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REVIEWS

Johanna Drucker, *Graphesis: Visual Forms of Knowledge Production*. metaLABbooks series. Cambridge, MA: Harvard University Press, 2014.

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Graphesis: Visual Forms of Knowledge Production intends to stimulate interdisciplinary discussions about how images—pictures, diagrams, charts and graphs, maps, frame grabs and stills, etc.—function as elements of forms, like the codex and the webpage, that also include text. Its central claim is that visual forms function as more than mere illustration for arguments made in verbal form. Drucker rightly asserts that such forms produce arguments themselves. Through their arrangement on page or screen, images enact assertions according to systematic frameworks. This is how visual elements make sense to us. And this is why, as Drucker indicates, we must consider the ways that images, etc., "serve as expressions of knowledge" in and of themselves; they do not simply illustrate logocentric and/or numero-centric knowledge.

For those who study visual materials, for example, film and media studies scholars, art historians, and scholars of visual culture, this claim will not be new. Drucker's argument participates in a longer tradition of thinking critically about how visual forms signify differently than text. Drucker herself cites several prominent names: Roland Barthes, James Elkins, William Ivins, Martin Jay, Barbara Maria Stafford, and Edward Tufte. But other names come to mind, including Rudolf Arnheim, Walter Benjamin, John Berger, Jonathan Crary, Vilem Flusser ("Line and Surface"), Anne Friedberg, Gotthold Ephraim Lessing, Laura Marks, W. J. T. Mitchell, Erwin Panofsky, and Marita Sturken and Lisa Cartwright.[1] Extending such precedents, *Graphesis* makes a relevant contribution to discussions of image-text relationships. Most importantly, it charges other humanistic disciplines (i.e., English, history) and the social sciences to

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employ visuals in more considered ways. Drucker especially challenges those who profess affiliation with digital humanities to attend more carefully to their use of visual content.

Drucker's volume itself exemplifies how scholarship might rethink its use of visual content. The book enacts its central claim through its use of graphics, color, font style and size, and layout. The book is organized into seven sections: a précis-like "Overview," four chapters, an Afterword, and a series of "Windows" (reminiscent of "Color Plates" found in art history textbooks). Pages of red signal the starts of chapters, and the "Windows," which are not at all transparent, but actually resemble parchment, readily stand out as one flips through the book. A black field serves as background for the Contents page. Through this use of color, Drucker successfully demonstrates reading as way-finding. Similarly, beautiful color images populate page margins in a manner suggestive of illuminated manuscripts—a nod to the long established practice of deploying images, symbols, and text in performative ways. And red typeface is used for footnotes, URLs, and bullet points, as well as for labeling figures.

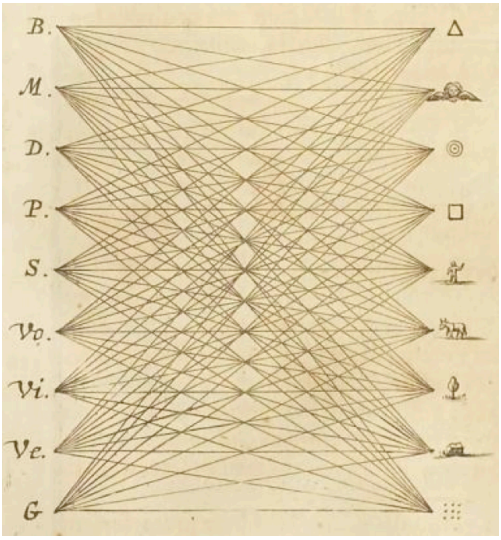

Figure 1

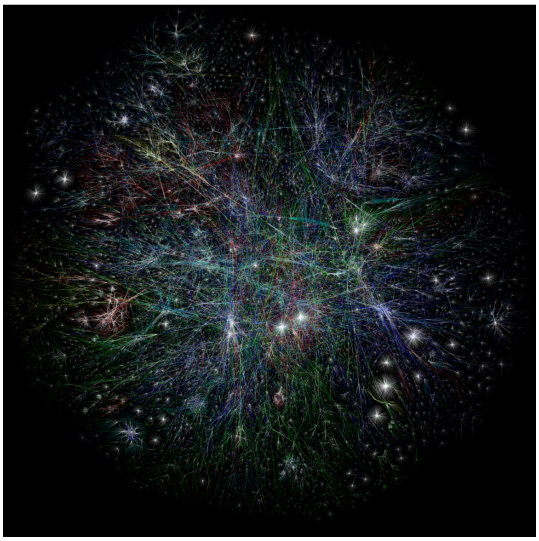

Figure 2

The first figures that appear in *Graphesis* epitomize Drucker's attention to form and its capacity to instantiate a claim. One figure is Athanasius Kircher's 1669 *Ars Madgna Sciendi*, whose diagrammatic system of lines connects letters to symbols. (Figure 1)** [2] In using the diagram for interpretative purposes, one has to make connections according to the schematic provided. The second figure is a 20th-century screen grab of a visualization of web traffic produced by Barrett Lyon. (Figure 2)[3] This image is merely representational, it does not ask for interpretation nor does it reveal the underpinning

logic by which it was constructed. However, the two figures, as Drucker points out, are iconically similar; both images present the viewer with a network structure.

By bringing these two figures together, Drucker distinguishes between two functions of images. The Kircher, she explains, "*produces the knowledge it draws*," it is performative. The Lyon, on the other hand, "*only displays information*," it is illustrative. Arrangement of the images on the page helps make this point. The former is positioned above the latter. The pair float against a rich red background; but they are bound together—the margins of red are thick but the border of red separating the images is narrow. Their placement within the field of the page presents us with the comparison that Drucker introduces in prose on the facing right hand page. This juxtaposition—of graphic and text—functions metapictorially.[4] As an ensemble, they offer a performative instance that underscores Drucker's point about the relevance of understanding the logics and structures that inform the nature of visuality in the present.[5] Drucker's consistent juxtaposition of image and word demonstrates an effort to expose us to our own expectations about how graphical and textual modes of expression function.

The "Overview," which begins with the images and prose just discussed, presents the reader with a gloss of keywords and phrases in order to establish a "common vocabulary" (5) across a number of potential audiences, including those who study or work in/with "information graphics," "graphical user interface," "visual epistemology," and "languages of form." In other words, the "Overview" assumes a novice reader, one who has not yet confronted the fact that "data does not have an inherent visual form" (7) or that an image is not an expression of "truth" but rather participates in a system of representation and communication. This system functions according to long established but not immutable rules or codes. And the knowledge so produced shapes how we engage with and interpret what we see and, by extension, how we make meaning. Drucker's goal is to de-naturalize our usual uses of visual materials and to offer a set of techniques for critical engagement with graphical forms.

Chapter one, "Image, Interpretation, and Interface," introduces the reader to the fact that visual content has long played a vital role in our experiences of and knowledge about the world. Drucker specifies that cuneiform tablets, treatises on geometry and architecture, and modernist design conventions all belong to this tradition. "Graphesis" names the mode of inquiry she outlines, which draws on a variety of disciplines including graphic and industrial design, architecture, natural and physical sciences, and aesthetics. Through it, Drucker aims to offer "a historical and critical foundation" (20) for a humanistic approach to working with visual content, one that understands the use of visual elements to be a "poetics of graphical form" that has rhetorical impact (54). While her account is broad-sweeping in its historical references (predominately Western) to theories of vision and knowledge, "languages" of form, and methodologies for interpreting graphical forms (e.g., Gestalt theory, semiotics, cinema studies, art history), she rightly emphasizes that vision and visuality are necessarily contingent on time and place, and on the subjects who inhabit a particular visual vernacular.

Chapter two significantly advances the argument by calling attention to the way the book's own graphics operate. The title of this chapter reads, "Interpreting Visualization :: Visualizing Interpretation," in black font against a red field. The red page has now become a visual motif for the book, signifying an opening onto a new chapter—not unlike an open bracket in software programming (which signals the beginning of a unit of code that may span several lines). Suggestively, the title is structured like a verbal analogy or mathematical ratio, the double colon signifying "as"—as in relational comparison or logical congruity. The symbol draws attention to the parallel gerundial structure (i.e., *-ing*) governing the active voice that lurks in the title, and it brings into juxtaposition the inversion of verbal formations (i.e., "Interpreting"à"Visualizing and "Visualization"à"Interpretation"). These rhetorical decisions return us to Drucker's principle assertion: While some visualizations are static and simply illustrate information already known, others are open-ended and dynamic, and generate new information through their use and interpretation (65). Bar graphs that present statistics, like Lyon's representation of web traffic, serve as an example of the former; train schedules that open onto a number of possible itineraries exemplify the latter. The chapter discusses these forms of visualization, the variety of their uses, the kinds of content they present or produce, the way they structure meaning, and their disciplinary origins or antecedents, as well as their evolution as techniques for organizing information and managing knowledge.

Important to Drucker's account is her insistence that visual schema (1) provide evidence of habits of thought shared by people, at the same time they (2) inform how such thinking takes shape and evolves over time. In other words, modes of visualization are socio-historical, they are technologies (*à la* Michel Foucault) that function to ensure the governance of populations.[6] They are administrative tools whose formal conventions are "grounded in historical and cultural exigencies," and their forms and modes of implementation shift according to socio-cultural context. Various types of maps provide Drucker a persuasive, if unsurprising, example, insofar as they readily show how spatial thinking makes use of conventions of representation and how such conventions "construct normative notions about time, space, and experience" (82), which subsequently inform how people *think* they experience the world around them. Thus, cadastral maps enable demarcations of property, navigational maps, travel, celestial maps, cosmology. Such representational forms mediate how human beings have for quite some time understood, approached, and interacted with each other and the environment.

This second chapter also introduces the term "capta," a *keyword* that refers to the fact that the "statistical description of phenomena depend [*sic*] upon the observer's circumstances" (83). She identifies Francis Galton, the 19th-century statistician who invented composite portraiture, whom she attributes with having recognized that representations of statistical phenomena are "observer-dependent and situated" (83).[7] She also provides a more recent example: Tom Carden's dynamic, time-governed map of the London Underground that redraws possible lines of travel according to stations

selected. These examples underscore Drucker's point that vision and visuality are conditional.

Later, Drucker will assert that "*all data is capta*" (129), that is, subjective in its constitution and arrangement. But "subjective" does not mean personal, as in idiosyncratic or emotional (131); rather, Drucker emphasizes that systematic expressions of information are constructed according to principles that correspond to some "point of view, agenda, assumption, presumption, or simply a convention" (131). Information visualization is, therefore, a semiotic process (*à la* Charles Sanders Peirce) involving fictional abstractions that operate according to a system of relations that govern purpose and, thereby, meaning—whether meaning is already given, as in an illustration (e.g., Lyon's representation of web traffic), or produced through use and real-time interpretation (Carden's generative London Underground map).

Chapter three, "Interface and Interpretation," reframes the discussion of knowledge and visualization in order to address networked displays of information. Drawing heavily on interface design and theory, Drucker turns her attention to the "graphicality," or constructedness, of the screen interface, which, as she indicates, is a "mediating structure" that "disciplines, constrains, and determines what can be done in any digital environment" (138-39). However, for Drucker, humanistically-informed interfaces are rare, insofar as "engineering sensibilities" have tended to dominate interface design (139). Interestingly, she turns to the codex to establish a general precedent. For her, the graphical features of the codex "should be understood as a spatially distributed set of graphical codes that provide instructions for reading, navigation, access, and use" (139). What's most compelling here is Drucker's attention to the relation between spatial composition or format, what she calls *mise en page*, and what she refers to as an environment for action, which she terms *mise en scène*, or, more productively, *mise en système*.

There is no new news in the notion that form directs the work of interpretation, but Drucker proves adept at demonstrating how attention to "interfaces" reconfirms this truth. Drucker's definition of interface, despite its abstraction, is apt: a "space of provocation in which the performative event takes place" (143). We are invited to understand the interface as a site of potentiality (e.g., provocation), where person and display convene and "interact," as per the affordances of design layout and computation (e.g., performativity), to produce some result. This means, as Drucker specifies, that "interface work is happening on what we would call the plane of discourse, or *the level of the telling, rather than the told*" (145, my emphasis). The codes, be these visual tropes/cues or algorithms, that govern what is possible to say or do or understand are never predetermined; nor are they a guarantee of outcomes, even as they may be informed by previous practice and, therefore, subject to certain expectations about interaction. This is because interface design must balance the need for a "rational organization of content" and a need for "an intuitive way of using that content" (143). Any "performance" of interaction is guided, but not governed in any absolute sense, by the frameworks and information structures that play out at an interface. Thus, the knowledge that graphical

[user] interfaces afford is a matter of process and engagement—a parsing in real time, and not some rote exercise in accordance to a predefined mandate.

Drucker cogently points out that the interface itself is informational. She states, "the structure of an interface *is* information" (143). Meaning, it is subject to analysis and interpretation. Although many have written about the interface (e.g., Wendy Chun, Jason Farman, Anne Friedberg, Alex Galloway, Janet Murray, Sherry Turkle, Nanna Verhoef), Drucker provides one of the most compelling demonstrations I know that providing content may be their least interesting feature. It is about *how*: *how* an interface allows someone to search and select; *how* it permits manipulation of returns (e.g., to a query); *how* it uses dialog boxes or clickable buttons for harvesting input. In other words, an interface's structure "supports 'sufficing' behaviors," which delimits acts of engagement and, therefore, provides for particular entrees to interpretation (149). For example, as Drucker suggests, the icons that populate our screens might very well invite us to consider our notions of information management (e.g., we tend to rely on hierarchies of nested folders on a desktop), at the same time they determine how we understand our access to our own information (e.g., we recognize that documents are held within folders). That this is so means that processes, defined by those who arrange and manage information and its access, provide information about how we make sense of things. And more than ever, these processes are visually constituted—clickable icons, dialogue boxes, blue-underscored links.

Especially productive is Drucker's reframing of the interface in ethical terms.[8] In chapter three, Drucker proposes that an interface is an ecology (148). For her, "ecology" refers to the "in-betweenness" that epitomizes the relation between a subject and the graphical construction of a particular digital display. Drucker proposes that we embrace a notion of interface that anticipates an embodied user who might explore and discover—for purposes other than simply accomplishing a pre-defined task. She advocates for an interface design that encourages wandering and browsing. Such engagement, as she explains, frequently produces innovative connections and surprising results. Approaching the interface as an ecology, as a "space of being and dwelling" (in the Heideggerian sense), requires that we think of it as a site of possibility, not simply a "*thing*" (152, emphasis in original) or tool for the production of already specified outcomes. Although she is not alone in doing so, Drucker is right to urge attention to the architecture and logics of the interfaces that shape how, when, and for how long, we engage with our technologies of knowledge acquisition and information production.

Drucker provides an especially useful discussion of analytic frames (e.g., frameworks by which we process information), and their work as filters through which experience acquires relevance and meaning. Specifically, she refers to socio-economic frames (of existence): commerce, entertainment, information, work, and communication (157). These frames are interlocking, as she explains, and how one is prepared (i.e., trained) to interact with them determines the kinds of relations or connections one is able to establish across content. In a networked environment, such relations are more malleable, than, for example, those the codex affords. As Drucker indicates, "hierarchies

of authority and priority shift" (157), the interface becomes a "zone of affordances organized to support and provoke activities and behaviors probabilistically, rather than mechanistically" (157-58). And this is important because it foregrounds the fact that the interface is not simply a thing, but rather a site of exchange between a person and the system or frameworks that shape cognitive processes. Neither are the images and graphics appearing on screen things. That images and graphics assume a particular position on screen, that they are sized and resizable, that they may be responsive to various kinds of interaction and input, that responsiveness may be tangible, activated through touchscreen technologies—this means that images and graphics *work*, they are catalysts for interpretation. While "they constrain and order the possibilities of meaning producing conditions," they do not prescribe intellectual outcomes (158). In other words, they open onto interpretive potentiality that extends beyond the site of the interface.

Towards the conclusion of chapter three, Drucker calls attention to the insights that the discipline of bibliography has to offer. First and foremost, studies in bibliography remind those who may naively think a bibliography is about content, not form, that graphic features shape how we interact with books. Their design informs how we approach and navigate content, as well as connect to additional information (e.g., footnotes, annotations, bibliography, etc.). As such, they function as "sites of social exchange"—between ourselves and others, between the past and the present (162). Convention disguises the logistical requirements and technical specifications underpinning our ability to negotiate a bound text as well as a webpage. As skilled readers, we are well-trained in methods of reading, research, and writing. "[T]he back-end technical and conceptual processes" (167) that make these processes possible seem readily transparent, straight-forward and, in the case of our screens, user-friendly—unless, of course, our screen freezes, our computer crashes, or our service fails. But as Drucker explains, it matters that these practices belong to a history that extends back to at least the Middle Ages and the manuscript page (168). Our habits harken back to an era that first defined the page as rectangular (or according to squareness), even as our devices afford resizing of font, scrolling through lines of text, and linking to related websites.[9] That we know how to approach a book or a webpage is indicative of our familiarity with a mode of mediation that we take for granted. Which means we are not so much "users," as Drucker contends, but "subjects" who are instantiated through our negotiations with media forms (177). Chapter three concludes with a call for critical interface design. Such design would "engage humanistic theory" (178). It would do so by exposing the "made-ness" of its artifacts and the "constructedness of knowledge" such made-ness affords.

The final chapter, "Designing Graphic Interpretation," begins to contemplate what this might look like, even as the book itself has been a working attempt at an example. Drucker encourages practices that are "diagrammatic, constellationary, or associative" (183). Moreover, she advocates for approaches to knowledge production that feature the spatial and the visual—rather than those that privilege linearity. She advocates "flexible" spaces for writing. At the same time, she asks us to think about how

interpretation changes in the context, size, and number of articulated screen displays, computationally enabled processes of analysis, and the different scales according to which we can access and negotiate content. How will the affordances of our networked environments allow us to construct arguments in the digital era? She asks us to think about how touch-based interfaces and the responsiveness of our screens open onto "zones of argument" (186). "Zone," as Drucker intends, refers to a multi-dimensional rhetorical mode, one that mobilizes text and image across various planes of interpretation, explanation, hypothesis, and that opens onto a variety of inter-related models of thinking. Patterns, framings and reframings, entanglements, embedments, hierarchies, and listings are the "new" ways of argumentation.

This claim warrants consideration, even as it may not be surprising to those who are familiar with the likes of Marshal McLuhan or Vilem Flusser—or those who have been exposed to the online journal Vectors, its offshoot authoring platform Scalar, the Media Ecology Project at Dartmouth, or even the emerging publishing possibilities supported by the metaLAB unit at Harvard University (whose imprint appears on the title page of *Graphesis*).[10] Drucker is correct in pointing out that our screens are not merely tools but a "means to think with" (194). And how we think in the digital era involves new behaviors: uploading, downloading, clicking, scrolling, swiping, linking, searching, and navigating.

Graphesis is timely in its attention to the nature of the visual. Our surroundings are teeming with screens displaying various content; images flow across and between them. Rarely do we stop to consider how that content is structured and to what ends. In fact, we frequently fail to *see* the graphical logics—for example, layout, border detail, color, font type and size, icons, etc.—underpinning how visual content means in particular ways, ways that are not linear and not informed by logocentric or numero-centric modes of thinking. In this regard, Drucker offers, as John Berger did in the 1970s, a much needed primer for those who would readily select an image solely for illustration or evidentiary purposes. And the latter approach predominates: literary scholars, rhetoricians, mathematicians, historians, social scientists, physical, biological and chemical scientists, engineers, among others, tend toward this use of images. But images do more than show and tell. Images "speak," they position us, they shape how we think and live. We would be wise to consider how the visual governs the way we interact with each other, and participate in and come to know (in) the world. In this regard, what Drucker accomplishes is a concise but necessary overview of how practices of visualization operate. She demonstrates, quite explicitly through the very form of her book, how the visual matters in an era where images of all sorts proliferate and spread.

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the Society for Cinema and Media Studies 2015 Anne Friedberg Innovative Scholarship Award.

** Please see "OIA Statement on Image Use in articles": http://openinquiryarchive.net/2012/02/08/oia-statement-on-image-use/

[1] See, for example: Rudolf Arnheim, *Visual Thinking* (Berkeley, CA: University of California Press, 1969); Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction," in *Illuminations: Essays and Reflections*, ed. and intro. Hannah Arendt (New York: Schocken Books, 1963), 217-251; John Berger, *Ways of Seeing* (London, UK: British Broadcasting System, 1977); Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: The MIT Press, 1990); Vilem Flusser, *Writings,* ed. Andreas Strohl, trans. Erik Eisel (Minneapolis, MN: University of Minnesota Press, 2004); Anne Friedberg, *The Virtual Window: From Alberti to Microsoft* (Cambridge, MA: The MIT Press, 2006); Gotthold Ephraim Lessing, "Laocoon," *The Bulletin of the American Art-Union* (August 1850): 73-75; Laura Marks, *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses* (Durham, NC: Duke University Press, 2000); W. J. T. Mitchell, *Picture Theory: Essays on Verbal and Visual Representation* (Chicago, IL: The University of Chicago Press, 1994); Erwin Panofsky, *Perspective as Symbolic Form* (New York, NY: Zone Books, 1991); and Marita Sturken and Lisa Cartwright, *Practice of Looking: An Introduction to Visual Culture,* 2nd ed. (Oxford, UK: Oxford University Press, 2009).

[2] Kircher image from http://3dpancakes.typepad.com/ernie/2007/10/subjectorum-uni.html

[3] Lyon image from the Opte Project (www.opte.org).

[4] I borrow "metapicture" from W. J. T. Mitchell. Metapictures are "pictures that refer to themselves or to other pictures, pictures that are used to show what a picture is" (*Picture Theory* 35).

[5] "Visuality," as I am using it here, refers to the fact that images are constructions through which social, cultural, and political agendas play out and naturalize into convention.

[6] While Drucker does not explicitly cite Foucault, her emphasis on the managerial functions of graphical elements and visual forms supports this connection.

[7] This is a surprising insight given Galton's field of specialization abstracted particulars in order to establish generalities that defined social "truths" (e.g., about genetic viability).

[8] I use "ethical" in the Foucauldean sense of *ethos*, or a practice of living or pattern of behavior. See: Michel Foucault, "On the Genealogy of Ethics: An Overview of Work in Progress," in *Ethics: Subjectivity and Truth. Essential Works of Foucault 1954-1983*, Vol. 1, ed. Paul Rabinow (New York, NY: The New Press, 1997), 253-280.

[9] Again, Drucker's examples are Western. While other graphical modes of information transmission, such as Chinese hanging scrolls, function according to established frameworks or

systems of presentation, they do not assume forms similar to the illuminated manuscript or codex. I thank Kirstin Ringelberg for raising this point.

[10] *Vectors* (http://vectors.usc.edu/journal/index.php?page=Introduction), Scalar (http://scalar.usc.edu/about/), Media Ecologies Project (http://sites.dartmouth.edu/mediaecology/), metaLAB (http://metalab.harvard.edu/about/).