29]. The illegitimate use of the terminology, however, grows out of a much deeper misunderstanding of the nature of the pictorial space of the icon. At this stage, I believe that it is clear that space in icon art is much more complex than in linear perspective. It is also fundamentally different from the latter and is certainly not—to use Panofsky’s words—“an apparently three-dimensional expance, composed of bodies (or pseudo-bodies such as clouds) and interstices, that seems to extend indefinitely, behind the objectively two-dimensional painting surface” [30].

One should remember that Panofsky’s description is from a text concerned with the rise of this type of pictorial space—in other words, Alberti’s “window” figure—in 13th-century Italian painting. It would be misleading to assume a 3D space for art forms long in existence before the 13th century; when such assumptions are made they invariably lead to untenable conclusions. For instance, the main thesis in the Perception article cited above proposes that reverse perspective is a “legitimate manner of representing rectangular objects seen in three-dimensional conditions, just as legitimate under the appropriate conditions as convergent perspective” [31]. The issue here is the predicated premise of 3D conditions in the case of the icon.

The following two views, proposed by Russian criticism on reverse perspective and little known in the West, are valuable exactly because they challenge the idea of a standard, three-dimensional pictorial space. They do not quite explain what an alternative space would look like, but it clearly would not be the frequently assumed three-dimensional one.

The Russian Contribution: Non-Euclidean Geometry and Supplementary Planes

While the Russian authors ultimately fail to produce a convincing theory of reverse perspective, their contribution consists in something no less important. They problematize the issue and demonstrate that reverse perspective is a much more complex phenomenon than is commonly suspected. Some of the insights by Russian authors, I believe, though underdeveloped at this stage, have the potential of offering a much more satisfactory explanation than the four views mentioned above.

Fig. 2. The Virgin and Child, apse mosaic, view from scaffolding, 9th c., Hagia Sophia, Istanbul; by permission of Dumbarton Oaks, Image Collections and Fieldwork Archives, Washington, D.C.
As many will undoubtedly notice, Florensky’s principle of supplementary planes, whereby frontal and profile aspects of the same object are depicted alongside each other, carries close associations with a similar development in Cubism, especially early Analytical Cubism. It is therefore not surprising to discover the immediate background of the Russian author’s idea in his earlier discussion of Picasso’s paintings of musical instruments, which could be seen in the Shchukin Collection in Moscow at the time [35]. What triggered Florensky’s interest in Picasso’s works was exactly the construction of pictorial space, which Florensky saw as an example of “synthetic” or “four-dimensional vision.”

The notion of the fourth dimension, which was extremely popular at the beginning of the 20th century in the context of the revival of occultism, suggested an experience beyond the confines of time and space. The terms sound inescapably close to the opening sections of “Reverse Perspective”: “The reality of the artistic image is realized in . . . unifying in one appearance that which is given in different moments and, consequently, under different angles of vision” [36]. In this context, the later notion of “supplementary planes” can be understood as Florensky’s attempt to provide an actual visual model, that is, the icon, for the functioning of “synthetic vision.”

Florensky’s notion of “supplementary planes” is promising, because it can be developed along several avenues. In my recent book, Space, Time, and Presence in the Icon: Seeing the World with the Eyes of God, I start from Florensky’s idea and elaborate it in a theological context. I propose therein that a structural analogy can be drawn between the artistic principle of the “supplementary planes” of the icon and the Christian dogma of a timelessly eternal, simultaneously existing God. A being who exists beyond time and, implicitly, beyond space and who, therefore, has no point of view, would perceive all aspects of an object in our world simultaneously, that is, in a manner similar to that described by the principle of “supplementary planes.” In other words, to a divine vision, objects would not appear from a single point of view; all sides of an object would be perceived at the same time. In practice, the “supplementary planes” never show all aspects of an object, but they show aspects that cannot be seen from a fixed position at one moment of time [37].

The two views briefly outlined above make the useful suggestion of a pictorial space that is fundamentally different

An intriguing idea, first proposed by Florensky and further elaborated by Zhegin, suggests that reverse perspective is a visual analogue of non-Euclidean geometry. In analogy to non-Euclidean geometry, space in the icon is interpreted as curved, and this accounts for the specific appearance of many objects and figures in the icon. To make sense of these representations, we have to imagine the objects as if spread out on a concave surface. It is true that we frequently come across the curvature of lines that are apparently objectively straight, as with the “barrel-shaped” form of the throne (Fig. 3) [32]. There are, of course, various problems with this view, not least of them the comparison of a medieval phenomenon with a scientific theory developed only in the 19th century. At this stage, however, what interests me is that the Russian authors draw attention to a persistent characteristic of space in the icon that until recently went unnoticed in the West [33]. More importantly, this characteristic grows out of the very nature of the posited curved—and no longer simply linear, three-dimensional—space of the icon.

If the non-Euclidean connection may point in the direction of a fifth line of thought on reverse perspective, there is a further one, again closely associated with the name of Florensky, which might well be the most promising one. In the opening paragraphs of “Reverse Perspective,” the discussion concentrates on what the Russian author calls “the supplementary planes” of the icon. One of the fundamental features of the organization of iconic space, according to Florensky, consists in the representation of “parts and surfaces [of the same object] which cannot be seen simultaneously” [34] from a fixed position. This principle can explain images such as Fig. 4, where the model of the church held by the two saints shows the front of the building alongside one of the lateral sides. For example, a typical representation of the Bible would show three or four sides of the book on the same picture plane.

Fig. 3. Barrel-like deformations: (top left) fragment from an icon, Novgorod School, 13th c.; (below) fragment from a miniature, 12th c.; (right) fragment from an icon, Italian, 13th c.; Plate VII in Zhegin [10].
from the standard space of the Western tradition. Why, however, did not these Russian writers come up with a well-developed theory on the basis of their promising ideas? I believe that the reason for this impasse in Russian scholarship is, just as with the authors in West we discussed in the previous section, the inability to completely re-think the principle of pictorial space in a pre-Renaissance art form without relying on any of the Renaissance categories relating to space.

Boris Raushenbach, too, seems to fall into this trap. In an article in Leonardo, he correctly observes that it is “wrong to make critical judgements about the parallel and inverted perspectives of Antiquity and the Middle Ages by proceeding from the dogmas of Renaissance perspective” [38]. I could not agree more. In a later article, however, the Russian author defined reverse perspective as referring to the idea that “the dimensions of objects increase (rather than decrease) with the distance from the viewer” [39]. In other words, he, too, takes for granted that pictorial space in the icon is grounded in the notion of depth and the corresponding distance between represented objects and the assumed viewer. Raushenbach’s own understanding of reverse perspective is developed on this background. What he calls “perceptual perspective” is based on the idea of the vision of nearby objects, whereby “the size constancy of the object is almost full” [40]. That is, when we see objects at close quarters we get a fairly good idea of their actual size. In the case of the icon, as in the case of Cézanne, to which Raushenbach refers, there is “an effort . . . to depict in an undistorted way” [41] the actual size of objects, even those objects—this is the implication—that are further away from the viewer and so “distorted” in size by the distance. The whole explanation, as we can see, hangs on the notion of pictorial space, in which objects are further or nearer to the viewer.

CONCLUSION

The term reverse perspective, coined by Os- kar Wulff at the beginning of the 20th century, has gained currency in art-historical circles. The present paper draws attention to the still highly problematic use of the term and thus suggests that far from being “a small matter,” the state of research on reverse perspective is—to paraphrase J.J. Gibson—in a “deep intellectual mess” [42].

References and Notes

Unedited references as provided by the author.

4. “Byzantizing” refers to art forms that are derived from the Byzantine artistic model.
the West was attracted to this idea. Two papers in the
Ham: Ashgate Publishers, 2010), on Shchukin’s
antonova, Michele emmer, that the attention of scholars in
emmer’s “Pavel Florensky, tra matematica e religione”—Michele Em-
mer’s “Pavel Florenskij, tra matematica e religione” and Clemena Antonova, “Spazio iconico, geometria non euclidea e cultura nella visione del mondo di
Pavel Florenskij.”


35. I have discussed this in greater detail in Clemena
Antonova, Space, Time, and Presence in the Icon (Farn-
ham: Ashgate Publishers, 2010). On Shchukin’s Collection, see Camilla Gray, The
Great Experiment: Russian Art 1863–1922 (London: Thames and Hud-

36. Pavel Florensky, “Smisl’s idealizma” in his So-
chinenia v chetirekh tomakh (Works in Four Vo-
lumes), Vol. 5 (Moscow: Izdatel’stvo “Mysl’”, 1999),
p. 98; the translation is mine.

37. Antonova [35].

38. Boris Raushenbach, “Perceptual Perspective and

39. Boris Raushenbach, “On My Concept of Per-
ceptual Perspective that Accounts for Parallel and
Inverted Perspective in Pictorial Art,” Leonardo 16

40. Raushenbach [39], p. 28.

41. Raushenbach [39], p. 28.

42. J.J. Gibson’s reply, Leonardo 6 (1973) p. 284.

Glossary

linear perspective—a method of representing space
in paintings invented at the beginning of the 15th
century by the Florentine architect Filippo Brunelles-
chi. The aim is to create the illusion of depth on
a two-dimensional surface. In concrete terms, the
orthogonals of all parallel lines in the painting are
extended so as to meet in a single point, called the
vanishing point.

picture space (or pictorial space)—refers to the prin-
ciple of organizing space in paintings. Frequently,
however, it is understood exclusively in terms of the
depicted illusion of a third dimension as this hap-
pens with linear perspective. One should keep in
mind that there are many other ways of handling space in pictures.

reverse perspective (“inverse” or “inversed” are also used)—the English equivalent of the German umgekehrte Perspektive, a term first used by Oskar
Wulff. It usually refers to the principle of construct-
ing space in the Byzantine and Byzantining icon. The
present article outlines six different definitions of re-
verse perspective, some of them mutually exclusive:
1. The inner view thesis, first proposed by Wulff, sug-
gests that the viewer of an icon is as if drawn inside
the pictorial space of the image and thus adopts the
viewpoint of the central figure of the representation.
From this inner point of view, space functions ac-
cording to the laws of natural vision in the sense that
objects that are further away look smaller and those
that are closer appear larger.
2. According to the scenography thesis, also put for-
ward by Wulff, the proportions of the figures in Byz-
antine and Byzantining images located above eye
level and/or on curved surfaces are adjusted in such
a way as to look “right” to a viewer on the ground.
This artistic practice, backed scientifically by Euclid’s
Optics, goes back to classical antiquity.
3. The hierarchical size thesis was advanced by Karl
Doehlemann as an alternative to Wulff’s ideas. It
suggests that the size of figures in an icon depends
on the hierarchical importance of these figures (i.e.
the more important ones are represented as larger
in scale than the less important ones, regardless of
their respective distance from the viewer).

Manuscript received 1 May 2007.

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