Review

Beyond Mimesis and Convention: Representation in Art and Science
Edited by Roman Frigg and Matthew C. Hunter.

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The theory of representation in art history and in the philosophy of science is at an impasse, according to Roman Frigg and Matthew C. Hunter, the editors of this volume. In both subjects, representation is theorized on the basis of either mimesis or convention, with each side opposed to the other but with no apparent way of overcoming the opposition. Representation conceived as mimesis is interpreted as one thing imitating or resembling another, whereas representation understood as convention is the stipulation and acceptance within a community of a system of signs, where none of the signs need resemble their referents in any way. In the philosophy of science, the impasse is over whether scientific models and their target domains are isomorphic, with conventionalists such as Frigg, Nelson Goodman and Mauricio Suárez asserting that similarity is neither necessary nor sufficient for representation. The impasse takes a different shape in art history. Developments in non-representational modern art, and the influence of structuralism, semiotics and political theory on art history have resulted in the subject’s preoccupation with representation as mimesis (up to the mid-twentieth century) being overtaken by questions of how representation is constructed by language, signification, instrumentalism, convention, and socio-economic conditions. Furthermore, historical studies of the ‘mimetic ambition’ in pre-twentieth century
image-production find that concepts of resemblance are challenged by theories which make other practices, such as data-gathering or institutional requirements, central.

The aim of the book is to see what might be achieved by bringing the two impasse-stricken subjects together. Some ways forward, the editors suggest, are already beginning to emerge as a result of the philosophy of science making forays into literary aesthetics to explore the parallels between scientific modeling and storytelling, in papers by, among others, Nancy Cartwright, Stephen Hartmann, and Donald McCloskey. It could be asked, if both art history and the philosophy of science are suffering from the same impasse (or similar ones), the idea of one impasse-stricken subject looking to another might not sound the most promising strategy. But the interest shown by the philosophy of science in aesthetics is wider than a mere impasse-to-impasse comparison, as the eleven papers in the book demonstrate. All started life as presentations given at the Beyond Mimesis and Nominalism conference held in London, 2006, with the editors as co-organizers. Although the book is not divided into parts, it has in essence three themes: (1) six essays build upon the promise shown by the initial references to literary aesthetics to overcome the imitation–convention binary; (2) a lone study of how analogies to visual art might expand the philosophy of science’s concept of representation (from Chakravartty, although Toon’s paper also refers to depiction); and (3) representation explored in relation to a number of topics across the art–science spectrum (the final four papers), including the nature of image-making, representation as material manipulation, art and consciousness, and a critique of neuroaesthetics.

So how can literary aesthetics assist the philosophy of science’s concept of representation? From the essays presented, it would appear that an expanded, variegated understanding of how one thing can be about another is on offer, where ‘aboutness’ is considered in more than mimetic or conventionalist terms. In David Davies’s essay on fiction and thought experiments (TEs), the ambition is to show how concepts of ‘implicit knowledge’ and ‘unarticulated cognitive resources’ can establish the narrative-nature of TEs. A TE can be construed as a narrative in the sense that the reader is invited to imagine that certain ‘procedures are enacted and to conclude that certain consequences would ensue, where this is taken to bear upon a more general question
which is the topic of the TE’ (p. 51; original emphasis). As Davies indicates, the claim that TEs are narratives is not new, but it is problematic for some because there is uncertainty over how cognitive insight can be gleaned from what is essentially a fictional account. Drawing on ideas from Noel Carroll and Catherine Elgin, Davies argues that the effect of reading literature is ‘the mobilization of “implicit knowledge” of concepts’ in the mind of the reader (p. 62; ‘implicit knowledge’ is Carroll’s phrase). The world projected by a novel will always be incomplete, in virtue of the parts that are described and the parts that are not, and so will make demands upon the reader’s wider knowledge of the world to fill in the details. Even if the world of the novel is different from that of the reader, there will be ways they can think about the fictional world, identify key principles and themes at work in it, and have a sense of what is possible in it. On this account, the objectivity of literature lies in the ‘tests’ the reader carries out, examining how their ‘implicit knowledge’ helps to make sense of the text, and whether they apply beyond the text.

Isn’t reliance on the activation and application of background knowledge ultimately an appeal to advanced aesthetic sensibility? Only the expert, practised reader approaches a novel in this way, it could be argued. Furthermore, being a good judge of the aesthetic merits of a novel does not necessarily make the reader a good judge of its cognitive content. Surely, if the claim is that narratives have cognitive value, then there needs to be a check over and above the act of reading to confirm the value? Davies anticipates this anti-cognitivist objection. The objectivity present in literature, sufficient to confirm its cognitive value, he suggests, resides in the fact that the ‘implicit knowledge’ which is awakened in the reader by the novel can be trusted. Fiction, he writes,

makes manifest to us patterns underlying the complexity of prior and present actual experience – this is reflected in our feeling that the novel has indeed revealed such patterns to us. And this feeling is to be trusted because it reflects the operation of such unarticulated cognitive resources in our reading. (p. 65)
To defend the cognitive value of literature by relying upon the concept of ‘trustworthy feelings’ is a dangerous, if not question-begging, move. It is effectively to argue that literature can supply cognitive content because it can elicit truth-supplying feelings. How are we to understand Davies’s concept of ‘trust’? Reading him closely, it would seem the trust is grounded in a three-stage process of manifestation, reflection, and reflection again: fiction makes manifest to us patterns underlying actual experience; this manifestation is reflected in the feeling that the novel has revealed the pattern to us; finally, this feeling is to be trusted because it reflects the operation of our ‘unarticulated cognitive resources’. But the idea of a reader feeling that a pattern has been revealed to them by a novel, with this feeling in turn being a reflection of the operation of unarticulated cognitive resources, is obscure. The sense that ‘we are learning’ from a novel, i.e. the sense that we are gaining from it cognitively, Davies adds, ‘is trustworthy only in proportion to the adequacy of the unarticulated cognitive resources that we draw’ (p. 67). Quite what these ‘unarticulated cognitive resources’ are, he does not make explicit. They appear to be his version of Carroll’s ‘implicit knowledge’ which, with some creative extrapolation, might be, in Davies’s words, ‘hypotheses about the general ordering of things in the world, or beliefs about specific aspects of the world, or potentially insightful ways of categorizing things in our experience’ (p. 65). In which case, the objectivity present in literature, sufficient to confirm its cognitive value, is a function of literature’s capacity to stimulate a reader’s world-organizing, conceptual faculties.

The cognitive content of narratives, and whether an external, extra-narrative check is required, is also a theme in chapters from Adam Toon and Roman Frigg. Interestingly, both authors start from Kendal Walton’s theory of depiction as make-believe, but end up with opposing positions on the ontology of representation. Toon and Frigg agree over the content of Walton’s theory: a representation is a ‘prop’ (Walton’s word), any kind of object which prompts someone to imagine something as a game of make-believe, for example, children playing a game in which they imagine tree stumps to be bears, and readers following the life of Napoleon in War and Peace. From here, Toon and Frigg go their separate ways. Toon posits representation as an entirely internal affair in the sense that it does not involve a relation between a model and a target system,
following Walton’s notion that props only function within the context of games of make-believe. In contrast, with Frigg, each prop-representation also has to represent a target domain, it has to go beyond itself, to refer to parts or aspects of the real world in a fashion which he defines by analogy to mapping (pp. 125-30).

But it is precisely the absence of this target-relation which Toon claims is a virtue of his theory, because it avoids difficulties associated with the fact that scientific models represent in a variety of ways. As Toon asks, ‘does Crick and Watson’s model represent the DNA molecule in the same way as Bohr’s model represents the atom?’ (p. 73).

Furthermore, he claims his theory can accommodate reference ‘beyond’ itself, in the sense required by Frigg, because it represents ‘the actual bouncing spring’ – to introduce an example of the kind of real-world reference required – as ‘imagine[d] propositions about the actual bouncing spring’ (p. 84; emphasis added). What Frigg holds to be a relation between model- and target-system is a state of aboutness which Toon takes to sit perfectly within the realm of imagination. The idea that real-world reference can be couched in terms of imagination is counter-intuitive and open to many objections, but sadly Frigg does not pick up the gauntlet in his essay. There is a similarity between Toon’s and Davies’s positions. Both believe that the cognitive element normally taken to come from a real-world check can be supplied by internal-to-imagination or internal-to-reading processes. If literary aesthetics is to illuminate or redefine representation within the philosophy of science, as the editors intend, much work remains to be done on the possibility of objectivity within imagined or fictional propositions, and on what it means to fall inside or outside (beyond) a system of representation.

The contribution which analogies to visual art can make to the concept of approximate truth in science is the theme of Anjan Chakravartty’s paper, ‘Truth and Representation in Science’. Because science is always improving upon or revising its claims, either through cumulative progress or paradigm shifts, it is problematic even for the most hard-headed realist in the philosophy of science to assert that scientific representations at any one time are ‘perfectly and comprehensively true’ (p. 34). Truth in science is necessarily approximate, but this creates the problem of what the exact natures and conditions of the approximation might be. Chakravartty focuses on two problems
affecting approximate truth and, for each, offers an analogy to a specific kind of representation in visual art as a solution. I shall concentrate upon the first issue, since this occupies the greater part of the paper: the distinction between abstraction and idealization as different kinds of approximate truth. Abstraction is a process where ‘only some of the potentially many factors that are relevant to the behaviour of a target system’ are included in the representation (p. 38), for example, the model of a frictionless plane, since it omits the frictional forces associated with the plane. In contrast, idealization is a process ‘in which at least one of the parameters of the target system is represented in a way that constitutes a distortion or a simplification of its true nature’, as in the case of Newton’s assumption in the *Principia* (in Chakravartty’s words) that ‘the sun is at rest in his derivation of Kepler’s laws of planetary motion’ (pp. 38-9).

Of the two, abstraction is easier to deal with, according to Chakravartty, since its conditions of approximation can be couched in terms of the number of factors relevant to the target system’s behaviour that are included in the representation; the greater the number, the greater its approximate truth. Idealization poses a more complex problem, he maintains, because its kind of approximation, rather than being a question of the comprehensiveness of representations, is a question of successful reference. Whereas abstraction is abstraction from a target system, idealization can involve the incorporation of a variety of idealized assumptions into a representation, with the ways in which one might de-idealize the representation (to work towards a truer representation) varying in the same way the idealizations do. Because of the potential for variety of idealization, with each idealization having its own peculiarity, the argument appears to run, the relevant condition of approximation is ‘successful reference, and degrees of distortion or simplification of the specific properties and relations targeted’ (p. 44). As Chakravartty acknowledges, stressing the importance of reference is not novel within the philosophy of science, especially with regard to scientific realism, yet what is novel, he maintains, is recognizing its importance for thinking about approximate truth (p. 42). It would seem to be the case that, while abstraction can be quantified in terms of comprehensiveness because it works back, so to speak, from the target system, idealization brings with it a freedom and variety of assumption which means it is uncertain whether reference to a target system is achieved from the outset.
This is where Chakravartty’s analogy to representation in art comes in, but I am afraid it is not convincing. *It would appear* that Chakravartty likens the abstraction–idealization contrast to that between depiction and denotation. I say ‘it would appear’ because the strict nature of the analogy is not clear. Picasso’s *Guernica*, he claims, *depicts* ‘the figures of a bull, a dead baby in the arms of a screaming woman, [and] a speared horse’, but can be said *to denote* ‘the rising threat of European fascism’ (p. 45). The depictions – the bull, the baby, the screaming woman, etc. – work back from their ‘target systems’, and ‘represent various things with greater and lesser degrees of realism’ (p. 45), in other words, the extent of their realism can be quantified much in the same way that the approximate truth of abstraction can. But to make denotation analogous to idealization would entail accepting ‘the rising threat of European fascism’ as a ‘successful reference’ for the painting. Historical accounts can confirm that this was a primary motive for the work, but in what way is its reference to the theme a ‘success’? Is it a success because the painting refers to the *gravest* ‘rising threat’ of the time of its production, or because it refers to the rising threat of European fascism and not the rising threat of anything else? There could be many, different ‘successful references’ for the painting, for example, a community’s experience of war or the horror of war in general. Determining the ‘successful reference’ or thematic content or meaning of an artwork will be down to interpretation. There might be some merit in pursuing an analogy between the freedom involved in interpretation and the (problematic) freedom within idealization that makes reference to a target system uncertain, but Chakravartty gives no indication that he intends to go down this route. The difficulties inherent in believing a work’s reference or meaning can be phrased in terms of ‘success’, I think, remain major problems for his analogy between representation in painting and approximate truth in science.

As I mentioned above, the book also contains studies of representation against the broader backdrop of art–science interaction. One, from James Elkins, is stimulating and frustrating in equal measure. Stimulating because Elkins (a) provides a no-holds-barred critical survey of all that he finds wrong or ‘impoverished’ about image theory in recent art–science discourse, and (b) indicates how the study of representation might be enhanced by looking beyond the arts. But frustration comes from the fact that the
support he provides for his claims is limited to summaries of his previous publications, including the wholesale reproduction of part of an already published chapter, all of which are ‘in the zone’ as regards art, science and representation, but none of the material is tailored to show how it gets us beyond representation narrowly conceived. The problem with recent art–science discourse, as Elkins sees it, is that neither artist nor scientist has a sufficiently informed grasp of the complexity of image-making and image-reading to address adequately the questions and themes thrown up by art–science interaction. As a result, participants invariably appeal to limited notions of beauty when describing scientific images (thinking this confers arthood upon the images), or artworks are described as if their raison d’être is the illustration of scientific content, or scientific visualization technologies are simply adopted by artists and described using outmoded concepts of representation, as in the case of the company DNA 11, cited by Elkins, which offers framed pictures of people’s DNA accompanied by straplines such as a ‘one-of-a-kind masterpiece’ and ‘a unique fingerprint’ (p. 176).

The reason for the generalizations and polarizations of art–science discourse, Elkins argues, is that image theory in North America and the UK is dominated by political and theoretical topics in mass media and fine art. These do not pay sufficient attention to the concerns of image-making and image-use in other subjects, and thus leave art–science discourse with a limited vocabulary to draw upon. As an alternative, he suggests, we should dismiss art–science discourse and think in terms of ‘visual practice’. A wide range of subjects have a visual practice, and attention to the various ways in which images are constructed and read in different subjects, he thinks, promises to supply theorization that is more up to the job of contextualizing cross-disciplinary images. His inspiration is visual studies as it is conducted in German-speaking countries and Scandinavia where more attention is paid, he claims, to non-art images. What difference might this make? How might an emphasis on visual practice improve upon art–science discourse? He spends much of the paper describing his reasons for writing his 2007 book Visual Practices Across the University (the reasons are those given above), and reproduces in its entirety chapter 29 from the book, ‘Visualizing Viruses’ (with the appropriate acknowledgments, including a name-check for the co-author, Stephen McGrath), as the final section of the paper. The richly illustrated chapter–section sets
out five ways in which a virus can be visualized by different imaging technologies, in support of the point that viruses do not ‘look like’ anything. But the section is purely descriptive. While it makes one of the most provocative claims of the book – the meaning and significance of the products of specific imaging technologies exceed philosophy’s concepts of ‘resemblance’ and ‘beauty’ (p. 191) – it does not begin to qualify philosophically how visual practice and technology challenge or depart from these concepts. Maybe it is unfair to ask Elkins, an art historian, to offer a philosophical investigation, but he could at least complete his argument: (1) art–science discourse is impoverished; (2) an emphasis on visual practice can provide the detail and contextualization required and more; (3) visual practice does this in one or more of the following ways. Except that (3) is the part we do not get.

The book does not have a concluding chapter, so it is hard to come away with a clear sense of where we are exactly with the alleged impasse in the theory of representation after the eleven papers. The absence of such a chapter is a missed opportunity, given that the book started life as a conference, more especially when one considers the overlap of interest in six out of the eleven chapters in literary aesthetics and scientific representation. A plenary in which the six authors reflected on each others’ work and identified key questions for further discussion, possibly extended through some post-conference email correspondence, transcribed, would have made a very useful conclusion to that part of the book. The collection nevertheless succeeds in displaying a variety of ways in which aesthetics can be applied to problems of representation in the philosophy of science. This is the direction in which the aesthetics–science relation works in the book, despite the editors’ pronouncement that the relation might be two-way, and aesthetics and art history might draw some insights from the philosophy of science. The objections I have raised to some of the arguments are not signs that the application of aesthetics to problems of scientific representation is flawed or impossible, but rather indicators of the kind of difficulties which will lie ahead if this intersection of subjects is taken further. That aesthetics has a lot to offer concepts of representation and knowledge in science is already apparent from continental philosophy, especially with regard to Martin Heidegger, Gaston Bachelard, Mikel Dufrenne, and Gilles Deleuze. All four philosophers construct metaphysics in which encounters with
artworks are shown to affect human being in the world in ways that have epistemological and ontological implications. Sadly, no reference is made to this work, a case of the ambition to overcome one philosophical division (between aesthetics and the philosophy of science) being limited by another (between continental and analytic aesthetics). But these can remain options for future projects in an exciting area of cross-disciplinary enquiry. For those who pursue the enquiry, this book will be a valuable point of reference. Sadly, priced at £126.00, its readership is likely to be restricted to individuals with borrowing rights at university libraries.