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The University as a Media Complex: The United States after 1940

In Los Angeles in the early 1940s, two exiled members of the Institute for Social Research at the University of Frankfurt am Main, Max Horkheimer and Theodor Adorno, described a division of labor that any university professor should have recognized. Odysseus, ancestor of modern intellectuals—scholars, scientists, statesmen—interprets the world and appreciates its beauty, straining toward the Sirens' enchanted song as oarsmen propel the ill-fated dialectic of Enlightenment forward. For Horkheimer and Adorno, the scene—Odysseus tied to the mast in helpless rapture while the oarsmen row in mechanical unison below—summarizes Enlightenment's tragic contradiction: the liberal individual, a philosopher and an aesthete, as the ultimate product and prisoner of "mass culture" (Horkheimer and Adorno, 2002: 25–27).

Witnessing the world's first atomic test in 1945 another such figure, the American nuclear physicist J. Robert Oppenheimer, felt moved to recall Hindu scripture: "Now I am become Death, the destroyer of worlds!" (Hijiya, 2000: 23–125).[1] Oppenheimer taught at the University of California, Berkeley from 1920 to 1943. Working during the war as a lead scientist on the Manhattan Project, Oppenheimer went on to direct the Institute for Advanced Study (IAS), an independent research center near Princeton University. During his tenure at the Institute, Oppenheimer, who had been involved in union organizing at the Berkeley Radiation Lab prior to the war, had his security clearance stripped by the anti-communist inquest that sent a chill through the postwar intelligentsia. He knew who his oarsmen were and was sympathetic to their plight. An outspoken opponent of nuclear proliferation, Oppenheimer exemplified the scientist-scholar caught, like Odysseus, in an impossible bind, forced to do the work of enlightened reason—splitting atoms or contemplating Being in splendid isolation—that he knew very well was profoundly unreasonable.

1 In a 1965 television documentary, Oppenheimer recalled thinking these words from the Bhagavad Gita as he witnessed the atomic explosion at the Trinity test site on July 16, 1945.

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It is not difficult, with Horkheimer and Adorno, to extrapolate modern society itself out of the Odysseus allegory: the alienated bourgeoisie above decks, reading books, managing offices, and attending concerts, and workers chained to the factory floor below. This primordial social division, with its two types of bondage, sustains every opera house, museum, and university. But what do we learn when we focus instead on the instruments—the *media*—that support and maintain the operatic spectacle: a piece of infrastructure (the boat with decks above and below), an "iron cage" (the mast to which Odysseus is tied), a power source (the oarsmen's labor), along with the rope with which Odysseus is bound, and the wax that plugs the oarsmen's ears so that they may continue in their labors undistracted by the Sirens' call?

This apparatus, which we can call a *media complex*, diagrams the architecture of Enlightenment which, with Oppenheimer-as-Odysseus in mind, we can understand as the architecture of the modern research university. Approaching university history in this way calls our attention to the material infrastructures within which knowledge is produced and circulates. Typically designed by architects, engineers, campus planners, and university administrators, such infrastructures divide knowledge into its intellectual and physical components. In the mid-twentieth century, there is no better place to begin a survey of the university as a media complex than at the University of California at Berkeley, where Oppenheimer began his career.

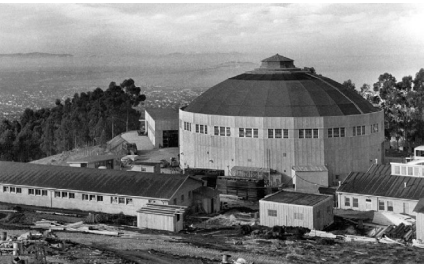
By the time Oppenheimer departed for Los Alamos in 1943, Berkeley had already become a key nexus in the "multiversity", the term later given by Oppenheimer's Berkeley colleague Clark Kerr to a new system of knowledge production. In *The Uses of the University*, published in 1963, Kerr, a scholar of labor relations and by then president of the University of California, half-jokingly defined the "multiversity" as "a series of faculty entrepreneurs held together by a common grievance over parking" (Kerr, 1963: 20). Although he could have been referring to any number of statewide public university "systems", or to the sprawling complexity of many private research universities, Kerr was referring first to the system over which he presided. With an annual budget of half a billion dollars and forty thousand employees, the University of California ran "operations in over a hundred locations, counting campuses, experiment stations, agricultural and urban extension centers, and projects abroad involving more than fifty countries" (Kerr, 1963: 7).

Berkeley was that system's most prestigious hub. Its Beaux Arts campus had been designed around 1900, principally by the architect John Galen Howard, as a frontier version of the neoclassical City Beautiful that was prototyped at the Chicago World's Exposition of 1893 and transferred by McKim, Mead & White to Columbia University (where Howard taught), which opened its new campus in upper Manhattan in 1897.

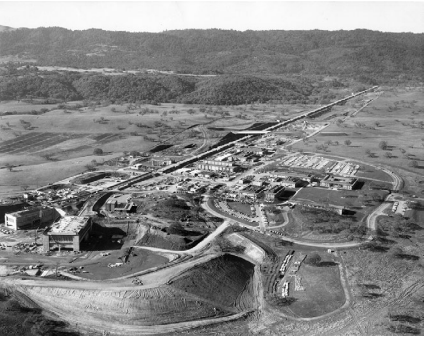
The central axis around which Howard organized the Berkeley campus opens an expansive view onto to Golden Gate, the strait that

1| John Galen Howard, Hearst Memorial Mining Building, University of California, Berkeley, 1907

2| Arthur Brown Jr. with Ernest Lawrence, Cyclotron Building, The University of California, Berkeley, 1940



3| Aetron, Blume, Atkinson and Charles Luckman Associates, Stanford Linear Accelerator Center (SLAC), Stanford University, c. 1966



separates the isthmus of San Francisco from the mainland. Although the plan was only partially realized, two buildings arranged along this axis mark Berkeley's transition from university to multiversity. The first, which stands abreast the axis and was designed by Howard, is the Hearst Memorial Mining building, a building devoted to the new science of mines that commemorated the career of mining entrepreneur George Hearst and was commissioned by his widow and Berkeley's patron, Phoebe Apperson Hearst (Fig. 1). The second building, positioned directly on the main east-west axis and aligned with the Pacific horizon, is the Lawrence cyclotron, designed by Arthur Brown, Jr. in 1940 (Fig. 2). Brown designed this large, cylindrical shed with neoclassical overtones to house a fifth-generation cyclotron, or electromagnetic particle accelerator, to support work done at Berkeley's Radiation Lab under the nuclear physicist Ernest O. Lawrence and his colleague Oppenheimer, among others.

As it happened, parts of the cyclotron were repurposed for work on the Manhattan project, and the instrument was not completed until after the war. But by 1940, the elements of the postwar multiversity, which turned on the sponsorship of university research by government on the one hand and by industry on the other, were already in place.

In 1961, not long before Kerr's book appeared, outgoing US president Dwight Eisenhower, who had earlier been president of Columbia University, warned of a growing "military-industrial complex." A few years later, US Senator J. William Fulbright spoke of a "military-industrial-academic complex" (Fulbright, 1970). Kerr's multiversity, with Berkeley at its core, belonged to this largely decentralized nationwide network. But other campuses, including Berkeley's northern California neighbor, Stanford University, were also growing branches. One such branch was the Stanford Research Institute (SRI), a nondescript suburban facility founded in 1946 to support research by Stanford faculty for the expanding electronics industry. Even as Kerr celebrated the SRI as an instance of university-industry cooperation, another nondescript monument appeared at the edge of the Stanford campus in a two mile-long shed: the Stanford Linear Accelerator Center, jointly developed with the Atomic Energy Commission, which opened in 1966 under the directorship of Wolfgang Panofsky—the physicist son of Oppenheimer's colleague at Princeton's IAS, the émigré art historian Erwin Panofsky (Fig. 3).

So already we have a partial map of the multiversity in its extended setting. But in what ways did its architecture belong to what we have been calling a media complex? And, if the Odysseus role has dissolved into the work of countless scientists and their humanist colleagues working in the multiversity's countless branches, where are the oarsmen? To see the mediations that force them out of the picture, we need to go off campus, to the cities and suburbs being redefined by the corporate capitalism that, as Horkheimer and Adorno already sensed in Los Angeles, was beginning to construct a new world order.

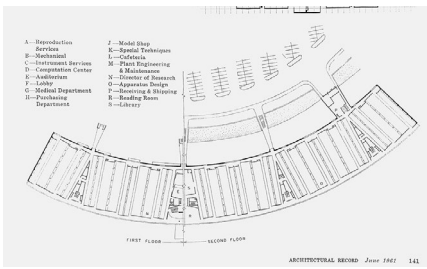
The headquarters building of the Union Carbide Corporation in midtown Manhattan was designed by the architect Gordon Bunshaft with the collaboration of Natalie De Blois, both of Skidmore, Owings & Merrill (SOM), and completed in 1960. This solemn, gridded skyscraper was set back from the street and clad in an articulate metal-and-glass curtain wall. A photograph by Ezra Stoller of a typical office floor, staged to highlight the modular interior, shows a group of white men meeting in a conference room, most of whom were probably college or university graduates (Fig. 4). Perhaps one or two were beneficiaries of the GI Bill, which funded college education for returning veterans after the war. Since Union Carbide was a chemical company, there may even have been a scientist among them. The women seen in the foreground of another Stoller photograph most likely did not benefit from higher education, though one or two may have attended trade schools to train for the work they did in the secretarial pool (Fig. 5). Both of the building's main designers studied at schools of architecture founded on the Beaux Arts model that, unlike European academies of fine arts, were integrated into American research universities. Bunshaft studied at the Massachusetts Institute of Technology (MIT); De Blois, a pioneer in a male dominated field, was educated at the Western College for Women in Ohio, and then at Columbia University's Graduate School of Architecture. Thus, on a typical day on a typical floor in Union Carbide's headquarters, the foundations of which straddle a commuter rail line that connects midtown Manhattan with the affluent northern suburbs, we witness a gendered division of intellectual labor, correlated with social class, within which modern architecture operated during the postwar period in the United States.

By the early 1960s, many corporations had borrowed the campus model to organize their work outside of cities, especially when that work involved some form of scientific research. A representative example was the Thomas J. Watson Research Center, designed by Eero Saarinen for International Business Machines (IBM), in Yorktown Heights, New York, a suburb of New York City, which opened in 1956. In plan, the building is a typical American college campus turned inside out and made more compact than many other corporate adaptations of the campus type to suburban enclaves (Fig. 6). Rather than a series of pavilions clustered around a quadrangle (as at Harvard), or a sequence of cloistered courtyards (as at Yale), this elongated, expandable, curved building was designed to cultivate reflective thought along an indoor stroll. By then the Saarinen office had designed numerous campus plans, and Eero Saarinen grew up on a campus designed by his father Eliel, for the Cranbrook Academy of Arts, in Bloomfield Hills, Michigan. The elder Saarinen brought an arts and crafts sensibility to the design of the Cranbrook campus and to the Cranbrook Academy curriculum. The aim was to counteract the urban alienation (and racial strife) of nearby Detroit, with an idealized Nordic *Gemeinschaft*.

4| Gordon Bunshaft and Natalie De Blois, Union Carbide Building, New York, 1960.

5| Gordon Bunshaft and Natalie De Blois, Union Carbide Building, New York, 1960

6| Eero Saarinen and Associates, IBM Thomas J. Watson Research Laboratory, Yorktown Heights, New York, 1961

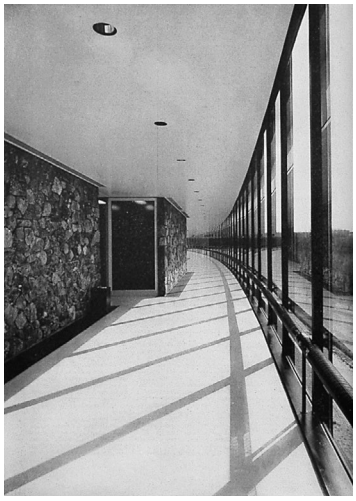


Throughout his short but prolific career, and often with the help of fellow Cranbrook alumni Charles and Ray Eames and Florence Knoll, the younger Saarinen translated the community-of-the arts he found at Cranbrook into a modernist idiom suited to constructing different forms of corporate community for American business.

The Watson Research Center was one such community—an inside-out campus designed mainly for doctors of philosophy, or PhDs, most of whom were engineers or computer scientists. Rather than enclose these office workers in cubicles doing repetitive tasks, as SOM had done at Union Carbide, Saarinen sought to free their minds. IBM was in the knowledge business, and the Watson Research Center was an extension of the postwar multiversity where many of its employee-researchers completed their dissertations. By this point, IBM's products included large mainframe computers and the software that ran on them, as well as the expertise to run the software and the machines, all of which the company leased to private and government clients whose work involved processing large amounts of information. To develop new machines, new software, new expertise, and new clients, IBM cultivated new landscapes of knowledge. Hence, the name of the magazine that IBM published for its employees and its customers repeated the simple command given by IBM's founder and the building's namesake, Thomas J. Watson, Sr.: "Think."[2]

Who then was the "researcher" for whom Saarinen designed this building? As imagined and staged by Saarinen's architecture, this figure, who was almost always a white male, was a thinking, feeling person—a unique individual. More specifically, far from being a modular abstraction—an "organization man", as at Union Carbide—Saarinen's imagined researcher exhibited all of the stereotypical eccentricities of the college professor or research scientist.

7| Eero Saarinen and Associates, IBM Thomas J. Watson Research Laboratory, Yorktown Heights, New York, 1961



At the Watson Research Center, Saarinen and his colleagues accommodated this figure's individuality in a floor plan organized around a rainbow of color-coded hallways, equipped with a modular partition system that could be arranged and adjusted as needed. In rows of color-coded office cells lining the internal corridors, researchers faced inward, doing specialized work. When they needed time and space to think, they could go for a walk, symbolically but also literally. This campus stroll, however, did not cross quadrangles or lawns; instead, it followed a curved, outward-facing corridor with an expansive, gently panoramic view of the rolling landscape that had been made famous a century earlier by the Hudson River School of American painters (Fig. 7). Like much else in Saarinen's work, the curve is functional (allowing for a panoramic view), but also expressive, with overtones of Erich Mendelsohn and more distantly, Hans Poelzig, the architect of the similarly curved IG-Farben-Haus now occupied by the University of Frankfurt. Although Saarinen's corridor

2 IBM published *Think* magazine from 1935 to 1999, principally for customers through 1970, and mainly for employees thereafter.

for IBM was glazed floor-to-ceiling, the rest of the building was windowless. Thirty years before the advent of the personal computer, the instrument screens and IBM Selectric typewriters on the desktops inside the cubicles were forerunners of screens, desktops, and Windows to come.

This topology—off campus scientists, inside-out walks, windowless offices with on-screen "windows"—belongs to what we can call the organizational complex, a type of media complex that, like the postwar multiversity, formed an aesthetic and technological extension of the Cold War military-industrial complex (Martin, 2003). Within such complexes, media were much more than computers or communications devices. Like the system of corridors, offices, windows, and screens at IBM, they are environments, where thinking was done on leisurely strolls designed, like the computers themselves, to mediate the production of knowledge in which universities and corporations joined forces.

Here, thinking was work that had been previously reserved for scholars and scientists but was gradually moved off-campus to corporate laboratories like those at IBM, as well as to non-profit "think tanks" and other civil society extensions of academia. Both "pure" and "applied" at once, in these early years of computerization, knowledge—technical knowledge, mathematical and scientific knowledge, social and economic knowledge, as well as engineering and design—was also a function of border lines that defined where and how that thinking was done.

While working on IBM, the Saarinen office designed another inside-out campus—a laboratory for the Bell Telephone Company in Holmdel (NJ). The original Bell Labs complex, also in New Jersey, was among the most important sites of communications research and development during the mid-century. The new facility extended this work to communication satellites and related systems for both the corporate sector and the US government, including the military. Again, there were inward-looking modular offices, this time surrounding a large central atrium. A wide corridor now wrapped around the entire building, clad in a gridded, mirrored glass curtain wall, the first of its kind (Fig. 8). Outside, the mirror reflected the suburban landscape of clouds above and cars below—a kind of ambient white noise, an ominous, everyday sublime that was quite unlike IBM's picturesque Hudson Valley (Fig. 9). This was the sprawl of big science in the suburbs, rising against the backdrop of the Cold War.

Saarinen's design associate on both projects was Kevin Roche, a graduate of the Illinois Institute of Technology. Together with John Dinkeloo, Roche completed the Bell Labs building after Saarinen's untimely death in 1961. Roche and Dinkeloo would go on to design many headquarters for multinational corporations, among which was a new campus for the Union Carbide Corporation, which had moved from its Park Avenue headquarters to suburban Connecticut. Completed in 1982 and designed as a single, massive piece of infrastructure,

8| Eero Saarinen and Associates, Bell Laboratories, Model, with corridor, Holmdel, New Jersey, 1966

9| Eero Saarinen and Associates, Bell Laboratories, Holmdel, New Jersey, 1966

10| Kevin Roche, John Dinkeloo and Associates, Union Carbide Headquarters, Danbury, Connecticut, 1982

Roche and Dinkeloo's Union Carbide headquarters organized clusters of office pods around a massive parking garage in place of a central atrium (Fig. 10). This was a drive-in campus, where suburban office workers could park just outside their cubicle and enter without ever having to go outdoors. The inversion allowed the offices to occupy the full perimeter, arranged in a snowflake-like pattern in which every office was a corner office, with each occupant able to enjoy a piece of the surrounding landscape from which both cars and people had been architecturally removed.

Roche and Dinkeloo's design utilized pattern-based techniques to minimize spatial hierarchy that had been pioneered at SOM by Walter Netsch, most notably in the design of the University of Illinois campus at Chicago Circle in the 1960s. But where Netsch's spatial patterns maximized opportunities for social encounter, Roche's plan addressed Union Carbide's American employees as individual persons, or what management jargon called "human resources", with rhetorically equal access to amenities, including personalized outdoor views and personalized environmental controls in each office. This individualized equality was, of course, a ruse of the sort that Horkheimer and Adorno had already associated with American mass culture four decades earlier. Transferred to the American suburbs, pseudo-individualization applied only to the distant descendants of Odysseus—college-educated office workers, particularly middle managers—and not to the oarsmen, like support staff and maintenance workers, who kept the giant ship afloat.

Union Carbide was a chemical company that, like IBM or Bell Labs, also depended on scientific and technological innovation. Among the company's most important products were fertilizers and pesticides manufactured and sold in support of "agricultural revolutions" around the world. One major Union Carbide pesticide manufacturing plant was located in Bhopal, India. On the night of December 2, 1984, two years after Roche's building opened, forty-five tons of the lethal gas methyl isocyanate (MIC) leaked from a poorly maintained storage tank at the Bhopal plant. The official death toll was 3,800, roughly equivalent to the number of workers at Union Carbide's headquarters in suburban Connecticut. Activists and survivors estimated the toll to be as high as 10,000 to 20,000. Most of the victims, including an unknown number of Union Carbide employees—"human resources"—lived next to the plant and were overcome by the gas as they slept. Many were from the poorest classes in Indian society and lacked citizenship papers and other documents, so neither their lives nor their deaths were ever formally counted (Martin, 2010: 123–145).[3]

These two examples—a suburban headquarters and an urban factory—show that, by the mid-1980s, the risks of knowledge work like boredom, stress, and de-personalization, were starkly differentiated

3 For more detail on the Union Carbide headquarters in relation to the Bhopal tragedy, see Martin 2010, pp. 123–145.

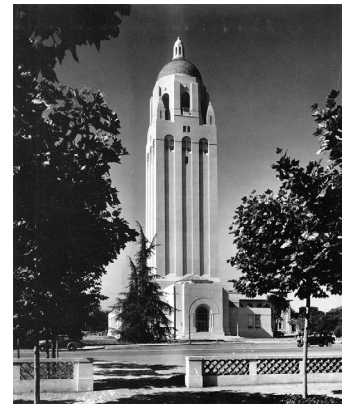
from those of physical labor, which was often performed for the same corporate body, like Union Carbide, by different people living dramatically different lives. Since the 1960s, campus activists had used Clark Kerr's description of the multiversity as a "knowledge factory" to critique its instrumental ties to business and the military (Savio, 1964).[4] By that time, corporations and universities were so enmeshed that it is possible to speak of something like a "corporate university" to describe the inside-out connection of research and development with its profit-seeking, and sometimes lethal, deployment.

Off campus, corporations like IBM and Union Carbide built media complexes—environments—for what amounts to the design of the office worker as a thinking individual. This individual, who was both real and imagined, lived on the constantly shifting border between universities and corporations. Modernist buildings like those designed by SOM, Saarinen, and Roche, redrew this border in unexpected ways. But modernism was not a necessary ingredient of mid-century modernity, as the example of the Hoover Tower at Stanford University shows.

Located in the historical core of the Stanford campus, in the middle of what is now Silicon Valley, the Hoover Institution of War, Revolution, and Peace was founded at Stanford in 1919 as a semi-autonomous research institute that later became one of the premier "think tanks" of the post-Cold War economic and political order. In 1941, Arthur Brown, Jr.—who would shortly design Berkeley's cyclotron shed—designed a new building for the Hoover Institution, centered on a tower that mainly houses the Hoover Library and archives, with a windowless, fluted shaft shielding the books and scholars inside from daylight outside. The Hoover Tower's simplified, vaguely Art Deco forms combine distant neoclassical references with the northern California Mission Style that connected the Stanford campus with the legacy of the Spanish Empire, for which the mission was an architectural unit of colonial rule (Fig. 11). This connection is most evident in Stanford's original, central quadrangle, completed in 1906 by Shepley, Rutan, and Coolidge (the successor firm to Henry Hobson Richardson) in a neo-Romanesque manner with sharp Mission Style accents, such as red tile roofs. The Hoover Tower sits off to the side of this quadrangle, distinctively marking the skyline.

Established during the 1920s as a repository of documents related to "war, revolution, and peace", by the early 1980s the Hoover Institution had become the principal archive of the history and ideology of neoliberal economic theory. W. Glenn Campbell, the Institution's president from 1960 to 1989, was an economist and early member of the Mont Pèlerin Society, the organization of professional economists that became a clearinghouse for neoliberal thought during

11| Arthur Brown, Jr., Hoover Library Tower, Stanford University, 1940



4 In one of the central statements of the Berkeley Free Speech Movement (FSM), which began at Berkeley in 1964, FSM student leader Mario Savio drew on Kerr's own description of the university as a "knowledge factory."

the postwar period. In 1980 the Society held its general meeting at the Hoover Institution, the first in North America since Princeton in 1958. Other Society members included the economists Milton Friedman and Friedrich von Hayek, both of whose papers are now stored in the Hoover Institution archive, as are the papers of the Mont Pèlerin Society itself (Mirowski and Plehwe, 2009, Martin 2021).

Like these archives, the architectural history we have been surveying belongs to the history of neoliberalism. Contrary to Horkheimer and Adorno's thesis, it does not record the inevitable death of the liberal individual at the hands of the modern masses, but rather his (and her) rebirth, as a knowledge worker. In 1784, Immanuel Kant began his famous remarks on Enlightenment with a categorical imperative—a command: Sapere Aude! Dare to know! In the new order, as Horkheimer and Adorno undoubtedly recognized, scholars had little choice, like Odysseus, but to obey this command, if only as a friendly, collegial rebuke—though not exactly a refusal—of the profit-seeking corporate command: Think!

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Illustrations

Fig. 1 John Galen Howard, Hearst Memorial Mining Building, University of California, Berkeley, 1907. "The New University of California", Architectural Record 23, no. 4 (April 1908): 283

Fig. 2 Arthur Brown Jr. with Ernest Lawrence, Cyclotron Building, The University of California, Berkeley, 1940. Lawrence Berkeley National Laboratories. Jeffrey T. Tilman, Arthur Brown Jr., Progressive Classicist (New York: Institute of Classical Architecture / W. W. Norton, 2006)

Fig. 3 Aetron, Blume, Atkinson and Charles Luckman Associates Stanford Linear Accelerator Center (SLAC), Stanford University, c. 1966. Stanford University, Office of Development, Photographs, Department of Special Collections and University Archives, Stanford University Libraries

Fig. 4 Gordon Bunshaft and Natalie De Blois of Skidmore, Owings & Merrill, Union Carbide Building, New York, 1960. Office interiors. Photograph by Ezra Stoller. © Ezra Stoller/Esto

Fig. 5 Gordon Bunshaft and Natalie De Blois of Skidmore, Owings & Merrill, Union Carbide Building, New York, 1960. Office interiors. Photograph by Ezra Stoller. © Ezra Stoller/Esto

Fig. 6 Eero Saarinen and Associates, IBM Thomas J. Watson Research Laboratory, Yorktown Heights, New York, 1961. First and second floor plans. "Unique Cross-Curve Plan for IBM Research Center", Architectural Record 130, no. 1 (June 1961): 140–141

Fig. 7 Eero Saarinen and Associates, IBM Thomas J. Watson Research Laboratory, Yorktown Heights, New York, 1961. Corridor. Photograph by George Cserna. "Research in the Round", Architectural Forum 114, no. 6 (June 1961): 80

Fig, 8 Eero Saarinen and Associates, Bell Laboratories, Holmdel, New Jersey, 1966. Model, with corridor. Photograph by Cervin Robinson. Eeva-Liisa Pelkonen and Donald Albrecht, eds., Eero Saarinen: Shaping the Future (New Haven: Yale University Press, 2006): 209

Fig. 9 Eero Saarinen and Associates, Bell Laboratories, Holmdel, New Jersey, 1966. Photograph by Cervin Robinson. "The Biggest Mirror Ever", Architectural Forum 126, no. 3 (April 1967): 33

Fig. 10 Kevin Roche, John Dinkeloo and Associates, Union Carbide Headquarters, Danbury, Connecticut, 1982 Aerial photograph. "Kevin Roche: Seven Headquarters", Office Age 01, Special edition (1990): 132

Fig. 11 Arthur Brown, Jr., Hoover Library Tower, Stanford University, 1940. Photograph by Jean Moulin © Moulin Studios. Jeffrey T. Tilman, Arthur Brown Jr., Progressive Classicist (New York: Institute of Classical Architecture / W. W. Norton, 2006)