Hans Haacke. *Photoelectric Viewer-Controlled Coordinate System*, 1968. © 2008 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn.

All Systems Go: Recovering Hans Haacke's Systems Art

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Hans Haacke, *Photo-Electric Viewer-Controlled Coordinate System* (1968)
The white cube scored with a grid of infrared beams. Photoelectric sensors studding each wall at waist level. Directly above the sensors, roughly at head height, a row of lightbulbs. Multiple sensors and bulbs per wall. The room empty. The lights off.

Upon your entering the room, however, light. Bulbs come on, illuminating the space. As you walk forward, the bulbs no longer aligned with you go off, while bulbs in line come on. A logic is suspected. You test the system, retracing your tracks. Obediently, the lights oblige your expectation, reversing their sequence. A moment of amusement, a moment of empowerment. You are striding around the room now, light at every footfall. Slow, self-generated, stroboscopy. Your body catching its own motion. Environmental feedback. Agency conferred on your every action. You're participating. You're making the art.

Then, another person enters the white cube and begins on the same short learning curve. Lights switch on and off. You pause. An expression of annoyance flickers across your face. The requirement to share space, recognize another with the same basic skills and claim to a luminescent reward. Contemplation. You settle back on your heels patiently. Resolution. You suspect new possibilities. Waiting for an appropriate moment you catch the other person's eyes—a playful invitation.

The stranger catches your hint immediately. Together you begin an impromptu performance. Awkward at first, soon finding your feet. Playing off another's rhythm, having that person catch your step and improvise on it. Trying to catch lag time in the lights, latency in the system. The gallery momentarily shifts into something other. Light beats time out of space.

Hans Haacke, *Norbert: All Systems Go* (1971)
Another white cube. A black bird with bright yellow stripes around the eyes sits in a chrome cage. It rocks gently on its perch. Silence. Occasional scrabbling sounds as the bird readjusts its footing. You walk around the cage, maintaining a

properly respectful distance from the art object. You're puzzled. This is strange. You wait. Nothing happens. Walk around the cage again. Wait. Nothing happens. You prepare to leave. Suddenly, the caged bird calls out. "All systems go" it squawks. And again, "All systems go." A pause. "All systems go. All systems go."

Two narrative reconstructions of works by Hans Haacke. *Norbert* in fact can be accessed only imaginatively: the bird's reluctance to parrot the phrase and the infamous cancelation of Haacke's planned Guggenheim show of 1971 prevented this work-in-progress from leaving the studio. Nevertheless, even treated as an unrealized proposal, it can be compared instructively with *Photo-Electric.* Both works by Haacke were vanguard propositions. Both sought to perform advanced critical work on received notions of artistic agency, the object status of art, the role of the spectator, the frame of the artwork, and the medium of its execution. Yet, though separated by a relatively short interval of time, *Photo-Electric* and *Norbert* seem conceptually divided. Two questions present themselves: How should we account for this apparent divide? What broader ramifications might it have—both for understanding Haacke's practice as a whole and for opening on to the wider artistic problematics that his work engages?

Technological development, and a radical polarization as to how art should relate to it, has long inflected critical accounts of the avant-garde. Andreas Huyssen claims that, "technology played a crucial, if not the crucial, role in the avant-garde's attempt to overcome the art/life dichotomy and make art productive in the transformation of everyday life."[1] He goes on to suggest,

> It may actually have been a new experience of technology that sparked the avant-garde rather than just the immanent development of the artistic forces of production. The two poles of this new experience of technology can be described as the aesthetization of technics since the late nineteenth century . . . on the one hand and the horror of technics inspired by the awesome war machinery of World War I on the other.[2]

Photo-Electric and *Norbert* could be read in this tradition, and the difference between the two works might be figured as an ideological break—Haacke's decisive move from an "aesthetization of technics" to a "horror," his shift from an affirmative technophilia to a critical technophobia motivated by a political reaction against the war machinery then being deployed by the U.S. government in Vietnam. Such an account might run as follows: while *Photo-Electric* presents a sincere engagement with technology, a play with its prosthetic extension of humanity's powers, this affirmative position is flatly negated by *Norbert.* In the

Hans Haacke. *Norbert: All Systems Go,* 1971. © 2008 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn.

later work, Norbert Wiener, cybernetics' founding father, is parodied, his optimistic feedback-steered path of human progress undermined. The optimistic "All systems go!" of *Photo-Electric* becomes, in *Norbert,* the sardonic refrain of a trained mynah bird, "All systems go . . ." (i.e., run down, no longer fit their intended purpose, fail). Haacke starts with emancipation and ends with entropy.

Here, Haacke would be assimilated to that critical tradition that discerns a neo-avant-garde repetition of the historical avant-gardes' (failed) attempts to "overcome the art/life dichotomy" by incorporating the latest technology into artistic practice, or their inability to resolve the issue of whether the labor of industrial production and the labor of cultural production should be related. However, in Haacke's case, such a well-rehearsed reading amounts to little more than a stock response. Haacke's art, and the complex ways in which it engages technics, cannot be reduced to a "neo" recapitulation of the historical avant-garde.[3]

The apparent break between *Photo-Electric* and *Norbert* is not, in fact, a fracture, as becomes clear if we recover the systems theoretical context underlying the elaboration of both works. In so doing, we rediscover a fundamental continuity in Haacke's work that is occluded by any accounting of his practice as ideologically split. Furthermore, in Haacke's use of systems theory, we uncover a productive approach to the challenge of relating cultural and industrial production, one that moves beyond the ossified conceptual opposition (philia/phobia) inflecting most critical accounts of vanguard art's relation to technology.[4]

Systems Aesthetics

In 1968 Hans Haacke was invited to participate in Karl Pontus-Hulten's landmark Museum of Modern Art (MoMA) exhibition, "The Machine as Seen at the End of the Mechanical Age." Pontus-Hulten's curatorial premise for the show was almost elegiac—a melancholy retrospective for the machine age, a humanist lament in the present for a past not yet fully departed. The catalog's epigraph reads "This exhibition is dedicated to the mechanical machine, the great creator and destroyer, at a difficult moment in its life when, for the first time, its reign is threatened by other tools."[5] The show looked back at the industrial age fully self-

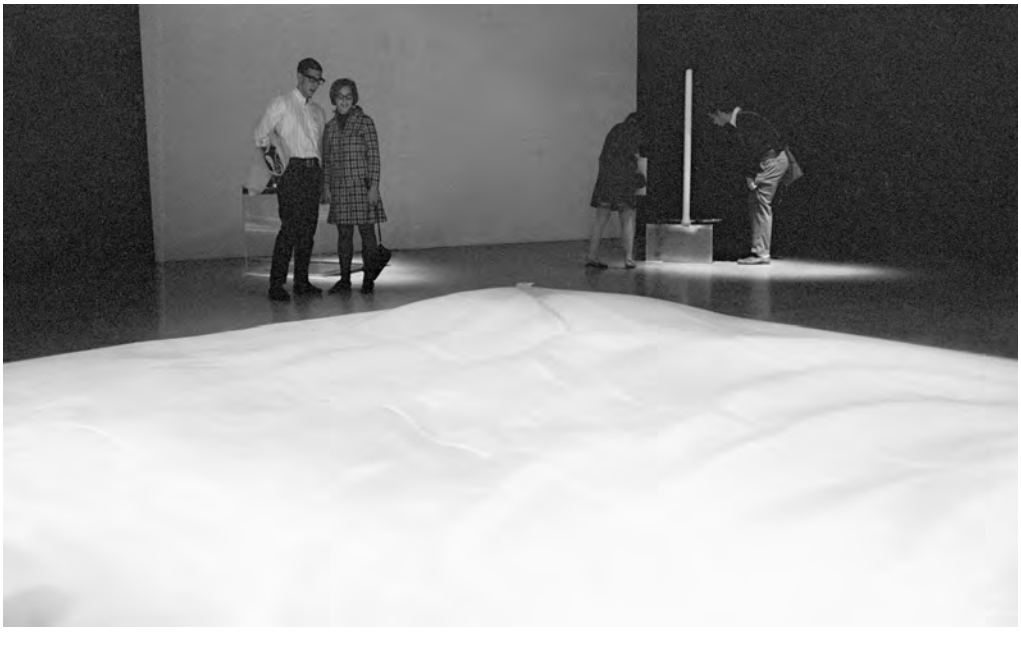
conscious of doing so from the perspective of a rapidly arriving postindustrial one. Despite the lachrymose rhetoric, Pontus-Hulten was clear-sighted about the historical freight of the machine and its social and artistic implications:

> Since the beginning of the mechanical age and the time of the Industrial Revolution, some have looked to machines to bring about progress toward utopia; others have feared them as the enemies of humanistic values, leading only to destruction. Most of these contradictory ideas persist, in one form or another, in the twentieth century and find their reflection in art.[6]

Here again are the twin poles of technophilia and technophobia, explicitly associated with utopian and dystopian social outcomes. Again their "reflection in art" is regulated by simple, binary polarities.

Though the show presented a sweeping survey of art history (from Leonardo da Vinci to La Monte Young), it had a clear focus on the historical avant-garde. Pontus-Hulten was concerned with the lessons to be learned from the affirmative relation to technology found in futurism and constructivism as well as the satirical skepticism manifested by Dada and surrealism. Pontus-Hulten also included a few works by established contemporary artists who were engaged with technology and whose work was considered representative of an emerging neo-avant-garde (Robert Rauschenberg, Nam June Paik). As such, "The Machine as Seen at the End of the Mechanical Age" sought to stage an early encounter between the historical and neo-avant-garde as they engaged technology.

Haacke's work selected for the show, *Ice Stick* (1964–1966), can be read as condensing this encounter into a single art object. *Ice Stick* was seventy inches high and consisted of a long copper freezing coil pointing directly out of a stainless steel–clad base containing a refrigeration unit and transformer connected to a power supply. Initially as sleek and phallic as any Brancusi, the piece would draw moisture out of the museal air, quickly freezing the vapor. Slowly but emphatically the pole would cover itself with an opaque, frosted ice sheath of its own making. Echoing Brancusi's integration of the sculpture and its pedestal, Haacke made light-hearted allusion to a foundational act of the avant-garde: renouncing the plinth in sculpture, a crucial initial step toward repudiating the



ideality of the art object and developing a critique of the traditional media. Yet Haacke went beyond this avant-gardist allusion, renouncing the formalist art object altogether in favor of a focus on art as contextually related process. Haacke staged a disappearing act, the artwork camouflaging itself against the museum's blizzard of "neutrality." Whiteout.

Pontus-Hulten clearly missed the joke. In the catalog text he described *Ice Stick* in the following way: "Technology, exemplified in the refrigeration unit, artificially produces a natural phenomenon, cold; but instead of exploiting it for some practical reason, such as the preservation of food, the artist has *induced it to create an image of itself.*"[7] In Pontus-Hulten's critical rendering, Haacke's piece is situated within a formalist tradition as read through Clement Greenberg; that is, as an extension of medium-specific self-referentiality. Technology here is set up as the next logical medium for art to explore following the achieved reduction-to-essence, and consequent artistic exhaustion, of the conventional media. Pontus-Hulten's reading of *Ice Stick* is problematic. Totalizing technology in this way—so that it can apparently produce a critical "image of itself"—is unconvincing. Diverse technologies cannot usefully be amalgamated under the category of technology-as-medium. Instead we should examine the way in which *Ice Stick* embodies a movement away from concerns with medium altogether. By this point ambitious art had already chewed over and spat out Greenbergian doxa.[8] *Ice Stick* engages what surrounds it not simply by taking the impress of negative space, as with Nauman's *A Cast of the Space under My Chair* (1965–1968), but by actively crystallizing the institutional environment. Haacke literalized his rejection of formalist concerns by making the work "disappear" into its context. By cloaking the sculptural object in this way, *Ice Stick* could even be read as announcing Haacke's interrogation of the ideology of the white cube.[9]

Yet for Benjamin Buchloh, according Haacke's work of this period any critical purchase is illegitimate. He divides Haacke's practice in two: on one side, the "mature—i.e., political—works"; and on the other, those earlier projects that emphasized "physiological, physical, and biological processes" and that often used technology as a means to create or evoke them.[10] Buchloh makes it unambiguous that he does not endorse Haacke's earlier work, dismissing it as "positivist scientism":[11] "The final departure of Haacke's work from the limitations of a systems-aesthetic approach really occurs in 1969 when—beginning with his *Polls*—he transfers his interests from biological and physical systems to social systems that implicate the spectator in an immediate interaction."[12] In this schema, Haacke's work with physical systems—for example, *Condensation Cube* (1963–1965), *Ice Stick* (1966), *Ice Table* (1967), *High Voltage Discharge Traveling*

Hans Haacke. *Ice Stick,* 1966. © 2008 Artists Rights Society (ARS), New York/ VG Bild-Kunst, Bonn.

(1968)—and biological systems—for example, *Grass Cube* (1967), *Live Airborne System, November 30, 1968* (1968), *Grass Grows* (1969)—was definitively superseded by a political turn toward social systems in 1969, which constituted "the radical redefinition of his conceptual and aesthetic parameters."[13]

However, Haacke actually continued to explore physical and biological systems in an important series of ecologically concerned works—for example, *Chickens Hatching* (1969), *Transplanted Moss Supported in an Artificial Climate* (1970), *Bowery Seeds* (1970), *Goat Feeding in Woods* (1970), *Directed Growth* (1970–1972), *Rhine Water Purification Plant* (1972)—that were executed concurrently with the majority of his polls—for example, *Gallery Goers' Birthplace and Residence Profile, Part I* (1969), *Visitors' Profile* (1970; "Software," Jewish Museum), *MoMA Poll* (1970), *Visitors' Profile* (1971; "Directions 3: Eight Artists," Milwaukee Art Center), *Documenta Visitors' Profile* (1972; "Documenta 5," Kassel), *John Weber's Gallery Visitors' Profile 1* (1972).[14] The problem with Buchloh's argument runs deeper than its questionable chronology though. Rather, his insistence on the artist's "departure . . . from the limitations of a systems-aesthetic" produces the requirement to specify a definitive break in Haacke's practice.

In making explicit reference to "a systems-aesthetic," Buchloh invokes the theoretical legacy of the artist, curator, and critic Jack Burnham.[15] Burnham was a friend of Haacke and, until Buchloh came to occupy this position, his most significant interpreter.[16] Rejecting formalism, Burnham elaborated a theory of systems aesthetics heavily inflected by his reading of biologist Ludwig von Bertalanffy's *General Systems Theory* (1968).[17] Sharing a publisher with Bertalanffy, Burnham had picked up on systems theory as a key strand of his broad-ranging attempt to develop a position adequate to a then-emerging postformalist practice of which Haacke's work was exemplary.

Burnham did not formulate systems aesthetics solely by observing Haacke's practice. Dan Flavin, Carl Andre, and Robert Morris all feature heavily in his account, and Burnham nominates Les Levine as "methodologically . . . the most consistent exponent of a systems aesthetic."[18] Nevertheless, Haacke's work is undoubtedly central to the development of Burnham's thinking on systems: "As a close friend of Hans Haacke since 1962, I observed how the idea of allowing his 'systems' to take root in the real world began to fascinate him, more and more, almost to a point of obsession."[19] Haacke openly acknowledges his debt to Burnham, explaining that Burnham "introduced me to systems analysis"[20] and that "the concept of 'systems' is widely used in

Left: Hans Haacke. *Grass Cube,* 1967. © 2008 Artists Rights Society (ARS), New York/ VG Bild-Kunst, Bonn.

Opposite: Hans Haacke. *Rhine Water Purification Plant,* 1972. © 2008 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn.

the natural and social sciences and especially in various complex technologies. Possibly it was Jack Burnham, an artist and writer, who first suggested the term . . . for the visual arts." For Haacke, systems aesthetics helped to "distinguish certain three-dimensional situations which, misleadingly, have been labeled as 'sculpture.'"[21]

Labeling the art of the late 1960s remains problematic. The diversity of Anglo-American postformalist practice has been historicized as a set of discrete movements including process art, anti-form, land art, information art, idea art, conceptual art, and so on. Yet their respective concerns overlap considerably because they all emerged in opposition to formalist artistic practice. Running parallel to what is now generally understood as postformalist art was "Tech art," a movement that advocated the fusion of advanced art and advanced technology.[22] As such, tech art now looks misguidedly teleological. Yet, in moving away from the traditional mediums, tech art still conceived itself in opposition to conventional, formalist modernism. In the late 1960s tech art enjoyed as much visibility as other postformalist practices. Haacke's "systems art," defying neat movement boundaries, bounds what can be designated both postformalist and tech art strategies. Similarly, Burnham sought to develop systems aesthetics as a general theory of artistic production, avoiding movement-specific categorization.

Whatever the status of Burnham's systems aesthetics as a general theory, it is undoubtedly productive in bringing to light Haacke's grounding in systems thinking. Recovering the influence of Burnham's systems aesthetics on Haacke encourages us to understand his practice holistically, revealing the fundamental consistency underlying its stylistic diversity. Haacke himself did not acknowledge any split in his work at the time he started to conduct his polls:

> If you take a grand view, you can divide the world into three or four categories—the physical, the biological, the social and behavioral—each of them having interrelations with the others as one point or another. There is no hierarchy. All of them are important for the upkeep of the total system. It could be that there are times when one of these categories interests you

more than another. So, for example, I now spend more time on things in the social field, but simultaneously I am preparing a large water cycle for the Guggenheim show.[23]

Pamela Lee has commented on the way in which, "reductively, Haacke would come to be known as a 'political' artist: political in thematizing such issues as the 'subject' of his practice. His systems approach, though, is as irreducible to the matter of content as it is to the matter of form."[24] Buchloh's historical success over Burnham for the exegetical privilege to Haacke's practice has had the consequence of suppressing its ideological continuity. As his art historical significance gets decided in late-career retrospectives and critical surveys, the assertion that Haacke's practice is ideologically split should be challenged.[25]

"Software" vs. "Information"—Misadventures of the System

Why then has systems aesthetics faded from critical view? How did the theory play out in Haacke's and Burnham's work? In 1970, Jack Burnham curated his first, and last, major exhibition. He remembers the experience less than fondly.[26] Yet a curatorial role gave him the platform to put his theory to a wider, nonspecialist audience and to make a public claim for its purchase on contemporary cultural production. The show, "Software, Information Technology: It's New Meaning for Art," at the Jewish Museum, set leading artists alongside bleeding-edge technologists. Here Burnham applied the holistic, integrationist lessons he had learned from systems theory, presenting advanced art and advanced technology within the same institutional frame. Les Levine's scatter piece *Systems Burn-Off X Residual Software* (1969) was shown alongside Nicholas Negroponte and the Architecture Machine Group's computer-built, self-reconfiguring gerbil maze, *Seek* (1969–1970). Vito Acconci hung around the gallery in his *Room Situation (Proximity)* (1970), while Ted Nelson and Ned Woodman presented the first public demonstration of a hypertext system, *Labyrinth: An Interactive Catalog* (1970).

Though "Software" has come to be received as an early, if unconventional, Conceptual art exhibition, this was not how it was billed at the time. The show did contain work by Haacke, Kosuth, Baldessari, and Weiner, but Burnham's catalog essay framed the exhibition's concerns within the broader sweep of artistic postformalism: "In just the past few years, the movement away from art objects has been precipitated by concerns with natural and man-made systems, processes, ecological relationships, and the philosophical-linguistic involvement of Conceptual art."[27] Furthermore, Burnham explicitly elided vanguard cultural and industrial production, disavowing boundaries between the art, the technology,

Hans Haacke. *News,* 1969–70. Jack Burnham and visitor perusing *News*, from the exhibition catalogue *Software* (New York: The Jewish Museum, 1970), 34. Photo by Shunk-Kender. © The Jewish Museum/Art Resource, New York.

and the art and technology: "*Software* is not specifically a demonstration of engineering know-how, nor for that matter an art exhibition. . . . *Software* makes no distinctions between art and non-art; the need to make such decisions is left to each visitor."[28]

Included in the show, Haacke's *News* (1969–1970) broadcast similar concerns. News consisted of five teletype machines installed in a straight line redolent of minimalism's industrial arrays. Crucially, however, these art objects functioned; the piece had use-value as well as exhibition-value. The teletype machines were hooked up to five commercial wire services, and reams of paper printouts accumulated in the gallery space as the exhibition went on, gradually building up a sea of discarded data. Echoing process art's utilization of quotidian materials (there are strong echoes of Robert Morris's use of thread waste), the piles of discarded paper brought the secular matter of the outside world into the consecrated precinct of the gallery. They represented a comment on the value of information, the currency of the postindustrial age. Haacke concatenated paradoxical registers of the precious and the profligate, powerfully engaging the viewer's understanding

both of the value of the right drop of information and the dissipation of this value when understood within the context of tide of data. The artistry of the piece resided in this juxtaposition: postformalist strategies were combined with a deployment of the latest telecommunication technology. Art and advanced technology were brought into productive conjunction.

Yet with "Software" Burnham set the stage for, perhaps even helped initiate, the shift from the technologically experimental utopianism manifest in much of the ambitious art of the 1960s to the rejection of technological means and materials in the art production of the 1970s.[29] Burnham's own attempt to prevent his theory of systems aesthetics being conflated with the ideology of an increasingly marginalized tech art movement was an undercurrent that informed the show. While preparing the exhibition in 1969, Burnham had entered into a notably ill-tempered public exchange with Terry Fenton in *Artforum*. Fenton defended an essentially reactionary philosophy of aesthetic "quality" by attacking Burnham's work, suggesting it amounted to little more than a rehash of constructivism's misguided technoscientific enthusiasms.[30] Burnham was moved to spell out his position: "Again and again I have stressed the need not for TekArt—that new hobgoblin of the critics—but for a technology based on aesthetic considerations. Where the latter exists the art impulse will take care of itself."[31] He went on to defend both systems theory and technology as means rather than ends: "Systems analysis, like the whole of technology, is a neutral but powerful tool. It asserts the values of those who employ it—their emotional and ideological shortcomings, and the strengths of their insights."[32] Burnham insisted that "Software is not technological art; rather it points to the information technologies as a pervasive environment badly in need of the sensitivity traditionally associated with art."[33] Struggling to defend the coherence of his show's curatorial premise, the tensions began to show in Burnham's attempt to relate cultural and industrial production.

"Software" also proved prone to literal, as well as conceptual, malfunction. Haacke's second work in the show, *Visitors' Profile* (1970), was compromised by such issues. Though he had worked with basic systems technology in *Chickens Hatching* (1969), this was the first time Haacke had the opportunity to integrate complex computational systems into his practice.[34] *Visitors' Profile* was intended to update Haacke's basic, paper-based sociological polls. The work was billed as follows:

> A terminal prints out the processed information in the form of statistics giving percentages and cross-tabulations between answers, opinions and the visitor's demographic background. The processing speed of the computer

> makes it possible that at any given time the statistical evaluation of all answers is up to date and available. The constantly changing data are projected onto a large screen, so that it is accessible to a great number of people. Based on their own information a statistical profile of the exhibition's visitors emerges.[35]

However the DEC PDP-8 computer that was supposed to drive the process failed. Visitors to the exhibition were to have been integrated into the artwork, forming a feedback loop that created a live sociopolitical census, powerfully demonstrating the museum's narrow audience demographic to itself in real time. Instead, visitors were presented with an "out of order" sign. Though the Digital Equipment Corporation (DEC) had engineers working round-the-clock to avoid their own corporate embarrassment, technical support were unable to get the computer working. Passing over the farcical humor of this situation, an artistic and political statement was lost to history because of the already overinflated claims of a nascent information technology sector.

Consequently, Haacke scaled down his exposure to technology in *MoMA Poll* (1970), shown at Kynaston McShine's "Information" exhibition of the same year. Here, the artist used the tried-and-tested paper ballot, but the work nevertheless depended on a simple photoelectric mechanism to count the votes in real time. Haacke described this project as follows:

> Two transparent ballot boxes are positioned in the exhibition, one for each answer to an either-or question referring to a current socio-political issue. The question is posted with the ballot boxes. The ballots cast in each box are counted photo-electrically and the state of the poll at any given time during the exhibition is available in absolute figures.[36]

The MoMA poll was apparently designed to be as simple and transparent as possible, from the Plexiglas ballot boxes to the constant visibility of its state. Haacke went so far as to mandate daily accounting of the results and to stipulate that "the museum instructs its personnel to make sure that no interference with the polling process occurs and that no more than one ballot will be cast by each visitor."[37] In the event of its successful installation, Haacke was able to pose the following, ostensibly unpartisan, question to MoMA's visitors: "Would the fact that Governor Rockefeller has not denounced President Nixon's Indochina policy be a reason for you not to vote for him in November?" Yet Haacke's poll, against appearances, was not designed to be politically neutral. Quite the contrary. At the most self-evident level, Haacke was unconcerned about a reinforcement effect skewing the

poll (transparent boxes do not make for a secret ballot). More pertinent, the poll was specifically conceived as an irritant to the institutional context and its vested interests: "The work was based on a particular political situation circumscribed by the Indochina War, Nixon's and Rockefeller's involvement in it, MoMA's close ties to both, [and] my own little quarrels with the museum as part of the Art Worker's Coalition's activities."[38] In fact, Haacke's poll actively sought a reinforcement effect, agitating against the war at the same time as revealing art's dependence on institutions financed by ethically compromised means.

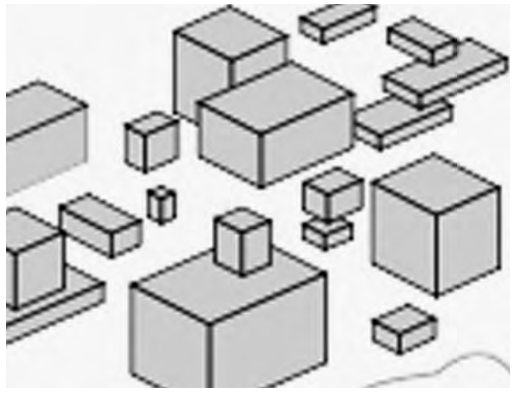
McShine's catalog essay for "Information" also made it abundantly clear that political issues (Vietnam, the Kent State shootings, economic recession) were now firmly on the social agenda and that it seemed increasingly urgent that artists should take a stand. Yet his understanding of politics was notably less sophisticated than Haacke's. His suggestion was to "extend the idea of art, to renew the definition, and to think beyond the traditional categories." McShine insisted that the artists selected for the show all address this issue, their practice involving "concepts that are broader and more cerebral than the expected 'product' of the studio." Despite all his encouragements, McShine was nevertheless careful to observe that "an artist certainly cannot compete with a man on the moon in the living room." McShine carefully advocated vanguard, postformalist practice (avoiding the "expected 'product' of the studio") but also took a clear swipe at the overinflated ambitions of tech art (implying that it was redundant and artistically counterproductive to "compete with a man on the moon in the living room").[39] Technology was equated with the shortcomings of technocracy, but the exhibition's own institutional entanglement with technocratic forces was not acknowledged.

Nevertheless, McShine was canny enough to know that artists did have to compete with the mediascape, because they inhabited, along with everyone else, a "culture that has been considerably altered by communications systems such as television and film." Yet his suggestions as to how to achieve this were defiantly quotidian: "photographs, documents, films and ideas." Here the low-tech is explicitly preferred to the high in a subtle reinscription of the technophilic/technophobic binary opposition that has long conditioned vanguard art's relation to technology. "Information" is widely acknowledged as a seminal exhibition precisely because it accurately captured the direction in which postformalist, specifically conceptual, practice would move. The show's restrained aesthetic and refunctioning of mainstream media forms could not have been more different from the high-tech, integrationist agenda of *Software*. The prevailing artistic climate had changed almost overnight. Yet Haacke, perhaps uniquely, managed

to utilize advanced technology to comment critically on the effects of technoscientific rationality. He refused to become phobic and collapse his practice back into the old avant-garde phobia/philia binarism. Haacke manifested his understanding of the interrelation of all systems, even as the rest of the art world sought simplistically to oppose "the System" and its technocratic apparatus.

Recording of Climate in Art Exhibition (1970) made the same point as Haacke's *MoMA Poll,* but more subtly. Installed at Donald Karshan's "Conceptual Art and Conceptual Aspects" (1970) show at the New York Cultural Center, the work comprised a thermograph, barograph, and hydrograph (the precision instruments used by conservators to monitor atmospheric conditions in the gallery). *Recording of Climate in Art Exhibition* literally took the aesthetic temperature of the times. Putting these devices on display, rather than leaving them discreetly out of view, foregrounded their regulative function. By an elegant act of détournement, Haacke drew back the curtain on the hidden material and financial infrastructure that is dedicated to the protection and preservation of the value of the works of art stored in the gallery. Precision instruments were ideologically recalibrated in order to demonstrate that the illusory ideality of the white cube masks its function as a vault. Furthermore, the control mechanisms of the gallery were implicitly associated with those of other social institutions. Homeostasis as a cipher for society. A systems work was used to make the same political point as a poll. Naturally enough, for as Haacke stated in the catalog for "Conceptual Art and Conceptual Aspects," "the working premise is to think in terms of systems; the production of systems, the interference with and the exposure of existing systems. . . . Systems can be physical, biological or social; they can be man-made, naturally existing, or a combination of any of the above."[40] Furthermore, as he later made explicit, systems can be turned on "the System," producing "a critique of the dominant system of beliefs while employing the very mechanisms of that system."[41]

Paradoxically, Burnham's thought collapsed back into the dystopian, technophobic mode his systems work had seemed to offer the possibility of overcoming. Having been excited by the artistic possibilities presented by systems theory and the new technology developing out of it, noting the progressive challenge they offered to traditional media and institutional contexts, Burnham, post-"Software," ended up deeply disillusioned. "Ultimately," he concluded, "systems theory may be another attempt by science to resist the emotional pain and ambiguity that remain an unavoidable aspect of life."[42] Despite his early enthusiasm for systems aesthetics, Burnham was to disavow his theoretical project in a late, dejected essay, "Art and Technology: The Panacea That Failed," convinced that "the results have fared from mediocre to disastrous when artists have



Marcel Douwe Dekker. Systems thinking about the society, 2007. Detail. GNU Free Documentation License 2007.

tried to use . . . the electronic technology of 'postindustrial culture.'"[43]

Burnham's account of artistic production as systems aesthetics hinted at but did not comprehensively follow through on a disarticulation of systems theory from systems science and its industrial deployment in systems technology. Bertalanffy himself had cautioned against conflating systems theory with systems science and technology:

> The humanistic concern of general systems theory as I understand it makes it different to mechanistically oriented system theorists speaking solely in terms of mathematics, feedback and technology and so giving rise to the fear that systems theory is indeed the ultimate step toward mechanisation and devaluation of man and toward technocratic society.[44]

Burnham's failure to rigorously differentiate systems theory and systems technology caused him to swing between a productive, analogical deployment of systems thinking and a prescriptive insistence on art's necessary fusion with systems technology. He declared with proleptic accuracy that "The traditional notion of consecrated art objects and settings will gradually give way to the conclusion that art is conceptual focus."[45] Yet he also regularly lapsed into a misguided technological determinism: "it now seems almost inevitable that artists will turn toward information technology as a more direct means of aesthetic activity."[46]

Burnham ultimately rejected both systems theory and systems technology; his own systems aesthetics as well as tech art. Asking whether "the ethos behind an invincible technology and a revolutionary art" was "a reciprocal myth," Burnham concluded in the affirmative, citing the nineteenth-century's "double-edged myth of progress" as the guarantor of both sides of a false conjunction. For an increasingly alienated Burnham, the art world absurdly insisted on preserving a belief in progress while rejecting technology as a viable resource for art: "Most ironic is the art world's rejection of science and technology without realizing that the same ethos of 'progress' that characterized technological change in the 19th and 20th centuries is equally responsible for the illusion of avant-garde art."[47]

Corporate Art, Social Responsibility

Though Burnham was well aware of many external reasons that artists turned to politics in the early 1970s, he nevertheless privileged a structural reason for the political turn, one that was internal to the unfolding of art: "The sudden transference of some avant-garde artists to politics stems from a desire to find a viable revolution, one providing the needed psychological surrogate."[48] In his analysis,

as well as in imputing the futility of the political turn, Burnham was misguided. He insisted on a revolutionary conception of the avant-garde and thus a revolutionary conception of progressive politics. However, it was precisely in situated struggles and local antagonisms that the vanguard art of the 1970s—institutional critique, feminist art, media activism—found political agency. By 1974 Peter Bürger had pointed out that an understanding of the avant-garde as defined by a revolutionary integration of art into life praxis might well represent a false sublation of art.[49] In a recent interview discussing the legacy of 1970s practice, Andrea Fraser has expanded on this observation, making it clear that "institutional critique, context art, and activist practice," all practices for which Haacke's work has been seminal, "fundamentally rejected that [revolutionary] paradigm, first of all by recognising the extent to which the art world is part of the 'life praxis' of the 'real' world and all of its economic, social and political structures."[50]

Haacke was already acutely aware of art's overlap with other social systems in the 1960s. Though his later work shifted emphasis, suspending the use of high technology for the appropriation of mass media forms, Haacke maintained his methodological grounding in systems. Understanding systemic interrelation, he has been able to make art that addresses all of the economic, social, and political structures of the real world (of which art is a part). Though Haacke transposes the focus of his art, Buchloh and others are unjustified in saying that his practice is split and that he makes political work only when he rejects systems. Haacke never rejected systems thinking as Burnham did, and his systems works hold political stakes.[51]

Two final exhibition contexts demonstrate the continuity of Haacke's project from the 1960s through the 1970s. In 1969 Haacke was contacted by Maurice Tuchman, head of the art and technology program at the Los Angeles County Museum of Art (LACMA), and asked to submit a project proposal. Tuchman had secured the financial and operational support of thirty-seven major, technically oriented corporations in Southern California. After three years of intense negotiations, twenty-two artists were eventually selected to partner with the participating corporations to produce work. The program ran from 1967 to 1971, culminating in a substantial exhibition and accompanying publication displaying all the art and technology collaborations it had facilitated. Critic Jane Livingstone explained the premises of the project in one of the show's catalog essays: "Art and Technology has had as one of its first premises the assumption that it is possible, and perhaps valuable, to effect a practical interchange between artists and members of the corporate-industrial society."[52] In effect, what was being quite openly proposed was a corporate-sponsored, technologized art—the

reconciliation of industrial and cultural production. Yet despite the official context of her essay Livingstone does not shy away from acknowledging the technophilic/technophobic tension that the program was obliged to negotiate:

> One of the fundamental dualisms inherent in the question of technology's uses in a humanist context has to do with the conflict between the belief that, in a word, technology is the metaphysics of this century, and therefore has to be accommodated from within, and the view that technology is somehow self-perpetuating, implacable and essentially inhuman, and that therefore humanist and artistic endeavor must function separated from it and even in opposition to it.[53]

Livingstone also made it clear that "despite a certain reluctance by some of the artists we dealt with . . . to participate with 'war-oriented' industries for reasons of moral objection, there were no final refusals to participate in the program on these grounds alone."[54] Politics apparently went only so far in the face of paid commissions. In the artists' defense, Burnham made the relevant point that "most of the artists in the show would not have participated by 1971, the year A&T finally opened, primarily because much of the art world believed by then that there was or is a nefarious connection between advanced technology and the architects of late capitalism."[55]

In 1969 though, Haacke, clearly a politically principled artist, was happy to generate five proposals for Tuchman's project, involving aerodynamics, meteorological simulation, high-voltage discharge, and real-time communication technology. All highly ambitious, one of Haacke's proposals was allocated to a leading visual technology company (Ampex Corporation) for consideration.[56] Entitled *Environment Transplant,* the proposed work might best be described as an early attempt at commenting on an emergent "culture of real virtuality"; namely, a culture mediated pervasively by real-time networked communication systems.[57] Haacke envisaged a large white room in the shape of a cylinder with a centrally mounted projector that would sweep its interior walls like the beams of a lighthouse. The broadcast material for the projector was to have been transmitted live and in real time from a camera rotating on a turntable on the back of a truck driven around the Los Angeles metropolitan area. Unfortunately, the project foundered on Ampex's inability to fulfill all of the necessary logistics and LACMA's reluctance to allocate more than one company to any one artist.[58] Haacke proactively submitted another proposal, a computerized visitors' profile, which was also rejected.[59] Consequently, apparently having surpassed the organisational capabilities of the museum and the "philanthropic" limits of the partner corporations

Hans Haacke. *Environment Transplant,* 1969. Unrealized proposal for Maurice Tuchman's "Art and Technology" program at LACMA. © 2008 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn.

involved in "Art and Technology," Haacke's work was not fabricated, and he did not participate in the final exhibition.

The failure to realize Haacke's proposal was a loss to a show that otherwise featured largely banal examples of tech art or lazy work by more established artists (as Burnham pointed out "the 'name' artists tended to do enlarged or elaborate variations of their standard work or to cynically build into their projects hints about the utter futility of technology as a humanistic endeavor"[60]). Though Burnham made some effort to review the show objectively, his enthusiasm for technologically inflected art was largely gone by 1971.[61] Less sympathetic observers roundly panned the exhibition, outraged at its profligate costs and perceived political outrages. *Artforum*'s Max Kozloff was perhaps the most savage:

ENVIRONMENT TRANSPLANT

A large white room in the shape of a vertical cylinder. In the center equipment for visual projection mounted on a slowly turning turntable so that projections would sweep over the curved walls like the beams of a light house. Loudspeakers are situated behind the walls all around the room so that sound emission can actually follow the sweeping of the projected images(a less desirable though cheaper version would be to mount a single loudspeaker on the turntable).

Corresponding to this set-up in the museum sound and image recording devices are mounted on a truck. Like the projection equipment the recording equipment is fixed onto a slowly spinning turntable. It continuously scans the "horizon". During the exhibition hours the truck drives through the entire Los Angeles Metropolitan Area constantly recording the sights and sounds of the streets it goes through.

The recorded material is immediately without any time lag transmitted into the museum and projected onto the walls or emitted through the loudspeakers of the room. Visitors will sometimes stand between projector and"screen". Consequently their shadows will appear on the wall and they themselves become the "screen". Whatever noises they make will also mingle with the streetnoises piped from the truck into the room.

> In 1967, the American economy could be superficially represented by the term "all systems go." . . . In 1971, unemployment, recession and inflation had . . . decimated the prospects of the masses. . . . While these convulsions were taking place . . . the American artists did not hesitate to freeload at the trough of that techno-fascism that had inspired them.[62]

However, Haacke's project, had it been realized, would have raised explicitly political questions as to the nature of representation and the distortion of space, time, and locality effected by telecommunication technologies; it would have presented an early intervention into the otherwise tightly regulated, profit-driven landscape of commercial broadcast media. Most interesting, however, the project would have superimposed real-life, street-level concerns (unemployment lines? riots?) on the museum, literally broadcasting the relationship between art and life

539-45 Fifth Ave.
Block 1279, lot 69
75 x 150', 13 story office bldg.
Chatham Associates, Inc.
Acquired 11-21'69
Land value $2 650 000, total value $4 500 000

531-37 Fifth Ave.
Block 1279, lot 1
125 x 140', 33 story office bldg.
Chatham Associates, Inc.
Acquired 11-21'69
Land value $3 700 000, total value $7 000 000

509 Fifth Ave.
Block 1277, lot 72
37 x 123', 12 story office bldg.
Chatham Associates, Inc.
Acquired 4-12'71
Land value $850 000, total value $1 700 000

92-96 Fifth Ave.
Block 816, lot 42
103 x 150', 18 story fireproof elevator apt. bldg.
West Haven Associates, Inc.
Acquired 11-11'70
Land value $545 000, total value $3 000 000

41 Fifth Ave.
Block 568, lot 6
54 x 141', 15 story fireproof elevator apt. bldg.
Newport Associates, Inc.
Acquired 10-22'64
Land value $340 000, total value $1 205 000

18-22 Fifth Ave.
Block 572, lot 38
80 x 124', 17 story fireproof elevator apt. bldg.
Newport Associates, Inc.
Acquired 7-20'64
Land value $420 000, total value $1 560 000

(rather than their artificial separation). Haacke sought to participate in the show precisely because he understood the potential political efficacy of so doing.

Haacke's interest in real-time systems (which are also real-space systems) was carried through into his much-discussed *Manhattan Real Estate Holdings* project. Though fully realized, these works also failed to make their way in front of the public in 1971. Haacke executed two major new works for his proposed solo show at the Guggenheim in New York: *Shapolsky et al. Manhattan Real Estate Holdings, a Real-Time Social System, as of May 1, 1971* (1971); and the less frequently cited *Sol Goldman and Alex DiLorenzo Manhattan Real Estate Holdings, a Real-Time Social System, as of May 1, 1971* (1971). They represented a very different form of corporate art, emphatically not sponsored by the organizations that occasioned them. Both pieces set out in forensic detail the slum property interests of New York families, cross-held in shadowy corporations. Haacke was able to reconstruct a schematic representation of a systemic network of social and financial exploitation from his own street photography and records freely available in the New York County Clerk's Office (to the few who would have had the patience, skill, and free time to reassemble them).

Ostensibly of most concern to Thomas Messer, the then director of the Guggenheim, was that this sociologically inclined analysis was to be presented *as art.* Notionally on these grounds Messer justified his decision to decline Haacke permission to exhibit these works in his own show.[63] The artist offered to compromise by changing real names to invented ones, but even this softening of the works' impact was not enough to change Messer's mind. The situation escalated and Haacke's show was canceled—an infamous act of censorship that still resonates today. Yet one would be naive to miss the deliberate political challenge that Haacke mounted to the institution. As Burnham asserted, "it is no longer useful to maintain the fiction that Haacke is not a political animal and that his work has no extra-artistic motivation."[64]

Haacke's art irritated the corporate interests associated with the Guggenheim and frustrated the corporate egos involved with "Art and Technology" at LACMA, all in the name of an explicit artistic concern with social responsibility. Despite its critical occlusion up to this point, a common conceptual articulation links *Manhattan Real Estate Holdings* and *Environment Transfer:* real-time systems.[65] There is no break between the high technology of *Environment Transfer* and the low technology of *Manhattan Real Estate Holdings,* they share a deep-rooted consistency. Both works are thoroughly mediated by systems thinking and steeped in politics. Their significance lies in their common systems-theoretical insight not the relative sophistication of the technology they employ.

Hans Haacke. *Sol Goldman and Alex DiLorenzo Manhattan Real Estate Holdings, a Real-Time Social System, as of May 1, 1971,* 1971. © 2008 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn.

All Systems Go?

Why then has Buchloh downplayed the importance of systems thinking for Haacke's practice? Buchloh is explicit about his reasons for dismissing Haacke's systems work. He reads Haacke's deployment of a systems aesthetic as the extension, in an American context, of the artist's affiliation with the project of the European Zero Group with which he had been linked in the earliest stage of his career. According to Buchloh, the Zero Group was passionately devoted "to an international post-war modernity" that operated "along an axis between the mystification of technology and the project of a scientific enlightenment freed from the suspicion of political ideologies." Consequently Zero's ideals "served as the perfect disguise of historical amnesia." For Buchloh, Burnham's systems aesthetics cannot escape related charges of "techno-scientific reductivism." Purportedly subjecting the art of the late 1960s to a profoundly ahistorical, spatializing explanatory schema, Buchloh stresses that "systems-theory aesthetics" was "governed by the logic of rationalist instrumentality" and the "repression of historical memory."[66]

Though one might justifiably raise the question as to what degree Burnham's systems aesthetics are positivist, the theory cannot be accused of entirely lacking historical awareness. Burnham understood his theory within its historical context: "It is . . . likely that a 'systems esthetic' will become the dominant approach to a maze of socio-technical conditions rooted only in the present. New circumstances will with time generate other major paradigms for the arts."[67] Nor even is a disavowal of history evident in systems theory proper—Von Bertalanffy explicitly considered the problem of a "Systems Theoretical Concept of History," locating his own contribution within a long, though marginal, tradition of theoretical historiography, from Vico through Hegel and Marx.[68] Pamela Lee has commented at length on the particular "nonlinear, recursive, and multidimensional" temporality that was characteristic of systems thinking, seeing close parallels with art historian George Kubler's arguments in *The Shape of Time: Remarks on the History of Things* (1962).[69] For Lee then, systems thinking in the 1960s instantiated a new form of historical consciousness rather than constituting the repression of historical memory.

Here, however, rather than problems of time and history, issues of space and politics obtain. Buchloh's critique of the "limitations of a systems-aesthetic" depends on an opposition between the natural and the social, a definitive spacing of these domains as if they were historically invariant, ideologically undetermined, and unambiguously distinct. This is why, for Buchloh, Haacke's art cannot be political until he "transfers his interests from biological and physical systems to social systems." However, Bruno Latour has interrogated exactly this division

between the natural and the social in the course of his project to elaborate a political philosophy of nature. He calls for a "political ecology" where nature is no longer identified as "a particular sphere of reality" but recognized as "the result of a political division, of a Constitution that separates what is objective and indisputable from what is subjective and disputable."[70] Following Latour, a politics is always already operative in the particular distribution of the natural and the social on which Buchloh depends and which, critically, he does not question. Haacke's ecological works are precisely the ones that Buchloh's account is obliged to overlook—*Transplanted Moss Supported in Artificial Climate* (1970) could be used as a textbook illustration of Latour's point about political ecology.

The spatial charge of systems thinking allows us to locate a critical dimension in Haacke's early work, as well as to mark its conceptual continuity with the later work. Systems theory offers a way to think the natural and the social analogically, and Haacke's art, via his engagement with Burnham's systems aesthetics, makes use of it to do exactly that. We can now see once more that Haacke's critical artistic interventions build on an unbroken, ascending scale of systemic complexity—from organic elements, through plants, animals, and finally up to human beings. From physical to biological to social systems, Haacke's work demonstrates the overlap and entanglement of the "natural" and the "social." As William Rasch and Cary Wolfe have summarized it, "systems theory makes use of the same formal and dynamic models *across* what have been viewed traditionally as discrete ontological domains (organic versus mechanical, natural versus cultural)."[71]

However, the spacing between the natural and the social has held together a foundational myth of modernity, as Latour makes clear: "The moderns have set themselves apart from the premoderns. For Them, Nature and Society, signs and things, are virtually coextensive. For Us they should never be."[72] In debunking this myth, systems theory threatens the critical achievements of (a certain concept

Hans Haacke. *Transplanted Moss Supported in Artificial Climate,* 1970. © 2008 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn.

of) modernity. In fact, Buchloh's rejection of Burnham's account of Haacke's practice anticipates, albeit in considerably restricted scope, Jürgen Habermas's profound disagreement with the sociologist and systems theorist Niklas Luhmann on the status of the critical project of modernity.[73] Such fundamental problems will not be resolved here. Their resolution is even unlikely because, as Eva Knodt has pointed out, Habermas and Luhmann operate with mutually exclusive conceptualizations of modernity:

> While Habermas insists on grounding modern society in the archimedean point of a rationally motivated consensus . . . [Luhmann's] principle of functional differentiation entails the absence of such a center and, by implication, the impossibility of a totalizing consciousness or collective identity on the model of a transcendental subject or of a linguistically grounded intersubjectivity.[74]

It is sufficient to mark the controversy and to acknowledge that traditional objections to systems theory (as antihumanist, positivist, technologically rationalistic, politically suspect, etc.) are increasingly, in Andrew Feenberg's explanation, "less persuasive as we enter a historical period in which the boundaries between the individual and the system are increasingly blurred. In this situation opposition must be 'immanent,' implied somehow in the very contradictions of the system. The way out must be a way through."[75] Which brings us back to Haacke's practice and his early determination to enact "a critique of the dominant system of beliefs while employing the very mechanisms of that system."

Returning then to the question of how to account most convincingly for the relationship between *Photo-Electric Viewer-Controlled Coordinate System* and *Norbert: All Systems Go,* the apparent ideological break between these two works is not a fracture at all but rather the articulation of two discrete, yet linked, systems-theoretical investigations. Haacke intended *Norbert* to parody a strain of cybernetic theory dominant in an increasingly technocratic world. Yet one can suggest with equal plausibility that the rigid grid of motion sensors and the harsh glare of naked lightbulbs in *Photo-Electric* constituted a clear warning about the advanced surveillance made possible by technological development rather than a technophilic promotion of liberatory play and viewer emancipation. Lured by promises of free interaction, the viewer is in fact ensnared in a highly controlled cell, his or her every movement tracked and scrutinized. On this account, participation amounts to no more than the freedom to live out a completely routinized existence.[76]

Similarly the apparently cynical and technophobic exercise of trying to train a mynah bird to endlessly announce the principle of entropy can also be rethought.

Hans Haacke. *Ten Turtles Set Free,* 1970. © 2008 Artists Rights Society (ARS), New York/VG Bild-Kunst, Bonn.

Might there not have been an invitation here, however covert, to free the caged bird? Surely the transgression of opening the cage door and letting the bird escape is a possibility that the piece countenances—particularly when we consider *Ten Turtles Set Free* (1970), a piece broadly contemporary with *Norbert* that Haacke did realize and document. Such an action might constitute a real act of liberation, a symbolically loaded and institutionally unsanctioned ethical choice. Rather than submit to the tedium of passively engaging the piece on its ostensible, institutionally sanctioned, terms, the viewer might step in and realign the rules.[77] The system could be opened along with the cage. Furthermore, the individual might find suggested his or her own potential for emancipation along with *Norbert.* As Haacke insists, "Works of art, like other products of the consciousness industry, are potentially capable of shaping their consumers' view of the world and of themselves and may lead them to act upon that understanding."[78]

We have cause, therefore, to question readings of Haacke's practice as split, readings that seek to locate its politics as emerging only after he has transcended "the limitations of a systems-aesthetic approach." Haacke's practice has no clear break, and his various real-time systems demonstrate a politics. Recovering Haacke's early systems art prompts us to begin to think beyond the reductive binarism of either an affirmative technophilia or a negative technophobia as the only possible modes of relation between cultural and industrial production. Haacke's systems art should be recognized as a powerful strain of postformalist practice, one that makes use of technological resources without sacrificing critical cultural engagement to ideologies of artistic or industrial progress. The aesthetic and political challenge of articulating relations between cultural and industrial production remains an open problematic. As such, Haacke's systems art constitutes an important, underacknowledged line in the conceptual genealogy of ambitious contemporary art.

Notes

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1. Andreas Huyssen, "The Hidden Dialectic: The Avant-Garde—Technology—Mass Culture," in *The Myths of Information: Technology and Postindustrial Culture,* ed. Kathleen Woodward (London: Routledge & Kegan Paul, 1980), 157.

2. Huyssen, "The Hidden Dialectic," 159.

3. Whether that recapitulation be disparaged as farcically unsuccessful, as in Peter Bürger's seminal account of the neo-avant-garde, or affirmed as extending the critical project of the historical avant-garde, as in Hal Foster's influential critique of Bürger. See, Peter Bürger, *Theory of the Avant-Garde,* trans. Michael Shaw (Minneapolis: Minnesota University Press, 1984), 47–59; and Hal Foster, *The Return of the Real: The Avant-Garde at the End of the Century* (Cambridge: MIT Press, 1996), 1–32.

4. Pamela Lee has developed an important and conceptually sophisticated reading of the art and technology nexus in the 1960s. See Pamela Lee, *Chronophobia: On Time in the Art of the 1960s* (Cambridge: MIT Press, 2004). In part inspired by Haacke's work, she has also focussed attention on the influence of systems theory in 1960s art and art criticism. My work is indebted to her path-breaking study.

5. Karl Pontus-Hulten, ed., *The Machine as Seen at the End of the Mechanical Age,* exh. cat. (New York: MoMA, 1968), 6.

6. Pontus-Hulten, *Machine as Seen,* 6.

7. Pontus-Hulten, *Machine as Seen,* 195; emphasis added.

8. This was dramatically enacted by John Latham. In his notorious action, *Still and Chew: Art and Culture* (1966–1967), Latham tore up, chewed to a pulp, and then distilled his St. Martin's College library copy of Clement Greenberg's *Art and Culture,* storing and exhibiting the resulting liquid in a glass phial. The action resulted in Latham's dismissal from his teaching post at the college.

9. Haacke's reflection on the art object's relation to its institutional context began as early as 1961 with his various mirrored objects—for example *A7-61* (1961), *D6-61* (1961), *A8-61* (1961)—and is also notable in the condensation works—for example, *Condensation Box* (1963–1965) and *Condensation Cube* (1963–1965). However, only as Haacke rejects conventional art objects altogether does his *critical* focus on art's institutional context sharpen.

10. Benjamin Buchloh, "Hans Haacke: Memory and Instrumental Reason," in *Neo-Avantgarde and Culture Industry* (Cambridge: MIT Press, 2000), 205, 215.

11. Buchloh, "Memory and Instrumental Reason," 212.

12. Benjamin Buchloh, "Hans Haacke: The Entwinement of Myth and Enlightenment," in Hans Haacke, *"Obra Social"* (Barcelona: Fundació Antoni Tàpies, 1995), 49.

13. Buchloh, "The Entwinement of Myth and Enlightenment," 45.

14. Furthermore, biological systems formed part of Haacke's recent, politically controversial Reichstag commission, *Der Bevölkerung (To the Population)* (2000), and were also integral to two unrealized proposals, *Calligraphie* (1989) and *Proposal: Competition for World Trade Center Memorial* (2003). Haacke has discussed the relationship between *Der Bevölkerung* and his earlier biological systems work. See Rosalyn Deutsche, Hans Haacke, and Miwon Kwon "*Der Bevölkerung*: A Conversation," *Grey Room* 16 (Summer 2004): 77–78.

15. For a critic who was a significant force in his day—sitting on *Artforum*'s masthead alongside Lawrence Alloway, Michael Fried, and Rosalind Krauss—Burnham's work has become relatively obscure. Other scholars who have commented on his theoretical legacy include Edward Shanken (a long-standing advocate), Pamela Lee, and Johanna Drucker. See, Edward A. Shanken, "The House That Jack Built: Jack Burnham's Concept of 'Software' as a Metaphor for Art," in *Reframing Consciousness: Art, Mind and Technology,* ed. Roy Ascott (Exeter: Intellect Books, 1999), 156–161; Edward A. Shanken, "Art in the Information Age: Technology and Conceptual Art," in *Conceptual Art: Theory, Myth, and Practice,* ed. Michael Corris (Cambridge, UK: Cambridge University Press, 2004), 235–250; Lee, *Chronophobia,* 70–77, 239–243; and Johanna Drucker, "The Crux of Conceptualism: Conceptual Art, the Idea of Idea, and the Information Paradigm," in *Conceptual Art,* ed. Corris, 251–268. The "Open Systems: Rethinking Art c. 1970" conference at Tate Modern (2005) produced two papers engaging Burnham's work: Sabeth Buchmann, "From Systems-Oriented Art to Biopolitical Art Practice" (paper presented at the "Open Systems: Rethinking Art c. 1970" conference, Tate Modern, London, 16–19 September 2005), available online at http://publication.nodel.org/From-Systems-Oriented-Art-to-Biopolitical-Art-Practice; and Matthias Michalka, "Antagonistic Systems" (paper presented at the "Open Systems: Rethinking Art c. 1970" conference, Tate Modern, London, 16–19 September 2005). A comprehensive resource of writing on Burnham can be found at http://www.volweb.cz/horvitz/burnham/homepage.html.

16. Writing in the late 1980s, Buchloh observed that "Critical support for Haacke's work has been given consistently by only three critics since the 1960s: Jack Burnham, Lucy Lippard, and John Perreault." Buchloh, "Memory and Instrumental Reason," 236 n. 3. Of these three critics, Burnham's engagement is the most sustained and the only one against which Buchloh takes a position.

17. "Systems Esthetics" was the title of an article Burnham wrote summarising his theoretical position. Jack Burnham, "Systems Esthetics," *Artforum* 7, no. 1 (September 1968), 30–35. For a detailed exposition of Burnham's theory in its intellectual and historical context see my "All Systems Go: Recovering Jack Burnham's 'Systems Aesthetics,'" *Tate Papers,* no. 5 (Spring 2006), http://www.tate.org.uk/research/tateresearch/tatepapers/06spring/skrebowski.htm. Both the Tate paper and this one have developed from research initially presented at the "Open Systems: Rethinking Art c. 1970" graduate symposium, Tate Modern, London (18–19 September 2005).

18. Burnham, "Systems Esthetics," 34.

19. Jack Burnham, "Steps in the Formulation of Real-Time Political Art," in Hans Haacke,

Framing and Being Framed: 7 Works 1970–75 (New York: New York University Press, 1975), 128.

20. Jeanne Siegel, "An Interview with Hans Haacke," *Arts Magazine,* May 1971, 18.

21. Hans Haacke, "Untitled Statement" (1967), in *Hans Haacke,* ed. Jon Bird, Walter Grasskamp, and Molly Nesbit (London: Phaidon Press, 2004), 102.

22. Because of its high production costs and emphasis on cross-disciplinary collaboration, tech art tended to be produced by groups. Robert Rauschenberg and Billy Klüwer's E.A.T. (Experiments in Art and Technology) initiative is the best known of these groups. In the 1960s, however, other groups such as USCO (Us Company) and Pulsa were also prominent. For a detailed, near-contemporary account of tech art, see Douglas Davis, *Art and the Future: A History/Prophecy of the Collaboration between Science, Technology and Art* (London: Thames & Hudson, 1973).

23. Siegel, "An Interview with Hans Haacke," 18.

24. Lee, *Chronophobia,* 78.

25. Benjamin Buchloh and Rosalyn Deutsche both reproduce the "break" argument in their catalog essays for Haacke's major late-career retrospective "For Real: Works 1959–2006" (2006). Excepting *Condensation Cube* (1963–1965), Buchloh declines to mention any work produced before 1969. See Benjamin Buchloh, "Hans Haacke: From Factographic Sculpture to Counter-Monument," in *Hans Haacke—For Real: Works 1959–2006,* exh. cat., ed. Matthias Flügge and Robert Fleck (Düsseldorf: Richter Verlag, 2006), 42–59. Deutsche is more nuanced, insisting that Haacke radically shifted aesthetic direction in 1969 but acknowledging that "to say that Haacke radically changed direction with the polls is not to say that they have no continuity with past works." Rosalyn Deutsche, "The Art of Not Being Governed Quite So Much," in *Hans Haacke,* exh. cat., ed. Flügge and Fleck, 78, n. 19.

26. "During the winter of 1969, Karl Katz, the director of the Jewish Museum in New York City, decided to mount a major exhibition based on computer technology and chose me to curate what was to become the first computerized art environment within a museum. *Software* did not open, however, until September of the following year. When I accepted, I hardly realized that the project would consume a year and a half of my life. Problems surfaced at every turn, ranging from dilemmas of conception and budgetary restrictions to malfunctioning of equipment and possibly even sabotage." Jack Burnham, "Art and Technology: The Panacea That Failed," in *Myths of Information,* ed. Woodward, 205.

27. Jack Burnham, "Notes on Art and Information Processing," in *Software, Information Technology: It's New Meaning for Art,* exh. cat., ed. Jack Burnham (New York: Jewish Museum, 1970), 10–11.

28. Burnham, "Notes on Art," 10–11.

29. Video art is the notable exception to this broadly technophobic trajectory. See Branden Joseph's account of Rauschenberg's disappointed hopes for tech art as a means to "disarticulate the social mechanism of industry," in Branden Joseph, *Random Order: Robert Rauschenberg and the Neo-Avant-Garde* (Cambridge: MIT Press, 2003), 209–285.

30. Terry Fenton, "Constructivism and Its Confusions," *Artforum* 7, no. 5 (January 1969), 22–27.

31. Jack Burnham, "Jack Burnham, Terry Fenton: An Exchange," *Artforum* 7, no. 8 (April 1969), 60.

32. Burnham, "An Exchange," 60.

33. Burnham, "Notes on Art," 14.

34. Burnham, *Software,* 35.

35. Hans Haacke, "Proposal: Poll of MoMA Visitors," in *Information,* exh. cat., ed. Kynaston McShine (New York: MoMA, 1970), 57.

36. Haacke, "Proposal," 57.

37. Siegel, "An Interview with Hans Haacke," 20.

38. McShine, *Information,* 138–141.

39. Hans Haacke, "Statement," in *Conceptual Art and Conceptual Aspects,* exh. cat., ed. Donald Karshan (New York: New York Cultural Center, 1970), 32.

40. Hans Haacke, "The Agent," in Bird, Grasskamp, and Nesbit, *Hans Haacke,* 107. It is in this sense that Frederic Jameson characterises Haacke's practice as 'homeopathic,' a curative response to 'the political dilemma of a new cultural politics: how to struggle within the world of the simulacrum by using the arms and weapons specific to that world . . .' Frederic Jameson, "Hans Haacke and the Cultural Logic of Postmodernism," in Brian Wallis, ed., *Hans Haacke: Unfinished Business,* 38–50 (Cambridge: MIT Press, 1986), 42–43.

41. Jack Burnham, *Great Western Salt Works: Essays on the Meaning of Postformalist Art* (New York: George Braziller, 1974), 11.

42. Burnham, "Art and Technology," 200.

43. Ludwig von Bertalanffy, *General Systems Theory: Foundations, Development, Applications* (Harmondsworth, UK: Penguin, 1973), xxi.

44. Jack Burnham, "The Aesthetics of Intelligent Systems," in *On the Future of Art,* ed. Edward Fry (New York: The Viking Press, 1970), 120–121.

45. Burnham, "The Aesthetics of Intelligent Systems," 97.

46. Jack Burnham, "Problems of Criticism IX," in *Artforum* 9, no. 5 (January 1971), 41.

47. Burnham, "Problems of Criticism IX," 41.

48. Bürger, *Theory of the Avant-Garde,* 54.

49. Stuart Comer, "Art Must Hang: An Interview with Andrea Fraser about the Whitney Independent Study Program," in *Afterthought: New Writing on Conceptual Art,* ed. Mike Sperlinger (London: Rachmaninoff's, 2005), 39.

50. However, Haacke's preferred lexicon *did* change. From the early 1970s onward, as systems theory was run together with systems science (and thereby the military-industrial complex) in the public imagination, Haacke increasingly related his artistic concerns to Pierre Bourdieu's analyses of art as a "field" of cultural production. This engagement culminated in a book, Hans Haacke and Pierre Bourdieu, *Free Exchange* (Cambridge, UK: Polity Press, 1995). The adequacy of Bourdieu's sociological account of art will not be broached here. What is crucial to note is that Haacke's early interest in systems thinking subtends his later work: "One could argue that 'institutional critique' cannot be performed without an understanding of the 'system' or 'field' of the art world." Hans Haacke, personal communication, 12 June 2007.

51. Jane Livingstone, "Thoughts on Art and Technology," in, *Art and Technology,* exh. cat., ed. Maurice Tuchman (Los Angeles: LACMA, 1971), 43.

52. Livingstone, "Thoughts on Art and Technology," 43.

53. Livingstone, "Thoughts on Art and Technology," 43.

54. Burnham, "Art and Technology," 210.

55. The five proposals were *Cold-Warm Environment, Weather Cycle Simulation, Wind Environment, Electric Discharge,* and *Environment Transplant.*

56. I borrow the phrase from Manuel Castells. See, Manuel Castells, "The Culture of Real Virtuality: The Integration of Electronic Communication, the End of the Mass Audience and the Rise of Interactive Networks," in *The Rise of the Network Society,* 2nd ed. (Oxford: Blackwell, 2000), 355–406.

57. Tuchman explained the decision to Haacke as follows: "After extensive discussions among ourselves and with Ampex, we have decided that the difficulties involved—the transmission problem, the truck and driver, the projection equipment—are more than Ampex or the Museum can assume for this particular ART AND TECHNOLOGY program. The basic idea behind our project is that one corporation takes on the responsibility to carry out one project from beginning to end. We are not equipped or organized to bring together many different companies, small and large, to execute one idea. . . . Ampex is not willing to extend its resources or to commit to the financial support to cover every aspect of this particular project. I know of no other company committed to ART AND TECHNOLOGY who could carry it out." Maurice Tuchman to Hans Haacke, 26 May 1969, in personal archive of Hans Haacke.

58. Tuchman stated, "Our Selections Committee has met to discuss your idea among several other computer projects, all of which are good. After much deliberation, we have had to narrow our selection of these projects because of the limited number of facilities available to implement computer works. Although we like your idea very much, we will not be able to include it in our program." Maurice Tuchman to Hans Haacke, 9 June 1969, in personal archive of Hans Haacke.

59. Burnham, "Art and Technology," 211.

60. See Jack Burnham, "Corporate Art," *Artforum* 9, no. 2 (October 1971), 66.

61. Max Kozloff, "The Multimillion Dollar Art Boondoggle," *Artforum* 9, no. 2 (October 1971), 76.

62. Alexander Alberro situates the cancellation of Haacke's show against the backdrop of a swing toward cultural conservatism in the Guggenheim's exhibition policy at that time, spurred by the hostile response to the Sixth Guggenheim International. See Alexander Alberro, "The Turn of the Screw: Daniel Buren, Dan Flavin, and the Sixth Guggenheim International Exhibition," *October* 80 (Spring 1997): 57–84.

63. Jack Burnham, "Hans Haacke's Cancelled Show at the Guggenheim," *Artforum* 9, no. 10 (June 1971), 69.

64. A catalog essay entitled "Real-Time Systems" by the curator Edward Fry was to have introduced Haacke's Guggenheim show. Fry's essay is available in German translation as "Realzeitsysteme," in *Hans Haacke: Werkmonographie,* ed. Edward Fry (Cologne: DuMont Schauberg, 1972), 8–22.

65. Buchloh, "The Entwinement of Myth and Enlightenment," 47–51.

66. Burnham, "Systems Esthetics," 35.

67. Bertalanffy, *General Systems Theory,* 211.

68. Lee, *Chronophobia,* 218–256. George Kubler, *The Shape of Time: Remarks on the History of Things* (New Haven: Yale University Press, 1962).

69. Bruno Latour, *The Politics of Nature: How to Bring the Sciences into Democracy,* trans.

Catherine Porter (Cambridge: Harvard University Press, 2004), 231.

70. William Rasch and Cary Wolfe, eds., *Observing Complexity: Systems Theory and Postmodernity* (Minneapolis: University of Minnesota Press, 2000), 17.

71. Bruno Latour, *We Have Never Been Modern,* trans. Catherine Porter (Essex, UK: Longman, 1993), 99–100.

72. See Jürgen Habermas, "Excursus on Luhmann's Appropriation of the Philosophy of the Subject through Systems Theory," in *The Philosophical Discourse of Modernity: Twelve Lectures,* trans. Frederick Lawrence (Cambridge: MIT Press, 1987), 368–385.

73. Eva Knodt, "Toward a Non-foundationalist Epistemology: The Habermas/Luhmann Controversy Revisited," *New German Critique,* no. 61 (Winter 1994): 98.

74. Andrew Feenberg, *Alternative Modernity: The Technical Turn in Philosophy and Social Theory* (Berkeley and Los Angeles: University of California Press, 1995), 37–38.

75. For a convincing account of the ambivalent signification of participatory artworks in the late 1960s, see Janet Kraynak, "Dependent Participation: Bruce Nauman's Environments," *Grey Room* 10 (Winter 2003): 22–45.

76. Jon Bird recounts an actual occurrence of just such a disruption of gallery etiquette—Robert Morris's 1971 retrospective at the Tate. The show had to be closed down temporarily and reinstalled after visitors damaged many of the exhibits through overenthusiastic participation. See Jon Bird, "Minding the Body: Robert Morris's 1971 Tate Gallery Retrospective," in *Rewriting Conceptual Art,* ed. Jon Bird and Michael Newman (London: Reaktion, 1999), 88–106.

77. Haacke, "The Agent," 106.