JUSTUS NIELAND

Midcentury Futurisms: Expanded Cinema, Design, and the Modernist Sensorium

We need, but do not yet have, a compelling explanation of how modernism and its designs on the human sensorium were transformed at midcentury. At midcentury, we have been told, a formerly transgressive, "bad" modernism becomes "good," by which critics have generally meant a modernism de-fanged and banalized, brought into the disreputable domain of middlebrow taste like "good design," and often conscripted in the ideological melodrama of the Cold War and its corporate imperatives.[1] But the midcentury also played host to vanguard visions of extravagant futurity, bold affirmations of a technologically transformed *physis*, and utopian claims about the revolutionary remaking of consciousness, art, and the mediated life of the senses that are often associated with the provocations of the counterculture, but rarely conceptualized in the way I propose here: a refashioning of modernist designs on perception and affect for acts of Cold War world-making. By "world," I mean both an historically situated idea of the world, a "world-concept," and the actual, material substrate of a world situation.[2] At midcentury, such worlds were glimpsed with a new

[1] See the introductory essay of Douglas Mao and Rebecca Walkowitz's collection *Bad Modernisms* (Duke: Durham UP, 2006); Fredric Jameson's discussion of late modernism in *A Singular Modernity: An Essay on the Ontology of the Present* (London: Verso, 2001), Serge Guilbault's *How New York Stole the Idea of Modern Art: Abstract Expressionism, Freedom, and the Cold War*, trans. Arthur Goldhammer (Chicago: University of Chicago Press, 1983). For more recent work on the way modernism in the Cold War "became propaganda for a 'Free World' defined by democratic institutions, free-market capitalism, and bourgeois individualism," see Greg Barnhisel, "Perspectives USA and the Cultural Cold War: Modernism in Service of the State," *Modernism/Modernity* 14:7 (November 2007): 729-54; 731.

[2] I borrow this double-pronged sense of "world" from Eric Hayot, *On Literary Worlds* (New York: Oxford University Press, 2012), 26. For a critique of recent world literature debates' inability to think worlding outside of spatial circulation and market exchange—i.e., the world of global capitalism—see Pheng Cheah, "World against Globe: Toward a Normative Conception of World Literature," *New Literary History* 45:3 (Summer 2014), 303-329.

acuity of vision by designers with newly global ambitions, and whose spatial sense of "worldliness" was part and parcel of the postwar globalization of the economy, and the geopolitical hegemony of the United States. As designers pressed the medium of film to expand beyond its routine commercial functioning and theatrical sites, they found new worlds for film, exploring and testing the perceptual-affective conditions of worldly citizenship in the strangest of places: the image-rich inside of a designer egg, a slideshow in an introductory architecture class, the total environment of an MGM robot, the new rites and sites of cinema in a Paleocybernetic age.

This requires modernist scholars to attend more closely to design itself, as a modernist formal idiom with its own disciplinary history, as a profession—"the designer"—with a new cultural prestige and world-historical mission at midcentury, and as an important discursive horizon for conceptualizing the transformed nature and power of media in the postwar period.[3] In the wake of wartime research into the effects of mass media as instruments of propaganda, the explosive growth of postwar communications networks, and the swift conversion of wartime technological advances into the happy consumer objects of liberal-democratic lifestyle, the media's capacity to define and distribute culture, and inculcate modes of citizenship, was subjected to an extraordinary degree of scrutiny across a curious range of disciplines, knowledge regimes, and institutional sites. Culture in the period—in its medial forms, and through its sensory-affective appeals and demands—could not *but* be administered.[4] A durable version of modernism was consolidated in the process, alongside—and

[3] For a canonical sociological assessment of the new role of the designer in the operation of the Cold War power elite, see C. Wright Mills, "The Man in the Middle: The Designer," in *Power, Politics, and People* (New York: Oxford University Press, 1963).

[4] On the emerging discipline of communication studies in the late 1930s as an outgrowth of concerns about wartime propaganda, and on the role of the Rockefeller Foundation in assembling the so-called "Communications Group" to study the effects of mass media in the service of more "democratic" propaganda, see Brett Gary, *The Nervous Liberals: Propaganda Anxieties from World War I to the Cold War* (New York: Columbia University Press, 1999), 85-130. For other, recent approaches to the role of mass media in the Cold War administration of culture, see Peter Decherney, *Hollywood and the Culture Elite: How the Movies Became American* (New York: Columbia University Press, 2005), and Mark Garrett Cooper and John Marx, "Crisis, Crisis, Crisis: Big Media and the Humanities Workforce," *differences* 24:3 (2014), 127-159.

often against—the rising prestige, and transdisciplinary universalism, of that crucial Cold War shibboleth, *communications*. As Mark Goble reminds us, at midcentury "the study of both modernism *and* communications emerged almost simultaneously as twentieth-century preoccupations and flourished as conglomerating triumphs of the postwar university in the United States."[5] Enshrined by the New Critics and the New York Intellectuals, literary high modernism's interwar aesthetics of communicative ambivalence, difficulty, and authenticity—its desire to "clear a space for more *authentic* forms of communication"—would be pitched in fitful competitions between media forms, across hierarchies of value, and within overlapping domains of professional and disciplinary expertise.[6]

In this context, designers routinely functioned in media-pedagogical capacities with a worldly scope, playing important roles within a broader Cold War administration of culture. Buoyed by the prospect of a bold midcentury world for the making, the designers' expansive liberal optimism incarnated what architectural critic and historian Reyner Banham once referred to as "the problem of affluent democracy," and brought a modernist tradition of media experimentation and sensory utopianism into the institutional operations of the "Cold War semiosphere."[7] If scholars generally adduce the midcentury as the crucial moment in the historical institutionalization of modernism, and, for many, the domestication of its revolutionary energies, any better story of the fate of a modernist sensorium during the period must attend not just to the central role of the designer in the institutional life of the period—to design "as a function of management" and Cold War culture administration—but to the

[5] Mark Goble, *Beautiful Circuits: Modernism and the Mediated Life* (New York: Columbia University Press, 2010), 4.

[6] On high modernism's desire for communicative authenticity within a media ecology shaped by propaganda and the pseudo-fact, see Mark Wollaeger, *Modernism, Media, and Propaganda: British Narrative from 1900-1945* (Princeton: Princeton University Press, 2007), 30.

[7] Reyner Banham, "Design by Choice," in *Design by Choice: Ideas in Architecture*, ed. Penny Sparke (New York: Rizzoli, 1981), 103. On the Cold War "semiosphere," see Pamela M. Lee, "Aesthetic Strategist: Albert Wohlstetter, the Cold War, and a Theory of Mid-Century Modernism," *October* 138 (Fall 2011), 15-36.

broader appeal of design for conceptualizing the life of the senses, and their new, worldly scales at midcentury.[8]

In what follows, I explore this design paradigm, and its implications for a modernist account of the midcentury sensorium, within the theory and practice of what has been called "expanded cinema," and the exuberant midcentury futurism that abetted it.[9] In the wake of digital challenges to cinematic ontology, film and art historians have excavated expanded cinema's importance in what Susan Sontag, in 1967, described as the two "principle radical positions in the arts today": the late, Greenbergian preoccupation with "what each art distinctively is," and "the breaking down of distinctions between genres" signalled in the mixed-media practices that defined much advanced art of the 1960s, including expanded cinema.[10] Expanded cinema practices have found a place in genealogies of the counterculture's intermedial provocations, and our current "post-medium" condition.[11] But they are not generally taken up, as this essay does, as a specific problem for the modernist sensorium. Attending to the expanded cinema practice and theory of midcentury designers, artists, and critics like Charles and Ray Eames, John McHale, and Gene Youngblood, as well as their shared interlocutor, Buckminster Fuller, this essay narrates both the sensorium's perceived historical transformations at midcentury and the tactics and scenes of its cultural administration, seeking to describe what is recognizably modernist about cinema's modes of "expansion," and the new

[8] I refer here to the title, "Design as a Function of Management," of the first International Design Conference in Aspen (1951), a crucial site for the midcentury merger of design, corporate management, and modernist aesthetics. On IDCA's emergence from the midcentury *bildungsideal* of visionary corporate patron Walter Paepcke, see James Sloan Allen, *The Romance of Commerce and Culture: Capitalism, Modernism, and the Chicago-Aspen Crusade for Cultural Reform* (Chicago: University of Chicago Press, 1983).

[9] For an early critical overview of expanded cinema practices, see Sheldon Renan's chapter "Expanded Cinema," in *An Introduction to the American Underground Film* (New York: Dutton, 1967).

[10] Susan Sontag, "Theatre and Film," in *Styles of Radical Will* (New York: Picador, 1967), 119.

[11] Rosalind Krauss, *'A Voyage on the North Sea': Art in the Age of the Post-Medium Condition* (London: Thames and Hudson, 2000); Ji-Hoon Kim, "The Post-Medium Condition and the Explosion of Cinema," *Screen* 50:1 (Spring 2009), 114-123.

worlds it speaks in the process. The essay turns first to the contested status of the Eameses in recent critical assessments of the sensory politics of expanded cinema, before offering an alternative genealogy of expanded cinema discourses. I begin this genealogy with one of the Eameses' overtly pedagogical media experiments in the early 1950s and end it by parsing the persistent idiom of design in and around Youngblood's canonical study *Expanded Cinema* (1970). My aim is thus to reframe expanded cinema discourses as a terrain of modernist thought about the very worldliness of media—its baffling spatial and geographic extensiveness across the globe; its seemingly new times, speeds, and natures; and the forms of belonging, community, and citizenship it might offer in proposing a human sensorium scaled to the world. In the process, it begins to provide an account of the status of modernism's sensory utopianism at midcentury, re-made by the new prestige of communication theory and wielded by designers who positioned themselves as communication's postwar prophets and global emissaries.

Architecture as Relationship Thinking

Consider the extravagant midcentury futurism of the so-called "Information Machine" at the IBM pavilion for the 1964-65 World's Fair in New York. The goal of the pavilion was "to tell the story of modern information handling devices in an interesting, informative and educational manner."[12] The pavilion, designed by Eero Saarinen and Associates, consisted of a "grove of man-made steel trees" providing a canopy for exhibitions in which probability displays and data-processing systems were framed by charming puppet theatre. The centrepiece of the exhibition was the "Information Machine"—a giant, hollow egg made of a concrete shell whose white surface was covered over with the IBM logo. Inside the egg was, in fact, a multi-media theatre that presented, on 15 screens of various sizes, a film and slideshow called *Think*, designed by Charles and Ray Eames. An experiment in the new quantities, speeds, and scales of information in the postwar period and the demands those changes made on the human sensorium, *Think*'s enveloping, "total" environment extended a Bauhaus tradition of exhibition design exemplified by the work of Herbert Bayer, while continuing the Eameses' longstanding interest in communication. In the

[12] IBM Press release, April 18, 1963, cited in Ben Highmore, "Machinic Magic: IBM at the 1964-5 New York World's Fair," *New Formations*, 134.

Eameses' case, this investment began properly in the early 1950s with a series of media-pedagogical experiments on television and in the university classroom, and was first set forth in the short film essay *A Communications Primer* (1954), an explication of Claude Shannon and Warren Weaver's foundational cybernetic work *A Mathematical Theory of Communication*. In *A Communications Primer*, IBM saw a vision of postwar technology's future firmly in line with the reinvention of its own corporate image in the 1950s and 1960s presided over by the Eameses' friend Eliot F. Noyes, the first curator of design at MoMA.[13] For IBM, the Eameses produced both *Introduction to Feedback* (1960), conceived as a "sequel" to *A Communications Primer*, as well as *The Information Machine: Creative Man and the Data Processor* (1957), an animated film made for the IBM pavilion at the 1958 Brussels World's Fair. As in *The Information Machine*, the aim of *Think* was, in part, to demystify and domesticate computers, showing, through a welter of audio-visual information, how these machines "help solve the most complex problems with the same principles of logic, similar to those we all use in making decisions everyday."[14] And the audience experienced *Think*'s techno-spectacle by taking seats on a 500-person "People Wall" which was then lifted hydraulically 50 feet into the egg's interior, all while suspended over a pool of water.

Think, to put it mildly, has not fared well in many of the more persuasive reassessments of the sensory-affective politics of expanded cinema. Alongside the Eameses' landmark multiscreen exhibition *Glimpses of the USA* exhibited at the U.S. National Exhibition in Moscow in 1959 (site of the infamous Nixon-Kruschev "kitchen debates"), *Think*'s now-ironic optimism is generally recalled to position the Eameses as critical bad objects—exemplars of a midcentury paradigm of sensory normalization and discipline over and against the liberatory sensorial regimes of the counterculture. Exemplary in this regard is Andrew V. Uroskie's compelling recent study *Between the Black Box and the White Cube*. Uroskie's historiographic goal is to consider a range of expanded cinema

[13] For a superb account of Noyes' design program at IBM, see John Harwood, *The Interface: IBM and the Transformation of Corporate Design, 1945-1976* (Minneapolis: University of Minnesota Press, 2011).

[14] Cited in Ben Highmore, "Machinic Magic: IBM at the New York World's Fair," *New Formations* 51 (2004), 134 [128-148].

practices in New York in the 1960s (from Robert Breer and Robert Whitman to Andy Warhol, Stan VanDerBeek, and Ken Dewey) within the art world's new attentiveness to the post-medium, phenomenological situatedness of the aesthetic encounter, and thus to cinema as "a social technology—a set of historically contingent practices of exhibition and spectatorship."[15]

The 1964-65 New York World's Fair appears in Uroskie's history as a crucial foil for distinguishing between two modes of cinematic "expansion": one, a properly "conceptual" concern with the "institutional qualities of the cinematic situation" also emerging in the fall of 1965, and best exemplified by the Expanded Cinema Festival held that winter at the Film-Maker's Cinematheque in New York; the other, a merely "formal" expansion of cinema evident in the fad of spectacular, multiscreen works featured at the fair, including and of course, the Eameses' *Think*, for IBM.[16] This latter, expanded cinema manqué, for Uroskie, is maximalist rather than minimalist, chiefly concerned with quantity (size and number of screens), speed (the pace of images), and sensory intensity ("the efficiency of sensory bombardment"). Neither "particularly novel nor greatly innovative," the use of multiple projection, as Uroskie reminds us, is nearly as old as the technology of cinema itself. More damning, Uroskie argues, is multiscreen's "surprisingly fixed understanding of the spectator-screen relationship." From the Raoul Grimoin-Sanson's Cinéorama of 1900 to the Cinerama of the 1950s, multiscreen experimentation proceeds "with a singular aim": the "enfolding of the spectator in an immersive, diegetic world through the overwhelming sensory conditions of display […]. By immersing the subject

[15] To delineate expanded cinema's kinship to minimalist and postminimalist strategies in postwar art, Uroskie draws on Rosalind Krauss' influential account of the "expanded field" of sculptural practice in the 1960s that, by returning to the conceptual provocations of Duchamp's readymades, moved from a modernist preoccupation with medium-specificity to a "post-medium" interest in the artwork's *situation*—an investment fueling new strategies of site-specific, materialist, institutional critique. Uroskie, *Between the Black Box and the White Cube: Expanded Cinema and Postwar Art* (Chicago: University of Chicago Press, 2014), 26.

[16] Uroskie, *Black Box and White Cube*, 26. Other multiscreen works at the fair included:" Saul Bass's *The Searching Eye* at the Kodak Pavilion, *Man in the 5th Dimension* at Billy Graham's Christian Evangelical Association Pavilion, *To the Moon and Beyond* at the Transportation and Travel Pavilion, Alexander Hammid and Francis Thompson's *To Be Alive!* at the Johnson Wax Pavilion.

within an overwhelming accumulation of visual data, they sought to produce a heightened experience of reality without too great a concern for realism."[17]

Uroskie's study exemplifies a persistent way of understanding the sensory-affective politics of midcentury designers like the Eameses, building on earlier parsings of the heterogeneous agendas of expanded cinema practices by critics like Liz Kotz, Branden Joseph, and Ben Highmore.[18] This work has noted, first, that all departures from mainstream norms of cinematic exhibition—as in the *Think* presentation—are neither necessarily liberatory nor disruptive, but rather proximate to the forms of corporate propaganda of mainstream display culture or military-scientific technologies and their ideological work (Kotz). It has further posited that the Eameses' apparent attentiveness to the disjunctive and dislocating effects of electronic media, modelled in *Think*'s very imagistic excess, and the designers' ways of encouraging spectators to "participate" by making connections between "diverse, fragmentary bits of information," might actually constitute a "more active form of suture, an identification with and subjection to the electronic image."[19] This, then, is how the media pedagogy of the "Information Machine" has been recently understood: as a corporate plot to "immerse the audience in images and overwhelm them with sensation" fully complicit with the logic of advanced capital; as a phantasmagoric forgetting of the lived body in a virtual environment of mystification; or as a nefarious form of perceptual distraction—one that not only naturalizes the speeds of a new information economy, but allows for more subtle forms of social control in which subjection to the electronic image masquerades as active human participation.[20]

Such readings assume a familiar model for conceptualizing the sensory-affective politics of cinematic attention and visual spectacle: the absorption/disjunction

---

[17] Uroskie, *Black Box and White Cube*, 24.

[18] Liz Kotz, "Disciplining Expanded Cinema," in *X-Screen: Film Exhibitions and Actions* (Mumok, 2003), 44-57; Highmore, "Machinic Magic"; Branden W. Joseph, "'My Mind Split Open': Andy Warhol's Exploding Plastic Inevitable," *Grey Room* 8 (Summer 2002), 80-107.

[19] Joseph, "'My Mind Split Open'," 93-94.

[20] See, respectively, Kotz, "Disciplining Expanded Cinema," 51; Highmore, "Machinic Magic," and Branden W. Joseph, "'My Mind Split Open'."

dialectic. It has a clear modernist pedigree, hinging on a critique of the faux "nature" of bourgeois illusionism, and a preference for defamiliarization that runs from Russian formalism and the Soviet montage theory of Eisenstein and Vertov, through Brecht and Benjamin's materialist critiques of fascist aesthetic spectacle—anestheticized against historicity—to the resurgence of Brechtian reflexivity and anti-illusionism in 1970s in the discourse of "political modernism" that fuelled the consolidation of a powerful theory of the cinematic apparatus.[21] And it assumes a basic ideological binary between the sensory conditions of "active" and "passive" spectatorship: the former abetted by modernism's arsenal of techniques, in Shklovsky's terms, for roughening perception or making it slow and difficult, somehow distanced and thus ideologically reflective; the latter for domesticating perception, making it conform to normative, pleasing, or readily consumed conditions of bourgeois custom—what Brecht critiqued as the "culinary" tendency in opera, and bourgeois cultural apparatuses more broadly.

By reasserting these binaries (absorbing/disjunctive, sutured/alienated; active/passive), recent scholarship on expanded cinema practices has both underestimated the nature of the Eameses' interest in sensory "discipline," and misrecognized its intellectual sources, its institutional contexts, and reach of its midcentury utopianism—its worldly ambitions. As I argue elsewhere, this utopianism, like the images of Eamesian happiness through which it circulated worldwide, is best understood not solely through consumption and spectatorship, but as a model of technophilic production, a process or technical manner of working with objects and images in their midcentury techno-scientific environments. Such making is indebted to their modernist self-understanding as inheritors of a Bauhaus genealogy in which promiscuous aesthetic production across media is the therapeutic expression of an integrated personality—a "whole man" in an era whose modernity is synonymous with debilitating over-specialization.[22] The Eameses, for their part, repeatedly called their conspicuous

[21] D.N. Rodowick, *The Crisis of Political Modernism: Criticism and Ideology in Contemporary Film Theory* (Berkeley: University of California Press, 1994).

[22] See my "Making Happy, Happy-making: The Eameses and Communication by Design," forthcoming in Julie Taylor, ed., *Modernism and Affect* (Edinburgh: Edinburgh University Press, 2015).

range of production ways of "taking their pleasure seriously." The phrase typifies a quasi-ascetic modernist approach to pleasure as a way of making unfamiliar demands on the senses, one necessarily involving, as Laura Frost has recently observed, a regime of discipline, difficulty, or unpleasure.[23] It also signals the designers' preference for modes of constraint-based production that worked not with autonomous things in isolation, but, importantly, things perceived in what they referred to as "relationships," and whose networked functioning it was the work of multi-screen presentations like *Think* to model.[24] And it anticipates their hostility to any model of agency predicated on total freedom, spontaneity, or the will to original self-expression. Allergic to such expressive models of unfettered aesthetic production, the Eameses' mode of expanded cinema—like the broader midcentury world to-be-designed—requires calculation and decision, a tooling of feeling and sensation.

Importantly, the Eameses first pressed cinema to expand in the explicitly pedagogical context of the classroom, an institutional site that begins to suggest how, for designers, media pedagogy blurred boundaries between the experimental provocations of expanded cinema and the instrumental work of "useful cinema."[25] Here, the sensorium of aspiring artists and architects would

[23] Laura Frost, *The Problem with Pleasure: Modernism and its Discontents* (New York: Columbia University Press, 2013).

[24] In this sense, the Eameses' sensory pedagogy of "relationships" would align itself not with the conditions of what Michael Fried hailed as the modernist artwork's self-sufficient "presentness," but with the ongoing, durational experiences he dubbed "theatricality," and critiqued in the phenomenological orientation of minimalist sculptors like Tony Smith. As Pamela Lee has argued, underlying Fried's critique of minimalism is a specifically phobic relationship to the sorts of temporal endlessness and duration everywhere explored in the progressively "environmental reach of three-dimensional work from the 1960s to the present, its extrinsic coordination of mixed media, even intermedia." Lee shows convincingly how this newly environmental orientation, and networked functioning, also reflects the art world's encounter with systems theory and cybernetics, which decisively shaped the media practice of designers like the Eameses. Histories like Lee's thus make it difficult to position the Eameses' pedagogy of "relationship" thinking and feeling against minimalist and post-minimalist investments in expanded cinema. See Michael Fried, "Art and Objecthood," (1967), in *Art and Objecthood* (Chicago: University of Chicago Press, 1998), and Pamela M. Lee, *Chronophobia: On Time and the Art of the 1960s* (Cambridge: MIT Press, 2004), 42.

[25] On this category, see Charles R. Acland and Haidee Wasson, eds., *Useful Cinema* (Durham: Duke University Press, 2011).

be trained in modes of perceptual-affective "awareness" consistently framed in cybernetic terms, and conceptualized within Cold War scenarios of choice and decision-making, prediction and speculation. Late in 1953, Charles Eames accepted an invitation to restructure a first-year design course for beginning students at UC-Berkeley's School of Architecture. From December 1953 to April 1954, he delivered to a 125-student class a series of monthly lectures, the bulk of which were taken up by a rather astonishing swath of multi-media experimentation spawned by the Eameses' interests in communication theory: slideshows, films (the Eameses' own, and a range of others), and lengthy readings from divergent sources ranging from rational-choice economic theory to editorials on information theory from *Astounding Science Fiction*.[26] The experiments called for, and performed, not just the flexible, open habits of mind typical of Cold War educational reform, but a sensory pedagogy of worldliness and citizenship in precisely the terms laid out elsewhere by the Eameses' friends and collaborators George Nelson and György Kepes.[27]

The concept of architecture, Eames explained in his Berkeley lectures, would be taught not in terms of buildings, but architecture "as the world, and the extension of man and his environment." The capacity for man's architectural "extension" was not just physical, but cognitive and perceptual: such architecture required worldly, integral seeing of the kind embodied in the Eameses' own famous Case Study House #8, modelled in its mediated forms. In the ninth lecture, the slideshow of the Eames house that would later become the film *House: After Five Years of Living* (1955) was shown as a living example of architecture as an "art of relationships," and the slides of the couple's carefully arranged domestic items marshalled as evidence of networked visuality. To see a succession of such arrangements flit by as slides is to observe how "everything in the room is in

[26] Part II, Box 215, Charles and Ray Eames Papers, Manuscript Division, Library of Congress, Washington, DC. The citations from the lectures that follow come from a typed, unpaginated transcript of the lecture content.

[27] Jamie Cohen-Cole, *The Open Mind: Cold War Politics and the Sciences of Human Nature* (Chicago: University of Chicago Press, 2014). Nelson's suite of essays on postwar educational experimentation, "Art X: On the Georgia Experiment," "The Designer in the Modern World," and "High Time to Experiment," are included in his collection *Problems of Design* (New York: Whitney, 1957).

relation to every other thing in the room, all of which is architecture," an architecture perpetually scaled to the "next largest thing."

Four multi-screen slideshows or "scapes" comprised the most insistent technology of the lectures, and were at the centre of this strategy of visualizing "relationships": *Townscape*, *Seascape*, *Roadrace* (portions of which reappeared in *Think*) and *Railroad*, also called *Trainscape*. To get a better sense of this sensory pedagogy, consider how *Seascape* operated in the lecture context. Eames' third lecture begins with a discussion of the importance of decisions and the necessity of adjudicating quality, despite—or perhaps because of—the absence of absolute values. *Seascape*, adduced as an experiment in "audible and visible associations" is projected to train the students' repertoire of "built-in" experiences necessary in decision-making and judgment. Eames proceeds by a disjunctive montage of sound and vision: images of people at the beach, and then elements of beach itself and marine life shown in rapid succession alongside a tape recording that mixes the continuous breaking of surf along the beach with snatches of French, American, and Italian songs, and the ambient sounds of the seascape: seagulls, barking dogs, and airplanes. After the show, the students were asked what they best remembered, and whether it affected them negatively or positively. Several complained that the scenes were too "busy" and that "noise filled the brain"; others that the slides went by too quickly, producing a confusing discrepancy between sound and image. Eames's comments on the students "associations" are revealing. For the handful of students repulsed by the "slimy" or "stagnant" aspects of marine life, Eames responded that this is but a personal, relative view, an arbitrary moralizing of forms of life that are, in themselves, neither good nor bad. Indeed, the student consensus about the "horrors of the sea" was surprising enough to Eames that he returned to it at the start of the next lecture, remarking that that he was "unable to conceive a form that was in itself ugly," but rather only so "relative to its surroundings." He then re-ran a series of *Seascape* slides, especially shellfish in states of deterioration, but without sound, to ask whether then seemed "less horrible in themselves at second sight."

By returning insistently to this sensual pedagogy of pragmatic relativism, Eames' Berkeley lectures acknowledged their debt to the work and thought of Buckminster Fuller, and his claim that "security in change" is "the great

advantage that education can provide the student."[28] Fuller protégé and Fuller Research Institute member Geoffrey Lindsay gave the one guest lecture in the course—on the background, training, and key architectural achievements of his mentor in the area of low-cost housing, from fire-cracker tents and trailer-packed houses to Fuller's experiments with geodesic domes of various sizes and scales of complexity. Indeed, it was Fuller's brand of specifically ecological awareness that, for Eames, exemplified "relationship" thinking and teaching, as compensatory modes of achieving "security in change," and that would be abetted by information and communication technologies. In the Berkeley lectures, Eames screened *A Communications Primer* in this context, immediately following Lindsay's lecture, and prefaced the film by returning to Fuller, noting that one way of "building up the feeling of security in change is to concentrate on the relationships of things to each other and the value of relationships rather than valuing the idea of the thing in itself." He followed this with another discussion of the contextual determination of morality, value, and convention (in the Crusades, he noted, both sides cried "kill the infidel!"), but now turned this to a new, related problem—the emergence of novelty and difference, and the management of the unexpected or improbable within any given "environment." How, in sum, does "security in change" happen? Here, Eames remarks on the double standards that emerge to challenge binary distinctions between friend and enemy: if "our team" retreats, it is "courage," if the opposition does, it is "weakness"; our rule-breaking is "originality," theirs is "taboo." Eames' point is that the new and "true" is often *the illogical*—indeed that truth includes "improbable data, or peripheral truths," and that if the truth-value is high, its degree of probability is correspondingly low. What Fuller would call "security in change," thus requires training in "knowing the nature of [any given] opposition," "seeing the relationship between the familiar and the unfamiliar," in order to integrate the new. This is change you can feel secure in.

Much like the film *A Communications Primer* itself, the "awareness shows" would school their viewers in forms of sensory integration that seek to speculate about, and better manage, the new and eventful—a discursive horizon of security

[28] Eames cites Fuller in his 1951 address to the inaugural International Design Conference in Aspen. Part II, Box 215, "Speeches and Writings File, 1943-1983," Charles and Ray Eames Papers, Manuscript Division, Library of Congress, Washington, DC.

in the unforeseen that, in the Cold War context, is decisively shaped by the event of the bomb. Eames makes this point directly following his discussion of *Seascapes*, arguing for the importance of science-fiction literature as one of the few arenas today in which the "art of speculation is practiced," and suggests that such a course be taught in public schools. Better practiced in speculating about the future, students will avoid the disasters that come when they wish "harder" rather than wisely: "Had we been collectively trained in an art of speculation," he speculates, we might not have wished so hard for "a weapon that could destroy whole cities." Thus he proposes a curriculum of "rationally organized speculation," offering the example of MIT's program in creative engineering, which asks students to speculate on an existing planet and its inhabitants, and design products for it in a way that requires their conceptual "points of reference be changed from that of earth."[29] But speculation also entails historical thinking, involvement in "the situations and conditions under which people solved problems in their own society," and so he tasks students with a design exercise in the reconstruction of an historical environment, and screens films that exemplify acute historical awareness.

For Eames, speculative thought demands of students both conceptual flexibility—the capacity to imagine radically other scenarios or environments, whether in unearthly space or historical time—and mobile forms of collective production and problem solving that challenge ideas about individual expression and creativity. Indeed, one of the more striking moments in the lectures comes when Eames recalls one of Fuller's many exercise in catastrophic speculation: imagine Chicago as a city to be destroyed in 14 days, and design an evacuation strategy. Fuller's solution, Eames explains enthusiastically, was a series of mobile units that would house 10,000 people, serve 5,000 meals per day, and be

[29] The MIT experiment in the pedagogical appropriation of science fiction and Cold War speculation, which goes unnamed in the lecture transcripts, was called Arcturus IV, and conceptualized by John E. Arnold, associate professor of mechanical engineering. See Hartley E. Howe, "'Space Men' Make College Men Think," in *Popular Science* (October 1952), 124-127, 266-268. The project is discussed by John McHale in "Marginalia" (1957), in Alex Kitnick, ed., *The Expendable Reader: Articles on Art, Architecture, Design, and Media, 1951-79* (New York: GSAPP Books, 2011), 140.

capable of moving every 24 hours to points within a 200-mile radius.[30] Eames calls this exercise in mobile planning a "circus community," and proceeds to develop an analogy between this kind of flexibility and that of the Ringling Brothers circus, whose forms of mobility (tents, ropes, pulleys, pegs, canvas, fasteners) constitutes an "architecture of tension," that he illustrates with a slideshow and accompanying soundtrack. The community and its architectural forms, Eames insists, is a model of efficient communal production across large swaths of time—you can sense, he notes, the presence of individual innovations and improvements, but they are subordinated to a supervening organizational structure, an abiding, integral whole. This kind of making, he continues, in which tremendous variety, modifications, and refinements are domesticated within a larger unit of production, and its abiding limits, are best exemplified by the making of bread, and the Eameses' film *Bread* is screened as a paean to just this kind of disciplined, communal making.

In the context of the Berkeley lectures, then, we can read *Bread* not just as a carb-heavy reminder of the Eames liberal humanism in its documentation of the sheer democratic *varieties* of bread across cultures and times, but an allegory of largely anonymous, corporate making in which the individual is integrated into a community, and freedom of expression is tempered by long-standing limits and constraints that produce "the feeling of security in change." Indeed, of all of the arguments made by Eames in the lectures, he is perhaps most insistent about this one—the necessity of working within limitations, the critique of originality for its own sake, and the need for modes of creative discipline. In the lectures' various examples of the Eameses' interest in the structure of theme and variations, Eames stresses that the variations have meaning "in relation to the one before it," which of course is the sensual and semantic lesson of the awareness shows broadly speaking. He makes the same points about writing itself as an expressive technology, which developed in the scale of deep, evolutionary time: 250,000 years of human history elapsed before the first cave paintings; another 15,000 until the emergence of Egyptian hieroglyphics; 5,000

[30] On Fuller's "autonomous dwelling unit" in the context of his Chicago-based pedagogy, see Tricia Van Eck, "Buckminster Fuller in Chicago: A Modern Individual Experiment," in Mary Jane Jacob and Jacquelyn Baas, eds., *Chicago Makes Modern: How Creative Minds Changed Society* (Chicago: University of Chicago Press, 2012), 11-47

more until the first "non-phonetic" letter, and then, relatively rapid development of Greek and Roman systems of writing. The fetish of originality, he insists, is overrated. In fact, it is one of the major hurdles for designers to overcome. Better to set limitations, often dictated by the medium in which one works: take granite, which allows for control over the terrain of possible decisions, and allows one to avoid the "horrible freedom in a completely plastic medium." Eames's students, we should point out, were largely unreceptive to these efforts to redefine freedom and creativity as "knowing an objective and working within restraints," and had a chance to critique the pedagogy in the penultimate lecture, when Eames solicited oral feedback on the semester. To his surprise, one student expressed frustration with the limitations of the exercises, which kept them from being free, and expressed a desire to explore the "impractical"; another wished for a problem which asked them to do the "most fantastic thing utterly without discipline," and that would encourage them to design "so that the expression of the architect is in the building." Eames' response was that the desire to do the impractical would require a great deal of discipline (in noticing and deciding on what *not* to do), and that architects, and the environments they construct, are always embedded in time and history: "our economy is all around us and we build with what we have." More striking, however, was his related claim about freedom itself: "All freedom is too big."

In making the claim, Eames again displayed his conceptual affinity for what Anna Vallye has called the "imbrication of economic and political imperatives driving the training of the mind" in the broader discourse of general education of the period and its vision of Cold War global citizenship.[31] Indeed, *General Education in a Free Society* (1945), also known as the Harvard *Redbook*, the work that Geoffrey Galt Harpham has described as the "single most important document in the history of the 'humanities,'" would make a similar point about the too-bigness of freedom, and its implications for the role of humanistic education within democracy: "We are apt sometimes to stress freedom, the power of individual choice, and the right to think for oneself—without taking sufficient account of our obligation to cooperate with our fellow men:

[31] Anna Vallye, *Design and the Politics of Knowledge in America, 1937-1967: Walter Gropius, György Kepes*., unpublished Ph.D. dissertation (Columbia University, 2011), 262.

democracy means an adjustment between the values of freedom and social living."[32] For the Eameses' friend Kepes, this attempt to reconcile a postwar demand for economic growth with the Fulleresque feeling of order and "security in change" fuelled a consistent agenda to align the individual scale of visual perception—the "living unity" or "dynamic equilibrium" between "order-security" and "freedom-growth"—to a socio-political scale, the "political relationship between freedom and community."[33]

Like the Art-X experiments before them, the Berkeley lectures demonstrate that the "language of vision" that designers like the Eameses began to test out in the media-pedagogical classroom experiments that developed in and around *A Communications Primer*—and would culminate in multi-screen extravaganzas like *Think*—should be considered as a related series of perceptual-affective techniques.[34] In them, designers sought not sensory "immersion" or absorption" but the reconciliation of order and growth, security and change, through the cognitive and perceptual training that saw individuals and individual units in broader webs of "relationships," and that allowed for the kinds of networked communications and decisions upon with nothing less than the future of the world depended. If the Eameses inherit such instrumentality from the utopian modernist tradition of the Bauhaus, and Fuller's homeostatic desire for security in change, they and other designers put it differently to work for the conditions of capitalist democracy in a postwar geopolitical order presided over by the United States and its techno-scientific hegemony. Indeed, within this context, the senses—and the broader domains of transfigured "culture" and "nature" to which they respond—cannot *not* be administered, managed, or otherwise designed.

---

[32] Harpham, qtd. Cooper and Marx, "Crisis, Crisis, Crisis," 138; the Harvard *Redbook*, qtd. in Vallye, *Design and the Politics of Knowledge*, 266.

[33] Kepes, "The Education of Vision," unpublished manuscript, quoted in Vallye, *Design and the Politics of Knowledge*, 266.

[34] On the "language of vision" developed by Bauhaus designers and artists László Moholy-Nagy and Kepes, see Reinhold Martin, *The Organizational Complex: Architecture, Media, Corporate Space* (Cambridge: MIT Press, 2003), 42-79; Fred Turner, *The Democratic Surround: Multimedia & American Liberalism from World War II to the Psychedelic Sixties* (Chicago: University of Chicago Press, 2014); and Charles Eames, "The Language of Vision: Nuts and Bolts," *Bulletin of the American Academy of Arts and Sciences* 28:1 (October 1974), 13-25.

If the scale of this regime of sensory discipline is now "the world," this is not so because that world should everywhere be made one, necessarily, with spectators absorbed into its most normative operations, but because the technological and scientific environments of the postwar period have so radically transformed what seemed normative, or "natural" in the midcentury world as given to the senses, and in the object world thought to exemplify the good life. Indeed, in the postwar terrain of production presided over by the new cultural prestige of designers like the Eameses, the midcentury object is thrown into pronounced crisis: its solidity fissured, catastrophically, by atomic science; its materiality flattened in a post-industrial society driven by the circulation and consumption of images; its capacity to function as an autonomous fragment of non-self challenged by expanding informatic networks that force it into scenes of communicative transparency.[35] There will be, in this horizon of production, no relief from ideology, but rather an enthusiastic, even technophilic, functionalism, an insistence on usefulness, and a seriousness of purpose regarding the range of human problems that might be solved by good design, whose purview and scale expand vertiginously—from plywood chairs to blueprints for postcolonial nationhood—and therefore threaten as instruments of a coercive, postwar technocracy. These designers aren't reifying a world, but reckoning with its very weirdness, its unnaturalness, its strange new nature.

Design as Environmental Communication

Across the Atlantic, for the artists John McHale and Richard Hamilton, then members of London's insurgent Independent Group (IG), the media practices of U.S. designers were understood in just this way. For them, the Eameses' experiments epitomized a sustained investigation into the expanded scales of sensory experience afforded by postwar technologies, and an exemplary encounter with significant changes in the scope, speed, and nature of media now understood as an "environment" that made quasi-evolutionary demands on the future of the human organism. An association of iconoclastic young artists, architects, and critics—including McHale and Hamilton, but also Lawrence Alloway, Reyner Banham, Peter and Alison Smithson, Toni del Renzio, and Eduard Paolozzi—the IG emerged in London in the early 1950s around the

[35] On interwar modernism's relation to the object world, see Douglas Mao, *Solid Objects: Modernism and the Test of Production* (Princeton: Princeton University Press, 1998).

fledgling Institute for Contemporary Arts to account for what David Mellor has called "the massive postwar proliferation of scientific and technical discourses, perceived as originating mainly in the United States."[36] But the IG, by virtue of its encounter with postwar techno-science in various American guises, was also a key site of nascent expanded cinema discourses, although it has never been credited for that. A recognizably expanded cinematic idiom—the language of sensory and medial extension, an evolutionary understanding of organism and its technological "total environment," attention to the communicative and informatic processes regulating humans and machines—pervaded the IG in theory and practice, especially in the work of McHale and Hamilton. McHale's career, in fact, provides a crucial link between Youngblood's canonical countercultural theory of expanded cinema in 1970 and the design practice of the Eameses. These seemingly disparate sensory worlds, as we will see, come together through a shared investment in the utopian globalism of Fuller.

Indeed, by the middle of the 1950s, the Eameses' films and design practice were in the discursive thick of the IG's typically wide-ranging conversations about technology, design, and postwar art and culture, taken up for discussion alongside, say, the architectural writing of Sigfried Giedion, the art of Jean Debuffet and Francis Bacon, the cultural force of horror comics and movie starlets, the films of Kenneth Anger, developments in probability and information theory, and the ubiquity of "advertising—sociology in the popular arts" (*IG* 31).[37] In 1955, the Eameses' film *A Communications Primer* was shown at the ICA, just a few months before the London premiere of Hamilton's landmark exhibition *Man, Machine, and Motion,* which aimed to consider "as the essential material of history," machines that "extend the powers of the human body" and "the range of the senses."[38] The theories of information and

[36] David Mellor, "The Pleasures and Sorrows of Modernity: Vision, Space, and the Social Body in Richard Hamilton," in Hamilton, *Richard Hamilton*, 18.

[37] IG member and architect Geoffrey Holroyd, for example, visited Charles and Ray Eames at their already famous Case Study home in Santa Monica 1953, and would, like his colleagues Peter and Alison Smithson, pen tributes to the Eameses' achievement in a 1966 special issue of the British journal *Architectural Design*, which began publishing the writings of the IG in 1956.

[38] Richard Hamilton, "Man, Machine, and Motion," in *Richard Hamilton: Collected Words, 1953-82* (London: Thames and Hudson, 1982), 19.

communication explicated in the Eameses' film, like Norbert Wiener's thought specifically, informed Hamilton's early art and exhibition designs, and Hamilton would later fold a discussion of the Eameses' early cybernetic experiments in multi-screen sensory pedagogy into his lecture on Hollywood's widescreen technologies, "Glorious Technicolor, Breathtaking Cinemascope and Sterophonic Sound." The couple's work, for the IG, epitomized a media practice whose terrain was a sensorium remade through the "general field of visual communication," in which cultural value hierarchies collapse, and art and advertising, the designed object and industrial film are viewed equally as data-rich sign systems, organized by the choices and decisions of individual users. [39]

As heralded by the IG, then, the Eameses' design activity was nothing short of world-making: it served as the hallmark of the technological saturation of postwar life in the American century, and as the apotheosis of an attitude toward technology and postwar Americanization on the continent that would shape the IG's pop sensibility—a comfort in technology's horizon of obsolescence and ephemerality, its modes of packaging and visual display, and the anti-hierarchical drift of its image sphere. As for the Eameses, so too for IG artists like Hamilton, Paolozzi, and McHale did the display technologies engaged in their art fuel a modernist collage practice that, at midcentury, achieved newly environmental and global aspirations: "In the '50s," Hamilton would later write, "we became aware of the possibility of seeing the whole world, at once through the great visual matrix that surrounds us; a synthetic, 'instant' view. Cinema, television, magazines, newspapers immersed the audience in a total environment and this new visual ambiance was photographic."[40] In this climate, Alison Smithson declared, the high technology of "the Eames chair was like a message of hope from another planet."[41]

One crucial midcentury enunciation of such global futurism was the IG's "This is Tomorrow" exhibition of 1956, specifically the most popular of the show's twelve exhibits: a sensory environment designed and planned chiefly by McHale

[39] Alloway, qtd. in Nigel Whiteley, *Reyner Banham: Historian of the Immediate Future* (Cambridge: MIT, 2002), 113.

[40] Hamilton, qtd. in Foster, "Notes," 59.

[41] Alison Smithson, "And now," 17.

and Hamilton, and built by architect John Voelcker. The show opened at London's Whitechapel Gallery in August of that year with the help of a full-sized model of Robby the Robot, star of MGM's sci-fi film *Forbidden Planet*. A sweating human operator inside Robby, on loan from the studio, read text written by art critic Lawrence Alloway: "This is the first time a robot has opened an art exhibition," Robby explained, "Formerly, people were used."[42] No mournful lament of incipient automation's displacement of the human, it's a telling gag about a new midcentury attitude towards technics and pleasure, and its sci-fi iconography, that extended into the Group Two exhibit of McHale and Hamilton. Here, visitors would again encounter Robby, now flattened as a sixteen-foot-high color image, and with his inhuman hands full of the sensory blandishments of industrial art: one metallic arm cradles the ample bosom of a swooning blonde, on top of the other is collaged an image of Marilyn Monroe and her gravity-defying skirt from *The Seven Year Itch*. At the nexus of Hollywood cinema and science fiction, Robby, and the domain of expendable popular imagery he represents, would inspire Group Two's exploration of the new worlds of midcentury perception and sensation. It would play out within a designed environment that also included an inhabitable Möbius strip, part of the period-specific fascination with topology; a giant Guinness bottle; a jukebox; a massive "Cinemascope panel" that amassed the dazzling products of Hollywood's new scalar experiments in widescreen into an equally encompassing collage; a spongy floor that emitted strawberry air freshener when stepped on; and a disorienting fun-house comprised of optical illusions—Duchampian roto reliefs and an optical illusion "corridor"—that constituted kind of a mini-archive of two traditions of vanguard perceptual experimentation fuelling Group Two's sense of "environment": the Bauhaus and dada.

The show's environmental awareness was spawned, in part, by McHale's visit to the United States in 1955, where he had a yearlong fellowship at the Yale School of Fine Art. There, he would continue to work with Fuller as he studied under former Bauhaus painter Josef Albers. He also amassed the trunk of American ephemera (advertisements from newspapers and magazines, Elvis Presley Records, and *MAD* magazines) whose contents made their way into Group

[42] David Robbins, ed., *The Independent Group: Postwar Britain and the Aesthetics of Plenty* (Cambridge: MIT, 1991), 135. Hereafter cited parenthetically in the text as *IG*.

Two's environment, and served as a visual archive for Richard Hamilton's collage, *Just what is that makes today's homes so different, so appealing…?*, one of the defining works of British pop art, which appeared in Group Two's contribution to the *This is Tomorrow* exhibition catalogue. As he planned the Group Two exhibition from the U.S., in correspondence with Hamilton and others, McHale expressed his preoccupation with issues of perception, visual illusion, and science fiction, writing: "Main kick now," he wrote, "is perception via [Adelbert] Ames etc. coupled with Joe's [Albers] field of color vibration."[43] His notes and mock-up for the catalogue layout, proposed in his correspondence, suggest "a largely visual-scientific" attitude, proposing "pictorial use of the equality $E=MC^2$, and also the standard diagram of 'sense extension,' derived from a book by E.W. Meyers," a British cybernetician who had lectured to the IG in March of 1955 on "Probability and Information Theory and their Application to the Visual Arts."[44]

McHale's perceptual investments and sources informed Group Two's catalogue statement, which asserted that "tomorrow can only extend the range of the present body of visual experiences," and called for "the development of our perceptual potentialities to accept and utilize the continual enrichment of visual material" (*IG* 154). Crucially, the catalogue continued, because we exist "at a point in human affairs where the actual nature of [practical accepted] reality as traditionally evidenced by the senses is under question," the exhibition will not reify or stabilize the nature of that reality, but rather underline the very "discrepancy between physical fact and perception of the fact, and the way this discrepancy may be so magnified by traditional attitudes and assumptions as to obscure the significance of the factual reality" (*IG* 154). Thus, the exhibition's sensory inducements, and its particular preference for optical illusion, is cast as a perceptual training ground for reckoning with a changed ratio amongst human organism, environment, and sensorium: "Any change in man's environment is indicative of a change in man's relationship to it, in his actual mode of perceiving and symbolizing his interaction with it" (*IG* 154). This language

[43] McHale, qtd. in John-Paul Stonard, "Pop in the Age of Boom: Richard Hamilton's 'Just what is it that makes today's homes so different, so appealing?', *The Burlington Magazine*, CXLIX (September 2007), 611.

[44] Stonard, "Pop in the Age of Boom," 611-612.

allows for a way of thinking about the idiom of scale taken up in the exhibition, and indeed in the catalogue's language of extension and magnification. The fun house, we might say, is an environment of an environment, about which it seeks to provide knowledge and information: it is a "complex of sense experience which is so organized, or disorganized, as to provide acute awareness of our sensory function in an environmental situation" (*IG* 154).

Indeed, the terms and preoccupations of Group 2's catalogue constitutes a kind of rough draft of McHale's landmark essay, "The Expendable Ikon," published in two parts in *Architectural Design* in 1959. The essay defines the work of the architect and designer as "participants in the process of mass communications," and offers an inquiry into "ikonic content" of the mass media, both in its visuality, and within a communications network.[45] McHale argues that the goal of the ikon in human evolution, from totems and masks, or poetry and cathedrals, to contemporary science fiction and stars like Monroe and Presley, is to *communicate environmentally*: "Aside from conveying simple messages about the disposition of perceptual reality in the everyday world, there is the more complex communication by sign, symbol or 'loaded image,' of statements about man's total environmental situation" (*ER* 57). What *has* changed the quality of the ikon's communicability—as an "array of symbolic images" of the human condition—is its own environment, the second machine age, and its newly scaled sensorium: "Culturally a period of enormous expansion and exploration; the whole range of the sensory spectrum has been extended—man can see more, hear more, travel faster—experience more than ever before. His environment extensions, movie, TV, picture magazine, bring to his awareness an unprecedented scope" (*ER* 48). With these "changes in the human condition," comes the demand for "symbolic images" of humanness on pace with "the requirements of constant change, fleeting impression, and a high rate of obsolescence. A replaceable, expendable series of ikons" (*ER* 49). McHale's logic is that the second machine age's extension of the regular operations of the human sensorium has, in its very defamiliarization of the human condition, produced a new, compensatory preoccupation with man at "the centre of the

[45] See McHale, "The Expedable Ikon 1," in *The Expendable Reader: Articles on Art, Architecture, Design, and Media (1951-79)*, ed. Alex Kitnick (New York: GSAPP Books, 2011), 48. Hereafter cited parenthetically in the text as *ER*.

picture" (*ER* 52). The expendable ikon is thus an "anthropocentric ikon" (*ER* 52), whose historically contingent forms circulate on a "concretely universal scale," and in the repetition and persistence of "certain image groupings of man in various environmental relations." As examples of these image environments, McHale adduced various categories: robots, mutants and mecanomorphs; outer space as a frontier of science and technology; industrial design's modes of commodifying tomorrow; the quiz show; Elvis Presley; and the rivalry between television and Hollywood over the location and scale of the screen, what he called the "alchemy of the moving image in the rectangle" (*ER* 59).

In sum, McHale's expendable ikon is at the center of an image ecology and a specifically worldly midcentury sensorium shaped by the economic horizon of Americanization and the "democracy" of consumption within Britain's postwar boom. It is a world characterized by a new temporality of obsolescence, repetition, and expendability (rather than permanency and uniqueness). It is a world preoccupied with the status of the image, and "imageability," for its capacity to communicate about, and within, a "total environment." And it is a world marked by a specifically environmental idiom and practice whose aspirations toward aesthetic wholeness underscored the world concept's longstanding relationship to "problems of totality, self-enclosure, and of spatiotemporal relations," and resuscitated a modernist investment in the *Gesamtkunstwerk* in the process.[46] Because the worldly sensorium seeks to gauge the space-times of the new nature and its putative changes to the human condition, it not only relied on a scalar language to do so, but also is technologically supplemented by image technologies whose powers of scalar manipulation revealed new worlds of sensory extension. This last point of emphasis, on the capacity of images and image technologies to reveal worlds *beyond* the human senses, was a consistent point of fascination in the IG exhibitions, and is directly identified by McHale in what he calls "the multi-ordinal character of the pictorial structure in much ikon material—the ways in which enormous close-ups, serial, X-ray, micro- and macroscopical views are

[46] On "imageability" as a crucial IG criterion of value, see Whiteley, *Reyner Banham*, 138-9; on the world's relationship to problems of aesthetic totality, see Hayot, *On Literary Worlds*, 15.

used, and the fragmentary, blurred, and out-of focus qualities which give ambivalence to the image" (*ER* 63).

McHale's use of the curious term "multi-ordinal" betrays the influence of Alfred Korzybski's General Semantics on the IG's studies of communication. Korzybski's word for the capacity of specific terms in everyday language to *become different* as statements are scaled at different layers of abstraction allows McHale to describe the midcentury image ecology's vexing way of being void of general or absolute meaning, but riven with contextually specific meanings arrived at on different scales, at different levels of abstraction. The multiordinal nature of the midcentury ikon illuminates the same preoccupation with perceptual ambiguity and skepticism about sense experience—the confusion of a physical fact and perception of it—that the Group 2 funhouse explored through optical illusions or the imageability of Robby the Robot. Indeed, that relativity of value was part of the lesson of the Eameses awareness scapes at Berkeley and their attempt to train students to adjudicate value in expanded networks of relations, and to decide.

In McHale's case, this preoccupation with the worldliness of the midcentury image ecology deepened and expanded in ambition through his transformative encounter with Buckminster Fuller, whose relationship to technology he discussed at length in an overview of the designer's work in 1956. In the early 1960s, McHale would join Fuller at Southern Illinois University. There, he wrote the first biography of Fuller, received his Ph.D in sociology on the concept of the future in social thought, and served as executive director of Fuller's World Resources Inventory, joining his longstanding preoccupation with the total environment of midcentury information and image ecologies, begun in the context of the IG, with a Fulleresque approach to worldliness. This approach entailed a concern with natural ecologies, the problem of global resources and their equitable distribution, the search for humane, sustainable modes of "world dwelling," and his quasi-perfectionist belief in the power of science and technology as tools of human betterment within a broader philosophy of "comprehensive design science."[47]

[47] See especially McHale's essays "Buckminster Fuller" (1956) and "World Dwelling" (1967) in *The Expendable Reader*, 104-23; 143-170.

The appeal, and the problem, of Fuller's worldliness has received sustained scholarly attention of late from a new generation of artists, and architectural and design historians. At stake in the new Fuller vogue is the contemporary relevance of his consistent ecological mandate to "think world."[48] During the heyday of the last Fuller revival in the 1960s and 1970s, the terms of this worldliness made him a kind of hero to the counterculture, and a key figure in a number of strains of neo-avant-garde and post-formalist aesthetic practice.[49] Today, Fuller's consistent preoccupations with the global management of populations and resources have found a new appeal for contemporary architects, designers, and planners invested in sustainable design and development practices, and yet critically sensitive to the potential complicity between Fuller's technocratic leanings and the operation of contemporary biopolitics.[50] Simultaneously, scholars have cast Fuller as a prophet of the information age, and identified the designer as "an artist, an image-maker" who brought the practice of design and architecture in dialogue with image-making technologies, media infrastructures, and communicative networks. This Fuller is less an architect than a data visualization strategist, preoccupied with coping with massive flows of information whose gathering, management, and processing through ever-vaster global databases would be the lynchpin of any just, equitable distribution of the world's finite resources—the very guarantor of future human survival on "Spaceship Earth."

Perhaps the most telling design project in this was Fuller's Geoscope, which linked resource and data management in futurist quest for a global view of the

[48] On the resurgence of interest in Fuller, see Anthony Vidler, "What Ever Happened to Ecology?: John McHale and the Bucky Fuller Revival," *Architectural Design* 80:6 (Nov.-Dec. 2010), 24-33; and the superb exhibition catalogue for the Whitney museum's 2008 Fuller retrospective, K. Michael Hays and Dana Miller, eds., *Buckminster Fuller: Starting with the Universe* (New Haven: Yale University Press, 2009).

[49] See Fred Turner, "R. Buckminster Fuller: A Technocrat for the Counterculture," in Hsaio-Yun Chu and Roberto G. Trujillo, eds., *New Views on Buckminster Fuller* (Stanford: Stanford UP, 2009), 146-159; and Felicity D. Scott, *Architecture or Techno-Utopia: Politics after Modernism* (Cambridge: MIT Press, 2007), especially 185-206.

[50] See Peder Anker, "Buckminster Fuller as Captain of Spaceship Earth" in *From Bauhaus to Ecohouse: A History of Ecological Design* (Baton Rouge: Louisiana State University Press, 2010), 68-90; Jonathan Massey, "Buckminster Fuller's Reflexive Modernism," *Design and Culture* 4:3 (2012), 325-344.

world *as* information system, and thus joined a range of Fuller's attempts at worldly visualization. Fuller began the project in 1952 with John McHale. Working with architecture students at Cornell University, the University of Minnesota, and Princeton University, Fuller and McHale developed a series of prototypes for an enormous globe, 200 feet in diameter, whose goal was "to afford the viewer a swift and comprehensive awareness of man in the universe, to provide a World View."[51] Comprised of triangular panels that recalled Fuller's Dymaxion Air-Ocean World Map (1943), the Geoscope's glowing surface—dotted with millions of light bulbs whose display patterns and varying intensity would controlled by a computer—would "graphically display the inventory and patterns of the world's resources and needs, in real time, slowed down, or speeded up, simultaneously or separately, for study and comparison—from stock trading and voting trends to weather patterns, tourist routes to military movements."[52] Fuller promoted the Geoscope as a gambit to render the totality of the earth's resources for view: "to satisfy the same need of humanity—to comprehend the total planetary, all-evolutionary historical significance of each days development." Over the course of the 1960s, he proposed a number of properly worldly venues for the Geoscope: a rotating installation in cities hosting the Olympic games; permanently located in the East River, suspended by cables across from the United Nations building; or displayed at the U.S. Pavilion at the Montreal Expo 67. There, the Geoscope would serve as a database for Fuller's World Game, in which players equipped with information about the world's conditions, events, and resources would construct competing speculative scenarios about various planetary futures, and thus be trained in art of steering "Spaceship Earth," for Fuller, a specifically homeostatic art yoking cybernetic principles of feedback and governance to a vision of "global humanity liberated from nation-based constraints, a humanity comprising 'nomadic citizens of the world'."[53]

---

[51] Fuller, qtd. in Mark Wigley, "Planetary Homeboy," *ANY: Architecture New York*, 17 (1997), 16-23.

[52] K. Michael Hays, "Fuller's Geological Engagement with Architecture," in Hays and Miller, eds., *Buckminster Fuller: Starting with the Universe*, 9.

[53] On the problematic elimination of the political as a site of constitutive antagonism in Fuller's post-sovereign thinking, see Felicity D. Scott, "Fluid Geographies: Politics and the Revolution by Design," in Chu and Trujillo, eds., *New Views on R. Buckminster Fuller*, 161.

An unrealized artifact of midcentury world-making, the Geoscope project of Fuller and McHale dovetails with the worldly modes of perceptual training and exercises in global awareness and communication at the center of Eameses' multiscreen experiments from the early 1950s through mid-1960s works like *Think*. Indeed, the IG members recognized in the design practice of Fuller and the Eames a similar fluidity of scale in which the "world" of an Eames toy like *House of Cards* announced the same pedagogical dialectic of user freedom and designer control that would play out in their multi-screen experiments, and the worldly citizenship they would inculcate.[54] McHale, for his part, connected an Eamesesian ethos of "catalogue building"—a "mecano aesthetics" that would join the toy, to their famous Case Study house built of pre-fabricated parts, customized by a user, to their extension of "the designer's attitude into other management areas" like filmmaking and consulting for I.B.M.—to the global reach of Fuller's own approach to mass production, most evident in the geodesic domes and their increasingly global locations (*ER* 134-135). For McHale, such "catalogue building" transpires within the midcentury's image ecologies and distribution networks. The Eameses' build through a collage-like process of receiving, extracting, and distributing images ("extracting components from catalogues, and seeing their own designs get into catalogues"). Fuller, relatedly, builds in by exploiting fits between the scalability of the geodesic dome and other midcentury exercises in expansion: "Fuller domes grow more geographically widespread: radomes in the Artic, a concert hall in the South Seas and the recent one in Kabul, Afghanistan," for the U.S. Pavilion in the International Trade Fair, where it "housed, among other items, an 80-ft. Cinemascope screen" (*ER* 135-136).

Scalar fluidity in the work of Fuller, the Eameses, and the IG itself, animated a design practice with worldly ambitions, and pressed cinema and other moving-image technologies to expand beyond their normal institutional operations and sites. Thought this way, the Geoscope is itself a site of medial expansion: the technical failures of its prototypes to deliver on a dream of a total world picture fuelled Fuller and McHale's own intermedial experimentation with a range of state-of-the-art image-making technologies, including multi-screen "projection devices, flat-screen data displays, triangular-faced television tubes, new kinds of

[54] Lawrence Alloway, "Eames' World," *Architectural Association Journal*, 72:7-8 (1956),

photography, multi-slide machines, microfilm, eight-millimeter cinema units, videotape mechanisms for film and data storage, and so on."[55] For McHale and Fuller, the dream of the Geoscope would be linked to its thinking brain—a networked computer fed by the "embryonic" networks of various libraries, universities, and international agencies, constituting a buildingless "global university orchestrated by communications satellites, transistor radios, television sets."[56] The product of this networked, mass-mediated university would be a newly post-national world citizen, one who thinks not in binaries (us-them), but ecologically, in dynamic "relationships." In his 1965 keynote address at the Vision 65 conference in Carbondale, Illinois, Fuller, for his part, would adduce the Geoscope as device for the dynamic apprehension of a transfigured universe itself—as a "nonsimultaneous complex of unique motions and transformations," in which world society operates "almost exclusively in the inaudible nonvisible area of the physical universe."[57] Frustrated "with all of our local, static organizations of an obsolete yesterday," Fuller's Geoscope would thus augur the emergence of a "world man"—one who would who think vision, communication, and the senses within new, experimental, intermedial configurations that reflect just such a mobile universe.[58] One such world man was Gene Youngblood, and his name for these dynamic configurations was "expanded cinema."

Expanded Cinema as Design Science

Youngblood's canonical study, *Expanded Cinema* (1970) is everywhere announced as groundbreaking, but nowhere taken very seriously. Uroskie, for example, acknowledges the debt of Youngblood's "world historical visions" to the work of Fuller, Marshall McLuhan, and Norman O. Brown, but describes the study as "tour de force of parascholarly speculation" and seeks to separate Youngblood's rhetoric of "expanded consciousness" from another idea of expanded cinema that emerged in New York between 1964 and 1966, one imbued with a post-minimalist sense of cinematic site-specificity and

[55] Wigley, "Planetary Homeboy," 20.

[56] Wigley, "Planetary Homeboy," 20.

[57] Fuller, "Keynote Address at Vision 65," in Buckminster Fuller: *Utopia or Oblivion: The Prospects for Humanity* (New York: Bantam Books, 1969), 115.

[58] Fuller, "Keynote Address at Vision 65," 117.

institutional self-awareness.[59] But this approach misunderstands the Eameses' work as preoccupied with "mere" scalar expansion as a strategy of sensory immersion, rather than as the fluid terrain of a design practice preoccupied with the vexing new nature of the postwar, and seeking to apprehend the contours of a worldly sensorium spawned in its wake. To imply that this preoccupation with the size, speed, and scale of images was somehow not "conceptual," or an encounter with cinema as an institution, is to overlook the sheer variety of institutional sites in which designers like the Eameses, as well as McHale and Fuller, were asked to function in media-pedagogical capacities—from the university classroom to state or corporate-sponsored missions of Cold War internationalism. Through those institutions, designers prompted cinema's expansion, and rethought modernism's sensory utopianism in the process. Indeed, Youngblood's *Expanded Cinema*, approached through the design genealogy sketched above, appears less as "parascholarly speculation" than the conceptual formalization of many of assumptions behind the media practice of the Eameses, McHale, and Fuller; the study codifies, in a countercultural idiom, the designers' longstanding preoccupation with the evolutionary recalibration of the human sensorium to the new worlds of the midcentury, and their commitment to forms of speculative futurism.

As a final example of the tangled aesthetic and intellectual genealogies of the design paradigm, let us dip into Youngblood's study, specifically the chapter titled "The Artist as Design Scientist," which few readers of this essay are likely to know, and Susan Sontag's canonical "One Culture and the New Sensibility" (1964). The pairing is less capricious than it may seem: the essays from Sontag's *Against Interpretation* (1966), are explicitly taken up in Youngblood's groundbreaking work, as part of his eclectic, densely compacted range of references. In this breathless four-page chapter of *Expanded Cinema*, he includes not just Sontag herself ("On Style," in this instance) but also Jacob Bronowski, Arthur Eddington, Herbert Read, A.N. Whitehead, Ludwig Wittgenstein, Rudolf Arnheim, and John Cage. It is the culminating chapter of the first part of the book, titled "The Audience and the Myth of Entertainment," whose goal, broadly speaking is to critique the operations of industrial-commercial entertainment as ill-suited to the "experiential needs of an aesthetically impoverished culture,"

[59] Uroskie, *Black Box and White Cube*, 9-10

and fundamentally out of step with the radical co-evolution of the human condition and the contemporary "intermedia" environment (what Youngblood calls, following Fluxus artist Dick Higgins, the "intermedia network").[60]

Locating the terms of this radical co-evolution within the transition between the industrial and post-industrial age, Youngblood proposes the term "Paleocybernetic" as a conceptual tool best suited to comprehend "the significance of our present environment" (*EC* 41). The term captures the "practical utopianism" he associates with cybernetic thought, and the primitive potential of humankind that realizes "that there is no such thing as human nature"—that the human is "relative to its past and present conditioning," and so can be improved, its capacities "expanded" through control of its environment, whose media and technologies share and transmit man's "symbolic needs and their expression on a world scale" (*EC* 55) While expanded cinema, Youngblood insists, means "expanded consciousness," industrial-commercial cinema perpetuates a manipulative "system of conditioned response to formula," circulating redundant and entropic messages, and thus "increasing our degree of ignorance about" the human condition (*EC* 62). Youngblood's application of cybernetics and communications theory—as in, for example, Norbert Wiener's definition of information—is rather loose, resulting in formulations such as:

> From the cinema, we receive conceptual information (ideas) and design information (experiences). In concert, they become one phenomenon, which I've described as the experiential information of aesthetic conceptual design. This information is either useful (additive) or redundant. Useful information accelerates change. Redundant information restricts change. If sustained long enough, redundant information becomes misinformation, which results in negative change. (*EC* 62)

Not quite gobbledygook, nor entirely lucid, this passage is symptomatic of Youngblood's desire here and elsewhere to overlap a modernist and countercultural commitment to experience (perceptual novelty, change, the interruption of routine and habit) with an idiom of design, and to draw on

[60] Gene Youngblood, *Expanded Cinema* (New York: E.P. Dutton & Co., 1970), 42. Hereafter cited parenthetically in the text as *EC*.

cybernetic concepts (information, feedback, communication, negentropy) in doing so. In this way, Youngblood's *Expanded Cinema* is fully in keeping with an important strain of experimental art practice in the 1960s informed by Fuller and McHale, as well as McLuhan, and which is interested in linking ecological art to an information aesthetics that would unfold in open systems and planetary networks.[61]

This impulse comes to a head in the "Artist as Design Scientist" chapter, when Youngblood observes that art and science are united by a desire to "order the facts of experience," and then redefines the work of the artist itself through an etymology of design:

> The word "design" is composed of "de" and "sign," indicating that it means "to remove the symbol of." In this context "symbol" means ideas distinct from experiences. As design scientist the artist discovers and perfects language that corresponds more directly to experience; he develops hardware that embodies its own software as a conceptual tool for coping with reality. He separates the image from its official symbolic meaning and reveals its hidden potential, its process, its actual reality, the meaning of the thing. (*EC* 71)

As etymology, this is pretty thin. But it attests to the influence of design paradigm as a way of confronting the midcentury's new sense of *worldedness*, and clarifies its anxious location at the dawn of the posthuman. What Youngblood wants in "aesthetic conceptual design information" is, he makes clear, the liberation of official or "ordinary" vision, whose means of ordering

[61] See, for example, artist and critic Jack Burnham's essays "System Aesthetics" and "Real-Time Systems," as well as his *Beyond Modern Sculpture: The Effects of Technology and Sculpture on the Art of this Century* (New York: Braziller, 1968); Jim Burns *Arthopods: New Design Futures* (New York: Praeger, 1971); as well as the post-minimalist and conceptual art practices on view at groundbreaking exhibitions like the London ICA's *Cybernetic Serendipity* (1968), and MoMA's *The Machine as Seen at the End of the Mechanical Age* (1968) and *Information* (1970). On these tendencies, see Pamela M. Lee*, Chronophobia*: *On Time in the Art of the 1960s* (Cambridge: MIT Press, 2006) and Edward R. Shanken, "Art in the Information Age: Technology and Conceptual Art," in Michael Corris, ed., *Conceptual Art: Theory, Myth, and Practice* (Cambridge: Cambridge University Press, 2003).

and conditioning experience through symbols works not just with old ideas and old information, but within an old world picture with an outmoded conception of the human organism at its centre: "The historical preoccupation with finding the one idea that is Man will give way to the idea that earth is, and then to the idea of other earths" (*EC* 49). Youngblood's call for properly ecological consciousness means not just, as he puts it, the "end of archetypal Man" but a redefinition of some of the central markers of the human: intelligence and morality, man and environment, progress and creativity: "What happens to our definition of 'man' when our next door neighbor is a cyborg (a human with inorganic parts)? […] What happens to our definition of 'environment' when our video extensions bring us the reality of the solar system daily? What do we mean by 'nature' under these circumstance?" (*EC* 52) As a result of such shifts, Youngblood continues, humans now live in "virtually another world." And this inability to recalibrate humans to worlds, to provide them with non-redundant information about their condition sufficient to the complexity of the new environments in which they find themselves, is for Youngblood, the chief problem with popular commercial cinema: its idiom "speaks to a world that no longer exists"; "for one thing," as he explains, 'world' now includes the microcosm of the atom and the macrocosm of the universe in one spectrum" (*EC* 54). Youngblood's ecological call for expanded consciousness—its mandate for "a new cinema that takes us to another world entirely"—thus deploys the idiom of art as a "design science" because design, in the tradition of Fuller and McHale that Youngblood takes up and extends, had already firmly established its own concern with the transfigured *physis* of the midcentury. And the force of this tradition is evident not just in Fuller's lengthy introduction to *Expanded Cinema*, which cast the book as a coping strategy—a way of providing "worldaround man with the most effective communication techniques for speaking universal language to universal man"—but also in Youngblood's dependence on McHale himself as his primary theorist of the status of "expendability and impermanence in radical evolution" (*EC* 51).[62]

[62] Youngblood draws liberally on McHale's work, included "Information Explosion-Knowledge Explosion," "Education for Real" (1968), "The Plastic Parthenon" (1967), and *The Future of the Future* (1969).

While Susan Sontag's mandarin cool and controlled style of intellectual history seem a world apart from the loose West-coast sensibility of Youngblood, her canonical "One Culture and the New Sensibility" essay exemplifies how the design paradigm sketched above makes for strange bedfellows. Indeed, the essay anticipates a number of the tropes and preoccupations of Youngblood's study, especially the premium he places on transformed experience and consciousness, with the radically extended media that deliver it, and the new scales and worlds through which they operate. The essay is motivated by a challenge to a "facile humanism" that would, in the model of C.P. Snow's "two cultures" formulation, set the values of art and science into opposition. To do so, Sontag observes a sweeping redefinition, and expansion, of the aesthetic: "art today is a new kind of instrument, an instrument for modifying consciousness and organizing new modes of sensibility. And the means of practicing art have been radically extended."[63] Crucially, for Sontag, the primary feature of the new sensibility is that "that its model product is not the literary work, above all, the novel," but rather expresses a new "non-literary culture" that includes "certain painters, sculptors, architects, social planners, film-makers, TV technicians, neurologists, musicians, electronics engineers, dancers, philosophers, and sociologists" (*OC* 298). Her list of authors of the key texts of this new cultural alignment includes not just Nietzsche, Wittgenstein, Artaud, Breton, and Barthes, and Lévi-Strauss, but a number of crucial figures in the history and theory of modern architecture and design: Siegfried Gideon, Marshall McLuhan, György Kepes, and, of course, Buckminster Fuller.

In fact, while it is often credited as a foundational enunciation of a postmodern sensibility, "One Culture" is better understood as an essay that bears the traces of humanist literary value's postwar displacement by the informatic "cool" of design—not just its postwar vogue and prestige, but its non-sentimental dispensation toward a sensorium transfigured by postwar technoscience, and administered by "technicians" and "specialists" (Sontag's terms) apt to think of art as "problem solving," and whose instrumental approach to "the analysis and extension of sensation" operates irrespective of media, and across cultural value

[63] Susan Sontag, "One Culture and the New Sensibility," in *Against Interpretation and Other Essays* (New York: Delta, 1966), 297. Hereafter cited parenthetically in the text as *OC*.

hierarchies. Thus, for Sontag the "coolness" of this non-literary culture, where the "artist's work is only his idea, his concept," becomes at once the hallmark of an incipient conceptualism in the arts, and the echo of "a familiar practice in architecture" (297). Because the sensibility conceives art as the "disciplining of the feelings and programming of sensations," it rejects the dichotomy between a "morally neutral science and technology" and "morally committed human scale art on the other" (300). Instead, advanced art's "unclosing of the senses" requires an attunement to unprecedented changes in a sensory environment now rescaled, Sontag observes toward the "infra" or "ultra" sensorial, an environment defined not by "the intelligible and visible" but by "what is only with difficulty intelligible, and invisible," an "environment which cannot be grasped fully by the human senses" (300-301). Sontag's guide to the infrasensorial is, perhaps unsurprisingly, none other than Fuller himself, whose concept of "etherealization" is, after all, one of the central inspirations of Youngblood's self-understanding as "a child of the New Age, for whom 'nature' is the solar system, and 'reality' is an invisible environment of messages" (*EC* 45).

The overlapping rhetorics of expansion in the work of Youngblood and Sontag bear witness to the human senses' confrontation with a new, bewildering fluidity of scales between the intimate and the universal, the molecular and the cosmic, that is, in part, the conceptual fallout of information and communication theory's rewiring of the great chain of being at midcentury—a fallout the design paradigm sought to manage. In the process, designers like the Eameses, McHale, and Fuller expanded exponentially the range of what counted as meaningful communicative situations and environments for human sensation, attending to the senses' remaking in man-made environments and technical networks that now exceed humans, and urge them to reorient, and rescale the human domains of perception, attention, and care. It is this *worldliness* of the sensorium ministered to and trained in the midcentury's designed environments—the global, even ecological, orientation of these experiments in attention and perception—that brings the Eameses' multiscreen work into most direct dialogue with theories of expanded cinema. And conversely, it is expanded cinema's often dismissed idiom of the universe and the universal—the disreputable big-ness of claims about the transformation of consciousness—that brings some of its most influential early theorists into the global ambit of design, and acts of Cold War world-making.

Modernism as Security in Change

How, then, do these claims about midcentury design square with extant critical accounts of modernism's claims on the sensorium? We might recall that many of the best stories about a recognizably modernist encounter with the technological mediation of experience in the first media age of the interwar period presuppose a literary culture, and cast modernist literature as one player in a rich media ecology of convergence and differentiation.[64] In this scenario, the value, cultural authority, and sensory-affective demands of modernist form materialize within, and differentiate themselves from, late-nineteenth- and early-twentieth-century technologies of perception and the crisis of sensory experience they provoked. Such technologies' seeming arrogation of the epistemic power and storage capacities of the human senses—their way of instrumentalizing the senses—were internal to the production of modernist literary form, spurring it to craft subjective, synesthetic, and/or non-positivist ways of seeing and sensing, or forcing it to become a thing by poaching the technical and material properties from other media.[65] To capitalist modernity's abstraction of sense experience through technological mediation, and rationalization's ruthless dismantling of *all* natural unities, including the sensorium, modernism responds with a sensory regime at once autonomous and fragmented, a symptom of modernity and its utopian compensation. In this Jamesonian way of thinking, modernism's battery of techniques for producing sensory-affective totalities—however compensatory—constitute world-making acts, displacing the "thematics of modernity by the desire called Utopia."[66]

---

[64] See David Trotter, *Literature in the First Media Age: Britain Between the Wars* (Cambridge: Harvard University Press, 2013); Julian Murphet, *Multimedia Modernism: Literature and the Anglo-American Avant-Garde* (Cambridge: Cambridge University Press, 2009); Michael North, *Camera Works: Photography and the Twentieth-Century Word* (New York: Oxford University Press, 2007). See also Fredric Jameson's account of the production of modernist style as part of "the history of the autonomization of language itself," in *A Singular Modernity*, 149.

[65] See Sara Danius, *The Senses of Modernism: Technology, Perception, Aesthetics* (Ithaca: Cornell University Press, 2002); Karen Jacobs, *The Eye's Mind: Literary Modernism and Visual Culture* (Ithaca: Cornell University Press, 2000). On the production of literary modernism's thingly opacity in a competitive media ecology, see Murphet, *Multimedia Modernism*.

[66] Jameson, *A Singular Modernity*, 215.

At midcentury, this familiar dialect between sensory abstraction or "bureaucratization" and utopian sensory totality is still in operation, evident in the return of synesthesia, kinesthesia, and a bevy of calls for the production of non-alienating, holistic, or participatory sensory environments or outsides to the depredations (and specialization) of institutional life.[67] But its setting, as I've argued above, is now a nonhierarchical, non-literary culture of communication, informatic abundance, and the becoming "environmental" of media. By this, I mean not just its ubiquity, or its relationship to ever-faster cycles of obsolescence, but its radically altered scale—its degree of personalization and customization, its penetration of lifestyle, and its way of opening up the smallest domains of life as yet another space of management and monetization. The design paradigm's administration of culture operates in an era in which aesthetic hierarchies of doing and making have collapsed, and literature becomes minor, even a modernism becomes major—an "ideology," in Jameson's account.

But even Jameson's story of the midcentury institutionalization of late modernism in the Cold War hinges on the conviction that high modernism's unevenly developed world—the temporally fractured world of incomplete modernization that produced the perceptual-affective gambits of aesthetic modernism in the first instance—has, at midcentury, come to an end. For this reason, he distinguishes between the chancy generation of high modernist form (the "groping discoveries" produced in the perceptual encounter with the empirical data of everydayness) and the formal "certainties" of late modernists like Nabokov and Beckett, who domesticate, as theme, the more radical ways that form and experience once discovered each other in high modernism, before global capital had reduced so many worlds to one.[68] By contrast, my design-centric genealogy of expanded cinema practices begins not with the Greenbergian fetishes of aesthetic reflexivity and autonomy (the closure, for Jameson, of modernism's utopian horizon) but rather with the Fullerian

[67] On the centrality of the Greenbergian doctrine of "pure opticality" in this story, see Caroline A. Jones, *Eyesight Alone: Clement Greenberg's Modernism and the Bureaucratization of the Senses* (Chicago: University of Chicago Press, 2005). For a superb account of the fate of Greenbergian specificity in the art world's encounter with systems theory, cybernetics, and the structure of time that organizes them, see Lee, *Chronophobia.*

[68] Jameson, *A Singular Modernity,* 206, 208.

presumption of an unstable climate of bewildering technological change and a transformed *physis*. This modernism traverses a midcentury moment defined by the sheer multiplicity of worlds, times, and natures, often on the thresholds of sensation, and thus fueled new, decidedly uncertain formal experiments of the kind later gathered under the rubric of expanded cinema. It responded to such changes in worldedness with the feeling of security—with new strategies of sensory management and discipline, new models of speculative futurism.

Reckoning with the terrain of modernist cultural production at midcentury thus requires keener attention to the implication of the sensorium in debates about how screen cultures and their institutional sites abet forms of governmentality, and about the sensation of democracy itself in the designed environments of postwar life, including expanded cinema. Within their modernism, the sensible conditions of democratic life blurred with the tactile solicitations of a strange new object horizon. Democratic perception, like democratic citizenship, was framed within the postwar technologies of freedom and control that operated under the expansive rubric of "communications," and fuelled an aesthetics of information in which designers, as artists and experts, played essential roles.[69] This would invite us to think of sensation itself as a scene of cultural, and beyond that, political administration, and to look to midcentury design as something beyond the mere aestheticization of the commodity's bold midcentury futures, or the superstructure of capitalism's globally extensive postwar markets. Instead, we might look to "the surface of design," as Jacques Rancière has provocatively suggested, as a space of equivalence between the forms of art and the forms of everyday life, a shared surface on which, say, modernist poetics and industrial design are joint acts of aesthetic communication, of distributing the common.[70]

---

[69] For an important step here, see Turner, *The Democratic Surround*. Gene Youngblood himself has recently extended *Expanded Cinema*'s calls for a communication revolution on a global scale to an indictment of the internet as a control technology of capitalist democracy, and a urgent call for a "meta-design initiative" in the form of mass-secession from the Internet it currently exists—a hegemonic tool of the "security and surveillance state with unprecedented powers of totalitarian control." See "Secession from the Broadcast: The Internet and the Crisis of Social Control," in *Millennium Film Journal* 58 (Fall 2013), 174-189.

[70] Jacques Rancière, "The Surface of Design," trans. Gregory Elliot, in *The Future of the Image* (London: Verso, 2007), 91-107. Rancière's striking example is the shared

This way of thinking design's cross-disciplinary force and cultural saturation will neither shy away from instrumentalism nor institutions, but rather extend them into the central operations of the aesthetic itself: its way of distributing the sensible, and thus, its world-making activity, its capacity to spawn "configurations of what can be seen and what can be thought, certain forms of inhabiting the material world."[71] For the artists, designers, and critics discussed here, such midcentury worlds demand the self's sensual self-perception in expansive webs of relationships secured by the activity of communication itself—a kind of disciplinary solvent that brings the domains of language, industrial design, and post-industrial image-making into new, experimental configurations of the sensible whose strangeness we have yet to fully assess.

---

preoccupation with essential types in the French poetry of Stéphane Mallarmé, and the German industrial designer, architect, and engineer Peter Behrens.

[71] Rancière, "The Surface of Design," 91.