FELICITY D. SCOTT

DISCOURSE, SEEK, INTERACT:
Urban Systems at MIT

Reporting to Institute President Howard W. Johnson on the state of the School of Architecture and Planning for the year 1968, Dean Lawrence B. Anderson noted the impact of the moment's turbulence as it was then being felt in the School. The profound "dislocations and adjustments" of society at large, he noted, had affected the ability of both architecture and planning to accumulate accurate knowledge of social needs or to predict future programs, troubling by extension the disciplines' sense of assurance of their professional roles, which he described as "giving order to environmental and social change."[1] While, as he remarked, "traditional values in the environmental professions are fading rapidly," the counterpart to this waning was that "interaction with other professions intensifies." For Anderson the rapid obsolescence of conventional expertise and established modes of practice were not cause for lament. Rather, such transformations had provided the occasion for a strategic rethinking of the School's role within the institutional milieu of MIT as the Institute strove to recalibrate the scope of its scientific and technical research in response to the so-called "urban crises" of the 1960s.[2] Acknowledging the effort's potential benefits, Anderson noted that "the continued awakening of the Institute as a whole toward urban problems is a spur to both departments." The school's encounter with that "awakening" left a profound mark on sectors of its architectural research and pedagogical initiatives in the years immediately following Anderson's Report; indeed, faculty and students became increasingly integrated within interdisciplinary frameworks dedicated to developing techniques of controlling urban and environmental "systems" and the populations who inhabited them—dedicated, that is, to their monitoring, quantitative description, regulation, management, organization and visualization.

While interdisciplinary architectural and urban research had of course taken place during the previous decades at MIT, as elsewhere, we can recognize in this exchange a significant shift in disciplinary and interdisciplinary identifications, and moreover a shift in the very

1 Lawrence B. Anderson, "School of Architecture and Planning," in "Report of the President, 1968," *Massachusetts Institute of Technology Bulletin* 104, no. 3 (December 1968), 29.
2 On the Federal Government's understanding of the "urban crises," see Senate Committee on Government Operations, United States Congress, Subcommittee on Executive Reorganization, *Federal Role in Urban Affairs, Hearings, Eighty-Ninth Congress, Second Session and Ninetieth Congress, First Session* (Washington: U.S. Government Printing Office, 1966-68).

conception of architecture.[3] No longer were architects simply drawing upon multiple fields of expertise in order to facilitate their design work and scholarship through an engagement of research at the forefront of a transforming modernity. Rather, architecture would momentarily come to be regarded (and even to model itself) as one more parameter in a general systems paradigm geared towards environmental management and control, a paradigm that, like its forebears in the large-scale techno-scientific research characteristic of MIT laboratories following World War II, was inextricably coupled with heavily funded research into the application of computers and scientific knowledge; that is, architecture became inscribed within the domain of "Big Science."[4] This did not of course affect the School in its entirety, and many other stories could be told about it during this period. However, the School's increased intimacy with the social sciences and computerization, and its scripted interpolation within what Senator J. William Fulbright termed the "military-industrial-academic complex" at this moment, emerge as important symptoms of a larger historical transformation that warrant further scrutiny.[5]

To understand why the School was temporarily embraced as central to the Institute's response to the period's social turbulence and related geopolitical insecurities, I want to trace some of the activities and the legacy of MIT's Urban Systems Laboratory (USL). As one official report retrospectively acknowledged, "M.I.T. responded to the urban crises of the 1960s by forming the Urban Systems Laboratory."[6] The USL was founded in 1968 following the recommendations of an Ad Hoc Faculty Committee on Urban Studies convened by Johnson in late 1966, his first year as President of the Institute. It was described as "a new interdepartmental and multidisciplinary activity to mobilize Institute-wide resources in the area of urban systems."[7] In February 1967 MIT submitted a 100-page proposal for a Program in Urban Affairs to the Ford Foundation. The proposal included requests for funding "Development of Laboratories for Urban Problems." Cities, the introduction remarked, "have become the focus for the most acute diseases of our society—poverty, racial discrimination, crime, social disintegration and the degeneration of public education"—problems which, it was believed, reiterating a common trope, "resemble those encountered in the traditional societies of less developed countries."[8] The Institute was awarded a $3 million grant as part of the Foundation's new program on

3 We only need to mention the foundation of the Center for Urban and Regional Studies in 1957 and two years later and in collaboration with Harvard University the establishment of the Joint Center for Urban Studies to make this clear. Moreover, in October 1966, the Department of Architecture hosted a conference entitled "Inventing the Future Environment," which brought architects together with economists, political scientists, planners, philosophers, social psychologists, and "futurists." The proceedings were published as *Planning for Diversity and Choice: Possible Futures and Their Relation to the Man-Controlled Environment*, Stanford Anderson ed. (Cambridge: MIT Press, 1968).

4 See Stuart W. Leslie, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford* (New York: Columbia University Press, 1993).

5 J. William Fulbright, "The War and Its Effects: The Military-Industrial-Academic Complex," in *Super-State: Readings in the Military-Industrial Complex*, ed. Herbert I. Schiller (Urbana: University of Illinois Press, 1970), 171-178. Reprinted from *Congressional Record*,

"University Urban Studies," which replaced its "urban extension" program.[9] $800,000 of the grant was dedicated to founding the USL.

The initial aim of the USL was to develop an institutional framework and techniques of interdisciplinary coordination and to build up large urban data banks that together would facilitate collaboration and "lay the groundwork for an Institute capability for playing a significant role in large-scale, mission-oriented, action-oriented projects." Moreover, the lab would, as the Ford Foundation proposal stressed, serve to educate "individuals who combine technical competence with an interest in and understanding of urban problems"— including, as they note, "social and aesthetic parameters"—to produce "a generation of urban technologists who will have a language in common with those whose primary concerns are the political, social and economic aspects."[10] Before turning to the history and vicissitudes of the USL, and to some of the architectural and urban research that took place under its sponsorship, I want to return to Anderson's 1968 report to President Johnson, which offers further clues regarding the historical contours of this encounter and the "urban technologists" it would produce.

Participation

Summarizing recent activities in the School, which he characterized as charting a move away from "old-style professionalism" towards the "catharsis" of "direct interaction with people in their environment," Anderson identified a series of "field activities in environmental development" concerned with the "dynamics of squatter settlement in cities in the have-not countries" and, "related to," as he put it, work on race and poverty in the United States and particularly inner-city Boston.[11] In the Department of Architecture alone, as reported by Chair Donlyn Lyndon, these field activities ranged from Robert Goodman's studio work with the Lower Roxbury Community Corporation and Chester Sprague's ongoing work with Blackfeet Indians to Horacio Caminos' Ford Foundation-sponsored program in Urban Settlement Design and recently-appointed faculty member John C. Turner's work on squatter settlements in South America, as well as comparative studies of South American communities with "selected communities in Boston."[12] One might certainly question the too-easy or pseudo-morphic conflation of development issues impacting the

90th Congress, First Session, December 13, 1967, vol. 113, part 27, pages 36181-36184. Today, Fulbright explained, "Our county is becoming conditioned to permanent conflict. More and more our economy, our Government, and our universities are adapting themselves to the requirements of continuing

war—total war, limited war, and cold war," 173-174.
6 Charles L. Miller, "Urban System Laboratory," in "Report of the President and the Chancellor Issue, 1973-74," *Massachusetts Institute of Technology Bulletin* 110, no. 4 (November 1974), 122.

7 Charles L. Miller, "Urban Systems Laboratory," in "Report of the President, 1968," 489.
8 "A Proposal to the Ford Foundation for a Program in Urban Affairs at M.I.T.: Report of the Ad Hoc Faculty Committee on Urban Studies" (Cambridge: MIT, 1967), I-1. The initial list of relevant

resources began with the School of Architecture and Planning and ended with the Lincoln and Instrumentation Laboratories. "We can and do bring together the city planner, the engineer, the political scientist, the economist, the manager, the architect and artists whose combined perceptions are

Professor Donlyn Lyndon with students, Department of Architecture, MIT, n.d..

needed on urban problems," the report explained, I-3.

9 The Urban Extension program ran from 1959 to 1966. "University Urban Studies" was dedicated to establishing "long-term intellectual resources," and was avowedly a response to the "social ferment in the nation's cities." See Ford Foundation, "University Urban Studies," *Ford Foundation Annual Report 1967*, p. 35. See also Ford Foundation, "Urban Extension: A Report on Experimental Programs Assisted by the Ford Foundation" (New York: Ford Foundation, 1966).

10 "A Proposal to the Ford Foundation," I-2.

11 Anderson, "School of Architecture and Planning" (1968), 30.

12 Donlyn Lyndon, "Department of Architecture," in "Report of the President, 1968," 36.

Global South and the socio-economic inequities and environmental injustices characteristic of American inner-cities following a period of rapid urbanization and "white flight." But the urban insecurities that emerged in both domains were connected in the minds—and hence in the development theories—of the State Department, Department of Defense, and policy makers as well as institutions such as the Ford Foundation as they turned their attention to "urban affairs." Both domains were impacted by the expanding reach and transforming character of policies informing a largely US-driven capitalist globalization, and it will be precisely at this nexus of policy and concern that social scientific knowledge, managerial strategies, and technologies born of Cold War military research would come to be recognized as having strategic lessons not only for warfare and developmental aid but also for domestic security applications in the form of technologies of environmental control.

After identifying the School of Architecture and Planning's attention to questions of urban instability, Anderson remarked, "Even more interesting (and disturbing to some) is M.I.T.'s own internal environmental ferment," which he cast as a manifestation of the community's rejection of delegating decisions to experts and of people's growing desire, rather, to "participate." "It is important to recognize and to provide creative outlet for this wish," he proposed, ominously adding with reference to the protest movement: "Administrators who insist that things must continue as they always have lay their institutions open to destructive action, as has occurred in New York and Paris." If MIT had emerged relatively unscathed from the events of 1968, such attempts to offer palliative measures to the period's growing civil unrest through forms of "participation" would not succeed for long. The following year, political activism, including within the Institute's own scientific community, would increasingly focus on the Institute's role in the development of weaponry and military strategy for the war in South East Asia, and MIT would in turn become the target of such "destructive action," in a series of events to which I will return.

Anderson then identified the form those "creative outlets" had taken, describing four "otherwise unrelated events" which "manifest this new spirit in our School." According to him they shared the capacity to "short-circuit conventional modes of representing action and go directly to the production of environmental change or artifact:"

13 In Spring 1967, MIT students had, as reported by C. Ray Smith, "overnight turned one of their design studios into an instant *barriada* by subdividing it with salvage timber and concrete blocks." Supposedly outraging the administration by their rebellion, this act of taking charge was in fact quickly incorporated and neutralized. As Smith continued, "the following Fall, Donlyn Lyndon, newly appointed head of the department, gained the administration's agreement for first-, third-, and fourth-year students to involve themselves officially in subdividing, building, painting, and personalizing all their design studios as a 'Space/Use Workshop.'" C. Ray Smith, "The New Interiors: Fad or Fact?," *Progressive Architecture* 49, no. 4 (October 1968): 154. In his report as Department head, Lyndon noted of this "more direct confrontation between form and behavior," that "students who worked in the area encountered the necessity for programming construction procedures, the difficulties of resolving conflicts in neighboring designs, and the consequences of long-term use of their own design decisions. At the same time, the entire project served
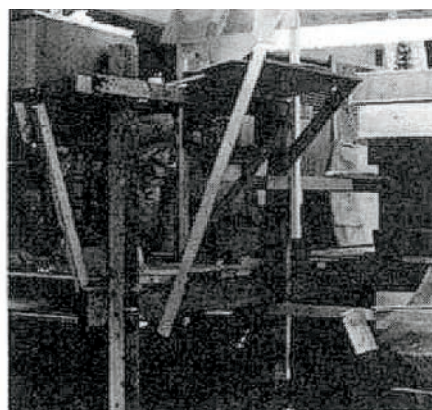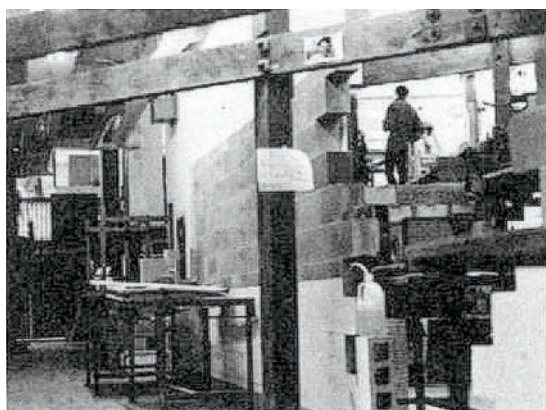
Fifth-Year Architecture Students' Studio Space, the "mezzanines." Photo: Phokion Karas.
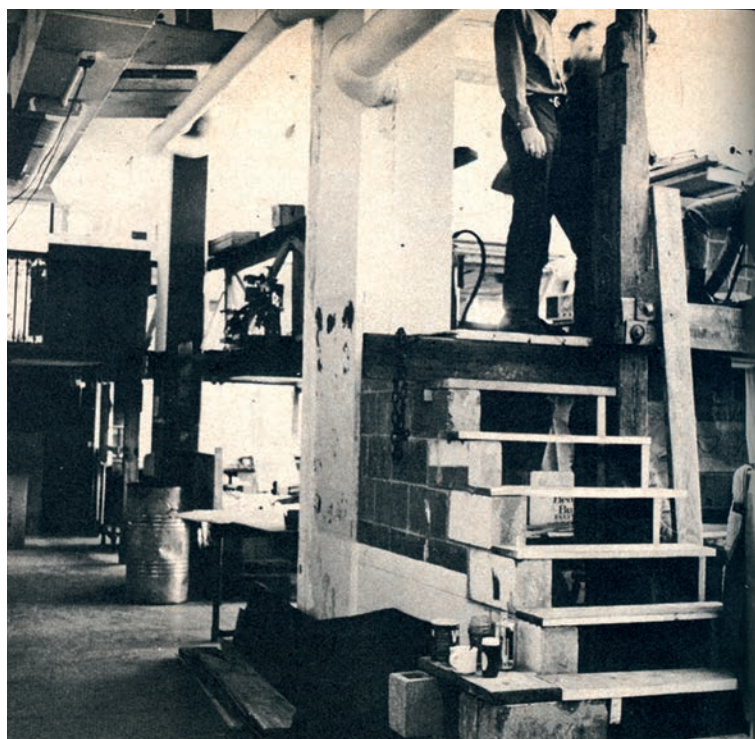
The studio "mezzanines." From Donlyn Lyndon, "MIT's Lofty Practicum," *Journal of Architectural Education*, 1968.

First is the action on the part of an extraordinarily mature and demanding group of students to force the reformation of the curricular requirements for the MCP [Masters of City Planning] degree. Second are the celebrated architectural "mezzanines," which, while trouble-making, are remarkable examples of a kind of mass will to create an environment.[13] Most public in character is the third example, the inspired commemoration of Martin Luther King, in which the design students chose to express their ideas by means of images arranged in space. Finally, I would mention the increasingly successful efforts of Professor Wayne V. Andersen, Professor György Kepes, and the Fellows of the Center for Advanced Visual Studies to intensify the experience of the visual arts by involving the viewer in direct participation, as in the events designed by Hans Haacke and Otto Piene.[14]

If each of these modes of "participation" exemplified for Anderson an engagement with indeterminate relations between a subject and their environment—whether educational or aesthetic—which demonstrated process-based transformation, and if they seemed to exhibit contemporary relevance in a moment of rapid social change, he qualified his enthusiasm by noting that within the institutional context of MIT they had a necessary limitation. "Unless supported by disinterested monitoring and evaluation," he added, "they may be too visceral in character to meet the university's standards of objectivity."[15]

Such standards, with their supposedly "disinterested monitoring and evaluation," could, Anderson went on, be found in another—to his mind "complementary"—side of the school's activities, which "spring from the promise of new methodologies for problem solving, especially those supported by memory and retrieval systems and manipulative possibilities of the computer."[16] With the computer came the potential to eclipse architecture's subjective and aesthetic parameters —to overcome the stasis and "overcodification" of "symbolic operations" burdening traditional conceptions—by adopting a feedback-based paradigm that, the Dean proposed, "assures continued relevance" in a rapidly changing world. The computer provided tools with which one could organize complex data and allowed architects to gain a "wider statement of the total problem" and "generate a richer choice of solutions." Like other professions, that is, architecture

to demonstrate alternative uses of space." Lyndon, "Department of Architecture," 34. Haacke's Hayden Gallery exhibition included early systems-based works, such as *Skyline, Wide White Flow, Weather Cube* and others. See "Haacke Exhibit Features Systems of 'grass,' 'ice'," *The Tech* 87, no. 38 (October 20,

1967): 1, 3.
14 Anderson, "School of Architecture and Planning" (1968), 31.

15 On the history of objectivity as the aspiration "to knowledge that bears no trace of the knower," see the remarkable Lorraine Daston, and Peter Galison, *Objectivity* (New York: Zone Books, 2010), 17.

16 Anderson, "School of Architecture and Planning" (1968), 31-32.

could move away from the intuitive towards the quantitative and hence toward what Anderson cast as a "rationalization" of "thinking patterns." If, as he recounted, architecture and planning had "been slower than other professions in adopting the powerful tools of computation," that trend, he confidently proclaimed, was "now in full swing." These methods were "now beginning to revolutionize environmental design," with developments in computer applications being sponsored "through participation in the newly organized Urban Systems Laboratory."[17]

Urban Affairs

In October 1968, MIT's official newsletter *Tech Talk* cast the founding of the Urban Systems Laboratory as a direct response to the period's domestic insecurity: "Civil unrest! Crisis in the cities! Scream the headlines almost daily. How to approach the seemingly insuperable problems urban life imposes these days?" Identified as "Institute's newest enterprise," the USL, they continued, "sprang into being last winter as an effort to initiate a systems approach—so effective in the space program—in alleviating some of the difficulties involved."[18] The USL was indeed central to the Institute's attempts to bring expertise developed in its engineering and social science labs, not only for the country's space program but also for its military and intelligence agencies, to bear on the domestic front. And the character of the USL's work, particularly in the fields of architecture and planning, would be very much marked by that legacy. "Much of the initial conceptual thinking about U.S.L.," Director Charles L. Miller reported to President Johnson at the end of the lab's first year, "was influenced by our experience with defense and space problem solving."[19] This transfer of skills was not, Miller explained, unique to a university setting. "Many technology-oriented companies are in the process of doing precisely what the Institute is doing, creating a mechanism whereby those skills and assets acquired working on the problems of defense and space can be transferred to the problems of cities," he remarked, pointing to a more widespread militarization of the domestic realm.[20]

In September 1969 *Progressive Architecture* published a profile on MIT's Urban Systems Laboratory entitled "In Search of Urban Expertise." Written by Associate Editor Alis D. Runge, it posed the question: "Can the university perform for the cities the same kind of

17 Ibid., 32. In his 1964 report as Dean, Pietro Belluschi stressed the need for a shift away from the artistic conception of architectural practice, noting, "It is clear that as a profession architecture has not undergone the technological revolution that has benefited other fields at M.I.T." Pietro

Belluschi, "School of Architecture and Planning," in "President's Report Issue 1963-1964," 55, 56.

18 "MITUSL??," *Tech Talk* (October 30 1968): 1.

19 Miller, "Urban Systems Laboratory" (1968), 499.
20 Ibid., 492.

research and development functions that it has so successfully performed for NASA and the Department of Defense? Can it work productively with city governments and industry to solve the difficult problems of the country's 'unmanageable' metropolitan centers? The Massachusetts Institute of Technology, for one, is setting out to prove that it can."[21] With the establishment of the USL, Runge went on to demonstrate, what constituted "urban expertise" in the university had fundamentally changed. The intimate triangulation of the military, industrial, and academic sectors was, she suggested, precisely what qualified MIT to operate at the forefront of defense against the "urban crisis": "the faculty is liberally salted with men whose careers straddle the academic-industrial consulting line," she noted, "and includes a number of returnees from Washington's advisory elite who still contribute more than their fair share to the support of Boston-Washington air routes."[22]

Runge stressed repeatedly that the USL's ambition was characterized by "urban action," or the practical application of scientific knowledge and technology. "Designating the new urban unit as a 'laboratory' rather than a 'center' was not a random choice," she explained, suggesting that the terminology "reflects the action-oriented thinking that is everywhere affecting the form of American institutions. 'We are not to be simply another center studying the city, but a group of people that are trying to do something about the problems,'" she quoted Miller as asserting.[23] Miller understood this application of academic research to mean making "technology work in the city," and he went on to characterize the goal of USL projects as the development of methodologies that would help close "an enormous gap between research—the university kind of research in particular—and the city."[24] According to Runge, albeit somewhat inaccurately, this "shift in emphasis from study to action" distinguished USL from the Joint Center for Urban Studies, which was also sponsored by the Ford Foundation and which had been founded in response to the destabilizing forces of rapid urbanization both in the US and the developing world.[25] The answer to why the Ford Foundation would fund, as Runge put it, "another urban unit in Cambridge," may indeed have lay in the instrumental nature of USL research as it attempted to bridge the (soon to be increasingly controversial) gap between basic and applied research. Miller had stressed this "action-oriented" quality when interviewed in April 1968 by MIT's student newspaper, *The Tech*, on the occasion of the lab's opening.

21 Alis D. Runge, "In Search of Urban Expertise," *Progressive Architecture* (September 1969): 125.
22 Ibid.
23 Ibid.
24 Ibid.
25 The Joint Center had of course initiated "action-oriented" research, as manifest perhaps most

famously in the development project for Guyana, Venezuela or its investment in Urban Renewal in American cities. Yet unlike USL, from which the humanities were largely banished, historical scholarship continued to play a role in Joint Center research.
26 Jay Kunin, "Urban Lab to Aid American Cities," *The Tech*

88, no. 23 (April 30, 1968): 1-2.
27 Miller, "Urban Systems Laboratory" (1968), 502.
28 Charles L. Miller, "Urban Systems Laboratory," in "Report of the President, 1969," *Massachusetts Institute of Technology Bulletin* 105, no. 3 (December 1969), 481.
29 See Jennifer Light, *From Warfare to Welfare:*

Defense Intellectuals and Urban Problems in Cold War America (Baltimore: Johns Hopkins University Press, 2003), 165.
30 Ibid., 167.
31 Miller, "Urban Systems Laboratory" (1968), 490.
32 Ibid.

As Jay Kunin reported in "Urban Lab to Aid America's Cities": "MIT's activities in urban research are somewhat unique, according to Miller. 'The style of the Institute is different,' from that of other universities. It is interested in being more than a 'city scholar, and is actually closer to being action-oriented than other schools.'"[26] Kunin recounted that Miller had moreover suggested that with its sponsorship of USL, "the main focal point of MIT's contribution to the nation is changing to solving the problems of cities," thus alluding to the conversion of military research to the domestic realm.

To understand the Ford Foundation's interest in funding the lab, we need to ask just what types of technology and scientific research were to be put to work in the city and of course for whom, and to what ends. "Urban Lab to Aid America's Cities" appeared, symptomatically, adjacent to the issue's cover story, "Columbia seized by Students." In his 1968 report Miller alluded to the prospect of the lab providing an outlet for such concerns: "Students turning to U.S.L. are particularly anxious to relate their academic study programs to real problems and issues, and they look to U.S.L. for a coupling with action in the cities."[27] The following year he pointed to the palliative nature of students' involvement: "In some ways, urban unrest and student unrest are connected. At least many students now view urban-oriented involvement as relevant and socially desirable, and their involvement in U.S.L. projects has always been high among our priorities."[28] With concern growing over the Institute's contribution to the nation's burgeoning war machine, MIT now attempted to deploy "urban action" as a conciliatory mechanism—just as the arts and humanities had previously been mobilized as a palliative to rising fears of unchecked technocracy. It is important to recall that the Ford Foundation had long been acknowledged as a CIA front for funding research, particularly in the applied social sciences; in this regard its efforts fed a national security strategy as it shifted its focus towards social engineering on the civilian front, both domestically and internationally.[29] Consequently we find the USL situated precisely at a junction of urbanism, social engineering, development, communication, and citizen participation cast as mechanisms to ensure the goal of political stability or, in cybernetic terms, political "homeostasis."[30]

Miller acknowledged that MIT already had considerable "experience in organizing interdepartmental and interdisciplinary research and project laboratories in engineering and applied science." Yet the USL was, he proposed, the first endeavor to actively script such an interaction between architecture, planning, management, the social sciences, and engineering "on a major scale."[31] The problems of "the city and urban living" were, Miller suggested of this imperative, the "broadest and most complex systems problems ever faced by the Institute," adding that "the commitment of the Institute is a long-term one, and work of U.S.L. will go on for several decades more" (it would actually close less than a decade later in 1974, as US involvement in the war in Vietnam and hence military funding subsided).[32] The Ad Hoc Faculty Committee on Urban Affairs had concluded the previous year that MIT's greatest contribution might lie in its "powerful problem-solving capabilities."

The Institute, it recalled, "has pioneered in the fields of operations research, information sciences, computer technology, and systems development," adding that "[s]trengths, resources, and interests in systems research and computer methods of problem solving exist in significant quality and quantity throughout the Institute," including the Schools of Engineering, Management, Humanities and Social Science, and Architecture and Planning.[33] As evident in the name of the lab, however, the conception of "urban" had undergone a significant transformation; the object of research was no longer the city, its history, or its inhabitants in the traditional sense but rather multiple "urban systems" pursued through analysis and modeling or simulation. Following earlier definitions, the lab's annual report for 1968 attempted to clarify just what was meant in this regard:

> The scope of urban systems is defined initially as the advancement and utilization of the methods of systems analysis, systems engineering, information systems, and related advanced capabilities and technologies applied to the planning, design, construction and management of the facilities and services required for urban living; including transportation, education, communications, environmental control, housing, health and others.[34]

This paradigm of science and technology being put to work in the service of environmental control and population management (its health, housing, educations, productivity for capitalist ends, etc.), situates us, of course, in the realm of what Michel Foucault would begin to theorize in the 1970s as biopolitical regulation.[35] With USL, that is, we find members of the academy, including architects, working to develop tools for advancing a form of governmental rationality and its micro-political techniques of power which sought to govern the body and the psyche of contemporary subjects in their everyday environments. And it is perhaps not incidental in this regard that Bedford-Stuyvesant in Brooklyn, New York, and Roxbury in Boston, both largely economically underprivileged African-American communities, soon became the objects of USL analysis, key sites for such "urban systems" research and potentially targets of its managerial tools for social and environmental control.[36] As the USL report for 1969-1970 explained, Professor Frank Jones, Associate Director of USL, was now running the "Technology, Race, and Poverty" project which was working with community organizers in Boston's South End and with the Metropolitan Applied Research Center, Inc. (MARC) in New York to "assist in a study of two urban ghettos as 'systems.'"[37]

33 Ad Hoc Committee for Urban Affairs, cited in Miller, "Urban Systems Laboratory" (1968), 490.

34 Miller, "Urban Systems Laboratory" (1968), 491. Miller initially set out this definition in January 1968 in "Some Initial Rough and Incomplete Thoughts on a Possible Form and Approach to Phase I of an M.I.T. Urban Systems Laboratory." Records of Vice President Constantine B. Simonides, 1960-1994. MIT Archives, AC 276 [hereafter AC276].

35 On biopower and biopolitics, see: Michel Foucault, "Right of Death and Power over Life," in *The History of Sexuality*, Vol. I: An Introduction, trans. Robert Hurley (New York: Random House, 1990); Michel Foucault, *Security, Territory, Population: Lectures at the Collège de France, 1977-1978*, trans. Graham Burchell (New York: Palgrave, 2007); and Michel Foucault, *The Birth of Biopolitics: Lectures at the Collège de France, 1978-1979*, trans. Graham Burchell (New York: Palgrave, 2008).

36 The archives of USL include a memo dated March 25, 1969, regarding a trip to Bedford-Stuyvesant in Brooklyn as part of this research.

37 Charles L. Miller, "Urban Systems Laboratory," "Report of the President for the

Towards the end of her account of the USL in *P/A*, Runge noted somewhat unexpectedly that "design excellence" had been "duly recognized in USL studies, proposals, and reports;" however, she clarified that "finite, individual concerns are not the province of those whose task it is to devise universal patterns of order for complex social, physical, and economic systems. Still," she concluded, indicating a certain hesitation or unease, "one hopes that, somewhere along the way to the execution of large-scale dreams, there will be someone who will plug in the right architect at the right place."[38] At stake here, in many regards, is precisely the question of what that "right architect" might look like at this moment in 1969, a moment characterized not only by increasing territorial insecurity but, and not unrelatedly, also by the expanding reach of information technology and the emergence of new, mediated forms of social and territorial organization, coupled with new techniques of management. In its contribution to the Ford Foundation proposal, the Department of Architecture suggested that under the impact of contemporary historical pressures the designer no longer had control over his product as such: "the elements that invite his manipulation are more extensive, no longer limited to the building as object," they explained of this encounter, adding that "individual buildings become part of a continuum held together by structures at a macroscale, whose complexities must become part of the designer's vision."[39] How then, we might ask, could any such architect or their vision plug in to such an expanded and increasingly less material apparatus of micro-political control, that "continuum held together by structures at a macroscale"? How could they do so from a disciplinary perspective that we would still recognize as architecture? What role, that is, did (and might) architecture play once interpolated within a systems-paradigm bent on the instrumentalization of disciplinary knowledge in the service of a paradigm of security?

Computer-Aided Design

Miller indicated that the "common denominator" of the USL's diverse activities was the computer, or "computer-based urban research."[40] "Access to an experimentally oriented computer" was, he explained, "essential to new research in urban information systems, urban simulation, and urban design as planned by many groups associated with U.S.L."[41] In 1968 those computer resources took the form of an IBM System/360, Model 67 time-sharing computer, a mainframe to which the various USL groups had access via

Academic Year 1969-1970," *Massachusetts Institute of Technology Bulletin* 106, no. 2 (September 1971), 99.

38 Runge, "In Search of Urban Expertise," 129.

39 "A Proposal to the Ford Foundation," IV-A8.

40 Miller, "Urban Systems Laboratory" (1968), 500.

41 Ibid., 501. In "Progress

Report on the Role and Utilization of Grant Support from the IBM Corporation," of January 1971, Miller reiterated this, adding the remark that "the computer is the most important research tool of the Laboratory" (4). MIT Office of the Provost, Records, 1958-1980, MIT Archives [hereafter AC7].

42 "Urban Systems Lab Installs New Computer." News Release Special to The Tech, September 23, 1968. MIT Urban Systems Laboratory Records, 1968-1974. AC 366, MIT Archives [hereafter AC366]. On the history and importance of the IBM System/360, see Paul E. Ceruzzi, *A History of

Modern Computing*, second ed. (Cambridge: MIT Press, 2003).

43 "Urban Systems Lab Installs New Computer."

44 In 1968 the USL had five associate directors. In addition to Fleisher and Lyndon were Richard L. de Neufville from the School of Engineering, Jerome

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CHAPTER II: REPLICATION                    PAGE 38


PATTERN FOR CIUDAD GUAYANA GENERATED BY DECISION RULES

                         1
         1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8
    1                            .•. .           1
    2                      •.•.•. 2 2   .        2
    3                    •.•.•. 1 1 1 .          3
    4                  •.•.•. 2 1 2 . . .        4
    5              •.•.•.•. 2•. 2 1 . . .        5
    6          •.   2 . . 1 •.•. . . . .         6
    7        •.  2 2 1 8 . 1 1 .•. . .           7
    8      •.•.•. 2 . 1 B 1 . B .•. . . 1 .      8
    9   •.•. 2 2 . . 1 1 1 . B•.•. . . .         9
   10   •. 2 2 2 2 1 1 . .•.•. . . . . .        10
   11     2 2 . . 1 2 1 . . .•. . .•.           11
   12     1 1 2 1 1 .•.•.•.•. .                  12
   13     2 2 1 2 2 .•.•.•. . .                  13
   14     2 1 2 1 2 .•.                          14
   15   . . 2 1 . .•.                            15

         1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8
                         1

LEGEND:

PRIMARY ATTRIBUTE ASSIGNMENTS - - '1' = URBANION(6); '2' =
INDUSTRY(7); '3' = CENTER(5)

'8' = 1, 3       '.' = NON EMPTY LAND


REFERENCE ATTRIBUTE ASSIGNMENTS - - '•' = RIVER(8); '-' =
CHANNEL(12); '•' = CHANNEL & RIVER; ' ' = NO REF ATTS


Figure (2.03)  Pattern generated  for Ciudad  Guayana by  the
decision rules specified in this chapter.
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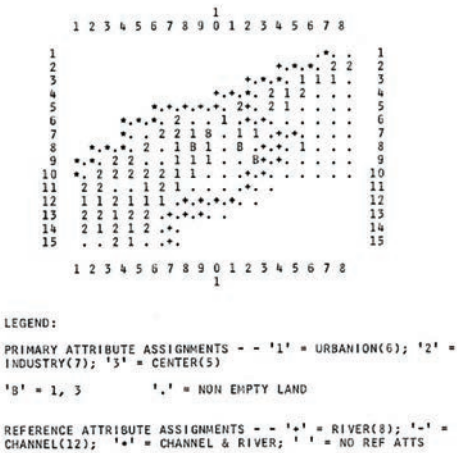
William L. Porter,
diagram of pattern
generated for Ciudad
Guayana by decision rules
of "DISCOURSE," 1969.

remote consoles. As announced in a press release, it was "operated under CP/67 and the Cambridge Monitor System, jointly developed by the M.I.T. Lincoln Laboratory and the IBM Cambridge Scientific Center."[42] At the time a highly advanced multi-user computer, with the notable capacity to simulate multiple virtual machines, the S/360-67 was configured with the then-impressive statistics of "512 K bytes of core storage, high speed drum, and 2314 disk storage."[43]

As reported by the two associate directors affiliated with the School, professors Aaron Fleisher and Donlyn Lyndon, the School of Architecture and Planning hosted a number of USL-sponsored research projects in the lab's first year.[44] Fleischer recounted that SA+P was supporting four major projects in the Department of City and Regional Planning: William Porter's computer program DISCOURSE; an "urban data system" called CHOICE which was being developed by Fleisher and his "urban data laboratory"; studies in the psychology of perception under Professors Stephen M. Carr, Mary C. Potter, and Kevin Lynch; and work on the Boston Model Cities Program, undertaken in collaboration with the Department of Political Science.[45] In

Rothenberg (Economics) and Ithiel de Sola Pool (Political Science) from the School of Humanities and Social Science, and Mason Haire from the Sloan School of Management.

45 Aaron Fleisher, cited in Miller, "Urban System Laboratory" (1968), 493. Fleischer does not cite

CHOICE by name, but it appears with this title in Urban Systems Laboratory, *Directory of Urban and Urban Related Research* (Cambridge, MA: Urban Systems Laboratory, December 15, 1968), 20.

46 Letter from Ithiel de Sola Pool to Charles L. Miller, December 18, 1967. AC 276.

An attached memorandum from Leonard J. Fein to Pool noted that the idea was to "train community people in survey research, which will help alleviate the immediate problem of data gathering." The "Situation Room" would depict program planning graphically, "to make it possible for people

with no special training to comprehend the activities of the agency." Such a connection to the Model Cities Program, Fein suggested, "would provide a major educational increment for our students (at a time when research in the inner city may otherwise become very difficult to undertake)."

a December 1967 letter to Miller, Political Science Professor Ithiel de Sola Pool identified the Boston Model Cities Program as a candidate for "one of the first investments of our Urban Systems Laboratories funds" on account of the potential value of the affiliated data bank and "situation room" to the experimental activities of the lab.[46] With the city and its population understood as components of information or cybernetic systems, computerized data banks would be crucial resources, and citizen participation the most effective means of feedback-based stabilization.[47] Formerly affiliated with Stanford's Hoover Institute (where he acted as assistant director of the Program in Revolution and the Development of International Relations), and founding chair of MIT's Political Science Department, Pool's own research and the projects, centers, and laboratories in which he participated at the Institute would exemplify precisely the Institute's focus on military and intelligence techniques and international development policy, as well as its transference of them to the domestic front in the wake of civil rights struggles. He was, for instance, a key player in the 1969 establishment of Project Cambridge within the Center for International Studies (CIS), a DARPA-funded initiative to develop computer-based applications of the behavioral and social sciences.[48] Along with USL, Project Cambridge co-sponsored DISCOURSE, Porter's previously mentioned system of data storage and retrieval of urban information in the service of environmental design.[49]

Lyndon listed three primary areas of USL-sponsored research in Architecture: "Communication in Urban Problem Solving, Computer-Aided Urban Design, and Environmental Planning for V/STOL (Vertical Short Takeoff and Landing) air transportation."[50] (V/STOL, also known as VSTOL and VTOL, was an Instrumentation Laboratory project that would soon prove highly controversial for its counter-insurgency applications.[51]) Of these three research areas, Miller repeatedly singled out developments in the area of computer-aided urban design in his reports, announcing the following year that "work on the development of an architecture machine, a special-purpose satellite device with local memory and local processing ability, capable of interacting with the Institute's large IBM machine, the 360/67, is being developed by Nicholas P. Negroponte and Léon B. Groisser with U.S.L. support."[52] Although I will return, briefly, to other USL-sponsored projects, I want to focus on this founding moment of computer-aided urban

Memorandum from Leonard J. Fein to Ithiel Pool, "Proposal for MIT Relationship to the Boston Model Cities Program," December 14, 1967. AC 276. On the Model Cities Program see Jennifer Light, "Taking Games Seriously," *Technology and Culture* 49 (April 2008): 347-375.

47 See Light, *From Warfare to Welfare*, especially chapter 6, "Cable as a Cold War Technology."
48 This appears to be an outgrowth of research entitled ADMINS Pool had previously undertaken within USL. The 1968 *Directory* lists ADMINS as an "experiment in computer methods for

handling large data files in the social sciences," and notes that it was jointly funded by the NSF, DoD, ARPA and the Center for International Studies.
49 DISCOURSE was initiated with Porter's PhD thesis under Fleischer and Kevin Lynch. The project was under the general direction

of Fleischer with Katherine Lloyd and others working on the computer system design. See William Porter, Katherine Lloyd, and Aaron Fleisher, "DISCOURSE: A Language and System of Computer-Assisted City Design," in *Emerging Methods in Environmental Design and Planning: Proceedings of The Design*

design, for it quickly becomes evident that what is at stake is not simply the development of a computer-based graphic interface for design—something like the replication of a design process from sketching to working drawings, which is where it began—but a much more thoroughgoing paradigm of data collection and management for the sake of environmental simulation in a virtual realm.

Negroponte and Groisser's research began in 1966 with URBAN 2, a project developed in collaboration with the IBM Scientific Center in Cambridge where Negroponte worked following his graduation that year from MIT's Masters of Architecture program. (Negroponte's masters thesis, "The Computer Simulation of Perception During Motion in the Urban Environment," was put forward as "an attempt at architectural research," and following his earlier interest in the question of population growth in the developing world, it forecast that a "new profession will evolve that must take the responsibility of handling the urbanization of millions and millions.")[53] URBAN 2 provided the platform for Negroponte and Groisser's inaugural MIT course in Fall 1967, "Special Problems in Computer Aided Urban Design." A course description dated January 1967 explained that students would "work towards establishing a coordinated system that aids the direct design process we usually associate with yellow tracing paper." URBAN 2 was, they explained, to be a "conversational computer system" in which the computer was conceived as "a partner in this procedure by providing a design service that monitors the process rather than optimizes or analyzes inputs."[54] Students were given a pre-scripted graphical language using a ten-foot cube building block system operating within a three-dimensional orthogonal grid. "The manipulation of cubes provides a way of simulating the urban design process," the professors explained, adding that it "furnishes a 'frictionless-vacuum' environment in which to work."[55]

Sponsored by USL and by then called URBAN 5, the application made quite an impact at the first Design Methods Group conference in Spring 1968, held in collaboration with Harvard's Graduate School of Design and MIT's Department of Civil Engineering. In his review, "Glass Box and Black Box," Jonathan Barnett declared it "the most spectacular example of blackboxmanship" at the conference, referring to the manner in which the

Methods Conference, ed. Gary T. Moore (Cambridge, MA: 1968), 92-104.

50 Lyndon cited in Miller, "Urban Systems Laboratory" (1968), 497. VSTOL was under the supervision of Edward B. Allen; Communication in Urban Problem Solving was directed by Donlyn Lyndon and Marvin Manheim. The

1968 USL *Directory* indicates that five additional projects were being conducted under USL: "Psychology of Place and Movement" by John Myer; the establishment of a "Group for Research in Environmental Design" under William Porter and Robert J. Pelletier; "Housing issues in American Indian

Communities" by Chester Sprague, focusing on the Navajos; "Building Design Issues Related to the Slope of the Ground" by Waclaw Zalewski; and, the establishment of the "Community Projects Laboratory" by Myer and Porter, focused on low income communities.

51 Dorothy Nelkin, *The University and Military Research: Moral Politics at M.I.T.* (Ithaca: Cornell University Press, 1972), 39. See also Committee on War-Related Research, "A Summary of War-Related Research at Draper Lab." AC276. A Special Review Panel, as reported in *Time*,

application retained a conventional approach to design, simply augmenting it through new tools. ("Glass box" approaches, by contrast, were more design methods-oriented and sought transparence through a rationalization of analytical techniques.) Barnett pointed, in particular, to the device's inherent drive toward a conciliatory process, noting that it "provides a sophisticated and flexible format which actually adjusts to the idiosyncracies [sic] of an individual designer." As he recounted, "Films, shown with three projectors, documented a novice's first encounter with URBAN 5, which is programmed to make kindly comments like: 'I'm afraid you have a conflict here, Ted,' (the user types in his name when he sits down at the console) or 'Ted, how long are you going to postpone resolving this conflict?'"[56] Here indeed, as Lyndon suggested of the project's ambition in his 1968 report as department chair, was "a new order of designer-machine interaction."[57]

URBAN 5 was designed, as the team explained at the conference, to be a monitoring device or "eavesdropping mechanism" that tried to eradicate conflicts by steering the architect towards a set of pre-determined normative parameters while learning from interaction with the human.[58] A few years later, Negroponte recalled that he had initially understood the computer's role as "checking for violations in constraints and criteria" which had been predetermined by the architect.[59] This modality of conversing with the computer might give us pause, as it seems not unrelated to the architects' desire to furnish a "'frictionless-vacuum' environment in which to work." For while they saw themselves as simply setting up a "launching vehicle" or "research toy" with which to test rather banal architectural parameters (number of bedrooms, structural feasibility, etc), this experimental mode of simulating environments without the "friction" of the real world (which they likened to laboratory experiments in Newtonian mechanics) would be responsible, it seems, for the high level of abstraction that came to characterize their environments.[60] In other words, the underlying technical logic of such systems could translate all too easily into a paradigm in which historical and political valences were simply swept aside in favor of a smoothly functioning apparatus—whether architectural, administrative, political, etc. That is to say, to eliminate conflict or "friction" is to close down spaces of contestatory negotiation.

"split sharply over the I-lab's work on Vertical Takeoff and Landing (VTOL) aircraft. The majority defended it on the grounds that VTOLs could be used to speed civilian intercity transit. . . By contrast, antiwar guru Noam Chomsky vehemently argued that VTOLs would be used mainly for 'repressing domestic insurgency in countries subject to our influence or control.'" "Universities: M.I.T. and the Pentagon," *Time* (Friday November 7 1969). **52** Miller, "Urban Systems Laboratory" (1969), 480-481. Negroponte described this time-sharing modality as follows: "More recently, real-time computation depending upon 'time-sharing' techniques allows the user a prompt machine response and permits terminals (usually teletypes) to reside in the office or at home. These terminals are connected to the large central machine, and they can be interconnected with each other. The rapid switching of users' programs in and out of the large machine provides each user with the illusion of a dedicated machine and permits him continual use of his terminal." Nicholas Negroponte, "Toward a Humanism Through Machines," *Architectural Design* 39 (September 1968): 512.

Architecture Machine Group, Interface for URBAN 5, with an IBM 2250, model 1 monitor, and scope connected to an IBM system 360/67, 1968.

53 Nicholas Negroponte, "The Computer Simulation of Perception During Motion in the Urban Environment" (Masters Thesis, Massachusetts Institute of Technology, 1966), 1 and preface, respectively. Describing this new mode of research, he wrote, "There are not accompanying plans, sections, elevations, or models. The research has compelled me to become more involved with the university and delve into other disciplines, some of them rarely associated with architecture," 1. Negroponte later recalled: "I was a student at MIT, and a student at MIT has a hard time avoiding exposure to computer sciences. No exception, I confronted an introductory course taught by Daniel Bobrow, a doctoral student at the time and one of the early contributors to artificial intelligence. As a result of this experience I embarked on a Master's of Architecture thesis on the simulation of perception, a mixture of eye movement modeling and perspective transformations. Following a controversial graduation I joined the IBM Cambridge Scientific Center under Norman Rasmussen with the vague charter of developing an application (with their 2250 display, in particular) that had something

Artificial Intelligence

Lawrence Anderson noted in his 1968 report as Dean that "The Architecture Machine is a phantom in the minds of Professors Léon B. Groisser and Nicholas P. Negroponte that is becoming concrete with disconcerting haste."[61] By 1969, as reported in "The Search for Urban Expertise," work on URBAN 5 had in fact been declared complete and a "second generation of studies [was] underway." As Runge explained:

> One of the more interesting—though least practical—groups of projects under the leadership of Architecture Professor Nicholas Negroponte, is searching for nothing less than artificial design intelligence. The "architecture machine," as it is called, is to be a "moral" animal and a design partner to the architect, capable of carrying on a man-machine dialog in the manner of an associate having "the potential for self-improvement."[62]

Now formalized as The Architecture Machine Group and with their research sponsored by the Ford Foundation and Interdata via USL (sponsorship which would later be supplemented by ARPA, the Air Force, Office of Naval Research, and others), Negroponte, Groisser, and their students had, under the impact of Marvin Minsky, Oliver Selfridge, and Seymour Papert (all leaders in the field of artificial intelligence), turned to questions of artificial intelligence that might be pertinent to design. The group's focus, Miller reported that same year, was now on "the problem of interfacing, both between computer and man, and computer and real world."[63] Artificial intelligence, or what Negroponte referred to as "ultra-intelligence in computers,"[64] was approached by breaking the design problem—understood as a process of monitoring and representing the environment—into systematic components: machine vision, sketch recognition, interfaces with the non-professional, computer graphics, tactile sensors and effectors, low-resolution interfacing, and three-dimensional input-output. If the ambition was to create "more flexible and more responsive" computer programs, what emerged was a mode of interface that, as it turned out, required the extensive acquisition and processing of ever more detailed information of both that "man" and his "real world;" such an interface also heralded an ever more extensive integration of this satellite computing facility into the larger administrative system or military-industrial-academic complex. Even after collecting environmental data, the

to do with architecture." Nicholas Negroponte, ed., *Computer Aids to Design and Architecture* (New York: Mason and Lipscome, 1975), 8.

54 Nicholas Negroponte and Léon Groisser, *URBAN 2* (Cambridge: IBM Scientific Center, 1967). Emphasis in original. As they explained here, "The computer's

role would be to receive information (restraints and graphical input), to monitor procedural interactions (conflicts an incompatibilities) and to display the graphical manipulation." Noting also, "Work will be carried out on an IBM 2250 (Model 1) display system with the support of a 360 Model 40 or 65. The

system is designed and implemented using Fortran IV to call IBM's second edition of GPAK, a series of subroutines that permit attention handling, display management and modeling."

55 Negroponte and Groisser, *Urban 2*, np.

56 Jonathan Barnett, "Glass Box and Black Box,"

Architectural Record 144 (July 1968): 127. See also: Nicholas Negroponte and Léon B. Groisser, "URBAN5," *Ekistics* 24, no. 142 (September 1967): 289-291; Nicholas Negroponte and Léon B. Groisser, "URBAN5: an on-line urban design partner," in IBM Report, 320-2012 (IBM, 1967); and, Nicholas

frictionless vacuum does not seem to have been replaced by socio-historical material so much as by other applications.

Under the subtitle "Computers in Search of Identity," Runge offered a succinct description of new research then underway as part of this shift towards questions of artificial intelligence. These were to be described in further detail in Negroponte's 1970 book-length account of the early research, *The Architecture Machine.* "A computerized robot, GROPE," Runge begins,

> is a toy tank with photoelectric eyes that are being trained to search out "interesting" places (points of greatest diversity) on urban maps, and may someday lead to a mechanical design partner that can seek out information about the real world without human supervision; SEE is a computerized television camera that studies various groupings of 2" x 2" blocks (representing urban-scale modules), and then devises its own configurations. A program is being developed for a computer that can interview people about their urban environment, the ultimate goal being to hook into the public phone system. Negroponte sees this as an important step towards universal advocacy: "the design of the city can start to reflect every single inhabitant—his needs and desires. This may seem completely ludicrous, but I don't think it is."[65]

Negroponte's step towards universal advocacy was illustrated by an image of an African-American man at a typewriter-like device. The caption reads: "Ghetto resident talks to computer about slum environment via typewriter computer terminal: Another of Architecture Professor Nicholas Negroponte's artificial intelligence projects."[66] As revealed the same month (September 1969) in a special issue of the British magazine *Architectural Design* dedicated to the discipline's interface with contemporary sciences—cybernetics, operations research, etc.—this project was titled INTERACT.

Edited by Royston Landau, the special issue of *AD* featured "Experiments in Computer Aided Design: Report from the Department of Architecture" at MIT. Along with a report on "Space Arrangement" research led by Tim Johnson, it covered the research then being

Negroponte, "URBAN5: An Experimental Urban Design Partner," in *Computer Graphics in Architecture and Design*, ed. Murray Milne (New Haven: Yale School of Architecture, 1968).
57 Lyndon, "Department of Architecture" (1968), 497.

58 Nicholas Negroponte and Léon Groisser, "URBAN 5: A Machine That Discusses Urban Design," in *Emerging Methods in Environmental Design and Planning: Proceedings of The Design Methods Conference*, ed. Gary T. Moore (Cambridge, MA: 1968), 112.

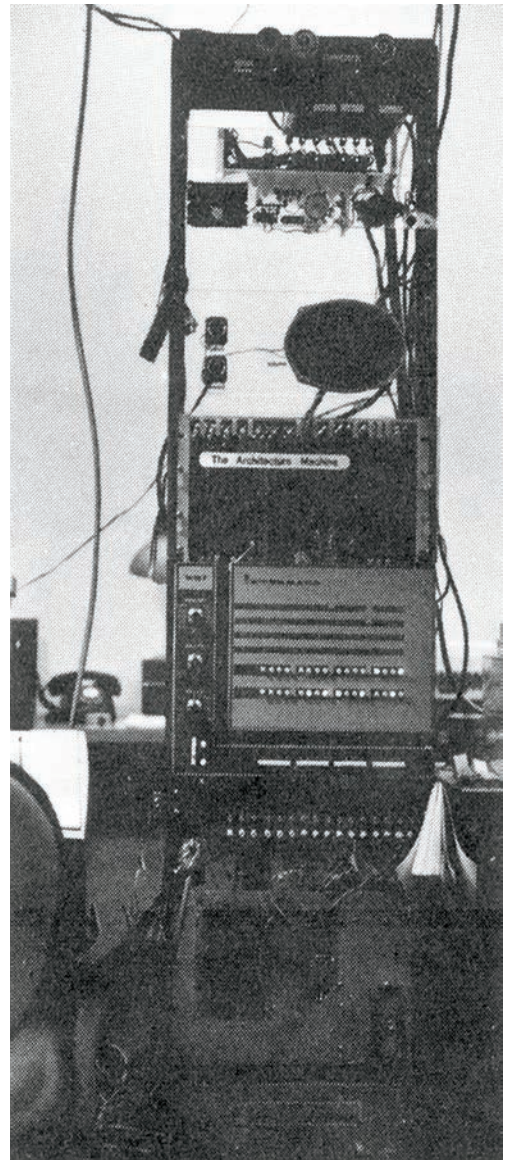**59** Negroponte, *Computer Aids to Design and Architecture*, 8.
60 Negroponte and Groisser, "URBAN 5: A Machine That Discusses Urban Design," 105-114.
61 Anderson, "School of Architecture and Planning" (1969), 34.

62 Runge, "In Search of Urban Expertise," 128. In a 1971 application to the NSF, the Arc Mac group explained: "The academic year of 1968-1969 saw a dramatic transition of our basic attitude. Rather than cramming descriptions of the real world into the machine,

sponsored by USL, including Porter's DISCOURSE and John Boorn's CHOICE, as well as the Architecture Machine Group's GROPE, SEE (soon to be called, more ominously, SEEK), and INTERACT. The introductory description proposed that machines, "and automation in general," might provide some of the "omitted and difficult-to-acquire information" needed for good design, as had been previously provided by human-architects. But it stressed that some information might still be missing. "Consequently, the Architecture Machine Group at MIT, are embarking on the construction of a machine that can work with missing information," one which could understand human metaphors, "solicit information on its own," "talk to a wide variety of people," acquire experience and be intelligent.[67] The brief prospectus was followed by a reprint of Negroponte's "Towards a Humanism Through Machines," in which the professor further described the desired process of mutual evolutionary exchange as an "acquaintanceship of two intelligent systems, the architect and the Architecture Machine," a relationship that would not take the form of master/slave but rather that "of two associates which each have the potential for self-improvement." Computer-aided design, he stressed,

Architecture Machine configuration, with Interdata Model 3 computer along with expanded memory, sound output, and high speed paper tape reader and housed in a chassis for expansion, September 1969.
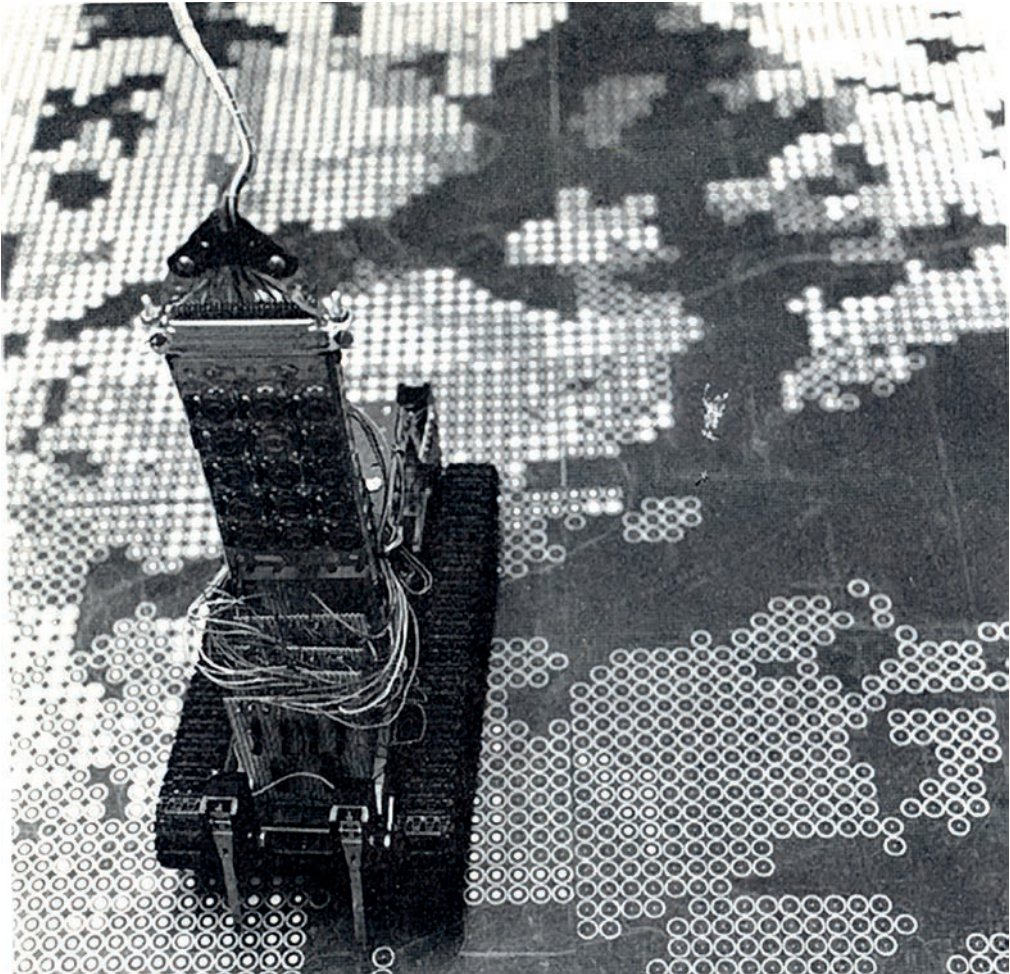
we began to emphasize providing machines with interfaces to that world." They also note the importance of the founding of USL and the Ford Foundation grant that was "able to sponsor a series of experiments in linguistics, self-organizing controllers, and machine vision." Nicholas Negroponte and Léon Groisser, "Computer Aids to Participatory Architecture," (Cambridge, MA: MIT, 1971), 59-61.

63 Charles Miller, "Urban System Laboratory," in "Report of the President for the Academic Year 1969-1970," *Massachusetts Institute of Technology Bulletin* 106, no. 2 (September 1971), 101.

Architecture Machine Group (Steven Gregory), GROPE, 1969. Shown seeking out "interesting things" on Richard Saul Wurman and Joseph R. Passonneau's 1966 Urban Atlas of New York with population density data.

64 Negroponte, C*omputer Aids*, 10.

65 Runge, "In Search of Urban Expertise," 129. As she presciently concluded of Arc Mac: "if, as prognosticators of the future tell us, the day is coming when every man will have a computer terminal in his office and/or home, such efforts are building tools that may one day be accessible to all architects."

66 Runge, "In Search of Urban Expertise," 126.
67 Negroponte, "The Architecture Machine" in "Experiments in Computer Aided Design," *Architectural Design* 39, no. 9 (September 1969): 510.

68 Negroponte, "Toward a Humanism Through Machines," 511. This had previously appeared in the April 1969 issue of *Technology Review*.

distinguishing his group's work from simple processes of computerization, would not leave either party untouched, since, as he put it, it "concerns an ecology of mutual design complementation, augmentation, and substitution."[68]

Negroponte returned to questions of "responsiveness" and "participation" in "Concerning Responsive Architecture," his concluding remarks for "The Shirt-Sleeve Session in Responsive Housebuilding Technologies," a conference held at MIT in May 1972 and published as *The Responsive House*.[69] He began by noting that there were many forms of responsiveness: there was "a responsive design technology that people are talking about— participation, advocacy planning," responsive building technology, and, finally, what he was dreaming of, "responsive architecture itself." The latter, he clarified, entailed "the removal of all middlemen," including architects. To explain what he meant he recalled having recently attended a conference in England on "design participation," in which he witnessed two primary orientations—the design methodologists and the "'Advocacy Planner' types."[70] The former sought information from social sciences: "We want the psychologists, sociologists, and anthropologists to tell us more about what people want. We want people to fill out more questionnaires. We want to know more so we can design better buildings," Negroponte ventriloquized. The latter, he went on, had taken on an activist role, which he characterized as saying: "We're going to get people heard. We're going to help them to affect the design of their environments." Both, Negroponte assessed, were paternalistic, a category in which he now included his initial response with URBAN 5.[71] His new solution: "a physical environment which has knowledge about you." This was an idea then being provisionally tested on the lab's door with a device entitled GREET, which was designed to recognize people using an apparatus he termed, invoking cybernetician Gordon Pask, a "you-sensor." But as with URBAN 5 this was only the first step: Negroponte was ultimately seeking an environment that, as he posited, could have the same predictive ability— with respect to his needs, desires, intentionality—as his wife. It was not surprising, he speculated, that people remained suspicious of the idea of such responsive environments, given the paucity of extant examples: "Unfortunately, examples such as floors that can tell how many people are walking on them, and doors that can recognize people, usually end up driving second-rate light shows, or doing very banal things in directing the

69 Nicholas Negroponte, "Concerning Responsive Architecture," in *The Responsive House*, ed. Edward Allen (Cambridge: MIT Press, 1974), 302-307.

70 Negroponte appears to be referring to the Design Research Society's conference "Design Participation," which took place in Manchester in September 1971. His contribution to this conference extended his remarks in "Concerning Responsive Architecture."

See Nicholas Negroponte, "Aspects of Living in an Architecture Machine," in *Design Participation*, ed. Nigel Cross (London: Academy Editions, 1972), 63-67. He later expands on these ideas in Nicholas Negroponte, *Soft Architecture Machines* (Cambridge: MIT Press, 1975).

71 Negroponte, "Concerning Responsive Architecture," 303.
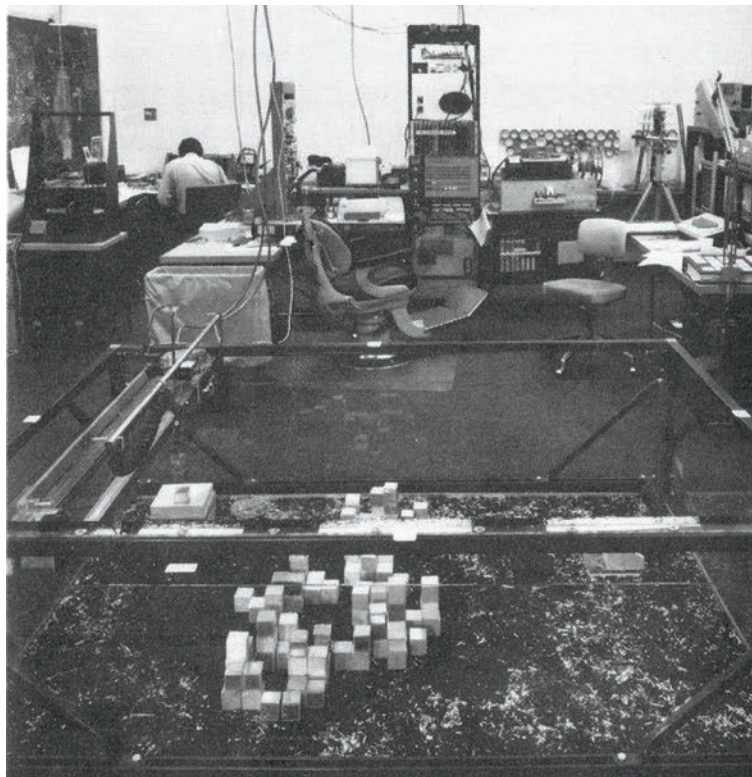
Architecture Machine Group, SEEK (earlier called SEE), 1969.
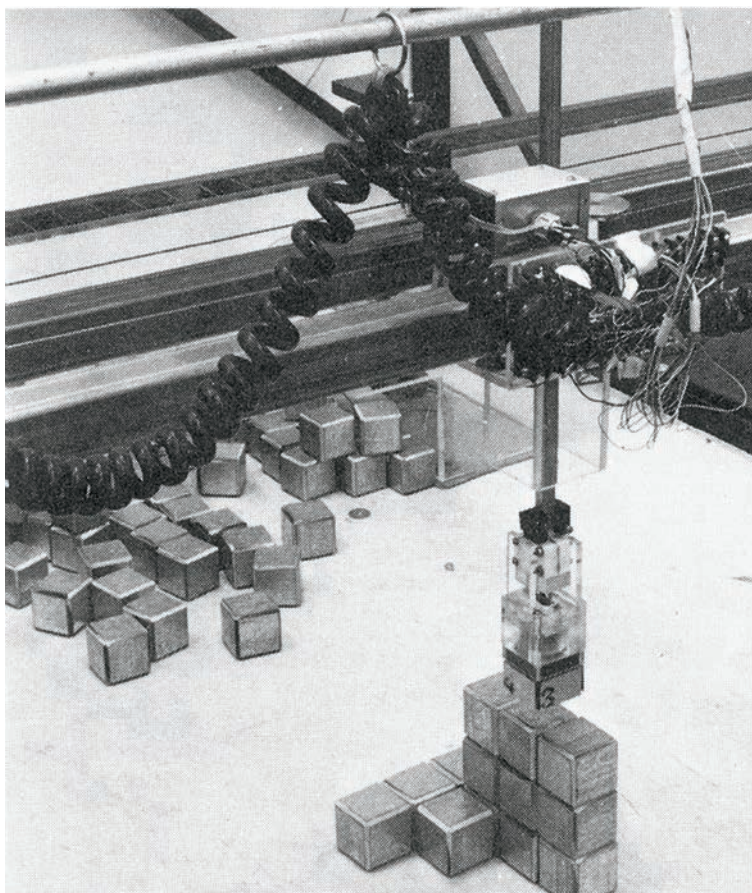
physical environment." The one "genuine architectural response" he could point to was Sean Wellesley-Miller's "design of a . . . sculpture exhibit which counts the number of people that go into it and come out of it, and inflates or deflates additional sections of the building, depending on how many people are in the exhibit." (Wellesley-Miller was part of Evenstructure Research Group, cofounded with Jeffrey Shaw and Theo Botschuijver.) Preempting contemporary personal data tracking applications, Negroponte concluded by pointing to paradigms of operational response that were more convincing, even if not yet realized in the architectural domain—what he called "lots of little applications of a surrogate 'me.'" "I hate reading newspapers and looking at news on the television," he explained, "but I would love to have some sort of device which knew me well enough to synopsize the news each night, and tells me if there happens to be something interesting on television today or tomorrow, without having to read TV Guide."[72]

INTERACT

With Arc Mac's INTERACT, and the group's work on interfacing with the "non-professional," we find ourselves at the crux of research operating at the nexus of "urban crisis," computers, and social sciences fostered by USL. INTERACT, as reported in AD, "faces the problem of soliciting information about the environment, about needs and desires, from the inhabitants themselves." The little-documented project's primary researcher was Richard Hessdorfer, who had just graduated from MIT's architecture program and was now developing this "'consumer' item that could initiate a dialog with inhabitants, build a model of [their] needs and desires (particular to the speaker) and report back to Architecture Machines." As the brief account in AD recalled, the experiment involved taking a "teletype writing device" into the South End, described here as "Boston's ghetto area."

> Three inhabitants of the neighborhood were asked to converse with this machine about their local environment. Though the conversation was hampered by the necessity to type English sentences, the chat was smooth enough to reveal two important results. First, the three user-inhabitants said things to this machine they would probably not have said to a human, particularly a white planner or politician: to them the machine was not black, was not white, and surely had no prejudices. Second, the three residents had no qualms or suspicions about talking with a machine (in English about personal desires); they did not type uncalled for remarks, instead they immediately entered a discourse about slum landlords, highways, schools and the like.[73]

Although not revealed initially, the "user-inhabitants" were Maurice Jones, Barry Adams, and Robert Quarles, the latter wearing a "tenant power" badge.[74] In July of 1969, Negroponte included a further description in the inaugural issue of the School's new publication, Research. INTERACT, he explained,

is a project that explores natural language communication between actual users (users-to-be) of a physical environment and machine "advocacy planners." The romantic notion of people designing their own houses, their own cities, their own physical environments (all within rapid change and growth) is the underlying goal. . . At present the system exhibits a very false intelligence and is primarily a wordy conversationalist. However, the goal is to build a model of the speaker's needs and desires and to provide a mirror of his requirements and aspirations (and to get to know him).[75]

Negroponte's suggestion that the system of data extraction still exhibited a "false intelligence," that it remained a "wordy conversationalist," was perhaps a reference to a conceit at the heart of this project. As revealed parenthetically in *AD*: "The reader should know, as the three users did not, that this experiment was conducted over telephone lines with teletypes, with a human at the other end not a machine. The same experiment will be rerun shortly—this time with a machine at the other end of the telephone line." When in 1973 he mentioned the project in his contribution to "La Ville Totale," which appeared alongside projects by Kenzo Tange, R. Buckminster Fuller, and Yona Friedman in *2000: revue de l'amanégement du territoire*, Negroponte revealed that the humans on the other end of the telephone line were architects.[76]

Negroponte's remarks on user-participation and advocacy planning also remind us of the degree to which Arc Mac's ambitions remained indebted to the work of the Metabolists and le Groupe d'Etude d'Architecture Mobile, particularly Yona Friedman. Following their initial meeting in 1964—when Negroponte, who could speak French, was sent to the airport to pick up the Paris-based visiting lecturer—Friedman's "une cite spaciale" became a key reference in Negroponte's undergraduate thesis of 1966, "Systems of Urban Growth," and Friedman would become a long-standing collaborator with the Arc Mac group.[77] The three-dimensional matrix which structured Friedman's spatial city would be reiterated initially as a mechanical framework in Negroponte's "Mova-grid," adapted from the Metabolists. The grid, he explained in that context, "merely defines points in space that in turn describe potential volumes," within which components were jacked into place. But that matrix can also be read in the cubes of URBAN 5 and other systems-based environments that

72 Ibid., 305.
73 "Experiments in Computer Aided Design," 513.
74 Nicholas Negroponte, The Architecture Machine: *Toward a More Human Environment* (Cambridge, MA: MIT Press, 1970), 56.

75 Nicholas Negroponte, "Five Experiments Toward an Architecture Machine," *Research* 1, no. 1 (July 10 1969), 1.

76 "La Ville Totale," *2000: revue de l'aménagement du territoire* (1973): v.

77 Nicholas Negroponte, "Systems of Urban Growth" (Bachelors Thesis, Massachusetts Institute of Technology, 1965). A key "point of reference," as Negroponte explained, rehearsing the period's panic over population growth, was the question of populations, "generating

Negroponte built in that seemingly frictionless vacuum of the virtual realm; these formal similarities suggest the degree to which the research uncannily harbored the memory of the period's experimental practice while taking it in a very different direction. Referring to Moshe Safdie's famous housing megastructure for Expo 67 in Montreal, Negroponte later acknowledged that URBAN 5 had in fact "mimicked the additive genre of composition, popular in school at the time and epitomized in Habitat. It did this comprehensively, smoothly, and expensively."[78] Moreover, he acknowledged that this desired shift to an advocacy-model of user-participation via the automation of artificial intelligence, and with it the eradication of the architect from the equation, "has received the serious attention only of Yona Friedman, in Paris, France." [79] But Negroponte's ambitions were distinctly out of sync with the utopian ideals or visions of the more liberatory environment motivating much experimental practice of this period. Introducing the English translation of Friedman's *Toward a Scientific Architecture* (also of 1975), Negroponte alluded to the "paradoxical intersection of two academic streams—participatory design and scientific methods—too frequently held apart by the circumstances of our training," implying however that his own position was somewhat closer to the "scientific" side of this conflict. As he put it, "Yona Friedman has used a mathematical scaffolding to support philosophical positions in a manner which affords the reader the opportunity to disagree with his utopian posture, but still benefit from his techniques."[80] That year, Friedman acted as a consultant to Arc Mac on a project entitled "Architecture by Yourself." Very much indebted to Friedman's Flatwriter project, the application even adopted his name, YONA.

By 1975, however, as Negroponte must have been aware, the logic of participation and the logic informing the feedback-based process of scientific methods were hardly so opposed. To reiterate, any avowedly idealistic goal of user-controlled systems of organization was easily transposed into a form of participation in which an ever more precise constellation of data or information about the human subject—their needs and desires—would be extracted and fed back into an intelligent machine. Indeed, this very logic had perhaps been the most evident lesson of the Architecture Machine Group's contribution to "Software: Information Technology, its New Meaning for Art," a famous exhibition of conceptual art held at the Jewish Museum in New York in 1970. "Software," as curator Jack Burnham explained,

a study of how populations live, what populations want, and primarily, how populations expand" (Preface), The Architecture Machine Group explicitly drew upon Friedman's graph theory design methods, as set out in *Towards a Scientific Architecture*, in developing "Architecture by Yourself," even

calling the related application YONA. Friedman would be referred to as a consultant to the Arc Mac group on the front of a paper also titled "Architecture by Yourself" and dated October 1975. See: Guy Weinzapfel, "Report on Yona Friedman's Visit," *Architecture Machinations* 1, no. 9 (November 16, 1975): 2-5;
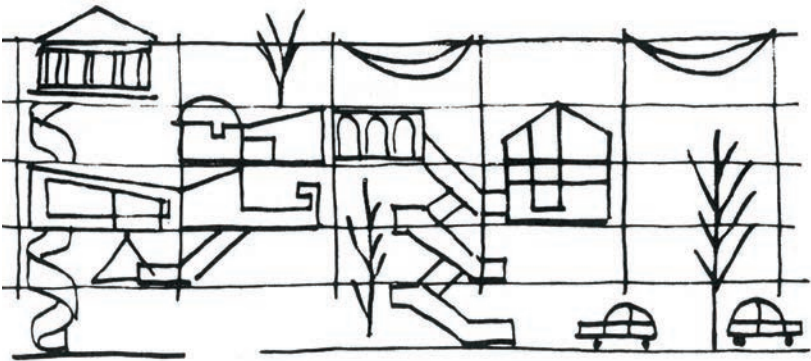
Guy Weinzapfel, "Architecture by Yourself," *Architecture Machinations* 2, no. 21 (May 23, 1976): 5-9; and Yona Friedman, *Toward a Scientific Architecture* (Cambridge, MA: MIT Press, 1975), with introduction by Negroponte.

78 Negroponte, *Computer Aids*, 8.
79 Ibid, 10.
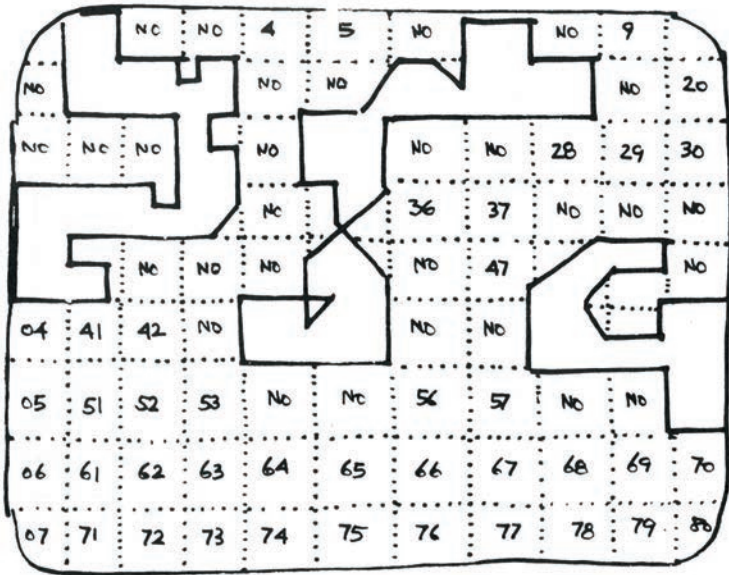
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Yona Friedman,
Flatwriter, 1969.

responded to "life in a computerized environment," aiming to demonstrate "the effects of contemporary control and communication techniques in the hands of artists." Research work in Negroponte's experimental laboratory had little in common with the critical artistic and institutional questions driving conceptual art practices at the time. Nevertheless, it shared the exhibition's focus on systems- and process-based work engaging communications and cybernetics paradigms through which individuals might interact with one another and with their environment.

Other contributors included CAVS alumni Hans Haacke, along with Sonia Sheridan, Vito Acconci, Les Levine, Allan Kaprow, Lawrence Weiner, and others. Haacke, for instance, presented *Visitors' Profile* and *News*, the former collecting, tabulating, and outputting data on visitors who interacted with the installation, the latter an active teletype print-out of national and foreign news services. Levine installed *Systems Burn-off x Residual Software*, a work comprised of photographs from the equally famous "Earth Works" exhibition the year before in Ithaca and speaking to the informatic residuals transmitted through media, along with *A.I.R.*—live feed from the artist's studio—and *Wire Tap*, speakers broadcasting his telephone conversations. In this context Negroponte presented Seek, configured as a servomechanism connected to the Architecture Machine and designed to "handle local unexpected events" occurring within an environment comprised of two-

Architecture Machine Group, SEEK, 1969. Installed at "Software: Information Technology: Its New Meaning for Art," Jewish Museum, New York, 1970.

inch cubes that served as the habitat for a colony of gerbils. As he explained it, Seek attempted to "go beyond the real world situation, where machines cannot respond to the unpredictable nature of people (gerbils). Today machines are poor at handling sudden changes in context in environment. This lack of adaptability is the problem Seek confronts in diminutive."[81]

Offered as an exercise in the benefits of artificial intelligence, one in which the computer-architect had replaced the human-architect (who was no longer able to deal with the complexity of their environment), Seek was meant to demonstrate, in miniature, optimized relations between humans, their actions, and their new computerized or virtual milieu. The ten-foot blocks had returned as five hundred two-inch cubes to be tested in a five-by-seven-foot "real world" situation that was perhaps best understood as a simulation of environmental control. Negroponte's intelligent machine would read the "desires" of the animals as registered by their random displacement of blocks, and then the computer-controlled prosthetic device would straighten the blocks in the new locations. The outcome, he wrote, was "a constantly changing architecture that reflected the way the little animals used the place."[82] That is, the computer was supposed to learn to read indeterminate actions and the fluidity of the environment as possessing underlying meanings and then operate to re-calibrate its organization of the blocks according to this newly detected set of parameters. Within this pernicious circuit, it was precisely via interaction with their environment that the gerbil facilitated the computer's learning process and hence ceded his control over the transformation of his environment to the Architecture Machine. Negroponte later conceded that at the time of the show the technology was not yet sophisticated enough for the Architecture Machine to actually learn in an "evolutionary sense"; it merely evaluated probabilities.[83] However, his attempts to produce such an environmental mechanism render the gerbils a perfect allegory of the potential evacuation of agency, and of space for political negotiation, at the hands of cybernetic machines, as had initially been modeled by INTERACT.

80 Negroponte forward to Friedman, *Toward a Scientific Architecture*, ix.

81 Nicholas Negroponte in Jack Burnham, *Software. Information Technology: Its New Meaning for Art* (New York: Jewish Museum, 1970), 23.

Architecture Machine Group, SEEK, 1969. Installed at "Software: Information Technology: Its New Meaning for Art," Jewish Museum, New York, 1970.
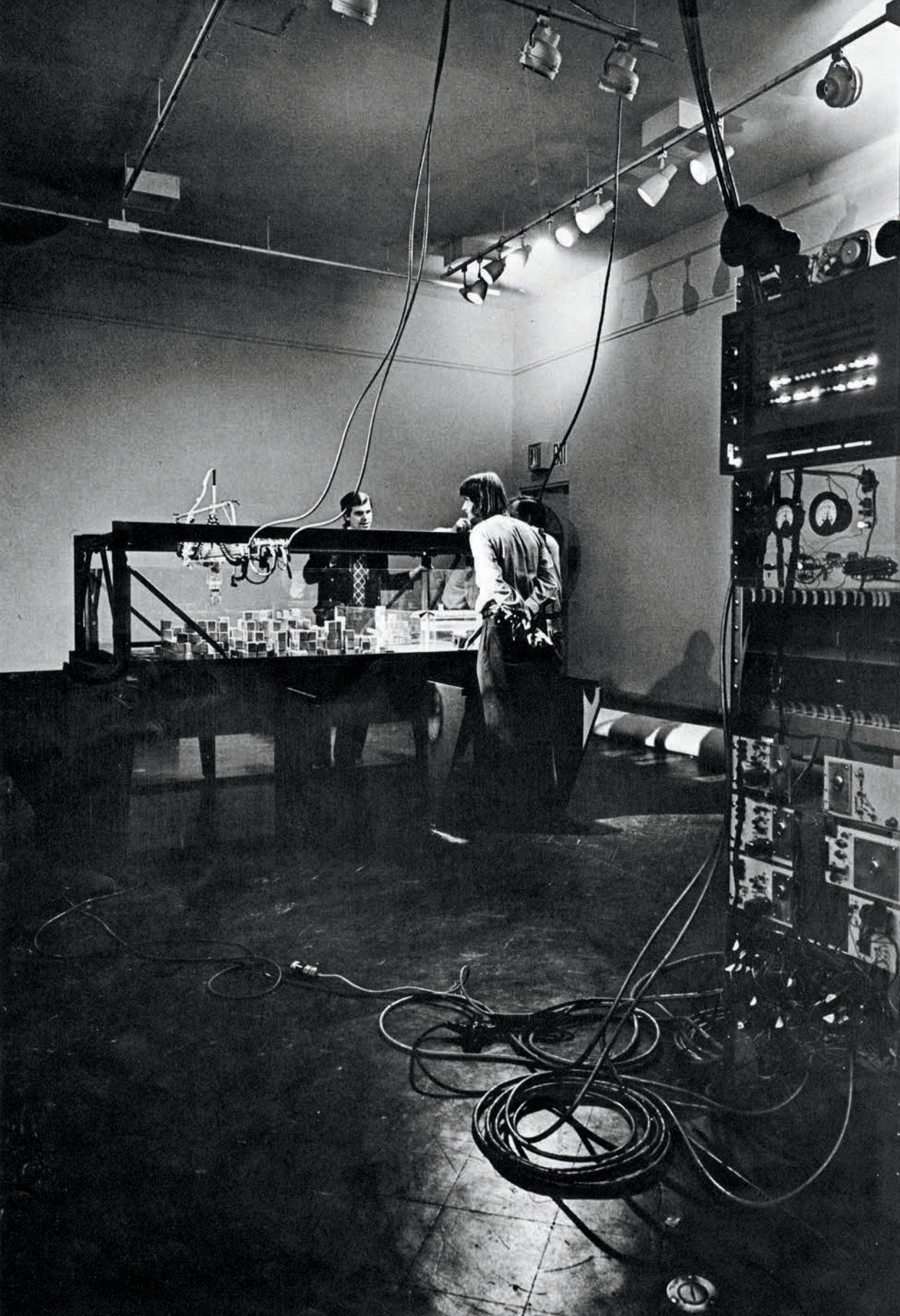
When Negroponte described INTERACT in *The Architecture Machine*, he added the somewhat troubling suggestion that

> with these domestic (domesticated) machines, the design task becomes one of blending the preferences of the individual with those of the group. Machines would monitor the propensity for change of the body politic. Large central processors, parent machines of some sort, could interpolate and extrapolate the local commonalities by overviewing a large population of "consumer machines."[84]

The formulation of such a surveillance device, connected, as the group imagined, through the telephone system and avowedly dedicated to a normative ideal—"blending the preferences of the individual with those of the group"—is certainly enough to make one nervous. Negroponte attempted to defer such a reaction by pointing to the machine's capacity to make ever more fine-grained distinctions among subjects, but in so doing he may have instead revealed the project's disturbing proximity to domestic security applications. "What will remove these machines from a 'Brave New World,"' he remarked,

> is that they will be able to (and must) search for the exception (in desire or need), the one in a million. In other words, when the generalization matches the local desire, our omnipresent machines will not be excited. It is when the particular varies from the group preferences that our machine will react, not to thwart it but to service it.[85]

What sort of decisions, we might well ask, would such a computer, even an architecture machine programmed to be an "ethical robot," really help you to make even if you believed that it was doing so on your own behalf? How, exactly, might they service your desires?

The ArcMac group returned to the question of "interfacing with the non-professional" in "Computer Aids to Participatory Architecture," a 1971 proposal submitted to the National Science Foundation for research to be undertaken with the USL. The document concluded with Seek, including both the page from *Software* and details on the six operations through which the software could control the hardware—Generate, Degenerate, Fix it, Straighten,

Architecture Machine configuration, 1970.

82 Negroponte, *Soft Architecture Machines*, 47. See also Nicholas Negroponte, "Semantics of Architecture Machines," *Architectural Forum* 133, no. 3 (October 1970), in which he notes, "Unknown to SEEK, the little animals are bumping into blocks, disrupting constructions, and toppling towers. The result is a substantial and continually changing mismatch between the three-dimensional reality and the computer remembrances residing in the core memory. SEEK's role is to deal with these inconsistencies" (40).

83 Negroponte, "Aspects of Living in an Architecture Machine," 67.
84 Negroponte, *The Architecture Machine*, 57.
85 Ibid., 57.

Find, Error Detect. The project abstract, published in the 1971 *USL Directory of Urban and Urban Related Research at MIT*, pointed directly to the task of data extraction, noting that "the outcome of a scenario with the system would be not so much an 'instant' house plan as it would be a model of the user, i.e., his needs and desires."[86] In the NSF proposal the group even went so far as to clarify that here technology would replace politics: "we are not proposing to do computer-aided advocacy planning. We propose to take a step towards allowing the urban dweller to participate in the design of his own environment by multiplying the availability of design services rather than by mobilizing political power."[87]

Again the group used photographs of INTERACT (though not naming the project in the proposal) to demonstrate their means of "eliciting information." "Since the basic premise of this proposal is that our users cannot express all their needs and desires explicitly, the machine must determine most of them implicitly." Those needs and desires could be precisely the feedback data needed by the system to ensure (political) homeostasis. If, to stress the point, this inscription of the user within an ever more extensive, data-driven feedback device was initially cast as a computer-mediated form of advocacy planning,[88] such remarks, along with the trajectory of funding for such research indicates that we might rightfully question a certain knowingness regarding its military, or counter-insurgency potentials. Years later Negroponte himself suggested that he had become all too aware of such resonances, noting that "the idea is to encourage the most advanced media research, without the 'Dr. Jekyll and Mr. Hyde' tone implicit in arts and humanities research done conjointly with military and industrial sponsorships."[89]

As Negroponte recognized, this dream of a computer-controlled environment, replete with integrated sensor and surveillance technology, computer-assisted data processing and evaluation, and automated prosthetic devices resonated all too eerily with General Westmoreland's ambition of achieving a soldier-less "Battlefield of the Future" in Vietnam, that super-efficient, computerized, and totalizing "electronic battlefield" designed to respond to the asymmetrical tactics of guerilla warfare. Here soldiers and military strategy would be replaced by machines (reducing US military casualties and soothing certain aspects of anti-war protest), data collected remotely and in increasingly microscopic detail,

86 "The concept is that each man might be his own architect for his immediate built environment within a high-density situation." Nicholas Negroponte and Léon B. Groisser, research project abstract for Computer Aids to Participatory Architecture, in Urban Systems Laboratory, *Directory of Urban and Urban Related Research Projects at M.I.T.*, Edition IV (May 1, 1971), 49.

87 "Computer Aids to Participatory Architecture," 13. **88** See Paul Davidoff, "Democratic Planning," *Perspecta* 11 (1967): 157-159.

89 Nicholas Negroponte, "Arts and Media Technology," *Plan* 11 (1980): 24.

communication instantaneous: it would be, as Paul Edwards writes, "knowledge without confrontation, power without friction."[90] Just as computers would run the wars of the future, so, it seems, would they manage future environments: architects could now in effect man those guard towers, performing their environmental control while maintaining the appearance of having withdrawn from the operation. And all of this could be tested in the realm of simulation or modeling, in which, to cite Edwards again, systems analysis "linked choices about strategy directly to choices about technology," thus informing policy decisions and "inherently promot[ing] technological change."[91]

Dr. Jekyll and Mr. Hyde

To try to understand what might be at stake in this Dr. Jekyll and Mr. Hyde dualism, this antinomy of good and evil inherent to certain trajectories of technological development, and why Negroponte might have recognized Arc Mac to be haunted by such a morality tale, I want to come back to the Urban Systems Laboratory, the Cambridge Project, and the politics of "big science" and the "military-industrial-academic complex" at MIT as the Institute steered (or claimed to steer) research activity and resources away from war-related projects and toward the civilian domain. As the Federal government became increasingly concerned with controlling or managing the "urban crisis"—including not only the physical status of its cities but the social unrest rising in the face of social and environmental injustices, the Cold War arms race, and the ongoing war in South East Asia—it seemed that things "urban" would for a short moment join military defense and space exploration as the new frontier of federal funding. MIT tried to situate itself at the forefront of this anticipated urban initiative, understanding its potential contribution through the USL to be that of collecting data and developing programs, technologies, and ever more detailed forms of simulation. But that funding proved not so easy to obtain and the program was dropped by 1974. That year *The Tech* published a short retrospective article on USL entitled "Urban Systems Lab: Social Work since '68." "According to Miller," it explained, "when the Urban Systems Lab was founded in 1968, 'there was the anticipation that urban problems would be approached on the basis of large scale, mission-oriented projects, as in the space program. These large scale projects never came about because of funding limitations. HUD never became the research equivalent of the Defense Department.'"[92] In the meantime, however, the DoD, like

90 Paul N. Edwards, T*he Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: MIT Press, 1996). 132.
91 Ibid., 120.

92 Greg Saltzman, "Urban Systems Lab: Social Work since '68," *The Tech* (May 17, 1974): 2-3.

the Ford Foundation, had emerged as a not-insignificant funding resource for certain types of urban studies, a development that raises important questions regarding both the character of research pursued under such grants and its potential applications.

MIT's significant contributions to scientific and technological developments during World War II were typically greeted enthusiastically for their role in ensuring US, and hence Allied, supremacy against Axis forces, although Norbert Wiener and others would famously raise the issue of science's social responsibility in the aftermath of the atomic bombing of Hiroshima and Nagasaki and refuse military funding for their subsequent research.[93] The Institute had also emerged from the turbulent months of 1968 largely without incident. Yet beginning with a research stoppage on March 4, 1969, MIT became an important target for, and site of, anti-war protest activities, including activities organized by MIT students and faculty, on account of the extensive military-sponsored, often-classified war-related research undertaken in its laboratories, and in particular the off-campus Special Laboratories—the Lincoln and Instrumentation Laboratories. [94] (The former, to recall, operated the IBM System/360 mainframe computer, the latter co-funded VSTOL). To recall Runge in *P/A*, not everyone was enamored by the Institute's liberal "salting" of its personnel with "men whose careers straddle the academic-industrial consulting line," or those "returnees from Washington's advisory elite who still contribute more than their fair share to the support of Boston-Washington air routes."[95] I want to turn now to trace two further, interrelated aspects of this story: first, the re-naming, proposed conversion and decision to divest the Instrumentation Laboratory (I-Lab) and, second, protests over MIT's Center for International Studies and with it Project Cambridge and Ithiel de Sola Pool. If these narratives might read initially as detours or departures from the history of the School of Architecture and Planning, the first, as we shall see, speaks to ongoing interactions between USL activities and war-related research, and the second to the intense proximity of such research, particularly in the social sciences, to figures within the school.

In April 1969, following protests, President Johnson convened a review panel on the Special Laboratories; known as the Pounds Panel, it was charged with examining the role of military-funding and war-related research at MIT. The former was a major source
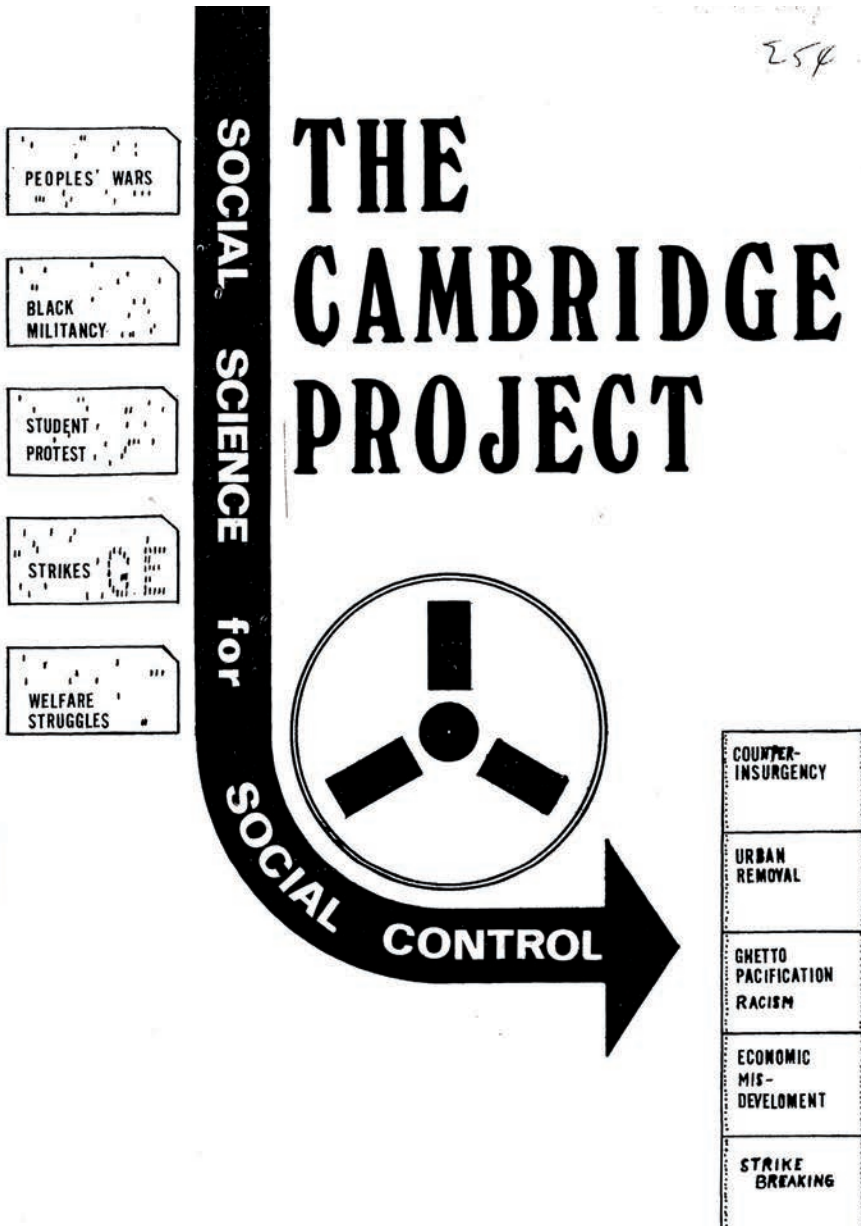
93 *Time* magazine, for instance, explained: "In the days when wars were simple—and considered just—the Massachusetts Institute of Technology was a proud developer of U.S. weaponry. As a patriotic duty in World War II, for instance, the school's electronics wizards perfected the radar that foiled

Hitler's bombs. Now duty has become a Faustian dilemma. In the age of antiwar dissent, M.I.T. still gets more money from the Pentagon–$108 million last year—than any other U.S. university. The result has thrust M.I.T. to the forefront of a growing national debate: What role, if any, shall universities play in

war research?" "Universities: M.I.T. and the Pentagon." See Norbert Wiener, "A *Scientist Rebels*," Atlantic Monthly 179 (January 1947), 46.
94 For a more detailed and general account of the protests at MIT, see Nelkin, *The University and Military Research*.

95 Runge, "In Search of Urban Expertise," 125. Runge notes that Miller was appointed "last winter as head of President Nixon's post-election task force on transportation" (125). Nelkin indicated that MIT faculty had been one-time administrators of Department of Defense research agencies, including

PEOPLES' WARS

BLACK MILITANCY

STUDENT PROTEST

STRIKES

WELFARE STRUGGLES

SOCIAL SCIENCE for SOCIAL CONTROL

THE CAMBRIDGE PROJECT

COUNTER-INSURGENCY

URBAN REMOVAL

GHETTO PACIFICATION RACISM

ECONOMIC MIS-DEVELOMENT

STRIKE BREAKING

ARPA and that many, such as Pool, sat on advisory boards for the army, air force and navy, as well as consulting for Pentagon and military contractors. A pamphlet from the anti-war faction, "Why CIS?," cast this far less favorably, noting that "In addition to the official research projects, individual professors do a very substantial amount of consulting for the State Department, CIA, USIA, and other government agencies. There has been a long history of professors moving back and forth between the CIS and the government. Milliken, former director of the CIS, served as vice-director of the CIA. Griffith worked for Radio Free Europe a CIA funded propaganda operation. Rostow, formerly of the CIS, served as national Security Advisor under Johnson and was responsible for many of the criminal policies pursued by the U.S. in Vietnam . . . In addition the CIS has trained cycle after cycle of mandarins

Judy Kaufman and Bob Park, eds., *The Cambridge Project: Social Science for Social Control* (Cambridge: 1969).

of funding (25% of the Institute's operating budget), the latter a major source of prestige. Among its conclusions, the panel recommended continuing some defense-related research but shifting the focus of work in the special labs "in the direction of domestic and social problems."[96] It also suggested that research be declassified and called upon the President to set up a Standing Committee to review work being undertaken in the labs.[97] The Executive Committee of the Corporation accepted the panel's recommendations in September and released a statement asserting that it "would be inappropriate for the Institute to incur new obligations in the design and development of systems that are intended for operational deployment as military weapons," and clarifying that this was "not meant to mean that with its unique qualities the Institute should not continue to be involved in advancing the state of technology in areas which have defense applications."[98] In October the faculty voted overwhelmingly in favor of Johnson's proposal to test the feasibility of the Pounds Panel recommendation, and Johnson set up a Standing Committee, known as the Sheehan Committee, to establish whether funding would be available for such a shift or even conversion in priorities. Johnson stressed his commitment to this change but noted, "The feasibility of these two interlocking goals—basic technology related to defense and domestic technology—will take some time to test."[99]

Shortly afterwards, Johnson appointed Charles L. Miller to succeed Charles S. Draper as the Director of the I-Lab (now re-named the Charles Stark Draper Laboratory), although Miller would not formally assume the post until January 1, 1970. As announced by Carson Agnew in *The Tech*, "According to a reliable source, Prof. Miller expects a major part of the Urban Systems Lab, which he also heads, to be absorbed into the new Draper Labs." Such a "transfer of on-going projects," the student reporter noted, "would pacify those who want the I-Labs to begin working on socially necessary projects now—even if those projects were a small part of the I-Lab total budget—and thus take away some support from the SACC [Science Action Coordinating Committee] drive to end war-related research at the labs."[100] But, Agnew concluded, the "reorganization [gave] only the illusion of change."

> This reporter was present when Prof. J. C. R. Licklider told Provost Jerome Wiesner in a phone conversation that appointing Miller to head the Draper Labs was "a stroke of genius." The whole thing is so pragmatic that Richard Nixon might have engineered

for the government. Military officers, State Dept. personnel and random other bureaucrats come to the CIS, study for a few years, learn new techniques of oppression, and return to their agencies with newly acquired skills." One-page typescript, no author noted (appears to be from MIT—Students for a

Democratic Society), c. 1972. AC276.
96 See Nelkin, *The University and Military Research*.
97 See "Statement by President Howard W. Johnson on the Special Laboratories, October 22, 1969," MIT *Institute Report* (October 24, 1969). Reprinted in Nelkin, *The University and Military*

Research, 168-177.
98 Ibid., 172.
99 Ibid., 172-173 and 175, respectively.
100 Carson Agnew, "Notes on Conversion," *The Tech* 89, no. 36 (October 14, 1969), 4.
101 Ibid., 4, 11.
102 Carol R. Sternhell, "M.I.T. Labs to Continue War Research, Says NAC," *The*

Harvard Crimson (October 29, 1969). In Nelkin's account, "Miller, as director of the USL, represented a program relevant to social issues, though one which operates at the comparatively small scale of about $1 million annually. By appointing him, the administration gained time without yet making

it. I-Labs, with $50 million a year in volume can swallow Urban Systems' $5 million whole—it will allow them, in fact, to keep people employed who might have had to leave now that the Apollo work is almost finished. But those projects can be used as a showcase effort. "See," MIT can say to us all, "the I-Labs are being converted to peaceful purposes."[101]

Agnew was not the only one convinced that MIT's "plans to convert its laboratories from war-related research were 'nothing but a fraud,'" or that such claims to conversion were meant to counter radical criticism of Pentagon-related research.[102] These suspicions were fueled by the "liberation" of a memo from Miller to Johnson into the hands of the November Action Coalition (NAC), a coalition of about 30 activist groups from the Boston area who were planning militant action against the I-Lab. Miller had written to Johnson with concerns about ongoing funding of USL, concluding his memo: "While wise use of Ford funds can help ease some of these, I feel it would be a mistake to ignore the critical needs of USL while giving a misleading illusion of 'converting' the I-lab.'"[103] The group had polemically taken this statement as proof of disingenuousness.

As reported in the *New York Times*, on November 4 approximately one thousand members of the NAC "mounted the steps of the student center with Vietcong flags and a loudspeaker to begin their 'anti-imperialistic actions' against the Institute," later chanting "Ho, Ho, Ho Chi Minh, N.L.F. is going to win." In anticipation of the action, MIT administration had obtained a court order banning violence and disruption on campus; it was "believed to be the first taken by a college in advance of disorders."[104] The largely non-violent protests continued for three days and were directed not only at the I-Lab but also at CIS and its recently founded Cambridge

Science Action Coordination Committee, made up of graduate students, rallied outside the Student Center and sought to intrude on a panel discussion of "The Human Purpose," on Alumni Day in 1969. At the left of the large placard is Dean for Student Affairs, Kenneth R. Wadleigh and Assistant Provost Paul E. Gray, and at the extreme left, Walter A. Rosenblith, chairman of the faculty.

firm commitments. The Urban Systems Laboratory was already co-sponsor of several projects within the Instrumentation Lab. It could be absorbed into the laboratory and at the same time provide a funding base from which to develop new projects." Nelkin, *The University and Military*

Research, 94.

103 Sternhell, "M.I.T. Labs to Continue War Research, Says NAC." Miller, Sternhell reports, was about to announce a $1 million Ford Foundation grant for converting the labs. She cites an NAC spokesman as saying "This announcement of this grant for an illusory

conversion is the apotheosis of M.I.T.'s attempts to head off our movement[.] Miller himself is down on the idea, both because he thinks it's a sop to radical students and because it is financially unfeasible."

104 Robert Reinhold, "1000 Stage a Peaceful Protest Against War Research at

M.I.T.," *New York Times*, (November 5, 1969), 18. On the November Action Coalition disruption, see also: "Educator in a Dilemma: Howard Wesley Johnson," *New York Times* (November 4, 1969), 34; Robert Reinhold, "Police Disperse Demonstrators at M.I.T. Lab," *New York Times* (November

Project. As the *Times* reporter noted, "They also charged that two social science projects at the Center for International Studies and the so-called Cambridge Project are designed to counter revolutionary movements." The Hermann Building, which housed the CIS, was preemptively closed and evacuated "because of the risk of violence."[105]

In May 1969, the SACC had launched an earlier demonstration against the Cambridge Project, brainchild not only of Pool but also of Licklider, a Professor of Electrical Engineering and founder and former director of the primary institutional support for artificial intelligence research, the Information Processing Techniques Office (IPTO) of ARPA.[106] The *New York Times* reported that the SACC, "which is dedicated to opposing academic research for the benefit of the military-industrial complex, asserted that the computer would be useful to the Pentagon for amassing data to be employed in suppressing popular movements." While the administration denied the assertion, insisting that the Cambridge Project was simply an unclassified project to develop computer analysis and modeling of research in the behavioral sciences, the Project, the article revealed, had just "applied to the Behavioral Sciences Division of the Advanced Research Projects Agency, an arm of the Department of Defense."[107] Pool, moreover, had a history of research on counter-insurgency and psychological warfare techniques, some developed for Vietnam, and he firmly believed in the value of the social sciences as a tool of government and national security, especially as a way of securing intelligence for US interests abroad.[108] "I can think of no greater contribution a social scientist could make to the intelligence of the US government," Pool argued in 1967, invoking Vietnamese villages, Dominican students, and Soviet writers, "than to help improve this effort at knowledge of the outside world."[109] On October 10, 1969, CIS had also been the target of a peaceful demonstration and "test occupation" promoted by Rosa Luxemberg Students for a Democratic Society (RL-SDS), which interrupted work for about three hours.[110] Carrying the flags of the Vietnamese National Liberation Front, the students chanted, "We won't die for Pool and Pye," again claiming that "the two were engaged in research on counter-revolutionary techniques and were funded by the Defense Department."[111] Pool's COMCOM program, which developed computer simulations of international communication patterns,[112] and the Cambridge Project were both condemned as part of an apparatus of "psychological warfare." A few

6, 1969), 26; Robert Reinhold, "150 Stage Sit-in as Protests Against M.I.T. Research Continue," *New York Times* (November 7, 1969), 8; Fred M. Hechinger, "Colleges: Tension over Issue of Defense Research," *New York Times* (November 9, 1969), E11. See also Robert Elkin, "Rally, Sit-in Protest War Research," *The*

Tech 89, no. 43 (November 7, 1969): 1, 5, and numerous other articles in this issue.
105 Reinhold, "1000 Stage a Peaceful Protest," 18. In 1971 the Hermann Building was actually the target of bombing, for which credit was taken by the Proud Eagle Tribe, "a revolutionary women's collective." The

target had been William P. Bundy, a senior research associate at CIS and former advisor to President Lyndon B. Johnson, for his role in the escalation of the Vietnam War. See Bruce Schwartz, "Women's Collective Claims Role in Hermann Bombing," *The Tech* 91, no. 41 (October 19, 1971): 1-2.

106 On Licklider see Edwards, chapter 8 "Constructing Artificial Intelligence" in *The Closed World*, 239-273.
107 John H. Fenton, "M.I.T. Group Assails Computer Plan," *New York Times* (May 7, 1969), 32.
108 Pool was part of an advisory committee of the

weeks later, as Dorothy Nelkin recounts in *The University and Military Research: Moral Politics at MIT*, Pool and three colleagues "were tried by a mock revolutionary tribunal and found guilty of 'crimes against humanity.'"[113]

On May 20, 1970, arguing that the I-Lab could not operate under the new constraints, Johnson announced his decision to undertake a two-stage divestment, "a divestment that protects this national asset, its personnel, and the Institute." For the country, he suggested, "looks to it as a shield." This separation allowed the lab to operate independently "and without the terms of the Corporation Executive Committee's directive."[114] As the reinstated Draper recounted in the Lab's annual report, "the first stage involved creating Charles Stark Draper Laboratory Division of M.I.T. with its own Board of Directors."[115] Miller was added to the new Board, and continued his duties as Associate Dean of the School of Engineering and Director of the USL. "It will be professor Miller's responsibilities to continue to develop the Urban Systems Laboratory as a main focus with which new mission laboratories will evolve which will be concerned with a wide variety of social problems," Johnson explained of this rapid redeployment.[116] The editorial in *The Tech* applauded the President's decision on account of the "current lack of funds for socially oriented research and the inability and unwillingness of the Draper Laboratory to change." "With the divestment of the Draper Lab and the gradual 'conversion' of the Lincoln Lab away from classified DOD research," they argued, "MIT will find itself out of the weapons systems development game." The editors hoped, in turn, that "when funds become available for [technically oriented research in the fields of social and urban systems] we look forward to the Urban Systems Lab becoming analogous to what the Draper Laboratories has become in the field of inertial guidance."[117] (This was an ambiguous remark, to say the least, given the D-Lab's role in developing weapons systems.) As with earlier attempts to demonstrate a shift toward civilian concerns, it was evident to many that this divestment was again covering up for business-as-usual. Bruce Schwartz offered a dissenting voice in "D-Labs Inc.: Divestment as Cop-Out," which appeared on the same page of *The Tech*, positing that MIT had simply washed its hand of the issue, hoping "to get war research protest as well as war research off campus," while the arms race continued with even less oversight.

National Research Council set up to encourage government programs in the behavioral sciences. In September 1968 the committee reported that "the behavioral sciences are an important source of information, analysis and explanation about group and individual behavior and are thus an increasingly relevant instrument of modern government," especially since, as the committee's chairman explained, "a very substantial portion of government policy decision are directly concerned with the behavior of specific segments of the population." Harold M. Schmeck, "U.S. Urged to Rely on the Behavioral Sciences,"

New York Times (September 3, 1968), 16.

109 Ithiel de Sola Pool, "The Necessity for Social Scientists Doing Research for Governments," in *The Rise and Fall of Project Camelot: Studies in the Relationship between Social Science and Practical Politics*, ed. Irving Louis Horowitz (Cambridge,

MA: MIT Press, 1967): 267-71. Quoted in MIT-Students for a Democratic Society, "CIS is CIA," 11. AC276.

110 Greg Bernhardt, "150 Students Peacefully Disrupt CIS," *The Tech* 89, no. 36 (October 14, 1969): 1, 11.

111 "Demonstrators Protest MIT War Research," *New York Times* (October 11, 1969), 13.

In 1972, as part of a reinvigorated campaign, the Committee on War Related Research issued "A Summary of War-Related Research at Draper Lab." "War research has a long history at MIT," it began.

> America's interrelating complex of basic research, defense contracts, and weapons systems (with the corresponding profits), known as the military-industrial-university complex, has always held MIT close to its heart. The Institute's leadership role has always been recognized, especially in war-time, and boasted of publicly. In 1966, J.B. Hanify, in a famous statement, defended MIT and its expansion in Cambridge by stating that it was an "arsenal of democracy." But times have changed, and the war in Indochina has increased the public's—particularly the student movement's—political awareness, to the point that now MIT has learned to hide behind the double-talk of innumerable committees, review panels, and false divestments.[118]

As they went on to note, "war research continues at MIT. A little digging brings out a coherent picture that is not very different from what prompted Senator Fulbright to refer to MIT as 'the sixth wall of the Pentagon.'" The Committee also issued pamphlets on the history of the Draper Labs and its research in advanced tactical weapons and strategic arms, and it called for further militant action. When on May 8, 1972 President Nixon announced his decision to mine the harbors of North Vietnam, massive protests broke out against the escalation of the war in Indochina; at MIT riot police using clubs, dogs and tear gas swept demonstrators from campus. [119] The Draper Lab became independent the following year.

"The Little Pentagon"

In 1972, MIT-SDS launched a renewed battle against war-related research at the CIS. Pointing to its role in the suppression of popular movements struggling against US imperialism, they again targeted social science research directed towards gathering intelligence, developing counter-insurgency techniques, and influencing government policy.[120] Moreover, this time demonstrators stressed the intimate coupling of such social science research with developments in engineering and computerization. As a pamphlet titled "Why CIS?" posited: "Many of the weapons systems developed by engineers at MIT's laboratories

Referring to Lucien Pye. **112** COMCOM was developing "a model of the impact of foreign broadcasting on the Soviet Union, Communist China, and underdeveloped countries" and was used to "study the spread of news during the Cuban missile crisis." Joseph Hanlon, "The Implications

of Project Cambridge," *New Scientist* 79, no. 740, (February 25, 1971): 421-423, reprinted in MIT-SDS, "CIS is CIA," 28-29. **113** Nelkin, *The University and Military Research*, 110-111. **114** Howard W. Johnson, "Johnson Reports Draper Lab Divestment," *The Tech* 90, no. 28 (May 22, 1970): 5.

115 C. Stark Draper, "Charles Stark Draper Laboratory," "Report of the President for the Academic Year 1969-1970," *Massachusetts Institute of Technology Bulletin* 106, no. 2 (September 1971), 433. **116** "Johnson Reports Draper Lab Divestment," 5. The USL continued to play this PR role. In October 1971,

the same day that *The Tech* a story of the bombing of the Hermann Building and CIS it also featured an article noting that USL still existed. "The operation of MIT's Urban Systems Laboratory," it concluded, "is not being phased-out, but rather is proceeding at as fast a pace as ever. Even more, the USL

are deployed and used under the direction of MIT's social scientists."[121] And under the subtitle "The 'Little Pentagon,'" another pamphlet, "End MIT's War Complicity," argued: "The CIS provides analysis and strategy used in maintaining US economic domination and sympathetic governments all over the world. The US war machine is dependent on both the hardware and software developed at MIT." The CIS, MIT-SDS explained, was "founded in 1951, with CIA funding, under the directorship of the infamous W.W. Rostow . . . well-known as key formulator of [President Lyndon B.] Johnson's policy in Vietnam," and a former major in the Office of Strategic Services, the forerunner of the Central Intelligence Agency. CIS was funded directly by the CIA until 1966, when, following protests, funding was taken over by the Ford Foundation and Department of Defense. Little else, they recognized, had changed. "The CIS is, to this day," they concluded, "a CIA front."[122]

During the strikes of 1972, MIT-SDS declared Ithiel de Sola Pool to be "People's Enemy No. 1." Pool and other key figures at CIS, they argued, "should be fired because they are essentially CIA agents in professors' clothing." As recounted in "CIS is CIA," Pool had been a consultant at the Rand Corporation since 1951 and in 1959 had founded Simulmatics, "a corporation to sell the software he developed to the government." Among Simulmatics's major contracts, they explained, was the Strategic Hamlet Program in Vietnam (in which rural peasants were forcibly relocated into villages with secure perimeters to insulate them from contact with the communist guerrilla insurgency) and "DoD's Project Agile/COIN (Counter-insurgency)."[123] Project Agile included "Research on Urban Insurgency," part-authored by Pool, and "POLITICA-A Manual Countersubversion and Counterconspiracy Game," again co-authored by Pool and described as "a gaming project designed to investigate how the army could effectively deal with the guerilla movement in Vietnam." In addition Project Agile had entailed research on insurgency and counter-insurgency tactics in Guatemala, Peru, Ecuador, and Bolivia. From Project Agile, MIT-SDS suggested, had emerged Project Phoenix, an operation in which "teams of counter-insurgents went to villages in South Vietnam, and tortured or killed village chiefs who sympathized with the NLF (about 20,000 such village chiefs were murdered)."[124] Pool and his graduate students, moreover, had been involved in preparatory field research, undertaking interviews with villagers to establish systems of political power and searching for "alternative organizations to the Viet Cong that would cooperate more readily with U.S. aims in Vietnam."[125]

represents the growing trend of research at MIT on the whole the shift of emphasis from defense-related work to research designed to solve problems of a most current and pressing sociological nature." Norman Sandler, "Lab Supports Efforts of Urban Researchers," The Tech 91, no. 41 (October 19, 1971): 1, 3.

117 "The Special," The Tech 90, no. 28 (May 22, 1970), 4.
118 Committee on War-Related Research, "A Summary of War-Related Research at Draper Lab," 4-page typsescript, nd. AC276.
119 "Riot Police hit MIT Campus," The Tech 92, no. 25 (May 12, 1972): 1, 3.
120 The group outlined the

charges as follows: "The purpose of the CIS, according to their most recent bulletin, is 'to conduct research which will contribute to the solution of some of the long-term problems of international policy that confront decision makers in government and private life." They then continued, "The

international policy of the US has long been to support fascist dictators (E.g. Spain, Greece, etc.); to suppress popular revolutions (e.g. the Philippines, Guatemala, Vietnam, and East Pakistan); and to engineer right-wing coups d'etat (e.g. Cambodia, Argentina, and Indonesia, where 500,000 revolutionary

According to Joseph Hanlon in the British magazine *New Scientist*, the DoD-funded Cambridge Project (operated under CIS) was the key player in developing computer technologies for data collection and military- and policy-oriented behavioral science modeling for deployment in Southeast Asia. Hanlon cited a series of proposed areas of research and data sets that had been set out in the original application to the DoD, a list which brings us back to the nexus of development and security: "Problems of the underdeveloped countries and on the conditions of stability"; "A study of peasant attitudes' including: 'under what conditions do peasants' protests become violent?'"; "studies on 'stability and disorder' in several countries"; "Analysis of several thousand interviews with Vietcong conducted by the Rand corporation"; along with "public opinion polls from all countries"; "cultural patterns on all tribes and peoples of the world"; "Data on youth movements"; "Mass unrest and political movements"; "Peasant attitudes and behavior"; and "Characteristics of Latin American countries." What Project Cambridge offered, Hanlon explained, was the possibility of taking data on villages, building a model of whether or not a village might be friendly to US interests or predicting what type of intervention might be help gain its allegiance. Computers, he noted, "are already selecting bombing targets in Vietnam, so it is not inconceivable that the model would be used to select the most unfriendly villages for bombing." The tools developed by Project Cambridge aimed to facilitate more complex war-gaming models while simultaneously cutting simulation time down from months to a few hours, hence aiding decisions such as "whether or not to intervene in a foreign revolution or election."[126] As part of a USL "Summer Study" program Pool had been working simultaneously on the question of developing computerized "Urban Information Systems" as "exercises in applied social science," this time dedicated to urban issues then confronting the US—"racial conflict, poverty, widespread physical decay, lack of low-cost housing, environmental pollution, and congested and wasteful transportation."[127]

peasants were massacred). We think that 'social science' research which aids this policy should be stopped. There is reason for this foreign policy: imperialism— the desire of a ruling class of bankers and businessmen in the US to extend their empire around the world. There is a reason why CIS exists: this

same ruling class controls the universities and set up the CIS to help them build and preserve imperialism." MIT-SDS. "CIS is CIA," 1.
121 "Why CIS."
122 "End MIT's War Complicity," pamphlet. AC 276. "At first the concept of the 'free world' was a confusing one," they posited, "but the

war has opened our eyes. The 'free world' is that part of the world which gets military and economic aid from the U.S. for free. It is that part of the world in which U.S. Big Business freely dominates the economies, the labor market, the raw materials, and the consumption market... We have come to see that

the war is being pushed by those who will profit from their freedom to exploit the people of Vietnam." See also Committee on War-Related Research, "Militant Action" and "What's Up at Draper Lab?" pamphlets. Same folder.
123 Simulmatics participation in such research is confirmed

Overlap

In 1974 the Cambridge Project was discontinued, or more properly, absorbed into the Overlap Project within the School of Architecture and Planning's newly founded Laboratory for Architecture and Planning (L.A.P.). Funded by the Advanced Research Projects Agency of the Department of Defense, the Overlap Project was, as Porter, then Dean of the School, explained, "an outgrowth of the Cambridge Project" and it was concerned with "devising ways of making inferences from textual and numerical data bases and automatically restructuring the data on the basis of these inferences (and vice versa)."[128] Given the long-standing relationship of Porter's "urban data management language," DISCOURSE, to the Cambridge Project (jointly funded by USL), Negroponte's presence on its Board of Directors since 1971,[129] and the interdisciplinary environmental research going on in the school, this transfer seems hardly surprising. But it brings us back the status of such research's political coordinates. With Porter as primary director, the Overlap Project continued DISCOURSE along with other data management research.[130]

Porter established the L.A.P. in July 1973 with the aim of promoting a "distinctive style of research and practice." In addition to stressing field-based research into physical and social environments, or "how people interact with each other and with these environments," its characteristics included "use of representations or modeling; and involvement in purposeful intervention." "As more is known about society and the processes of social and environmental change," Porter explained, it had become evident that "the environmental professional" was no longer adequately served by physical models and drawings of their buildings and needed to adopt the abstract modeling or simulation of the scientist. By "purposeful intervention" Porter hoped to express in turn that what distinguished architects and planners from other fields, such as social scientists "who try to understand existing social systems," was their roles as "agents of change." Architects and planners, he proposed, had to concern themselves with "sensing opportunities, points of leverage and mechanisms for change, and with ways of monitoring change."[131] In welcoming remarks at an Open House in March 1974, Porter recalled that the idea for the L.A.P. dated to an ill-fated 1971 proposal to the National Science Foundation for funding to establish a "Center for the Human Environment." He stressed the similarity of the intended research to

in Philip Quarles van Ufford, and Ananta Kumar Giri, *A Moral Critique of Development: In Search of Global Responsibilities* (London: Routledge, 2003). That Pool was unapologetic about this relation, as well as that between the CIS and the CIA, is evident in his rather alarming account: Ithiel de

Sola Pool, "The Necessity for Social Scientists Doing Research for Governments," in *The Rise and Fall of Project Camelot: Studies in the Relationship between Social Science and Practical Politics*, ed. Irving Louis Horowitz (Cambridge, MA: MIT Press, 1967), 267-280.
124 "CIS is CIA," 14.

125 "Why CIS?"
126 "The Projects leaders," Hanlon explained in concluding, "generally reflect the continuing military presence in the social sciences. The original proposal to DoD was written by Pool and MIT professor J.C.R. Licklider. Licklider was a staff member of the DoD

Advanced Research Projects Agency (ARPA) and at MIT was connected with the ARPA funded Project Mac: ARPA is funding Project Cambridge. Pool has done counterinsurgency research for ARPA and he is a member of the MIT Center for International Studies, which was funded until 1966 by the

laboratory methods in the physical sciences in which scientists constructed representations of the real world "in order to permit experimentation where they cannot physically get at what they wish to investigate." In the L.A.P., he posited, faculty and students would make "interventions into carefully constructed representations of reality," using computer based modeling to facilitate the simulation of complex urban and social environments through the incorporation of data.[132] Moreover, as he stressed, being visually oriented the School would be able to bring additional visual skills to bear on such quantitative data: there was, he explained, "considerable promise to some early efforts to combine the computer with other media for representing and manipulating environmental information." Again MIT, and in particular Negroponte and his Arc Mac team, would be at the forefront of this development; this became evident later in the 1970s with the development of the Aspen Movie Map, the Media Room and "Put-That-There," and the launching of the Arts and Media Technology program, soon renamed the Media Lab.[133]

As with the Cambridge Project, the Urban Systems Lab ceased operations in 1974 at a moment in which, to reiterate, military spending was being cut back on account of the reduction of US military involvement in Vietnam. But by then, in any case, as reflected in L.A.P., as well as in the Interdisciplinary Environmental Design Program founded in 1973 (absorbing the Urban Design program of 1966), and even the ongoing work of Arc Mac, the School had so fully interpolated into its midst other aspects of scientific and technological research, as well as a systems-based paradigm and tools of management, as to make such an additional interdisciplinary apparatus largely unnecessary.

Conclusion

What, then, might we learn from this story? What I have been attempting to trace here are a series of interconnections—at the level of collaborations, of funding, of scientific methodology and technological tools—which together suggest something more than simple homologies between the characteristics of research undertaken in the social sciences and computer applications at MIT and that undertaken in architecture and urbanism. This of course is hardly strange, given the shared institutional milieu and its governing mandates, which structured the possibility for such heavily-funded interdisciplinary research. (Other

Central Intelligence Agency. The present head of the project is Dr. Douwe Yntema, who was psychology group leader at the Air Force funded MIT Lincoln Laboratory." Hanlon, "The Implications of Project Cambridge," 29.

127 "Urban Information Systems: Report of M.I.T. Summer Study #2" (1968).

AC7.

128 William L. Porter, "Laboratory of Architecture and Planning," in "Report of the President and the Chancellor Issue, 1974-1975," *Massachusetts Institute of Technology Bulletin* 111, no. 4 (November 1975), 163. In the year 1974-75, as Porter reported, the lab had a budget

of "more than $480,000, mostly sponsored by the Department of Defense."

129 "Computer Aids to Participatory Design," 80.

130 See William L. Porter, "Laboratory of Architecture and Planning," in "Report of the President and the Chancellor Issue, 1975-1976," *Massachusetts Institute of*

Technology Bulletin 112, no. 4 (November 1976), 159.

131 William L. Porter, "Laboratory of Architecture and Planning," "Report of the President and the Chancellor Issue, 1973-74," *Massachusetts Institute of Technology Bulletin* 110, no. 4 (November 1974), 145.

key players in the history of computers, such as Stanford University and Cal Tech, it might be noted, had no professional architectural programs.) I am not, to be clear, trying to suggest that we should read all work undertaken at the School as necessarily directed, wittingly or unwittingly, towards military ends, or that it necessarily or self-consciously operated in the service of national security and the US's broader geopolitical aims, even if I do think it was similarly marked by the social, political, and territorial insecurity of the late 1960s. But I do think we might ask whether, in some cases, architects too had become "defense intellectuals," whether in the course of adopting modes of funding and alliance proper to "big science," and of collaborating with centers and laboratories at the forefront of military operations in Southeast Asia (and counter-insurgency strategies more globally), that many of these coordinates and skills had become so internalized or naturalized within the practice of these "urban technologists" as to be pursued without questioning. The question is not, furthermore, whether architects should engage with advanced forms of scientific knowledge and computer technology; such engagement has often characterized the discipline's vanguard, occasionally even its more radical avant-garde (although we are not concerned with avant-gardes here), and of course tactical forms of practice continued to negotiate this territory with criticality and to politically progressive ends.[134] Rather, the difficult question remains: how or to what ends might architects have engaged such scientific and technological developments to progressive ends in a situation in which architectural and urban research in the university had become a targeted area of funding by the military and intelligence establishment and its allies such as the Ford Foundation?

For in this case, as I have tried to show, these fields of study were all too proximate to contemporaneous scientific research into human subjects, populations and their milieux that were directed toward more coercive, militaristic, or at least less democratic forms of environmental control. If such research was often cast in the language of disinterested monitoring, objective evaluation, forecasting, and as facilitating rationalized design responses appropriate to increasingly complex urban and social problems, such new "methods" of information management and their materialization as environmental "solutions" were the product of an economic and political matrix that was far from neutral. That is to say, behind the supposed neutrality of systems-based analysis and quantitative methodologies,

132 "Welcoming Remarks made by Dean William Porter at the Open House of the Laboratory of Architecture and Planning, March 21, 1974." AC 400. "As it turned out," he noted, "the proposal could not be submitted because that part of the National Science Foundation to which the proposal was directed was abolished just as the proposal was being completed."

133 The Interactive Movie Map, more commonly known as the Aspen Movie Map, forms another chapter of my forthcoming *Outlaw Territories*. See also Nicolas Negroponte, "The Media Room. Report for ONR and DARPA," (Cambridge, MA: MIT, The Architecture Machine Group, 1978); Richard A. Bolt, "Spatial Data Management. DARPA Report," (Cambridge, MA: MIT, The Architecture Machine Group, 1979); and Richard A. Bolt, "'Put-That-There': Voice and Gesture at the Graphics Interface," *Computer Graphics* 4, no. 3 (July 1980): 262-270. On the history of the Media Lab see Stewart Brand, *The Media Lab: Inventing the Future at MIT* (New York: Penguin, 1988).

134 See, for instance, Felicity Scott, *Living Archive 7: Ant Farm* (Barcelona: ACTAR Editorial, 2008).

with their apparently seamless ability to modulate across fields ranging from the collection of data on race and poverty, to the development of computer-aided design programs, attempts to develop new methods of environmental controls were not simply haunted but were also motivated by governmental responses to the period's social unrest and territorial or geopolitical insecurity. At a historical moment threatened by insurrection at home and abroad, with civil rights struggles and anti-war dissidence cast as a security threat, and in which military strategies were increasingly directed to controlling such insecurity, we might ask, then, for whom the environments simulated and tested at MIT were envisioned?

Paul Edwards' argument that we should not simply dismiss the implied or actual military potentials of such research as simply "grantsmanship"—"the deliberate tailoring of grant proposals to the aims of funding agencies"—seems relevant here. For even if initially intended as a convenient or available vehicle for obtaining necessary funding, this logic could shift to become what he calls "mutual orientation." In this scenario, just as the researchers start to imagine and even project the work's technical capacities into the military register in appealing for funding, so the military agency comes to recognize new possibilities, hence re-orienting both sides of the equation.[135] In 1967, Senator Fulbright cast this slightly differently in "The War and Its Effects: The Military-Industrial-Academic Complex." Noting what had become "an arrangement of convenience, providing the Government with politically usable knowledge and the universities with badly needed funds," he proposed that "a university which has become accustomed to the inflow of government contract funds is likely to emphasize activities which will attract those funds."[136]

This story reminds us, additionally, that the history of computers in architecture, or computer-aided design, is not comprised merely of a history of graphic interfaces and drawing or rendering techniques, or of the experimental forms later facilitated by advances in both software and hardware. To this we need to add the story of a paradigm shift put into effect during the discipline's inscription within new modalities of environmental management and control, the story of the role it played (or was understood to play) within emergent paradigms of governmentality developed under the pressures of Cold War politics and expanded domestically with the threat of civil unrest. In the case of computer-

135 Edwards, *The Closed World*, 81-82.
136 Fulbright, "The War and Its Effects" 175, 176. "The corrupting process is a subtle one: no one needs to censor, threaten, or give order to contract scholars; without a word of warning or advice being uttered, it is simply understood that lucrative contracts are awarded not to those who question their Government's policies but to those who provide the Government with the tools and techniques it desires" (177).

aided design, Robin Evans's brilliant demonstration of the manner in which drawing techniques are not only descriptive tools but formative mechanisms within the practice of architecture might thus be extended to suggest that what is at stake here is to understand, and to critically and politically intervene in, the ever-increasing structural alignment of the field and its tools with the administration of such mechanisms of control. As the conception of architecture and the city came to be replaced by notions of environmental systems, we find that data on social organization and its physical matrix came to be understood simply as computational parameters with quantitative (rather than historical or political) values, insurrection a momentary instability before a feedback-based stabilization of, to invoke Jay Forrester's work at USL, those "urban dynamics" might be put to work.

I want to come back then, in concluding, to Dean Anderson's remark, with which we began—that the role of architecture and planning was that of "giving order to environmental and social change." For it was the nature of that order, or ordering, which had radically transformed. Architecture has long played a role in giving material form to the normative social mandates and welfare functions of the state as it both manages and cares for its citizens. And it has long operated semantically and even organizationally to political ends. In the story we have been following, however, architectural practice was understood to function no longer simply (or not only) in the traditional sense of giving form and organization, or even aesthetic expression, to social needs or cultural identity, or even to enhance quality of life. Architecture now offered tools and even a tactical arena through which to both accumulate and deploy knowledge of the population who interacted with it. Architectural research, that is, now operated in the service of advancing modes of global governmentality and their micro-political techniques of power; it was cast as one agent among many within an expanded biopolitical regime and its security apparatus. The architect, and its updated version, the computer-architect, was imagined for a moment to be a protagonist in the increasingly detailed research that fed the proliferation of such political technologies, hence offering us a historical platform through which to investigate the fault-lines or even identify the fine line distinguishing the discipline's progressive forms of experimentation, long a role played by schools of architecture, from its instrumental and normative function. If architecture in some sense always treads this difficult line, we find here a shift to an operational paradigm in which decision making has been ceded to technologies of control and management which inscribe the user-participant ever more intricately into its machinations by mobilizing the rhetoric of choice, participation, interaction, and even discourse, all now computer applications geared towards eradicating conflict.