Spatial Colour Effects Across Three-dimensional Form:
The Tilt Effect

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ABSTRACT
This doctoral research examines and analyses the spatial activity created by colour combinations, drawn from landscape, when applied to three-dimensional form. Colours perform spatially upon a two-dimensional surface in a multitude of ways and these may be affected significantly by other formal properties of three-dimensional works. My research has revealed that bands of colour arranged upon the three-dimensional bowl, display spatial manoeuvres that are not found within identical alignments of hues upon a two-dimensional surface. A key finding to date is the ‘tilt effect’, an illusion that bends form. This phenomenon is so resolute and compelling, that not only can a dual tilt appear, but further unexpected spatial events can also occur. Such effects, once determined, may be used as an abstract language across the mediums of painting and ceramics to return to and realise an abstracted representation of landscape.

INTRODUCTION
This paper examines the spatial phenomena that occur on the coloured surfaces of the three-dimensional ceramic art forms that I make as a practitioner. Aesthetic evaluations are mainly undertaken from theoretical positions within art, but also consider theories and debates from disciplines such as neuroscience, psychology and philosophy. Certain artists have dealt specifically with the perception of colour, Josef Albers arguably having undertaken the most recent and rigorous investigations, but even he does not explore phenomena that occur when colour is perceived across three-dimensional space. Similarly there is no published literature on this subject in the field of ceramics. Understandings therefore for the colour movement on one of my earlier works, Undulation (figure 1), could only be found from examples in painting. The perceived undulations appeared to comply comfortably with physiological and psychological colour movements found in two-dimensional painting, as highly saturated hues appear larger than less saturated hues and “warm colours advance and cool colours recede”, Zelanski and Fisher (1989: 44). The following research anticipated results that did not fit so comfortably with understood colour phenomena, whereby physical space might affect and alter findings.

Until the nineteenth century, although landscape painting used traditional and well-understood physiological colour effects in describing space, these effects were easily overlooked and often suppressed by other developments in perspective and topography. Colour took a secondary role as painters failed to investigate further the powerful spatial effects that changes in colour could have on an outdoor scene. Constable was one such example. In his painting The Hay-Wain, 1821 (figure 2), the
composition comprises two passages of perspective. On the right, the far distant sky is pale blue and the foreground is more highly saturated, congruent with established spatial colour states. However, the colours used for the perspective on the left are almost the reverse of that on the right, yet depicted space is equally successful. Colour has no influence on spatial depiction as pictorial detail represses physiological colour states. Furthermore, if the left hand passage is distilled to a series of bands, as in *figure 3*, the dark recessive part no longer recedes and the paler foreground no longer advances.

Walsh and Kulkowski (1988: 2) help to explain this occurrence as they suggest the spatial consistency of colour is “affected by the figural content of a scene”. This description aptly complies with a study by Troost (1988: 275) where colours belonging to a scene are described as “surface colours”, and colours without pictorial detail, those seen in isolation, are “aperture colours”. Aperture colours were found to have very different colour and spatiality to surface colours. For my use of the term I will assume that aperture colours are perceived, more exclusively, according to their physiologically and psychologically understood spatial states; for example, in their aperture states a highly saturated red will advance over a low saturated blue.

The ways in which colour is carried or accommodated by other properties of a scene, in surface state, appears to have notable, if not absolute effect upon its spatial presence. The pictorial properties of perspective however, are not the only contributors to this. In his skyspace installation, *Deer Shelter*, 2006, by James Turrell (*figure 4*) the frame placed around the sky distorts its infinite spatiality to one that instead appears finite, close and reachable. In an artwork that changes with the weather, all sky colours that once receded are newly determined by a low-lit room and a frame of minimal detail; a new context or surface state.

My own studio investigation began with Series 1 (*figure 5*), which was derived from a landscape scene, Table Mountain in the Black Mountains of South Wales. Similar to Turner’s multiple depictions of the mountain The Rigi (that showed the same scene to be variably spaced depending on the colour of the light), a field study recorded the scene altered by the spatial dynamics of light and colour changes throughout the day. Each individually hued scene was distilled using colours and proportions from the moment into a series of abstract and banded panels that reflected the changes of hue and space in the landscape. These were then applied to both the inner and outer surfaces of a series of conical forms. Certain results appeared to correspond with physiological, or aperture, colour phenomena found in two-dimensional works, but one finding did not.

This is the ‘tilt effect’, an illusion that appears to bend the inner wall backwards and create tension between inner and outer surfaces. It can be seen in-between the two central wider bands. Thus many of the trial groups in Studio Investigation Series 2 were then undertaken to more fully understand this occurrence. Findings from this second series are as follows:

*Group 1* maintained the full arrangement of bands from Series 1 but systematically altered the actual width of the two main bands that encompassed the tilt. It found that the two main bands have to be of substantially larger width than other bands in the surrounding arrangement in order for the tilt to be clearly perceptible. *Group 2* focused on two bands only, keeping the juncture centrally located on the wall, but allowing for different tonal extremes between the bands on each bowl. It found that the tilt occurs when bands are very close in value but is stronger when they are more highly contrasting. *Group 3* used a strong tonal arrangement and systematically varied
the width of the upper yellow band. It found that the tilt is stronger when the juncture of bands is close to the central and upper position of the wall and when both bands are of ample width. The focus for Group 4 sought to explore if the arrangement of values and consequential tilting of bands in Group 3 could be partly connected to the physiology of colours i.e. that “optically…yellow seems to spread more than…blue”, Zelanski and Fisher (1989: 44), blue having similar properties to the green here. The reversed arrangement clearly shows that the tilt is not dependent on such tonal positioning. It was noticed however that the tilt is marginally stronger in Group 3, proving that the propensity for yellow to spread may strengthen the tilt. Group 5 investigated the effect of wall gradient in relation to the tilt. It was found that the tilt was strongest between the 40° and 60°, leading to the conclusion that an inclination closer to the horizontal or vertical axis lessened the likelihood of a tilt. Group 6 originally aimed at testing the effects of translucent colours on either side of a wall but instead revealed a dual tilt effect. On this bowl the centrally banded group acts as one band whereby a tilt occurs at either side of it. Such abundance of spatial phenomena appears to encourage further effects, such as an outward curve of one of the wide bands. The curve appears to compensate for the double tilt and allows stronger corners to appear at both tilts.

The spatial manoeuvres of colours on the inside of a conical form emerge determinably through certain constraints. The colours appear to be bound by the tilt effect, which in turn arises out of a particular context or surface state. The bowl’s dimensional presence means that we no longer respond to colours according to aperture state or physiologically freer colours that can be found on a two-dimensional surface. The effect is so resolute and determinate in its spatial control of colour, it can be compared to the effects of perspective within painting or the effects of Turrell’s window on the sky. This raises the question as to why and how does this occur here? A study by Hubel and Wiesel, as cited by Blakemore in Jan 2008, has offered a possible insight: they discovered that lines and boundaries have a greater impact on the brain than lights. This would explain why a reversal of coloured values does not prevent the occurrence and would suggest that the boundary line creates the tilt. The advancing phenomenon of a sharp line is well understood within principles of drawing and could also be of consequence.

However, it is also possible that the tilt occurs due to abstract possibilities presented by three-dimensional space, as no absolute tilt occurs on the two-dimensional disc example (figure 6). It is highly probable therefore that the issue of the ‘bowl’ and possibilities determined by our knowledge of the bowl and the diagonal are apparent. Gombrich’s notion of ‘mental set’ could be of relevance here as he suggests we arrive at objects with an expectation, ‘our receivers already attuned’, Gombrich (1977: 53). The juncture line may therefore stimulate an illusion that is connected to more familiar bowl shapes that actually bend. It is also recognised that the use of different shapes in art can instil different conceptions, for example the sculptor David Nash states: “The sense of the Cube is solid unmoving representing matter…The sense of the Pyramid is rising expanding representing space”, Nash (2005: 4). When, as seen in Group 5 and figure 6, the form is increasingly cylindrical or flat, as opposed to conical, there is less flexibility for our
knowledge to resolutely betray the form; any illusions remain in flux therefore cylindrical is ultimately straight and flat is flat, both constrained by physical shape as Nash’s cube. Our knowledge of a line at 45 degrees, however, is one of instability. Therefore, colours on a bowl with a diagonally angled wall, have more potential to determinably change the wall’s appearance because 45 degrees is a “rising expanding”, visually tense and unstable angle.

The tension and ambiguity created between the inner and outer wall, or less specifically the indefinite nature of form, can be a key factor in the effectiveness of art. Piet Mondrian creates dynamic spaces by the “balance of opposing forces”, Milner (1992: 161). Composition with Red, Yellow and Blue, 1921 (figure 7), is uncomfortable to view because the action appears to be around the edge instead of the more usual central area where black and white reside alone. The central four white squares then begin to reveal a more subtle interest as the whites appear tinted with colour due to their surroundings, a mysterious and ambiguous hue arising through colour relationships. The notion of contradiction and the unresolved is often a central factor for the artist and the work’s success. However this exploitation, not as widely understood within craft and ceramics, is a territory in which I find myself; tensions between the inside and outside of ceramic forms exhibit contradictions, uncertainty, and the indeterminate.

**CONCLUSION**

Such indefinites were initially expressed in landscape painting. Notions of indefinite and Sublime landscapes were explored by Turner and Casper David Friedrich, where depictions of voids and the unknown evoke uncomfortable spaces. For the ceramic artworks, if taken in a literal sense, the tilt effect could pertain to an undulation in land, or even two undulations. However, the ambiguity created by the tilt and a void-like space within the form could be seen to allude to those uncertain spaces found in landscape. Places that mask the reality of landscape by mist and hue could be suggested. The conical form can thus become a canvas for painting that exploits the shapes, spaces and volumes of landscape and form, with tantalizing ambiguity, on its inner and outer walls; a shape that, by its resolute illusion, arguably challenges the theories of constancy in colour and shape.

**REFERENCES**


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