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Art and Science: Historical Perspectives

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There is a long history of treating art and science as binary opposites, bringing them together in order to highlight their differences. As Peter Galison and Caroline Jones wrote in their 1998 collection of essays *Picturing Science, Producing Art*, “art and science needed to be yoked together (yet held apart) in order to accrue the strengths of their polar positions: soft versus hard, intuitive versus analytical, inductive versus deductive, visual versus logical, random versus systematic, autonomous versus collaborative, and, like all binaries, at some level, male versus female.”¹ We could also add the most commonplace division of ‘objective’ versus ‘subjective’.²

This is a tradition which goes back at least to John Stuart Mill’s essays on Bentham and Coleridge, though it was no doubt made earlier, visible in the disputes between ancients and moderns in the seventeenth century and in the initial phases of science’s efforts to distinguish itself from the literary culture of the renaissance (compare Bacon’s relation to humanism, for example, to that of Vesalius).³ More recently the most forceful instances of this binary approach have been seen in the famous ‘two cultures’ thesis of C. P. Snow, and in the Science Wars, both of which contrasted a science characterised by common sense and utility with a perceived elitism and obscurantism in the humanities, in modernist literature in Snow’s case, and in the continental philosophy and sociology of science in the case of Science warriors Sokal, Bricmont, Gross, Leavitt, etc.⁴

¹ Peter Galison and Caroline Jones, eds., *Picturing Science, Producing Art* (Routledge, 1998), p. 2.

² For the history of the objective/ subjective split see Lorraine Daston & Peter Galison, *Objectivity* (MIT Press, 2007).

³ On which see Peter Dear, *Revolutionizing the Sciences: European Knowledge and its Ambitions, 1500-1700* (Palgrave, 2001).

⁴ For discussion see Jay A. Labinger and Harry Collins, *The One Culture? A Conversation About Science* (University of Chicago Press, 2001).

Against this binary opposition has been an equally vibrant tradition of bringing art and science together in order to show their similarities. To follow Galison and Jones again, the psychology of perception and investigations of creativity figure prominently here – in the work of Rudolf Arnheim on visual thinking, Anton Ehrenzweig on abstraction in art and science, or in arguments for the importance of individual creativity in science, such as those made by the historian of science Gerald Holton.⁵ There have also been numerous attempts to show crossovers between visual arts and science, in the work of Martin Kemp, who explored the role of optics and perspective in art from Brunelleschi to Seurat, or in Linda Henderson’s studies of artists’ use of the notion of the “fourth dimension” and non-Euclidean geometry.⁶ Henderson’s work highlights a period commonly identified as critical for art in its enthusiasm for science – when modernism at the turn of the 20th century, celebrated science and industrial technology as a means to save art from decaying academism, a development echoed in more recent turns to digital art, though I would suggest new media art has a more interesting and integral relationship to science and technology.

Galison and Jones are right, I think, to claim that recent work in the history of art and science has sought to leave behind an essentialist goal of identifying any fundamental, once-and-for-all distinguishing features of art or science, and instead chooses moments revealing of a much richer history of shared techniques, reciprocal interactions, and historically-situated relations between art and science. New works have pointed out the inadequacy of assuming there are just two simple practices we can call ‘art’ and ‘science’ – both domains are variegated, disunified, and shade into one another in various places, and it is at these interesting boundary sites that recent

⁵ Rudolf Arnheim, *Art and Visual Perception* (University of California Press, 1954); Anton Ehrenzweig, *The Hidden Order of Art: A Study in the Psychology of Artistic Imagination* (University of California Press, 1967); Gerald Holton, *The Scientific Imagination* (Cambridge University Press, 1978).

⁶ Martin Kemp, *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat* (New Haven: Yale University Press, 1990), pp. 8-52; see also Samuel Y. Edgerton, *The Heritage of Giotto's Geometry: Art and Science on the Eve of Scientific Revolution* (Cornell University Press, 1991). Linda Dalrymple Henderson, *The Fourth Dimension and Non-Euclidean Geometry in Modern Art* (Princeton University Press, 1983).

work has sought to engage. Instead of taking for granted the existence of essentialized domains of art and science, this approach looks for sites and techniques of representation at the border of artistic and scientific practices and considers their effects and the ways they have been historicized. Illustration, images of the body, cartography, or notions of perception and epistemology offer examples of such sites.⁷ Historians in this approach ask how visual practices or objects (physical or theoretical) have operated within economies of art and/or science, and about their role in structuring power and identity. They also ask how objects come to be designated as “artistic” or “scientific” in culture in the first place, a question regularly overlooked in most studies of art and science. How has this process worked historically and how has it changed over time? How does this process vary geographically? We need to research the way places, context, and the social and epistemological conventions associated with them, determine whether an object is to be identified as ‘art’ or ‘science’.

We also need to historicize the terms ‘art’ and ‘science’, which brings us into the domain of crafts and their relations to science. Until the renaissance, and well after it, it was meaningless to speak of art and science existing as we think of them – rather they were understood as craft and knowledge. Here we enter a long debate between Marxists and their opponents over the role of craft in the development of experimental science. Edgar Zilsel proposed craft skills were the key resource in shifting science from a medieval, logical discipline to a practical, empirical and observational enterprise in the 17th century, a theme taken up again by Paolo Rossi and more recently in Pamela H. Smith’s *Body of the Artisan: Art and Experience in the Scientific Revolution* (2004), a brilliant statement of this thesis based on looking at the intersection of crafts such as painting, sculpture and metalwork with alchemy and

⁷ Brian S. Baigrie, ed., *Picturing knowledge: historical and philosophical problems concerning the use of art in science* (Toronto; Buffalo: University of Toronto Press, 1996); *Picturing Machines, 1400-1700*, ed. Wolfgang Lefebvre (Cambridge, MA: MIT Press, 2004); Wolfgang Lefebvre, Jurgen Renn, Urs Schoepflin, eds., *The Power of Images in Early Modern Science* (Birkhauser, 2003); Svetlana Alpers, *The Art of Describing: Dutch Art in the Seventeenth Century* (London: Penguin, 1989); Barbara Maria Stafford, *Artful Science: Enlightenment Entertainment and the Eclipse of Visual Education* (MIT Press, 1996).

experimentation in the 16th-17th centuries.⁸ This is also the theme of my own research. What interests me is to approach the art/ science question from a geographical perspective – asking how interactions of arts, crafts and sciences have varied according to place in the past. I’ve studied this question through a case study of the history of fireworks between the 16th and 18th centuries, in three locations, London, Paris, and St. Petersburg, and I examine how different *local* traditions of interaction formed among artisans and natural philosophers in each of these places, and how these relations were transformed through processes of travel and exchange between different sites.⁹ To my mind, thinking about the geography of art and science, the ways that changes within and between places reshape the identities and meanings of what counts as art or science, offers a fruitful alternative to the old “two cultures or one” approach. And for anyone interested, I also teach a lecture course on the changing relations of art and science between the 15th and 19th centuries (HIST 219, in Winter 2009).

Finally, let me say a few words about digital and new media art, though my co-panelists are much better qualified than me to talk about this. To my mind there is a real transformation going on in relation to the art/ science divide at present in the development of digital arts, in which, put simply, scientific and technical skills are integral to the artistic process, and in which works deal much more directly with the history and practices of science and technology than previous art has done – I think of work by artists such as Catherine Richards, Toshio Iwai, and my present company.¹⁰ This integration and interest in the history of art and science is also evident in the

⁸ Edgar Zilsel, *The Social Origins of Modern Science* (Kluwer, 2000); Paolo Rossi, *Philosophy, Technology, and the Arts in the Early Modern Era*, trans. Salvator Attanasio (New York: Harper & Row, 1970). See also Pamela H. Smith, “Art, Science, and Visual Culture in Early Modern Europe,” *Isis*, 2006, 97: 83-100.

⁹ For a brief version of my argument, see ‘Making Fire Work: Pyrotechnics and Natural Philosophy,’ *Endeavour*, vol. 32, no. 1 (2008): 32-37.

¹⁰ <http://www.pixelsurgeon.com/interviews/interview.php?id=239>; <http://www.stephnet.org/>; <http://www.catherinerichards.ca/>

work of many ‘traditional’ though no less ingenious artists, such as Panamarenko, Cornelia Parker, or Susan Hiller.¹¹

To conclude, the picture for me seems to be this: Instead of polarized or essentialized views of art and science we now have a developing picture of a complex and changing economy of techniques, moving back and forth between different practices, and being identified as art or science in different ways at different times. As such, in new media art and in the new history of art and science, the days of the “two cultures or one” debate are (or at least should be) finally and thoroughly over. Of course the specialized practices of art and science go on, and may well continue to become more specialized, but we no longer need to *think* about them as being in any way fundamentally divided (though we may ask how divisions are made to appear and sustained) because as various new disciplines and historiographies show, art and science are realms whose interactions and integration have been constantly, and fascinatingly, in flux.

¹¹ www.panamarenko.org; www.bbc.co.uk/radio4/science/relativelyeinstein.shtml; www.susanhillier.org/