57 Julian Raxworthy, "Transgressing Edges and Doing Time: Evolving New Urban Contexts," in Jordi Ludevid (ed.), *Landscape: Product/Production: Iv European Landscape Biennial* (Barcelona: COAC, 2008), 282–293.
58 R. van Gerwen (2004). "Force Fields in the Daily Practice of a Dutch Landscape Architect." In J. Raxworthy and J. Blood *(eds.), The MESH Book: Infrastructure/Landscape* (Melbourne, RMIT Press), 238–257.
59 I have written about the relationship between landscape design and maintenance extensively, including in Julian Raxworthy, "Transactions with Chance in the Garden", paper presented at the LIMITS: The 21st Annual Conference of SAHANZ, RMIT University, September 26–29, 2004). This is also the subject of my forthcoming (2018) book, to be published by MIT Press: *Overgrown: Practices between landscape architecture and gardening.*
60 Bill Gammage, *The Biggest Estate on Earth: How Aborigines Made Australia* (Sydney: Allen & Unwin, 2012): 2.
61 Ibid.: 3.
62 Ibid.: 5.
63 Ibid.: 6.
64 Roderick J. Fensham, "Book Review: The Biggest Estate on Earth: How Aborigines Made Australia," *Australian Geographer* 43, 3 (2012): 326.
65 The term 'landscape architect' was first used as a description of the work of Brown's protégé, Humphrey Repton; J. C Loudon, *The Landscape Gardening and Landscape Architecture of the Late Humphry Repton, Esq.* (Edinburgh: Longman & Co, 1840).
66 Timothy Mowl, *Gentlemen & Players: Gardeners of the English Landscape* (Stroud: Sutton Publishing, 2004): 149.
67 Ibid.: 150.
68 James Corner, "Eidetic Operations and New Landscapes," in James Corner (ed.), *Recovering Landscape* (New York, NY: Princeton Architectural Press, 1999).
69 Mavis Batey, "Horace Walpole as Modern Garden Historian: The President's Lecture on the Occasion of the Society's 25th Anniversary AGM Held at Strawberry Hill, Twickenham, 19 July 1990," *Garden History* 19, 1 (1991): 7.
70 Batey, "Horace Walpole as Modern Garden Historian": 8.
71 Martin Wallen, "Lord Egremont's Dogs: The Cynosure of Turner's Petworth Landscapes," *ELH* 73, 4 (2006): 867.
72 Mowl, *Gentlemen & Players* (2004): 153.
73 Tom Williamson, *Polite Landscapes: Gardens and Society in Eighteenth-Century England* (Baltimore, MD: Johns Hopkins University Press, 1995): 94.
74 Ibid.
75 Ibid.: 109.
76 Sue McIntyre, "Review: The Biggest Estate on Earth by Bill Gammage," *Aboriginal History* 36 (2012): 186.
77 Ibid.
78 Wallen, "Lord Egremont's Dogs": 867.
79 Williamson, *Polite Landscapes*: 102.
80 J. Ross Wordie, "The Chronology of English Enclosure, 1500–1914," *Economic History Review* 36, 4 (1983): 484.
81 Williamson, *Polite Landscapes*: 102.
82 Wordie, "The Chronology of English Enclosure, 1500–1914": 503.
83 Williamson, *Polite Landscapes*: 104.
84 Wallen, "Lord Egremont's Dogs": 867.
85 Stuart Banner, "Why Terra Nullius? Anthropology and Property Law in Early Australia," *Law and History Review* 23, 1 (2005): 101.
86 Bruce Pascoe, *Dark Emu: Black Seeds Agriculture or Accident* (Broome, WA: Magabala Books, 2014): 19.
87 Banner, "Why Terra Nullius?: 101.
88 Wallen, "Lord Egremont's Dogs": 867.
89 Mignolo also argues that Marxism is the other strand of modernity that is also colonial.

20

OF NEON, ROAD SIGNS, AND HEAD SHAPES

A case for generative criticism

Peter A. Hall

One of the biggest challenges of design criticism, in its relative infancy, is a fundamental disagreement about its purpose and its proper subject matter. Bluntly characterized, the professional position is that design criticism is useless unless it engages the profession on its own (professional) terms, while the academic position oscillates between 'detooling' design history from design practice and consolidating a proper academic field by clearly defining design criticism's boundaries. In what follows, I will propose a response to the disagreements about design criticism amid what has been termed 'post-criticality,' as it has been articulated in recent debates in the academic and popular design media. The response draws from the techniques of Bruno Latour, including his 2004 argument that a critic is "not the one who debunks, but the one who assembles"[1] and recent work on the limits of critique by the literary scholar Rita Felski.[2] I will make a case for a generative approach to criticism that attempts to bridge the gulf between the critic and practitioner by acknowledging the desire to reinvent what is shared by both parties. A generative criticism, as outlined, is not that of the *detached* observer viewing *images* of design, but one that embraces the socio-material nature of its subject by assembling relational mappings. A generative criticism also validates praxis in its anticipation of ongoing and future cultural shifts affecting the understanding and practice of design.

My aim is to venture a framework for a criticism that accounts for design practice in all its material, disciplinary, professional, vernacular, and theoretical forms, rather than accounting only for a regional practice posing as a universal one, or a particular professional practice and studio-based critique that is entirely separate from academic traditions of critical thinking. This will be supported with three specific case studies from my own journalistic design writing: the first about neon signs, the second a typeface for the United States highway system, and the third a set of head forms for product designers to use as measurement benchmarks for sports equipment in Asian markets. As will become clear, the term *design* is used here to describe primarily the activities and outputs of practitioners and researchers in the fields of graphic and typographic design and product and ergonomic design. These case studies are meant as prototypes of a generative approach rather than exemplars: alternatives to historicist approaches that seek to link design practices back to uber-historical works or a canon, and alternatives to a dominant mood characterized by what Felski describes as a "hypercritical style of analysis that has crowded out alternative forms of intellectual life."[3]

To begin, we turn to a 2012 post on the influential blog *Design Observer* by leading graphic design writer and critic Rick Poynor, which, in many ways, exemplifies a perceived rift between academic and professional understandings of the purpose and value of criticism. Poynor's argument included the claim that design academics produce material that rarely makes it into "the field's everyday discourse" and the implication that they were afraid of the comment column: "It's hard not to suspect that some design academics nurture an ingrained reluctance to expose themselves to the rough and tumble of more public forms of scrutiny and comment."[4] A subsequent 2013 issue of the academic journal *Design and Culture* provided a forum for six scholars to respond to the debate sparked by Poynor's post. Leading the charge from the academics was Meredith Davis, who wrote that Poynor failed to observe a distinction between design writing by professional critics (like Poynor) and scholarly research writing. The role of the former is "to critique the work of designers, discuss the behaviours of the profession at large, and analyze trends shaping design practice"—this kind of criticism appears in magazines, blogs, journals, and books. The role of the latter, argued Davis, is the "transfer of knowledge in the discipline and upon which the future work of other scholars will be based" and results from investigations that conform to research standards and is "subject to a vetting process that confirms its relevance and rigor." This kind of writing appears in peer-reviewed journals or conferences.[5]

Davis' position is premised on the need for design to achieve maturity as an academic discipline—a position shared by the design scholar Kjetil Fallan, who argues *in the same issue* that design history needs to be "detooled" to enable it to stand in its own right, rather than simply serve as "context, background, legitimacy, and inspiration to design education and practice."[6] Davis and Fallan's stances can be contextualized in academe. As the former director of the North Carolina State University PhD in Design, one of only a handful of such degrees in the United States, Davis has been a key advocate for rigor in design research, which she argues is hampered by confusion about: (1) what constitutes research; (2) limited history of research writing in the field and in design education; and (3) the absence of a disciplinary database. Both Fallan and Davis note that other fields offer more clear-cut divides between vocational and research paths: No one expects artists also to be professional critics and art historians, argues Davis, nor do we assume the same people working on a cure for cancer and writing for the *New England Journal of Medicine* are also dispensing flu shots to patients in a clinic.[7]

There are two difficulties with these arguments, however, since they both stem from models rooted in historical patterns of disciplinary formation. The first is that if we follow Fallan's logic and 'detool' design history by detaching it from its duty to inform practitioners, then we are in danger of being left with a history without teeth, without the tools to change anything. It is true that history and criticism cannot be confined by current conceptions and limitations of professional design practice—its habitus—but at the same time, the larger geopolitical, cultural, and societal shifts that affect the profession cannot be ignored. Design practice is deeply entangled with the legacy of modernity, with its two-sided act of human creation and massive environmental destruction.[8]

The second, related, difficulty is that Davis' efforts to legitimize the academic field of design comes with the danger that a disciplinary boundary is drawn around 'proper' design research and its 'acceptable' subject matter that ultimately stifles its development. This has been the fate, arguably, of the trajectory of design history launched with Nikolaus Pevsner's 1936 *Pioneers of Modern Design*, which entrenched the field within the infrastructure of art theory and history. Anne-Marie Willis gives voice to these difficulties in the last essay in the *Design and Culture* issue, with her prediction that design writing "will die . . . or just shuffle along in the shadows if it stays bonded to design as it is now."[9]

Willis describes both journalism and academic writing in design as "circumscribed," in the academic case by performance criteria and the contradictory desire to claim distinctiveness for

design process and then turn that distinctiveness, once nailed, into a "piece of software" or repeatable step-by-step process. She calls for an antidote to what she calls design writing "from the inside" in the form of a more open-ended inquiry: "The obverse of self-enclosed writing on design process, designers and the like is the kind of thinking and writing that engages design outside of professional enclaves, and considers it as encountered in the world."[10] In literary studies, the sense that critique has "run out of steam" (to cite the title of Latour's influential 2004 essay) has initiated a spirited post-critical discourse, with scholars like Felski questioning the normative, one-size-fits-all dominance of a style of critique with a largely unchallenged tone of detachment and nonchalance: what Felski calls "skepticism as dogma."[11] Citing Paul Ricoeur's "hermeneutics of suspicion," an interpretive term which does not exclude other possibilities (Ricoeur's case for a hermeneutics of trust, of restoration and of recollection), Felski sets out a case for alternative methods for the many aims of criticism. She lays the groundwork for a "pragmatic" response to the crisis of criticism, allowing for aesthetic appreciation alongside an insistence that works of art cannot help being connected and social.[12]

If design criticism is currently trapped between a perceived need to serve a narrowly defined 'profession' of practitioners and a perceived need for academic legitimation only achieved through 'detooling' it from practice, then how might Felski's case for a more generous account of critical reading be adapted to design, so that design in the larger, relational sense—as the conscious production of things and their affects and impacts—better informs design practice?

To achieve a broader understanding of the purpose of design criticism a broader definition of design itself is required. Design historians and historiographers have frequently noted the rigid parameters and Eurocentric bias of the accepted material of design history. As John Walker put it, "why are design historians so unimaginative?"[13] At the same time, stretching the boundaries of the design 'discipline' is a radical project that perhaps strikes a fear in practitioners, historians, and critics that too much probing will destabilize the field and question the need for a discipline at all. Can we achieve rigor in a nascent field if the field is both ill-defined and more rigorously interrogated by non-design disciplines?

The question can be addressed by looking closer at the subject of design, not as either a profession or an academic discipline, but as both, in need of an adjoining link. Like design critics, design researchers have faced a threefold complaint, identified recently by Kees Dorst: (1) their academic field is disconnected from design practice, (2) it is too scattered and confused, and (3) it is too analytical and backwards-focused. Useful parallels are identified by Dorst in contemporary business and marketing discourse and in 1970s art criticism.[14] In a seminal 1979 paper, Rosalind Krauss argued that the "expanded field" of modern sculpture could be understood as a dialectic between sculpture and its defining characteristics. Sculpture had entered a state of crisis as it had moved away from a set profession to a conceptual field, with sculptures literally moving off the pedestal, turning from bronze and stone to butter and abandoning permanency and object orientation (in land art). But as an expanded practice, modern sculpture was dealing with the deeper issues of classical sculpture (place, materiality, relationship to the body) by exploring their negation—a newly defined space organized in oppositional terms.[15] The design fields are similarly expanded and difficult to pin down, but their strength and coherence comes from "recognizing these contradictions."[16] By eschewing an analytical paradigm in favor of a 'curative' future-focused paradigm as identified by economist Henry Mintzberg, Dorst argues that design research might better acknowledge the engaged work already underway in the larger subject. The missing link between academic and professional discussions might be, he suggests, a body of case studies, as exemplified in the literature around marketing, "rigorously gathered and described (so that they can be used as a basis for serious academic study), well-written and amply illustrated (so that they can be used as a basis for reflection and inspiration by practitioners)."[17]

Such case studies are extant, for example, in company archives and evidence already gathered by design researchers, writers, and journalists; but they become coherent when the critic adopts a curative or futural focus that takes into account environmental and social impact of design. This requires methods that look closer at the contexts of production and consumption in which designed artifacts emerge and circulate, as I have argued elsewhere.[18]

The case for evidence

In my own experience as a reporter and writer for design magazines and newspapers, the material unearthed has the flavor of an archive: interviews with designers, their clients, and experts in the various disciplines recorded in notebooks, on cassette tapes, as digital audio and video; correspondence, company archives, and press releases in paper and digital form; field trips to building sites, skunk works, museums, airports, hospitals, and designers' offices recorded in photographs (film and digital) and again in piles of notebooks. *Archive* is an appropriate word in the sense that the reporter, and particularly the trade magazine reporter, always investigates within a circumscribed culture of practice. Archive also has a Foucauldian sense that refers to its selective and constructed nature, pointing to the conditions of exclusion and inclusion that prevent other practices from being accepted as 'scientific.'[19]

Journalistic design writing is viewed with suspicion because it is perceived to operate under the constraint of needing to support the industry it serves. At the same time, journalistic writing is commonly informed by critical theory—sometimes without the journalist knowing it. An example from personal experience serves to illustrate this point and provide a first case study.

In 1998, while living in New York, I became quite interested in neon signs—an interest that extended through several essays over the period of a decade. The tools of the journalist are always empirical; to write a story you must report, but at the same time design criticism during this period tended to work in the hypercritical style characterized by Felski: a detached, nonchalant decoding of images, looking for loose threads that might unravel the tightly knit mythologies at work in a given subject, imposing a singular re-reading that revealed 'true' ideological motives.

My first neon article was for the *Guardian* newspaper's *Weekend* section, whose editors, seeing an opportunity for a color pictorial feature, responded to a proposed news hook on the restoration of neon signs in Las Vegas under a city-funded initiative called the Neon Museum. After interviewing the museum's director and representatives of two sign-making companies, including the Young Electric Sign Co, owners of the famous 'neon boneyard' of discarded signs, I constructed a descriptive account of the museum's context and development, propped up by references to Robert Venturi, Steven Izenour, and Denise Scott Brown's seminal study *Learning from Las Vegas* (1972).[20] Since *Learning from Las Vegas* drew its critical approach from Jean Baudrillard's concept of the signifier without referent, it was relatively easy to allow my critique to dwell at the level of ironic appreciation of American hyper-reality—as characterized by Venturi et al.: "If you take the signs away, there is no place." The restored neon signs were placed strategically around the sleazier downtown end of the city, where their original referents had long been removed:

> The uninitiated visitor might be somewhat mystified by the appearance of electric advertisements for absent attractions. The Flame Restaurant sign, rescued from the roof of an early '60s diner long since demolished, features a long, swooping pink arrow pointing to a void where food once was served.[21]

Despite the pleasure of identifying a literal example of the vanishing referent, this mode of design criticism, which 'reads' designs as texts and revels in the absurdities of an economy of signs, is perpetually in danger of irrelevance in design practice. In theoretical terms, the problem is related to what John Stewart has called a "two world" orientation, which insists on "a fundamental distinction between two realms or worlds, the world of the sign and the signifier, symbol and symbolized, name and named, word and thought."[22]

A quote from Baudrillard's book *America* (1988) illustrates this problematic two-world orientation: "The Americans, for their part, have no sense of simulation," Baudrillard writes. "They are themselves simulation in its most developed state." Clearly this is the voice of a detached hyper-critic, arguably thinking of *the image of America* as projected in the 'developed simulation' of Disney hotel staff in Southern California than, say, a newspaper reporter writing on the labor relations of construction workers in Brooklyn or lobstermen in Maine. Baudrillard's perennial European condescension of American culture is clear to see and undoubtedly informed the tone of my *Guardian* report. Baudrillard writes of America:

> [T]hings seem to be made of a more unreal substance; they seem to turn and move in a void as if by a special lighting effect, a fine membrane you pass through without noticing it. This is obviously true of the desert. It is also the case with Las Vegas and advertising, and even the activities of the people, public relations, and everyday electronics all stand out with the plasticity and simplicity of a beam of light.[23]

This hyper-critical approach is difficult to sustain for a design criticism whose subject is rooted in industrial trades and an appreciation of material craft. For art theorists accustomed to a primary subject matter of images, Baudrillard's precession of signifiers was an easy fit. But design has always been insistently material, which is why, for example, the whole area of ergonomics was never successfully incorporated in a critical account of design.

Dualism: critique's unwanted offspring

More broadly, the practice of deflating bubbles of meaning came increasingly to seem detached from the very material catastrophes pressing for urgent responses. In his 2004 essay cited earlier, Latour cites a quote from a strategist for the right-wing Republican party who laments that the scientific debate on global warming is "closing against us," but advises that it is tantamount to continue to make the "lack of scientific certainty a primary issue." The very phenomenon of an "artificially maintained scientific controversy" and "fooling the public by obscuring the certainty of a closed argument" seems to be an unexpected offspring of critique, and, indeed, Latour's own work on how scientific facts are constructed.[24]

In addition to the appropriation of critique by extremists, argues Latour, there is something "troublingly similar" in the structure of conspiracy theories and a teachable version of social critique inspired by a hasty reading of Pierre Bourdieu.

> What has critique become when a French general—no, a marshal of critique; namely, Jean Baudrillard—claims in a published book that the Twin Towers destroyed themselves under their own weight, so to speak, undermined by the utter nihilism inherent in capitalism itself, as if the terrorist planes were pulled to suicide by the powerful attraction of this black hole of nothingness?[25]

The relational complexity of the event, in other words, has been reduced to a singular grand narrative. The semiosis of the Twin Towers, even were we to adopt the detached view of a critic viewing looping videos of the towers' collapse, is not fixed, but in flux. There are the Twin Towers of capital, yes, but also the Twin Towers in millions of tourist photos, the Twin Towers of the tightrope walker in *Man on Wire* (2008), and the Twin Towers of Michel de Certeau's famous passage in *The Practice of Everyday Life* (1980), providing a vantage point for 'reading' the complexity of the city below. To cite the social semiotics argument of Robert Hodge and Gunther Kress, "the social dimensions of semiotics systems are so intrinsic to their nature and function that the systems cannot be studied in isolation." Hodge and Kress argue that mainstream semiotics has stubbornly remained logonomic, and maintained the notion of a system of signs as static social fact, as an abstract structure realized in text.[26]

The material-semiotic account of designed things, as practiced by John Law, Michel Callon, and Bruno Latour, liberates a reductive semiotics from a logocentric bias and allows that things have material affects and constituent parts. From the outset, Latour embraced a monist or non-dualist ontology, a world of socio-material hybrids in which humans and non-humans had agency. His method, loosely characterized, was to examine the human and non-human actors gathered behind a fact or a claim, which he did, for example, with analysis of the demise of the French public transport experiment Aramis.

As Latour has argued in his most influential work, *We Have Never Been Modern* (1993), critics have developed three distinct approaches to talking about our world loosely aligned with three fields and scholars: naturalization drawn from biology (E. O. Wilson), socialization drawn from sociology (Pierre Bourdieu), and deconstruction drawn from philosophy and literary criticism (Jacques Derrida). If the biologist speaks of naturalized phenomena, the discourse of societies and subjects vanishes; if the sociologist speaks of fields of power, then "science, technology, texts and the contents of activities disappear." If the deconstructionist speaks of truth effects, then "to believe in the real existence of brain neurons or power plays would betray enormous naiveté." In short, each of the three forms or criticism is powerful but "impossible to combine with the other two."[27]

By way of example, Latour would have us practice the three critiques simultaneously on the hole in the ozone layer, the result of which would be 'grotesque': the ozone hole is too social and too narrated to be truly natural; the strategy of industry and politics is "too full of chemical reactions to be reduced to power and interest; the discourse of the ecosphere is too real and too social to boil down to meaning effects."[28] The problem, as Latour explains in *We Have Never Been Modern*, is that of modernity's dual tendency to create hybrid nature-culture networks and then purify them by separating humans from non-humans. So, while the ozone hole investigation would link chemistry, industrial strategy, political preoccupations, and ecological anxiety in a hybrid nature-culture network, the 'modern critical stance' would separate the natural world from society and discourse. To reinvent criticism requires a fundamental philosophical shift, to acknowledge that we have never been modern.

Here, Latour shows the influence of philosopher Michel Serres, who in published conversations with Latour argues against the conceit that the present day always represents the culmination of scientific and technological progress. He aligns this adulation of the present with a linear view of time that imposes a constant distance between moving objects. Citing the contemporary relevance of the work of Lucretius and Pythagoras in modern-day science, Serres makes the case that we reconceive linear time intuitively as a "crumpling, a multiple, foldable diversity."[29] The modern-day scientific paper can thus be aligned with the modern-day car, which Serres calls a "disparate aggregate of scientific and technical solutions dating from different periods":

> One can date it component by component: this part was invented at the turn of the century, another, ten years ago, and Carnot's cycle is almost two hundred years old. Not to mention that the wheel dates back to Neolithic times. The ensemble is only contemporary by assemblage, by its design, its finish, sometimes only by the slickness of the advertising surrounding it.[30]

Serres's pleated model of time radically disrupts the conventional positioning of design as a subject of study whose jurisdiction extends only to the dawn of the European industrial revolution. If the wheel is Neolithic, isn't it, too, design? Latour similarly disrupts the idea that a clear boundary can be drawn between the man-made and the natural—a boundary that underpins the delineation of design's 'proper' subject matter. Latour's provocation is that the ozone hole is simultaneously natural, man-made, and political, suggesting that it, too, is a designed artifact and that, to understand it, we must look closer at the actors that are gathered around or in it. He has suggested that we reimagine criticism not as something that looks for sweeping explanations but one that looks closely at things, and asks how they got there. He calls this a "multifarious inquiry launched with the tools of anthropology, philosophy, metaphysics, history, sociology to detect how many participants are gathered in a *thing* to make it exist and to maintain its existence."[31]

Applied to the more conventional subjects of design discourse, these shifts suggest a generative approach, one that replaces epochs and movements with hybrid nature-culture networks. Graham Harman's characterization of Latour's philosophy is "object oriented": "The world is a series of negotiations between a motley armada of forces, humans among them, and such a world cannot be divided cleanly between two pre-existent poles called 'nature' and 'society.'"[32] Instead of a reading of a designed object that looks for the solution or motive that explains *away* the entire project as the product of a childhood trauma, sibling rivalry, economic forces, or state oppression, then, a generative design criticism would look closer at what is gathered or *assembled* in a designed thing. No more looking for formal resemblances with which to construct a lineage from William Morris to the Bauhaus—Pevsner's famously reductive and exclusionary account of the pioneers of modern movement. Even the notion of a movement is suspect for its simultaneous reduction of things to their visual representations and of the past to the "look that defines the epoch." To appropriate Latour's term, a generative criticism is *irreductive*: to critique is to dismantle the 'black boxes' of design history, not to sweep the contents aside and point to a singular cause outside the box, but to shed light on who and what is in there.[33] Hence Latour's call for a critic who assembles.

Getting physical with neon

Revisiting the topic of neon in subsequent years, it became apparent to me that there was room in a critical writing for a kind of reporting that sought to redress the obsession with simulacra in criticism, and 'assemble' very material accounts of the 'special lighting effect' that Baudrillard used to describe the entirety of American culture. In the first instance, this took the form of straightforward research, unearthing the oral histories of the designers who participated in the construction of the Las Vegas sign-scape. Interviewing four of the designers (age range 58–84) from the city's neon heyday was conceived as a strategic rebuff to Venturi's account of the city's supposedly anonymous vernacular. To quote Tom Wolfe: "it becomes important not to mention the names of these people if you want to treat their work like primitive art, like Easter Island icons."[34]

The inherent chauvinism in the critic and profession's exoticization of anonymous design is linked to the chauvinism that Felski argues has become a defining feature of critique, and limits its reach to an informed few. It is striking how swiftly an engagement with the designers of formerly anonymous works transgresses the boundaries between critique and practice. In several cases, the quotations I selected from phone interviews pointed to the practices of the sign-makers, which were strikingly visceral and ritualistic. For example, the appropriately named 'Buzz' Leming's account of the launch of a completed neon sign:

> Once in a while there would be a switching on ceremony. The Stardust had thousands of feet of neon. When we lit that thing up, we had guys on radios running back and forth checking the flashing action. From a design standpoint, the switching-on is an excellent moment.[35]

The designers' paradoxical dependence on and awareness of the frenzy of obsolescence in the economic infrastructure is also evident in the quotes, as Leming again indicates: "When they blew up the Sands (hotel) I watched it on TV. It was pretty impressive, but sad to see it go. The hotels get tired of looking at the signs, but I guess that's what keeps us in work."[36] If the reporting uncovered networks of actors, material, economic, semiotic, and human, lurking behind each sign, it required a further exploration to comprehend the agency of the sign. In "Neon Typography," an essay I published on *DesignInquiry*'s blog in 2008, interviews with sign designers were in-person and in-depth, thus avoiding the more canned, nostalgic responses typical of the Vegas designers interviewed on the phone. The interviews focused on materials and processes, rather than the finished, glowing artifact, as perpetually photographed at night.[37]

The neon sign, it turns out, is a very active actor, being the product of rare gases charged at high voltage in sealed tinted glass tubes. The semiotic and material motion is remarkably similar, the gas molecules are excited in a contraption designed to elicit excitement—or at least attention—from the passing motorist. Indeed, a non-dualist perspective would allow us to combine the semiotic and material in one hybrid thing. The empty promises inherent to advertising are reiterated at every stage of neon's production and implementation. Bending glass to mimic handwritten or printed letterforms is itself a project of negotiation between human craftsmen ('benders'), gases and solids (glass must be heated to near-breaking point, while the bender puffs blasts of air into the tube; bubbles and kinks are inevitable), and the less tangible aspirations of an art director interpreting a client's 'brand.' Negotiation, failure, and compromise are central to the process; it is generally more economical and efficient to make an entire word out of a single glass tube, in sections up to eight feet long per transformer (which is as much gas as the transformer can charge up). But, as most designers and even design critics know, making display type using script fonts is a short cut to illegibility, particularly if in the production your letterforms are going to bleed (to appropriate a printing term for going over the edges) excessively. So, while the glass tubes require continuity, the glow of light, and the bleed requires separation to make it legible. The solution is to paint the tube black in the connecting sections, so that the letters appear discrete. Legibility is achieved by simply painting out parts of the letters, rather like tweaking your newly designed typeface by applying correcting fluid to the stems, serifs, and ligatures.[38]

"Neon Typography" in many ways sits somewhere between modes of criticism discussed above. The decoding, hypercritical critic looks at the lush photos of neon at night and neon discarded in a boneyard by day and contrives a narrative of promise and disappointment; a pathos in this contradiction between the backside of neon, with its blackened tubes, tangles of wires, and transformers, and the unearthly glow of a rare gas charged at high voltage at night.[39]

The trade journalist, duty bound to inform and engage the profession he serves, seeks recourse in a Richard Sennett-like appeal to the craft and material under discussion—despite its obvious entanglement with material waste.[40] There is an appeal to the imagined reader's appreciation of invention, by discussing the recent technique among neon innovators of painting the entire front side of tube black, so that colored light spills from the back of the letters, to interesting effect. And, on an academic level, there is appeal to archetype—as Northrop Frye might have written of neon[41]—in the idea that spelling out letterforms in light has a richer and deeper cultural history connected to fire and Eastern mysticism. Neither appeal is satisfactory because the voice of the hyper-critical critic has already debunked the entire enterprise as hyper-reality.

This lingering ambivalence and implicit battle, between aloof critic and embedded reporter, mirrors Felski's account of hyper-critical and belletristic traditions of criticism and how in recent years the hyper-critical style of analysis has stifled other forms of intellectual life. Rather than allow the Baudrillard-inspired critic to trump the trade journalist seeking to justify an obsolete craft, might it not be possible to assemble a critical account that simultaneously accounts for the neon-bender's craft, the material-semiotic tensions, the anthropology of ritual, and its inherent obsolescence?

Giving critique a direction

In a 1981 interview on French politics, Foucault presented a definition of critique that evokes the building work required in a critical project: "A critique does not consist in saying things aren't good the way they are. It consists in seeing on what type of assumptions, of familiar notions, of established, unexamined ways of thinking the accepted practices are based."[42] In directly rebuffing the interviewer's suggestion that political and social reform is unrelated to critique, Foucault reminds that "reforms do not come about in empty space" and that:

> [C]riticism consists in uncovering that thought and trying to change it: showing that things are not as obvious as people believe, making it so that what is taken for granted is no longer taken for granted. To do criticism is to make harder those acts which are now too easy.[43]

The notion that critique functions in partnership with practice to instigate social change is often forgotten in current critical discourse, where the goal might be easily dismissed as the seeking of reputation—be it in the ivory halls of academe or on the blogosphere. James Faubion's edited volume of Foucault's later work on power and the political characterizes a "coherent body of political ideas" and notes that the French government's 1981 abolition of the death penalty and liberalization of political asylum and penal reforms point "by general consent" to Foucault's voice as an effective influence. Faubion argues that "Foucault was interested in the possibility of gaining, helped by historical analysis, new and more effective political ways of seeing."

Gilles Deleuze's account of Foucault's method, in a chapter he titled "A New Cartographer" (1994), focuses also on power conceived as "less a property than a strategy" that can be defined "only by the points through which it passes."[44] Deleuze's paradigmatic example is panopticism, the seminal account in *Discipline and Punish* (1975) of an architecture entangled with a system of penal law: "a system of light and a system of language."[45] While its physical purpose is to "see without being seen," panopticism's abstract formula is "to impose a particular conduct on a particular human multiplicity." In a typically dextrous move, Deleuze then converts architecture into an abstract machine and a diagram. A diagram, according to Deleuze, is made up of several superimposed maps, "[a]nd from one diagram to the next, new maps are drawn." He closes

the chapter on panopticism with a definition of writing that aligns with mapping practice; not of calmly tracing, but of striving to identify what is being excluded or placed outside by each diagram: "to write is to struggle and resist; to write is to become; to write is to draw a map: 'I am a cartographer.'"[46]

Power dynamics in a relational criticism

Herein lies a succinct account of a critical practice that simultaneously assembles and agitates; a diagrammatic account that sheds light on the human and non-human agency inherent in a subject, in this case a system of building and law. It is more common to see Foucault's approach as hermeneutic, one of disclosing hidden truths and revealing power as an "elusive interrelational phenomenon."[47] But Deleuze's metaphor of the cartographer-critic suggests that something new is being built in the struggle to impose new diagrams on existing structures. Might this assemble-agitate move then be applied to the kind of generative design criticism being advocated here?

A second test case from my own archives is an article researched for *Metropolis* magazine on the research work of industrial designer Roger Ball. The news hook was simple: Ball, recently relocating to Hong Kong Polytechnic University from a professional design studio in Toronto (Canada), had decided to focus on a problem from his own practice as a designer of snowboarder helmets: that the anthropometric data available for headgear was not as universal as its authoritative, scientific aura suggested. In 1998, the Vermont-based snowboard manufacturer Burton held a meeting to find out why one of its award-winning products, a helmet, had sold well in the United States and Europe but miserably in Japan, the world's third largest snowboarding market. In attendance was a group of Japanese snowboarders, and Ball, whose Toronto-based design practice Paradox Design had designed the helmet. The answer from the snowboarders had nothing to do with colors or styling, recalled Ball. "They said, 'we can't wear it—it gives us a splitting headache.' I asked why and they said, 'We have a different shaped head than you.'"[48]

Ball ascertained that, while there is plenty of existing research into measuring and codifying body shapes and sizes to help improve fit in the West, with benchmarks like Henry Dreyfuss Associates' 1960 Measure of Man charts and the more recent United States Airforce-initiated Civilian American and European Surface Anthropometry Resource (CAESAR), there is no equivalent in Asia. He secured a Government grant, three industry sponsors, six partner universities, and a research team, and began a field study taking a mobile lab of 3D scanning equipment around mainland China to scan 2,000 Chinese civilians. The fieldwork produced a commercially available database of anthropometric data, Size China, and a body of evidence to support a case for ejecting a longstanding presumption that human sizing can be proportionally scaled.

A Foucauldian critique of anthropometry might seek to expose the solidification of its discourse, tracing the power dynamic that characterizes the historical process and manifests itself in the discourse's DNA (its genetic instructions, to extend the genealogical metaphor) of present-day anthropometric standards. Anthropometry's origins are famously in criminology: French police officer and researcher Alphonse Bertillon's measurement and classification of physical cranial features preceded fingerprinting as a means to identify convicted criminals in nineteenth-century Europe. Shortly after Bertillon invented anthropometry, the Italian criminologist Cesare Lombroso began theorizing that criminality was inherited and could be identified by physical 'defects.' This jump from measuring heads in order to keep criminal records to measuring heads in order to predict criminal behavior is what Actor-Network Theorists would call an act of translation—one that ultimately is revealed to be lacking evidence, to the extent that the practice was discredited.[49]

Power runs through this project like the veins in blue cheese. In the nineteenth century, what Adas calls the "civilizing mission" was well under way, with European nations voraciously

colonizing lands in Africa, South America, Asia, and Australia, hiding brutal exploitation under the guise of humanitarian motives. Many nineteenth-century writers at the time equated the imperialist projects of Europe with the "triumph of science and reason over the forces of superstition and ignorance which they perceived to be rampant in the non-industrialized world."[50] Particularly prone to adaptation was the theory of evolution, which suggested to many writers that there was a rating system for the gradations between savage and civilized cultures, visible in the degree to which they had managed to harness nature. The most pernicious and dominant of these adaptations was recapitulation; the idea that the most highly evolved species went through similar stages of development that the rest of the animal kingdom had undergone. Lombroso thought he had discovered anatomical similarities in criminals recalling an apish past, rather than a human present.

Although recapitulation was discredited as a theory, its hierarchical and colonial flavor persisted into the early twentieth century in the form of eugenics: the idea that humans could and should be designed to breed out ugliness, genetic deficiency, and disease. We tend to associate eugenics with the compulsory policies of immigration, sterilization, and euthanasia in 1930s Nazi Germany, but precedent laws for the Nazis were provided in the United States: the Supreme Court upheld a law in 1927 on the compulsory sterilization of 'imbeciles.' In 1921, President Calvin Coolidge argued against miscegenation that "divergent people will not mix or blend," and large philanthropic organizations actively supported eugenics research.[51]

By the time we get to 1960, when Henry Dreyfuss Associates published its first universal guide to human measurements, it is easy to see why it was felt appropriate to base The Measure of Man on anthropometric charts produced for the United States military, and assume those already selected body types were 'typical Americans.' The power dynamics running through the history of anthropometry, then, would suggest, following Foucault, that the practice of measuring heads and developing standards is one that seeks to exclude and, through exclusion, control who gets counted as a universal human. Shortly before Alvin Tilley drew the first charts in 1946, Japanese civilians living in America were still being rounded up into internment camps. At the same time, it would be absolutely counter to the generative critic's method to allow this characterization of power to explain away the entire project of anthropometry. The Size China project needs to be understood as a corrective to the sweeping standardizations of history. The golden, optimized head forms created by Ball with the data gleaned from 2,000 Chinese civilians do not claim to be the measure of man. Instead, they should be considered as a regional counter-argument to the so-called universal design in the history of head measuring.

It might seem a stretch to open up the golden, optimized head forms created by Ball with the Size China data and find, among the 3D scanners, analog measuring devices, and participating universities, a gathering of Nazis and United States presidents, nineteenth-century policemen, criminologists, and explorers—but that is what is being proposed here for a generative criticism. To explain anthropometry only in terms of colonial legacies and racist science is to sweep aside the details, the objects, and the evidence. To focus only on the functional aspects of the project—the *how* of the research and technology—is to miss the tensions and hazards present in the project. Indeed, Ball presented the project to a stony-faced audience in Austria, where consciousness of anthropometry's dark history was a little more painfully present. "It's a little bit of a Pandora's Box," Ball admitted to me in an interview.[52]

A generative criticism attempts a tricky reconciliation, between a hyper-critical and an appreciative tradition; between a Foucauldian approach that tends to look for linear genealogies with characteristic asymmetrical power dynamics, and a Latourian approach that tends to look for local power plays in which human and non-human actors take on more symmetrical roles. If the Foucauldian approach reveals unexamined ways of seeing and thinking, the Latourian

approach exposes how those ways of seeing and thinking get embodied in material form such that designed objects take on the force of nature. In assembling a vivid picture of exploded golden heads, the design critic aligns a professional practice with a critical practice.

Bridging the gap between practice and critique

The challenge in advocating a generative approach to criticism as a way to bridge the gulf between academic critique and professional practice is that, thus far, the position I have established sits more happily in the academic than in the practice-based camp. For Ball to have confronted the dark history and power dynamics of anthropometry might have made for a more candid presentation to an Austrian audience and, perhaps, won over a few skeptical audience members with the argument that a database of regional measurement variations in mainland China actually destabilizes the aspirations toward the universal man inherent in Dreyfuss and, indeed, the Nazi and the high-Modernist project. The problem, however, is that the design research and the design critique did *not* coincide and, arguably, they could not, because the critique has to happen after the fact: critique is, as literary scholars would (after Harold Bloom) put it, *belated*.

A generative criticism would seem to require that the negative stance of 'againstness' identified as symptomatic by Felski is tempered with a more pragmatic approach toward addressing the design problem at hand, and that critics engage with the design research process *during* the process, rather than critiquing the finished result after the fact. Such embeddedness might seem to be abhorrent to the literary—and indeed fine art—world, where distance between the process of a work's creation and the process of its appreciation and interpretation is long established. But Felski identifies a number of interpretative possibilities that she argues would be validated by a framing of Ricoeur's hermeneutics of suspicion—possibilities that are connected in that they challenge the presumption that everything that is not critique is *de facto* uncritical: "the idea of a suspicious hermeneutics does not invalidate or rule out other interpretative possibilities."[53]

Clearview—a case for politicking

A generative criticism must then account for how design practice functions *within* a critical discourse, rather than assuming criticism is something that happens *after* the designer has done her good work. A final case study provides evidence of the interrelatedness of practice and critique, and how conversations about form—hitherto confined to design studios—cannot be separated from social, cultural, political, and environmental conversations. For this we must call to the witness stand a typeface known as Clearview, which in 2004 was granted interim approval by the United States Federal Highway Administration for use on road signs in over 20 states.

Developed by graphic designer Don Meeker and type designer James Montalbano, Clearview was the result of over a decade of research and development into the problem of information clutter and legibility of road signs. This was not an aesthetic problem, but a material-semiotic problem. Specifically, as the materials of road signs have become highly reflective (a result of material innovations by manufacturers like 3M), and as roads are filled with more elderly drivers with deteriorating vision (the proliferation of older drivers is a result, indirectly, of better healthcare and health awareness), a curious phenomenon has emerged, known as halation. The shine of headlights on highly reflective material tends to blur the distinctions between letterforms, affecting legibility, particularly among drivers with impaired vision moving along highways at 70 miles per hour. Rather than increase the letter size by 20 percent, which would increase the sign size and the cost of materials, Meeker and Montalbano worked with researchers from various state Transportation Institutes to develop and test a sans-serif typeface that retained its

clarity under the combined conditions of headlight glare, speed, ailing eyes, and high reflectivity at night. As my own report in *I.D.* Magazine and subsequent reports in the *New York Times* and *Creative Review* documented in detail, this meant opening up the counter shapes inside the letters, achieving an easy-to-follow flow between letters, and increasing the x-height.[54]

Testing and iteratively developing the typeface was, however, only a small part of Meeker and Montalbano's role in the project. Cognizant of its interim status, Meeker continued to collaborate with traffic engineers in studies of the typeface's performance, collating reports from transportation institutes around the country and co-authoring a number of papers to build evidence that Clearview was "easier to read and allow more time for eyes-on-the-road."[55] Despite the investment of states in the gradual implementation of Clearview across the United States, the Federal Highway Administration (FHWA) abruptly announced in January 2016 that it was terminating the interim approval. An incensed Meeker began assembling support and evidence to counter the FHWA's claims that Clearview showed no improvement on the existing FHWA Standard Alphabet series and that it had contributed to confusion and inconsistent practices among states over highway sign design and implementation.[56] Meeker worked with researchers to come up with a 30-page rebuttal, finding that many of the references used in the Federal Register notice were inaccurate and outdated and pointed to discredited studies.

The Clearview case presents an opportunity to imagine alternative modes of criticism. The project's very beginnings lay in a design-driven critique of the existing road sign system, seen as a failed effort at universalism amid the changing conditions of materials, ad hoc implementation, ageing populations, and driving behaviors. In its current state, the typeface and its designer have been drawn into battle with a technocratic and legalistic discourse that seems to represent certain characteristic behaviors of government that support perpetuation of the status quo. The failure of Clearview, should it ultimately fail, arguably reflects the larger failure of government to adapt quickly to changing social and environmental conditions. Design practice for Meeker has correspondingly evolved into a combination of politicking, canvassing, and careful reading of obtuse and esoteric documents. The Federal termination notice, he writes, is "a contorted, incomplete justification that ignores significant research that shows reduced fatalities, less serious crashes and lower road mgmt. costs." Meeker adds that "this is something I would rather not have to fight" (email correspondence to author, 3 Aug 2016).

Clearview is quite inadequately misrepresented if we take a traditional 'art history of design' approach to its discussion, which might seek to nonchalantly critique the persistence of a functionalist faith in uniform systems built around sans serif letterforms, or lionize the typeface's designer, Montalbano. A generative approach to Clearview would begin to develop through evidence, of a collision of interdisciplinary research: the problem of a highway system conceived as a user interface riddled with inconsistencies; conflicting philosophies on the effects of highway signs on psychological perceptions of safety; the impact of weather on legibility and safety; the contested boundaries between state and federal jurisdiction on highway management.

The Clearview project could by now fill several filing cabinets of information gleaned from a wide range of experts, from typographic historians to climatologists. We begin to see how something as seemingly simple as a sans-serif typeface actually embodies an entire roomful of disciplinary experts, making arguments, devising tests, writing papers, seeking funding. We also therefore see how something as seemingly neutral as a highway sign embodies an entire history of theories-turned-decisions-turned-policies. Alongside its account of *how* people should drive is the implicit exclusion of those who should not drive. One might add that decades of investment in highway infrastructure embody the longstanding assumption that people should have a 'right' to drive—itself an assumption that might be called into question in environments that clearly cannot support this 'right.'

Conclusion

I have endeavored to argue here that criticism can be reconceived as a constructive and relevant activity, involving field research that seeks to uncover the actors involved in a given project, rather than debunking it through a reading that finds a singular explanation: hyper-reality, colonialism, society, etc. I have also attempted to show, through reflecting on case studies from my own journalistic reporting on design, that it is possible to achieve an understanding of a designed artifact's power by assembling evidence of its constituent parts and trajectories of influence. These are tentative steps toward a generative criticism, but it is imagined that they begin to provide a direction for the enrichment of design practice, rather than aiming for the establishment of a discipline with rigid boundaries. Criticism requires paying close attention to the artifact under discussion, while not losing sight of the larger shifts that are influencing the nature and behavior of that artifact. Inevitably, the critic brings to the analysis his or her own perspective, and ideally, this is then calibrated by the understanding of perspectives encountered. Simply put, if the design critic constantly questions the critic's urge to reduce and opine, to search and destroy, or simplify and exaggerate, she might get a little closer to a design criticism liberated from its habitus. This is ultimately an argument against battening down the hatches of design discourse while everyone outside gets on with the project of tackling complex problems by connecting knowledge and expertise. Designed artifacts never belong to design alone, and therefore warrant an interdisciplinary interrogation. At the very least, it is hoped that criticism will be recognized as a vital and generative activity quite far removed from the taste-making that dominates mainstream discourse.

Notes

1 Bruno Latour, "Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern," *Critical Inquiry* 30, 2 (2004): 225–248.
2 Rita Felski, *The Limits of Critique* (Chicago: University of Chicago Press, 2015).
3 Ibid., 10.
4 Rick Poynor, "The Closed Shop of Design Academia," *Design Observer* (blog), April 13, 2012, retrieved from http://designobserver.com/feature/the-closed-shop-of-design-academia/33658
5 Meredith Davis, "Research Writing in Design," *Design and Culture* 5, 1 (2013): 7.
6 Kjetil Fallan, "De-tooling Design History: To What Purpose and for Whom Do We Write?" *Design and Culture* 5, 1 (2013): 13.
7 Ibid., 10.
8 The implications of design's entanglement with modernity and productivism is a central theme in the work of Tony Fry. See, for example. his *Design Futuring: Sustainability, Ethics and New Practice* (London: Bloomsbury Academic, 2009).
9 Anne-Marie Willis, "On Design Writing," *Design and Culture* 5, 1 (2013): 39.
10 Ibid., 41.
11 Rita Felski, *The Limits of Critique*, 9.
12 Ibid, 10.
13 John Albert Walker, *Design History and the History of Design* (London: Pluto Press, 1989), 32–33.
14 Kees Dorst, "Design Practice and Design Research: Finally Together?," paper presented at the Design Research Society conference, June 27–30, 2016.
15 Rosalind Krauss, "Sculpture in the Expanded Field," *October* 8 (1979): 42.
16 Kees Dorst, "Design Practice and Design Research: Finally Together?"
17 Ibid.
18 Peter Hall, "Changes in Design Criticism," *Design and Culture* 5, 1 (2013): 21–28.
19 Thomas Flynn, "Foucault's Mapping of History," in Gary Gutting (ed.), *The Cambridge Companion to Foucault*, 2nd edition (Cambridge, UK: Cambridge University Press, 1994), 30.
20 Robert Venturi, Denise Scott Brown, and Steven Izenour. *Learning from Las Vegas: the forgotten symbolism of architectural form* (Cambridge, MA: MIT Press, 1977).

21 Peter Hall, "Unplugged: When Twilight Falls on the City of Neon," in Michael Bierut (ed.), *Rethinking Design Number Five: The Visual Language of Subcultures* (Cohoes, NY: Mohawk Fine Papers, 1999), 36.
22 John Robert Stewart, *Language as Articulate Contact: Toward a Post-Semiotic Philosophy of Communication* (Albany: State University of New York Press, 1995), 6–7.
23 Jean Baudrillard, *America*, trans. Chris Turner (London: Verso, 1988), 29.
24 Bruno Latour, "Why Has Critique Run out of Steam?": 226.
25 Ibid.: 228.
26 Robert Hodge and Gunther Kress, *Social Semiotics* (Oxford: Polity Press, 1988), 2.
27 Bruno Latour, *We Have Never Been Modern*, trans. Catherine Porter (Cambridge, MA: Harvard University Press, 1993), 6.
28 Ibid., 6.
29 Michel Serres and Bruno Latour, *Conversations on Science, Culture, and Time* (Ann Arbor: University of Michigan Press, 1995), 45.
30 Ibid., 45.
31 Bruno Latour, "Why Has Critique Run out of Steam?": 246.
32 Graham Harman, *Prince of Networks: Bruno Latour and Metaphysics* (Melbourne, re.press/Graham Harman, 2009), 13.
33 According to Latour, 'blackboxing' is "the way scientific and technical work is made invisible by its own success"; that is to say, the more successful a designed object or technology is, the more it is normalized and the more opaque its inner workings become. See Bruno *Latour, Pandora's Hope: Essays on the reality of science studies (Cambridge, MA: Harvard University Press 1999), 304.*
34 Michael Bierut, "Who Designed Easter Island?" in Michael Bierut (ed.), *Rethinking Design Number Five: The Visual Language of Subcultures* (Cohoes, NY: Mohawk Fine Papers, 1999), 9.
35 Peter Hall, "Unplugged," 59.
36 Ibid., 68.
37 Peter Hall, "Neon Typography," *DesignInquiry* (blog), June 25, 2008, retrieved from http://designinquiry.net/failagain/87/neon-typography/
38 Ibid.
39 Ibid.
40 Richard Sennett, *The Craftsman* (New Haven, CN: Yale University Press, 2008).
41 Northrop Frye, *Spiritus mundi: Essays on Literature, Myth, and Society*, vol. 3 (Abingdon: Taylor & Francis, 1976).
42 Michel Foucault, "So is it Important to Think?," in James D. Faubion (ed.), *Power: Essential Works of Foucault, 1954–1984* (New York, NY: New Press, 2000), 456.
43 Ibid.
44 Gilles Deleuze, *Foucault*, trans. Sean Hand (Minneapolis: University of Minnesota Press, 1988), 25.
45 Ibid., 32.
46 Ibid., 44.
47 Jim Merod, *The Political Responsibility of the Critic* (Ithaca, NY: Cornell University Press, 1987), 160
48 Peter Hall, "Sizing China: The World's First Digital Database of Asian Head and Face Shapes Could Help Change the Way all Industrial Designers Think about Ergonomics and Fit" *Metropolis* (March 2008): 122.
49 Stephen Jay Gould, *The Mismeasure of Man* (New York. NY: W. W. Norton & Company, 1996), 210.
50 Michael Adas, *Machines as the Measure of Men: Science, Technology, and Ideologies of Western Dominance* (New York, NY: Cornell University Press, 1990), 199.
51 Christina Cogdell, "The Futurama Recontextualized: Norman Bel Geddes's Eugenic 'World of Tomorrow,'" *American Quarterly* 52, 2 (2000): 200–201.
52 Peter Hall, "Sizing China," Metropolis: 123.
53 Rita Felski, "Critique and the Hermeneutics of Suspicion," *M/C Journal* 15, 1: 8.
54 A standard typographic measurement determined by the lowercase letter 'x' of a specified typeface and point size. Usually a proportionately larger x-height corresponds with a more legible typeface.
55 Charlotte W. Frei, Meead Saberi, and Hani S. Mahmassani. "Clearview Font in Illinois: Assessing Idot Experiences and Needs," Report No. FHWA-ICT-13-003 (Northwestern University Transportation Center, 2013), 8.
56 Federal Register, National Archives and Records Administration, FR 4083, 81 (15), January 25, 2016.