

Zones of inhibition: interactions between art and science

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It has been suggested that successful art helps to solve our emotional problems. Can it therefore help with our current crisis in the relationship between biological science and society? Art and science are activities that have seemingly different cultures; scientists are seen as objective and rational, artists as subjective and intuitive. Each inhabit cultures that are seen to be mutually exclusive, but this has not always been the case. For example, during the Renaissance, people were schooled across both art and science and there was no clear dividing line. Where did the split occur, and is their interaction important in the 21st century?

The images of anti-GMO protesters that continue to haunt the media, which are reminiscent of the Luddite movement of the 19th century [1], are symptomatic that new biotechnologies are raising new issues. Prince Charles highlighted some of these concerns and the split that has occurred between science and society when he stated that ‘wisdom, empathy and compassion have no place in the empirical world yet traditional wisdoms would ask “without them are we truly human?”’ [2].

Herbert Read has suggested that art helps to solve our emotional problems [3]. Can art, therefore, be used to help integrate our emotional response to public concerns about biotechnology? Several scientific establishments, including Rothamsted Research, have employed an artist-in-residence to try to heal this dislocation between science and the public. However, the divide in education brought to prominence by C.P. Snow’s Two Cultures [4] means that the interaction between art and science is complex.

In an exhibition at the Royal Academy of Arts in 1997 entitled *Sensation: Young British Artists from the Saatchi Collection*, Damien Hirst came to prominence with *Away from the Flock* (Fig. 1), an exhibit that consisted of a sheep preserved in a glass tank. Together with other items, this outraged the public. This was the same year that Ian Wilmut and colleagues at the Roslin institute successfully cloned Dolly [5]. As Lisa Jardine perceptively pointed out [6], it was as if Hirst’s exhibition was forcing the public to address what was being done in the name of biological science. George Braques felt that ‘art is made to disturb’ and ‘science reassures’, but the public clearly found both these events disturbing.

The highly influential academic and literary critic George Steiner recently came down very heavily against

science when he suggested that, ‘An imp of demonic triviality inhabits the imperial regime of the sciences.’ [7] Is it therefore any wonder that many people today have a distrust of biotechnologies such as genetic engineering? Biotechnology is raising many fundamental questions about human values, and is clearly the cause of much soul searching.

Broadly speaking, the period between the Renaissance and the Scientific Revolution saw a change in outlook from one of contemplation to one of action. If there is ever a single person who spanned all human knowledge and epitomizes the Renaissance, it is Leonardo da Vinci because he disregards the theories of the Middle Ages and turns instead to a careful observation of the facts. He was one of the first anatomists to dissect human corpses. Indeed, many artists of that era, including Michelangelo Buonarroti, undertook the dissection of human corpses. As Georgio Vasari recounts in his *Lives of the Artists*, ‘Michelangelo very often used to flay dead bodies in order to discover the secrets of anatomy’ [8]. In a study of Michelangelo’s *Creation of Adam*, Frank Meshberger argues convincingly that the image surrounding God and the angels has the shape of a human brain [9], intertwining art with science (Fig. 2). However, da Vinci takes his study of the natural world even further for he perceives the body of an animal, whether a bird or a human, as a machine and subject to mathematical law. ‘Thus a bird’, he wrote, ‘is an instrument working to



Fig. 1. *Away from the Flock*, 1997. Damien Hirst.

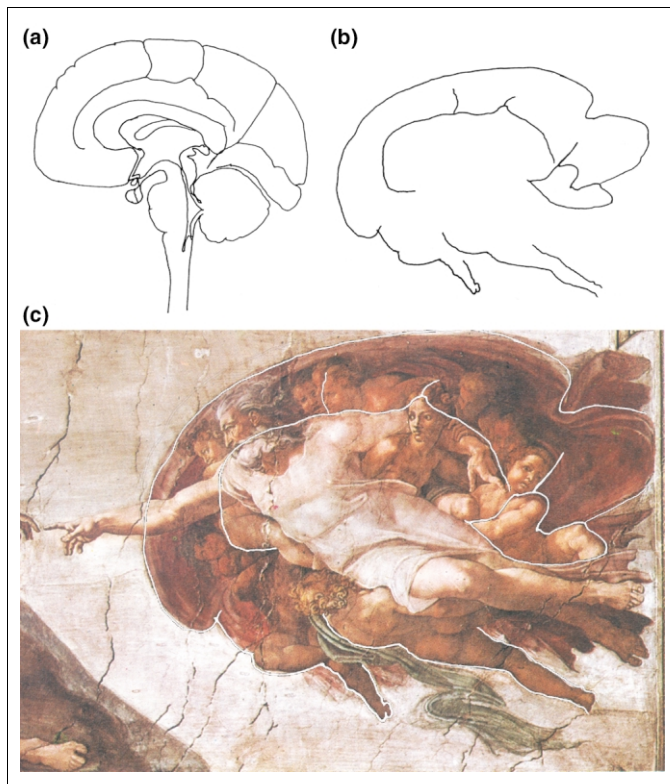


Fig. 2. Adaptation of Frank Meshberger's interpretation of Michelangelo's *Creation of Adam* based on neuroanatomy. (a) Schematic diagram of a cross-section of a human brain. (b) Tracing of *Creation of Adam*. (c) Tracing of *Creation of Adam* overlaid onto a detail of the painting depicting God and the angels [9].

mathematical law, which...is within the capacity of man to reproduce.' [10]

The idea of a mechanistic world governed by laws of nature according to mathematical law becomes increasingly dominant in the work of people like Galileo Galilei and Isaac Newton. However, this mechanistic view did not really become such a manifestly important and potent vision until the industrial revolution. Indeed, this split between subjective and rational approaches occurred to Charles Darwin. In his autobiography, he laments a loss of his aesthetic tastes [11]:

Up to the age of thirty, or beyond it, poetry of many kinds, such as the works of Milton, Gray, Byron, Wordsworth, Coleridge, and Shelly, gave me great pleasure, and even as a schoolboy intense delight.... I have also said that formerly pictures gave me considerable, and music very great delight.'

He clearly had an artistic and poetic mind but this state was not to continue:

But now for many years I cannot endure to read a line of poetry: I have tried lately to read Shakespeare, and found it so intolerable dull that it nauseated me, I have also almost lost my taste for pictures or music. ...My mind seems to have become a kind of machine for grinding general laws out of large collections of facts, but why this should have caused the atrophy of that part of the brain alone, on which the higher tastes depend, I cannot conceive.

With the development of his analytical reasoning powers, Darwin laments the apparent concomitant loss of his aesthetic tastes as, '...a loss of happiness, and may be injurious to the intellect, and more probably to the moral character, by enfeebling the emotional part of our nature.' Darwin clearly felt that he had lost some emotional capacity. His biography suggests that as a young man he was emotionally sensitive for he could neither stomach dissections nor operations. The operations, performed without chloroform, must have been very distressing and they haunted him for many years. The young Darwin was demonstrating a sensitivity seemingly much greater than the likes of da Vinci and Michelangelo. More recently, the physicist and Nobel-prize winner Richard Feynman described his motivation for learning to draw was that he '...wanted to convey an emotion [he had] about the beauty of the world.' [12]. And in another Nobel laureate's biography, Barbara McClintock's biographer says, 'Good science cannot proceed without a deep emotional investment on the part of the scientist. ...For McClintock, reason – at least in the conventional sense of the word – is not by itself adequate...' [13]. So we can see here that scientists don't have to be emotionally insensitive. But what about artists, are they devoid of reason and objectivity?

Reason and objectivity are heralded as two of the cornerstones of science of which the ability to reduce everything down to mathematics is an extension. It is interesting to note that with a mathematical view of the universe and Darwin's metaphor that his mind had become a machine, we are led to a view in which science is seen as reductionist, and indeed, many people believe that science is as good as it can be reduced to mathematics. Mathematics, we must remember, is the quintessence of abstraction. One of the major artistic revolutions that occurred during of the first half of the 20th century must be that of abstract painting, and this, I would argue, mirrors an explosion in scientific knowledge and technology. One of the clearest examples of a painter evolving an increasingly abstract series of images is seen in the work of the Dutch painter Piet Mondrian (1872–1944). Despite recent criticisms regarding the nature of Mondrian's aesthetic impact [14], in the period from 1908 and his painting entitled *The Red Tree*, he produces a series of paintings that becomes increasingly abstract, and in 1922 culminates with compositions that are basically made up of rectangular geometrical forms in black and white containing the three primary colours – red, blue and yellow. It is clear that Mondrian's work was driven by simplification and reductionism. Towards the end of his life, having thoroughly explored painting at its most abstract and simplistic, he starts to build up more complicated images like that of *Broadway Boogie Woogie* (1942/1943).

Similarly, in the work of Tina Bolyos, who was recently artist-in-residence at Rothamsted Research, a similar development can be seen in her exhibition entitled *Zones of Inhibition* [15]. Here, in her artistic analysis of fungi, Bolyos was doing, with the help of modern microscopes, what Mondrian more recently, and da Vinci and Michaelangelo much earlier, had been doing – she was dissecting and abstracting them (Fig. 3). We can clearly see in the development of her images in the exhibition that she was

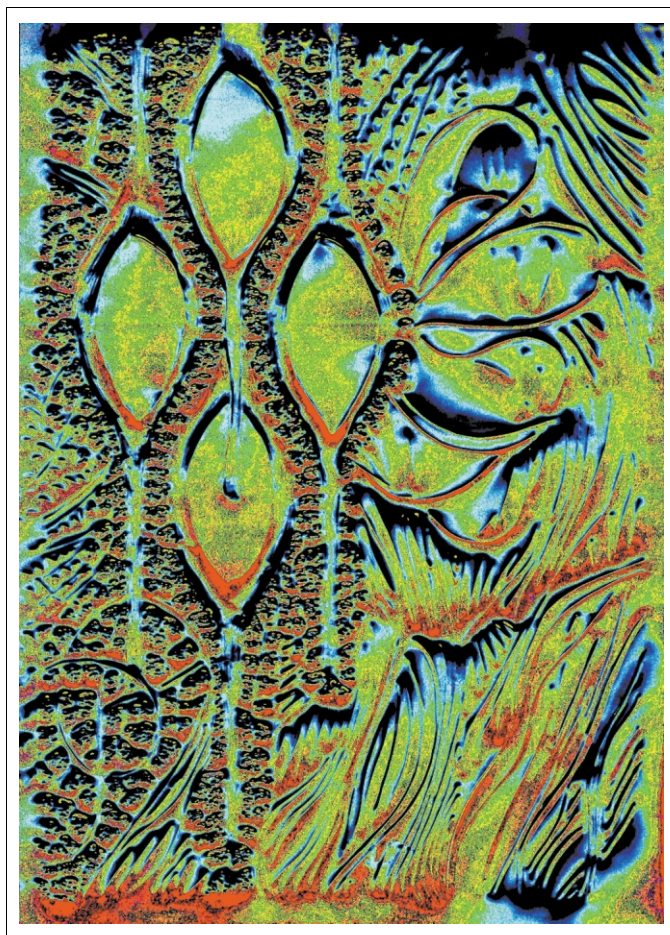


Fig. 3. 'Cell metal 1c' by Tina Bolyos. A computer generated image inspired by the plant pathogenic fungus powdery mildew, *Blumeria graminis*.

abstracting information and simplifying everything as an iterative process. Then, using her aesthetic sense of judgement and intuition, she could reconstruct an appealing image to be presented as a final work of art. Usually, the public only ever sees the final image, and therefore the analytical part of the artist's work is rarely on show – the final image shown complete as if it came into being all at once through a single process. This is clearly not the case; the image evolves into its final being.

The stereotypical view of the objective analytical scientist and the subjective intuitive artist is false, and the work of both artist and scientist requires a mixture of objectivity and subjectivity, analytical and intuitive abilities working together as one. As the late Jacob Bronowski made clear, 'Man is unique not because he does science, and he is unique not because he does art, but because science and art equally are expressions of his marvellous plasticity of mind.' [16] Whether art can help heal the division that now exists between science and society will remain to be seen, but even if it cannot heal the division, it is an excellent method to open up a much-needed debate.

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