

On Space and Colour in Art

This is still a draft.

Since all art is created in and exists in space of some nature, a thoughtful consideration of space may provide a conceptual framework to order one's artistic understanding. In particular, it may give the artist a sense of direction for his own work and a framework for considering the relative positioning of the work of others.

Consequently, we find it useful to consider three distinct classes of space, physical, perceptual and conceptual. These are discussed below.

Physical Space Considered

The world in which we live and in which much of the art we create is situated, may be conceived of as a three dimensional (3D) Euclidean ***physical space***. This situatedness is relative to an observer. This relativity, in turn, allows us to consider the ***work of art*** or simply ***work***, as fixed, and the positioning or orientation of an observer as a variable.

There are two issues with regard to physical space of concern in this discussion. One is the physical dimension or structure of the work itself. Traditional art work, that is up to the 20th century, could be classified as either two dimensional (2D), notably painting, drawing and print making, or 3D, called sculpture.

Modern art has seen a blurring of this simple categorization. Works intended to be viewed as paintings or 2D works, now may have extensive 3D surface structure through heavy texture or sculptural additions. Sculpture may have imagery added to 2D surfaces.

The other issue is the positioning of the observer with respect to a work. Most art has a vertical orientation specified by the artist; that is, a definite top and bottom. If a work doesn't, we can arbitrarily assign one for the purposes of this discussion, restricting positional consideration to two dimensions.

An effective definition of sculpture may then be a work which the artist intends the observer to be able to view from any orientation in these two dimensions. Without becoming semantically precise, a painting or similar work would become a work which the artists intends us to view from one dimension or side.

Obviously one can create exceptions such as a 3D object that appears finished from all orientations but for which the observer has restricted viewing by physical barriers, to one dimension only. The wonderful thing about categorization is that it makes it easy to construct interesting exceptions.

Perceptual Space Considered

Our visual perceptions can be considered to exist in a 3-D Euclidean ***perceptual space***. Visual imagery is the result of a complex, incompletely understood cascade of neurological processes that begin in the retina, continue along the optic nerve and incorporate a number of neural regions in our brains. It is largely an automatic response to retinal stimulation.

Perceptual space is an internal representation of the physical space we see around us. We have very little control over the content and organization of this space, being primarily a result of our biological machinery. A neuroanatomist peering into our head would see individual neurons firing but this would give her no clue what the painting we are looking at appears like to us.

Our sense of depth in this space is partly a function of our stereoscopic vision and partly a computational interpretation of visual information based on memory of past experience. If we close one eye and look at something, we still infer spatial information.

Psychologists have spent a great deal of time studying the psychology of perception. A number of famous optical illusions have been constructed that expose our innate, hard-wired ability to infer spatial depth.

In studying human visual perception, we can speak of the phenomenon of figure and ground. In the visual field or **perceptual space** which is everything that one can see at a glance, an area may be abstracted by the visual system and brain as representing an object or **figure**. These are not to be confused with the much more restrictive reference of the human figure. It is the contrasting boundary or transition between contiguous areas in the space that define such an object of attention. The rest of the visual space is termed **ground**. A restriction of the notion figure/ground applies specifically to painting.

Image Space

I will use the more neutral term **element** to describe an object or figure of visual interest. If an element cannot be subdivided into smaller components, it is called **atomic**. Otherwise, it is called **composite**. I will call the picture plane or part of the perceptual space occupied by a work of art as the **image space**. Clearly, an image space has an analogue in physical space in the actual physical work of art. From this point on, I won't make the distinction.

A work of art, then, is seen as a number, possibly zero, of elements (embedded) in an image space. One may have discerned that at a higher level, a work of art itself is an element in the larger perceptual space.

Traditionally in painting, the image space has been considered to be a 2-D physical space that represents, and induces the perception of, a 3-D space. Beginning with the discovery of the principles of chiaroscuro and perspective, artists found ways of representing elements in the 2-D image space such that the observer could be tricked into interpreting the image as 3-D. Colour, value and the amount of detail or **information** in an element are important properties that create the illusion of spatial depth or third dimension.

In the twentieth century, artists began to extend the physical space of their painting into three dimensions. In the case of artists such as Bruce Piermarini, these elements create a projective extension of the depth of the image space by a slight amount, probably contributed by stereoscopic vision.

Another treatment of this physical extension can be seen in the work of Patrick Hughes. His extensions are artfully designed to be imperceptible from a large viewing angle and have no impact on perceptual depth. Instead, they induce a sense of panoramic motion as the observer moves.

The artist, then, has both extension in physical space and the various artifices of painting to control the sense of spatial depth in the image space.

The Edge Effect

Image space, when rendered with depth, generally recedes from the observer. Occasionally, it may appear to move forward. In either case, the movement is relative to the external perceptual space at the boundary or edges of the image space. Often this boundary is marked by a frame, mat, painted edge or other artifice. For the sake of discussion, let us consider this boundary to be the front edge of the canvas or the edge of a piece of paper.

An element in the image space not touching an edge has the freedom to float and move spatially forward or backward. It has a sense of isolation, of uniqueness or individuality.

An element with a significant contact with an edge of the image space becomes anchored, inheriting a sense of solidity, permanence and weight. Its identity becomes ambiguous since we don't know how much of it exists beyond the perceptual identity implied solely from the part visible in the image space. The tip of an iceberg is an analogy to that part we see in the image space.

As the edge connection becomes more extensive, the element may transform from a shape to a plane or ultimately a separate space, losing any identity of being a figurative element.

Another edge affect is created by the sense of confinement the edges of the space produce. The edges of symmetrical image spaces such as circles and squares create an evenly distributed sense of confinement or containment. Rectangular spaces are more interesting in that the sense of confining pressure in the narrow direction is greater than in the longer direction.

Thus, images in a *portrait* or vertical orientation, have a sense of immediate presentation. We have no room to move horizontally but feel confined to a singular perspective. Although we have more freedom to move vertically we in fact don't for two reasons.

The first is the innate reaction to gravity which manifested by a natural visual bias toward vertical ordering of mass in the visual space. This tends to vertically compress the visual space from a psychological perspective.

The second results from the fact our field of vision is horizontally skewed, simply because our eyes are arranged horizontally in our head and not vertically. We naturally look to the sides because that's where the predator attacks from; we don't naturally look up or down. Also, as I stare at this document, my horizontal peripheral vision extends more than twice that of what is my vertical peripheral vision.

So portrait images are very constrained. Conversely, horizontal images created by wider edge placement, are much more expansive giving the viewer much more room to move and explore.

In summary, the modern painter must understand that he is working in two different spaces, the actual physical space that contains the structure of his work and the perceptual space that is induced not only by its physical structure but by its psychological components of colour, value and information content as well as genetically wired perceptual biases.

Geometry of the Space

The geometry of the image space, it turns out has a major impact on both how the artist renders the image and how the viewer perceives the image. In the last section we briefly discussed geometries with respect to their edge effects. Here, we discuss two geometries, the square and the rectangle, and the implications for arrangement of elements in the image space.

The square presents a symmetrical space. An element placed at the center appears at rest. This, if you like, is the point of lowest visual energy. For simplicity of argument, suppose we move the element towards the midpoint of one side.

As the element is moved off center, the distance from one edge is decreased and from the opposite edge increased. Imagine that there are two springs connecting the element to these sides. As the element moves, one spring compresses and the opposite one expands. The element now experiences forces from its non-symmetrical relationship with the two edges. This raises the visual energy of the image and creates a sense of unease and tension.

We feel the imbalance and unconsciously want to correct it. The artist can capitalize on this energy by controlling it in terms of degree and position of placement in the image space. He can allow the imbalance to remain or offset it.

One option to correct the imbalance is to add additional elements, each off center and each unbalanced by itself, but through the collective relationship, an overall balance is achieved. This is the point of lowest visual energy of the collective *system* of elements. It has more energy than the single element in the center at rest – a higher energy state if you like.

Each element has the property of visual mass imparted by its size, density (shape), colour and relative value. If we thought of an element as having a property of antigravity, a repulsive force proportional to its mass, then the entire collection of elements would rearrange themselves into a composition of perfect balance – lowest system energy. There may in fact be many compositions of lowest energy. It is the artist's challenge to find one.

Due to the gravity-induced visual bias in the vertical direction, an element placed near the top of the image space will have a lot more visual energy or tension than an object placed near the bottom. This is especially true of vertically oriented rectangles.

The rectangle has a natural asymmetry about its center. But if we are to move an element along the long axis of the rectangle – we could call it a horizon line in a landscape – the unbalance we experience is less than if we move the element the same distance along the short axis (the vertical in a landscape). For the artist, the issue then becomes the distribution of elements along an axis as opposed to about a center point.

Conceptual Space Considered

The final distinct classification of space we consider is ***conceptual space***. Like perceptual space, it exists in the mind, but it is generated by concepts or ideas rather than physiological responses. Whereas perceptual space is Euclidean in nature, having three directions or axes mutually perpendicular, conceptual space is non-Euclidean. The orientation of its fundamental planes or axes does not have to be ninety degrees as is the case in perceptual and physical space.

Indeed, the number of dimensions the artist chooses to work with in conceptual space is limited only by his ability to devise a schema that allows him to generate what must ultimately become a 2D physical representation of what he has in mind. One might then speak of Cubist space where the conceptual orientation of the planes or angles of viewing are greater than ninety degrees.

Another consideration is spatial metrics. Euclidean spaces have the same metric in each direction. Conceptual spaces may have different metrics in different directions or metrics that are variable. The result is a perceived distortion in figurative content.

Expressive painters work in conceptual space, being unconcerned with precise expression of measurement or relative size.

Colour Considered

Rather than being an element in itself, colour is a property of an element or a space along with other characteristics such as shape and size. One cannot paint a red. One has to paint a line or shape or area of space *with* the colour red. Colour requires an element to carry it, whether that element is a line, a shape, a composite element or an entire space.

The other side of this coin is that every element or space must have colour, either the chromatic colours such as red and blue, or the achromatic colours such as white and black. No artist can escape the fact that he is using colour. The reductive example of a work with null content would be one with null colour. There is a subtle but fascinating distinction between null colour and no colour.

Until the mid twentieth century, artists had access to materials such as pigments, whose colour works by light absorption. Of all the colours in white light falling on a pigment, some are absorbed and some reflected. The first result of this is that an observer looking at the pigment would see a characteristic colour formed by the reflected colours of light. The second effect is that the amount of light absorbed determines the intensity of light reflected and affects the brightness or value characteristic of the pigment.

Beginning in the 1960's, a new class of special effect pigments was created. These pigments have a characteristic colour formed by light reflection and interference. Films and papers constructed with similar coating processes and holographic techniques began to enter the market, giving the artist access to sheets of material exhibiting luminous reflective colour effects.

Colour Space

Elements in our image space may have several characteristics including shape, size, colour and directionality or orientation. If we suppress all of these characteristics except colour we reduce our image space to a colour space. Perceptually, we cannot do this since it is the transition between areas of colour that automatically induces the perception of shape. We can, however, conceive of the idea and speak from this vantage point.

This notion of a colour space we propose as synonymous with the notion of a colour field.

With the colour field painters, the nature of the element became secondary to the colour it was carrying and the colour of its neighbouring elements and space. In other words, colour became the dominant characteristics of the elements of an image.

With painters like Jules Olitsky, much of the image space becomes modulated colour without identifiable elements inhabiting it, except perhaps, around the edges. In its minimal expression, the image is simply a coloured space, perhaps with modulation or texture, but lacking other distinct elements.

Morris Louis explored the effects of poured painting, being unconcerned with the precise shape of his colour elements. The placement and colour sequences against the neutral colour of the unpainted image space become the important issues.

Painters like Joseph Drapell and Bruce Piermarini remove any reference to a separate underlying image space by blending their colours to form a continuous inclusive coloured field that becomes the image space, with or without distinct elements in it.

The Colour Plane as a Space

Elements in an image that have the same hue, intensity and value can all appear to have the same relative spatial depth in a painting. This is easiest to see in the work of an artist like Gershon Iskowitz. Such elements inhabit a plane in the image space which in turn, is a 2D space in its own right. It takes a bit of mental gymnastics, but this planar sensation is clearly apparent in some works.

The artist can use this knowledge not only to help generate desired spatial depth but to provide a force to help integration in a work.

Summary

I have attempted, in this essay, to create a comprehensive framework for considering the nature of space in the context of art. I propose that this can be accomplished by considering a physical space, the space in which we live and move and create our art, a perceptual space being what we see, and a conceptual space being what we think and imagine.

I have characterized colour as a property of space and the elements that populate the space. I have suggested means by which colours, either alone or in planar relationship, can be considered to form a subspace of our perceptual and image spaces.

I have suggested a means of classifying art as either 3D (sculpture) or 2D (painting and its planar relatives).

The intention is that these concepts of space and colour may inform the observer in analyzing and understanding 2D works of art while helping the artist create such works in the first place.