The Concept of Space in Twentieth Century Art

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"But, after all, the aim of art is to create space - space that is not compromised by decoration or illustration, space within which the subjects of painting can live."

-Frank Stella

ABSTRACT

A variety of developments in twentieth century painting have expanded the depiction of space beyond the direct representation of optical space. This paper analyzes some of the artistic explorations of spatial concepts, giving particular attention to: (1) spatial composition, (2) spatial density and optical impressions, and (3) the deconstruction of visual space.

Keywords: space, dimension, art, visual space

1. SPACE REPRESENTATION

Space has been a major concern in art throughout recorded history. The representation of space through perspective was so dramatic for the ancient Greeks that Plato inveighed against this new art form. The murals of Pompeii attest to the fascination of the Romans for enhancing the space of their windowless rooms. Considering all fields of endeavor, the issues are multiplied due to the number of ways we can define space. Mathematical space, for example, is in the form of a noun. It might be conceived as a set of elements or points satisfying specified geometric postulates and identified in terms of Euclidean or non-Euclidean systems. Or, topologically, space might be seen as a more continuous form of the infinite extension of the three-dimensional field in which all matter exists. As a verb, however, ‘to space’ implies a process of organizing and arranging. Given that visual art production includes this active quality, it is not surprising the contemporary visual artist Frank Stella sees the creation of space as the principal goal of art (see lead quote). He goes on to point out that, since painters create space, it seems ironic that twentieth century painters had to work so hard to create abstract space in paintings (Stella, 1986, p. 5).

Following his own dictum, Stella often presents us with a space that is non-representational and incompatible with physical space, offering us contemporary examples that easily demonstrate that the concept of space in twentieth century art is difficult to define. Painterly space, however, exists in a much broader context, and it is one that cannot be detached from the nexus of historical, cultural, metaphoric, philosophical, and religious ideals. So when Plato, for example, inveighed against the illusions that ‘represented’ reality and, by extension, the ways in which representation distorted ‘Truth’, he was talking about the kind of illusory space painters generally present when they represent the world we see. Similarly, much of the power of Renaissance art grew out of its ability to use perspectival techniques to create the illusion of three-dimensional space on the walls in their churches. Simultaneously with the development of deep, illusionist space on a painted surface in the Renaissance, events moved art out of the ecclesiastical setting on several fronts. One came about in the art itself as the religious and narrative motifs were re-defined and secularized. Another is that framing images allowed art objects to become portable and thus easily moved outside of the fixed, architectural environment of the church, for the framed works could be carried from place to place. Similarly, exciting, spatial expressions were added into the humanist world of the palazzos and piazzas.

Illusionistic space was also a dominant theme of ceiling decorations from the High Renaissance through the Rococo styles of the eighteenth century. By the nineteenth century, however, empirical information and cultural developments further re-defined painting. Scientific studies on vision and color, new mathematical views of physical space, the invention of photography, chemical advances in color preparation, and industrial advances in the manufacture of studio instruments were among the influences that altered visual art. Some compositional evidence that illustrates these nineteenth century responses include photographic stereograms and optical experimentation by artists like Turner and the Impressionists.
Finally, in the twentieth century, we find that new scientific discoveries concerning the physical structure of space and space-time set the stage for a renewed investigation of space in art. Moreover, as is well known, the twentieth century was one in which painterly explorations of space were often abstract and, as a result, paintings are more likely to offer statements related to surface, texture, color, and other ways of configuring the optically perceived space of the canvas than they are to represent the world as we know it. More important, the variety of nonlinear developments that expand the concepts of representation and abstraction rely on optical impressions and an encounter with conceptual ideas. These varied explorations are the subject of this paper.

2. THE BIRTH OF CUBISM

The birth of Cubism marked the eruption of styles in the twentieth-century. Overall Cubism is not easily classified. Rather, and to begin with a pun, Cubism has many facets. Inaugurated by Pablo Picasso and Georges Braque between 1907 and 1914, Cubism emphasized the flat, two-dimensional surface of the picture plane. Adopting an approach of spatial deconstruction, these painters rejected the traditional techniques of perspective, foreshortening, modeling, chiaroscuro and the imitation of nature. Analytical Cubism, for example, took form between 1909 and 1912, as exemplified by Georges Braque’s ‘Harbour in Normandy’ (1909), shown in Fig 1. The paintings executed during this period break down the object surfaces into their constituent facets. Synthetic Cubism (after 1912) emphasized the combination or synthesis of forms in the picture, often introducing foreign materials such as newspapers and developing the technique now known as collage. Intersecting with these styles was a Cubism of trying to show all sides of the depicted objects simultaneously. We might, and many do, interpret these Cubist expressions as relating to an interplay between two, three, and even four dimensions, in trying to show all sides of the depicted objects simultaneously, a view of a fourth-dimensional reality. There was a Cubism of violating the unified space of simple perspective to show each object from its canonical viewpoint, regardless of the relation to other objects. And there was a Cubism of breaking through the surface to reveal the simple essence of the objects or persons depicted (see Fig. 2).

![Fig. 1. ‘Harbour in Normandy’ by Georges Braque (1909).](image1)

![Fig. 2. Picasso’s ‘Nature Morte avec Verre et Citron’ (1910).](image2)

But, to begin at the beginning, we must look behind Cubism to its progenitor, generally considered to be Paul Cézanne. Cézanne’s work neatly straddles the start of twentieth century modernism due to his focus on experimenting with the ‘look’ of physical space and with the space of the canvas. Many of these experiments were extended by later artists. Cézanne’s innovative contributions to Cubism are best understood when we look and at how Cézanne approached space throughout his career.

Cubism, of course, derived its name from remarks made by the painter Henri Matisse and the critic Louis Vauxcelles in regard to Braque’s “Houses at L’Estaque,” showing a clear stylistic line that connects the texture and coloration to Cézanne’s...
innovative paintings. They derisively described the volumes of the houses, the cylindrical forms of the trees as ‘composed of cubes.’ Delineating how Cézanne himself might be said to have initiated Cubism is a bit more complicated. To a large extent, he is just a post-impressionist, painting still-lifes and landscapes with a characteristic style based on the use of dense short brush-strokes. With hindsight, art critics now see the seeds of the Cubist revolution in Cézanne’s struggles to break away from visual representation and his efforts to capture the sense of space that he was experiencing. For example, the hard edges of the short brush-strokes seem to give extra depth to the elements making up the texture of the many ‘Mont St. Victoire’ canvases, as he painted the mountain over and over from slightly different viewpoints. But quite how Cézanne intended this texture to be seen is unclear from his notebooks and letters. Cézanne was temperamentally misanthropic and found it hard to express his artistic insights to the few colleagues with whom he had contact. Thus interpretations are often reliant on geometries that suggest forms we know and our conclusions as to how he distorts them.

Cézanne’s career as a whole perhaps best explains how he eventually arrived at the deconstructed forms. Many early works were crude representations, often thickly painted, palette-knife pictures (Gowing, 1988). Later, under the influence of Camille Pissarro and the Impressionists, his heavy, rough forms were replaced by a lightened palette as he began to experiment with the rendering of light and optical impressions. Then, finding the results too limited, he aspired to conceive substantial representations. As Gasquet reports, Cézanne went off on his own, aiming to “make out of Impressionism something solid and lasting like the art of museums.” (Gasquet, 1927, p. 164).

We see the tension between solid form and optical sensation beginning to take hold in the paintings of the later 1870s and early 1880s. These pieces show that Cézanne had arrived at a consistent method by this time (Fry, 1966, p. 64) and also show that he had already begun to initiate his experiments on how to represent solid, three-dimensional objects using a system he termed ‘modulation’ (as distinguished from modeling). In a general sense, this modulation technique was one in which he superimposed multiple strokes of color, creating both a cumulative visual effect and a reverberation that resonated throughout the canvas.

What is perhaps most important in terms of twentieth century concepts of space is that Cézanne was intent on giving solid form to impressionistic goals. This means that Cézanne’s presentation recognized that form, more than color, renders the thing seen. At the same time, his use of modulation to harmonize the colors as he organized (and composed) the lines and planes on the canvas allowed him to render his sensation in a form that presents nature but is not a literal imitation of it. Indeed it is this modulation that paved the way for later non-representational painting. A dramatic painting, ‘Lac d’Annecy’, the view of Lake Annecy, expresses several of these contributions. This painting, completed in 1896, ten years before his death, is quite striking pictorially and in terms of what was to follow. The vibrant modulation seems to point toward the early twentieth century styles. The reflections in the lake are almost palpable. But why would Cézanne want to introduce a cubistic solidity into the space of the lake’s surface?

![Fig. 3. ‘Lake Annecy’ by Paul Cézanne (1896)
To answer this question we must presume that space to a painter includes the physical space he sees, his sensation of this space, and the activity of defining space in the painting. Cézanne seems to be trying to make the interplay between these aspects of space explicit in his paintings. The shimmering results reflect this perceptual struggle: he wanted to represent nature accurately but was, simultaneously, attempting to record his sensation of it. Contemplating Cézanne’s ‘Lac d’Annecy’ (Fig. 3), one may develop a sense of the space between the canvas and the lake as being simultaneously solid and transparent, like a block of ice. (This impression is less clear in the grayscale reproduction than in the original.) This evocation of space, light, and air is very different from Cubism where most of the space is formally rather than optically deconstructed. As a result Cézanne’s expression is a harmony that relies upon the interplay of space, color, and form. It gives vividness to optical impressions while offering a novel interpretation of physical space. Moreover, as his letters and recorded conversations reveal, even when we see fractured space on a Cézanne canvas, a multifaceted cubism is not an accurate characterization of his goals. He was attempting to capture a new sense of space to show that it was not an empty domain in which object and planes are separated or exist in a relative sense. Rather, his space was full of essence, a corpuscular space represented in ‘Lac d’Annecy’ as filling the distance between the eye and the reflections in the lake. Given this, could it be that Cézanne was anticipating the new view of space reached by Einstein a decade later? In his early papers, Einstein proposed a quantum interpretation of space that, instead of being void, consists of a seething evanescence of particle creations and annihilations. This eventful, energetic view of space finds a resonance in the space depicted in Cézanne’s late paintings. One might even ask whether Einstein, who lived in Berne, not far from Lake Annecy, might have seen Cézanne’s work and drawn inspiration from it, but this would be sheer speculation.

3. SPATIAL COMPOSITION IN TWENTIETH CENTURY PAINTING

Early in the century, when the illusionistic quality of representation was beginning to be questioned, science was also in the process of re-defining space. Perhaps this is why artists began to experiment with the idea of dimensions and often illustrated ideas about multiple dimensions. Within this context, many perceptual, optical, and conceptual questions were posed and related to the nature of space as defined in physics. This trend was particularly evident in non-representational work, where questions were addressed through experimentation with visual space, optical perceptions of the canvas, and constructions that distort and reconfigure space. In addition, it is fascinating to see artists expressing their ideas not just through their painting but also through explicit conceptual analysis of the issues involved. Indeed, several of the most intriguing ideas about spatial reconstruction in twentieth century art were (and continue to be) proposed by artists in relation their own work. While we tend to group their work into schools labeled as Cubism, Futurism, Suprematism, Surrealism, Superrealism, and so forth, these categories fail to express how diverse individual practices were (and are), especially in relation to space.

The plurality of responses has been as hard to characterize as their relationship to historical art. For example, Frank Stella one artist who has presented a compelling critique on space artistically, he explains several of the pertinent issues in his book ‘Working Space’, where he provides a foundation for seeing the artistic context and evaluating the scope of spatial conceptualization employed in art through the centuries (Stella, 1986). Far from defending modernism, Stella struggles with its failure to develop a form of abstraction that actualizes space in the Renaissance manner. As he notes, abstract art has been, ironically, dominated by the two-dimensionality of the picture plane, and even by the Cartesian rectangle of the picture frame. Stella contrasts this timidity with the power of Caravaggio’s masterly development of pictorial space 300 years earlier, through the use of deep shade and bold juxtaposition of the compositional masses. He finds that much of this power is missing in the flatness of Cubist and post-Cubist abstraction. Stella then concludes that the deficiency of twentieth-century art is that it has not solved the conundrum of abstract three-dimensional composition. Stella also concludes space was (more or less) reduced to surface by the way artists removed the illusionistic quality that accompanied three-dimensional narrative work.

We can see some of the issues by returning to the paintings of Stella and earlier twentieth century artists. For example, as noted above, we tend to say Pablo Picasso initiated Cubistic abstraction with Georges Braque. Yet neither of these painters was to pursue the logic of disjointed form to the abstract expressionism of later painters such as Jackson Pollock. Although some of these mid-century currents might be traced back to the Cubist inspiration, they might also be traced back to the Russians Wassily Kandinsky and Kazimir Malevich, painters who contrast sharply with Picasso and Braque. A key point within this is that the practices of Kandinsky and Malevich were based as much on symbolism and transcendental ideas as they were on shape and color. The compositions, as such, were intended to awaken spiritual qualities in the viewer And toward this end were quite dependent on optical effects. From a strictly formal perspective, we can say that the work of both Malevich and Kandinsky was visually attuned to how we see and thus advanced the visual syntax of the purely non-representational domain in concrete and definable ways. Kandinsky, in particular, was capable of a shimmering evocation of numinous forms with a dynamism of depth (Fig. 4) that rivaled those of Caravaggio and Turner. Stella accords Kandinsky due recognition for this achievement, but seems disappointed in his later development to a collage style (Fig. 5). The earlier
works retain their freshness and vivacity, and yet they have been somehow marginalized from the mainstream of 20th century abstraction. Indeed, many critics claim the formal qualities of the later work are either too contrived or have a sort of whimsical uncenteredness that lacks the power of the later developments of the New York School of abstract impressionism (e.g., Jackson Pollock, William de Kooning, etc.). According to Stella,

![Image](image-url)

Fig. 4. Left: Kandinsky’s ‘Composition IV’ (1911), showing the free-floating compositional structure.

Fig. 5. Right: Kandinsky’s ‘Composition X (1939), showing the continuity of compositional structure from his early works.

This visual syntax, although non-representational, has historical antecedents. Here too we find that the devices bring the nature of artistic experimentation with space and the cross-fertilization of influences into focus. For example, Frank Stella describes how Kandinsky aspired to liberate modern art from the dominance of the pyramid composition, represented by the grounded stability of Raphael’s ‘The Canigiani Holy Family’ (c. 1506) by noting that Kandinsky, like Braque before him, was clearly influenced by Cézanne. In fact, Stella gives the most comprehensive statement of this dominance that we have found, tying it to Cézanne’s early influence

Kandinsky was right to appreciate Cézanne. The emergence of triangularity in the ‘Large Bathers’ was an unconscious step in the right direction, a step about to break through the crust of the future’s pictorial surface. However, agile and muscular as it may have been, Cézanne’s triangle could not shake the pyramid anchoring Raphael’s composition. The dogged perseverance of this pyramid illuminates the mystical dead weight which Kandinsky and all abstract painting following him have always had difficulty accounting for, and which in the end we, if not they, cannot live without. (Stella, 1986, p. 116)

Still, and unlike the Cubists urge toward analytical abstraction and synthetic collage, Kandinsky replaced this formal stability with a free-floating cloud of loosely articulated forms, a theme that was to characterize all his work through many changes of iconographic style. Perhaps this freedom from the pyramidal stability became the underlying ethos of abstract expressionism for the reminder of the century. Compositional space was stretched, twisted, cut, articulated, inverted, gridded, minimalized, blocked, textured, splashed, lashed, exploded and imploded, but rarely did the classic pyramid composition reappear in abstract art. This eradication, in Stella’s view, was Kandinsky’s bequest to 20th century art.

### 4. SURFACE, DEPTH, AND THE REPRESENTATION OF SPATIAL DENSITY

The scope of this paper is insufficient to introduce all of the notions of space that have also been explored in the twentieth century; nor can we explore how the tensions that arise when optical and perceptual themes compete with historical conventions of representation and the depiction of physical space. It is nonetheless important to recognize that these tensions do exist and have been factors in artistic practice, becoming increasingly evident as the century unfolded.

A radical treatment of space is found in the work of Salvador Dali. Although he began painting in the early part of the century, he is a part of a later generation of artistic development. Trained in traditional methods of representation, at the Academy in Madrid, Dali had studied and mastered the techniques used to render classical physical space and forms. Nonetheless, like many of the early Surrealists, his work offered him a means to question rational notions of reality. As a result, his paintings offer yet another example of how the concept of space was being re-considered and explored by twentieth century artists.
What is perhaps most striking when we compare Dali with the twentieth century artists discussed above is how his work demonstrates that the move toward disintegration was not confined to abstract paintings. Narrative and conceptual ideas accompanied the spatial notions and all of these qualities influenced the art of the century that followed, often in subtle and direct ways. A vivid example of Dali’s ability to include conceptual statements in his visual expressions is provided by his double disintegration of the ‘Disintegration of the Persistence of Memory’ (1954; see Fig. 6). In his most famous painting ‘The Persistence of Memory’ (1931), Dali has already explored the disintegration of objects, as the watch under the surreal sky. But the space itself is classical, only the watch is undergoing a distorting influence. In the later painting, however, space itself is coming apart, revealing its constituent blocks and the void under the surface of the water. Dali explored this theme extensively in the 1950s, generating some of his most compelling works. The structural underpinnings of matter are revealed in a manner that is reminiscent of X-ray crystallography and the wave-particle duality of quantum mechanics, which is intimately related to the nature of space itself in its post-Newtonian conceptualization.

A prolific artist, Dali was keenly influenced by Freudian psychology and Surrealism. Generally his work was composed in a more representational style than Picasso, Braque, Kandinsky, and Malevich. As a result, we can say that, while Picasso, for example, offered a direct assault on the illusionistic Renaissance perspective and Kandinsky had presaged a disintegration of the spatial structure in the painting, Dali’s work could be viewed as “a frontal assault on Renaissance perspective” in the words of David Hockney (although applied in a different context). Hockney, of course, is one of several contemporary artists who have brought a third and even a fourth wave of response to twentieth century spatial exploration.

For example, Robert Kudielka, pointed out that Bridget Riley accomplished a reconsideration of pictorial space through her transition from a primarily chromatic organization to an invocation of rippled surfaces through geometric texture. Rather than treating the surface of the canvas as a transparent window though which we view a picture, Riley emphasizes the pictorial surface and refuses to let us look beyond it. Frequently, as her piece ‘Hesitate’ (see Fig. 7) illustrates, she rewards us with a dramatic distortion of its flatness into dynamic rippled corrugations. The depth illusion of these simple curvilinear manipulations is compelling, lying on the boundary between art and perceptual science. Kudielka compares her approach to that of Frank Stella, who has also reconsidered space in pictorial space, as we have discussed. Perhaps of most importance is that Riley and Stella, both born in the 1930s, provide new directions and continual movement away from the early twentieth century non-representational work. Comparing the work of these later artists we see additional responses to the concept of space. Where Riley distorts the flatness of the canvas into rippled depth, Stella plays with a cartoonish representation of geometric depth that is as much conceptual as perceptual (see Fig. 8). More intriguing is his range. While his earlier work is avowedly limited to flat perceptual geometries, it is strikingly different from his later work which is designed invoke an interplay of three-dimensional depth structures, while the stylized shading cues simultaneously insist that it is simply a draftsman’s illusion.
A quite different response is that of Jackson Pollock, who took abstraction to its logical conclusion by focusing purely on the properties of the paint as he hurled it at the canvas without the direct intervention of the painterly brush or palette knife. At first sight, his dense overlays of paint trails might be thought of as an exploration of dynamic texture, a new approach to the surface of the canvas. The dynamism of whiplash forms, which fully reflect the intensity of the actions that created them, may be seen as a direct extension of the free-floating forms of Kandinsky’s abstractions. The difference is, however, that Pollock reactivates to the more vivid depth evocation of Kandinsky’s early style. Pollock’s paintings have a density of texture that deepens into a sense of impenetrable depth. He seems to be using the tangled thickness of the streaks of paint to explore the energetic density of space itself, resonating with our interpretation of Cézanne’s approach to space. Once we understand that space is filled with metamorphosing, interacting particles, we cannot look at Pollock’s work without being struck by the degree to which he captures this sense of vital space.
Although their style is at the opposite end of the representation spectrum, the superrealists of the 1970s, such as Richard Estes may also be seen as exploring the density of perceived space through the depiction of commonplace scenes dominated by transparent layers. The confusing space of his ‘Central Savings’ (1975) is achieved by a literal painting of the reflections of the buildings behind us in the window of the drugstore (Fig. 9). In the architectural setting of linear Bauhaus forms, he invokes some of the mystery of space that we saw in Cézanne’s paintings. It is nevertheless a false view because one could not experience such an image without seeing one’s own reflection in the glass. Estes thus achieves a free-floating clarity of representation in this highly spatial image, taking us into a space that seems photographically real and yet is abstracted from our experience.

![Fig. 9. Estes’ ‘Central Savings’ (1975)](image)

This probing of the stratification of space was amplified by David Parrish, in his ‘Yamaha’ (1978, see Fig. 10). We have to work hard to resolve the full structure of the curved reflections and transparencies in this vivid evocation of the gleaming vehicle. In the superrealist idiom, it captures much of the crystalline structure of space that we found in Cézanne. Apparently, the same sense of the density of visual and physical space motivated the superrealists that we have seen in a strand running through 20th century painting from Cézanne through Dali to Pollock.
5. THE DECONSTRUCTION OF VISUAL SPACE.

As we have shown, adding dimensional concepts to ideas about representation and illusion led twentieth century painters to innovative reconsidereations of surface, depth, and optical impressions. All of these experiments, as we have also shown, raised questions about the space artists present in paintings. Another equally important area is the way in which twentieth century artists began to experiment with ways to raise questions about the nature of boundaries in space and our perception of form as well. Since art moved out from the walls of churches to the private homes of the Renaissance princes, it was delimited with few exceptions by the convention of a frame in the form of a rectangle. Variation from the wide range of vertical to horizontal aspect ratios, and the occasional circular format, have been incremental until the twentieth century. In the twentieth century, on the other hand, we find strikingly noticeable breaks. These include the sporadic attempts to break free of the Cartesian hegemony of the rectangular frame, notably by Mondrian in his rift with the Stijl group that he had founded, by jumping to a diamond format — and then Calder built his first mobile after wondering what a Mondrian painting would look like if it could move. We also find de Chirico’s explorations of the triangular frame and those by Hans Arp, who extended exploration of panels in ‘biomorphic’ shapes in the early and mid-twentieth century. Arp’s response is mirrored today in the work of Elizabeth Murray. Others have moved outside the frame completely. Early in the century this was evident in works like Duchamp’s ‘Fountain’ and again in the later experiments, noted earlier, of Stella who literally abandoned the frame using sculptural, iconic structures that define their own limits by leaping off the wall onto the gallery floor. Installations now commonly do this as well, ironically bringing early Renaissance altarpieces and predellas to mind. Work of these earlier eras had long been accustomed to dealing with non-Cartesian frames in its role of decorating
eclesiastical vaults with all manner of peculiar-shaped spaces between the structural elements. In sum, the rectangular format only became common with the advent of separate canvases and the shift to secular halls and palaces.

Fig. 11. De Chirico’s ‘The Enigma of Fatality’ (1914) and Murray’s ‘Can You Hear Me?’ (1984)

For example, when Stella wrote *Working Space* his practice was already rejecting the flat surface of abstract art in favor of painting that literally extended off the surface, clearly adding a third-dimension and a visual depth. Still others, such as David Hockney, continue to engage with how an artist might contrive depth on the flat surface. As David Hockney, points out, Stella’s move away from the flat surface may explain why Stella’s story of abstraction and space omits a key spatial tension we find in all paintings that are confined to the surface, as historical paintings generally were. This is that historical painters who worked on a flat surface often aspired to present narrative information and Stella seems to direct his historical review in a way that locates art in this narrative context, even abstract art. The subsequent flaw Hockney sees is that Stella makes “a plea for a narrative abstraction” because he does not adequately deal with how a flat surface comes to appear three-dimensional to a viewer. Stella, like many, does not address how a flat surface can appear to have depth and thus force us to see space when an artist uses paint to create depth and the illusion of space. He does not speak about how it is that the viewer activates the painting and the space of the painting. He fails to adequately reconcile how the viewer is pulled into the activities of the paint when looking at a piece (Hockney, 1987, p. 239).

Hockney’s oeuvre is particularly noteworthy in terms of how the viewer activates the painting and how we define concepts of space in the twentieth-century art. Thus he offers a fertile point for closing this discussion. Not only has Hockney explored the space from several vantage points, he has also brought an interest in how contemporary and historical optical technologies are used by artists to render space to his experimentation with both illusionistic and relative spatial possibilities. Moreover, his curiosity and urge to experiment has been evident throughout his career, which might explain why it has been difficult to characterize his work. For example, one early and major change came in the 1960s when he visited Los Angeles for the first time and began to paint with the then new acrylic emulsion paints. This coincided with a shift in emphasis within his work from texture to color. In Hockney’s ‘A Big Splash’, painted in 1967, Hockney diluted the acrylic medium with large quantities of water and, in this form, the paint acted like a glaze to help him create depth, form, and luminosity.

Then, in the 1980s, Hockney began to make extensive use of photographic technology to extend the image beyond the confines of the painted canvas. The works most relevant to space representation are a series of photocollages based on closely spaced snapshots taken of a scene of interest, which he may have derived from the photocollage concept developed by Paul Green-Armitage (1965). These works are also directly connected to Synthetic Cubism and the way these Cubist works asked what is reality and what is illusion in nature and painting. At first glance, Hockney’s technique seems like an arbitrary method of piecing together the image of a scene that could have been shot in a single photograph. Hockney,
however, like the Cubists, describes the approach as a means of re-evaluating the geometry of Renaissance perspective. Fig. 12, for example, compares a standard photograph of the Brooklyn Bridge with a photocollage version of the same structure, which reveals various curved distortions of the straight elements in a very unphotographic fashion.

Fig. 12. Hockney’s ‘Brooklyn Bridge’ (1992) expresses the synthetic curved perspective of the construction from multiple views (right panel), in contrast with the traditional point-projection onto a flat film plane (left panel). Notice how the curved view in Hockney’s collage extends all the way down to his feet at the bottom of the composition, an impossibility in a conventional horizontal shot.

Hockney’s approach additionally forms a direct line from the spatial explorations of Leonardo da Vinci, who first defined the terms ‘natural’ and ‘artificial’ perspective. Natural perspective is conceived as the projective geometry in the moving eye of the observer, whereas artificial perspective is the transformation required for painting an accurate replica of a scene in the world on a flat canvas. Leonardo was the first of a long line of thinkers who saw these two forms of projection as antithetical to each other. Hockney is attempting to depict the information in natural perspective on a two-dimensional picture plane. The snapshots represent the discrete ‘looks’ of the eye as it surveys the bridge from a single point in space. The curved perspective results from the projection of the local geometry of each look on to the flat plane of the collage. In some sense, Hockney proves what Leonardo had intuited, that the perspective of the natural viewer introduces a curvature when projected onto a flattened surface. The result is a fascinating depiction of the perspective distortions that we experience as we look around a scene in real space.

We cannot, however, forbear from noting that Hockney’s assemblages reveal that this construction is entirely synthetic, rather than natural. The projection of the straight edges is absolutely straight in any one snapshot. It is only the continuity between the snapshots that generates a synthetic tangent curve of the overlaid segments. Similarly, the natural perspective of straight edges in a single glance is entirely straight. We do not see straight lines as curved if we keep our eyes stationary. It is only when we move our eyes to follow the edge through space that we generate a synthetic curve of the tracking locus.
What Leonardo, Vredemann de Vries (1605), Irwin Panofsky (1936), Mauritz Escher (1941), John White (1957), Hockney and others have defined as the curvature of natural perspective is actually a property of the synthetic perspective of the moving eye. There is no way to combine the directional snapshots into a coherent image with this curved property, unless the shots are vanishingly small, representing only a single point in the visual field. Even if they were such non-dimensional points, the only way to combine them meaningfully would be on the surface of a sphere surrounding the viewer’s eye. Hockney’s projection to a flat plane is meaningful only over a limited field of view. Had he taken the exercise to its logical conclusion, he would have been faced with the inevitable conundrum of the projection of the sphere to the plane, which has occupied cartographers for at least as long as the study of perspective itself.

For example, what many have interpreted as ‘natural’ perspective is, in fact, a synthetic perspective requiring a synthesis of non-congruent views as the eye looks out from a single viewing location. The true natural perspective is the progressive mapping of the projection of the world onto the curved retina of the eye, the fovea-dominated projection from the retina to the visual cortex, the perceptual mapping from this primary visual cortex to the subsequent cortical mappings, the operational mapping from these cortical representations into motor control space, and the behavioral mapping of the motor control space out into the actions of the viewer within the world he or she inhabits. This sequence of progressive mappings has no definitive stopping point that we can regard as defining the geometry of the mapping. Even if it did, its geometry would be inherent to its own structure, and not something that could be meaningfully projected to a flat sheet of paper or art medium. The distortion of this projection is obviously an artificial structure imposed by the choice of viewing medium.

What is known as ‘artificial perspective’, on the other hand, is the natural geometric projection of light rays onto the picture plane on which the artist is working, as viewed by a stationary eye. The key point that should be realized is that a correct projection in linear perspective will generate the identical ‘natural’ perspective in the eye of a viewer to that of the scene itself. There is, thus, no inherent disjunction among spatial conceptions in the twentieth century or between Leonardo’s two forms of perspective. ‘Artificial’ perspective is simply a means of generating the accurate ‘natural’ perspective in the (single) eye of the viewer. Once at the center of projection for the perspective construction, the eye is free to look around at any part of the picture and will still get a view that is indistinguishable from the natural view of the objects depicted.

A final point on this issue of space representation that pertains to the variety we see in the twentieth century is that none of these abstractions ‘violate’ space since there is no clear way to violate it — or to ‘soften’ linear perspective so as to make it less sensitive to the viewing location. This interpretation has frequently been offered in art historical analysis, but the construction that achieves this goal has never been specified beyond saying that the convergence to vanishing points should be less accurate. In comparing the eclectic twentieth century forms with the convergence to a central vanishing point, for example, it is even harder to distinguish between the ‘artificial’ and ‘natural’ forms of perspective. Visually all types of projection geometry require straight projection of the same lines to a single central vanishing point. The main method that artists have used since the sixteenth century to ‘soften perspective’ and to mask key elements with figures or drapery in the foreground, so as to avoid committing to other vanishing points that would define a specific viewing distance. If only one corner of a structure is shown, there are no parallel lines that specify where the convergence to a vanishing point would be located, so the sense of an architectural structure is conveyed.

Often contemporary artists who include figurative and representational elements are still inclined to challenge classical spatial assumptions. For example, as we discussed, Hockney has straddled both sides. He is one of many twentieth century artists who have challenged the unified Renaissance approach to perspective in his photocollages and he has also gone beyond the photocollages to adopt a more free-wheeling approach that is reminiscent of the medieval style of local, distorted and even reversed perspective renderings. The results are eye-catching and irreverent (Fig. 13). Chairs and tables seem splayed out and idiosyncratic, as though each is making a little joke of itself. Part of the power of this approach may be to evoke a stronger sense of object identity, as we are stimulated by more aspects of the objects than we normally see in a single photographic view. We also get a sense of a four-dimensional view, as by a larger intelligence that can comprehend more features of the object than usual, or that we are privy to a kind of perceptual dissection of the scene before us. It is hard to capture the multifield interpretations that Hockney’s distortions elicit, but they are undoubtedly effective in an easy-going, vernacular fashion.

6. CONCLUSION

In conclusion, we would emphasize that the concept of space in the twentieth century is one that mirrors views of space and vision from a myriad of perspectives. Twentieth century artists have frequently favored non-traditional approaches to compositional dilemmas. Moreover, their deconstructive approach to space seems to have brought the art of the century full circle. With Hockney we travel back to the exploratory evocations of the medieval monks who first brought visual representation out of the cultural vacuum of the post-Roman interregnum. This style, as noted, could be considered
characteristic of twentieth century art, from Picasso near the beginning of the century to the digital revolution at its close, but a broader view would see the century as embracing an eclectic array of space representation styles, from the extreme perspective accuracy of the superrealists through the filmy textural haze of Mark Rothko and Helen Frankenthaler to a world where computers present a vast array of images across spatial boundaries that even allow us to interact with these images directly. We have been able to consider only a few aspects of this diverse array of styles in this brief survey, but it is hoped that this is sufficient to dispel Stella’s notion that twentieth century art has mainly focused on the arrangement of compositional elements within the flat space of the canvas.

Fig. 13  Hockney’s ‘Caribbean Tea Time’ (1985-1987), Double-sided four panel folding screen.

7. REFERENCES