Introduction to Special Section

The Science of Art: Visuality at a Disciplinary Crossroads

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A Brief Outline

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The special section, presented here, was made possible and inspired by several institutions and individuals. Most immediately, the articles included in this volume are based on the talks given at the one-day international seminar on 20 May 2019 at IMERA, the institute for advanced studies at the University of Aix-Marseille. IMERA provided not only the beautiful surroundings, but also served as a model of an institution, dedicated to radical interdisciplinary research. We all owe gratitude to the Director Raouf Boucekkine, Pascale Hurtado and the rest of the people at the institute.

IMERA, on the other hand, has an interesting personal connection to the Leonardo journal, since Roger Malina, the editor-in-chief of the journal, was a former director of the institute in Marseille. It, thus, felt very natural in more ways than one to offer the papers for publication to Leonardo, a journal that is in the forefront of making research at the crossroads of art and science available to the public.

As the title of the seminar reflects, the topic for the seminar in terms of general approach, if not actual themes, was inspired by Martin Kemp’s seminar book, The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat (Yale University Press, 1990). It, therefore, made sense to ask Kemp, a scholar who has become world-famous for his interdisciplinary work in art and science, to introduce our issue. The overall aim of the collection is to explore ways in which scientific theories from the fields of mathematics, neuroscience, psychology, etc. have informed – and could potentially inform – art history and practice. The papers that follow are by scholars coming from a wide variety of disciplines, who have been brought together by their shared interest in questions of visuality.

The first article, by the mathematician Michele Emmer, looks at the topic of soap bubbles in art and science. It offers some reflections on an exhibition on this theme, which was organized in 2019 and was directly inspired by one of Emmer’s recent books. Emmer was a curator of the exhibition. The second piece by two behavioural scientists, Nick Chater and Ivo Vlaev, addresses the question: “why does looking at a painting take so long?” through the prism of neuroscience and the psychology of vision. In their collaborative article, neuroscientists Dezso Nemeth, Karolina Janacek, and Kate Schipper study the complex phenomenon of artistic creativity by drawing on their expertise in neuroscience and cognitive psychology. The last two papers are by art historians and both look at Russian material from the early twentieth century. Isabel Wünsche discusses the influence of the discovery of liquid crystals by German physicist Otto Lehmann on the work of the avant-garde artist Mikhail Matyushin. Clemena Antonova’s paper draws...
attention to the notion of “reverse time” in dreams and in art, developed by Russian polymath Pavel Florensky under the inspiration of developments in psychology, dream theory and physics.

Lots of Questions. As Yet, Few Answers
Martin Kemp

The convention in an introduction to a set of essays of this kind is to present an overview of the contributions and to try to draw out some unifying theme or themes. My impression, reading this ingenious, informative and wide-ranging collection is how much more there is to do. This is not a criticism but an acknowledgement that we are (or should be) at the beginning of a potential revolution in how we bring together the visual arts, above all their history in eras very different from our own, and the present frontiers of science. Therein lies a dilemma of commensurability.

The big problem of method is that each artist, each work of art works with particulars, which individualise and differentiate within the norms. Historians play to subtle and less subtle divergences. Scientists and science take the ragged variations in art and nature and search for what is common in a causal net. I am not only speaking here of what goes into the work of art or scientific paper but also as importantly the multifarious acts of reading art in a whole variety of contexts by viewers from different cultures and eras. Multiple, alternative readings is not the goal of a scientific paper, although that might happen in an unwanted manner.

If a work of art exploits the shapes of abutting “bubbles” in a Voronoi foam (the cellular structure proposed by the Russian mathematician, which has been suggested as a model for the organisation of galaxies), the artist is not proposing a theory, even though they may have one. Rather the maker of the work is inviting the spectator to enter a field of interpretation in which cellular and cosmic and other structural echoes might arise – not necessarily limited to sight. Such imaginative reverie is not under the artist’s control. If we see the bubble-art in the context of an exhibition in a science museum, the spectator is implicitly invited to something more “scientific” with it than if it is shown in a contemporary art fair. If I see it in company with an artist or scientist my acts of looking are most unlikely to be the same. Where science has something of this freedom is at the very early intuitive stage in which something is first noticed before stages of analysis and the search for explanation. The aim of science is to eliminate the “mess” that surrounds the early notices of a new phenomenon. Exploiting the “mess” may be the key to the work of art.

The viewing of Brueghel’s Fall of Icarus raises the problems of viewing in a very sharp way. It is a painting that requires quite a lot of attention and untangling since the central element in the story - the fall of Icarus into the uncaring sea – is certainly not the primary focus of the composition. In fact it is barely a focus at all and requires much more than the 30 seconds or so that the average viewer today expends looking at a picture in an art gallery [1]. But this is to assume that a modern viewer is looking in the same way as one of the intended spectators for the painting. Some artists in Northern Europe in the sixteenth century were beginning to play with the setting of the primary subject of a narrative in obscure places in a picture. This requires a sophisticated patron, who enjoys such picture-puzzles and a set of friends who are much better versed in Ovid’s Metamorphoses than most of today’s spectators are. When we learn that technical examination suggests that this is a copy of a lost original, not painted by Brueghel
himself, a whole set of other considerations kick into our act of viewing [2]. Such particularities are the very devil for the scientist.

As a historian I have been hoping that someone in neuroscience would systematically investigate “specialist” viewers rather than the kind of “general viewers” favoured by experimentalists. I am not just thinking of how art professionals look in a different way from a non-professional. That general principle is well demonstrated already. I am thinking of how an expert in Russian art would look at a sixteenth-century icon of the Virgin and Child differently from a worshipper on their knees in a Moscow basilica. A conservator would probably notice the crack patterns, areas of lifting paint and re-touchings. As a Renaissance specialist I see the icon as what I think an icon should look like. Once the icon is put in an art gallery, it becomes a different kind of thing. It becomes a “work of art,” occupying a designated position in the chronological march of style and subject matter. We know how much Matyushin and Florensky were seeing Russian art, in a nationalist manner, as occupying a special and very avant-garde position that activated a particular kind of Russian metaphysics. Had their experience of devotional images in Russia affected their acts of looking, and the acts of people with comparable experience? It is virtually certain that Malevich’s Black Square was intended to be understood as a modern icon.

What this situation suggests to me is that we need genuinely collaborative programmes of investigation in which art historians and scientists identify mutually tractable problems that are actually of *significance* in both art and science. The present essays suggest some valuable signposts. But we have a long way to go down the various roads.

**References and Notes:**

1. [https://www.artsy.net/article/artsy-editorial-long-people-spend-art-museums](https://www.artsy.net/article/artsy-editorial-long-people-spend-art-museums)