

Narrative as science, science as narrative

An extract from MPhil thesis, exploring the place of narrative as a tool for tracking emergent processes

Jean Boulton, 2011.

Introduction

This is the story of how I came to consider whether complexity theory is indeed a science and conclude it is a form of post-modern science.

I want to show how this exploration evolved over a period of time, what contributed to it, how my ideas emerged. I want to do it in this way for a number of reasons. First I want to ask if a narrative approach can be deemed scientific. As I discuss below, Darwin wrote ‘The Origin’ as a narrative, as an account of what he did, what he thought, how that affected his choices of experiments and development of hypotheses. He included his uncertainties and the blind alleys he followed. His approach indeed mirrors the nature of evolution itself, in that there is a particularity, a path-dependent history, to what evolves, what emerges. If we look at an averaged-out, tidied-up version of evolutionary history, we are likely to miss the very details and factors that led to the outcomes that emerged.

So, if I follow a narrative approach, do I learn something different by following closely what I did, what I thought, how I shifted ideas? If I tell my own exploration of the connection between science and story *as* a story, do I learn something about how my own theorising about science is emerging? The alternative would be to tell it as a post-rationalised, tidied-up account where I might seek (perhaps) to present certain conclusions and show how the data and analysis support them; a method which mirrors the dominant paradigm of certainty and causality.

The story of developing the idea of complexity as a post-modern science

This story of my exploration of complexity as a post-modern science was written in 2010 and is presented as a piece of evidence, a real-life story on which I subsequently comment. I present it as it was written; otherwise I run the risk of tidying it up, making it less authentic and hence less of a test of the narrative method. Yet it is still, of course, not actual ‘raw data’; it was written retrospectively. So it already has been sanitised, inadvertently tidied up just through the passage of time, even if I did not intend this.

Although I am presenting this story as an ‘exhibit’ in some sense – of how I theorise, of the efficacy of narrative to explore complex and contingent problems – I would like the reader to read this for content as well as process, as it contains some important arguments. I will draw attention to key aspects of the story as they strike me as I re-read it, through the use of text boxes.

Science as Narrative, Narrative as Science

Margaret and learning histories

I begin this particular story with reading Margaret’s PhD thesis. Margaret was looking at the use of learning histories as a way to engage with creating change, sharing learning and shifting attitudes towards the use of low carbon technology. A learning history is an account of what happened as particular people and organisations tried to introduce new

technology and influence others; and it is an account told from many perspectives, through many eyes. It does not seek to find the dominant story but presents sometimes contradictory views, albeit framed and reflected on by the researcher and by others involved. So it presents a messy, complex, emerging story. Margaret wrote her PhD following the same form; did not try to close down the sometimes conflicting strands, left open what was open, told what happened and showed, sometimes, how her own thinking evolved through the process. What was the point of this? The point was that it allows the reader to join in the learning and meaning-making. Rather than be told what to conclude and learn by the writer, the reader is invited to engage in the process and uncover her own thoughts or learnings and engage strongly with certain parts of the story as she sees fit. That may create new insights or connections for the reader in her world in a way that is not directed or limited by the writer.

As I grappled with the reading of Margaret's PhD, I found that I 'got' the point of the narrative, learning history approach more deeply than I had before – and I felt it was because the form of the writing as a learning history itself allowed me to find my own way to relate to the ideas it embodied. It touched me emotionally as well as cognitively and this felt important and exciting. I seemed to have internalised a new understanding. I experienced the medium as the message; the narrative approach changed me as I engaged with it.

Reading Toulmin

With these ideas of narrative and learning histories in my mind, I happened to be reading Toulmin's (2001) 'Return to Reason', sitting on a train. Toulmin's book explores the limitations to science, to Newton's science and explores our fascination with reason. When I got home I wrote:

'This perfect, logical, unemotional, universal, abstract, certain science describing the perfect, unchanging, stable world has more to do with religion than with facts'. I went on to write:

'What we need is a new science story, a post-modern science, a new definition of what science is all about. That will help us counter the tradition Newton unwittingly started. And that is what interests me.'

So the idea of linking post-modernism to science came into my head at that time.

Darwin and a visit to a friend

The next part of this story centres on a visit to a social-scientist friend. I was in the throes of editing a journal on Darwin and evolution and she produced a book from her shelves by Gillian Beer (1983), 'Darwin's Plots'. Professor Beer is a literary scholar at Cambridge and her interest was in how Darwin's 'Origin of Species' influenced late nineteenth-century authors such as George Eliot and Thomas Hardy. What interested *me* though, and



This is an example of a coming together of influences. This is the sort of synergistic process that it would be easy, in a more traditional discussion about science, to ignore.



This statement about a post-modern science was a really important leap for me and started the inquiry into the nature of science which forms the basis of this chapter



leapt off the page, was her descriptions of the way he *wrote* the Origin. I copied down some of Beer's thoughts into my notebook.

(1983:49) Darwin's language does not close itself off authoritatively nor describe its own circumference...He sought to move out beyond the false security of authority or even of the assumption that full knowledge may be reached. The nature of the argument led into expansion, transformation and redundancy of information. The Darwinian world is always capable of further description and such description generates fresh narrative and fresh metaphors which may supplant the initiating account....

(1983:6) Evolutionary theory is first a form of imaginative history. It cannot be experimentally demonstrated sufficiently in any present moment. So it is closer to narrative than to drama...

(1983:6) Evolutionary ideas shifted in very diverse ways the patterns through which we apprehend experience and hence the patterns through which we condense experience in the telling of it...

(1983:65) Darwin's work...is the description of a process of becoming and such a process does not move constantly in one direction.

I felt very excited. So Gillian Beer is saying that Darwin wrote the Origin as a narrative rather than as a scientific treatise of certainty and clarity; he included his uncertainty, he told the story of his experiments and reflections which triggered further experiments and reflections. AND the way he wrote the Origin reflects his theory of evolution – that messiness and variation sometimes trigger new patterns in the local ecology and sometimes these new patterns may be better adapted than old patterns or other competing patterns and so sustain; other times they will be less well adapted and fade away. The process of evolution is thus understood as *essentially* local and messy and quirky and uncertain. *Harré in 'The Philosophies of Science' points out (1972:176) that Darwin focuses on 'minute differences', not a usual thing to do for scientists, who tend to look for what is common and repeatable.*

I am interested that *Harré* focused on this issue of minute differences, contingency. It shows his quest for the nature of science and his questioning of the mainstream.

'Indeed', I thought, 'evolutionary theory itself is post-modern in the sense that it shows that every situation is different, suggests outcomes are path-dependent, historically and contextually specific, and synergistic'.

So this book brought together for me the threads of my developing questions about science, my exploration of complexity theory and my recently-awoken interest in narrative. I returned home with science, narrative, evolution and post-modernism all connecting in my head.

Lyotard and post-modern science

I wondered where to go next with this. I was not entirely clear what I meant by the phrase post-modern science. I remembered I had a copy of the classic book on post-modernism

by Lyotard (1979) 'The Postmodern Condition'. As I flicked through it I was somehow surprised to find a whole section on post-modern science. And I thought I had invented the phrase! Lyotard discusses the certainty which we accord to science and mathematics; he discusses the way that science is based on axioms that sit outside the theory and are often questioned by later science. He mentions Gödel's theory of incompleteness: that no science or mathematics can be complete; that there will always be things that are 'true' that cannot be proven from within the system of thought or of mathematics. So he brings into question the notion of absolute truth or the possibility of a universal theory of everything and emphasises the need for a plurality of perspectives. He argues that perfect knowledge and hence certainty are not achievable – in part because the effort required to know the initial conditions exactly requires an impossible amount of work and energy and secondly, as quantum physics suggests, because total knowledge does not exist. He says (1979:60):

'The conclusion we can draw... is that the continuous differentiable function [ie as exemplified by equations in calculus] is losing its pre-eminence as a paradigm of knowledge and prediction. Post-modern science – by concerning itself with such things as undecidables, the limits of precise control, conflicts characterised by incomplete information... – is theorising its own evolution as discontinuous, catastrophic... It is changing the meaning of the word knowledge while expressing how such a change can take place. It is producing not the known but the unknown'

This is an extremely important quote, defining post-modern science and implying that to assume certainty and completeness when there is none cannot be deemed scientific.

Lyotard (1979:60) goes on to quote Medawar, (a Brazilian anatomist who considered the nature of science and wrote, amongst other things, 'Advice to a Young Scientist') as saying that, *'having ideas is the scientist's highest accomplishment.... a scientist is before anything else a person who 'tells stories'. The only difference is that he is duty bound to [try to] verify them.'*

Particularity

Lyotard's focus is to question the universality of any scientific theory and emphasise the need both for pluralism and for questioning and bringing to light the axioms, the pre-suppositions on which any theory is built. So he warns us not to reify science, to recognise its limitations and not try to adopt any particular scientific theory or method as a theory of everything, as meta-narrative.

Taking this a step further; we can look at evolution and complexity theory as a new *sort* of science, where every situation is different and where it is the particular detail of choices and chances *in combination with* pre-existing relationships and laws and circumstances, which creates the next step. Where, if we generalise or average or smooth what is there

This is a central point to my argument made here – that if we ignore contingency and particularity our understanding can be qualitatively incorrect. It is arguing that, for complex problems, it would be unscientific to adopt traditional scientific methods

or assume that the most likely path will be followed, we may throw out the very detail that is crucial to an understanding of what emerges. So, by ignoring the particularity of a situation, we run the risk not just of creating quantitative errors, but *qualitative* errors – i.e. we may miss the very moments and combinations of factors that are central to what actually is happening, is central to the future that is emerging. So I am suggesting that complexity science *is* post-modern science, and *is* narrative.

What do I mean when I say this? I mean that you have to follow each step in order to try to know what happens. Evolution is like journaling. After the event, we often create a story of what happened to us and what caused what. But when I go back to my diaries, I find that I have left out quite key events or feelings, that the events and outcomes were much more multi-faceted than I remember. And if I read *your* journal covering the same events I'd find there were even more factors contributing to the outcomes than I wrote at the time.

A recent conference on narrative and what happened there

When I talked about all this – the idea of science as narrative – at a recent gathering of ‘narrative’ people, I felt I had gone to the opposite extreme from your average scientist and brought into question the validity of science at all. Margaret asked a good question about mathematics; was I throwing that out too? I felt depressed. Am I trying to tell a tidied-up, coherent story about all of this; am I being too definite that to see science as narrative is all that we need? Am I indeed running the risk of telling as *definite* a story as the science story I am bringing into question?

The next step in the process came by accident. I picked a book off the shelf in the library at the place where we were meeting. A rather odd book called ‘The Orphic Voice’ by Elizabeth Sewell (1960). Much to my astonishment, I found the title to a sub-section, ‘Poetry agrees with science and not with logic’, and read:

‘in science the friction occurs along the boundary where the exact sciences border up those which are not ‘exact’... if you cannot think in mathematics you have to think in words... this is partly because time and change are of the essence of living organisms whereas mathematics is essentially a timeless discipline.

So this abstruse passage speaks to the fact that mathematics cannot cope with the messy evolutionary process of living things. It speaks to the question Margaret had just posed about mathematics. No I am not throwing out mathematics but I am recognising it is not good for everything. As Lyotard (1983:60) said ‘*the continuous differentiable function is losing its pre-eminence as a paradigm of knowledge and prediction*’.

The maths used by complexity theorists is more complex than simple differential equations; use of the so-called Master Equation¹, for example, seeks to work with ensembles of possible pathways, not just the most likely path the system could take. But even these approaches, or approaches which allow for even more variation, still pin us

This is an important paragraph. It is a good explanation of the limitations of mathematics, no matter how complex is the mathematics, to capture the necessary information.

¹ Used by Prigogine and Allen and others (see Allen and Boulton 2011).

to a degree of certainty in defining relationships and deciding what to include and what to ignore. As Lyotard (1979) also said, if we were to work with all the variation in say the behaviour of a city, it would take all the people in the city all their time to try and model it. Mathematics inevitably leaves out some detail and we cannot predict in advance what of the messy variation and detail will prove in hindsight to have been of critical importance.

The car journey home – and Margaret again

The next step on which I focus in this story took place in driving back from the meeting. Margaret and I were musing on the complexity of it all, of this idea of science as narrative. We discussed that I had down-played, in my talk, the fact that some science stories are pretty ‘true’ in their context and **do** describe some universally-held laws such as electromagnetism or gravity – which might be approximations in the full scheme of things, but provide enough certainty to design and run complex electricity systems and build aircraft and so on.

On the narrative side of the picture, Margaret raised the shadow of narrative approaches: the dangers of ‘merely’ presenting learning histories to people rather than drawing conclusions for the reader, presenting stories as examples to elucidate certain points. What she was saying was that readers may take out of learning histories something that was not really there, something that was not intended. Indeed she reminded me that so-called social Darwinism and eugenics, adopted by the Nazis, used Darwin’s work to justify social engineering and genocide. So, giving people the opportunity to engage with messy and pluralist stories *does* allow the possibility that the stories can be used manipulatively and ruthlessly. She also pointed out that those who want to influence can always find and promote stories that support what they want to happen or how they want people to feel about it. So there are issues of power and subjectivity in all this, as well as anything to do with truth.

It was good to reflect on the other side of the coin, not to get too fixed about seeing narrative and evolutionary and complexity approaches to science as being ‘the solution’. It is good to remember that every theory, by necessarily making simplifications and abstractions, is still not the same as practice.



This is an example of where a narrative approach captures something important that it would be easy to omit; Margaret has many times raised counter-arguments, ambiguity, conflicts. It limits the tidying up and concretising of any conclusions.



Reflections

I feel Darwin made a great leap forwards in getting us to see that, at least in biological and human systems, the context and particularity of events cannot be ignored if we are to understand what happens. It tells us that knowledge has limits, that generalising is dangerous and can lead us to throw out the very information that is vital to understand what is happening. Viewing complexity and evolutionary science as post-modern is a part of the legitimating of narrative as a way of exploring. It is a way of holding pluralism (in that narrative does not need only one discourse or perspective). And it reminds us that science itself is only a story, albeit a very useful and appropriate one in some contexts – but not when we elevate it to a meta-narrative, a worldview, as did the French

Enlightenment to Newton's mechanical laws. I am reminded that all this matters, because how we choose to make sense of the world, how we reside in a meta-narrative of which we may only be partly aware, is a political act with profound consequences.

So I am excited by this idea of post-modern science. I have gained confidence in this position. Science is not science if it is not appropriate to the problem; and if contingent, particular, path-dependent events are fundamental to what emerges, we cannot explore such situations in average, generalised ways. So for those situations, giving detailed accounts, telling detailed stories, investigating particular situations in great detail rather than reviewing many situations statistically, is the appropriate scientific method. I would argue that taking a narrative approach can be viewed as a scientific method, if we define a method as scientific if it allows us to explore and engage appropriately with the important features of a problem that lead to understanding.

And to say some science is post-modern from an ontological perspective also reminds us, as Lyotard (1979) says, that some things in the world are 'un-decidable' and 'conflicting'; that information is always incomplete, and also that some things are both unknown and unknowable. So a post-modern approach to science can reflect this complex nature of the world and not try to pretend it is otherwise in the name of science.