

RESEARCH ESSAY

Art, Science and Experiment

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Some novel concepts have invaded the arts: ideas of art as experiment, and associated understandings of art as research or research-creation conducted under laboratory conditions, and, beyond that, an idea of a hybrid art-science. It is as if art and science, two fields long regarded as distinct, and even polar opposites, are fusing into one. It is hard not to see politics at work in this. In the pursuit of academic standing, art allies itself with the field with the most prestige and funding, science. Conversely, the sciences, always in danger of social disconnection, try to plug themselves into the everyday world through art. I am not concerned here with politics, but I want to explore some of the ways in which art, science and experiment actually engage with one another.

We can start by recognizing that ‘experiment’ has at least two meanings. In science, it often has the narrow and precise sense of determining some well defined parameter. I am not exactly sure what the acceleration due to gravity in Exeter is, so I set up the appropriate apparatus, do an experiment and measure it. Scientific experimentation is also often associated with hypothesis-testing. Theory X predicts the value of some parameter to be x, theory Y predicts y. We do an experiment, the value turns out to be y; theory X is falsified, theory Y confirmed. But at the other extreme from these examples, one can find another, much more open-ended and exploratory sense of ‘experiment’: experimentation as brute finding out. Try and see; what happens if . . . ? In the history of physics, one could think about attempts to cool matter down closer and closer to absolute zero. It just turned out that some substances lose all electrical resistance and become superconducting when very cold. I cannot think of any artwork that conform to the narrow hypothesis-testing sense of experiment. But much contemporary art belongs to the finding-out mode, and that is what I want to focus on here.

The phrase ‘new media’ comes to mind. New-media art began and to some extent continues to be experimental in the sense of plunging into the unknown and finding out what can be achieved using, say, digital media instead of paints and brushes. Circuit-bending would be a striking example of this impulse, randomly reconfiguring electronic circuits to find out what sorts of sounds they can generate.¹ And this is one way in which art and science/engineering are productively engaged. The artist Simon Penny (2008) has written about a historical genealogy of artist-inventors, in which artists have been central to important technological developments. This aspect of art as research-creation goes back at least to Leonardo da Vinci, but became more systematic with, say, the development of computer-art from the 1960s onwards (Reichardt 1971a, b). Though the connection to engineering is more evident here, science can also be important. Advanced microbiological techniques are crucial to bio-art, for example.² The works of Evelina Domnitch and Dmitry Gelfand take off from esoteric physical effects like the implosion of bubbles induced by high-frequency sound (<http://www.portablepalace.com>). In works like these, science and engineering figure as a substrate for artworks that may (or may not) spark more developments in the former. This is the sense of art as a productive detour away from and possibly back to techno-science; techno-science as a surface of emergence and return, in Foucault’s (1972) sense, for art.³

But relations between art and science are often more interesting and oblique than simple mutual support. In their studies of science/art interdisciplinarity, Georgina Born, Andrew Barry and Gisa Weszkalnys (2008) documented important frictions around methods and goals between artists and engineers collaborating in

¹ www.youtube.com/watch?v=KHD9iGxDPM

² Symbiotica’s website describes it as ‘an artistic laboratory dedicated to the research, learning, critique and hands-on engagement with the life sciences’ (www.symbiotica.uwa.edu.au), and see Salter (2015, section II).

³ For exemplifications of these concepts in the history of 19th-century science and engineering, see Pickering (2005).

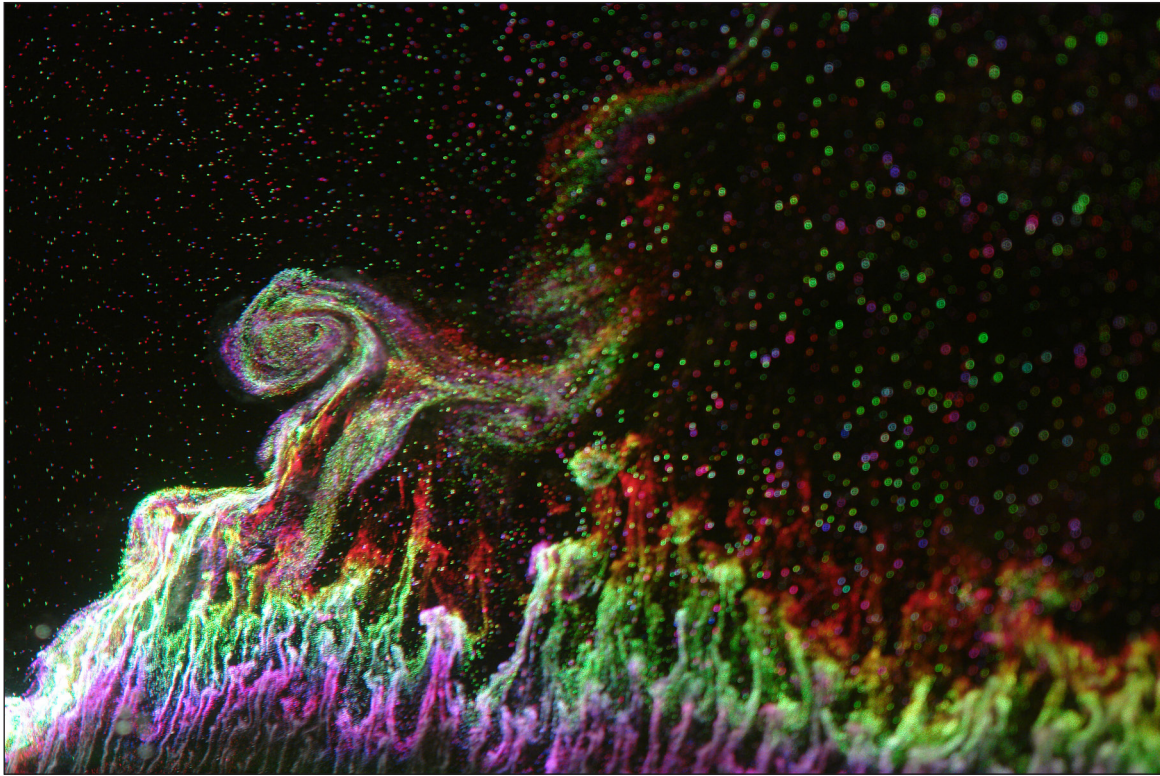


Figure 1: *Hydrogeny*, Evelina Domnitch and Dmitry Gelfand, Amsterdam 2000. Credit: Evelina Domnitch and Dmitry Gelfand.

the laboratory (see also Barry and Born 2013). In a more roundabout intersection between art and science, Simon Penny's works include mobile and interactive robots (simonpenny.net). These draw directly on established mechanical and digital techniques, but at the same time have led him to argue against familiar representationalist paradigms in cognitive science, computer science and artificial intelligence and in favor of embodied, inactive and performative accounts of cognition—which in a further twist resonate with accounts of research practice emerging in science and technology studies (Penny 2011, Pickering 1995). Through a sort of interdisciplinary alchemy, engineering and computing turn into brain science and philosophy in Penny's practice. Tabatha Andrews' work, *Oracle 2000* (tabathaandrews.co.uk/oracle#1) consists of paper strips of shredded text tossed around on a vibrating loudspeaker. Again, established technology features as a substrate for this work, but, to me at least, it seems to signal a more determined rejection of representationism—and even of science itself—than Penny's, harking back to Zen's insistence that words simply get in the way of apprehending our being in the world.

We can return to 'experiment' as 'finding out.' Clearly art and science are often in the same business here, but there is also a characteristic difference which is worth contemplating, a difference which once more centers on questions of knowledge and representation. The guiding principle of science, its telos, is not simply to find out about the world, but to produce representations of it in text, graphics, formulae, theories. We could say that scientific finding-out is always oriented to and punctuated by words (Pickering 1995), and that the words and texts are the important thing—they are the 'immutable mobiles' that circulate in scientific journals and popular accounts (Latour 1987). And this punctuation can be more or less absent in contemporary artworks. It is interesting, for example, to think here of artworks that function as 'technologies of the self' (Foucault 1988) and act directly on the inner state of the viewer/participant. Tabatha Andrews was surprised (personal communication) to discover that many people cried after passing through her installation *Among Remote Lost Objects* (tabathaandrews.co.uk/arlo), presumably a function of recalled memories. But that discovery was not the principal product of the work, something to be written down and published, leaving the work itself behind. It was not, as in science, a fact to be set alongside other facts in the frame of some overall theory. It was, at most, a stepping-stone along the way to later works.

Likewise, the artist Chris Salter interviews participants immediately after they have experienced his immersive environments. After experiencing *Ilinx* in 2015 (chrissalter.com/projects/ilinx), I said I was reminded of his ambition to emulate the effects of the psychedelic drug ayahuasca. My companion, on the other hand,



Figure 2: Oracle, Tabatha Andrews, 'Slade Engine' show, London 2000. Credit: Tabatha Andrews.

said that her experience of *Ilinx* reminded her of meditation. But again, Salter's goal is not to assemble all the interviews as part of a coherent theory of inner states. That is not the point of the exercise. Again, the reports are simply grist to the mill of creating the next artwork and the next field of experiences. In this respect, then, the difference between science and art is that science necessarily valorizes a detour through words and representational knowledge while art does not.

There is a further sense of 'experiment' to be explored. The western canon is a list of finished artefacts: great paintings, sculptures, musical compositions. But John Cage's work was a landmark of another sort of art: the production of lively dynamic systems whose evolution in time in fact constitutes the work. And especially important here are works whose future behavior is not determined in detail by the artist (or anyone else). The 'experiment' in this class of works is to find out how the work itself will perform in time. And, on the other side of the coin, the experiment lies in relinquishing, in part at least, the authorial control that is the mark of western mastery. In a very insightful essay, Brian Eno (1996) once talked about 'sailing the tides of the algorithms' in a species of human-computer co-creation of music and visuals. Since the late 1960s, Chris Welsby has been producing films and videos in which the images are controlled not by himself as the artist-director but by the weather, the light, the motion of the planet. (http://www.luxonline.org.uk/artists/chris_welsby).⁴

Cage, Eno, Welsby—their artworks all depend on technological set-ups, mechanisms, computer algorithms as their necessary substrate. Yet the works themselves point to another direction, away from mainstream science and engineering, and towards a different ontology, a different overall vision of what the world is like. In the west, we inherit from the scientific revolution and the enlightenment a vision of the world as fixed and knowable by the scientist, and controllable by the engineer or the artist. These latter works, however,

⁴ The other side of the surrender of authorial control is a foregrounding of the agency (in a performative sense) of nature and machines. Alvin Lucier pioneered brainwave music in the 1960s, exploiting the brain as the source of electrical signals, rather than the locus of conscious thought (Lucier 1995). Lucier's *Music for Solo Performer* was also a technology of the self, a biofeedback device helping the former to find and maintain a meditative inner state. See also, for example, Ursula Damm's *Greenhouse Converter* (2010) which stages complex and emergent interplays of organic and physical agencies (ursuladamm.de/treibhauskonverter-venus-v/).



Figure 3: *Ilinx*, Chris Salter+TeZ+Valerie Lamontagne, HAU3, Berlin, Germany 2015. Credit: Anke Burger.

stage a sort of ontological theatre in which the artist himself has no definitive knowledge of how the work will behave and instead sets in motion processes of unpredictable emergence. The implicit invitation is to adopt a non- or post-scientific worldview which sees humanity not in a position of cognitive control but rather as simply caught up in the weather of unpredictable becoming (again we can make a connection back to science and technology studies here—Pickering 1995—and also to Zen and the Tao). And the experiential environments just mentioned (Andrews, Salter) fill out this picture, showing, from the other side, how our inner states are themselves caught up and transformed in material, technological assemblages.

One can, then, construct a canon in contemporary art that draws on science and technology as its substrate but, in its products, radically subverts the ontological premises of modern science and engineering (Pickering 2013). What can we make of this? We have reached another twist and turn in the relations between art and science. As ontological theatre, artworks that foreground unpredictable emergence and altered inner states fit exceedingly badly into the paradigm of modern science. But there is another paradigm—‘a new kind of science’ (Wolfram 2002)—that comes under headings like chaos, complexity and cybernetics (Pickering 2010) and that shares much the same ontology of becoming as artworks. So, if the designation art-science sometimes seems to be striving to reconcile the irreconcilable, one can glimpse here an alternative art-science formation in which the arts and sciences of unknowability genuinely hang together. One can even complete the loop through the different senses of ‘experiment’ with which we began. In 1958, Gordon Pask, a cybernetician and one of the patron saints of dynamic, interactive and emergent art, contrasted the scientific mode of experiment as hypothesis-testing with another mode: dense, open-ended performative interaction as the only way to get to grips with the unknown. He called the latter the ‘cybernetic method’; I want to associate it here with experimentalism in art.⁵

In conclusion, we can turn to art and politics, or art as politics. Much contemporary art is overtly political, of course—usually a left-oriented critique of injustice, inequality, corporate capital, environmental destruction, surveillance. Valuable as this critique is, there is little experimental about it. We already know the script and what needs to be done. But one can also think of politics as practice, ways of acting in the world. In *The Cybernetic Brain* (2010) I explored all sorts of cybernetic projects and artefacts that somehow acted out an understanding of the world as unknowable and emergent, and I contrasted them favorably with our

⁵ On Pask’s contributions to the arts and architecture, see Pickering (2010, ch. 7).

usual attempts at mastery. Included amongst those projects were artistic ones (I focussed especially on the work of Gordon Pask). And all the 'experimental' artworks mentioned above can be understood as part of a big inter- or anti-disciplinary paradigm which is political precisely in the sense of elaborating new modes of both understanding the world and, more importantly, acting in it.

In this sense, this sort of experimental art lies in a mutually reinforcing relation alongside non-modern approaches to psychiatry, management, robotics, complexity science, spirituality, the environment. But we could also think of a special place for art within this paradigm. Brian Eno (1996, 8) once wrote,

Evolving metaphors . . . is what artists do. They produce work that gives you the chance to experience in a safe environment, because nothing really happens to you when you are looking at artwork, they give you the chance to experience what might be quite dangerous and radical new ideas. They give you a chance to step out of real life into simulator life.

In the present context, it would be better to speak of models and performance rather than metaphors, looking and explanation. The artworks we have been discussing are in their various ways models of a world that we can engage with but never fully understand or control. They are not so much simulations as microcosms of the real thing. As ontological theatre, they help viewers and participants come to terms with the world as it is, a place where experimental finding out, rather than domination, should come naturally. If we could all get to grips with that idea, we would act very differently, I think (Pickering 2009, 2010). That would be a significant political pay-off of the experimental turn in art.

Competing Interests

The author declares that they have no competing interests.

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