The Triumph of Modernism, 1946–1964

Americans felt justly proud when their decisive role in World War Two catapulted the nation to superpower status. Immediate post-war realities were difficult, however, with the country plagued for several years by severe inflation, housing shortages and job scarcities. The 'GI Bill of Rights' promised generous education, health and housing benefits for 11 million returning veterans, but facilities were sorely lacking. The horrors and deprivations of the war made a safe middle ground seem especially appealing. Commentators touted social and political consensus – what Arthur Schlesinger, Jr, called 'the vital center' in 1949 – as the basis for a fundamental national character, an American Exceptionalism. The ascendancy of modern architecture became a central tenet of this accord throughout the country and the world.

All sorts of angst underlay the 'nifty fifties'. A cheerful outlook was always shadowed by the risk of failure, falling from grace by having made the wrong choice. With the first references to the Cold War in 1948, the government initiated a military and propaganda campaign of prepared-ness. Officials promised protection in underground bomb shelters and curvilinear architectural surfaces that supposedly deflected radioactive fallout. Senator Joseph McCarthy's virulent attacks on supposed Communist infiltration made any criticism seem potentially dangerous. Competition between companies, cities and neighbours was all the more intense for being discreetly hidden. The transparency of curtain walls and picture-windows could not assuage ever-present fears about con-tamination, subterfuge, spies and secret lives.

Architecture did not escape the ferocity of these tensions. Lewis Mumford's 1947 essay 'The Bay Area' in the *New Yorker* attacked the International Style as placeless and inhumane, then extolled an alterna-tive Modernism, a 'free yet unobtrusive expression of the terrain, the climate, and the way of life'. His title clearly referred to northern California, past and present, although Mumford resisted provincialism, lauding similar predilections from Latin America to New England. Philip Johnson, once again MOMA's Curator of Architecture, quickly counter-

I. M. Pei, Alcoa's Washington Plaza Apartments, Pittsburgh, Pennsylvania, 1964, view from a 'blighted' neighbourhood, from *Fortune* magazine (October 1964).

attacked, staging a 1948 symposium with an alarmist title: 'What Is Happening to Modern Architecture?' Even a sensitive designer like Marcel Breuer mocked Mumford's appeal to humanism. 'If "human" is considered identical with redwood all over the place or with imperfection and imprecision,' he sneered, 'then I am against it.'[1] The vituperative tone and aftermath of this event forced the discipline into polarized camps, contemptuous and soon ignorant of each other: East Coast versus West, universalism versus regionalism, radical avant-garde innovations versus adaptive pragmatist experiments.

As if to finalize the break, a 1952 MOMA exhibition, *Built in USA*, acclaimed pristine office buildings, elegant apartment buildings and suburban dwellings along with one glass-walled industrial structure in Texas in deference to the 1920s European Modern Movement. Curators Arthur Drexler and Henry-Russell Hitchcock proclaimed that the 'quality and significance' of post-war American architecture was 'more nationally standardized – in a good sense' and also 'more luxurious – and not to balk at a word – beautiful'.[2] To buttress the implied comparison they appropriated the title from Elizabeth Mock's 1944 show, thereby erasing its legacy of popular, multifaceted Modernisms.

Modern art was central to the post-war commercial world and to intellectual resistance against the pervasive influence of 'mass culture', typically attacked as a form of totalitarianism. The avant-garde saw themselves as outsiders to an establishment that often cultivated them as it explored a wide range of aesthetics. Clement Greenberg's 'Avant-Garde and Kitsch' became a mantra, affirming the intellectual difficulty of 'genuine art' by heroic individuals whose rigorous formalism probed the distinctive medium of their art, whether painting or architecture. 'The essence of Modernism,' he told a Voice of America audience, lay 'in the use of characteristic methods of a discipline to criticize the discipline itself.'[3] Critics like Dwight McDonald condemned all aspects of 'middlebrow' or 'midcult' taste. Television soon extended the pervasive and seemingly pernicious realm of popular culture to a mass audience. Whereas only 5 per cent of households had televisions in 1950, this escalated to almost 90 per cent by the end of the decade. To artists and intellectuals, the built environments and social worlds on the screen seemed unspeakably vulgar.

President Harry S. Truman's Council of Economic Advisers assured the nation of permanent prosperity so long as American capitalism experienced continuous growth, regulated by fine-tuned governmental interventions. Government agencies helped the private sector expand dramatically, especially producers of building materials and the real-estate industry. The gross national product soared 250 per cent between

1945 and 1960, while expenditures on new construction multiplied nine-fold. A prescient 1947 article by Hitchcock dared to suggest that 'the Architecture of Bureaucracy' in large, anonymous firms might be appropriate for most needs in post-war society. He acknowledged the usefulness of an 'Architecture of Genius' for monumental structures, but warned of 'pretentious absurdity'.[4]

In principle, all Americans were middle class or almost there. The unprecedented affluence of the 1950s created the world's first mass middle class, roughly half the population by most indicators, with race a major factor in the split. Real incomes rose for most socio-economic groups, as did home ownership, while the advent of credit cards and new consumer goods provided a bounty of comforts known as 'the good life'. 'Fitting in' was a prime goal, and most groups ostracized those who did not abide by their norms. In many ways the country was more democratic than at any time in its history, but also more materialistic and intensely conscious about status. C. Wright Mills's *White Collar* (1951) described businessmen assuming the trappings of professionals, including their titles, claims of highly specialized knowledge, and assertions of public interest. Professionals, including architects, became even more concerned about their own authority and prestige. Modern architecture was a cornerstone of these ambitions, whether in civic facilities, office buildings or houses. Vance Packard's *The Status Seekers* (1959) compared blue-collar suspicions of Modernism with its 'snob-appeal' for those with aspirations. 'Eggheads have enough self-assurance so that they can defy convention', he contended, 'and they often cherish the simplicity of open lay-out.'[5]

Businessmen and politicians saw the modern metropolis in terms of orderly development and deplored the dynamic, disorderly world of city streets. Urban renewal – a generic term taken from 1954 federal legislation – remains the most controversial aspect of post-war American growth. The 1949 Housing and Urban Redevelopment Act joined federal and local governments to 'modernize' downtowns and boost property values by clearing blighted properties to create large parcels that would attract investors. As experts looked for problems they could 'solve', they fixated on recent African-American migration to major cities, which increased dramatically during the 1940s and '50s with the decline of Southern sharecropping. A major tax liability, this demographic shift also fuelled 'white flight' to the suburbs. Title I of the 1949 Act gave re-development agencies two-thirds of the funds to eradicate blighted areas. Only 20 per cent of a designated area had to be declared 'blighted' for the entirety to be demolished.

Urban renewal dispossessed more than 400,000 families between 1949 and 1967, federally aided urban highways an additional 330,000. The

writer James Baldwin called this 'Negro removal', although small-scale commerce and homes in stable white ethnic neighbourhoods also fell to the bulldozers. Low-income African-Americans lost the equivalent of one of every five homes. Replacement or public housing provided for less than one half of 1 per cent of those displaced. White ethnics scattered fairly widely, although many experienced a sense of 'grief' as they were cut off from the ties of family and friends, but racial segregation limited options for African-Americans, which in turn increased rents and over-crowding. Black ghettos and all-white suburbs became far more permanent and pervasive features of American life, what one Soul song called 'a chocolate city with vanilla suburbs', although there were some all-black suburbs.[6]

The results transformed American cities almost as radically as their bombed-out counterparts in Europe and Japan. New building sought to keep or lure wealthy residents and increase urban tax bases. Construction standards in Title 1 housing for middle-class tenants were notoriously shoddy and favoured small units, making them unsuitable for families with children. Luxury apartments and corporate office towers predominated, along with convention centres, stadia and tourist mon-uments like the St Louis Arch (1947–66). Pittsburgh's Gateway Center by Otto Eggert and Daniel Higgins was the nation's first completed redevel-opment (1948–53). Mayor David Lawrence then appointed himself head of the Redevelopment Agency and continued major projects. The 1954 Urban Renewal Act encouraged cities to combine historic preservation with large-scale new building. Almost 1,600 urban-renewal projects would be in place by 1965. Highly visible examples include Denver's Mile High Center (1952–60), Philadelphia's Penn Center and Society Hill (1955–64), San Francisco's Golden Gateway and Embarcadero Center (1957–67) and Boston's Prudential Center and Government Center (1960–68). By 1960 *Fortune* magazine could proclaim a revised model of the American city as 'a control tower'.[7]

Scientific and social-scientific discourse helped legitimate architects' desire for leadership, especially in urban transformations. MIT's Norbert Wiener, author of *Cybernetics* (1948), extrapolated from the 'feedback' conditions of new information-processing machines. Harvard's Walter Gropius favoured the social sciences, cellular biology and nuclear physics. The main result was analogies about social cohesion, organic growth and dynamic power in architecture. The Social Science Research Council sponsored a conference in 1951 about these trends, but quickly withdrew from the topic in frustration about the vague methods. This did not curtail architects' enthusiasm.[8] References to quantitative surveys generated vague norms about the 'typical office' or 'average family'. Facile

Elaine de Kooning in the de Koonings' Soho loft, New York City, c. 1958.

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'liveability' studies evoked psychoanalytic theories and sociological data to prove the potent effects of home environments.

The familiar story of post-war Modernism gives the illusion of a common purpose which has obscured significant experiments and variations in all the arts, including the peripheries of architecture. Some were created by inspired 'outsiders'. Simon Rodia completed Watts Towers in Los Angeles in 1954 after 33 years of inspired, ad hoc construction. Elusive 'underground' artists transgressed boundaries, while small journals explored broad cultural terrains. The Walker Art Gallery in Minneapolis created the *Everyday Art Quarterly* (renamed *Design Quarterly* in 1951). J. B. Jackson's *Landscape* explored 'new architectural forms' in the 'ordinary realm', including builders' houses and drive-in restaurants. The first semi-programmed, mixed-media 'happenings' and live electronic music were staged; bebop dissonance spurred virtuoso riffs; and painters incorporated tattered fragments of mass culture. New York artists unintentionally suggested a new approach to space, beauty and time when they began to transform industrial lofts into live/work spaces in the late 1950s. Faced with abandoned buildings when industries moved out of the city, landlords were willing to rent cheaply, if illegally. The artists honed necessity into an aesthetic, transmuting the gritty open spaces of industrial modernity into a harbinger of future trends in design. Within a decade, these aesthetic principles would play a visible role in architecture, and three decades later in real estate.

Corporate Modernism

Post-war finance and business launched a 'systems' revolution. The economist and management consultant Peter Drucker led the charge with his influential book *The Concept of the Corporation* (1946). Transferring military strategies to private business, he hailed a rational model of centralized management and decentralized operations, each entity a holistic 'social institution'. In principle, both individuals and units would identify themselves as interchangeable parts in a corporation's large-scale, standardized yet more flexible system. Financial and marketing specialists calculated tactics for continual growth, in part through 'planned obsolescence' – a term coined in 1954, although the basic principle had emerged in the 1920s. A parallel set of human-relations experts sought to build employee morale and company loyalty. Prestigious architecture firms synthesized these goals with new kinds of office buildings based on the subtle distinctions of a statistical Sublime. Large architect-engineering-construction companies built generic modern structures with higher capacities and more 'flexible space' – converting a wartime idea to peacetime prosperity.

Skidmore Owings &
Merrill (Natalie de
Blois and Gordon
Bunshaft, principal
designers), Union
Carbide Building, New
York City, 1960,
typical office interior.

Interior spaces helped reorganize the day-to-day world of advanced
capitalism after World War Two. Modern paintings and sculpture
adorned the transparent ground-floor lobbies, suggesting lofty principles.
Isamu Noguchi created biomorphic lobby ceilings for two of Harris
Armstrong's 1947–8 corporate headquarters in St Louis, although most
lobbies were self-consciously understated. Noguchi and other modern
sculptors soon collaborated with architects to design outdoor plazas for
major corporate clients. Art served to humanize business calculations.
Office floors were much larger in the raw space of their footprints and the
'modular coordination' of perfectly uniform arrangements. Designers

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replicated the physiognomy of the exterior building modules, subdividing internal grids with lightweight standardized office partitions, visible signs of order and flexibility – even if changes were rare. Control extended to micro-grids of luminous ceiling panels and sealed windows to ensure a uniform temperature with central air conditioning. The furniture designer Florence Knoll collaborated with major architects to provide evidence of good taste and orderly employee diligence for elite corporations. A new profession called 'space planning' helped balance strong public image with efficiency in ordinary offices.

Architects mostly obsessed about façades, especially the transparent curtain wall, a thin, non-load-bearing cladding 'hung' on the structural frame. The term honed Modernism's focus on surface or skin, combining visible transparency with the minimalist elegance of construction details. Executives shared architects' beliefs that impeccably coordinated building systems communicated directly to employees and the public. The building committee for the Inland Steel headquarters in Chicago spoke of investing in a 'unique institutional identification', or corporate image; its chairman compared the façade to 'a man with immaculate English tailoring'.[9]

Two precedents were clear at the time: Mies van der Rohe's unbuilt

Pietro Belluschi, Equitable Building, Portland, Oregon, 1944–8 (today the Commonwealth Building), main street façade.

Berlin project for a glass skyscraper (1921–2) and Pietro Belluschi's Equitable Insurance Company Building in Portland, Oregon (1944–8). Belluschi had first conceived the latter project for *Architectural Forum*'s 1943 series, 'New Buildings for 194x', so he was ready when a pre-war client approached him the next year for an office building. Sheathed in thin war-surplus aluminium, the Equitable rose all of twelve storeys, but its concrete frame and aluminium spandrels were virtually flush. Slender ground-level piers clad in pinkish marble maintained the street wall and a protected walking corridor for pedestrians. The absence of parking revealed pre-war origins, but the interiors were decidedly up-to-date with open floor plans and exacting climate controls. The immense glass windows were tinted, insulated and sealed, washed by an ingenious system suspended from the roof (soon a standard device around the country). Initially greeted with resounding praise, the Equitable's provincial location then hid it from view until a restoration

in 1988 as the Commonwealth Building reaffirmed its significance as the first all-glass office tower.

Curtain walls and open, grid-based interiors became trademarks of Skidmore Owings and Merrill (SOM) and New York's Lever House (1949–52) assured their reputation for prestigious corporate statements. The structure comprised two gleaming asymmetrical frames: one hovers, a horizontal two-storey plane traversing the site; the other ascends 24 storeys. Gordon Bunshaft, chief designer in the New York office, convinced the client to create magnanimous public spaces, a broad 'plaza' under the *piloti* supports and an exhibition area in the tower's glass-enclosed lobby. A provision in the municipal zoning regulations permitted towers with small footprints to rise as sheer volumes without the setbacks required of 1920s skyscrapers. Bunshaft also understood architectural symbolism: the transparent façades celebrated cleanliness for a producer of soaps; lightly green-tinted glass reduced glare; spandrel glass between floors made the building seem to float unobtrusively. Its immediate success solidified the shift of New York's business and finance from Lower Manhattan to Midtown that had begun during the 1920s, while glass revolutionized a district defined by limestone.

SOM soon acquired four regional offices and high-status international commissions. Each office balanced collective anonymity with talented individuals. Natalie de Blois was another chief designer in the New York office, bringing an incandescent lightness to the Union Carbide and the Pepsi-Cola buildings (both 1958–60). Walter Netsch provided the schematics for the Crown-Zellerbach Building in San Francisco (completed by Chuck Basset in 1959) and then moved to Chicago. Netsch's Inland Steel (1954–8) gave prominence to gleaming steel columns rising the full height of the façade and clearly differentiated internal functions with a set-back windowless box for elevators, stairs and the HVAC system. *Fortune* contended that 'SOM took Mies's stainless-steel standard, warmed it up and sold it as a prestige package to the US businessman.'[10]

For most architects nothing surpasses New York's exquisite Seagram Building on Park Avenue, diagonally across the street from Lever House. Another narrative of redemption helped build its mythic status. Samuel Bronfman, president of the corporation, an international whisky-distribution company, announced a grand new building to celebrate its centennial in 1954 and selected an architect. His daughter, Phyllis Lambert, convinced him of the need for higher aspirations. Mies van der Rohe seemed the pivotal figure who was creating a 'grammar' and a 'poetry' for modern architecture. 'You might think this austere strength, this ugly beauty, is terribly severe', Lambert explained. 'It is, and yet all the

more beauty in it.'[11] Assertive individual interventions seem a leitmotif in American corporate Modernism.

Completed in 1958, the Seagram Building reduced modern architectural form to its simplest, most perfect elements. Clad in sumptuous travertine and topaz-tinted glass, this sleek box redefined the slab. A double-height glass entry lightened the massive structure. A grid of bronze I-beams is welded to the curtain wall at close intervals to evoke the ideal of structural expression. As with Lever House, the public space transmuted zoning regulations to permit a perfect rectangular volume and extended a grand gesture of *noblesse oblige.* The granite-paved plaza occupies 48 per cent of the site, raised on a plinth, if only two steps off the sidewalk. This grand forecourt distances the 38-storey tower from the street. The interiors are finished with exacting attention and opulent materials. Every aspect of the building is faultless and therefore neutral, leading to frequent comparisons with a Greek temple. Lewis Mumford considered the Seagram Building the 'Rolls Royce' of contemporary buildings, while Manfredo Tafuri spoke of its 'aloof' character, 'tragically . . . self-aware' of its superiority.[12]

The quality of Mies's building encouraged architects to believe that singular artworks allowed them to operate within a commercialized world, uncontaminated by commercial influences. Critical analysis focused on nuances of intellectual and formal rigour. Colin Rowe's 1956 essay, 'Chicago Frame', sought to distinguish unique works of art by master architects from the standardized veneers of buildings by commercial architects. Yet the inevitability of inexpensive copies raised a critical dilemma, given modern architecture's inherent drive towards replication. Every society confronts differences in economic leverage and technical skills. Rather than simply deploring inevitable copying, how can modern architects help improve urban streetscapes?

Many companies moved their headquarters to suburban locations where inexpensive land facilitated rambling low-rise facilities and easy expansion. Most industrial or business parks of the 1950s were haphazard groupings of bland structures with insipid landscapes, but some corporate 'campuses' were impeccably elegant. The General Motors Technical Center outside Detroit, commissioned in 1945, set a high standard even as it drew on the audacity of popular culture. Having overtaken Ford as the industry leader, GM's chairman, Alfred P. Sloan, Jr, took up Drucker's corporate programme of centralized policy-making and decentralized operations. Recognizing the pent-up demand for exciting new automobiles, he added vibrant stylistic imagery to the package, appointing GM's chief stylist, Harley J. Earl, as the first Vice-President of Design of any corporation. Earl initiated a series of remarkable changes, not just tail fins

Mies van der Rohe and Philip Johnson, Seagram Building, New York City, 1954–8.

Eliel and Eero Saarinen, General Motors Technical Center, Warren, Michigan, 1945–56, view to exhibition dome, from GM brochure *Where Today Meets Tomorrow*.

and two-tone paint, but the annual model change, which he called 'dynamic obsolescence': the creation of desire for the latest styling.

Although Eliel and Eero Saarinen's design for the GM Center began as a joint project, Eero took over after his father's death in 1950. His appearance on a 1952 *Time* cover celebrated the Center's rigorous engineering, especially the early curtain-wall sections and the 1.5-metre modular system. Thomas Church's landscape design accentuated the ordered horizontality of the composition, offset by a tall, elliptical water tower and a sleek, low dome for Earl's exhibition extravaganzas. Building mock-ups allowed for systematic development, replacing the hagiographic ideal of aloof genius with models of collaboration and feedback. Eleven vibrant colours of glazed ceramic-brick walls distinguished various research functions, carried through to details, furnishings, even the colour of push-pins inside each building. Eero soon delved into American car culture with Neoprene gaskets and sleek glass, all specially produced by GM. He paid homage to Earl's famous spokes and tail fins in the main public lobby. Some custodians of high culture sneered at Saarinen's 'immoral' styling as an assault on the dignity of 'true' Modernism. He seemed too comfortable with big businessmen, his designs too appealing to the popular press. When the GM complex opened in 1956, *Life* called it a 'Versailles of Industry'.[13]

Office buildings were often staid glass boxes, but sometimes startling. Suppliers encouraged adventurous applications to promote their

General Motors Technical Center, lobby.

products: Harrison & Abramowitz glorified one material at the Corning Glass Center in New York in 1951, another in the Alcoa Aluminum Company offices in Davenport, Iowa, and in the clip-on diamond-faceted panels of the company's Pittsburgh headquarters in 1953. A court ruling that aluminium, the first man-made metal, had to allow competition prompted the rival companies to commission audacious new corporate structures and scores of other uses from parking garages to housing. One of the most surprising is surely Minoru Yamasaki's 'architecture of delight' with gold-anodized aluminium screens on the Reynolds Metals Regional Office in Detroit in 1961.

Exuberant vivacity was more common outside the East Coast. Even banks, usually quite sedate, invested in eye-catching architecture. Three Oklahoma City banks are still surprising. The eponymous Gold Dome (1958), the undulating concrete shells of the drive-through facilities at Central National Bank (1960), and the State Capitol Bank (1963), known locally as the 'flying saucer bank' and often featured in the national media, were all designed by the hometown firm of Roloff, Bailey, Bozalis, Dickinson. Enrique Gutierrez's Bacardi usa (1963) in Miami translated Mies's Seagram Building into a Latin idiom, decorating two walls with resplendent murals in glazed-ceramic tiles from Spain. Commercial architecture in Miami seemed to dance as the strong relief on its façades (today known as Mi-Mo) accentuated colour, texture, shadows and other sensual delights.

The physics historian Peter Galison has highlighted the emergence of 'Big Science', typically dispersed away from major cities, during the post-war era. Post-war federal agencies funded scientific research and facilities in every field from atomic energy to zoology. The National Science Foundation, created in 1950, would see its influence soar after the Russians launched Sputnik in 1957. Large generic buildings proliferated for major chemical companies, pharmaceuticals, the energy industry and aeronautics during the Cold War. Galison links these spatial practices with modern art and architecture, as well as with the emergence of the 'military-industrial complex', a term first used in President (former General) Dwight Eisenhower's 1961 farewell speech to the nation.[14] Modern architecture was closely linked to defence contracts as well as to corporate power.

SiliconValley emerged in the farmland between San Francisco and San José just after World War Two. Stanford University Vice-President Fred Terman established the Stanford Industrial Park in 1946 to encourage industry collaboration in high-tech research. Hewlett-Packard joined immediately since Terman had helped his former graduate students Hewlett and Packard set up a workspace in a Palo Alto garage in 1938 – now revered as a national landmark. The site was soon given a more stately name: Stanford Research Center. The landscape architect Thomas Church designed the 265-hectare site plan, while Terman himself established regulations about informal low-rise buildings and helped choose architects. Some were major figures, notably Erich Mendelsohn, who designed the headquarters for Varian Associates, and John Warnecke, who designed General Electric's microwave division. A similar, if less cohesive approach, took hold elsewhere, most conspicuously along Route 128 outside Boston, Massachusetts.

The embryonic information-technology industry sometimes sponsored notable modern architecture. O'Neil Ford, the architect of the Texas Instruments Semiconductor Building in Richardson, Texas (1956–8), invited the Mexican architect-engineer Felix Candela to collaborate on the hyperbolic paraboloid shapes supported by pre-cast concrete tetrapods. Recognizing that this emerging industry required continuous technology upgrades, Ford created the first full interstitial floor between working floors. To encourage employees' collaboration, he accentuated landscaped areas and hand-crafted wooden screens in abstract patterns, both integral to his Modernism.

Meanwhile IBM's Thomas Watson, Jr, began a complete makeover geared to computers in 1952. Watson hired Eliot Noyes to oversee the sleek 'new look' that encompassed product design, flexible 'horizontal' management and architecture: 150 plants, laboratories and office buildings throughout the world in the succeeding fifteen years.[15] Noyes gave Eero Saarinen several important commissions, notably the Watson Research Center (1957–61) in Yorktown Heights, New York, an enormous arc – 300 metres long, 45 metres wide and three storeys high – with sleek glass promenades on the front and rear, echoed by interior corridors. Saarinen kept the sight lines under 30 metres to avoid vertigo. Saarinen also designed a research structure for Bell Laboratories (1957–62) in Holmdel, New Jersey, using dark mirrored glass to reduce heat gain, ensure security and provide another signature façade. Such distinctive architecture has now set preservationists against the companies as they seek to replace their outdated research buildings.

Healthcare followed a similar pattern. The National Institute of Health sponsored multi-purpose hospitals for veterans while an emergent corporate medicine combined federal research funds with private-sector profits.

O'Neil Ford, Texas Instruments Semiconductor Building, Richardson, Texas, 1956–8, construction photograph.

Louis I. Kahn, Salk Institute for Biological Studies, La Jolla, California, 1959–65, view of studies and courtyard.
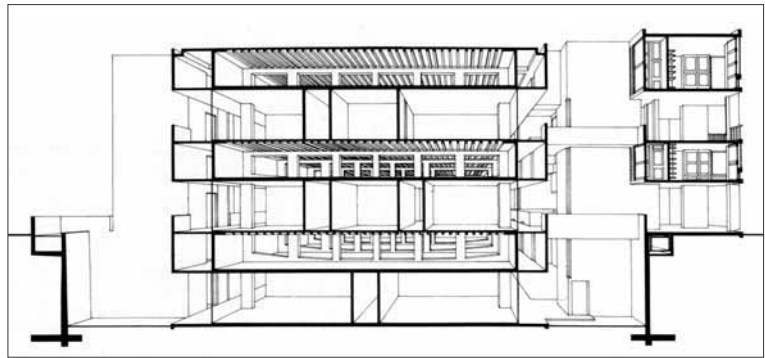
Salk Institute, section showing Vierendeel trusses.

The Texas Medical Center in Houston became world-famous when its 1947 campus added nine specialized hospitals in the succeeding six years, along with adjacent education and medical-office buildings. The centrepiece, the M. D. Anderson Cancer Center (1951–4) by MacKie & Kamrath, set new standards for oncological surgery, treatment, research and teaching. In the words of *Architectural Forum*, the building synthesized 'a complex indus-trial plant' with Wrightian 'organic architecture'.[16] The multi-level integration of landscapes added visual richness and therapeutic calm.

If Houston provided the model for recombinant expansion, Louis Kahn created two architectural monuments for medical research with two laboratory settings. The Richards Medical Research Building

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(1957–61) at the University of Pennsylvania in Philadelphia replaced impersonal corridors with clusters of small labs in three eight-storey towers. Kahn's humanistic systems analysis differentiated 'served' spaces for human work from 'servant' spaces for mechanical equipment, relegated to a fourth tower, although some scientists complained that symbolism trumped functionalism. Kahn's Salk Institute for Biological Studies (1959–65) in La Jolla, California, took these ideas about order to a transcendent plane. A thin channel of water slices the spare central court, leading towards the Pacific and seemingly towards infinity. Two rows of four-storey concrete towers, open at ground level and angled for views of the sea, contain private studies and collective labs. Full interstitial service floors of pre-stressed Vierendeel trusses afford seismic support. Cloistered bridges, staircases and courtyards link the workplaces with chalkboards set into the walls at the junctures to encourage impromptu exchanges. Unpainted teak panels have weathered to soft antique patinas. Kahn's attention to minute details evoked scientific precision. The fundamentals of biological research and architectural systems entered the realm of the Sublime.

'Good-life' Modernism

'Like them or not,' announced *Time* in 1949, 'modern houses are here to stay [with] practicality and sometimes spectacular good looks.'[17] New houses for all classes came fully equipped with status, individuality, high-tech amenities and the natural Sublime. It took some time, however. Five years after the armistice the Housing Act of 1949 finally generated a long-awaited surge. An astounding 2 million dwelling units went up in 1950, and a total of more than 13 million between 1950 and 1960 – 11 million of them in the suburbs, which grew six times faster than cities. The elusive promise of security in the suburbs drove private emotions and public policy. Washington endorsed suburban decentralization as protection against a Russian nuclear attack. Indirect federal subsidies included income-tax benefits and expanded mortgage programmes, each costing the government at least five times more than it spent on housing subsidies for the poor.

A formidable cultural apparatus promoted modern suburban houses. Art museums in New York, San Francisco and Minneapolis sponsored full-scale model homes for general audiences, as did popular magazines and television programmes. The houses varied, of course, given the national desire for individual expression, but Modernism triumphed, especially in systems of production and spatial organization. Structural components were highly visible. Wartime synthetics like acrylic sky-

lights, durable laminates, sandwich panels and new kinds of plywood became standard. Advanced technologies for comfort included insulation (rare before World War Two), automatic heating, passive solar orientation – and then a rush to air conditioning in the early 1950s. Built-in facilities and storage walls provided for a conspicuous increase in consumer goods.

The flow of space emphasized 'zones' rather than rooms, in part to cope with reductions in size. A 'master bedroom' was separated from children's bedrooms, and two new spaces appeared, an outlying utility/laundry room and the 'family room' at the centre. First awkwardly called a 'don't-say-no' place for children and teenagers, it linked the open kitchen and outdoor patio. The architect-authors of *Tomorrow's House* and the editors of *Parents' Magazine* christened the newborn space almost simultaneously in 1946–7. Architecture magazines lavished attention on open living areas and attention-getting roofs, including alternatives to the flat roof, much-maligned for its orthodoxy and its tendency to leak, but gave little attention to site.[18] Shelter magazines like *House Beautiful* defined 'the American Style idea' in similar terms: honest use of simple materials, comfort not show, privacy and view,

Jones & Emmons for Eichler Homes, family room in a model house in Sunnyvale, California, 1955. First Award of Honor from the AIA and the National Association of Home Builders.

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Richard Neutra,
Kaufmann House,
Palm Springs,
California, 1946–7.

indoors and outdoors 'perfectly integrated'. These articles also stressed more overtly political references to 'freedom of choice' and the 'drive for something better'.[19]

Two well-known modernists became popular heroes at this time. *House Beautiful* editor Elizabeth Gordon lauded Frank Lloyd Wright's 'greater principles' as emblematic of American values. *House and Home*'s article 'Frank Lloyd Wright and 1,000,000 Homes a Year' (1953) explained how speculative builders could adapt specific techniques to make small houses seem more commodious. Richard Neutra was equally well received, the evangelist of therapeutic houses that increased psychological and physiological well-being. A *Time* cover story from 1949 praised his ability to merge spaciousness with compactness, exemplified in the magnificent Kaufmann House in Palm Springs shown behind him in the cover photo. *Time* praised Neutra as a leader in the movement to 'humanize and domesticate' the International Style.[20] Each of his domestic landscapes was highly specific; the house plans stretched out lithely, often dematerializing into their surroundings, especially where

sliding glass doors opened onto heated terraces. Neutra explored gestalt psychology to affect illusions of infinite space. He also worked diligently on possible mass prototypes, seeking to convert consumerism into progressive environmental design – indeed into *Survival through Design*, the title of his well-received 1954 book.

Arts & Architecture's Case Study Program helped popularize modern houses for a limited audience. The editor John Entenza issued a call for innovation in January 1945, then marketed 36 model dwellings over the next eighteen years, hoping to stimulate cooperation with industries (notably in metals) and to influence speculative housing. House #8 (1945–9) by Charles and Ray Eames was an epiphany for architects around the world. The Eames House literally captured the post-war sense of open possibilities since it transformed an initial neo-Miesian scheme, its foundation already poured, into a serendipitous assemblage with off-the-shelf industrial components set in an exposed steel frame. Structural rigour joined with a joyful interplay of colour and light, seemingly impromptu yet carefully staged. The overlapping social spaces extended into small niches with designated bedroom and studio areas, providing a flexible live/work environment for this husband-and-wife team, a distinct contrast to the exaggerated gender roles that defined most houses. Yet even this remarkable prototype remained a one-off.[21]

Suburban mass housing went modern for many reasons, including scale. Whereas a typical builder might have put up five houses a year before the war, speculative builders now generated instant subdivisions with thousands of tract houses, mostly indistinguishable from one another, which soon accounted for 80 per cent of American production.[22] The phenomenon of mass builders cannot be isolated from modernist dreams of standardized mass production. Architecture magazines assured readers that Modernism could happily coexist with merchant builders and the American mass market. For several years they promoted collaborations, offering useful design advice and pleading for alternatives to what was already recognized as sprawl.[23]

Most builders simply bulldozed greenfield sites to make the terrain uniform, then mixed conventional post-and-beam construction with factory production to cut costs. Levitt & Sons converted a potato field in Long Island, New York, into the first Levittown between 1947 and 1951. By 1950 the company's offsite factory was producing one four-room house every sixteen minutes. Like GM, Levitt produced a new model every year with special 'built-in' features that quickly became commonplace for other builders. Behind the traditional façades were modern amenities: radiant-heated concrete slabs replaced basements; double-glazed sliding windows and doors that extended onto patios; three-way fireplaces that

Charles Goodman for Robert Davenport, Hollin Hills, Virginia, suburb of Washington, DC, landscape design by Daniel Kiley, 1948, from the AIA's *1857–1957: One Hundred Years of Architecture in America* (1957).

provided a centrifugal focus for open plans – a device borrowed from Frank Lloyd Wright. Modernism endorsed standardization, which extended to homogeneity of class, race and religion as suburbs grew increasingly segmented.[24]

Modern architects had a significant effect on some impressive, racially integrated white-collar developments. In 1948 the developer Robert Davenport hired Charles Goodman to craft an idyllic progressive suburb outside Washington, DC. By 1952 Hollin Hills had almost 500 homes, variations on Goodman's fourteen different models. The landscape architect Dan Kiley maintained the existing topography, kept most of the trees and avoided visible references to property lines. The AIA considered it exemplary American design. The architecture critic Michael Sorkin, who grew up in Hollin Hills, remembers it as 'one of the truly happy experiments in modernity'.[25]

Joseph Eichler built some 12,000 California houses between 1949 and 1968, all resolutely modern, economical and still appealing. Anshen & Allen designed early prototypes for subdivisions in the Bay Area. In 1951 Eichler turned to Quincy Jones, an innovative young architect in Los Angeles, after both received *Architectural Forum* awards. Expanding into the southern California market, Eichler commissioned prototypes from Jones & Emmons, Raphael Soriano and Pietro Belluschi. Jones and Eichler designed a Case Study neighbourhood project of 200 small eco-

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logical houses in 1961, never built because of opposition to fees for the community services.

Several architects challenged normative models by insisting on purity, occasionally to the point of didactic all-glass houses. Mies's house for Dr Edith Farnsworth in Plano, Illinois (1945–51), exposed yet sealed off from the outside world, proved so expensive and frustrating that the client sued the architect unsuccessfully. Philip Johnson's 1949 Glass House copied Mies's with 'a form of exhibitionism' that launched his own career. It also helped breed some 80 flat-roofed 'Harvard boxes' near the staid town of New Canaan, Connecticut.[26]

Regional Modernism flourished from Oregon to Florida, engendering softer variants on the glass box. Igor Polivitzky's Bird-Cage House in Miami (1949) encased a glass-and-steel-frame dwelling in plastic screens, providing almost total integration with the environment. The Sarasota wunderkind Paul Rudolph took a slightly different path. His glass houses used wooden jalousies drawn from Southern vernacular traditions that allowed residents to change the walls in line with their personal responses to climate and desires for privacy. The thin inverted-catenary roof of his 1950 Healy Guest House, known as the 'Cocoon House', was stabilized like a tent with cables and steel straps, then sprayed with a thin coat of Saran-vinyl 'cocoon' invented to protect battleships. The peripatetic Harwell Hamilton Harris, Dean at the University of Texas in the 1950s, distinguished the parochial, backward-looking 'Regionalism of Restriction'

Paul Rudolph, Healy Guest House ('Cocoon House'), Sarasota, Florida, 1950.

173   The Triumph of Modernism, 1946–1964
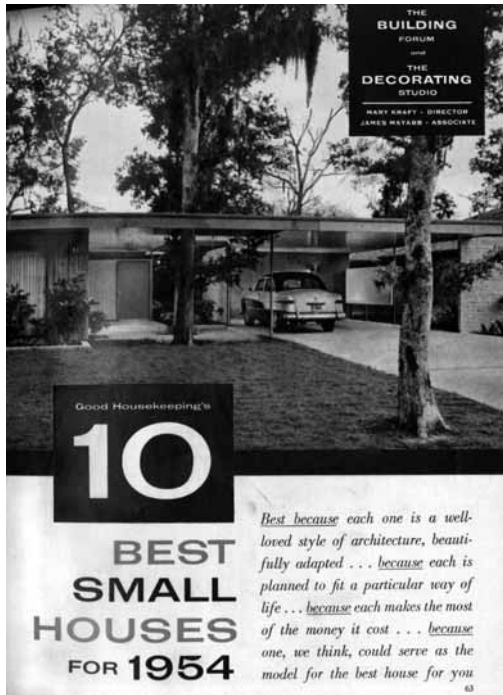
Lars Bang, Bendit House, Houston, Texas, 1954, from *Good Housekeeping* (1954).

from this 'Regionalism of Liberation' or locally based experiments that explored 'emerging ideas'.[27]

Government agencies enthusiastically supported another kind of experiment, prefabrication, seeking technological solutions for problems of affordability. Many such companies collapsed, Lustron most notoriously, beset by financial irregularities, restrictive local building codes and exaggerated promises, but some 300 firms were producing factory-built houses by 1956, accounting for 10 per cent of the nation's total output. Innovations required testing and small-scale production, so thoughtful designs by Edward Barnes, Henry Dreyfus and Charles Goodman reached only a small market, as did Carl Koch's series of inventions that began with folding stressed-skin panels on the Acorn House (1948). Koch later reflected that architects find it difficult to consider site plans, ongoing adaptations and marketing, preferring 'to focus on completely new prototypes'.[28]

The country saw many variations on basic types. Houston, Texas, enjoyed a decade of flat-roofed, steel-framed Miesian courtyard houses of all sizes and price tags. *Good Housekeeping* chose a design by Lars Bang as one of ten 'Outstanding Small Houses of the Year' in 1954. Esther McCoy noted that 'architectural misfits tripled during the 1950s', especially in the West, encouraging an engagement more experiential than cerebral.[29] Iconoclasts experimented with biomorphic forms and unusual materials. Bruce Goff favoured plastics and corrugated metal. John Lautner shaped concrete and added surprises like 750 drinking glasses set as skylights in the coffered concrete ceiling of the Sheats-Goldstein House in Los Angeles (1963). Several Lautner houses have starred in blockbuster movies, iconic expressions of audacity and divergence from conventional norms, akin to the *Playboy* Bachelor Pad of the era.[30]

Multi-family housing was fairly restrained in comparison with the experimentation of pre-war examples. Insurance companies and hospitals used redevelopment funds to finance huge urban enclaves, some fortunately relieved by thoughtful landscaping. Mies again provided the ideal model with two luxury towers at 860–880 Lake Shore Drive in Chicago

John Lautner, Sheats-Goldstein House, Los Angeles, 1963, as shown in the movie *Charlie's Angels: Full Throttle* (2003).

(1949–51), so inexorably uniform that they make no accommodations to sun or wind conditions. MOMA praised the immaculate pair as 'Metropolis defined', precisely because these 'formidable urban objects' provoked an emotional response to urban life 'so well described by Franz Kafka'.[31] The young Herbert Greenwald developed the project, recognizing Mies's towering talent and the need to keep it in check by providing conventional rooms rather than completely open spaces for the apartments. A decade later, Bertrand Goldberg's cylindrical towers at Marina City (1959–64), also in Chicago, offered a more flamboyant prototype and a mixed-use programme.

Low-rise garden apartments re-emerged in the mid-1950s. Herbert Greenwald decided to acquire Gratiot, a large urban-renewal site in Detroit that had laid dormant since the initial clearance in 1950. The IIT faculty began the first section, called Lafayette Park, planned by Ludwig Hilberseimer with a relatively informal landscape by Alfred Caldwell and an extraordinary collection of Mies's architecture, including two-storey townhouses, single-storey courtyard houses and three high-rise apartment towers. Unfortunately, Greenwald died in 1959, leaving the eight other parcels uncompleted; they were sold off separately. As at other renewal sites, former residents could not afford the new accommodations, but the project was racially integrated and may embody a rare success, both spatially and socially.

Charles Goodman collaborated with the Reynolds Metal Company on River Park Mutual Homes (1959–62), which stand out amid the largely failed renewal area of south-west Washington, DC. Two nine-storey apartment buildings and barrel-roofed townhouses share common spaces. Both showcased aluminium with patterned screens that cast lyrical shadows. Similar qualities pervade the wooden geometries of St Francis Square, a San Francisco union cooperative by Marquis & Stoller, completed in 1961. This unusual super-block combined four city blocks into housing and a school. The 299 apartments are stacked three storeys high, arranged as seven groups around three major open spaces. The limited budget forced restraint, so the hilly site provides variety, accentuated by the interplay of decks, balconies and pathways. Lawrence Halprin's landscape plan accentuated vistas, pedestrian connections and various areas for sitting or children's play, relegating parking to the periphery. This remains one of the country's finest examples of affordable housing.
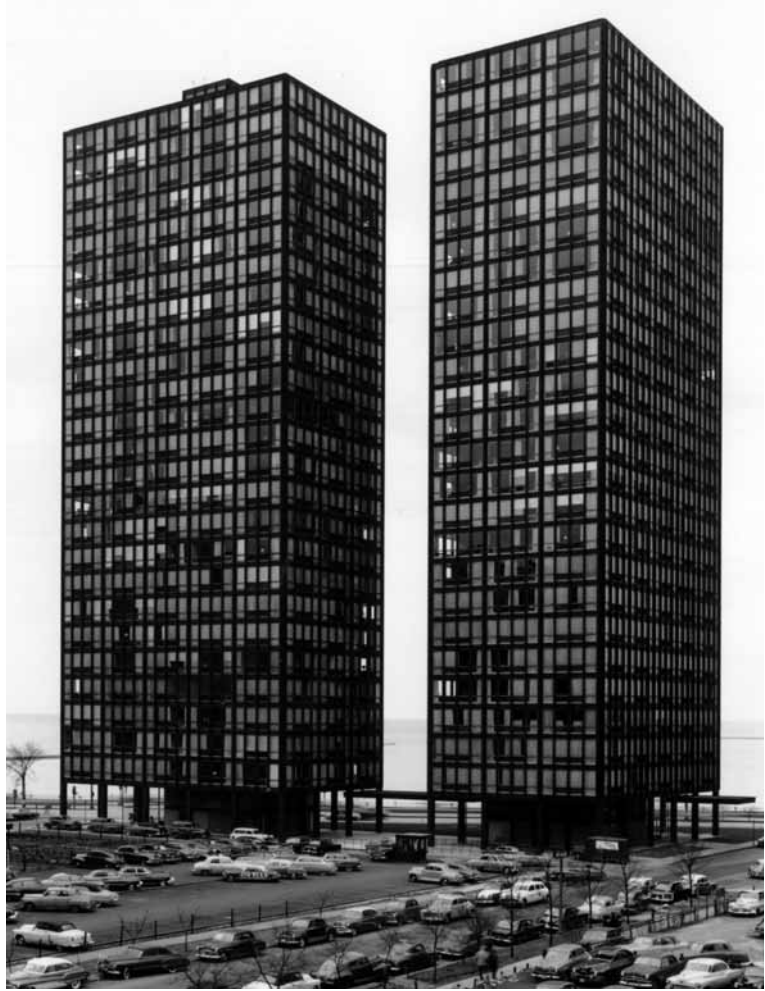
Mies van der Rohe,
860–880 Lake Shore
Drive, Chicago,
1949–51.

860–880 Lake Shore
Drive, site plan and
initial floor plan.

Mies van der Rohe,
Lafayette Park,
Detroit, Michigan,
1955–8.

'Mid-Century Modernism' housing now commands attention in lavish architecture books, popular magazines and specialized real-estate firms. Even the moderate-cost, small-scale urban housing of the post-war years is again finding favour, especially when informal compositions are merged with environmentally conscious site-planning. Smaller garden-apartment complexes in Miami, Chicago, and San Diego merit reconsideration. So do the two-storey stucco apartment buildings of Los Angeles – dubbed 'dingbats' by Reyner Banham in reference to the prevalence of starburst ornamentation that resembled the asterisk-like printing symbol.[32] James Marston Fitch remarked that 'one of the most curious problems facing the architectural editor of a national magazine is trying to keep good West Coast dwellings from monopolizing its pages'.[33]

Public housing represents a small but controversial aspect of 1950s Modernism. Most officials and architects embraced the high-rise super-block as economical, even beneficial, convinced that it protected residents from 'contamination' by the surrounding slums. The costs of the Korean War compounded with Congressional antagonism against services for the poor to slash funding and obliterate many good intentions. Pruitt-Igoe in St Louis (1950–54) is a case in point. Both critics and the architect, Minoru Yamasaki, ignored the fact that the original plans had been scuttled. The descent from ideals to actualities shocked reformers like Elizabeth Wood, then Director of the Chicago Housing Authority (CHA). In 1945 she called for planning to be 'bold and comprehensive – or it is useless and wasted'.[34] The next decade revealed how concentrated locations aggravated problems of racial segregation. When Wood tried to

integrate and disperse Chicago's housing, she was immediately dismissed. She went on to write *Housing Design: A Social Theory* (1961), a thoughtful argument for better alternatives and more resident involvement. Meanwhile, CHA's Robert Taylor Houses by Shaw Metz & Associates (1960–63) packed 27,000 residents into 28 virtually identical 16-storey towers on a 3.2-kilometre-long super-block – the largest such project in the world, now mostly demolished for a mixed-income HOPE VI enclave that depletes much needed housing for the poor.

The 1950s also saw a rise in second homes at ski and beach resorts, including modern icons like Neutra's Kaufmann House and Rudolph's Cocoon House. Wartime values of mobility, restraint and climatic adaptation remained strong for a decade with informal open plans and playful shapes, mostly in wood. 'Vacation houses' could be small and flimsy, thereby legitimizing poor construction standards, especially in Miami and other fast-growing southern cities. Government propaganda insisted that all American workers enjoyed holiday homes like the one displayed at the 1959 American Exhibition in Moscow, designed by Andrew Geller for the All-State Development Corporation. Made famous as the site of the famous Kitchen Debate between Richard Nixon and Nikita Khrushchev, it quickly became a prototype for several hundred 'Leisurama Homes' sold through the department store Macy's. Although Geller's custom-designed beach houses remained economical and whimsically adventurous, the country's 3 million second homes

Charles Goodman, River Park Mutual Homes, Washington, DC, 1959–62, night view.

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Marquis & Stoller,
St Francis Square,
San Francisco,
California, 1960–61,
view of housing from
courtyard.
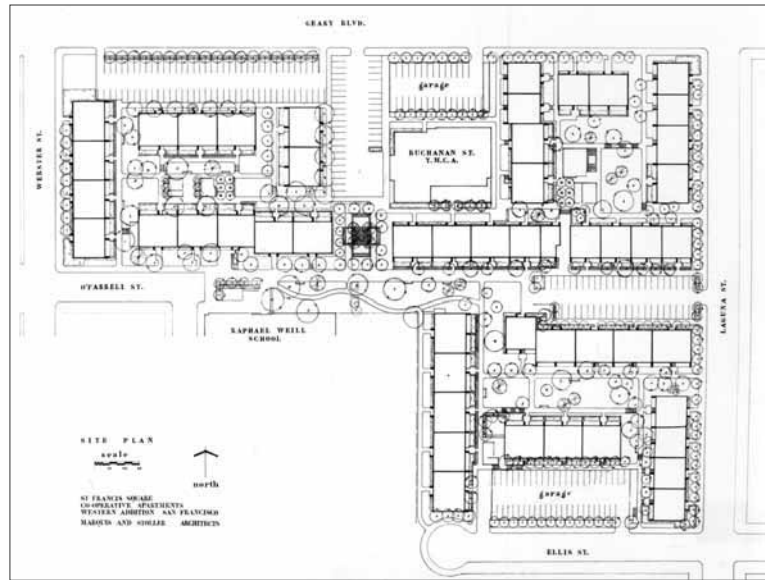
St Francis Square,
site plan.

Hellmuth, Yamasaki and Leinweber, Pruitt-Igoe public housing, St Louis, Missouri, 1950–55, photographed in 1955.

would gradually become more elaborate and expensive in the early 1960s.[35]

Spaces for Leisure and Learning

The problem of monuments preoccupied post-war architects and critics, who wondered how to represent unity in contemporary democratic societies. Neo-classicism virtually disappeared in civic buildings as private architects replaced bureaucratic designers. The first great example was the United Nations. Nelson Rockefeller donated a prime parcel of land, determined to make Manhattan the world capital for trade and diplomacy. A stellar team of international architects was assembled to create the 'Workshop of Peace' under the leadership of the Rockefeller favourite Wallace Harrison.[36] The contentious design process began in 1948; by 1954 it was complete: a horizontal Assembly Building with a curved roof line (and a dome as well, to entice a loan from Congress) alongside a tall curtain-wall slab for the Secretariat.

Buckminster Fuller's geodesic (great-circle) domes were non-specific solutions to any building task, based on a universal, tetrahedral cosmos of tensegrity mathematics. Fuller both criticized and exemplified Americans' romance with techno-science. Each invention was a simulation of natural and social systems, a means for ongoing exploration,
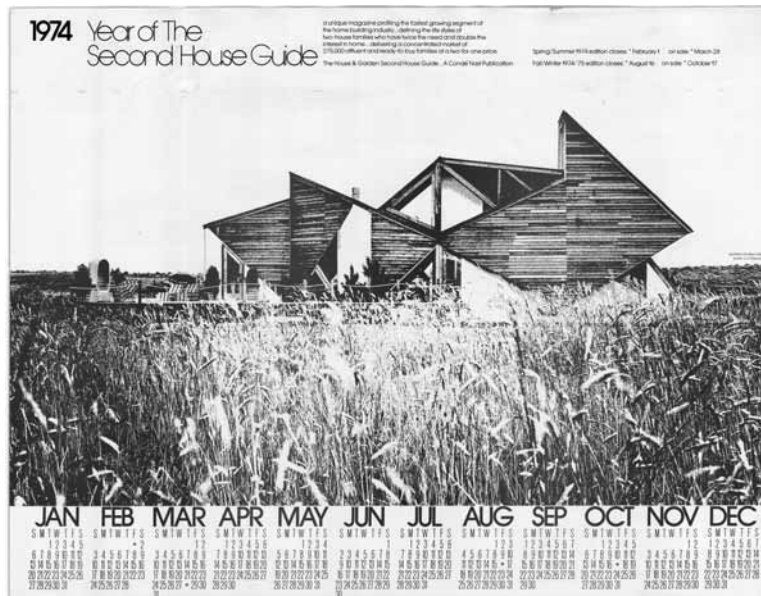
although both he and his disciples tended to take them as higher truths. The lightweight demountable dome was omnipresent for almost two decades. The Marines deployed them in the early 1950s. The United States Information Agency (USIA) took a portable dome to international trade fairs and exhibitions, eager to tout American ingenuity and technological prowess around the world. Fuller built a giant aluminium dome for the Ford Motor Company headquarters in Dearborn, Michigan, and others for a railway company in Shreveport, Louisiana, for Miami's Seaquarium and for the Climatron at St Louis's Botanical Garden. Architecture students around the country constructed domes outside their schools, confident of a spiritual and technological revolution. Over 300,000 geodesic domes based on Fuller's patents were erected between 1954 and his death in 1983.[37]

Embassies, military installations and other international buildings were equally significant representations of democracy and free enterprise. The State Department's Foreign Buildings Office oversaw more than 200 projects in 72 countries, determined to enhance America's prestige and underscore its technological prowess. Most of the structures were emphatically modern. SOM designed several incarnations of an Amerika Haus in Germany, all variations on the rectangular glass houses intended to 'sell America'.[38] The best known embassies were modern too, notably those in New Delhi by Edward Durell Stone (1959);

in Baghdad by Josep Lluís Sert (1961); and in Athens by Gropius/TAC (1962).

Flashy modern buildings for leisure were a conspicuous sign of American well-being in the post-war era. As flashy automobiles kept people on the move, Douglas Haskell acclaimed what he called 'Googie Architecture' in a 1952 article, taking the name from John Lautner's brilliant collision of fragmented planes on a 1949 Los Angeles coffee shop.[39] Commercial architects of the post-war era delighted in mixing synthetic materials, bright colours and startling shapes, often derived from engineering advances like 'cheese-holes' in steel-webs, rippled or folded-plate roofs, concrete-shell vaults, and exaggerated diagonal or free-form ('woggle') supports. The razzmatazz had a broad popular appeal that soon extended to franchises like McDonald's parabolic Golden Arches, designed in 1952 by Stanley Meston. In contrast, most post-war modern artists and intellectuals deplored the honky-tonk quality of the strip, resort hotels and middle-brow buildings like coffee shops or bowling alleys. Lautner insisted that the connection with 'Googie' hurt his career as a serious architect. As with Team X in Europe, the ideal vernacular was far away and exotic, not the commercial world close at hand.

Car-oriented suburban developers invented the regional shopping centre just after World War Two. Seattle's Northgate by John Graham set the basic formula in the years 1947–50: a freeway-intersection location, underground tunnels for deliveries, ample parking and fixed

R. Buckminster Fuller, portable US Trade Pavilion, Kabul, Afghanistan, 1956.

Douglas Honnold,
Biff's Coffee Shop,
Panorama City, San
Fernando Valley,
California, 1950.

layouts, albeit increasing in size. Suburban shoppers found a semblance of community life – privately owned with every detail calibrated to encourage consumerism as the emblem of American happiness. Victor Gruen's Southdale (1954) outside Minneapolis introduced the first 'mall': fully enclosed, climate-controlled, landscaped, evoking European gallerias in a lively, two-level central court. 'Integrated planning' considered everything from financing to human scale and visual surprises. Gruen soon appropriated these elements for pedestrian malls – he called them 'community leisure centers' – seeking to revitalize main streets in small cities. But larger shopping centres grew rapidly and, like housing, increasingly segmented to draw different socio-economic classes.[40]

More Americans could afford vacations at exotic resort hotels representing the 'tropical Modernism' of sensuous Caribbean retreats designed by Toro & Ferrer, Edward Durell Stone and Igor Polivitzky. Miami Beach had an astounding concentration of these, notably Morris Lapidus's eight

'flabbergast' hotels, as he rightly called them, drawing on his previous experience in theatre and retail plus a few tricks from Baroque Rome. He was sincerely convinced that 'the new sensualism' fulfilled fundamental 'emotional cravings'.[41] The word 'motel' (from motor and hotel) entered American dictionaries and lives after World War Two. Some were glamorous, even voluptuous, like Paul Lundy's Warm Mineral Springs Motel in Venice, Florida (1958) and Paul Williams's La Concha in Las Vegas (1962).

Las Vegas hit the limelight in 1946 with the Flamingo, its first modern (as opposed to cowboy-themed) hotel-casino. Spectacular competitors soon lined the Strip, most designed by car-oriented architects from Los Angeles, notably Wayne McAllister, Welton Beckett and Douglas Honnold. A major shift occurred in 1957 with the emergence

of Young Electric Sign Company (YESCO). This specialist *extraordinaire* in neon and flashing lights designed signs for the 1957 Mint Casino and 1958 Stardust Hotel, the latter billed as the largest hotel in the world with 1,000 rooms. This changed basic relationships along the fabled Strip, where brilliant signs now upstaged the cheap and basic architecture.

A Boeing 707 carried Pan-Am's first non-stop flight to Europe in 1958, inaugurating 'jet-age' culture. Airports needed much larger runways and enticing modern structures for the surge in travel. Minoru Yamasaki's Lambert-St Louis Airport Terminal (1956) had already suggested a new idiom with its soaring, thin-shell groin vaults. The New York Port Authority then proposed the novel idea of separate structures for each airline, seemingly more efficient and a sight-seeing attraction as well. The original 'Seven Wonders' at New York's Idlewild (now Kennedy) Airport were glorious; the most spectacular was Eero Saarinen's TWA terminal, which opened in 1962. Saarinen's 'form-world' entailed a total environment. This one extended from the beak-like canopy entrance and upward-soaring wings to voluptuous interiors, even to details like stair railings and heating ducts. Douglas Haskell fondly called the structure 'Eero's "big bird" in concrete'. Within a few years several mass-market magazines were noting the build-up of auxiliary buildings, the 'Airport City' as a hub for travelling businessmen who became 'corporate gypsies'.[42] No longer adequate by the 1990s, even the famous TWA Terminal was threatened with demolition. A preservation movement has convinced Jet Blue to use it for some flights, thus lending cachet to budget travel.

New cultural institutions re-energized the experience of public space.

Morris Lapidus, Americana Hotel, Bal Harbor, Florida, 1957, drawing of entrance.

Museums embraced contemporary art and architecture for new buildings and extensions to City Beautiful temples of the early twentieth century. Louis Kahn's 1953 addition to the Yale Art Gallery in New Haven, Connecticut, was his first significant building, an open grid around a massive round stairwell with an exposed space-frame of concrete tetrahedrons to maximize flexibility for installations. The bravura of other structures generated early conflicts about the 'edifice complex'.[43] Frank Lloyd Wright's

The Las Vegas Strip. The 1958 Stardust Hotel and Casino with neon sign by Kermit Wayne of YESCO (Young Electric Sign Company) is on the right (imploded in 2007) and the 1961 La Concha Motel by Paul R. Williams on the left. Photograph c. 1975.

Eero Saarinen, TWA Terminal, Idlewild (now Kennedy) Airport, Queens, New York, 1956–62, interior of waiting area.

Solomon R. Guggenheim Museum in New York was immediately controversial, especially the spiralling ramp and the 'great-room' lobby, which he likened to being inside a seashell. Wright began the first design in 1943, modified the concept in 1952 with a change in client and patron, then completed the museum in 1959. Originally intended solely for 'non-objective', or abstract, painting, the curved walls of the galleries were meant to 'liberate' each picture, allowing it be seen independently and in the changing conditions of natural light. Critics, including many artists, reviled the building's 'egomaniacal' upstaging of artwork. But the public loved the dramatic spatial experience from the day it opened.

As high culture became more democratic, it often lost the vivacious exuberance of nineteenth-century theatres that had connected actors and audiences. Guthrie Theater in Minneapolis (1959–63) was an exception. Ralph Rapson, the architect, kept the interior spaces animated yet intimate with irregular acoustical 'clouds' and a moveable stage closely surrounded by small asymmetrical seating areas. The dynamic façade with its cut-out screens heightened changing perceptions of light and shadow, inside and out, surface and depth, all to convey the layers of meanings in all performance.

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Frank Lloyd Wright, Solomon R. Guggenheim Museum, New York, 1943–59, interior view from upper galleries to base of the ramp.

The 'baby boom' generated thousands of new schools in suburbs and small towns, mostly single-storey elementary schools that emphasized 'day-lighting' and flexibility. Educators wanted to help children focus more effectively, while school boards tried to keep costs under control and plan for expansion. A bare-bones facility for West Columbia, Texas, completed in 1952 by the Houston architect Donald Barthelme, was widely admired. A 'roller-coaster' entry canopy for buses enlivened the inexpensive industrial materials, while 'neighborhoods' of classrooms faced landscaped courtyards. When the Supreme Court's momentous 1954 decision, *Brown v. Board of Education*, outlawed 'separate but equal' facilities, school districts in the seventeen Southern states continued to build segregated facilities. Paul Rudolph's Sarasota High School (1959) is one such example. Its gravity-defying concrete screens, stairs and canti-levers dramatize teenage social life while shielding classrooms from the sun – and from black classmates.[44] Formal brilliance can sometimes short-circuit social change.

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Ralph Rapson,
Guthrie Theater,
Minneapolis,
Minnesota, 1959–63,
demolished 2006.

Several firms now specialized in educational facilities, notably John Lyon Reid in northern California and Caudill Rowlett Scott in Bryan, Texas, and Oklahoma City. Caudill's 1941 pamphlet, 'Space for Teaching', now became a major influence on modern schools. Committed to research and teamwork, CRS developed ingenious devices to control the elements and reduce costs, as well as planning strategies for better learning. Schools Construction Systems Development (SCSD) focused on packing all mechanical equipment into a roof system. The Ford Foundation's Educational Facilities Laboratory (EFL) sought to centralize and distill many such innovations.

A 1947 Presidential Commission report had declared mass higher education a national mission as returning GI students dramatically increased enrolments at major research universities and small liberal-arts colleges. The University of Miami, hailed internationally as the first modern university, completed its first buildings in 1948–9, based on wartime designs by Marion Manley with credit shared by her post-war associate, Robert Law Weed. Critics praised the flexibility, informality and climatic adaptations, and the daring engineering of rigid bents and cantilevers – using timber salvaged from military installations. In a similar vein Henry Klumb built nineteen magnificent tropical-modern buildings for the University of Puerto Rico between 1946 and 1966, drawing in part on his work with Frank Lloyd Wright.

Yale University President A. Whitney Griswold commissioned a wide range of expensive, daring modern buildings, beginning a trend that

Donald Barthelme,
West Columbia
Elementary School,
West Columbia,
Texas, 1951–2, bus/car
entry.

continues into this century. Architects fostered 'identity' and 'community' with distinctive shapes and textured finishes, the most visible and notorious being the rough-textured Brutalism of Paul Rudolph's School of Art and Architecture (1958–64). By 1963 Richard Dober's *Campus Planning* had distilled a 'scientific' approach to the 'multiversity' based on 'modules' for continuous growth softened by greenery – two fundamental principles of American college campuses since Colonial times. Expansive modern dormitories were imperative for the expanded student bodies, including apartments for married GIs.

New kinds of educational institutions explored innovative environments for different kinds of learning. When SOM was selected from 260 applicants for the 'future-oriented' Air Force Academy in Colorado Springs (1954–62), the design overcame Congressional resistance by placing a thin classical veneer of limestone over disciplined industrial Modernism – using computers to analyse the structural loads. Ernest Kump's Foothill College (1957–60) in Los Altos Hills, California, provided a model for community colleges with 44 modular pavilions knit together by a informal site plan and wide overhangs that sheltered circuitous pathways. Edward Larrabee Barnes's 1961 Haystack Mountain School at Deer Isle, Maine, embraced nature with its bold roof lines on interconnected pavilions covered in cedar shingles. At the other end of the spectrum, major foundations raised funds for advanced research and conference centres in the social sciences at Princeton and Stanford. Despite similar dates and programmes, each was visibly distinctive.

If post-war intellectual life was deeply secular, the larger culture experienced a religious revival. Liberal congregations derived spiritual inspiration from abstract forms and dramatic incarnations of space and light – qualities the Protestant theologian Paul Tillich characterized as

'holy emptiness' and 'majestic simplicity'.[45] Three 'gathered churches' built between 1948 and 1951, when wartime restrictions remained in effect, mark a first stage of this shift: Eliel Saarinen's spare Lutheran Christ Church in Minneapolis; Pietro Belluschi's numinous wood-frame First Presbyterian Church in the lumber town of Cottage Grove, Oregon; and Lloyd Wright's Wayfarers Chapel in Palos Verdes, California, with panes of glass set in delicate redwood arches inviting communion with the sea and woodlands. Peter Blake's *An American Synagogue for Today and Tomorrow* (1954) dismissed 'meshugothic' historical styles and praised modern synagogues by Percival Goodman, Harrison & Abramowitz, Erich Mendelsohn, Philip Johnson – and the ever-present Frank Lloyd Wright, whose Beth Shalom (1953–9) in the Philadelphia suburb of Elkins Park has crystalline walls of lustrous corrugated fibreglass.

The scale and visual drama of religious architecture soon escalated. Marcel Breuer's first buildings (1954–61) for St John's Abbey and University in Collegetown, Minnesota, highlighted mammoth concrete plates, folded or honeycombed, and a massive trapezoidal bell-tower. Another kind of mega-church now emerged in the suburbs, epitomized by Neutra's Community Church (1962) in Garden Grove, California, for the evangelist Robert Schuller. Its fan-shaped area for 1,400 cars gives drive-in and walk-in worshippers alike a view of the nave. Schuller's success led him to collaborate with Philip Johnson on the nearby Crystal

Richard Neutra,
Community Church,
Garden Grove,
California, 1962,
view from interior
and pulpit out to
parking lot.

Cathedral, completed in 1980, calling it a '22-acre shopping center for Jesus Christ'.[46]

By the end of the 1950s, more architects and critics were breaking out of strait-laced propriety. *Progressive Architecture* endorsed plasticity and 'emotional and sensual delight' in 1958; a 1961 series lauded the benefits of 'chaoticism'.[47] Most of the nation came to realize the limits of post-war promises as people confronted the entrenched problems of racism and poverty throughout the country, especially the deplorable condition of cities. *The Death and Life of Great American Cities*, Jane Jacobs's riveting assault on the destructive realities of urban renewal, became a best-seller in 1961; a year later came Michael Harrington's *The Other America: Poverty in the United States* and Rachel Carson's *Silent Spring*, an attack on chemical pollution. The shock of John F. Kennedy's assassination in 1963 affected the country deeply. The first large-scale urban riots broke out in Harlem and Los Angeles. Martin Luther King's March on Washington culminated with his 'I Have a Dream' speech – then his own assassination in Memphis. Modern architecture joined the ranks of

social reform once again, this time offering incremental improvements rather than redemption through master plans.

In such circumstances, the slick, futuristic architecture of the 1964 World's Fair in New York did not seem worth its unprecedented cost, over a billion dollars. Robert Moses' elaborately orchestrated control now appeared heavy-handed. Professional and popular magazines savaged the New York Pavilion by Philip Johnson, the gigantic IBM logo-building by Saarinen with Charles Eames, and the House of Good Taste (in fact a pluralistic choice of Modern, Contemporary and Traditional houses along with an Underground Home). Two very different authors commented indirectly on choices. Susan Sontag's 'Notes on Camp' evoked the emerging realm of pleasure and theatricality, unconcerned about moral or aesthetic judgements. These very attitudes led the architecture critic Peter Blake to blast contemporary American culture and its landscapes as *God's Own Junkyard*. In any case, to paraphrase Bob Dylan, the times they were a-changin' – and so was architecture.

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