

Guest editorial essay

Natural magicians

Trompe l'oeil works attempt to fool the eye by creating the impression of a surface that has different three-dimensional structure to the painting. The works of Patrick Hughes have been described in *Perception* previously (Wade and Hughes 1999); they are in relief but are painted to appear like conventional flat pictures; those parts that protrude from the picture plane are pictorially distant, or in reverse perspective. The recent works of Calum Colvin (figure 1), exhibited at the Royal Scottish Academy, add yet another twist to the genre. Initially Colvin also turned the trompe l'oeil issue on its head—he made the solid look flat. He painted over three-dimensional structures and alignment was maintained because the final scene was photographed from the only point where this was possible. When viewing his photographs, the solid scene is initially overlooked and pictorial flatness dominates perception. With more protracted viewing, the objects in the scene emerge and a strange tension is introduced between the solid and the flat, between the scene and the seen. Objects in three dimensions are intentionally merged in the picture plane—and their identity is recognised after the flatness is transcended.



Figure 1. [In colour online, see <http://dx.doi.org/10.1068/p3805ed>] *Natural Magick* by Calum Colvin.

The works in Colvin's *Natural Magic* exhibition represent exploration of new dimensions. By adopting two viewpoints, neither of which will yield perfect alignment between the contours painted on the solid objects, retinal disparity is introduced. The clues to the objects are given visually rather than conceptually. Even so, disparity takes time to develop and our familiarity with pictorial images tends to determine the initial

visual victory. Depth derived from disparity vies with pictorial depth, so that the works are not narrowly stereoscopic but they display a dynamic duel between the pictorial and binocular cues to depth. A dual duel is implied with rivalry not only between the slight contour misalignments but also between selected elements within each stereoscopic image. The subject matter of Colvin's works in the exhibition is distinctly perceptual and historical. The title is taken from David Brewster's (1832) book on *Natural Magic*, and there are stereo-portraits of Brewster (figure 2), Charles Wheatstone (figure 3) and also of the notorious Chimenti drawings (figure 4). The three paired pictures are painted over the same objects—ladders, projectors, and screens—all of which link to optics. The large stereopairs are viewed through a variety of stereoscopic devices, like mirrors, lenses, and also anaglyphs. The catalogue to the exhibition contains a book stereoscope so that the depth in the reprinted stereopairs can be appreciated and the struggle between pictorial and disparity cues can be experienced (Colvin 2009).



Figure 2. [In colour online.] *Portrait of Sir David Brewster* by Calum Colvin.

Pictures present us with an unnatural magic that is so commonplace in our culture that we regard it as natural. Paintings, prints, and photographs provide us with allusions to spaces they do not occupy, and these allusions are distinctly static (see Wade 1990). More specifically, pictures are devoid of two dimensions that are fundamental to our everyday interactions with objects—depth and motion. Pictorial magic consists of confounding these wants, so that we overlook what they lack. Optics has been part of this trickery and Brewster was a major player in the magic of his day. Magicians of the past appreciated the laws of light and could manipulate attention with far greater subtlety than was the case for students of the senses. They were able to beguile and bamboozle those who did not share their knowledge, which they kept as secret as possible. As Brewster wrote: “The secret use which was thus made of scientific discoveries and of remarkable inventions, has no doubt prevented many of them from reaching the present times; but though we are ill informed respecting the progress of the ancients in various departments of the physical sciences, yet we have sufficient evidence that almost every branch of knowledge had contributed its wonders to the magician’s budget, and we may even obtain some insight into the scientific acquirements of former ages, by a diligent study of their fables and their miracles” (Brewster 1832, page 3).

Brewster and Wheatstone were bitter rivals and the origins of the rivalry preceded the stereoscope (see Wade 1983). In 1832 at an early meeting of the British Association, Brewster, the elder statesman of optics, was contradicted by a youthful Wheatstone over an interpretation of certain simple visual phenomena. The enmity was heightened with Wheatstone's invention of the stereoscope at around the same time. Brewster would have been expected to have been aware of disparity leading to depth perception since he had published an extensive encyclopædia entry and monograph on optics in which binocular vision was addressed (Brewster 1822, 1831). When Wheatstone (1838) published his account of the stereoscope and the experiments he conducted with it Brewster was initially enthusiastic. He changed his views following experiments on binocular vision in the 1840s and then with his invention of the lenticular stereoscope in 1849. Initially, he sought to wrest the invention from Wheatstone by introducing a contender, Mr James Elliot, a teacher of mathematics in Edinburgh. According to Brewster, Elliot had made an 'ocular stereoscope' in 1834. This was simply a septum dividing the views of each eye so that paired drawings could be observed. Brewster amplified his claim in his book on the stereoscope and its history (Brewster 1856) as well as in the correspondence columns of *The Times*. In 1856, three letters issued from the pens of both Brewster (his first being anonymous) and Wheatstone, with the latter providing ample evidence of his priority. Nonetheless, Brewster's opinions did not change with *The Times*, and he found a more devious device for his attacks on Wheatstone—an old pair of drawings by Jacopo Chimenti (1551–1640).

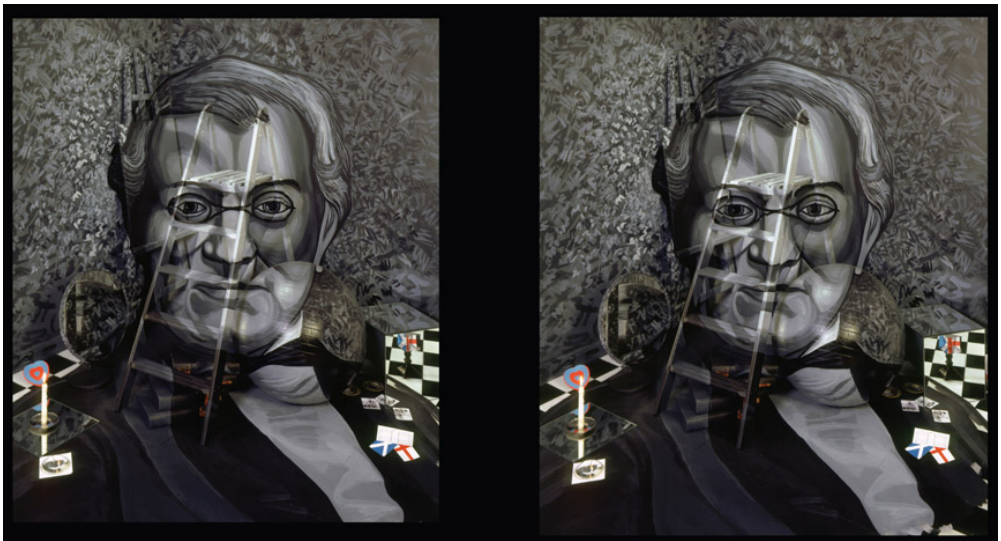


Figure 3. [In colour online.] *Portrait of Sir Charles Wheatstone* by Calum Colvin.

The Chimenti drawings are both of a young man seated on a stool, suspending a plumb line with one hand and holding the legs of dividers in the other (see Wade 2003). When Brewster learned about them, in 1860, he suggested that they were produced for a stereoscope, possibly one made by Giovanni Battista della Porta (1535–1615) around 1600. There followed a bitter debate about the supposed stereoscopic effects that could be seen when the pictures were combined. Brewster's claims were finally dispelled when precise measurements were made of the drawings: some parts were stereoscopic and others were pseudoscopic. Brewster's second attempt to wrest the invention of the stereoscope from Wheatstone was again unsuccessful. With this bitter legacy, it might seem surprising that the antagonists were eventually reconciled, shortly before Brewster's death.

This occurred at a meeting of the British Association held in 1867 at Dundee, where they agreed to forget their former disagreements. Perhaps it is this uneasy alliance that is alluded to in the collection that Calum Colvin has assembled. In the *Natural Magic* exhibition Colvin adds further subtlety to the rivalry between Brewster and Wheatstone. A pair of Chimenti pictures can be viewed in an upright lenticular stereoscope; they have Brewster in the background. However, viewers are led to believe that they are observing two wall-mounted Chimenti pictures, aligned with the lenticular stereoscope, that have Wheatstone in the background! While this arrangement cannot be represented here, figure 4 shows the left image of the Chimenti/Wheatstone pair and the right image of the Chimenti/Brewster pair. When viewed in a stereoscope, Wheatstone and Brewster can be seen hovering in symbolic rivalry relative to a stereo/pseudoscopic Chimenti.



Figure 4. [In colour online.] *Chimenti* by Calum Colvin.

Both visual artists and visual scientists are natural magicians but the rules by which they operate differ. They are often concerned with examining the same spatial phenomena, but the methods they adopt differ radically. Scientists try to discover new facts regarding old phenomena; they rarely discover new phenomena but different conditions under which the old ones operate (perhaps using some novel apparatus for generating stimuli). Artists are concerned with arranging phenomena in a manner that has not been seen before, or perhaps to increase the spectators' awareness of the phenomena. This typically involves complicating the effects rather than simplifying pattern elements. Thus, scientists rarefy and isolate phenomena to control them in the laboratory, whereas artists embrace complexity and manipulate phenomena intuitively. It is less common for artists to harness the instruments invented by scientists and yet this is precisely the approach adopted by Calum Colvin in *Natural Magic*, thereby bringing art and science into closer harmony.

Acknowledgment. I am most grateful to Calum Colvin for permission to reproduce stereopairs from his *Natural Magic* exhibition.

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