Media Analysis: Ted Nelson, *Dream Machines*, 1974.
Kevin Driscoll
DRAFT: September 17, 2011

Introduction

Ted Nelson's 1974 book *Dream Machines* is not, strictly speaking, science fiction. Most of its content is drawn from the proceedings of academic conferences and the author's visits to computer science research labs around North America. Woven throughout this technical reporting is a speculative narrative in which home computing will soon enable universal access to the entire corpus of human knowledge. Nelson, an independent researcher, entrepreneur, and self-described "generalist," maintains a cynical distance from the traditional institutions of scientific inquiry at the same time as he glorifies the machines they produce. On any given page, Nelson is as likely to cite a scientific journal as he is to deny the authority of professional science. The resulting book, a deeply intertextual work, scarcely distinguishes the dreamy machines Nelson has actually seen from those that only exist in dreams.

The combination of true stories about science and engineering with science-based speculative fiction is not unique to *Dream Machines*. In fact, Nelson's project is similar in purpose and form to the editorial vision that drove Hugo Gernsback's publications in the 1910s and 1920s (Bleiler, 2011). Both men hoped to inspire a thriving popular technology culture through compelling stories grounded in scientific fact. They shared an aversion to technical jargon and insisted that science and technology should not be the exclusive domain of a credentialed elite. Furthermore, each of their visions was informed by the daily demands of life outside of the ivory tower. Where Gernsback stood to benefit from increased sales of his hobby electronics products, Nelson hoped to commercialize his own vision of personal computing.

Like Gernsback's willingness to publish short fiction alongside science reporting in magazines like *Modern Electrics* and *Science and Invention*, Nelson ignored conventional boundaries of genre and discipline in his assembly of texts for *Dream Machines*. When existing technology failed to illustrate his ideas, Nelson turned to literature, poetry, film and philosophy. In

this respect, Nelson's book reflects the wandering mode of creative thought described by Vannevar Bush in his 1945 article “As We May Think,” to which Nelson refers several times. Bush imagines a device that tracks the connections made by a reader following her curiosity through a vast library:

> “[The human mind] operates by association. With one item in its grasp, it snaps instantly to the next that is suggested by the association of thoughts, in accordance with some intricate web of trails carried by the cells of the brain” (Bush, 1945).

Dream Machines is the material realization of one such “trail.” Rather than refer through footnote or citation to documents outside of the text, Nelson reproduces the relevant passages right there on the page. In some cases, he draws an arrow with a felt-tip pen from one chunk of text to the next, explicitly indicating the connection he wants the reader to make. This approach to assembling a trail is reflected in Nelson's description of “hypermedia,” a system for the presentation of information in which readers navigate through a non-linear network of audio and visual materials.

Nelson is conversant in a number of programming languages but he does not write code. Calling himself a “computerman” rather than a programmer and an “explainer” rather than an engineer, there was no role in the contemporary computing culture for a person with his strengths. Software was designed by programmers and the field of human-computer interaction was yet to be named. Absent the technical apparatus, social circumstances, and programming skills to realize hypermedia as he imagined it, *Dream Machines* is both a proposal and a prototype for the system Nelson envisioned.

Self-publishing provided a platform on which Nelson could reproduce photos, text, and illustrations from a variety of sources without having to first seek permission. The resulting text is at once familiar, especially to readers steeped in the contemporary alternative press (272n28, Turner, 2006) and novel, suggesting connections among the seemingly disparate fields of filmmaking, writing, education, and computer engineering. What better way for Nelson to make a case for non-linear “hypertext” than to compose and publish his argument in as non-linear a fashion as print media could afford?

By the time he published *Dream Machines* in 1974, Nelson's interventions into the

prevailing discourses of computer science were not new. According to citations sprinkled throughout the text, most of his ideas were first presented in more conventional venues: conference proceedings, industry publications, and academic journals. Failing to convince those inside of the computing field, Nelson wrote *Dream Machines* to bring his vision of personal computing directly "to the People" (107). By making a strong first impression on open-minded readers, Nelson reasoned, they would not settle for the same old "cybercrud" when the computer industry finally turned its attention toward the individual consumer. Instead, they would demand human-friendly systems like the "dream machines" he described.

About the book

"Dream Machines" was published in 1974 as the 105-page "flip side" to Nelson's *Computer Lib*, a book that explained in plain language how computers work. *Computer Lib/Dream Machines* is printed in black and white on large format pages measuring 11"x16". Leafing through the pages, one sees columns of text of wildly different sizes and orientations pasted up alongside hand-drawn illustrations, marginalia, jokes, newspaper clippings, and snapshots of people sitting at computer terminals. Halfway through, the entire book flips upside down. *Computer Lib/Dream Machines* is reversible. Each half has its own cover and Nelson refers to *Computer Lib* as the "first half," and *Dream Machines* as the "second half."

Of the two sides, *Dream Machines* is clearly Nelson's priority. In the introduction, Nelson explains that "[*Computer Lib*] is an honest come-on" to prepare readers for the ideas presented in *Dream Machines*. He goes on to describe the book as an assemblage of materials selected for their "exhilarating and inspirational character," each one detailing some feature of a new media "dream" or "vision." Lest the reader think this a catalog to the World's Fair in Nelson's mind, he makes his stakes plain. Everyday readers need to start thinking about the design of new media because life is increasingly enveloped by media. "Hard-edged fantasy is the corner of tomorrow;" the "technicalities" of hardware and software are mere details to be worked out later.

Dream Machines addresses an explicitly counter-cultural audience. At the start of the *Computer Lib* side, Nelson's bio includes details about his academic experience and industry affiliations. On the *Dream Machine* side, however, he lists his “counter-cultural credentials” with references to astrology, Woodstock, and “dropping out.” Subsequent pages include R. Crumb strips clipped from *Zap Comics* along with passages from *Alice in Wonderland, Ozma in Oz* and other texts adopted into psychedelia. For the cover, an anonymous artist provided an illustration of a young man with torn blue jeans, sandals, long hair, and a Superman cape reaching out with one finger towards a rectangular screen illuminated against a solid black ground. This is the archetype of the programmers and artists who supported Nelson in the past and a sketch of his ideal readership: the “superstudents”—young, open-minded, frustrated with formal education, and steeped in the counter-culture.

Dream Machines is an appropriately flexible title for a text like this one. At first blush, the “dream” machine is the one you covet but can't afford, “my dream machine is a DEC PDP-11—if only I had $10,000 to throw around.” But, for Nelson, “dream machines” are also the machines depicted in dreams and the machines that will one day produce dreams. The former defies the engineer's dour practicality; it has a touchscreen, can process two million instructions per second, and pulls a perfect espresso shot while you wait. The latter machine is the one toward which Nelson's entire project is directed; the machine that blurs the lines between the dreaming and waking worlds through the real-time manipulation of endless, non-linear media networks.

The chaotic layouts of Nelson’s individual pages belie a clear argument that ties together the entire *Dream Machines* project. As readers make their way from the cover toward the interior, reading bits and pieces as they go, they learn about the state of the art in computer graphics, text manipulation, and networking. Each of these vignettes demonstrates an extant piece of technology that finds its way into one or another of Nelson's grand designs: Thinkertoys, Fantics, Hypermedia, Xanadu. Where Gernsback's writers were subject to review by a board of professional scientists, Nelson places scientific fact right alongside his speculative fictions. In *Dream Machines*, the

present-day and the near-future are always just a few inches apart.

Hypermedia

Having coined the term “hypertext” and contributed to one of the earliest working systems (Carmody, et al, 1969), Nelson is often remembered alongside Vannevar Bush and the Memex in histories of the World Wide Web (Wardrip-Fruin & Montfort, 2003). Bush's machine was inspired by an overwhelming rise in the volume of accessible scholarly materials, “publication has been extended far beyond our present ability to make real use of the record.” The primary purpose of the Memex was not to help researchers produce new texts but to help them better manage the deluge of texts already in circulation.

Nelson's vision for “hypermedia” inverts these concerns. Whereas Bush's speculative design starts at the experience of the research scientist, Nelson's begins with the director of a film. On the same page that he introduces the term “hypermedia,” he reviews experiments in non-linear and interactive film (14-15). Later, he compares interactive computing to “showmanship”, hypermedia to the “penny arcade,” and his overarching ideology to “Barnum-tronics” (95-96, 105). For Nelson, authorship remains a central concern and the “dream machine” is a universal medium for the presentation (or “performance”) of branching texts.

Hypermedia is interactive insofar as readers can adjust the level of detail and choose their own pathways through a text. In a hypermedia environment, they are not bound by the one-size-fits-all structure of a traditional text. But Nelson's vision stops short of a fully participatory medium. Hypermedia does little to challenge the division between author and audience even as it enlarges the range of possible texts and welcomes in new kinds of readership.

Nelson's investment in authorship as an individual achievement is evident in the complex system he suggests for linking among hypermedia documents. The HTML anchor or “hyperlink” familiar to users of today's World Wide Web is only the most rudimentary kind of connection by comparison. In Nelson’s ideal, authors would maintain master copies of their works in a publicly

accessible fashion somewhere on the network. Those who wished to quote from a document would pay a small royalty fee to the original author to establish a “transclusion” between the two works. This type of link would allow readers of the new work to trace every quotation back to the full text of the original document. Additionally, the transclusion is a two-way link so readers of the original document might find their way onward to one of the newer works.

Of all the features of hypermedia, this type of rich transclusion seems to have been one of the most difficult to represent in Nelson's printed prototype. Most of the clippings included in *Dream Machines* are accompanied by some form of credit: an academic citation, a footnote, a mailing address, or telephone number. In some cases, he simply indicates the original copyright owner with a hand-drawn symbol: “(c).” The labor and ambition required to follow some of these “links” makes Nelson's call for rapid information retrieval feel all the more urgent and compelling.

For critics frustrated by the unauthorized copying of digital information, Nelson's attention to royalties suggests an alternate world in which networked personal computing enables the creative industries to flourish. In a 2010 book, Jaron Lanier championed Nelson's vision of hypermedia as a system in which “anyone might be able to get rich from creative work” (101). But one wonders whether or not *Dream Machines* itself could have been produced at all if royalties were paid to each of its sources at the time of publication.

Conclusion, open questions

> “If hyper-media aren't the greatest thing since the printing press, this whole project falls flat on its face. But it is hard for me to conceive that they will not be” (102).

After trying for more than a decade to convince computing insiders to start building his hypermedia system, Nelson assembled *Dream Machines* as a working prototype in print, the medium to which he had ready access. Addressing a non-technical audience who would soon have the opportunity to purchase affordable home computers, Nelson hoped to inspire a popular technology culture grounded in his values. These values are summarized by his notion of “uncomputerish good-guy

systems”—sophisticated tools wrapped in an interface that a child can learn to use in fifteen minutes or less (105). By gathering together information about existing technologies and suggesting how they might be arranged into “good-guy” forms, Nelson hoped to create a consumer demand that the computer industry would be compelled to follow.

Throughout the text, Nelson does little to hide his hostility toward programmers who lack the “fantic imagination” needed to apprehend the hypermedia dream. Contemporary projects like the oN-Line System at Stanford and PLATO at the University of Illinois, each of which is lovingly profiled in the book, convince him that the barrier to hypermedia is not technology but ideology. Of course, *Dream Machines* presents only one side of this conversation. To better understand Nelson's decision to self-publish his vision of hypermedia, we need to know more about the discourse of computing within which he had been living and writing for the previous decade. What events in this culture might have convinced Nelson to turn away from the academy to address the counter-culture? Were there others attending the same conferences and reading the same papers who regularly corresponded with Nelson during time?

Furthermore, it would be useful to investigate the production, circulation, and reception of *Computer Lib/Dream Machines* among members of the computing culture it criticizes. The second edition—a ground-up re-creation published by an imprint of Microsoft Press in 1987—does away with many of the rough edges and quirks that characterize the original but includes blurbs from well-known figures the personal computer industry such as Lee Felsensetein and David Bunnell. It seems that during the intervening decade, Nelson's ideas had found a home. Perhaps this adoption of Nelson's humanistic approach suggests a fissure in computing culture. Which readers were most taken with Nelson's argument and how did they come upon the book? Where was it sold and how many were in circulation? Could one purchase it overseas? Did any professors assign it to their students?

Dream Machines articulated a mode of engagement with computers that very few actual humans had experienced in 1974. Nelson was clear that hypermedia (and especially Xanadu, the

system he hoped to commercialize) were not platforms for programming and computation. Rather, hypermedia would obscure the technical details of computing from the user so that he or she could focus on another task: writing a book, learning to speak a new language, or experiencing a non-linear film. For the present-day reader, this aspect of Nelson's “dream machine” is realized in devices like the iPad that present hypermedia in “uncomputerish good-guy” interfaces that require no technical training to operate. At the same time, these machines offer little to no opportunity for the everyday user to casually program them or significantly alter the way that they operate. In a sense, this is consistent with Nelson's vision; the division between producer and consumer remains strong. But how does this arrangement of technologies undermine the populist values that accompany Nelson's speculative design? Can hypermedia realize its potential as a platform for learning when its underlying operations are inaccessible to the audience? Would it have been conceivable in 1974 to think that the vast majority of computer owners and operators would not know how to read and write code?

References

Bleiler, Richard. (2011). “Hugo Gernsback and His Writers” in *Sense of Wonder: A Century of Science Fiction* (Ed. Grossman, Leigh Reynolds). Wildside Press.

Bush, Vannevar. (1945). “As We May Think”. *Atlantic Monthly*, July. Retrieved from: http://www.theatlantic.com/magazine/archive/1945/07/as-we-may-think/3881/

Carmody, Steven; Gross, Walter; Nelson, Theodor H.; Rice, David; van Dam, Andries (1969, April) *A Hypertext Editing System for the /360*, Center for Computer & Information Sciences, Brown University, Providence, Rhode Island, File Number HES360-0, Form AVD-6903-0, pages 26–27

Lanier, Jaron. (2010). *You are Not a Gadget*. New York: Knopf.

Nelson, Ted. (1974). *Computer Lib/Dream Machines*. Self-published.

Turner, Fred. (2006). *From Counterculture to Cyberculture*. Chicago, IL: Chicago University Press.