

Dark Matters: Historicising Science and Poetry since 1950

Peter Middleton

As I was writing this essay, ENCODE project members simultaneously published six papers in *Nature* about a major project that "provides information on the human genome far beyond that contained within the DNA sequence," notably on "the functional genomic elements that orchestrate the development and function of a human" (Ecker et al 52). Publication of so many papers at once is a sign of the exceptional importance attached to the work. The research findings have, however, not been met with unalloyed joy. *New Scientist* sums up the concerns: "It seems, though, that the more we learn about the genome, the less we know" (Geddes 43). A medical researcher, Alasdair Mackenzie, echoing what is becoming a commonplace amongst researchers in this field, asks, "how much of this mysterious genomic 'dark matter' exists within our cells?" (Mackenzie 7). A *Guardian* report based on Mackenzie's talk and the stir caused by ENCODE is bluntly titled "Dark Matter of the Genome," making even more explicit the suspicion that biology has succumbed to the same dark forces as physics, which currently struggles to understand two vast areas of darkness, dark matter and dark energy. Instead of scientific advances bringing greater certainty to our knowledge of the world, they appear to be diminishing it.

This story points to one of the many surprises that I have encountered during research for a book about American poetry and science in the Cold War, and an encyclopaedia article on science and poetry ("Science and Poetry"). Literary theory repeatedly defined itself in relation to the sciences, either building hostile barriers, or swooning into an uncritical embrace of the latest scientific ideas. Poets were much more informed about scientific developments than I had realised, and more influenced by them. The sciences have been far more diverse, complex, and above all pervasive, than I thought; whatever you do or think or feel, a scientist may be looking over your shoulder. What counted as science included disciplines that I had not thought were considered sciences. Authoritative science journals published articles on archaeology, urban studies, nuclear deterrence, and until the end of the 1960s on 'the negro,' articles on race science that with hindsight look strongly racist. I have also found reputable scientific papers still advocating eugenics in the 1960s. And instead of scientific knowledge progressively increasing certainty, its growth has also increased the scientific unknown.

I didn't set out to study such a wide field of interrelations between science and poetry. I began with the conviction that epistemic values played a much larger part in the poetry of the avant-garde than has been recognised by literary studies because I was trying to explain a sudden change in American poetry that took place about half way through my chosen period of 1948-1989. I conjectured that the change in poetic style was partly due to the shift from one publicly dominant model of science to another, as high-energy physics gave way in public esteem to molecular biology, a shift from energy to information.

Pursuing this research therefore led me to revise a number of my assumptions about science and literature, and these I shall explore in the remainder of this article. The first assumption was that despite the disputes within literary theory and the philosophy of science it must still be possible to synthesise a broad methodology for the study of science and poetry using key ideas from both domains. But as I

proceeded I realised that because the intellectual tools we use tend to be the products of this same era, an intense reflexivity is at work. Thomas Kuhn's theory of paradigm shifts was taken up not only by science studies but also by many literary theorists, as John Guillory has shown, so that our cultural theory is partly Kuhnian, and we cannot then just expect our theory toolkit to give us an objective account of the history of interactions between science, philosophy of science, and poetry (Guillory). Theorists of literature were influenced by both the sciences and the philosophies, and to a more limited extent the philosophers and even perhaps the scientists were consequently influenced by what the literary and cultural theorists proposed.

The effects of such feedback loops are especially evident in the history of literary theory since mid-century. Conflicts and affinities between science and poetry have had a profound effect on the conceptual architecture of modern literary criticism as it either tries to keep out science or to trump its authority over methodology and knowledge. New Criticism strove to separate science and poetry into two entirely disjunct cultures and in doing so formulated many key principles of literary criticism. In 1950, Douglas Bush looked back on the modernists in a founding text for the study of science and poetry, and said that "all modern poetry has been conditioned by science, even those areas that seem farthest removed from it" (151). Was this also true of the post-war poets? I asked myself. The difficulty in answering this question was partly that whereas the now debunked New Criticism strove to keep science out of poetry, the more expansionist and more confident literary theories in the structuralist mode attempted to develop their own literary science. Tilottama Rajan suggests that such developments can be described as "the extension of the human sciences paradigm, by way of structuralism, into a literary criticism also anxious for scientific and technobureaucratic legitimation" (25). Roman Jakobson, in his key essay "Linguistics and Poetics," writes that "poetics deals with problems of verbal structure," and "since linguistics is the global science of verbal structure, poetics may be regarded as an integral part of linguistics" (18). Poetics is a science, and major poets can be called scientists: Hopkins, for instance, is an "outstanding searcher in the science of poetic language" (18). Studying science and poetry since the mid-century therefore requires a self-consciousness about method that is very different to that required by earlier periods of literature.

What about the sciences themselves, how have they changed? Some aspects of science that confront the researcher into the relations between science and poetry are simply amplifications of difficulties facing researchers into any period. "Come out and talk to me" shouts the "Poet to Physicist in his Laboratory" as the title of David Ignatow's widely anthologised poem strikingly has it (*Poems 1934-1969* 188).¹ The laboratory continues to epitomise the inaccessibility of scientific knowledge, which Hilary Putnam aptly calls the "unformalisable practical knowledge" of scientific research, the craft knowledge and first-hand experience of the entities and equipment central to most scientific research (72). Some difficulties studying the late twentieth century are simply the result of the researcher's temporal proximity to the still evolving sciences. But other difficulties are result of radical changes in the sciences that are not yet well understood. Over the past sixty years the sciences increasingly employed new forms of communication (the now highly specialised rhetorical structures of scientific papers, the institutionalised peer review system, and the technical journals targeted at expert readerships), new structures for organising research, new types of modelling (usually dependent on a technical shorthand nearly impenetrable to lay persons – the labelling of DNA genes is a notable example), and new mathematics. Some of the best conceptual studies of recent sciences, like those of

Evelyn Fox Keller on molecular biology, are studies of metaphors (*The Century of the Gene; The Mirage of a Space*). Authoritative and inclusive histories of the science of this period are still understandably in relatively short supply.

At the start of this period the dream of a unified science, and the small size of the profession made it possible to talk of 'science'. By the end of this period the enormous expansion of the sciences into many new fields, new methodologies, and new types of institution, makes it impossible to use the term 'science' except as a rough shorthand. Big teams have spread out of physics into other sciences: the ENCODE articles I mentioned earlier have several hundred authors and some scientific papers have had authorships running into the thousands, and as Peter Galison argues, the 'we' inscribed in the scientific paper appears to function as the "collaboration-as-experimenter" or "the collaboration-as-author" What, he then asks, is "the constitution of the collective self" that authors these papers? (329). This new scale affects everything, from the role of the scientist to the idea of a scientific author. Several physicists have rivalled Einstein's brilliance but science no longer has a place for singular figures like Darwin, Einstein or Freud.

Another big change is the growth of secrecy. At the start of this period, many thinkers were praising science for its cosmopolitanism and its democratic openness, even as wartime necessities required the Manhattan project to close down access to knowledge of new research in particle physics. After the Second World War such secrecy became a new norm as nuclear science was made a tool of foreign policy and much of its research a closely guarded secret asset, while other scientific research increasingly became a trade secret as commercial imperatives became uppermost. When his enemies wanted to punish J. Robert Oppenheimer for his opposition to the hydrogen bomb, they took away his security clearance, effectively excluding him from participation in much of the new research in nuclear physics. Today many scientists have to sign non-disclosure contracts to protect commercial investment in universities. Secrecy plays a role in the difficulty of getting the scientists to come out of the laboratory and talk to the poets, and in some of the poets' visionary responses to science.

How did my poets learn about science and indeed how much did they know? Here too were surprises. The poets made far more effort to read authoritative sources than I anticipated. Even poets known for their love of sheer poetic imagination turned out to be reading the *Scientific American* (which for at least two decades was an authoritative record of new scientific work to be read by professional scientists), and some of my poets were subscribing to *Nature* or reading specialist journals in everything from ecology to physics. As in earlier periods, however, on the whole the poets no more got their knowledge of Heisenberg's uncertainty principle (frequently invoked by poets as an example of scientific endorsement of the ineliminability of the subject's own perspective) from reading the original scientific papers, than did their eighteenth-century counterparts learn directly from Newton. The difference is that in the late twentieth-century there have been many more channels of information about the sciences: the radio, the television, newspapers, magazines like *Life*, films, books and latterly the internet. Elizabeth Leane has shown how many misconceptions have been set loose by popularisations of physics, saying that "almost every quantum phenomenon has been leapt upon with alacrity and assigned one or more literary parallels," and all too often the metaphors that popularisers use, "like the equations employed by particle physicists, are all vehicle and no tenor" (412, 420). Documenting the varying accuracy of this onslaught of information about the sciences has barely begun.

How might this broad picture be summed up? I have come to think that the epistemological primacy of the sciences meant that their expansion into every area of human life, even those private intensities special to poets, has led to a widespread competition for epistemic authority. Models and metaphors developed in one prominent science are rapidly appropriated by others. Poets have played their part in this, and for me this is one of the most exciting areas of investigation. But I am tempted to conclude by saying that much about the interrelations between poetry and science in this period remains a dark matter, though I should add, that like the willingness to talk about the dark matter of the genome, such allusions to 'dark' uncertainty, whether literary or biological, are leveraging themselves by borrowing epistemic authority from another science. Reflexivity is everywhere in this period.

Notes

1. The poem is included in John Heath-Stubbs and Phillips Salman's *Poems of Science* (290).

Works Cited

- Bush, Douglas. *Science and English Poetry: A Historical Sketch 1590-1950*. Oxford, Oxford UP, 1950.
- "Dark Matter of the Genome." Dispatches from the Science Desk Blog. *The Guardian* 14 Sept. 2012. Web. 20 Dec. 2012.
- Ecker, Joseph R., Wendy A. Bickmore, Inès Barroso, Jonathan K. Pritchard, Yoav Gilad and Eran Segal. "Genomics: ENCODE explained." *Nature* 489 (2012): 52-55.
- Geddes, Linda. "Unfathomable." *New Scientist* 8 September 2012. 41-43.
- Guillory, John. "The Sokal Affair and the History of Criticism." *Critical Inquiry* 28:2 (2002): 470-508.
- Heath-Stubbs, John, and Phillips Salman eds. *Poems of Science*. Harmondsworth: Penguin, 1984.
- Galison, Peter. "The Collective Author." *Scientific Authorship: Credit and Intellectual Property in Science*. Ed. Mario Bagioli & Peter Galison. London: Routledge, 2003. 325-355.
- Ignatow, David. "Poet to Physicist in his Laboratory." *Poems 1934-1969*. Amherst: Wesleyan UP, 1970.
- Jakobson, Roman. *Selected Writings*. Ed. S. Rudy. Tübingen: De Gruyter, 1981.
- Evelyn Fox Keller. *The Century of the Gene*. Cambridge, Mass.: Harvard UP, 2000.
- . *The Mirage of a Space Between Nature and Nurture*. Durham, N.C.: Duke UP, 2010.
- Leane, Elizabeth. "Knowing Quanta: The Ambiguous Metaphors of Popular Physics." *Review of English Studies* 52 (2001): 411-31.
- Mackenzie, Alasdair. "Can Genomic 'Dark Matter' Make You Sick." *Programme: British Science Festival Aberdeen 2012*. 7.
- Middleton, Peter. "Science and Poetry." *Princeton Encyclopedia of Poetry and Poetics*. Ed. Roland Green et al. Princeton, N.J.: Princeton UP, 2012. 1264-1273.
- Putnam, Hilary. *Meaning and the Moral Sciences*. London: Routledge & Kegan Paul, 1978.
- Rajan, Tilottama. *Deconstruction and the Reminders of Phenomenology: Sartre, Derrida, Foucault, Baudrillard*. Stanford, Ca.: Stanford UP, 2002.