New Leaves

Broken Material Metaphor & Digital-Textual History

Martin Paul Eve

A Proposal for Stanford University Press

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Brief Synopsis

Contemporary computing is saturated with physical metaphor and analogy. It is a virtual *space* of *web sites*, of *windows*, of *menus*, of *icons*, and of *pointers*. There is a clear reason for such a prevalence of metaphor in this world. The metaphorical trope of relation provides a way for new users to imagine how a digital interface might work with respect to its physical correlate. This has been thought as true in the digital reading world as elsewhere.

New Leaves, however, exposes the weakness of our digital-textual, material metaphors. This book tackles and rewrites the most common assumption in UI design: that user interface designs for digital reading and writing are mentally constrained by and designed to mimic physical correlates. Conducting a new media archaeology of several digital forms – from pagination, whitespace, virtual typography, keyboards, directionality, and dimensionality, to technical protection measures – this book revises our understanding of material path dependencies, which are often erroneous or misplaced.

This book crosses between literary studies, material textual studies, and new media studies. It would be well suited to the 'Text Technologies' series at Stanford, if the editors would be amenable, but could also sit apart in its own right.

Biography

Martin Paul Eve is Professor of Literature, Technology and Publishing at Birkbeck, University of London. Martin holds a Ph.D. from the University of Sussex and is the author or editor of seven other books: *Pynchon and Philosophy: Wittgenstein, Foucault and Adorno* (Palgrave, 2014); *Open Access and the Humanities: Contexts, Controversies and the Future* (Cambridge University Press, 2014); *Password* (Bloomsbury, 2016); *Literature Against Criticism: University English and Contemporary Fiction in Conflict* (Open Book Publishers, 2016); *Close Reading with Computers: Textual Scholarship, Computational Formalism, and David Mitchell's* Cloud Atlas (Stanford University Press, 2019); *Reassembling Scholarly Communications: Histories, Infrastructures, and Global Politics of Open Access* (ed.) (The MIT Press, 2020) [passed review, in press]; *Peer Review and Institutional Change in Academia* (Cambridge University Press, 2021) [under contract with submission in February 2020]. He has held three large grants from the Andrew W. Mellon Foundation, is a co-investigator on the £3m Research England COPIM project, and was a 2019 winner of the Philip Leverhulme Prize.

Past Endorsements

'This book is full of 'aha!' moments. The sheer number, combination, and experimentalist élan of Eve's methods set a model for how future distant and close readers might work in concert, closing the gap between the digital humanities and the larger communities of scholars of literature, book history, and textual criticism.' — Alan Liu, University of California, Santa Barbara

Funding Acknowledgement

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Projected extent   **105,000 words**

Chapter Summaries

Introduction: Science Friction

Contemporary computing is saturated with physical metaphor and analogy. It is a virtual *space* of web *sites,* of *windows,* of *menus,* of *icons,* and of *pointers.* Our internet resources are *pages,* our word processors open onto A4 *sheets,* and our scholarly articles are rectangularly packaged to mirror the common-book form of the *Philosophical Transactions.*[1] There is a clear reason for such a prevalence of metaphor in this world. Even while we may smile as first-time users of a computer mouse are confused as to why lateral should translate to vertical motion, it is too easy to assume that digital interfaces are transparent and obvious.[2] Such assumptions lead to the well-known paradigm of supposedly intuitive interface designs, when really what is meant by 'intuitive' (or, more correctly, 'intuitable') is learned behavioral patterns. Intuitive, as Jeff Raskin puts it, really means 'familiar'.[3] This is why computer interfaces become '*more* intuitive' the more we use them, since metaphor pertains to a familiar relationship that is strengthened through repetitious encounter.[4] This trope of relation provides a way for new users to imagine how a digital interface might work with respect to its physical correlate. This has been thought as true in the digital reading world as elsewhere.[5]

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1 John Willinsky, Alex Garnett, and Angela Pan Wong, 'Refurbishing the Camelot of Scholarship: How to Improve the Digital Contribution of the PDF Research Article', *Journal of Electronic Publishing*, 15.1 (2012) <http://dx.doi.org/10.3998/3336451.0015.102>.

2 David Greetham, 'The Philosophical Discourse of [Textuality]', in *Reimagining Textuality: Textual Studies in the Late Age of Print*, ed. by Elizabeth Bergmann Loizeaux and Neil Fraistat (Madison, WI: University of Wisconsin Press, 2002), pp. 31–47 (p. 33).

3 Jef Raskin, 'Viewpoint: Intuitive Equals Familiar', *Commun. ACM*, 37.9 (1994), 17–18 (p. 17) <https://doi.org/10.1145/182987.584629>.

4 Raskin, p. 17; see also Adream Blair-Early and Mike Zender, 'User Interface Design Principles for Interaction Design', *Design Issues*, 24.3, (2008), 85–107.

5 Monica Landoni and Forbes Gibb, 'The Role of Visual Rhetoric in the Design and Production of Electronic Books: The Visual Book', *The Electronic Library*, 18.3 (2000), 190–201 <https://doi.org/10.1108/02640470010337490>; Ruth Wilson and Monica Landoni, 'Evaluating the Usability of Portable Electronic Books', in *Proceedings of the 2003 ACM Symposium on Applied Computing - SAC '03* (presented at the the 2003 ACM symposium, Melbourne, Florida: ACM Press, 2003), p. 564 <https://doi.org/10.1145/952532.952644>.

Yet, Dennis Tenen has encouraged us to think of such ubiquitous computational metaphors under the rubric of what he calls 'speculative formalism'.[6] This is a mode that recognizes the mediation and friction of such metaphors, that sees the Saussurean arbitrariness of the skeuomorphic 'trash can' in relation to the operations of, say, journaling file systems. It is a strategy that follows in N. Katherine Hayles's footsteps, calling for analyses of 'material metaphors'.[7] Speculative formalism is a model that acknowledges that '[s]imulations ultimately embody specific power structures in an economy of exchange between physical and mental resources'.[8] 'What does it mean', asks Tenen, then, 'to turn a page in a medium that sustains neither turning nor pages?'.[9]

This chapter introduces the volume in terms of Tenen's 'speculative formalism' but also through its own concept of 'science friction': the notion that the materialistic metaphors that underpin our understandings of the histories of computing are leading us astray. The fact that we use metaphors to describe, for instance, our page-like composition surfaces leads us to believe that 'the physical page' holds an overwhelming power over our computational environment. As Chapter One shows, this is not necessarily so. More important for my argument here is the question of how *strongly* such metaphors hold: how deterministic are the physical environment and historical path dependencies of our virtual practices? For Wendy Hui Kyong Chun has rightly cautioned us that analogy is not a singular, one-to-one relationship but provides for messy and perspectivized lineages.[10] It is the proposition of *New Leaves* that the friction

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6   *Plain Text: The Poetics of Computation* (Stanford, CA: Stanford University Press, 2017), pp. 51–54; note that this concept is different to that proposed by Tom Eyers, *Speculative Formalism: Literature, Theory, and the Critical Present* (Evanston, IL: Northwestern University Press, 2017).

7   *Writing Machines*, Mediawork Pamphlet (Cambridge, MA: The MIT Press, 2002), p. 23.

8   Tenen, p. 53.

9   Tenen, p. 26.

10 Wendy Hui Kyong Chun, 'On "Sourcery," or Code as Fetish', *Configurations*, 16.3 (2008), 299–324 (pp. 299–300) <https://doi.org/10.1353/con.0.0064>.

of such metaphors – when unpicked and dismantled – can yield to us fresh understandings of the conditioning forces that have crafted contemporary textual technologies.

Chapter I: New Leaves

As Johanna Drucker has noted, 'page space isn't a given, an a priori static entity'. Virtual pagination exists due to technological dependencies on, and readers' mental familiarity with, print, we are told. Many commentators believe that such a reliance on print must be overcome in the digital space. By contrast, this chapter argues that print pagination exerts a far weaker historical hold on contemporary digital textual reception. Specifically, this chapter conducts a material-textual archaeology and new-media historical re-interrogation of three interrelated phenomena: 1.) that digital pages do not behave as do their physical correlates, but instead mimic earlier historical forms of print that fused pagination, scrolling, and the tablet form; 2.) that the relatively late development of PDF as a trans-media pagination format was almost abandoned by Adobe's board of directors, who could see no audience for it; and 3.) that there are other stronger lineages of constraint for digital pages that come from cinema, television, and line-printer continuous paper, rather than the single-leaf printed page. Drawing on new correspondence with the creators of the PDF format, the emergent argument from these historical tracings is that the role of the virtual 'page' in digital environments is much more loosely and frictionally metaphorically associated with the reality of hard-copy pagination. This chapter shows how the digital page almost never came to the prominence that is now presumed.

Chapter II: Margins of Error

How do we understand 'whitespace'? How did whitespace even become white?

Leading on from the discussion of visual display units at the close of Chapter One, this chapter interrogates the histories, conventions, namings, and uses of negative space in computational textual environments. This chapter sequentially examines three aspects of whitespace and the physical metaphors/constraints that play in this area: 1.) the transition from white page surface to black-background terminal visual display units; 2.) compositional and display uses of margins, tabs, and other whitespace; 3.) the Unicode system's variable characters for different whitespace widths, including analogies to the em- and en- spacers but documenting and noting the twenty-five different types of whitespace character provided for within the specification.

This chapter touches on many aspects of the neglected importance of whitespace. The most prevalent, and arguably most important, computer programming language of the past decade – Python – uses whitespace as its distinctive syntactical markers that determine logical code flow. Further, non-display control characters – a kind of 'negative space' – such as the LTR and RTL characters – are crucial for the correct display of left-to-right and right-to-left languages, as apart from the Anglocentric defaults of computational character flow.

In its examination of invisible typography, this chapter paves the way for Chapter Three's exploration of ASCII art and its use of non-European character sets for decorative effect. This chapter also, though, breaks the metaphor of computer typography as having a print-equivalent, noting the ways in which the 'invisible ink' of character controls have functional outcomes, more akin to speech acts than character displays.

Chapter III: The Imperialism of Fonts

What could be less political than the computational design of typography? It turns out,
quite a lot, particularly when we deal with various forms of ASCII art that emerged
from the 1980s and 1990s DemoScenes. The NFO files produced by these groups are
written in a format that takes advantage of particular typographic features in order to
render a type of concrete poetic outline. There is, though, a history of computational
colonialism at work in this double-layered process. For the characters that translate into
ASCII art blocks when used in an appropriate font are all drawn from the non-English
alphabet. Without overly conflating different histories of exclusion, here we see a
linguistic bias rooted in colonial geographies that sits in parallel to the way in which
search engines have premised their models on the cultural assumption of the
transcendental white subject and the history of computing has worked to erase women
from its record.[11]

This third chapter dismantles the assumption that digital typography and font
design are 'just letters'. It thus explores the way in which a linguistic colonialism has
emerged in the development of typography through an analysis of the Unicode
implementation of the Ho language. For in 2007, K David Harrison and Gregory
Anderson noted in a letter to the Unicode consortium that:

> The current Unicode proposal (authored by Michael Everson, dated 1999-
>
> 01-29) is incomplete in its current form and notably requires consultation

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11 Safiya Umoja Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York,
    NY: New York University Press, 2018); Marie Hicks, *Programmed Inequality: How Britain
    Discarded Women Technologists and Lost Its Edge in Computing* (Cambridge, MA: The MIT Press,
    2018); Roopika Risam, *New Digital Worlds: Postcolonial Digital Humanities in Theory, Praxis, and
    Pedagogy* (Evanston, IL: Northwestern University Press, 2018). See also Tara McPherson, 'Why Are
    the Digital Humanities So White? Or Thinking the Histories of Race and Computation', in *Debates
    in the Digital Humanities*, ed. by Matthew K. Gold (Minneapolis, MN: University of Minnesota
    Press, 2012), pp. 139–60 <https://doi.org/10.5749/minnesota/9780816677948.003.0017>.

and fact-checking with the user community. While it is crucial that the Ho

orthography be included in Unicode, this can only be done in close

consultation with Ho scholars at every step of the process. As a practical and

ethical matter, we urge the Unicode consortium to accept only proposals that

emerge from or are formulated in close consultation with native speaker

communities. To do otherwise is to espouse a kind of linguistic colonialism

that will only widen the digital divide.[12]

Indeed, one of the basic premises seen in the Unicode specification is that

English-language Latinate characters are the first to appear in the table, while other

linguistic systems are often relegated to much higher assignations. Sometimes, as

Sharjeel Imam points out, these 'other' languages are spread across many different

blocks, rather than in the more concentrated forms of the Latin alphabet.[13]

'Internationalisation', then, means a spread outwards from English to other cultures,

demonstrating a strong Anglocentrism. As Don Osborn puts it, for example, 'Apart from

Arabic, the development of the use of African languages in computing and the internet

has been relatively slow for a number of linguistic, educational, policy and technical

reasons' while 'a particular problem for a number of languages written with modified

letters or diacritic characters – or entire alphabets – beyond the basic Latin alphabet (the

26 letters used in English) or the ASCII character set (that alphabet plus basic symbols)

has been the way in which computer systems and software handle these'.[14] As 'an

industrial standard controlled by the industry', in Domenico Fiormonte's words, we

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12 K David Harrison and Gregory Anderson, 'Review of Proposal for Encoding Warang Chiti (Ho Orthography) in Unicode', 22 April 2007 <https://www.unicode.org/L2/L2007/07137-warang-chiti-review.pdf>.

13 Sharjeel Imam, 'Digital Colonialism: 1. All Latin Alphabets and Symbols Are Denoted in Unicode by the Range of 0 to 500 in One Single Block. But Urdu-Arabic Alphabets Are Scattered in Five Different Blocks Ranging 1500 to around 64000.', @_imaams, 2017 <https://twitter.com/_imaams/status/934109280285765632> [accessed 4 April 2019].

14 Don Osborn, *African Languages in a Digital Age: Challenges and Opportunities for Indigenous Language Computing* (Cape Town: HSRC Press, 2010), pp. 59–60.

should be sceptical around 'claims about the neutrality or impartiality of' Unicode – the

subject of this chapter.[15]

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15 Domenico Fiormonte, 'Towards a Cultural Critique of the Digital Humanities', *Historical Social Research / Historische Sozialforschung*, 37.3 (141) (2012), 59–76 (p. 64).

Chapter IV: Multi-Dimensional Texts

Directionality and dimensionality are key to many metaphors in the computational world. Our supposed path of web browsing, for instance, is confined to the two dimensional metaphors of a linear-timeline: forward and back. We also have *home* pages, but *home* further refers to the start of a line of text, as well as the starting screens that users may customize within their browsers. Yet these metaphors are dubious at best.

Indeed, consider the way in which multi-dimensionality is configured in contemporary web browsers for textual and media consumption: that is, through tabs. The assumed linearity of a browsing 'history' cannot accommodate the fact that, in fact, our histories are non-linear and multiple, spread across many axes and dimensions – as, in some ways, are our offline reading practices. This chapter is concerned, then, with the metaphors of spatial placement of computer users and the directionalities from those placements that are assumed. Tracing this back to Howard Hinton's explorations of multi-dimensionality in his concept of the tesseract in the nineteenth century, Chapter Four here attempts to disturb our metaphors of time and place.[16] This chapter aims to force a reconsideration of the ways in which multidimensionality is grafted atop linearity in the digital environment; thereby asking difficult questions of thought processes, reading practices, and navigation.

This chapter, then, is as much about the 'unbinding' of our reading pathways as was Chapter One in its discussion of non-pagelike digital pages. Drawing on theorisations of non-linearity in electronic literature – while avoiding cliched and outmoded rehashings of statements about 'hypertext' – Chapter Four dismantles the simple unidirectionality of metaphors of start-to-end reading. It does so not only

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16 Charles Howard Hinton, *The Fourth Dimension* (New York, NY: Arno Press, 1976); Mark Blacklock, *The Emergence of the Fourth Dimension: Higher Spatial Thinking in the Fin de Siècle* (Oxford: Oxford University Press, 2018).

through technological analysis, but also with reference to 'multi-dimensional texts' such as B.S. Johnson's book-in-a-box, *The Unfortunates* (1969).

Further, this chapter advances the arguments about 'home' and othered 'away' that were presented in Chapter Three, noting that the importance of how imagined textual readers and producers are placed by interface and software design. It also, though, queries the binaries of the terms used herein. What does it mean, this chapter asks, to present different spaces as 'homes' in various contexts, and who makes the decision about the identity of home in such environments? Why is it that the antonym of 'home' in the digital textual sense is 'end' and not 'away'? How might we read the globalised political contexts of digital homes?

Chapter V: A Sense of Vision

In many ways, Microsoft is and was a *visionary* organization. Admittedly, many people disagree with its visions, be they for operating systems, proprietary software, or vast corporate profits, but *vision* has been key to Microsoft's metaphors for years. Microsoft gave us *Windows* that open onto *Vista*s, yielding fresh *Outlook*s and *Paint*ing new scenes within *Visual* Studios of virtual design. Indeed, it is ironic that a company sued for anti-trust should name its core product and system of visual iconography after an icon of transparency: the window. It is also curious as the windows that contain the visual output of our software are not really opening *onto* anything. They are instead the result of complex compositing and rendering processes within software. Yet the metaphor invites us to imagine that we are seeing *through* a portal – a transparent opening.

This chapter examines the implications of these metaphors of transparency and vision, with specific focus on the ways in which Microsoft brought the 'Windows Key' to PC keyboards around the world, normalizing their operating system, but also the metaphor of the Window for textual composition and reception. This chapter works to dismantle the metaphor of the window by analysing the ways in which the logic sits within the complex dynamics of opening and closing (in relation to Microsoft's historical relationships to open-source communities), and locking and unlocking, windows.

Most importantly, however, this chapter examines the thorny issue of ability discrimination in digital-textual metaphor and the assumptions of users' identifications with sensory metaphors. The question then becomes: can a trope of relation be provided through a metaphor with which a substantial number of impaired users will have little

familiarity? How, this chapter asks, does the mediation of *imagined* or *remembered* rather than *experienced* sense condition our interface interactions?

Fusing the work on path dependencies in Chapter One on pagination, on command-actions in Chapter Two, on typography and standard-infiltration in Chapter Three, and on linearities and directionalities of vision from Chapter Four, this chapter works to synthesize the book's findings until this point, coalescing around Microsoft's successful insertion of its visual metaphors into the vast majority of keyboards manufactured today.

Chapter VI: Libraries without Books

An age-old interview task for programmers consists of the following: set a moderately complex, intermediately difficult problem. Observe the candidate. The outcome is appraised thus: did the candidate try to reinvent the wheel and write their own code to solve the problem or did s/he download and use an existing library of code to do the job? The desired behaviour in most situations is the latter. Technological corporations do not want programmers who rewrite already-existing material.

Yet what is this metaphor of the 'code library'? In common technological usage, it refers to a framework of existing computer code that can be re-deployed within multiple new contexts. An example of this might be a fragment of code that converts a decimal number (say, '15') to a hexadecimal representation ('F'). There are several contexts that might require such a code fragment and it does not make sense to rewrite the code to do this every time. Hence, we have libraries from which one can 'borrow' code.

As Stuart Lawson has recently charted, however, the history of libraries is complex and political. The economics and geopolitical entanglements are many. For instance, early libraries were often subscription based and the idea that open public lending would take place was far from the original idea. Further, class structures in the history of libraries meant that ideas of self-improvement for the working classes – yet imposed by the ruling classes – led inexorably towards the neoliberal self-made and self-bettering subject. Finally, libraries built overseas in the era of the British Empire in particular attempted to educate colonial subjects in a patronising and top-down fashion. Libraries are far from the purely beneficent entities that they are often made out to be.

This has implications for our understanding of code libraries, investigated in this chapter. The analysis here focuses on three metaphorical breakages within the concept of the code library: borrowing, learning, and improvement.

On the concept of borrowing, this chapter highlights the non-rivalrous nature of 'borrowing' in the digital context, while also tracing the history of (non-)lending libraries, on-site access, and subscription-only libraries. On the matter of learning, this chapter highlights the fact that code libraries often actually obscure their contents from the 'borrower'. An of-repeated example of this is the adage that a programmer should not 'roll their own cryptography', but should always use an audited library. However, in so doing, this act of borrowing means that very few coders ever learn how to produce reliable cryptographic functions. Finally, on ideas of societal self-improvement, this chapter highlights the centralization implicit in the idea of a code library and the reduction of sites of failure to a single point. For when bugs are discovered in widely used code libraries, the impacts are often systemic and extremely dangerous. Should such centralization, as against diversity and proliferation, be considered as self-improvement?

This chapter also, by necessity, deals with the nature of code as opposed to other forms of textual production. Rooted in histories of performative utterances and following recent work by Caroline Bassett and David Berry, the libraries without books to which this chapter turns are more akin to magic incantations; summoning spells of esoteric knowledge, enmeshed in broken metaphorical tropes that re-enforce a false history of the contemporary library.

Chapter VII: The Sacred Unreadable Artefact

How 'safe' are our digital texts? What do we even mean by the metaphors of safety and protection in the virtual world? This chapter examines the digital-textual tensions between proliferation and insularity, between dissemination and hoarding, between abundance and scarcity. As such, Chapter Seven is dedicated to digital-textual preservation and to digital-textual copy protection: both fall under the rhetoric of keeping texts safe, but the metaphors stretch in opposite directions.

This chapter takes as a case study the recent introductions to and reports on the UK's non-print legal deposit regulations, which extend the requirement of deposit of physical print items in the national deposit libraries to digital objects. Under such a system, I here argue, we see a fetishisation of an inaccessible archive; we develop a set of sacred unreadable artefacts, with librarian custodians as the high priests. This is no more clear than in the physical location requirement of this legislation, which prohibits off-site digital access to the deposited material, thereby rendering it more a print correlate than anything else. This is to ensure protection of publisher revenue, demonstrating a difference of extreme degree, rather than type, for widespread digital access. At the same time, the protection is designed to ensure the long-term survival of the artefact, even if there is no plan ever to release the item for general consumption. Indeed, the UK legislation specifically introduces a clause that deftly circumvents such items ever entering the public domain. In such cases, I argue, the system is one in which society never stopped to ask *why* it was saving material, other than because it thought it *should* and because it *could*.

Such protection mechanisms interact strongly with copyright law but thus, also, with localised sentiments of nationalism. Indeed, insular protectionism and national

isolationism are strong drivers of digital preservation practice, conditioned through soft power mechanisms of infrastructural funding. The UK Web Archive, for instance, has had to deal with issues of even defining what a 'UK website' is or means in a distributed global, digital era. Thus, once more, the political implications of metaphors of protection in the textual space are here brought to the fore.

More broadly, metaphors of protection are dismantled in this chapter and shown to be torn across several axes at any one time. For every stakeholder group who require a form of textual 'protection', another set is placed in jeopardy. Ranging from shadow archives, to pirate libraries, to formal legal channels, this chapter brings to the fore the complex dynamics of protection and preservation of the contemporary digital text.

Chapter VIII: Futures Past

This final short chapter offers a speculative creative vision of a different digital world, one in which alternative metaphors could have conditioned our interface interactions. Charting a day in the life of Jill Warlock the world here painted is one in which plastic overhead projection slides are created for each modified digital scene, accumulating a colossal rate and thereby causing massive environmental and ecological damage. In the meantime, for 'faster' editing, soundscapes are painted that convey, in a Morse-code-like language, the textual manipulations that have been made as workers sketch alphabets in the air.

An exercise in imaginative speculative thinking, this chapter rounds off the book with a demonstration, no matter how seemingly fantastic, of how metaphors condition our futures and have conditioned our futures past. The future, certainly, isn't what it used to be.

Estimated Delivery Date

I anticipate delivery before December 2023.

Figures and Tables

There may be up to 10 black and white figures in the text and up to 3 tables.

Prior Publication

Chapter One is currently under submission as a journal article. Chapter Seven is based on a keynote given at the University of Cambridge in 2019.

Fit with Existing Literature

This is a work of new media archaeology/digital textual history. It sits alongside the extensive body of work by Johanna Drucker, Matthew Kirschenbaum, Lev Manovich, Dennis Tenen, Wendy Hui Kyon Chun, Kathleen Fitzpatrick, N. Katherine Hayles, John Willinsky, and others.[17] An international perspective on the book's merits could also be provided by Jane Winters, Paul Gooding, Melissa Terras, or James Baker, all of whom

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17 Johanna Drucker, *The Century of Artists' Books* (New York, NY: Granary Books, 1995); Johanna Drucker, *The Alphabetic Labyrinth: The Letters in History and Imagination* (London: Thames & Hudson, 1999); Johanna Drucker, *SpecLab: Digital Aesthetics and Projects in Speculative Computing* (Chicago, IL: University of Chicago Press, 2009); Matthew G. Kirschenbaum, *Track Changes: A Literary History of Word Processing* (Cambridge, MA: The Belknap Press of Harvard University Press, 2016); Lev Manovich, *The Language of New Media*, Leonardo (Cambridge, MA: The MIT Press, 2002); Tenen; Chun; Kathleen Fitzpatrick, *Planned Obsolescence: Publishing, Technology, and the Future of the Academy* (New York, NY: New York University Press, 2011); Hayles, *Writing Machines*; N. Katherine Hayles, *How We Think: Digital Media and Contemporary Technogenesis* (Chicago, IL: University of Chicago Press, 2012); Willinsky, Garnett, and Pan Wong.

have also conducted extensive recent digital research work in this area.[18] It is, though, the first volume to offer the history and analysis of its entities in depth.

The book also fits within the traditions of material texts analysis and cultural studies. Recent work in this field that complements this book include those by Adam Smyth and Dennis Duncan, Lisa Gitelman, Bonnie Mak, Jerome J. McGann, and Alberto Manguel.[19]

Finally, the book resonates with a set of ethical digital readings in recent years that have stressed the importance of solid social theoretical frameworks for appraising the contexts within which technology emerges. Hence, in its appraisals of the imperialism of fonts and the ethics of digital preservation, this book also sits well alongside the work of Roopika Risam, Mar Hicks, and Safiya Umoja Noble.[20]

Intended Audience

The intended audiences for this book are:

- Literary scholars interested in digital-material textual history

- Scholars of the history of the book

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18 Jane Winters, 'Giving with One Hand, Taking with the Other: E-Legal Deposit, Web Archives and Researcher Access', in *Electronic Legal Deposit: Shaping the Library Collections of the Future*, ed. by Paul Gooding and Melissa Terras (London: Facet Publishing, 2020); *Electronic Legal Deposit: Shaping the Library Collections of the Future*, ed. by Paul Gooding and Melissa Terras (London: Facet Publishing, 2020); James Baker and David Geiringer, 'Space, Text and Selfhood: Encounters with the Personal Computer in the Mass Observation Project Archive, 1991–2004', *Contemporary British History*, 33.3 (2019), 293–312 <https://doi.org/10.1080/13619462.2018.1539828>.

19 *Book Parts*, ed. by Dennis Duncan and Adam Smyth (Oxford: Oxford University Press, 2019); Lisa Gitelman, *Always Already New: Media, History and the Data of Culture* (Cambridge, MA: The MIT Press, 2006); Lisa Gitelman, *Paper Knowledge: Toward a Media History of Documents*, Sign, Storage, Transmission (Durham, NC: Duke University Press, 2014); Bonnie Mak, *How the Page Matters*, Studies in Book and Print Culture Series (Toronto: University of Toronto Press, 2011); Joseph A. Dane, *Out of Sorts: On Typography and Print Culture*, Material Texts (Philadelphia: University of Pennsylvania Press, 2011); Joseph A. Dane, *Blind Impressions: Methods and Mythologies in Book History*, Material Texts (Philadelphia: University of Pennsylvania Press, 2013); Jerome J. McGann, *The Textual Condition* (Princeton, NJ: Princeton University Press, 1991); Jerome J. McGann, *A New Republic of Letters* (Cambridge, MA: Harvard University Press, 2014); Alberto Manguel, *A Reader on Reading* (New Haven, CT: Yale University Press, 2010).

20 Risam; Hicks; Noble.

- Those interested in cultural/theoretical digital humanities work

- Digital historians

- Students of any of the above

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