The Language of Graphics: A Framework for the Analysis of Syntax and Meaning in Maps, Charts and Diagrams. Yuri Engelhardt, Amsterdam: University of Amsterdam, Institute for Logic, Language and Computation (www.illc.uva.nl), 2002. ISBN 90-5776-089-4. 197 pp., 60 b/w figures.

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Although we live in the era of the visual, applicable theories of the static image (as distinct from philosophical treatises) are still rare. In his PhD dissertation *The Language of Graphics*, Yuri Engelhardt explores an important part of the territory. He wisely narrows down the field: "We will first try to understand static versions of graphic representations, before we will try to understand dynamic and interactive versions" (p. 10). His definition of a graphic representation as "a visible artifact on a more or less flat surface that was created in order to express information" (p. 2) further limits the corpus. First, the insistence on the "crafted" nature of the representations investigated is significant because it allows for greater control by the image-maker over what is represented than in the case of photographs (although Engelhardt's definition does not, strictly speaking, rule out this latter category). Second, the focus on communicative representations is helpful. The fact that any aesthetic dimension the images may possess is always subservient to their informative goal sets them off from other categories of images – especially artistic ones, where the priorities may be reversed. Together, maximum control and uncontroversial goal-directedness mean that the type of representations chosen is likely to display more regularity and patterning than, say, realistic photographs or paintings. Hence it will be possible to come up with proposals concerning a rudimentary "semantics" and "syntax" of the image.

Engelhardt's project is a deceptively simple one. He sets out to make an inventory of all the relevant elements in the images selected and of the meaningful relationships between these elements. Moreover, he presents labels for all specimens identified. To avoid the trap of conflating names for concepts with those concepts themselves, Engelhardt consistently and conscientiously outlines and explains terms and meanings as proposed by various

predecessors, and indicates how these correspond, roughly, to his own. Because of this careful procedure, his suggestions are strong candidates for adoption as standardized terms.

After his introductory chapter, Engelhardt discusses the various dimensions of "graphic syntax," distinguishing between objects and the relations which may obtain between them. Graphic objects are discussed both in terms of various visual attributes (such as size, texture, and shape), and in terms of how they relate to one another and to the general space within which they occur. Like the number of different attributes the number of different syntactical relations is limited, which allows for recurrent patterns. The syntactic structures are further subdivided into basic types, such as "spatial clustering," "separation by a separator," and "lineup."

Chapter 3 proposes two interpretive dimensions of an image: (1) type of correspondence (literal, metaphoric, metonymic, rebus-based, and arbitrary-conventional); and (2) mode of expression (pictorial or non-pictorial – each with further subdivisions). In later sections of chapter 3, some attention is paid to the informational roles that a graphic object may play, and to the kinds of information that a graphic object can present. Thus the size of (part of) an object usually correlates with quantity, as in bar charts, while color often indicates category membership.

Chapter 4 classifies graphic representations. Ten primary types are identified (map, picture, statistical chart, time chart, link diagram, grouping diagram, table, symbol, composite symbol, written text), and six hybrid types. Each type is illustrated by one or two figures. Indeed, concepts and terms are illustrated throughout by pictorial examples. Each example, moreover, has a legend which specifies its source; a comment; a description of the "syntax of spatial structure"; the "type of correspondence"; and the "type of graphic representation."

Chapter 5 is a short summary of the terms and concepts deployed by various predecessors in the field, while chapter 6 makes brief suggestions about the theoretical and practical uses of the results of the investigation. The thesis is completed by summaries in English and Dutch, a figure index (!), author and subject indexes, and a glossary.

There is no doubt that Engelhardt does important groundwork in the young discipline of "picture theory." The clarity and precision of definitions and classifications contribute to their practical usefulness. They also make the proposals verifiable, and open to debates about improvement and refinement. Such debates should certainly be conducted, ideally on the basis of a trade edition of the book. A trade edition, however, should have at least twice the length of the present volume, for the author's terseness has a price in terms of readability. There is nothing wrong with his style, but often his characterizations of types and categories are brief

and difficult as mathematical formulas. Breathing air into his study by inserting more reflection and, perhaps, even more examples, he could turn the study into an exciting textbook.

My respect and admiration for Engelhardt's work notwithstanding, I have some criticisms, as well as suggestions for how his model can, perhaps must, be further enriched. For one thing, although a vast range of images is covered, Engelhardt's claim that he "can provide any graphic representation with an analysis in terms of the framework" (p. 151) may be a little overenthusiastic. Probably the most problematic type of image is the "picture." Pictures are considerably less coded than the other nine categories of images and allow for far more artistic and communicative freedom. Pictures, for instance, may contain pictorial "tropes" such as creative metaphor (Forceville, 1996), but Engelhardt is silent about them. Newspaper cartoons depicting George W. Bush in cowboy outfit metaphorize the US president, and surely this is what matters most about the picture. And while Teng and Sun's (2002) "pictorial grouping" hypothesis bears a close resemblance to what Engelhardt calls a "lineup," he would not be able to accommodate their "pictorial oxymoron." And these are only two specimens of a much longer list (see Kennedy, 1982). Perhaps Engelhardt's neglect of pictorial tropes also explains why he fails to problematize the notion of "similarity," invoked to elucidate "literal correspondence." Not only is similarity a matter of degree, but its (non)presence depends on numerous factors. Given the right context, any two things can be (made to look) similar. But the concept of "pictorial similarity" is worthy of a thesis in its own right.

Other aspects of graphic representations that a full-blown theory of the image will have to accommodate are Kennedy's (1982) "pictorial runes" – such as speed lines, and various squiggly lines that may suggest stench (when emanating from a turd) or anger (for instance when surrounding an angry cartoon character's head; see Forceville, in prep.). Engelhardt does not discuss this type of visual information-carrier, although his own figure 2-17 (a "*link diagram* that involves *pictures,*" p. 44) of a ringing phone appears to have two types of runes: the first to indicate its movement (or sound?), the second to suggest that the light on the apparatus is flashing.

While Kress and Van Leeuwen's (1996) study of the "grammar of visual design" is less systematic than Engelhardt's, and has some disturbing ideological bias (Forceville, 1999), it contains several notions that would be useful additions to the parameters identified in the present study. Thus Engelhardt touches only fleetingly upon the locations graphic objects occupy in a bounded space (rather than vis-à-vis one another). Left-right, top-down, and

centre-margin orientations can be important in graphic representations, even outside of the problematic "picture" category. It seems to me, for instance, that the author too easily dismisses the role of the ships in figures 2-08 and 2-26. About the first, depicting the food pyramid in the ocean, he rightly points out that the depiction of bigger fish as closer to the surface of the ocean than smaller fish is not realistic. But the *ship* (with the humans that catch even the biggest fish, and hence are even "higher up" in the predator food chain) is not coincidentally *above* the ocean level, and hence to some extent "naturalizes" the – indeed arbitrary – vertical orientation of the other graphic objects (the various fish) in the representation. The same holds for the statistical time chart of figure 2-26, showing the quantities of radio-active waste dumped into the sea. Again, the unusual top-down orientation of the bar chart is "motivated" by the ship: because of the ship, the three-dimensional graphic space underneath it is transformed into a sea, and hence it is not correct to state that the ship serves only "decorative purposes" (p. 59).

Another parameter that deserves more systematic discussion in Engelhardt's schemes is "framing." While he often refers to the *pars pro toto* variant of metonymy, he does not discuss specific framing choices (close-up, medium shot, long shot, etc.). While transparency of the embedded information is no doubt an important guideline in framing decisions, a choice for a certain frame also may have connotative value. Similarly another concept from film theory, "high/low angles" (see the textbook by Bordwell and Thompson 2001) merits a place (cf. Engelhardt's figures 2-30, 2-42, and 3-11). There are yet other stylistic options that may influence the way an image is perceived and understood. Thus Kress and Van Leeuwen present three variants of the same simple tree diagram – with parallel, curved, and oblique lines (1996, p. 83), rightly pointing out that the variants evoke different connotations ("curved," for instance, suggests "organicness"). Since Engelhardt, considers labels an integral element of the representations investigated, we may furthermore think of the connotations evoked by specific letter fonts. Here, of course, we are gradually moving into the area of pragmatics.

All this does not detract from Engelhardt's fine work. Although the author may overestimate the universal comprehensibility of at least some of his pictures, I applaud his decision to focus on recurrent semantic and syntactic properties of graphic objects before venturing into the jungle of pragmatics. As indicated above, the many categories identified by Engelhardt do not yet exhaust all the text-internal dimensions by which graphic objects may generate meaning, but at the moment his is the standard to build on.

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