

782 *Book Reviews*

that our confidence in a right answer should not be shaken by the failure of well-informed, insightful, and rational interlocutors to come to agreement. After all, he points out, philosophical disputes themselves are like this: in our honest moments, we admit that our colleagues down the hall are smart and careful, even though their views are completely wrong—and we hope they say the same about us. Intractable disagreement between (more or less) ideal inquirers does not—and perhaps, but less obviously, should not—shake our confidence in either our own views or in the idea that there *is* a correct answer to vexing philosophical questions. Those of us who hope for a difference between the two must either point to the disanalogies or confront the troubling thought that philosophical disputes are grounded in differences in temperament, as William James's famous remark has it.

Worries about convergence highlight an interesting omission from Shafer-Landau's book. This concerns the *semantic* problems of moral realism: how can realists offer an account of the meaning of moral terms that allows diverse speakers engage in univocal disagreement, to share linguistic common ground, and so on? This is an old problem, but a potent one, as interest in the Moral Twin Earth argument demonstrates (see for example Terence Horgan and Mark Timmons, 'Troubles on Moral Twin Earth: moral queerness revived,' *Synthese* 92, pp. 221–60). The problem is especially pressing, one might think, for a realist who thinks that moral properties are non-natural, who has serious doubts about their causal powers, and who allows for equally authoritative judges to come to contrary opinions. What we need, and what is not provided, is warrant for attributing the *same* terms to these diverse speakers; if none is forthcoming, realism threatens to leave us with equivocation rather than real argument—a serious drawback for the position.

In this case, though, sins of omission are easily forgiven. As should be clear, this work is an ambitious and wide-ranging attempt to examine important and difficult problems in meta-ethics, and it succeeds at many levels. The book is full of careful arguments, many of which proceed by establishing a presumptive case for a position then seeking to undermine objections and competing views. As a result, it is also useful in giving the reader a good sense of the relevant dialectical terrain.

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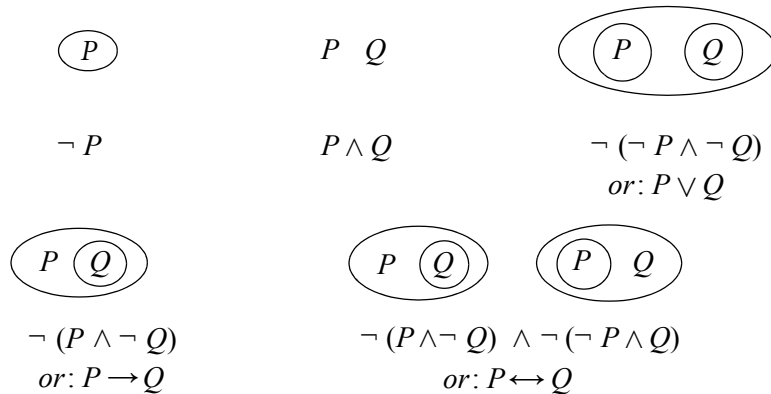
***The Iconic Logic of Peirce's Graphs***, by Sun-Joo Shin. Cambridge, MA: MIT Press, 2002. Pp. x + 208. H/b £23.95.

Sun-Joo Shin's new book is a valuable and original contribution to the literature on Peirce's Existential Graphs (EG). It gives new methods to interpret the alpha and beta systems, which allow the reasoner to read off logical properties

from the visual properties of complex graphs directly, rather than by decomposing them into their basic constituents. By slightly revising the respective rules of inference for the two systems, Shin both streamlines them and brings out their underlying commonality. The result is a case study of a heterogeneous system—one that uses both symbolic and iconic forms of representation—which significantly enhances our understanding of the graphs, especially the beta graphs, as a whole.

For those not already familiar with EG, a little background may be helpful. In the 1890s, after a decade of work that included the invention of quantifiers independently of Frege, C. S Peirce devoted his attention to diagrammatic logic. His goal was to develop a logic that was, as far as possible, ‘analytic of reasonings’, which he identified in part with maximal explicitness. (Frege seems to have had similar motivations, given his stress on gapless proofs in the *Begriffsschrift*.) The end results were the three systems known collectively as the Existential Graphs: the alpha graphs, provably equivalent to propositional logic; the beta graphs, equivalent to first order predicate logic with identity; and the gamma graphs, which—though unfinished by Peirce—have been used to generate diagrammatic systems equivalent to various modal logics. Overall, EG thus marked a dramatic increase in expressive power over its principal diagrammatic predecessors, Euler circles and Venn diagrams; indeed, in this respect at least, there is nothing to choose between EG and standard ‘sentential’ languages.

The unfamiliar reader can get a feel for EG by considering the alpha graphs for the standard truth functors in a five-functor sentential language (5SL), as below:

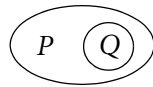


The primitive vocabulary of the alpha graphs just consists of propositional letters and closed curves (known as ‘cuts’). A letter by itself is taken assert a proposition; to enclose a letter with a cut is to negate it. There is no conjunction sign as such; two letters are conjoined by being written on a given region together. There is no need in EG for brackets, since the cut defines the scope of

784 *Book Reviews*

the relevant operator by what it encloses. The vocabulary of the beta graphs is only slightly more elaborate, consisting of one or more predicate letters, cuts and one or more lines ('lines of identity') denoting the existence of objects.

According to the standard 'endoporeutic' reading method given by Peirce, graphs can be translated into formulas of a sentential language by working inwards from the outside, reading cuts as negation and the open area between letters or subgraphs as conjunction; this gives an equivalent sentence in a two-functor ( $\wedge$ ,  $\neg$ ) language (2SL). But it quickly becomes evident to someone reasoning with EG that other readings are often available. For example, in alpha EG the following graph (a 'scroll', in Peirce's term)



can be read not merely as equivalent in 5SL to  $\neg(P \wedge \neg Q)$ , but also to  $P \rightarrow Q$  or  $\neg P \vee Q$ . On these latter readings, there is no decomposition of complex graphs into their basic elements prior to translation; rather the visual properties of the graph as a whole are used.

This 'multiple readability' is pervasive in EG. It constitutes one way among several in which EG is analytic of reasonings, in Peirce's phrase. And it is valuable: given multiple readability, many logical equivalencies and inferential transitions that are opaque in sentential languages become obvious in EG. Despite EG's representational simplicity however, it has been a common criticism that the more complex graphs in EG are hard to read off; that Peirce's rules of inference, which permit the reasoner to insert or erase a graph from a given graph or subgraph, are less natural than their sentential equivalents; and that reasoning with EG significantly fails to exploit its visual properties. Though the reasoner quickly learns the value of switching between different readings of the graphs, a comprehensive formal justification of multiple readability has so far been lacking.

Shin plausibly traces the source of these criticisms to an unnecessary reliance on Peirce's endoporeutic reading method. But she also answers the criticisms themselves, meeting the need for formal justification with a persuasive treatment of different methods of reading the graphs, showing that multiple readings do not imply ambiguity, and advancing a reading algorithm that seeks to combine the best of the various alternatives, for both the alpha and the beta graphs. To complete the picture, she reformulates the rules of inference for each system so as to take advantage of the graphs' newly recognized visual properties. This is a substantial undertaking, especially for the beta graphs, where the treatment of quantification raises numerous technical issues.

Shin's amendments are not costless. Her multiple readings algorithm is significantly more complex than the earlier endoporeutic method. Her revised inference rules are longer and have more subrules than Peirce's originals, and some can be harder to use; for example, the rules replacing Peirce's rules of iteration (pp. 84, 139) can require several applications to achieve the same out-

come. However, the overall result is not merely an important contribution to our understanding of EG, but a valuable case study of a heterogeneous formal system.

A central motivation for Peirce's development of EG was his interest in 'semeiotic', the study of the general nature and conditions of representation as such. In particular, Peirce distinguished between iconic and symbolic representation: between signs (such as many diagrams) that, he believed, represent in virtue of a resemblance of some kind to their object(s), and signs (such as words) that represent in virtue of a conventional relationship with their object(s). It is a further merit of Shin's book that, as its title implies, she embeds her logical analysis in a philosophical reconsideration of Peirce's foundational notion of iconicity, and it is this that gives her book its relevance to the present debate over the nature of heterogeneous reasoning as such.

One might raise a few worries, however, especially as relates to Shin's treatment of iconicity, which forms the philosophical heart of the book. Shin develops Peirce's notion of iconicity in a fairly standard way, by construing it in terms of a structural resemblance between a representation and its domain. In this sense, a representation is iconic of a domain if there is a homomorphic mapping between elements or properties of the representation and elements or properties of the domain. But the complexity of the topic of iconicity outruns Shin's relatively brief discussion, and the overall effect is, I think, to raise more questions than are answered here.

In the first place, several of Shin's own classifications of signs in EG are questionable. For example, she claims that the 'cut' is symbolic, not iconic (p. 56); but a 'cut' can plausibly be taken as iconic of a dividing line between one region and another of the graphs, and so as iconic of scope distinctions (Peirce seems to regard the 'cut' as iconic in essentially this way). A more interesting case is that of lines of identity. Shin's stated view is that a line of identity can iconically represent not merely the sameness of two individuals (p. 54), but also individuals themselves (p. 57). But it is hard to see in virtue of what structural correspondence a line of identity can represent an individual. Even if it were accepted that such lines are iconic in some such contexts, moreover, it would remain unclear how they can be iconic when used inside cuts to represent universal quantification (i.e. as equivalent to  $\neg \exists x \neg$ ). As this illustrates, and as Shin independently agrees, we need not think that iconicity is always and everywhere an all-or-nothing matter: for example, a given representation can combine iconic and symbolic aspects; a picture of an aeroplane can simultaneously be iconic of an aeroplane, and symbolic of an airport.

Second, Shin elaborates the symbolic-iconic distinction by contrasting the diagrams used in reasoning with Euclid's geometry with geometrical symbols. In so doing, she takes issue with a standard view that, whatever their psychological benefits, diagrams lack epistemic value; and, in particular that they are too representationally specific to be used in proof. Against this, Shin's thought is that a diagram of a triangle in Euclid can represent 'a triangle in general', and



## 786 Book Reviews

that such icons must be general in representational scope if they are to have any logical status in proof (p. 28).

As Shin agrees, the iconicity of EG is importantly different from that to be found in Euclid. First, EG has a distinct syntax and semantics, but the geometry of Euclid is an interpreted system. One cannot follow an argument in Euclid—as one can in EG—without knowing what the diagram stands for. So it is not clear what iconicity, specified as a representation relation between a graph and its domain, has to do with the kind of reasoning in EG described above. Secondly, there is a fairly clear difference between what might be termed intrinsically depictive and intrinsically non-depictive diagrams; between diagrams that can represent via (approximate) visual resemblance to their object(s), and those that cannot. Euclid's diagrams are depictive in this sense, and Peirce's graphs are not: logical relations are not normally thought to have visual appearances, as Shin notes.

Let us ignore the Berkeleyan question of what it is for a diagram to represent a triangle in general. There are two problems here. First, it is unfortunate that the discussion of the importantly different case of Euclid comes (without disclaimer) within Shin's general overview of the icon-symbol distinction; in particular since the claim of over-specificity has rarely been made against diagrams in EG, perhaps just because they are intrinsically non-depictive. We may want to call both types of representation (and reasoning) iconic; but an account of iconicity that includes them both needs to acknowledge and explain these differences. (Note that merely framing iconicity in terms of homomorphism is not sufficient by itself to do so.)

Second, and more substantively, even within Euclid's geometry we need not accept Shin's claim that icons must be general in representational scope to play any role in proof. On the contrary, we can identify processes of reasoning in Euclid in which the diagram is depictive of for example, certain triangles (and so not entirely general in scope) and yet the general conclusion follows from the reasoner's grasp of the generality of the construction procedure used to generate the diagram. A suitably formalized version of such an argument could in principle count as a proof.

Peirce seems to have designed EG to be as iconic as possible, and clearly valued this feature greatly. It is, as I have noted, plausible that modern criticisms of the readability of the graphs—especially the beta system—have derived from an over-reliance on Peirce's endoporeutic reading method. But Shin also suggests that, notwithstanding his interest in iconicity, Peirce himself 'failed to obtain better ways of understanding [EG as a] graphical system' (p. 11), by which she means that he did not formalize direct readings based on the iconicity of the graphs; something that she later attributes to his preoccupation with explicitness, and not efficiency, in logic.

It is hard to know how we are to understand this 'failure', especially in a project Peirce did not set himself. Perhaps one can sum the position up as follows: Peirce believed multiple readings were possible, as Shin notes, and we

can see his use of the endoporeutic method merely as reflecting an insistence that *some* independent means be available to resolve interpretative disputes. Moreover, it is clear that Peirce believed in principle that complex graphs could be read as representing logical relations directly, since he says that the 'scroll' is to represent implication; and he doubtless believed, for good but non-conclusive reasons, that the rules of inference of EG preserved iconicity across graphs. These insights—and the theory of signs in which they are embedded—contain much of what is of primary philosophical interest here. However, it is also true that for whatever reason—not least his desire to complete the gamma graphs—Peirce does not appear to have had an interest in the justification of multiple readability as such, and in formalizing direct readings of the alpha and beta graphs. These are the distinctive and valuable achievements of the present book.

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***Goodness and Advice***, by Judith Jarvis Thomson, edited by Amy Gutmann, with commentary by Philip Fisher, Martha C. Nussbaum, J. B. Schneewind and Barbara Herrnstein Smith. Princeton, NJ: Princeton University Press, 2001. Pp. xvi + 188. H/b £24.95, \$37.95, P/b £10.95, \$16.95.

In part one of the book, Judith Jarvis Thomson wants to repudiate consequentialism (utilitarianism) in general, and hedonistic utilitarianism (Hedonism about Goodness) in particular. Before she attacks hedonistic utilitarianism she tries to make it 'seem plausible', which, at the end of the twentieth century 'is not easy to do'. She knows of 'no moral philosophers nowadays who accept it' (p. 12). Well, her book has fallen into the hands of a reviewer who does defend hedonistic utilitarianism, and one who is unperturbed by her argument. He is unperturbed not because utilitarianism in general, and hedonistic utilitarianism in particular, are views the defence of which comes easily. During the last few decades serious problems connected with utilitarianism have surfaced. They arise within population ethics (ought we really to accept what Derek Parfit has nicknamed 'the repugnant conclusion?') and within the area of collective action; moreover, if happiness is what matters in the final analysis, how should it be properly measured? Are there, besides noticeable differences of well-being recognized by Bentham and Edgeworth, sub-noticeable differences as well, and if there are, what is their normative impact, and so forth? The number of original problems is legion. However, in Thomson's treatment of