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SCIENCE IN CULTURE

Hearing colours, seeing sounds

Wassily Kandinsky's synaesthetic paintings go on show in London.

Martin Kemp and Colin Blakemore

"I saw all my colours in spirit, before my eyes. Wild, almost crazy lines were sketched in front of me."

The author was not describing effects he had seen with his eyes. Wassily Kandinsky was reacting to a performance of Richard Wagner's opera *Lohengrin* in St Petersburg. The Russian painter and art theorist, who spent much of his career in Germany, conceived a kind of painting that might aspire to the abstract condition of music. His aim was nothing less than a new 'science of painting' that would exploit the inherent power of form and colour.

'Colour music' has a long tradition. Aristotle and his followers in ancient Greece provided encouragement for artists and theorists from the Renaissance onwards to explore precise connections between 'colour scales' (arrayed between the poles of white and black) and the mathematical harmonies of music. Attempts to devise detailed colour notations for music date back to the sixteenth century, and the earliest attempt to construct a 'colour organ' was made as long ago as the early eighteenth century.

The early twentieth century saw a cluster of diverse attempts to weld the visual and aural into an abstract unity. Kandinsky moved freely in the intellectual circles of two composers, Alexander Scriabin and Arnold Schoenberg, who were openly involved in this endeavour. The score of Scriabin's *Prometheus: Poem of Fire* (1910) includes a part for a '*luxe*' or '*clavier à lumières*', which was intended to project a 'symphony' of vivid colours on a screen.

Kandinsky's *Über das Geistige in der Kunst* (Concerning the Spiritual in Art, 1911) draws on the ideas of theosophy, the philosophy that advocates a form of pantheistic spiritual insight based on the deepest affinities between world theologies and the principles of science. He advocated a "renewal of the soul" in the face of rampant materialism.

His personal contribution was an art that relied on a direct communication of 'inner vibrations', in which visual arrays of shapes and colours evoke sensory conjunctions — embracing not only sound but also taste, smell and touch. Colour serves as the "keyboard, the eyes are the hammers, the soul is the piano with many strings". Looking at photographs of *Composition VII* during progressive stages of execution, Kandinsky's gestures with loaded brush in hand look like those of a conductor drawing phrases and colours from an orchestra — although his visual sounds endure, not fade away.

Kandinsky realized that all effects are relative. Each rhythmic stroke, each adjacent colour, is part of a dynamic system of pulsing interaction. Signature circular patches radiate haloes of applied and induced colours. Shallow curves arch harmonically, only to be interrupted by jagged dissonances. *Composition VII* (pictured here), 2 × 3 metres in size, invites us to read its 'music' over time in an act of sequential contemplation.

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This cross-sensory endeavour raises the question of whether Kandinsky experienced synaesthesia, in which particular sensory stimuli trigger extraneous sensations. As with Scriabin, the answer is not straightforward. Synaesthesia is thought to be disproportionately common among creative artists, but they were both knowing heirs to the long tradition of colour music (see chapter 11 of John Gage's *Colour and Culture*, Thames & Hudson, 1995).

In synaesthesia, all manner of weird associations can occur (such as imaginary tastes associated with the sight of particular people), but the commonest is 'colour grapheme' synaesthesia, in which written or printed letters and numbers appear distinctively coloured. We don't come into the world knowing about graphemes, so the particular associations must be learned, even though synaesthesia itself is partly heritable. Using functional brain imaging, the colour-processing areas of the visual cortex have been seen to light up in synaesthetes listening to words that evoked synaesthetic colour sensations.

Colour is the 'added value' of vision. Numerous studies of human vision suggest that colour is separately analysed and then attached to the perception of objects and surfaces. Perhaps the prevalence of colour metaphors, and the fact that colour is so frequently the extra experience of synaesthetes, reflect a normal mechanism for associating colours with objects.

Kandinsky's writings suggest that he did experience coloured music. His distinctive, brightly coloured swirling and jagged lines might be representations of experiences evoked by music. But his approach may have been more formal. Kandinsky left an annotated copy of Schopenhauer's treatise on vision and colour, *Über das Sehn und die Farben* [*On Vision and Colour*], with his lover, artist Gabrielle Münter, when he left her in 1914. This was the year he painted *Fugue*, whose interwoven sequences of coloured patterns were explicit representations of musical motifs.

Beyond such speculation about Kandinsky lies the intriguing fact that colours have pervasive emotional associations for all of us. Although explicit synaesthesia is uncommon (affecting about 1 in 2,000 of the population), about one-third of non-synaesthetic people are roughly 70% consistent in associating colours with graphemes in separate tests a week or a month apart (M. S. Steven D. Phil. thesis, Univ. Oxford, 2004).

Regardless of where Kandinsky stood in the spectrum of synaesthetes, he has tapped into one of the stranger capacities of our perceptual system, creating works that were in their own way as experimental as those of a scientist. The key difference is that his experiments are presented as open fields for our imaginative viewing, rather than as parades of results of controlled testing.

An exhibition of his paintings, 'Kandinsky: The Path to Abstraction', can be seen at Tate Modern in London until 1 October, and at the Kunstmuseum in Basel from 21 October to 4 February 2007.

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