

Digital Caricature

Sean Sturm <s_dot_sturm_at_auckland_dot_ac_dot_nz>, The University of Auckland

Stephen Francis Turner <sf_dot_turner_at_auckland_dot_ac_dot_nz>, The University of Auckland

Abstract

For Vilém Flusser, philosopher of technology, the advent of photography heralded the return of the image from its subjection to the linearity of written language. Here we extend his concept of the “techno-image” (successor of the pre-historical hand-drawn image and the historical printed word), to consider the digital image-text that today dominates reading and writing. Our question: Can we reader-writers think the digitas, or are we doomed to perform its functions in an “automati[c]” or “robotiz[ed]” fashion, as Flusser put it, so that, if anything, the digitas now “thinks” us? The short answer to our question is as follows: we can think the digitas, but only if we consider it, firstly, as a kind of writing (“digital orthography”) and, secondly, as a caricature of thinking, both impoverished and, dare we say it, funny (“digital caricature”).



Figure 1. Vilém Flusser [Sommer 2012]

Introduction

For Vilém Flusser, philosopher of technology, the advent of photography heralded the return of the image from its subjection to the linearity of written language. Here we extend his concept of the “techno-image” (successor of the pre-historical hand-drawn image and the historical printed word), to consider the digital image-text that today dominates reading and writing [Flusser 2004, 40].^[1] When Flusser ponders this technological revolution in the “Future of Writing”, he concludes that old school reader-writers – like us – are unable to fathom the world into which we have been thrust because we are chained to a “historical consciousness” based on the sequential, progressive logic of syntax and the sentence [Flusser 2004, 63]. We take this supposed inability to come to terms with what Lisa Samuels has called the “digitas” – “civitas, digital acts, habitus, and the digits we call our fingers” [Samuels 2008, 1] – as our point of departure. Our question: Can we reader-writers think the digitas, or are we doomed to perform its functions in an “automati[c]” or “robotiz[ed]” fashion [Flusser 1999, 52], so that, if anything, the digitas now “thinks” us?

1

The idea that the digitas cannot be thought is part and parcel of “posthistory” [Flusser 2004, 144]. Because we reader-writers are caught in a predigital “critical” consciousness, the nature of post-history necessarily eludes us, hence our anxiety about the loss of history, deep reading and critique itself – especially among “the young” (who roll their eyes at the lack of techno-savvy of their “olds”). As supposed digital natives fully attuned to the image-text, they manipulate the digitas, seemingly without angst, as “functions” of its apparatus [Flusser 2005, 32]. Though the generational divide between such natives and we “settlers” is often overstated [as in [Prensky 2001]; see [Sheely 2008],^[2] the problem of thinking about this technological revolution from our side of the historical divide strikes us as real enough – and

2

pressing, given the economic and educational implications of “digitisation”. In this essay, by way of an answer to our question, one that is by virtue of its prophetic nature hypothetical, we reconstruct the epochal shift from word to image-text that made possible the world of the *digitas* to locate such other worlds as are possible within it. According to Deleuze, to reconstruct a “dispositif”, or apparatus, like the *digitas* is to map its “lines of force and flight”, that is, its constraints and, more importantly for us, its possibilities or “surplus-value” [Deleuze 1992, 160–161].^[3]

For Flusser, the digital image-text works like the early Wittgenstein’s logical proposition.^[4] It does not refer to anything outside of itself, but rather embodies, or “concretizes”, a computation [Flusser 2005, 15]. It is not a “thing in the world”, but a flat picture-thing that concretizes code [Heidegger 1992, 188]. Nothing more can be said about it than it says itself; to write about it is merely to “illustrate” it – which is, Flusser would say, a reversal of the role that images have played for a millennium as illustrations of written texts [Flusser 2004, 39–41]. Our construction of the *digitas*, however, works much like the later Wittgenstein’s problematising of his earlier work on logical propositions: we would argue that there *is* something to be said that cannot simply be shown – though the flat screen that typifies the *digitas* seems to suggest otherwise.^[5] The short answer to our question, then, as to whether we reader-writers can think the *digitas* or are doomed to be thought by it is as follows: we can read living and lived worlds in the *digitas*, but only if we consider it, firstly, as a kind of writing (“digital orthography”) and, secondly, as a caricature of thinking, both impoverished and, dare we say it, *funny* (“digital caricature”). To put it another way, to attend to digital caricature requires attention to writing as image, or impression.

3

Image and impression



Figure 2. “Correction of a Writing Tablet”, detail of “School Scene” [Douris 2012]

The world may well be our impression (“all that is the case” [Wittgenstein 2001, 5 section 1]), but we only know “it” by

4

the impression that it makes upon us; otherwise, it remains incommunicado. An impression of any kind requires a medium and a tool to inscribe it. It is not a question of what it is “out there” or independent of us but of the role played in the self in the world by an intersubjective system of communication. This is not just a matter of language. The world does not press upon us; we are of a piece with it. Rather, a system of communication presses upon our relation to the world: on how we relate to it, how we go about in it and how we talk about it. [6] What “impresses” us is not so much the world as the various forms its impressions have taken.

For we reader-writers, the development of the alphanumeric writing system in the service of the exchange of goods – and meanings – informs our interactions with others and the environment (in fact, alphanumeric writing began as an impression in clay for the purposes of accounting) [Ezzamel and Hoskin 2002, 341–42]; see [Kittler 1996]. Interaction with the world and others gives rise to a perceptual apparatus, a sensorium, that takes on thing-like shapes and structures. But an “image”, contra Locke’s well-worn argument in *An Essay Concerning Human Understanding* for the mind as *tabula rasa*, is not the result of the unmediated impact of things upon our perceptual apparatus that gives rise to impressions mentally compounded in the form of “simple” and “complex ideas” [Locke 1996, 40]. Rather, an image, for our orthographical aesthetics, is shaped by writing systems into the service of which language has already been pressed – the physical form, for instance, of Locke’s words or works. Our sensorium is a *scriptorium*.

What we call digital orthography (the *digitas* considered as writing, that is) concerns writing systems rather than language per se because the latter can be thought only through the former. Writing dominates modernity because, as Flusser puts it, “[t]he more texts one writes (and reads), the more textually one thinks, and the more textually one thinks, the more one writes and reads” [Flusser 2007, 20]. [7] As writing and written subjects, reader-writers cannot help but think through language that is already pressed upon by the alphanumeric system, with its orthography (literally, “straight writing”) of selves and things (subjects and objects) arranged according to a linear logic of cause and effect (predication). This system is the basis of our historical sense qua narrative: to quote Flusser, “the close connection of writing to speaking through the alphabet had the distinctive result that the rules of thought were initially posited as equal to the rules of writing (orthography) and then to the rules of language (logic)” [Flusser 2007, 20]. However, the kind of discursive logic proposed by the early Wittgenstein, following efforts by Alfred Whitehead and Bertrand Russell to found philosophy in propositional language, has been superseded by the kind of algorithmic logic that is inscribed in our digital technologies [Whitehead and Russell 1997, 61–64]. For this reason, technology is often mistakenly metaphorized: today, the body is “programmed”; the brain “computes”; etc. Without, then, reducing mental processes to the algorithmic operations of the *digitas* (because we wish to avoid technicity [Stiegler 1998, 16–17] as much as discursivity [Foucault 1998, 217–19]), we can admit that what “presses” upon and increasingly shapes our mental processes today is digital orthography. No doubt, the more image-texts we see on screen, the more screen-wise we think: our Sumerian clay is the portable computer. But if our perceptual apparatus is today shaped by digitally generated impressions, firstly, how does the digital image-text differ from the analog text (assuming, for argument’s sake, that a strict binary exists); and, secondly, how can that difference be thought (assuming, once again, that we reader-writers can do so)?

Spacing and speed

Digital orthography is not linear or critical, but algorithmic or calculative; not historical, but post-historical.

	historical age (analog)	post-historical age (digital)
mode	writing, i.e. critique and representation (<i>mimesis</i>)	computation, i.e. calculation and concretization (<i>mathesis</i>)
medium	book	screen [8]
“logic”	linear, hypotactic	algorithmic, paratactic
positionality	subjectivity, authorship	status, programming

Table 1. The historical and post-historical ages.

Writing is giving way – to the regret of some – to computation, or programming (“numbers are beginning to free

themselves from letters”, writes Flusser [Flusser 2011a, 26]), though we reader-writers cannot help but critique. While the advent of linear perspective often taken as emblematic of modernity created the illusion of real-world depth, the disappearing point of the digital perspective, our “lever” on the digitas, is zero as digit (... 10011 ...) and dimension (>).^[9] Zero is the algorithmic basis, and sine qua non, of digital computation and, by “real abstraction” (concretization), of the digital image-text.^[10] What was once a space and placeholder, the “zero-marker”, has become a “proper” digit in the digitas: the idea of zero in writing as the place “between” – the interword and intersentence spaces, literal and metaphorical – has been eliminated because the binary digital on/off excludes a middle [Kaplan 2000, 59–60].^[11] (Similarly, the digitas can’t be half on.) But what we don’t see when we read and write online is the code that underwrites the digital image-text on the screen.^[12]

This is a code.

**010101000110100001101001011100
110010000001101001011100110010
000001100001001000000110001101
101111011001000110010100101110**

Figure 3. “This is a code” in code.

Both digital computing and imaging reduce the alphanumeric system to strings of zeros and ones in a further abstraction of writing systems already at a remove from things in the world – albeit that the digital image-text can simulate “reality” losslessly [Kaplan 2000, 12, 59–60]. Whereas Walter Benjamin, Flusser’s precursor, dwelled on the “aura” of a world in photography, for Flusser, the digital image-text is characterized by the loss of a world [Benjamin 2008, 22–27 (sections 4–7)]. Flusser argues that black-and-white photographs are “more true” in this sense because they instantiate a photographic “proposition” that cannot be mistaken for the “real” thing (a naturalisation, or digital phenomenalism, that in literary works Paul De Man calls “aesthetic ideology” [De Man 1984, 264]). As he puts it, they “embody the magic of theoretical thought since they transform the linear discourse of theory into surfaces” [Flusser 2005, 43–44]. But binary encoding cuts across artistic and non-artistic experience and expression: we cannot talk about an art “world” set apart from the ubiquitous digitas and offering a critical meta-commentary upon its social practices and meanings; we must talk instead about the loss of a “real world” as a point of reference for art, and the consequent end to its “critical” function [Groys 2008, 6–9].

The binary nature of the digitas echoes Jacques Derrida’s concept of “spacing” in language, the relational – or “differential” – play of binary oppositions (in the terms of structural linguistics, the paradigmatic and syntagmatic axes) [Derrida 2004, 23–25]. Its anti- or self-referential nature echoes his epistemologised world-text, the world “over-written”, or discursified, by the language (“there is nothing outside of the text *il n’y a pas de hors-texte*” [Derrida 1997, 158]). Derrida’s deconstruction is in this sense proto-digital. But whereas the alphanumeric system is regulated (“orthographized”) by rules of writing, including capitalisation, punctuation and, in particular, literal spacing, which Derrida more deeply reads as *différance*, or self-referentiality, the digital system is “regulated,” or better, paced, by the speed of a mobilised application that involves a new non-orthographic “distribution [*partition*] of the sensible”, to borrow Rancière’s phrase [Rancière 2004, 12].^[13] It is *ideographic* rather than *orthographic*, concretizing ideas as picture-things (“screening”) rather than discursifying things in the world (“scripting”).^[14]

I took my first
 early Latin lesson
 at the age of seven
 at the school of the
 Holy Spirit
 in the city of
 Rome

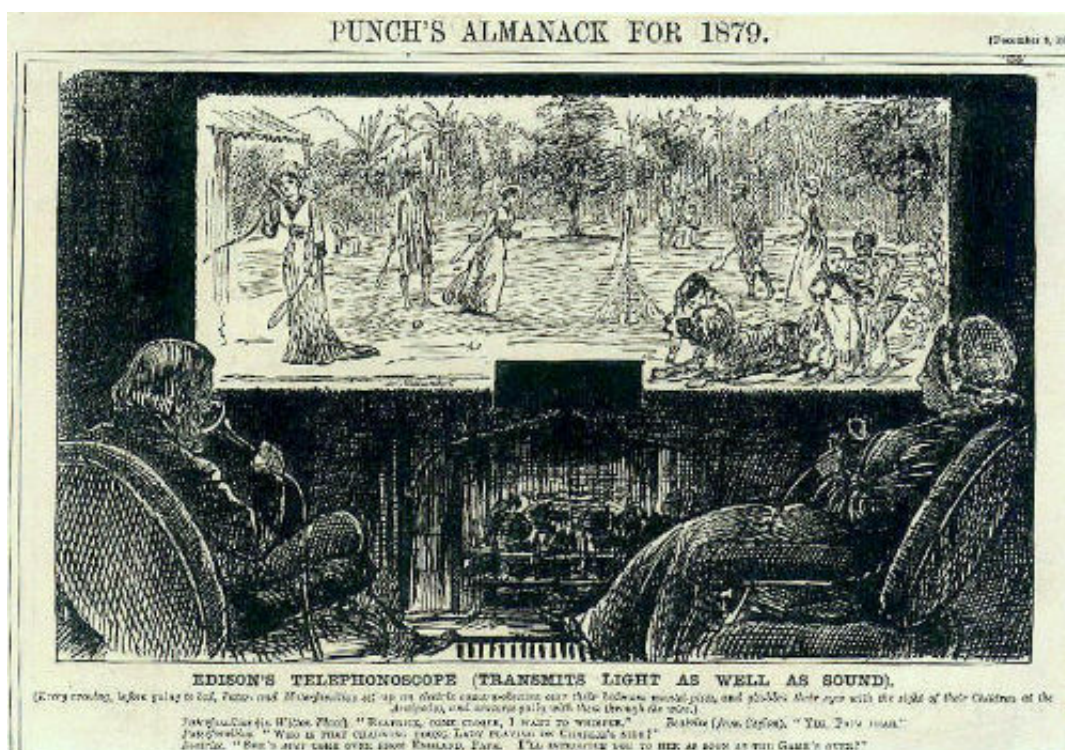


Figure 4. Scripting and screening: Latin cursive script vs Edison's Telephonoscope. "Latin Documentary Text" 2004; [Du Maurier 2008].

Read negatively, namely, from the perspective of historical culture, this shift embodies what Paul Virilio has called the “aesthetics of disappearance”, the way worlds of reference are collapsed by the speed of telecommunications [Virilio 1991, 62]. More positively, from the perspective of Derridean deconstruction, it implies worlds of reference that disappear into the “play of *différance*” [Derrida 1997, 109]. In any case, the world of screens makes the question of reference moot: the reader is no longer (or not only) interpreting text but (also) concretising code. The “play” of the screen unfolds possibilities latent to code and makes “reading” and the “reader” reality effects of a digital apparatus. Through their digits, the reader – or better, player – becomes a limb, a prosthesis, of the digitas, the functions of which proliferate through the feedback of multiple players. To grasp the effects that Flusser variously describes as “automatisation” or “robotisation” [Flusser 1999, 52], or, simply, “functioning” thus requires that we construct (rather than deconstruct) digital “reading”, that is, think through its constraints and possibilities [Flusser 2004, 19].

Parataxis and hypotaxis

To read a printed text is to attend to – and unravel – the texture of the sentence and the larger structures into which it is woven (paragraph, section, chapter, book). We read the images in series, as Flusser has it, “spooled” as scenes into stories and, more largely, histories [Flusser 2007, 20].^[15] To “read” a digital image-text (e-book or online book, webpage or -log, PDF or Word document, to take just the “bookish” examples),^[16] however, is to attend to it as a digital system. The meta-commentary of reading as interpretation (or critique) is replaced by “reading” as systems analysis (or digital aesthetics), the mapping of relations like juxtaposition and recombination, and intensities like speed and affect. (We scare-quote digital “reading”, “writing” and other descriptors of digital image-texts because these terms can only be analogies in the post-historical age.) In the printed text, the sentence is a string (hence “spooling”); it is linear and sequential, that is, historical. Thus, for Flusser, the function of writing is literally to *del*ineate images as it interprets them [Flusser 2004, 66]. To read (or write) right – orthographically – is to discursify things in the world (to “script” them) in accordance with history. History, or the historical sense, is the physical condition of interpretation (to repeat: our sensorium is a scriptorium). But in the digital image-text, the “sentence” is a setting; it is taken in all at once, as a gestalt. To read (or write) for ideas (from the Greek *idea*, “form, pattern”, from *idein*, “to see”^[17]) – ideographically – is to concretize ideas (to “screen” them) as picture-things. Digital “reading” involves scanning the surface of the image; digital “writing” becomes mapping possibilities latent in code, constructing what might otherwise appear to be a cut-up or collage, a mix of text, image and even sound [Kress 2005, 6–11]. This accounts for the apparently dynamic nature of digital texts, the way in which they seem to invite re-imagination (Flusser calls digital “reading” and “writing” “techno-imagination” [Flusser 2004, 67]): we say “seem” because digital texts are no more dynamic than analog ones (think of the limited ways in which we can annotate a PDF).

It is this instantaneous recognition of the digital image-text that makes speed rather than spacing the technical condition of the digital “reading” experience. Digital “reading” takes no time, hence the negative ascriptions attached to online readers: they are merely “browsing”, “glancing”, “scanning”, etc.; they are lazy and unable to sustain attention (not that old-school readers didn’t “skim” or “leaf through” texts – or “dip into” their depths). The digital image-text is something “readers” look *at* and *around*, not *through* – it is shallow, or rather, depthless. The difference between this kind of scanning and what we have called scripting can be understood in terms of the difference between *parataxis* (Gk. “juxtaposition”, or coordination) and *hypotaxis* (Gk. “subordination”) in syntax.^[18] The former is a principle of looking and linking, or *scanning*; the latter, of en- and unfolding, or *scripting*. Thus, to “read” digital “pages”, or hypertext, is to look at and link to and from them paratactically; to read print pages, or text, is to look through and read “through” (into) them hypotactically. We draw this distinction between print and digital reading and writing starkly here, although digital “writing” often references print culture with its skeuomorphic lexicon of desktops, files, folders, scrolling, pages and so on, and digital “readers” often read online in something akin to the way print has always been read. But the digital “reader” *is* doing something significantly different from the print reader. The way they read, as they concretise code on the screen, is much like an encounter with concrete poetry, as writerly an experience as that seems.

sem um numero
 um numero
 numero
 zero
 um
 o
 nu
 mero
 numero
 um numero
 um sem numero

Figure 5. Augusto de Campos, "Sem um Numero ['Numberless']" [de Campos et al. 1962]

One approaches such an object first of all as an image. It is strictly unreadable as a collection of sentences whose overall sense one composes by reading in sequence. Instead, one scans the image as a whole and "interprets" it as a shape, rather than for its meaning. (Consider when, say, a bridge or shop or playground is encountered: seemingly, none require us to interpret them, or even think about them.) This takes no time – unlike the "thinking" of interpretation, which can take forever. Digital image-texts seem to involve no composition (or "writing") on the reader's part. They appear all of a piece, and are "read", or rather received, as such. Concrete poetry responds to the technical revolution of mechanically reproduced imagery and presages the properly "digital" moment of electronic concretization. Perhaps not coincidentally, the Czech-born Flusser developed the insight that the digital image-text is "concretized" code in the 1950s in Sao Paulo, whence he had emigrated to escape Nazi persecution, and where the Brazilian poets of the Noigrandes group (Augusto and Harold de Campos, Décio Pignatari and Ronald Azeredo) were developing concrete poetry (see [Wurth 2006]). In this kind of poem, the concrete – material and visual – elements of the text communicate the "poem": it stands for itself, as does the digital image-text. It does not refer to anything outside of itself; it is a proposition that instances a state of affairs, and thereby concretizes code.

14

Calculation and computation

In terms of images, we thus move from historical (analog) image of the world, concerned with *mimesis* (Gk. "imitation"), namely, the representation of things in the world, to the post-historical (digital) image-text of the concept, concerned with *mathesis* (Gk. "calculation"), that is, the concretization of picture-things in a code-world.

15

	historical image (analog)	post-historical image-text (digital)
mode	representation (<i>mimesis</i>)	concretization (<i>mathesis</i>)
model	objectivity (subject-object)	design (programme-programmer)
effect	distantiation	immersion
exemplar	painting	CGI
technique	linear perspective	the gestalt

Table 2. Historical and post-historical images.

The historical image relies on objectivity, namely, the subject-object relation, and distantiation ("re-presentation"). Its exemplar is painting; its technique, linear perspective. The post-historical image relies on design, that is, the programme-programmer relation, and immersion ("present-ation"). Its exemplar is computer-generated imagery (CGI); its technique, the gestalt figure.

16



Figure 6. R. C. James, *The Dalmatian Dog* [James 2007].

The zero of binary code is key to the gestalt: the “disappearing point” of digital perspective is the zero that is not nothing but a fully-fledged digit, “equivalent” to one [Kaplan 2000, 210–211], after [Frege 1980., 86–88 (sections 74–75)]. This apparent ontological convergence of zero and one is the basis of real abstraction, or concretization, the function of which is to de-world history and re-world it through the digital image-text as gestalt. ^[19] (It is also the basis of the real abstraction of technical capitalism, that is, enterprise supplemented by an enhanced system of measure, of what Michael Peters refers to as “algorithmic capitalism” [Peters 2011], which we have addressed elsewhere and to which we return below [Sturm and Turner 2011].) The advent of the digital image-text that presents – or projects – concepts as images, as ideographs, begins the end of the era of historical consciousness.

17

Historical consciousness did not vanish all at once; indeed, we still tend to think about the digitas in historical terms. Digital settlers like us are prey to what might be called, after Walter Benjamin, “auratic” thinking: just as those new to photography sought the “aura” of the icon in a photograph, and saw it as technicized painting, digital settlers seek the worldly “aura” of things in a code, and see it as technicized writing – hence our bookish terms for reading on screen [Benjamin 2008, 22–27 (sections 4–7)]. Yet mechanical reproduction is not the issue in the digitas that it is in photography: digital image-texts reproduce wildly without a “real-world” referent. Likewise with critique: as Flusser sees it, photography awakened for the bookish a “phenomenological doubt” that what they were seeing represented the world adequately; the digitas does no such thing [Flusser 2005, 38]. While digital settlers might see it as delirium-inducing (we talk about “addiction” and so on), natives simply immerse themselves in the endless present of a code-world.

18

The advent of the digital image-text that enables users to record information and manipulate it – in photography, film and then television (leaving aside audio production) [Kittler 1999] – foreshadowed a post-historical and post-industrial epoch dominated by programming and algorithms, that is, by calculation. ^[20] Photographic images can thus be seen in two ways: firstly, as the product of light from the world of objects outside imprinted on celluloid inside the camera, creating an analog image – negative, but an exact copy nonetheless – that can be reproduced, that is, as mimetic; secondly, as a projection of information stored by the apparatus of the camera, creating a digital image-text that can be

19

produced, that is, recalculated, according to different algorithms, hence as mathetic. Analog images signify objects; digital image-texts signify codes.



Figure 7. The first digital scan, Russell Kirsch's *Walden* (1957), which instituted the square pixel [Kirsch 2007].^[21]

We thus move from the copy/re-presentation, or abstraction, of an object to the projection/presentation, or concretization (or “real abstraction”) of a code. And because the code is mathetic, number, not letter, is inscribed as the dominant means of measure in the post-historical age.

20

The all-consuming digitas, increasingly a space where users are all consumers, or “prosumers” who create digital “content,” expands capital exchange.^[22] But it is not technical capitalism per se, or enterprise, but rather the “enhanced” techniques of measurement that it permits – econometrics, or “e-conometrics”, if we take them to be marked by their digital nature – that are the real innovation and commodity of the age (and our real target).^[23] One such econometric springs to mind: our university’s online and “in-line” (fully strategically “aligned”) “Research Outputs Module” tool designed to enable us to generate outputs via its “PBRF tool” to complete our PBRF “evidence portfolios”.^[24] Such econometric programmes embody the self-referentiality of the digitas: their “reference” is simply a projected output, a yet-to-be-concretized possibility of their code. This is not to say that such programmes don’t have a very “real” effect on our “outputs” and “real” effects throughout the university: they generate ideographs that are vehicles not just for ideas but for ideology, ideographs that concretize not only concepts, but also the interests of capital. The idea that academics should create research and teaching portfolios – and increasingly e-portfolios – does not echo in name only the investment portfolios of technical capitalism: in such portfolios, we are tasked to “package” our work and ourselves as “products” of and for the university, and to account for – to measure – our own “performance” in terms of its actual

21

and potential “returns” on the university’s “investment” (of the buzzwords here, only “performance” would be official university parlance – as of now, at any rate).

The corollary of the digital image-text, then, is technical capitalism: what presses on language today is not just digitalized code, but fully capitalized code. If, as we have noted, the digital image-text appears as a gestalt, so does the digital world in which we find ourselves immersed as soon as it appears; it is as if, to rephrase Derrida (or rather, Ricoeur), we were *always already* online [Ricoeur 1990, 57]. The digitas thus enables capitalism to *re-world* the many worlds we inhabit according to econometrics of productivity by which ideas must turn a profit, viz. a return on “capital” (literally, “head-count,” from the Latin *caput*, “head”). Or rather, the de-worlding of worlds of history and “re-worlding” of post-history involves a reconstruction of thinking to more acutely attune it to the delivery and measurement of outputs, or “outcomes”, be that GDP, GNP (Gross National Product) or GNH (Gross National Happiness) – or even PBRF or University rankings. Such thinking is not critical, but *quantized* (literally, “calculated”). To quantize, as Figure 8 suggests, is to approximate a continuously varying signal (here, the smooth analog wave) by one whose amplitude is restricted to a prescribed set of values, no matter how “lossless” (here, the jagged digital line, a.k.a. “jaggie”). This is exactly what econometrics do.

22

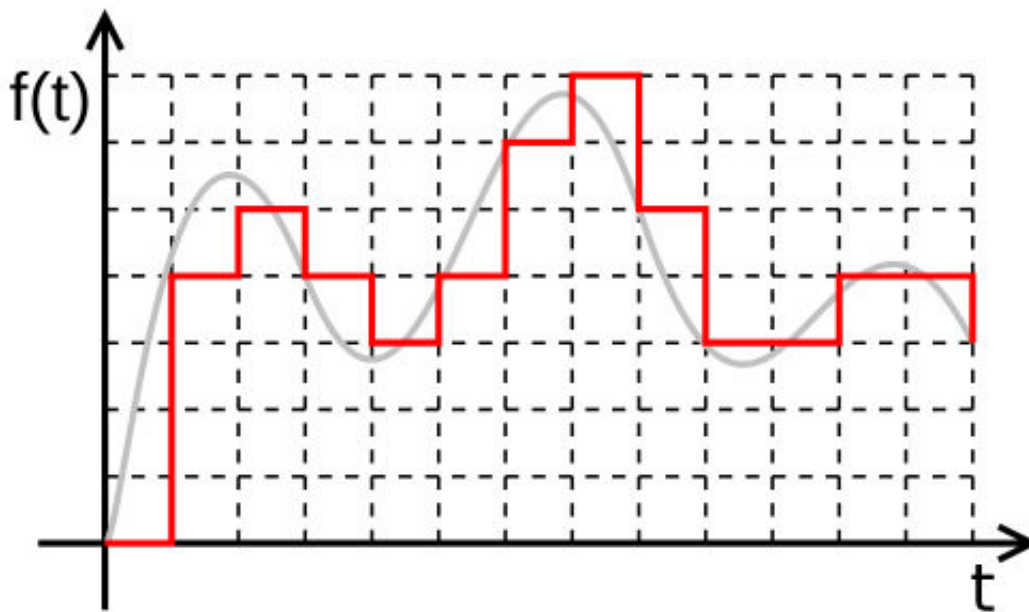


Figure 8. Quantized signal [Adamek 2010].

The digital character

The linear, historical logic of written text and critique is giving way to the algorithmic, post-historical logic of computation and calculation (see Table 1). Similarly, representation is giving way to concretization; analog images, to digital (or technical) images (see Table 3). What we have is a new hieroglyphics of technical imagination, a digital orthography that is really an ideography; its “big idea” is technical capitalism, namely, business enterprise supplemented by a digitally enhanced system of measure, an *e-conometrics*. This new “language” of the digital character is embodied not only in media such as photography, film and television, which are considered iconic digital media (see [Kittler 1999]), but also in designs (iconic brands) and environments (iconic buildings).

23

Importantly, such digital icons don’t represent or refer to anything. Rather, they point to something we can *do*; they proffer a communicative world in which we find ourselves with others, acting out our objectives and enacting various effects – in other words, programming and being programmed. And they intensify the worlds they “iconise,” through the multiple (inter)activities of multiple users, hence the immediacy and intimacy of digital affect. This communicativity is a technical operation, continuously updating and upgrading itself by ever more accurate – or “efficient” – measurement of

24

users' (inter)activity. The icons of the digital character are thus inherently communicative. While it is a problem that the message digital icons communicate is monopolised by technical capitalism, it is the co-optation of the virtue of critical-creative thinking – now called “innovation” – to link enterprise and technological development that is most concerning.

One response to what seems a grim situation – the “Flusser problem”, so to speak – is not to recall criticism to its hallowed role as social conscience and to reboot history: to speak truth to power (the “Foucault solution”).^[25] To be heard at all today we must speak truth *in* power rather than truth *to* power, which is to say, inside communicative networks that are technically amplified by our talk [Dean 2010]. *Post-criticism* foregrounds the noise of digital “writing”, that which is neither discursive nor merely technical in writing, those values and worlds which are “screened out” by the *digitas*. It depends on caricature, not critique. We would argue that there are two senses of digital caricature: the first is digital caricature, in the sense of impoverished, or diminished, thinking, which is the tendency to think about thinking in terms of given technologies, namely, as programming. The second sense of digital caricature relies on Charles Peirce’s idea of an “interpretant”, or reader, someone for whom digital caricature might also be funny, or diverting in both senses of the word [Pierce 1974, 50–52].

25

Taking caricature in the first sense, consider Flusser on simulation [Flusser 1999, 51–54].^[26] A lever, he suggests, simulates an arm: in one respect, namely lifting, a lever is an arm. In many other respects (texture, movement, pliability), it is a caricature of an arm. To think that a lever is an arm is to make the same mistake as thinking that the body is programmed (by DNA) or that the brain computes (by the firing of neurons), both of which mistakes caricature thinking.^[27] For us, the technical operation of the digital character, or any attempt to ontologise that operation through an appeal to its mathetic substrate, is a caricature of thinking.

26



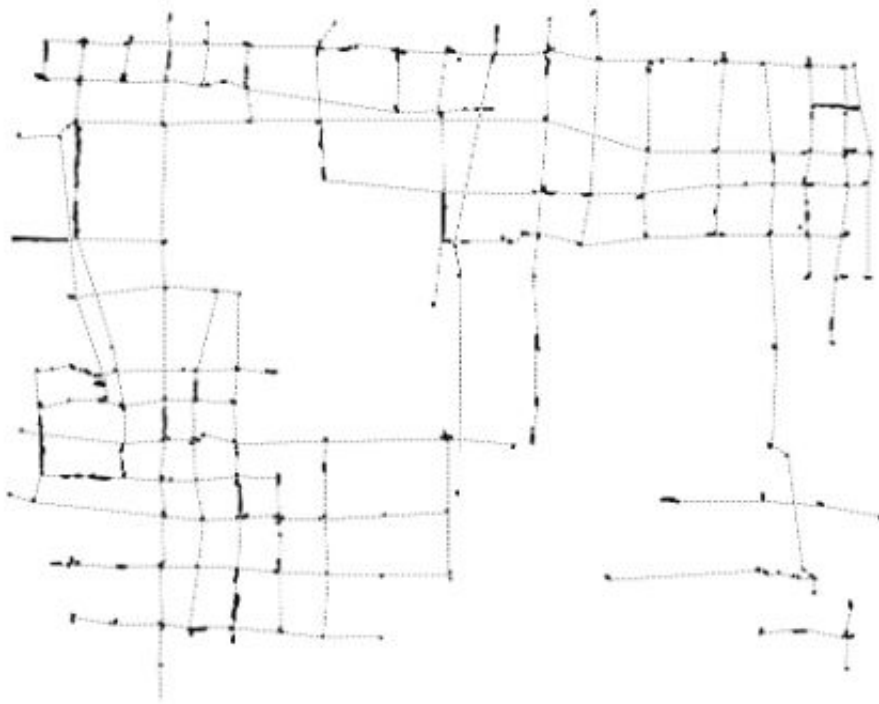


Figure 9. Paul Klee's *Flora in Sand* and caricature [Thomas 2011, after Klee 1927].

Although digital “writing” may be as much a caricature of thinking as a lever is a caricature of an arm, the idea of digital caricature, we think, is worthy of thought. For instance, it prompts questions about the real abstraction in which our mental processes are caught up. Thinking as caricature is embodied in the “drop-down menu-isation”, or algorithmisation, of so much contemporary design: in social media, in architecture – and in teaching and learning. Social media programmes like Facebook and Twitter offer an extensive array of “drop-down” options to customize our “profile” (a “portfolio self,” perhaps), but we cannot work outside the options they offer – and these options change based on feedback algorithms. ^[28] Such a profile cannot but be a caricature, and literally so. The architectural design of teaching and learning spaces in universities often works similarly: in our university, such spaces – including our offices – are designed according to spatial algorithms derived from our benchmark institutions in the “Group of Eight” universities in Australia (single occupant of an office = $x \text{ m}^3$ with $y \text{ m}^2$ window and shelf space + a whiteboard or more shelves or a workbench based on the discipline of the occupant, etc.). The “built pedagogy” [Sturm and Turner 2012, 23–34] implied by such spaces is thus “capsular” or generic [de Caeter 2002, 275], and thus caricatural.

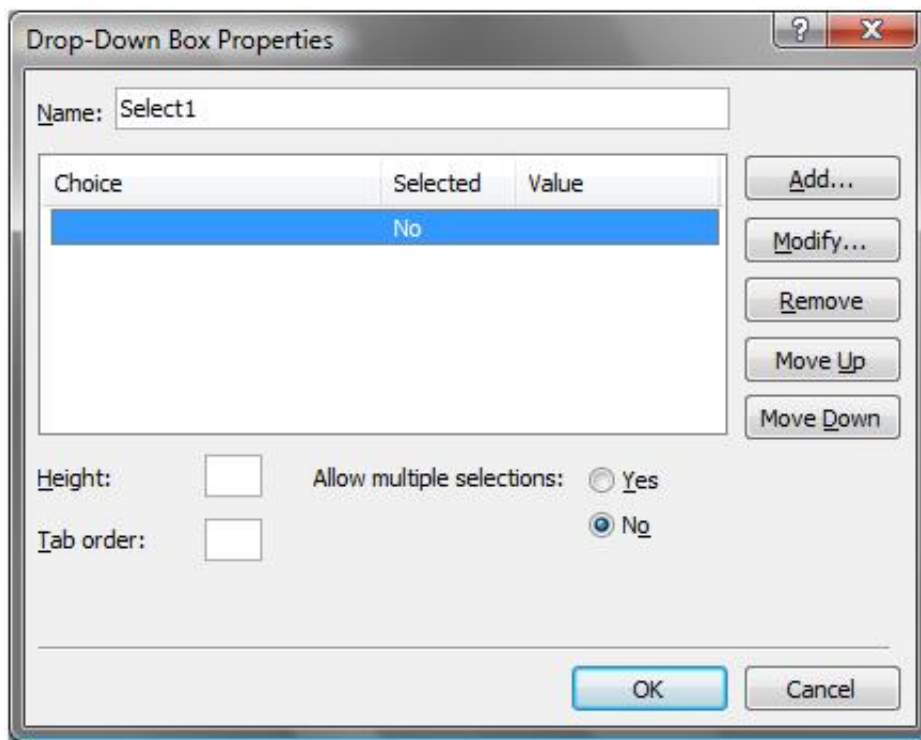


Figure 10. A drop-down menu.

Caricature may thus be considered a sketch, a diminished version of something else. In one respect, this is *not* true of digital “writing” because the calculating power of computers now vastly exceeds that of the human brain. In what sense, then, do we mean that thinking is diminished by analogy with computation, or programming? Here, another sense of caricature becomes key, one that draws together Wittgenstein’s later work on rule-following [Wittgenstein 1953, 80–88 (sections 189–241)], Paulo Virno’s idea that jokes put into question the norms governing the application of rules [Virno 2008, 3–8], and passing remarks by Terrence Deacon on the evolutionary role of laughter, which both recapitulates and rearticulates the primitive bases of social norms of behaviour [Deacon 1997, 420–421]. The key figure here is the interpretant of a sign operation who will understand the caricature and, by seeing that it is paradoxical and contradictory, find it funny. If this moment is a critical-creative event that is crucial to innovation, indeed to the development of the human animal, as Virno suggests, the question is what is required to “get” the joke.

28

Caricature in this second sense thus refers to something that is conceivably a joke. For Virno, a joke “suspends” the norm that would ordinarily enable us to decide how the rule should be applied [Virno 2008, 6]. Thought this way, a joke suggests a “state of [linguistic] exception” that opens out a vertiginous regress [Virno 2008, 5]. What stops this regress, on Virno’s reading of Wittgenstein, is social consensus, or the “anthropological backdrop” (or “bedrock”) of pre-existing social practices, an unspoken agreement that this is how “we” collectively understand things [Virno 2008, 5]. This same bedrock, however, is the stuff of more primitive drives or instincts, in terms of which a joke can be grasped:

29

The joke is the state of exception of discourse because it suddenly edits, once again, the primary scene of every speaker: the grafting of the clausal thought onto nonlinguistic drives. This grafting ... is not simply an ontogenetic episode, but also a permanent dimension of linguistic experience: that dimension, to put it plainly, in which our words imitate that which they substitute (the cry or whatever), thus resembling a thoughtless reaction. Jokes are habitual dwellers in that dimension. Precisely for this reason, they have the appearance of a semi-instinctual drive or, as Freud says, of an “involuntary idea”. [Virno 2008, 7]

Caricature as joke requires this shared basis in the non-symbolic regions of drives, which is the accumulated product of the “natural history” of our species [Virno 2008, 3]. With reference to Deacon’s *The Symbolic Species* and his use of Charles Peirce’s triadic sign of symbol, index and icon [Deacon 1997, 63–65, 74–78], ^[29] we note that getting the joke

requires situating, or concretising, the symbolic contradiction or paradox within an experiential field that is organised by sign operations that are iconic and indexical (that physically resemble their objects or indicate them via a sensible feature). Human beings constantly concretise symbolic meaning, in this way, cutting across a sharp distinction between mind and material, symbolic and non-symbolic species, human and other animals. The interpretant, however, the one who gets the joke, must share the biological substrate of the human-animal species in order to laugh. As Terrence Deacon says:

The ability of jokes and other forms of humour to elicit this stereotypic call [a play signal in mock aggression] is the most curious feature of all. Rather than a function under any selection pressure, it too has probably evolved as an incidental correlate of ... other social functions and a somewhat serendipitous connection to the peculiar symbolic pirouette that constitutes humour. [Deacon 1997, 420]

While we do not share Deacon's rigorous Darwinism, we agree that the joke requires a deeply acquired affective experience of other bodies. The accident of meaning that suspends the norm – as in the case of a joke – is grasped or graspable, because, as Catherine Malabou notes, we “cannot be without being affected” [Malabou 2012, 22].

30

When caricature is understood not as simply a diminished version of something else, but as an intentional joke, we begin to see how the mathesis of a digital norm (calculation on the basis of data) has captured and reduced thinking. To think that this is “funny” is to presuppose an animal interpretant, or human community, that is predisposed to experiencing themselves in more corporeal terms. To put it differently, a computer cannot laugh because its sign operation remains strictly symbolic. To concretise such caricature in experiential terms requires that we field the “ill-logic” of the joke in experiential fields of indexical and iconic relations [Sturm and Turner 2013]. In doing so, the post-critical interpretant comes to occupy the position of Michel Serres' “third man” in a digital pedagogy [Serres 1982, 67]. Serres's parasitical “third man” is the noise that must be excluded for message to be heard, the condition of the digitas: “The noise is a joker. It has at least two values, like the third man: a value of destruction and a value of construction. It must be included and excluded” [Serres 1982, 67]. But, we would add, such noise requires an interpretant if it is to be taken to be a funny, not merely a random, interference. Finding something funny, say, the creative assignment of the student who spammed our mailboxes with a view to demonstrating Serres' principle, ^[30] is also to recover a sense of community in whose terms symbolic interaction may be both destroyed and reconstructed. It is to recover meaning as “accident” [Malabou 2012].

31

Laughter thus places digital norms and mathesis in a region of primitively evolved drives, connecting the human animal – but not the computer – to a “natural history of the human animal” [Virno 2008, 3] that inheres in symbolic interaction, and that is activated by our biologically evolved disposition to laugh (and Wittgenstein would add with respect to instincts – to experience “fear, desire, sympathy and antipathy, submissiveness and dominance” [Virno 2008, 7]). The joke is an accident of meaning that recalls the evolution of symbolic practice itself. The suspension of the norm also supplies, albeit negatively, the semiotic “missing link” that Deacon's Darwinism refuses to allow him to identify. This is because, on his account, linguistic ability is always already favoured, and therefore “selected in”. On this view, symbolic practice has always taken place rather than been triggered. It is impossible, we think, not to use the word “accident” at this point and, with reference to Malabou's notion of “destructive pulasticity” [Malabou 2012], to think that the precarity of the human animal hinges upon this accident. ^[31] The apparent groundlessness of the event of symbolic meaning, which is to say the accident of meaning itself, is what jokes “incidentally” recall. Before we can grasp the selection of acquired characteristics that favour the rapid evolution of the linguistic animal, then, we must grasp the accident of the object of selection. The human-animal might better be described as “opportunistic”, the species that maximises the interruption of a seamless experiential field. The “innovation” of the human, Virno might note, was thus some kind of a joke, a meaning-making accident.

32

The digital classroom need not simply be considered in terms of the technical infrastructure of the university and the econometrics that inform it. The “ridiculous” moment when an application serves ends other than its own programming – for example, in spamming – may involve a true caricature in Virno's sense. Such a moment reveals not only the structure of the joke as signifier, but also the structure of forces that it instances, its “lines of force and flight”, to use

33

Gilles Deleuze's phrase [Deleuze 1992, 160]. And that application can potentially be used dialogically – as the effect of bodies on bodies – to generate alternative programs, for example, if we use spam “critically-creatively” (for credit, even!), as our student did. Spamming thus bears the same relation to the digital character as concrete poems do to poetry: where concrete poems foreground the materiality of the printed word, spamming foregrounds the digitality of binary code. Our post-critical, classroom- and body-based pedagogy thus gets at the comparative impoverishment of technical capitalism, despite the superficial allure and intensity of the digitas that concretizes it. In Serres' sense, we may be uninvited guests at the digital menu who crave something other than what is preprogrammed [Serres 1982, 15–16].

Caricatural thinking is particularly problematic in teaching and learning, given that learning institutions are, as Flusser puts it, the “factories of the future” [Flusser 1999, 49] (because commodities are increasingly intellectual [Berardi 2011]) and that learning is increasingly online (and thus increasingly “digitized”). Our worry is that we are simply educating students to apply econometric algorithms at the expense of all other codes, others' or their own, discovered (heuristic) or recovered (historical): for example, ways of writing that privilege a certain linear and teleological (or “end-stopped”) style of argument [Sturm 2012], and the constructive alignment of aims, objectives and outcomes in curricula (a curriculum of means and ends, perhaps^[32]) that encourages teachers to teach to the test and students to learn likewise [Sturm and Turner 2011, 167–168]. Instead, we would reconstruct the classroom, analog or digital, on the basis of learning games that foster jokes in Serres' sense (hacks, or “exploits,” they might be called in the language of the digitas^[33] – to encourage the innovation of which computers themselves are one product, but, critically, to which our capacity to laugh is not itself reducible. To do so, we would “up the noise floor” of the classroom to problematise – laugh at, in short – all such caricatural thinking and locate such other worlds of “surplus value [or values]” as are possible within the world of the digitas [Deleuze 1992, 161]. Flusser calls such problematisation “alternative program[ming]”, which, he says, goes beyond “self-programming”, or “having our own programs”, to “dialogical programming”, or “hav[ing] other programs (programs of others) to be able to change them (to suggest them to others)” [Flusser 2011b, 155]. The former is a critical move; the latter, post-critical. Alternative programming does not claim that we can escape the digitas to speak truth, as it were, *to* its power; it claims that if we cannot escape it, then we can speak truth (or better, truths) *in* its power.

Notes

[1] What Flusser calls a “techno-image” #flusser2002, or “technical image” [Flusser 2005, 14], we call a *digital image-text*, in order to capture better his sense of the “dialectic u[of] image/text”, the “divorce between text and image” in “alphabetic culture”, that has entered its “slow decadence” with the advent of digital image-texts [Flusser 2012, 1] – and the ambiguous position vis-à-vis the digitas in which predigital reader-writers consequently find themselves.

[2] For the liminal third category of the “digital settler” (“digital natives” and “immigrants” being the other categories), see [Palfrey and Gasser 2008, 3–4].

[3] “Disposition” – or construction – looks at both lines of “visibility”, “enunciation”, “force”, and “subjectification”, and lines of “fracture” and “flight” [Deleuze 1992, 160–161]: respectively, lines of “stratification or sedimentation” (territorialization) and “lines leading to the present day or creativity” (deterritorialization) [Deleuze 1992, 165].

[4] For the “picture theory” of language, see [Wittgenstein 2001, 9–12].

[5] For “language games”, see [Wittgenstein 1953, 11–12 (section 23)]; for his repudiation of the “picture theory” of language, see [Wittgenstein 1953, 43–50] (sections 94–125).

[6] In this, we – and Flusser – differ from Heidegger, who is concerned with the self (“Dasein” as “a self-interpreting, self-articulating entity” [Heidegger 1992, 302]: where his concern is phenomenology, ours is “communicology” (see Flusser's “On the Theory of Communication” [Flusser 2004, 8–20]).

[7] For a definition of a text as “verbal, visual, oral, and numeric data, in the form of maps, prints, and music, of archives of recorded sound, of films, videos, and any computer-stored information”, see [McKenzie 1999, 13].

[8] Our use of the catch-all term “screen” might well not capture the full range of “screening” technologies; Wardrip-Fruin uses the term “surface,” which seems to us more capacious but perhaps less suggestive [Wardrip-Fruin 2008, 164].

[9] For the history of zero, see [Kaplan 2000]; for technological levers, see [Flusser 1999, 51–54].

[10] For real abstraction as concretization, see [Toscano 2008]. The term comes from Marx and Engels’ “Introduction to a Critique of Political Economy” [Marx and Engels 1970, 140–141].

[11] Compare the structuralist reading of the zero in [Diehl 2009, 107–113]; she cites, in particular, Deleuze’s “How Do We Recognize Structuralism?” [Deleuze 2004, 170–192].

[12] Compare [Drucker 2001, 141] on “[t]he relationship ... between digital images and the algorithms that generate them”: she draws a “distinction between the form of information *mathesis* and information as form-in-material (*graphesis*)” [Drucker 2001, 145]. An alternative model of this interplay, albeit a rather writerly one, is offered in Aarseth’s *Cybertext* [Aarseth 1997], which distinguishes between “*scriptons* (text strings as they appear to readers), *textons* (text strings as they exist in the text), and *traversal functions* (the mechanism by which scriptons are revealed or generated from textons)” [Wardrip-Fruin 2008, 164].

[13] Rancière defines a “distribution of the sensible” as an “apportionment of parts and positions ... based on a distribution of spaces, times, and forms of activity”, in particular, of “what is seen and what can be said about it, [and] who has the ability to see and the talent to speak, around the properties of spaces and the possibilities of time” [Rancière 2004, 12–13].

[14] See [Kress, G.]. An ideogram is a graphic symbol that represents – or rather, embodies – an idea, for example, a hieroglyph or a traffic sign.

[15] See McKenzie’s argument that the word text “derives ... from the Latin *texere*, ‘to weave’, and therefore refers, not to any specific material as such, but to its woven state, the web or texture of the materials” [McKenzie 1999, 13], which accords with Flusser’s idea of writing as “spooling”, that is, linear and sequential [Flusser 2007, 20].

[16] For a summary of the characteristics of “writing” on-screen and the species of literacy it entails, see [Merchant 2007].

[17] For ideas and seeing, see [Heidegger 2002, 36–39].

[18] Parataxis: “I came, I saw, I conquered” [Plutarch 2011, 114 (section 50.3)]; hypotaxis: “As long as I am in the world, I am the light of the world” [John 9:5].

[19] Compare [Badiou 2011].

[20] For calculation and calculability – or *mathesis* – as characteristic of modern technicity, see [Stiegler 1998, 3–4]; for the (unfortunate) nexus of the digitas and mathesis in the digital humanities, see [Drucker 2009].

[21] See [Kirsch et al. 1958] and [Ehrenberg 2010].

[22] See [Ritzer and Jurgenson 2010]. The term “prosumer” is, of course, Alvin Toffler’s from *The Third Wave* [Toffler 1980, 265ff].

[23] For technical capitalism, or “technocapitalism”, see [Suarez-Villa 2009].

[24] The Performance-Based Research Fund (PBRF) is the New Zealand Government’s performance-based block funding mechanism for research akin to the UK’s Research Assessment Exercise (RAE) and Australia’s Excellence in Research for Australia (ERA).

[25] For such “fearless speech”, see [Foucault 2001].

[26] Compare Flusser on “electronic memories” as simulations of “the memory functions of the human brain”: “On Memory (Electronic or Otherwise),” *Leonardo* 23.4 (1990): 398 (397-99).

[27] For an example of this kind of work by a leading neuroscientist, see [Koch 2013].

[28] For the “portfolio self”, see [King 2007, 338]; elsewhere, he describes a “modular self”; see [King 2000, 9–12].

[29] Peirce’s triadic definition of a sign as something that represents, or signifies, an object to some interpretant in one of three ways: an *icon* physically resembles its object (a picture of your face is an icon of you); an *index* denotes its object by virtue of some sensible feature that

correlates with and thus “points to”, or indicates, it (your smile indicates your happiness); a *symbol* denotes its object by virtue, primarily, of a convention, agreement or rule – it is thus, in some sense, normative (the word “smile” denotes a certain range of facial expressions in English) [after [Burks 1949, 673–74].

[30] We draw here on the work of a student who spammed us as part of a critical-creative writing assignment [Devasathan 2010].

[31] For technology as the accident of techno-science, see [Virilio 2007, 10–11].

[32] On the “means-end reasoning” of the standard “technical production [curriculum] perspective” of Ralph Tyler and others, see [Posner 1998].

[33] For the “exploit” as “a resonant flaw designed to resist, threaten, and ultimately desert the dominant political diagram”, see [Galloway and Thacker 2007, 21].

Works Cited

- Aarseth 1997** Aarseth, E. J. *Cybertext: Perspectives on Ergodic Literature*. Baltimore, MD, Johns Hopkins University Press (1997).
- Adamek 2010** Adamek, P. “Digital Signal”. *Wikimedia*. 6 July 2010.
<http://commons.wikimedia.org/wiki/File:Digital.signal.png>
- Badiou 2011** Badiou, A. “Mark and Lack: On Zero”. Trans. R. Brassier and Z. L. Fraser. *Translations: Cahier pour l'Analyse (An Electronic Edition)*. June 2011. <http://cahiers.kingston.ac.uk/pdf/cpa10.8.badiou.translation.pdf>
- Benjamin 2008** Benjamin, W. *The Work of Art in the Age of Its Technological Reproducibility, and Other Writings on Media*. Ed. M. W. Jennings, B. Doherty and T. Y. Levin. Cambridge, MA and London, The Belknap Press of Harvard University Press (2008).
- Berardi 2011** Berardi, F. (Bifo). “I Want to Think: POST-U”. *E-flux*, 24 (Apr. 2011). <http://www.e-flux.com/journal/i-want-to-think-post-u/>
- Burks 1949** Burks, A. W. “Icon, Index, and Symbol”. *Philosophy and Phenomenological Research*, 9.4 (Jun., 1949): 673–89.
- De Man 1984** De Man, P. *The Rhetoric of Romanticism*. New York, NY, Columbia University Press (1984).
- Deacon 1997** Deacon, T. W. *The Symbolic Species: The Co-evolution of Language and the Brain*. London and New York, NY, Norton (1997).
- Dean 2010** Dean, J. *Blog Theory: Feedback and Capture in the Circuits of Drive*. Cambridge, Cambridge Polity Press (2010).
- Deleuze 1992** Deleuze, G. *Michel Foucault: Philosopher*. Ed. T. J. Armstrong. Hemel Hempstead, Harvester Wheatsheaf (1992).
- Deleuze 2004** Deleuze, G. *Desert Islands and Other Texts, 1953-1974*. Ed. D. Lapoujade. Trans. M. McMahon and C. J. Stivale. New York, NY, Semiotext(e) (2004).
- Derrida 1997** Derrida, J. *Of Grammatology*. Trans. G. C. Spivak. Baltimore, MD, Johns Hopkins University Press (1997).
- Derrida 2004** Derrida, J. *Positions*. Trans. A. Bass. London, Continuum (2004).
- Devasathan 2010** Devasathan, A. Personal communications with the authors. Aug. 2010.
- Diehl 2009** Diehl, C “The Empty Space in Structure: Theories of the Zero from Gauthiot to Deleuze”. *Diacritics*, 38.3 (2009): 93–119.
- Douris 2012** Douris. “School Scene”. *Wikimedia Commons*. 7 Apr. 2012.
http://commons.wikimedia.org/wiki/File:Douris_Man_with_wax_tablet.jpg
- Drucker 2001** Drucker, J. “Digital Ontologies: The Ideality of Form in/and Code Storage – Or – Can Graphesis Challenge Mathesis?” *Leonardo*, 34.2 (2001): 141–45.
- Drucker 2009** Drucker, J. *SpecLab: Digital Aesthetics and Projects in Speculative Computing*. Chicago, IL, University of Chicago Press (2009).

- Du Maurier 2008** Du Maurier, G. "Edison's Telephonoscope (Transmits Light as well as Sound)". *Wikimedia Commons*. 27 Nov. 2008. <http://commons.wikimedia.org/wiki/File:Telephonoscope.jpg>
- Ehrenberg 2010** Ehrenberg, R. "Square Pixel Inventor Tries to Smooth Things Out". *Wired.com*. 28 June 2010. <http://www.wired.com/wiredscience/2010/06/smoothing-square-pixels/>
- Ezzamel and Hoskin 2002** Ezzamel, M., and Hoskin, K. "Retheorizing Accounting, Writing and Money with Evidence from Mesopotamia and Ancient Egypt". *Critical Perspectives on Accounting*, 13.3 (June 2002): 333-67.
- Flusser 1986** Flusser, V. "Lecture 2: Crisis in Alphabetic Culture". Trans. R. M. Novaes. *Into Immaterial Culture* lecture series at University of São Paulo (Aug. 1986). 28 Nov. 2012. <http://metafluxlab.net/>
- Flusser 1990** Flusser, V. "On Memory (Electronic or Otherwise)". *Leonardo*, 23.4 (1990): 397-99.
- Flusser 1999** Flusser, V. *The Shape of Things: A Philosophy of Design*. Trans. A. Mathews. London, Reaktion (1999).
- Flusser 2004** Flusser, V. *Writings*. Ed. A. Ströhl. Trans. E. Eisel. Minneapolis, MN and London, University of Minnesota Press (2004).
- Flusser 2005** Flusser, V. *Towards a Philosophy of Photography*. London, Reaktion (2005).
- Flusser 2007** Flusser, V. "Crisis of Linearity". Trans. A. Mers. *Bootprint*, 1.1 (March 2007): 19-21.
- Flusser 2011a** Flusser, V. *Does Writing Have a Future?* Trans. N. A. Roth. Minneapolis, MN, University of Minnesota Press (2011).
- Flusser 2011b** Flusser, V. *Into the Universe of Technical Images*. Trans. N. A. Roth. Minneapolis, MN and London, University of Minnesota Press (2011).
- Foucault 1977** Foucault, M. *Language, Counter-Memory, Practice: Selected Essays and Interviews by Michel Foucault*. Ed. D. F. Bouchard. Ithaca, NY, Cornell University Press (1977).
- Foucault 1998** Foucault, M. *The Essential Works of Michel Foucault, 1954-1984*. Vol. 2: Aesthetics, Method, and Epistemology. Ed. J. D. Faubion. New York, NY, New Press (1998).
- Foucault 2001** Foucault, M. *Fearless Speech*. Ed. J. Pearson. Los Angeles, CA, Semiotext(e) (2001).
- Frege 1980**. Frege, G. *The Foundations of Arithmetic*. 2nd rev. ed. Trans. J. L. Austin. Evanston, IL, Northwestern University Press (1980).
- Galloway and Thacker 2007** Galloway, A., and Thacker, E. *The Exploit: A Theory of Networks*. Minneapolis, MN, University of Minnesota Press, 2007.
- Groys 2008** Groys, B. *Art Power*. Cambridge, MA, The MIT Press (2008).
- Heidegger 1992** Heidegger, M. *History of the Concept of Time: Prolegomena*. Trans. T. Kisiel. Bloomington, IN, Indiana University Press (1992).
- Heidegger 2002** Heidegger, M. *The Essence of Truth: On Plato's Cave Allegory and Theaetetus*. Trans. T. Sadler. London, Continuum (2002).
- James 2007** James, R. C. "The Dalmatian Dog". *Wikimedia Commons*. 7 Feb. 2007. <http://commons.wikimedia.org/wiki/File:Gestalt5.PNG>
- Kaplan 2000** Kaplan, R. *The Nothing That Is: A Natural History of Zero*. Oxford, Oxford University Press (2000).
- King 2000** King, B. "Being Virtual: Modularity as a Cultural Condition". *Afterimage*, 28.2 (Sep.-Oct. 2000): 9-12.
- King 2007** King, B. "Modularity and the Aesthetics of Self-Commodification". In M. Beaumont, A. Hemingway, E. Leslie and J. Roberts (eds), *As Radical as Reality Itself: Essays on Marxism and Art for the 21st Century*, Oxford and New York, NY, Peter Lang (2007), pp. 319-46.
- Kirsch 2007** Kirsch, R. "Walden". *National Institute of Standards and Technology*. 2007. <http://patapsco.nist.gov/ImageGallery/details.cfm?imageid=342>
- Kirsch et al. 1958** Kirsch, R. A., Cahn, L., Ray, L. C., and Urban, G. H. "Experiments in Processing Pictorial Information with a Digital Computer". *Proceedings of the Eastern Joint Computer Conference, 9-13 Dec. 1957, Institute of Radio Engineers*, New York, 1958.

- Kittler 1996** Kittler, F. A. "The History of Communication Media". *CTheory.net*. 30 July 1996. <http://www.ctheory.net/articles.aspx?id=45>
- Kittler 1999** Kittler, F. A. *Gramophone, Film, Typewriter*. Stanford, CA, Stanford University Press (1999).
- Klee 1927** Klee, P. *Flora on Sand* (1927), *Wikipaintings.org*. <http://www.wikipaintings.org/en/paul-klee/flora-on-sand-1927>
- Koch 2013** Koch, C. *Consciousness: Confessions of a Romantic Reductionist*. Cambridge, MA, MIT Press (2013).
- Kress 2005** Kress, G. "Gains and Losses: New Forms of Texts, Knowledge, and Learning". *Computers and Composition*, 22.1 (2005): 5-22.
- Kress, G.** "Reading Images: Multimodality, Representation and New Media". *Information Design Journal & Document Design*, 12.2 (2004): 110-19.
- Latin Documentary Text 2004** Latin Documentary Text (Acknowledgement of Debt), 2nd Century AD, Caesarea, Mauretania [Latin Cursive]. *Advanced Papyrological Information System (APIS UM)*, P.Mich.inv. 4301; Recto (2185). 7 June 2004. http://www.lib.umich.edu/writing-graeco-roman-egypt/latin_cursive.html
- Locke 1996** Locke, J. *An Essay Concerning Human Understanding*. Ed. K. Winkler. Indianapolis, IN, Hackett (1996).
- Malabou 2012** Malabou, C. *Ontology of the Accident: An Essay on Destructive Plasticity*. Trans. C. Shread. Cambridge, Polity (2012).
- Marx and Engels 1970** Marx, K., and Engels, F. *The German Ideology, Part One, with Selections from Parts Two and Three, together with Marx's "Introduction to a Critique of Political Economy"*. Trans. C. J. Arthur. New York, NY, International Publishers (1970).
- McKenzie 1999** McKenzie, D. F. *Bibliography and the Sociology of Texts*. Cambridge, Cambridge University Press (1999).
- Merchant 2007** Merchant, G. "Writing the Future in the Digital Age". *Literacy*, 41.3 (2007): 118-28.
- Palfrey and Gasser 2008** Palfrey, J., and Gasser, U. *Born Digital: Understanding the First Generation of Digital Natives*. New York, NY, Basic Books (2008).
- Peters 2011** Peters, M. A. "Algorithmic Capitalism and Educational Futures". In M. A. Peters and E. Bulut (eds), *Cognitive Capitalism, Education and Digital Labor*, New York, NY, Peter Lang (2011), pp. 245-58.
- Pierce 1974** Pierce, C. S. *Collected Papers of Charles Sanders Peirce*. Vol. 5. Ed. C. Hartshorne and P. Weis. Cambridge, MA, Belknap Press (1974).
- Plutarch 2011** Plutarch. *Caesar*. Trans. C. Pelling. Oxford, Oxford University Press (2011).
- Posner 1998** Posner, G. J. "Models of Curriculum Planning". In L. E. Beyer and M. W. Apple (eds), *The Curriculum: Problems, Politics, and Possibilities*, Albany, NY, State University of New York Press (1998), pp. 79-100.
- Prensky 2001** Prensky, M. "Digital Natives, Digital Immigrants". *On the Horizon*, 9.5 (2001): 1-6.
- Rancière 1995** Rancière, J. *On the Shores of Politics*. Trans. L. Heron. New York, NY, Verso (1995).
- Rancière 2004** Rancière, J. *The Politics of Aesthetics: The Distribution of the Sensible*. Trans. G. Rockhill. London, Continuum (2004).
- Ricoeur 1990** Ricoeur, P. *Time and Narrative*. Vol. 1. Trans. K. McLaughlin, K., and D. Pellauer. Chicago, IL, University of Chicago Press (1990).
- Ritzer and Jurgenson 2010** Ritzer, G., and Jurgenson, N. "Production, Consumption, Prosumption: The Nature of Capitalism in the Age of the Digital 'Prosumer'". *Journal of Consumer Culture*, 10.1 (2010): 13-36.
- Samuels 2008** Samuels, L. *Gaps, Vexes, and the Digitas*. Seminar. English Department, University of California at Santa Barbara, 2008.
- Serres 1982** Serres, M. *The Parasite*. Trans. L. R. Scher. Baltimore, MD, Johns Hopkins University Press, 1982.
- Sheely 2008** Sheely, S. "Latour Meets the Digital Natives: What Do We Really Know?" *Proceedings from ASCILITE 2008*, Melbourne, 2008.
- Sommer 2012** Sommer, E. "Portrait Vilém Flusser". *Vilém Flusser Archive*. 2012. <http://www.flusser-archive.org/aboutflusser/photogallery>

- Stiegler 1998** Stiegler, B. *Technics and Time: The Fault of Epimetheus*. Stanford, CA, Stanford University Press (1998).
- Sturm 2012** Sturm, S. "Terra (In)cognita: Mapping Academic Writing". *TEXT: Journal of Writing and Writing Courses* 16.2 (2012). <http://www.textjournal.com.au/oct12/sturm.htm>
- Sturm and Turner 2011** Sturm, S., and Turner, S. "Knowledge Waves: New Zealand as Educational Enterprise". *Australian Journal of Communication*, 38.3, The Political Economy of Communication (2011): 153-77.
- Sturm and Turner 2012** Sturm, S., and Turner, S. "Built Pedagogy": The University of Auckland Business School as Crystal Palace". *Interstices*, 12 (2012): 23-34. http://interstices.ac.nz/wp-content/uploads/2011/11/INT12_Sturm_Turner.pdf
- Sturm and Turner 2013** Sturm, S., and Turner, S. "Erratology and the Ill-Logic of the Seismotic University". *Educational Philosophy and Theory* (30 July 2013). <http://www.tandfonline.com/doi/abs/10.1080/00131857.2013.817941>
- Suarez-Villa 2009** Suarez-Villa, L. *Technocapitalism: A Critical Perspective on Technological Innovation and Corporatism*. Philadelphia, PA, Temple University Press (2009).
- Thomas 2011** Thomas, D. "Klee Policed". *Latent City*. Syracuse School of Architecture: Transdisciplinary Media Studio, 14 Sep. 2011. <http://latentcity.blogspot.co.nz/2011/02/klee-policed.html>
- Toffler 1980** Toffler, A. *The Third Wave*. New York, NY, William Morrow (1980).
- Toscano 2008** Toscano, A. "The Open Secret of Real Abstraction". *Rethinking Marxism*, 20.2 (2008): 273-87.
- Virilio 1991** Virilio, P. *The Aesthetics of Disappearance*. Trans. P. Beitchman. New York, NY, Semiotext[e] (1991).
- Virilio 2007** Virilio, P. *The Original Accident*. Cambridge, Polity Press (2007).
- Virno 2008** Virno, P. "Jokes and Innovative Action: For a Logic of Change". *Artforum*, 46.5 (Jan. 2008). <http://www.betalocal.org/pdfs/virno-jokes.pdf>
- Wardrip-Fruin 2008** Wardrip-Fruin, N. "Reading Digital Literature: Surface, Data, Interaction, and Expressive Processing". In R. Siemens and S. Schreibman (eds), *A Companion to Digital Literary Studies*, London, UK, Basil Blackwell (2008), pp. 163-82.
- Whitehead and Russell 1997** Whitehead, A. N. and Russell, B. *Principia Mathematica to *56*. Cambridge, Cambridge University Press (1997).
- Wittgenstein 1953** Wittgenstein, L. *Philosophical Investigations*. Trans. G. E. M. Anscombe. New York, NY, Macmillan (1953).
- Wittgenstein 2001** Wittgenstein, L. *Tractatus Logico-Philosophicus*. Trans. D. F. Pears and B. F. McGuinness. London and New York, NY, Routledge (2001).
- Wurth 2006** Wurth, K. B. "Multimediality, Intermediality, and Medially Complex Digital Poetry". *RiLUnE [Review of Literatures of the European Union]*, 5 (2006): 1-18.
- de Campos et al. 1962** de Campos, A., Pignatari, D., and de Campos, D. *Antologia Noigandres: Do Verso à Poesia Concreta*. Vol. 5. São Paulo, Massao Ohno (1962).
- de Cauter 2002** de Cauter, L. "The Capsular Civilization". In N. Leach (ed.), *The Hieroglyphics of Space: Reading and Experiencing the Modern Metropolis*, London and New York, NY, Routledge (2002), pp. 271-80.



This work is licensed under a Creative Commons Attribution-NoDerivatives 4.0 International License.