

From the Farm to the Valley: Stanford University and the San Francisco Peninsula

THE growth of the Cold War science complex, the emergence of the “multiversity,” and the new public programs using scientific research activity as an economic development tool all had a dramatic effect on the social organization and physical landscapes of the communities surrounding major U.S. research universities. Universities themselves functioned as important political actors in the creation of the Cold War research complex and in its use as a force for local economic development. Public policy responded to the examples set by universities and their local allies in government and industry. Federal policy choices profoundly affected the size, shape, and composition of university-centered communities of scientific production, but these federal policies were themselves shaped by a few compelling prototypes. The most compelling of these—a community having a huge influence on the way policy makers thought about scientific communities, and greatly affected by the resultant public policy choices—was the area surrounding Stanford University, located amid the suburban communities of California’s San Francisco Peninsula. Understanding this region’s influence on the development of federal policy related to science-based economic development strategy, and on the development of other high-tech regions themselves, is a further step in understanding the evolution of the city of knowledge within the postwar suburb.

Over the second half of the twentieth century, this region evolved from a primarily agricultural landscape far away from the centers of industry and capital in to “Silicon Valley,” a sprawling new industrial landscape that was the undisputed global capital of high technology. Stanford stood at the center of this economic growth, not only because it was extraordinarily successful in attracting major federal scientific R&D monies, but also because it was an important and influential land developer. Enriched and empowered by Cold War grant money, located near some of the largest concentrations of military spending in the nation, and enjoying the unique asset of owning vast amounts of desirable and undeveloped land, Stanford entered into a highly successful land development and planning business. The centerpiece of Stanford’s real estate development work was a research park whose architecture and design standards became models for

countless other industrial developments. Stanford's was not the first research park, but it was the first to be so closely associated with, and physically proximate to, a major research university. This connection between university and industrial development set an important precedent, as did the way that Stanford incorporated a particularly Californian architectural vernacular into the design principles of the industrial park. Other universities and local institutions embraced Stanford as a model city of knowledge, often overlooking the many unique regional and institutional assets that allowed Stanford's economic development efforts to be so successful. Stanford was often the example that policy planners had in mind when they talked about the possibility of replicating areas of scientific production through programs like the STSA. However, because of the unique assets of the university and the region, replication of what one observer called "the miracle of Palo Alto" was nearly impossible, particularly in urban environments that had little in common with Stanford's bucolic suburban landscape and advantaged location amid a booming regional economy.

The story of Stanford and the San Francisco Peninsula provides a vivid example of how the concurrent forces of mass suburbanization and the growth of the Cold War science complex interacted with each other to map out a low-density, decentralized geography of high-tech production. Here we can see how the federal policies of Cold War science and economic development played out on the ground, and how, in turn, local institutions had a significant effect on the development and implementation of federal policy. The example also further illustrates the complex interaction between public and private that mapped out the geography of high-tech production in the late twentieth-century United States. In this case, a private university, fueled by public money, created institutional structures and physical spaces that served as literal "incubators" for private scientific industry—industry that, in turn, was immeasurably enriched by the programs of the Cold War defense complex.

It is significant that the university whose actions were so influential upon the development of other cities of knowledge was also an institution with unusually close ties to private industry. And it is ironic that this region—which benefited so tremendously from federal largesse—and the University that was its intellectual anchor were led by people with a general distaste for activist government and a firm faith in private enterprise and the market system. Their pro-entrepreneurial sentiments led, over time, to idealization (even idolization) of the private entrepreneur in Silicon Valley. True, the high technology phenomenon would not have happened without the innovation and management of talented individuals. However, the enduring myth of the Silicon Valley entrepreneur ignores the pivotal role that federal contracts played in the economic development of the region and ignores that way the interaction between public and private also shaped the

physical appearance and demographic composition of Silicon Valley and other cities of knowledge.

A Western Retreat

The geographic, intellectual, cultural, and spatial context in which Stanford University was founded have had an immense effect upon its development as an institution, its emergence as one of the preeminent Cold War research universities, and its role in the development of Silicon Valley. Stanford was founded by a businessman who believed in training young people for the modern world of corporate capitalism. It was an institution that, from the start, was designed for teaching *and* research, and it was assumed that the fruits of these endeavors would benefit commercial enterprise and further the technological development of California and the West. At the same time, Stanford was removed from the urban environment, an environment where business was conducted but also where social turbulence and disorder would disturb the process of learning and prevent the creation of a controlled, secured community.

The University's founders, millionaire railroad baron and California governor and senator Leland Stanford and his wife, Jane, established the school as a memorial for their beloved only son, Leland Jr., who died of typhoid fever while traveling in Europe at the age of fifteen. As legend has it, the devastated Leland Stanford woke the morning after his son's death and pronounced: "the children of California shall be my children."¹ The Leland Stanford Junior University opened its doors to its first class in 1891.²

While candid about their desire to create a school that would rank among the best in the country, Leland and Jane Stanford saw the University not as a place for intellectual dreamers but as a place where future business leaders could learn practical skills. Science—creator of wondrous modern technology, source of the innovation that was making men like Leland Stanford millionaires—was an essential ingredient in providing this practical higher education. And research, not simply teaching, was an important component of a proper science curriculum. While it was a university, not a technical school, and would offer courses in a wide variety of subjects and disciplines, its "object [was] to qualify its students for personal success, and direct usefulness in life."³

Although the early emphasis on scientific research and its practical applications gave Stanford University an intellectual orientation that would prove highly valuable in the Cold War era, another institutional asset was more significant to Stanford's later influence on the shape and social structure of communities of scientific production. This asset was land—nearly nine thousand acres of prime agricultural countryside in an area that would one day become some of the most

valuable real estate in the world. Like many wealthy Gilded Age San Franciscans, Leland and Jane Stanford owned a large farm in the Peninsula's rolling foothills, and it was on this Palo Alto Farm that they chose to establish their new university, bestowing the entire holdings to the university in the process.⁴ This land, of which the campus took up only a fraction, could be leased to others, but it could never be sold. For better or for worse, the university owned the Farm permanently.

The Stanfords' gift of this particular piece of land, and the provisions they attached to its use, was both a personal and political statement. It was, on the one hand, an emotion-laden choice made by grieving Victorian parents. Leland Stanford Jr. had loved to come down to the Palo Alto Farm, ride horses on its trails, and hike through its hills; after his death, the Farm became forever associated in the Stanfords' minds with their son. For Leland and Jane Stanford, the land upon which they established the memorial University was hallowed ground that should never be corrupted by substandard uses. On the other hand, the land grant and its location were calculations demonstrating the Stanfords' status as members of the nineteenth-century urban elite, and reflecting a sensibility about relationships to nature that were particularly Western.

The Stanford's choice to locate the institution on the Palo Alto Farm, although chalked up by some observers as further evidence that the new university was merely a giant vanity project,⁵ reflected the times: one of the most politically and socially turbulent—and anti-urban—moments in American history. The late nineteenth-century United States was reeling from the effects of massive, simultaneous social and economic transformations that had been under way since the Civil War. American cities doubled and tripled in size, and became filled with huge factories belching smoke and hundreds of thousands of new immigrants from southern and eastern Europe. The deep inequity generated by emergent corporate capitalism, where the rich got immeasurably richer and working people and their children toiled away under substandard working and living conditions, manifested itself in civil unrest on city streets, mass strikes, and violent behavior. Vast neighborhoods of slums sprung up in cities crammed with thousands of families. All these changes created deep cultural disquiet on the part of the white native-born citizens, and cities came to be the focus of this cultural anxiety.

The middle-class response to the social conditions of late nineteenth-century cities was a huge wave of social reforms generally referred to as Progressivism.⁶ One of the common themes running through progressive reform was improvement through the rejection of the urban and the embrace of the pastoral. An important manifestation of this was the widespread effort to create ordered and inspirational space within cities through the creation of parks. Undergirding the urban parks movement was the belief that placing persons in a green, "natural," and decidedly non-urban atmosphere would prompt good behavior and serve as an antidote to

the tremendous stress and alienation of city life.⁷

San Francisco, while much smaller than New York or Chicago, was the largest urban settlement west of the Mississippi, and it shared many of their urban woes. The vast wealth generated by extractive industries of the Western states—gold, then silver, then lumber—made San Francisco the “Queen City of the West” but also a crowded, turbulent place. In the minds of Victorian-era capitalists like the Stanfords, San Francisco was hardly an appropriate place to start a university focused on educating and uplifting young people. Just as city residents needed to breathe fresh air and enjoy pleasing vistas in city parks, college students needed a peaceful, natural setting in which to learn. The Palo Alto Farm was part of the burgeoning agricultural area of the Santa Clara Valley, called the “Valley of Heart’s Delight” for its rich soil and pleasant climate. While its agricultural activity made the valley far from “natural,” the lightly settled area was a dramatic contrast to the crowded city to the north. The Valley’s already established role as an upper-class retreat further distinguished it from San Francisco; while plenty of working-class residents toiled in its mines and on its farms, the area was notable for the number of significant estates owned by Western capitalists.⁸

The Stanfords’ choice also reflected a particularly Western type of American anti-urbanism. Stanford University came into being at the same time as John Muir was writing some of his seminal work on the magnificence of the California landscape. These essays expounding on the glories—and the fragility—of places like the Yosemite Valley recharacterized the natural resources of the West as precious and finite treasures, not wildly abundant commodities, and the advocacy of Muir and other Western reformers became instrumental in the creation of state and national park systems. The Western environment, Muir and his fellow conservationists argued, needed to be preserved because of the important antidote it provided to the stress and toxicity of the industrial city. It was a place of solace, of uplift, of scientific education.⁹

The intensified Western variant of American ideas about the relationship of nature and educational uplift informed the location and design of the Stanford campus. Like other American campuses, the Stanfords sought to create an environment that retained yet carefully rearranged the “natural” qualities of the landscape to create an appropriately pastoral environment for study. As if to underscore their seriousness about good planning, Leland and Jane Stanford hired the premier landscape designer of the age, Frederick Law Olmsted, to design the campus.¹⁰ Although both Stanford and Olmsted shared a vision of the University as an enclosed community of uniform and uplifting design, they disagreed on aesthetics—Stanford wanted a more monumental campus, Olmsted a more pastoral one. The end result was a campus plan that incorporated the straight lines and grand vistas popularized by the architects and planners of the

contemporaneous City Beautiful movement, rather than the curving paths and hillocks of Olmsted designs like New York's Central Park.¹¹ While borrowing design inspiration from city planning ideas that were themselves European in inspiration, Stanford felt that the campus architecture should be reflective of the landscape in which it was situated and draw upon the history of the West, and pronounced that the buildings should be "distinctively Californian in character."¹² No Gothic or neoclassical structures here, but instead long, low buildings of California sandstone and red tile, incorporating Romanesque arches. The design evoked the mission architecture of colonial days, about as far from the look of Eastern campuses as one could get.¹³ From the natural backdrop of rolling foothills to the spacious main sandstone-and-tile quadrangle to the grand avenues culminating in monumental gates, the campus of Stanford University projected a design aesthetic that was reflective of prevailing ideas about urban space and planning. It was simultaneously "natural" and highly planned.¹⁴

For the first sixty years of Stanford's existence, the Palo Alto Farm served academic purposes or was leased to cattle ranchers or farmers. The institution realized a small profit, as taxes were still low in the area, and there was little demand for using the land in any other way. Students, faculty, and alumni developed a fixed idea of Stanford as a rural oasis; years after graduation, alumni would still wax lyrical about long hikes in Stanford's foothills or leisurely paddles on its lakes. "Poppy fields, rolling green hills, and winding country roads! The 'Old Grad' loves to dream of them!" rhapsodized one Stanford writer in 1927.¹⁵ The lands themselves became integral to the educational function of the University, as its biologists examined the flora and fauna of the undeveloped hills and ridges and geologists probed its schist and soil. Ray Lyman Wilbur, who served as University president from 1916 to 1942, wrote that "located as it is in the center of a large estate with a mile or so of free space on every side, [the University] has developed a spirit of the open air and a sense of freedom and independence which have become the background of the Stanford spirit."¹⁶

Until the Second World War, Stanford remained this rustic retreat in the middle of larger, relatively undeveloped countryside. Stanford administrators focused on developing its core academic campus and in recruiting talented young professors from the East and Midwest who were ready for a Western adventure. As a result of the emphasis on research and advanced training that the University had from the beginning, by the 1920s Stanford's scientific research facilities were becoming moderately distinguished. And the area surrounding the University began to witness the very faint beginnings of the high-technology era, as a small cadre of experimenters and smalltime scientists in and around Stanford became involved with the development of new radio technologies. Stanford president Ray Lyman Wilbur was one champion of these young entrepreneurial efforts emanating from

Stanford laboratories, indicating an institutional willingness to support commercial technology that would be put to great and profitable use in the Cold War years.¹⁷

Hot and Cold Wars

The Second World War had a profound and lasting impact on the San Francisco region. Always a military hub, the Bay Area became a center of wartime production. War workers poured into San Francisco, Oakland, and the surrounding counties. Richmond, an industrial suburb of the East Bay, became known as the hometown of “Rosie the Riveter,” the iconic figure representing the millions of women who came to work in the factories. Between 1940 and 1947, the nine-county region surrounding the San Francisco Bay became home to 676,000 more people, 330,000 more jobs, and \$2.5 billion more in annual income.¹⁸ The per capita wealth of the region reached the highest level in the nation. Between 1940 and 1945, individual incomes increased by 66 percent.¹⁹

As in other parts of California, rapid residential suburbanization accompanied the population boom. Military spending priorities played an important role, as many military bases, production facilities, and wartime housing projects located outside the city limits. Yet another important factor spurring decentralization in the Bay Area was the fact that industrial activity had long established what one observer has termed a “centrifugal” pattern of development. Since the nineteenth century, factories had located not only in the industrial part of San Francisco’s downtown, but had moved farther south on the San Francisco Peninsula or across the Bay to industrial suburbs like Alameda and Richmond.²⁰ Compounding the scattering of industrial districts was the multinodal quality of the metropolitan area from the late nineteenth century forward, as Oakland grew to challenge San Francisco in size and economic supremacy.

Wartime growth reinforced industrial, residential, and infrastructural patterns, and created added incentives for the mass suburbanization of people and jobs in the postwar decades. By 1960 the Bay Area would have three people living in the suburbs for every person living within the city of San Francisco.²¹ California was accustomed to huge population increases—the state’s population has approximately doubled every twenty years, with the biggest increase coming not in the wartime years but in the 1920s, when the population grew by 66 percent.²² But the changes of the 1940s were felt more deeply in the Bay Area, as the infusion of people and jobs strained the region’s infrastructure well beyond its capacity. All of these new migrants needed new housing, new roadways, new public services. As in other “military metropolises,” one off-shoot of the wartime defense boom was new attention to regional industrial planning.²³ In 1943 federal

officials established a Metropolitan Defense Council (MDC), led by local businessmen and politicians, to address the chaotic situation created by clogged urban roads and too few apartments. Internal squabbling kept the MDC from getting much done, but it did spawn a successor organization, the Bay Area Council, in 1944.

The structure and programmatic emphasis of the Bay Area Council provides a revealing look into the planning and economic development ethos of the region, a policy approach that created a highly favorable environment for the growth of industry in the Peninsula suburbs and gave Stanford yet another advantage in its land development efforts. The Council, started by public funds but soon incorporated as a nonprofit, was sustained by \$10,000 annual donations from some of the most prominent members of San Francisco's corporate community. The leaders of these concerns sat on the Council's Board of Trustees and reflected the makeup of prewar San Francisco business: banks, oil companies, chemical companies.

Business interests had been incorporated into government policy making in California since the Progressive era, serving on boards and commissions and on other advisory bodies.²⁴ The public-private dynamics of state and regional politics during this period is perhaps best encapsulated through the philosophy of "business associationalism" championed by U.S. president (and lifelong friend of Stanford University) Herbert Hoover. Government worked best when it focused its efforts not on centralized planning or redistributive policy, Hoover and his political allies argued, but on supporting the healthy workings of the free-market economy.²⁵ The business and political establishment of the Bay Area tended to agree with this kind of approach: when business prospered, the whole economy prospered. Yet after the boom of the war years, these champions of the free market did not hesitate to take advantage of federal largesse when it could positively affect the business climate and regional economic growth. As one Bay Area Council publication acknowledged: "Close contacts between Federal and private business groups built up during the war should be continued and strengthened.... Government business—Federal, State, and local—is a big business in the Bay Area and is a vital factor in its economy."²⁶ In short, the political philosophy of the men who ran the San Francisco Bay region in the mid-twentieth century—men who often had professional and personal connections to Stanford—was one that respected the right of capitalist enterprise to operate freely with a minimum of government regulation but at the same time understood the value of public-sector investment for regional economic development in the Cold War world.

These leaders also were pragmatic about the limited new possibilities for development in the city of San Francisco itself. As the minutes of a 1947 meeting

of the Council noted: “San Francisco has reached its peak in residence and industrial sites—this city must now have an area-wide viewpoint.”²⁷ The Council announced that it was “dedicated to the proposition that the San Francisco Bay Area is an integrated economic unit. The economic opportunities of all counties and localities in the Bay Area are not only interrelated but are interdependent. The basic purpose of the Council, then, is the furtherance of this economic and social unity.”²⁸ While the Council’s activities over the next two decades demonstrated that it clearly was more interested in economic than social unity,²⁹ the recognition of the regional nature of economic development was an important reflection of how the suburban areas of the region had become an economic force by the end of the war.

The Council’s interest in regional economic planning and boosterism also revealed the new spatial needs of industry. Not only were the region’s large cities completely built up and prevented geographically and politically from further expansion, but also industrial and commercial activities required much more space during the automotive age. In accepting this reality, the Council became quite pro-suburban in its orientation and saw itself as the promoter of more extensive industrial development in the outer areas of the metropolitan region and took a particular interest in the enlargement of industrial districts farther south on the Peninsula. In their plans and actions, the leaders of the Bay Area Council reflected the pro-decentralization and pro-dispersal tenor of the times. One early report commissioned by the Council—published at about the same time as planners like Tracey Augur were advocating dispersion, and policy makers in Washington were beginning to write dispersion clauses in procurement policy—noted that “careful planning to utilize and develop potential industrial areas in the region will not only stimulate the more rapid development of ‘foot-loose’ industries, but in the long-run make for more economical operation both for individual industries and for the communities in which they are located.”³⁰

The decentrist mindset of postwar planning in the Bay Area had an important effect on the willingness of the towns surrounding Stanford to welcome industrial activity into their midst. And the local business community’s activism in postwar regional planning gave an important boost to the political fortunes of Stanford, an institution founded by a past captain of industry, whose administrators remained closely connected to the regional business elite. The leaders of the Bay Area Council also saw that California was going to find its economic niche not through replication of the industrial pattern of the Northeastern and Midwestern United States but in fostering the growth of “new” industries whose employees would be attracted to a good climate, beautiful landscape, and cultural amenities. The Bay Area Council became one of the first local economic-development entities in the United States to “sell” its region. The Council’s marketing pitches almost

exclusively emphasized the cultural and environmental amenities of the region—in effect, marketing to employees rather than just employers.³¹ One of these amenities—perhaps *the* amenity for professionals in science and engineering—was the emerging research complex of Stanford University. Stanford administrators welcomed this attention from the business community. In a 1945 speech, the University’s president Donald Tresidder expressed the “hope that in the postwar period Stanford will draw very much closer to business and industry than it has in the past—by means of cooperative undertakings we hope to develop more and more projects in which both the University and business will have a legitimate stake.”³²

Yet in 1945, despite the small scientific community around it, the university as a whole was a regional school of a standing far below its aspirations. Its administrators worried about the school’s reputation as a country club that afforded more social and athletic opportunities than academic ones.³³ Unlike its peers in the northeastern United States, Stanford had seen little in terms of wartime government research contracts. Its leading scientists had gone to other campuses like MIT and Harvard, or government laboratories like Los Alamos or even nearby Livermore (in the East Bay), for the duration of the war in order to participate in wartime research. Despite the fact that the Bay Area was a center of military activity, the key university-based R&D projects of the war occurred elsewhere. “Stanford emerged from World War II as an underprivileged institution,” commented Frederick E. Terman, the dynamic engineer who served first as dean of engineering and then as University provost during the crucial Cold War years.³⁴

Within the next decade, however, Terman and other high-ranking Stanford administrators and professors would not only transform Stanford into a nationally recognized research powerhouse but would also help make the quiet suburbs around the University a magnet for innovative technological and scientific companies and their highly educated workforce. Terman later was called “The Father of Silicon Valley” because of his pivotal role in growing a high-tech agglomeration economy in the area. However, the national ascendance of Stanford as a research university, and the emergence of a high-tech economy on the Peninsula, occurred because of factors external to Stanford as well. Terman and other Stanford administrators were able to capitalize on these conditions in a way that, for the time, showed an unprecedented awareness of the capacity of research universities to spur certain kinds of economic development.³⁵

The first advantage was the University’s location amid one of the nation’s most booming Cold War economies. Stanford and its immediate area were the parts of the Bay Area that were among the most blessed by the magic combination of military spending, middle-class suburbanization, and new private-sector wealth

that emerged during the postwar period. Building on the Peninsula's heritage as a suburban retreat for the very rich, Palo Alto and neighboring Menlo Park became home to upper-middle-class families who tended to be highly educated and employed in white-collar occupations. Menlo Park's population grew from just over 3,000 people to nearly 27,000 between 1940 and 1960; Palo Alto's grew from under 17,000 to over 52,000 in the same period.³⁶ Yet the commercial activity that existed in these and other Peninsula suburbs in the late 1940s and early 1950s was almost exclusively generated by retail and service firms that addressed the needs of the communities' residents. The suburbs of the Peninsula were still commuter towns, whose workers traveled to San Francisco or elsewhere for their jobs.

The few exceptions to this pattern on the Peninsula were the small but influential spin-off technology companies that had emerged from Stanford's prewar engineering programs. Perhaps the most famous example of these was Hewlett-Packard, a company started in a Palo Alto garage in 1939 by two former graduate students. Another example was Varian Associates, founded by two brothers, Palo Alto natives who began their scientific careers tinkering with radio equipment in their family attic. Unlike the "dirty" industries like shipbuilding and heavy manufacturing that were emerging around the perimeter of the San Francisco Bay, advanced scientific firms like Hewlett-Packard and Varian were unobtrusive neighbors in the residential landscape of Palo Alto and its neighboring towns. The people who worked in these firms (or at least those who were the most visible members of the workforce) were white-collar professionals, unlike the masses of blue-collar workers who filled the factories by the Bay.

The presence of these select advanced scientific companies, combined with the ecological, infrastructural, and demographic conditions on the Peninsula, made the moment ripe for creating a whole new sort of economic base for the metropolitan region that would revolve around the scientific research programs at Stanford. Fred Terman recognized this potential. He made some frank comparisons with other institutions in a 1943 letter to a colleague: "The years after the war are going to be very important and also very critical ones for Stanford. I believe that we will either consolidate our potential strength, and create a foundation for a position in the west somewhat analogous to that of Harvard in the East, or we will drop to the level somewhat similar to that of Dartmouth, a well thought of institution having about 2 per cent as much influence on national life as Harvard."³⁷ Terman's comment is revealing not simply in its cognizance of how the war might change the fortunes of colleges and universities, but in its underlying message that the West would soon become a significantly more dominant region in the postwar period.

Stanford also found itself in an advantageous political position in the Cold War period, not only benefiting from the political ascendance of scientists in federal

government affairs, but also enjoying close ties with the local civic leaders whose own power was increasing as a result of Cold War spending patterns. Terman had been a student of Vannevar Bush at M.I.T., and in 1942 Bush was a leading candidate (supported by Hoover and others) for the presidency of the University. While Bush turned Stanford down in favor of his job at OSRD, Stanford administrators continued to build their ties to national political figures. Thomas Spragens, the lobbyist that President Tresidder had hired in 1945 to give the university a full-time presence in Washington, helped the university capitalize on these personal connections, build new contacts, and win important government contracts that gradually elevated its stature and national reputation.³⁸ On the local level, the men who ran Stanford also traveled among San Francisco's civic elite. Every Stanford president received an automatic invitation to join the famous Bohemian Club, the men's organization made up of the top notch of San Francisco society; many of the city's leaders were Stanford alumni who would vigorously defend the University's interests in regional economic affairs. Stanford administrators, in turn, were perhaps more attuned to the university's role in guiding regional economic development and supporting business interests than they might have been otherwise. While the University's entrepreneurial, pro-market mindset had its roots in the philosophy of millionaire capitalist Leland Stanford, the midcentury local political culture served to solidify this approach. The business associationalism of the regional elite colored University leaders' attitudes about government intervention, but like their allies in organizations like the Bay Area Council, the university was quick to recognize the central role of government spending in the local economy. Although President Tresidder had warned in 1942 that "permanent government subsidy carries with it many disappointments and disposes to new ailments. 'Cursed is the gift that taketh away liberty,' " by the end of the 1940s Stanford administrators were working actively to win lucrative federal contracts.³⁹

Their efforts paid off. Over the course of the 1950s Stanford's income from federal grants and contracts rose steadily, from less than \$2 million in 1951 to \$8.3 million in 1960. The bulk of these grants came from the Department of Defense and the Atomic Energy Commission and went to the School of Engineering, which rose to become one of the most preeminent departments in the nation, a quintessential "steeple of excellence" in Cold War university research and teaching.⁴⁰ By the late 1950s, Stanford University was an undisputed research powerhouse and one of the federal government's most valuable resources in its Cold War-related research efforts. Yet Stanford administrators understood from the beginning that government contracting was not an end in itself, but rather a means by which to achieve commercial ends. Terman and others recognized quite early that federal grants and contracts not only contributed to the national

defense effort but that these funds also served as seed money for industrial innovation. Their entrepreneurial sympathies gave them a keen understanding of the degree to which the university as an institution was becoming a more potent force in American cultural and economic life. Thus, their postwar approach to building Stanford's reputation focused not only on strengthening certain of its academic departments to attract defense dollars, but also on making them more conducive to the promotion of innovation and entrepreneurship, working in concert with the private sector and with government. At Stanford, the commercial potential of academic innovation was celebrated and encouraged—to a degree that was sometimes found excessive by certain members of the faculty.⁴¹

Stanford further beefed up its postwar reputation by aggressively recruiting faculty from the Ivy League colleges of the East. Good pay, plentiful research dollars, strong ties with high-tech industry, a good climate and natural amenities, and a pleasant, family-oriented community were all powerful selling points in luring talented junior professors to Stanford. The exodus that resulted from the University's recruitment effort was noticeable enough by 1961 to merit an article in *Newsweek*, in which one new professor was quoted as saying that he left Harvard to come west “because interesting things are happening ... there's excitement in the air.”⁴²

It is a great irony that an institution with such a long legacy of anti-government sentiment would use federal defense contracts to bring it fame and fortune and, in turn, foster hundreds of fledgling entrepreneurs in their work. Although Stanford had always relied on the federal defense industry to a certain degree in its research pursuits, the Cold War-era explosion of research was unprecedented. And when this money began to flow in the direction of Palo Alto, local officials and Stanford administrators alike celebrated the “new” local economy's reliance on government dollars. The “impact of the electronics-nuclear space-age upon America's research and technology is accelerating the transformation of the Palo Alto area into one of the country's most important national defense facilities,” crowed *The Tall Tree*, a journal sponsored in part by the Palo Alto Chamber of Commerce, in 1958. “The Palo Alto–Stanford research community has grown to become an integral part of the science community of the nation.... These United States resources of science are tapped by the armed services in continent-spanning teamwork for defense.... This brings Stanford research and the laboratories of industry here into sharp focus in their considerable dependence on the armed services and federal funds.”⁴³ During the 1950s and early 1960s, the dependence on defense was a good thing, a display of patriotism, and a sign that advanced scientific industry was “bigtime”—doing important things for the country and the world.

Land Development

The Cold War gave Stanford administrators an unprecedented opportunity to build on the institution's strengths in the sciences and engineering. The concomitant urban decentralization of the period presented Stanford's leaders with another new opportunity—to turn its vast landholdings into extraordinarily lucrative real estate developments. Stanford's choice to develop its land, spurred both by economic necessity and its administrators' real desire to make the San Francisco Peninsula a preeminent region of high-tech activity, had lasting repercussions on the geography of advanced scientific production through the Cold War and beyond.⁴⁴ For the university sought not simply to create isolated and unconnected real estate developments, but to form a “community of scholars” that would be a center for scientific production and innovation. In order to do this, Stanford consciously and comprehensively planned its developments, using architecture and design to accomplish social and cultural ends. Like other developers, Stanford may have gotten into the real estate business because it saw the opportunity for a quick profit, but its administrators also saw that the University could provide an alternative to the sprawling and unplanned suburban tracts growing up across the Peninsula. As a developer, Stanford saw itself as an important counterbalancing influence; because the University owned so much land, its choosing to develop carefully and sparingly would preserve land values over the long term. Interestingly, a university whose leadership embraced entrepreneurial, free-market economics not only eagerly accepted large amounts of federal grant monies but also saw that comprehensive planning (of the kind often practiced by the state) could be a way to control social and economic outcomes.

Prior to the war, the University had leased the land that was not part of the campus to farmers and ranchers, the only possible tenants for property located so far in the country. This provided the University with a modest income, but one that was hardly significant to the institutional budget. Like many other universities in the prewar period, Stanford struggled for financial solvency; diminished class sizes and shrinking alumni donations during the Great Depression exacerbated this problem. The population and economic boom during and after the war changed all this and gave new value to the thousands of acres of land owned by Stanford. Alf Brandin, chief of business affairs at the University, later remembered it this way:

I worked on fundraising before we went off to war and I didn't understand—if we needed some money, why didn't we do something with our land? We could lease it out. What I didn't understand was that there wasn't the growth that we had later.... on all sides of us we had open land.... So, the opportunity wasn't there. Now, the war changed all that.... After the war we then had an

opportunity to do something.⁴⁵

The University not only had an opportunity—it had a *need* to “do something.” Rising land values also meant rising property taxes; while a nonprofit organization, the University was subject to tax on “unrelated business income,” which applied to the Stanford lands whether they were home to grazing sheep or suburban subdivisions. Leaving the land undeveloped would mean cash-poor Stanford would have to pay high taxes without getting significant rents in return.⁴⁶ Another danger was that local governments—as an outgrowth of urban renewal legislation—had power to condemn unused land and take it over for public uses such as schools or parks. In order to avoid both high and uncompensated tax costs, as well as possible land condemnation, Stanford needed to develop its acreage.

Wallace Sterling’s ascension to the presidency of the University in 1949 was the turning point in making this land development campaign a reality. As Terman later put it, “Sterling [got] the world behind Stanford interested in Stanford.”⁴⁷ Another Stanford administrator remembered: “Wally was the one who made Stanford’s emergence possible. He really looks to me like the giant, the giant of those times. There was nobody in the country that compared to Wally—and in my opinion there still isn’t.”⁴⁸ While engineer Fred Terman was undoubtedly a crucial figure in the national emergence of Stanford and the development of Silicon Valley, it was under the leadership of historian Wallace Sterling that Stanford became a great engine of science-based economic development.

The choices that Sterling and his fellow administrators made in developing the Stanford lands were not simply a response to mass suburbanization and attendant increases in land value. In their design and planning, Stanford’s land developments show the influence of prevailing modes of thought about urban decentralization and the design of places of scientific production. The first evidence of this connection is the postwar development and expansion of the campus itself. Carefully planned and designed from the start, the University continued this tradition after the end of the war. Stanford was the first university to establish a campus planning office, which enforced the University’s stringent architectural and landscape standards.⁴⁹ Just as Leland Stanford had brought in the preeminent planner of his day—Frederick Law Olmsted—to design the original campus, in 1947 the University hired the famous urbanist and advocate of decentralization Lewis Mumford to assess potential development options for the campus and its surrounding land.

“Stanford owns the last large open area in what has become practically a single great suburban development,” Mumford wrote after his visit. “For the sake of Stanford’s future development as a University it is important that this area should

be conserved exclusively for University uses.” But Mumford was liberal in his definition of what these uses might be, finding that “housing developments to serve the staff and faculty of the university” would be acceptable uses and suggesting that the University further try to enhance its land values by obtaining strategically located parcels of land that could later be developed for business or residential use in a way that would not “reduce the value of nearby university land.” Unlike the earlier planning recommendations laid down by Olmsted, which sought ways to best suit Stanford’s unique landscape and convey its higher academic purposes, Mumford’s memorandum reflected pragmatic concerns about how best to maximize the value of Stanford’s land. Mumford argued that the land was most valuable when it was kept open or used for academic purposes and was strongly against subdividing acres on the border of the Farm for housing subdivisions.⁵⁰

In the short term, Stanford administrators seem to have ignored Mumford’s advice completely.⁵¹ Within a few years, the University’s leadership had commissioned a variety of other reports to assess the feasibility of residential, commercial, and industrial development of its acreage. Yet Stanford’s longer-term choices for the land, while not exclusively academic in purpose, reflected Mumford’s concerns about preserving the value of Stanford’s property with the “right” sort of development. It is clear that Stanford’s administrators also saw that the financial benefits of development would be maximized through comprehensive and conscientious planning.

University planners drew their inspiration not only from urbanists like Mumford but from concurrent city-planning movements such as the New Towns Movement in Great Britain, a public sector initiative that aimed to improve working-class housing conditions and urban congestion by building satellite cities from the ground up that incorporated industrial, commercial, residential, and recreational land uses.⁵² A 1951 Stanford report authored by planning official Elmore Hutchinson noted “it is fortunate that the entire area is held in one ownership, as almost all planning now for new cities, especially the new city developments in England, make it necessary for a sort of redevelopment to take place and the ownerships gathered from many holdings into one, either publicly or privately.” Sole ownership, Hutchinson continued, “is a deterrent to uncontrolled development that has in mind only the greatest amount of money return and it makes possible the ultimate stabilization of land values.”⁵³

Hutchinson’s observations echo the American campus planning traditions that valued single ownership and comprehensive, multi-use planning; they also reflect prevailing thought about city planning in general. Other university communities had to employ public sector tools like urban renewal to obtain ownership and control of land beyond their campuses; Stanford had a huge advantage in that it

already owned vacant and desirable property. Stanford administrators were also cognizant early on of the way in which the right sorts of jobs and the right sorts of people added to the value of land. Hutchinson's 1951 report expressed the hope that "we can develop a final plan where more work areas are made available, such as light industry of a non-nuisance type and which will create a demand for technical employees of a high salary class that will be in a financial position to live in this area. If this be possible, it will add greatly to our plan and make possible a more economically sound community."⁵⁴

In 1953 the Stanford Board of Trustees voted to make available for development all of the lands except for the areas required for Stanford's future campus buildings. To determine how best and most profitably to use this land, the University hired the San Francisco architectural firm Skidmore, Owings, and Merrill to survey the region's economic potential and suggest land uses. The 1953 Master Plan that resulted showed Stanford administrators how fortuitous conditions were for high-end residential, commercial, and industrial development on Stanford lands. The Plan noted that between 1940 and 1950 the Peninsula had grown 105 percent—twice the rate of growth of the metropolitan area as a whole. Those who moved to the Peninsula tended to be higher income; San Mateo County had the highest per capita income in the metropolitan area. Once again, the plan noted the appropriateness of high-tech industry to this kind of area, as "these high-income residential communities do not want heavy industries, but they have become increasingly desirous of obtaining small, attractive, light industry plants to relieve their residential tax load, particularly if such industries can be developed in controlled industrial districts with rigid regulations governing land coverage, architectural design and adequate open areas for parking and landscaping." Careful planning should also guide the construction of residential development on Stanford lands: "The development criteria for the residential areas ... reflect the application of contemporary planning concepts to attain a high order of living environment and at the same time render the University the highest economic return compatible with this aim. However, the ultimate character of the residential communities will be determined by the imagination and skill with which the development criteria are applied to the detail[ed] planning of the neighborhoods."⁵⁵

While this evaluation was extremely useful and reflected the University's concern with high planning standards, the precise recommendations of the report were somewhat unsatisfactory to Stanford administrators. Skidmore, Owings, and Merrill persisted in thinking of the Peninsula as simply a growing and wealthy commuter suburb of San Francisco rather than an economic center in its own right. As a consequence, the 1953 Plan was heavily skewed toward high-end residential development and less concerned with the development of "small,

attractive, light industry plants.” The Plan recommended that up to 6,000 acres of the Stanford lands be developed as residential subdivisions, while only 350 acres be devoted to commercial or industrial uses. In its eagerness to develop such a massive portion of Stanford’s acreage, the 1953 Plan was typical of its times. If the Stanford administrators had accepted this recommendation, not only might the economic history of Silicon Valley have taken a different course, but the landscape of Palo Alto also would have been strikingly different. Residential development on such a scale would have nearly obliterated the open spaces on the Stanford reserve, and perhaps would have set a precedent for further subdivision and development of open spaces elsewhere. In subsequent decades, the “growth-is-good” philosophy evident in the Skidmore, Owings, and Merrill document gave way to rising concern about environmental preservation and new growth control and land-banking practices that prevented large-scale development on the Peninsula’s coastal mountains as well as in other parts of California and the West.⁵⁶

Stanford administrators, seeing how federal defense contracts were greatly accelerating the creation and rate of growth of high technology spin-off companies around Stanford, disagreed with the Skidmore, Owings, and Merrill assessment and argued for a strategy that focused more of its attention on industrial development and on housing and retail components that responded to the future industrial functions of the region.⁵⁷ “If Stanford retains ample uncommitted land, in an area where land shortage is clearly looming, it will be in a position to attract to the University community a wide variety of national and regional activities which have a direct and immediate value to the University,” an administrative committee wrote in a report to President Sterling. “They are likely to provide income from rentals, and provide as well both income and professional opportunities for students and staff.”⁵⁸ The administrators’ implication was that such activities would revolve around advanced scientific industry.

The Stanford leadership’s emphasis on high-tech industrial development was not entirely due to economic foresight, as leasing land for industrial purposes gave the University more long-term flexibility than giving the acreage over exclusively to residential development. Industrial firms, with little grumbling, could be persuaded to sign 51-year or even shorter leases. Residential developers, however, could hardly be persuaded to sign anything less than a 99-year lease, locking up Stanford’s land and limiting more lucrative possibilities in the long term.⁵⁹ But the Stanford administrators’ response to the 1953 Master Plan also reveals their allegiance to the comprehensive planning ideas first proposed by Ebenezer Howard and later promulgated by their planning consultant Lewis Mumford. Sounding very much like garden city planners, the administrators argued that the University needed to take advantage of “the unique opportunity which the

Stanford lands present to develop a community in which work, home, recreation, and cultural life are brought together with some degree of balance and integration.”⁶⁰ In the context of the San Francisco Peninsula of 1954, which was in the process of turning from a sleepy rural area into a mostly residential commuter suburb, this was a bold vision.

In response to these criticisms of the Skidmore, Owings, and Merrill report, President Sterling, Provost Terman, and other University leaders embarked on a building program by the mid-1950s that had three chief components: high-end housing that would be attractive to professional families, a large regional shopping center that would take advantage of local purchasing capacity, and—most importantly—an industrial park made up of businesses and manufacturers who desired the cachet and the technical support gained by a location very close to Stanford. Reflecting the University’s concern about long leases as well as Fred Terman’s desire to increase the presence of high-tech industry in the area, nearly half of the total developed acreage was earmarked for this “Stanford Industrial Park.”⁶¹ The University stated “that the aim of the development shall be to produce in the ultimate a community of which the University Trustees and all those who have its welfare at heart can be proud and that will, by reason of the fact that it is a University project, serve in an important way as an educational example in the field of community development.”⁶²



Figure 3.1. As the San Francisco area suburbanized, Stanford University's vast and largely undeveloped landholdings became more valuable. In this 1960 aerial photograph, the Stanford campus appears at the center, framed by the University's two major land developments: the Stanford Industrial Park (top) and the Stanford Shopping Center (bottom). Courtesy Stanford University Archives.

In the 1950s, the political dynamics between Stanford and local government worked in the University's favor in making this "educational example" a reality. Town-and-gown tension was never entirely absent in Stanford and Palo Alto, even though the University was the center of the town's economy and community culture. Outwardly, the town usually assumed an attitude of cheerful cooperation: "Stanford and Palo Alto have always been a single community in spirit, utilizing each other's resources and cooperating for mutual benefit," wrote a *Palo Alto Times* editor in 1953.⁶³ Palo Alto readily agreed to incorporate the land developments into the city, thereby providing Stanford with public utilities and road upkeep

(and providing the city with tax revenue). The mayor of Palo Alto pronounced this “one of the finest annexations Palo Alto has had in its history.” “I can’t conceive of any opposition to the plan,” said the mayor. “I feel the entire community is in favor of the annexation, and in the future it will become a greater and greater benefit, both to the city and university.”⁶⁴

The reality was a bit more complicated. Palo Alto officials were somewhat distressed by the idea of a large shopping mall siphoning off revenue from its downtown merchants and, at one point, attempted to wield power over the Stanford developers by threatening not to provide sewer service to the site.⁶⁵ The town seems to have quickly given up on this attempt to influence Stanford’s plans, however, and made no further efforts to control the path of development. The hard political reality was that—as in many other small university-centered towns—Stanford administrators had much more political clout than Palo Alto elected officials. The University’s political power was further enhanced by the tireless boosterism of the Palo Alto Chamber of Commerce, whose motto was “Palo Alto: The Home of Stanford University.” Also working in Stanford’s favor was California’s heritage of a highly localized legal and regulatory environment that fragmented political power and tended to champion the rights of large private-property owners.⁶⁶

The residential and retail components of Stanford’s development plan, while seeking to adhere to higher architectural and planning standards than the usual kinds of postwar construction on the Peninsula, were not particularly innovative or remarkable aside from the fact that their leaseholder was a major research university. For these developments, Stanford administrators turned the tasks of construction and marketing over to private real estate development firms, but the University still remained an important influence on the projects. The commercial element of the development scheme, the Stanford Shopping Center, was the first regional shopping mall on the Peninsula and one of the first of the inward-facing shopping centers in the nation. While the University administrators were only nominally involved with its day-to-day operations, they maintained a strong interest in maintaining a prestigious and profitable group of tenants in the mall and in keeping the development from having significant commercial competition.⁶⁷

The first phase of residential development was a small tract of single-family housing in Menlo Park, on the northern side of the campus near the new shopping center. The homes were designed to appeal to the educated white families already residing in the area, and many of those who moved in were Stanford alumni.⁶⁸ Stanford got deeper into the residential real estate business in 1957 with the development of “Stanford Hills,” a subdivision whose houses cost between \$33,000 and \$75,000 and where lot sizes varied from the standard one-quarter-acre up to

five acres. This development was significantly more upscale than those proposed in the Skidmore, Owings, and Merrill plan and built in Menlo Park.⁶⁹ The developer trumpeted the exclusivity of the tract in a 1959 advertisement: “Enjoy Peninsula Living at Its Best ... in the lovely, rolling ‘Stanford Hills,’ our largest and most beautiful development. All homes INDIVIDUALLY PLANNED for the most discriminating buyers. No stock plans ... no repeats.... You, too, can now join our ‘Who’s Who.’ ”⁷⁰

In 1959 the University embarked upon a development called Willow Creek Apartments, a facility that marketed itself to the mobile, urbane professional who desired proximity to amenities like the University and the Shopping Center—a person who might otherwise choose to live in San Francisco. At the groundbreaking, developer Howard J. White remarked that “these luxury apartments were the result of innumerable requests on the Peninsula for true apartment living in a country setting” and said that he “expect[ed] his tenants to come from New York, from Florida, from the Northwest as well as Palm Springs and Arizona.”⁷¹ In all cases, the University’s residential developments were for individuals and families of a certain income level; they were far beyond the means of blue-collar workers and often out of reach for ordinary middle-class families as well.

Despite the success of these commercial and residential projects, the greatest achievement of the Stanford real estate development effort—and the part with which Stanford administrators were most closely involved—was the Stanford Industrial Park. Like the Shopping Center, the planning and development of the Park was already underway prior to the 1953 Master Plan; the University first designated the area as a “light-industrial” district in 1951, and the first tenants moved in the year after.⁷² The story of the Park is a vivid, real-life example of how the American campus planning traditions of pastoral isolation, separation, and comprehensive design were applied to industrial real estate development in the Cold War period. The Stanford Industrial Park was the exemplary research park, managing to become an industrial facility with the look and feel of a college campus. By 1960 Stanford’s effort at this disguise had been so successful and so influential upon its neighbors that the local newspaper editor commented: “The research centers of the Midpeninsula, with their architectural buildings and landscaped lawns, look more like college structures than factories. In fact, I’ve seen many college buildings, and attended classes in a few, that resembled those factories of old more than do the industrial plants of today.”⁷³

The purpose of the Stanford Industrial Park was to strengthen Stanford’s position as a top national research university through the economic development of its surrounding region. Creating a home for high-tech industry next door to Stanford’s campus enhanced the reputation of the University and created

profitable connections to the business community. Yet Fred Terman and his fellow administrators recognized that this goal would be accomplished only if the University's Palo Alto neighbors were persuaded that industrial development was a good thing, and if the development was sufficiently attractive to advanced scientific firms and their professional employees. The administrators thus set out to make the park a model for suburban industrial planning. If the future of the San Francisco Peninsula lay in high-tech industry, as Fred Terman believed, there needed to be an example to show how this kind of industrial development could peacefully coexist with an affluent suburban community. If the Park looked markedly different from other industrial parks, it would underscore the fact that advanced scientific industry was different from other kinds of industrial production—and thus better suited to a town like Palo Alto. The new high-tech industries used modern, “clean” facilities rather than smoke-belching factories; their employees were white-collar professionals rather than blue-collar workers. Because of physical plant and personnel, most manufacturing activities were highly inappropriate for exclusive suburbs like Palo Alto, reasoned the Stanford administrators. On the other hand, if contained in the proper setting, advanced scientific industry could blend in well with the landscape of the suburban college town. Palo Alto officials supported Stanford in its recruitment of this kind of industry and agreed that this growth could “fit in with the residential character of the city and with Stanford University.”⁷⁴

In order to attract advanced scientific industry and placate nervous suburban neighbors, administrators designed an Industrial Park that mirrored the lush greenery and low-rise, architecturally compatible buildings of the Stanford campus. In doing so, the administrators also demonstrated their allegiance to the idea that scientific creativity required a pastoral atmosphere in order to flourish. Having ownership to a huge, undeveloped expanse of land, and enjoying a generally supportive and cooperative relationship with local authorities, Stanford administrators had the luxury of translating the pastoral ideals of the college campus into an entirely new and comprehensively planned industrial development.

To these ends, Stanford took the architectural and planning standards of private industrial parks and intensified and tailored them to an unprecedented degree. The University instituted stringent architectural and planning restrictions and maintained close control over the design of every facility. Prospective tenants had to “submit an overall plan spelling out in some detail the type, size, location and setbacks of buildings, roads, off-street parking and green areas.”⁷⁵ There had to be ninety-footwide buffer strips of green space between the road and buildings at the front of every lot. Buildings had to be low-rise structures, and all structures had to incorporate ample green space. The open land around the buildings had to be 60

percent larger than the buildings constructed on it, making the park extremely low-density. Some of these lands, naturally, had to be taken up with parking lots, but in order to maintain the illusion of uninterrupted greenery, companies had to place their lots behind their buildings rather than toward the street. Tenants had to gain University approval for any alterations to their facilities and had to maintain the neatness and cleanliness of their buildings and grounds.⁷⁶

The buildings that resulted were not particularly architecturally innovative, but they were cleanly modernist and generally unobtrusive. Some companies chose to articulate their connection and proximity to the University through architecture that evoked the colonnaded sandstone of the University's buildings. Varian Associates, a Stanford spin-off company and an early tenant, was one of these; a contemporary description of its facility used language that emphasized the psychic benefits of the building's design and environment: "The architectural qualities of serenity and repose—somewhat forgotten in today's stress on dynamics and drama—which the rhythmic pattern of the structural columns gives to the building, have a special appropriateness in the more or less rural area in which the building is located."⁷⁷

In echoing Stanford's campus buildings—sometimes down to the red tile on the roof—the structures in the Industrial Park were not only creating a campuslike atmosphere but one that drew on the romanticized history and architectural traditions of the American West. The influence of the regional vernacular extended beyond imitations of the Mission Romanesque of the Stanford main quadrangle, to industrial buildings in the park that looked remarkably similar to the modernist suburban homes springing up throughout California subdivisions during this period. Some buildings in the Park incorporated the strikingly modern and distinctly Californian architecture seen in the homes of Joseph Eichler, a Bay Area architect whose mass-produced and cleanly modern ranch houses became architectural symbols of postwar California. Others used gently sloping landscaping and the incorporation of natural features, such as trees and shrubs (not always native, but characteristic of the region), to convey a particularly California feel. When we examine photographs of the earliest Industrial Park structures, it is hard to imagine these buildings being located in the suburbs of New York or Boston. The University also controlled the park's environment through careful selection of tenants, attracting a rarified group of innovative scientific manufacturers and research laboratories. Reversing the usual economic development model, where localities and developers wooed industry through extensive marketing campaigns and other enticements, Stanford required tenants to apply for admittance to the Park.⁷⁸ Existing connections to the University lured the earliest tenants; the first firm to lease land was run by Terman's former students the Varian brothers. Although the University was not explicitly recruiting

high-technology tenants at the outset, the presence of large facilities for Varian and similar firms set the tone for the development, and many other technology-related companies soon followed.



Figure 3.2. The General Electric facility in the Stanford Industrial Park was one example of an industrial structure whose architecture and landscaping reflected the influence of California modernism and allowed it to blend in almost seamlessly to the surrounding suburbs. Courtesy Stanford University Archives.

While the Park's tenants were private businesses, the presence of the federal government also was strongly felt in their operations. A significant portion of the tenants—particularly those who were newer companies, who numbered its Stanford faculty and former students among its founders—relied on government defense contracts to maintain and grow their profitability. A good number of the Park's tenants were federal contractors; many more benefited in a secondhand

fashion from federal contracts by supplying electronic equipment to large aerospace manufacturers and other companies who were building the hardware and technology for the military. Hewlett-Packard, is another early tenant and a firm founded by Terman protégés, is an instructive example. Company lore tends to highlight its first client, the Walt Disney Company, who bought eight of its oscillators in the early 1940s to provide technologically advanced sound for the movie *Fantasia*. But as Terman later recalled, military investments were more important: “In all the companies that supplied military equipment, new things were being developed, and the companies bought a lot of instruments to help them with new developments. It just turned out that these expensive things that Hewlett-Packard had developed just were right in where the line of great progress was.”⁷⁹ In an era when there was virtually no consumer market for high-technology electronic equipment or computers, the direct or secondary support of fledgling companies like Hewlett-Packard by the military was essential in keeping the industry alive. The Stanford Industrial Park and its supporting services acted as one of the first business incubators for these kinds of companies, who at the time they moved into the Industrial Park were so little known that even Stanford administrators like Alf Brandin were “trying to find out something about Hewlett-Packard stock. Nobody even knew about them. That’s how young they were.”⁸⁰ Yet within a few short years of moving into the Industrial Park, Hewlett-Packard had grown in size and wealth to such a degree that one of its founders, David Packard, served as president of Stanford’s Board of Trustees.

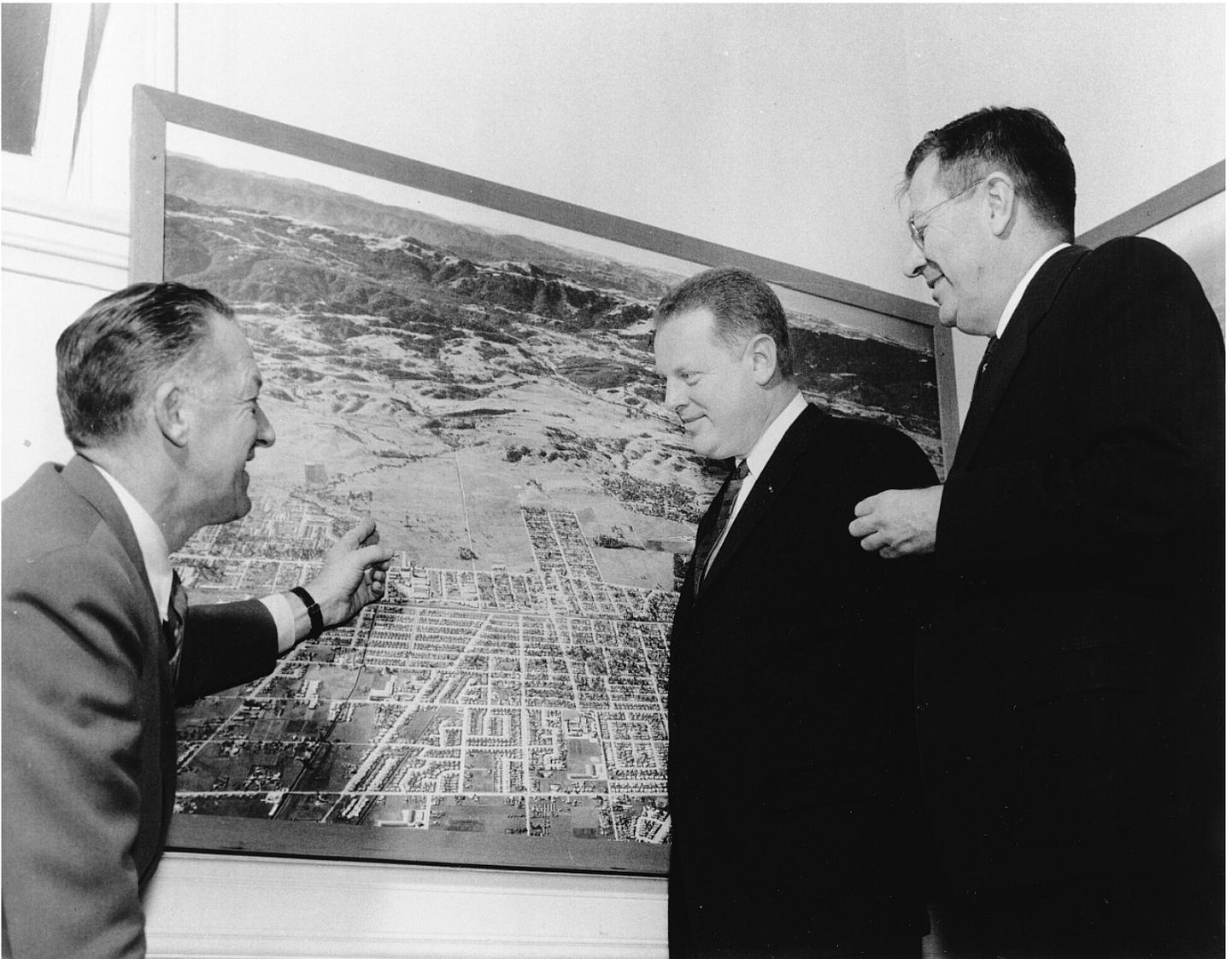


Figure 3.3. The Stanford Industrial Park created new alliances between university and industry beginning in the late 1950s. Here, Stanford and Lockheed officials inspect the location of the park on an area map. Courtesy Stanford University Archives.

The “youth” of technology companies like Hewlett-Packard was part of their appeal as tenants of the Industrial Park. Stanford administrators kept tight control over who leased land there, and they looked for tenants who reflected the energy and innovation of the new high-technology industries. Even non-industrial clients had to meet this test. When presented with the possibility of a synagogue being located in the Park, a key Stanford administrator handling the Park “said this would be OK if they are a young and vigorous group, but not if they are old and orthodox.”⁸¹ “Young and vigorous” tenants were desirable not only for the economic potential of their companies but because they would bring their young, educated, professional employees to Stanford and Palo Alto. Published brochures and unpublished internal documents about the Park repeatedly refer to the Park’s

ability to “attract a better class of workers” as one of its chief assets.⁸² Engineers and scientists, already lionized by the national political culture of the space age, were what David Packard called “a very desirable kind of resident” for the community.⁸³

The Park looked and felt different from other industrial developments that had grown up throughout the Bay Area since 1940, and the way in which business executives and local elites responded to it reflected the national political and cultural transformations accompanying the rise of the Cold War science complex. Its industry was “smokeless,” not dirty, and its workers were not only white-collar professionals but were portrayed as people of exceptional creative abilities. Discussions of workers in the Park often played off the prevailing stereotypes of scientists as quirky but brilliant. Discussing his Industrial Park facility, one Lockheed executive quipped: “we don’t have any set working hours for our scientists.... If a man works better from midnight till morning it’s all right with us. We’re working with gifted individuals and we try to encourage them to have bright ideas. We don’t care what time of day they have them.”⁸⁴

In mandating such stringent architectural standards and such high standards for its tenants, Stanford violated nearly every cardinal rule of economic development. “We didn’t know what the hell we were doing,” Alf Brandin admitted to a group of real estate developers in 1958. “If we knew how hard it was to get industry, that you’ve got to give tax exemptions, cheap labor and free buildings, we probably wouldn’t have tried.” But instead of struggling to find tenants, University officials found that industries were very interested in coming to the Park. “We were as tough as we could be,” Brandin said, “and we couldn’t discourage them.”⁸⁵ However, advanced scientific industries’ footloose nature and the shortage of scientific manpower caused these sectors to behave differently from other industries in making location choices. The old rules of economic development did not necessarily apply, and this was exceedingly clear in the area surrounding Stanford, which already enjoyed numerous economic and environmental advantages over other regions of the country.

Companies evaluating whether to locate in the Industrial Park were drawn by the proximity to defense installations, the many natural and community amenities, and the growing concentration of scientific minds working at Stanford and its spin-off companies. As the *San Francisco Chronicle* noted in 1961, “Brains Are Bait” for advanced scientific industry: “Certainly one of the greatest single attractions for the new—and highly desirable—smogless, light industries that make exotic products is brains. The electronics and missile industries as well as the less novel, more familiar varieties, must have a large pool of deep thinkers from which to draw new ideas, push ahead of competitors in the mad research scramble.”⁸⁶ The desires of scientific workers to be near communities of other

scientists and in places with the right amenities for them and their families gave the Stanford Industrial Park a huge advantage in luring industry, as it was located in the sort of community that offered all these advantages. The campuslike look and feel of the park presented an additional advantage for firms who were attempting to lure workers away from university jobs and into industrial research. By locating in the park, firms could potentially have their pick of some of the best “brains” in the country—not only faculty but Stanford graduates as well. The particularly Californian atmosphere, communicated through architecture, planning, and the internal culture of the entrepreneurial and innovative young companies that populated the park, also was a compelling asset in an era when the Golden State was the favored destination for so many migrants.⁸⁷

Industrial parks elsewhere had already demonstrated the effectiveness that pleasant landscaping and high architectural standards could have on the ability of real estate developers to find tenants, and on the willingness of wealthy communities to accept industry in their midst. What the Stanford example demonstrated was the extremely positive effect of proximity to, and association with, a prominent research institution. Stanford administrators structured the development to maximize the connection between university and industry in a way that was mutually beneficial. The businesses that leased land in the Industrial Park gained access to Stanford faculty and laboratory facilities, as well as the cachet of the Stanford name. Lockheed Corporation, the giant Los Angeles–based aerospace company, announced that it was leasing an Industrial Park facility in 1956, noting that “proximity to the University and its outstanding laboratories will give Lockheed researchers an opportunity for advanced study; and that consulting opportunities in the Lockheed laboratories will be afforded the Stanford faculty.”⁸⁸

Among the opportunities enjoyed by Lockheed and other tenants was an Honors Cooperative program that offered company employees parttime enrollment toward advanced degrees in scientific disciplines. This unique offering added to Stanford’s attraction as an industrial location and was a useful source of funds for academic programs. About four hundred employees from thirty-two companies were participating in the program by 1961, and enrollment later grew significantly.⁸⁹ “The program is fully self supporting through a combination of the tuition paid by the students and supplementary grants made by the participating companies,” Terman noted in 1959. “This is also a good deal for the employer on the San Francisco Peninsula because it is such an attractive fringe benefit that, with this to offer, the employer is able to recruit the cream of the crop graduating from colleges all over the country in a market which is highly competitive for men.”⁹⁰ At a moment in history when many American research universities remained wary of overly close ties with industry, Stanford administrators, led by

Terman, embraced the concept of corporate education and the cross-pollination of research efforts.⁹¹

The Honors Cooperative program complemented another ingenious fund-raising tool of Terman's, the "Industrial Affiliates Program" of the Department of Aeronautical Engineering. Companies like Lockheed paid \$10,000 annually for the privilege of being Industrial Associates. In return, they enjoyed an enhanced relationship with the researchers at Stanford and, again, the cachet of a close affiliation with the university.⁹² Ancillary benefits like these increased tenants' allegiance to Stanford and resulted in additional revenue through corporate donations. High-technology companies, who benefited most from access to Stanford's faculty and research laboratories, were the most willing to give, and this in turn influenced the University's choice of tenants for the Park. Terman "pointed out to Brandin that we were getting more money here at Stanford from gifts from these technical companies [than] lease income from the land.... And Alf Brandin saw the point very quickly, and very soon thereafter, if you weren't a high-technology company, you had a hell of a time coaxing him to give you a lease."⁹³

While the Stanford Industrial Park was distinctive in many regards, we must not forget that its success was due in good part to its being on the right side of larger economic and demographic trends. By the early 1960s, when the Park was filling up to capacity, the region's population had suburbanized to a degree that the ratio of population between the suburbs and the core cities (San Francisco and Oakland) was "well over" two to one, noted a survey by the Bay Area Council.⁹⁴ Regional decentralization was mirrored in business decentralization within suburban towns as well; a 1960 Council publication found that "even in suburban communities some dispersion of trade and service establishments is taking place in accordance with the trend in the entire Bay Area toward a broader distribution of economic activities."⁹⁵ The commuting patterns of Industrial Park employees attested to the shifting live-work patterns in the Bay Area. A 1962 survey showed that the majority of the Park's 10,500 employees did not live in the immediate area but commuted from communities south of Palo Alto (56 percent). Seven percent lived outside the "regional area" of the Peninsula altogether. Palo Alto residents made up 21 percent of the workforce. Employees overwhelmingly depended on cars to get to work:

Few people use means other than the automobile—(little other means is offered). Nine men walk to work, four use the S.P. [commuter] train, and 8 use bicycles—a total of 1.6%. It should be observed that many companies do not encourage walking or public transportation. For example, Hewlett-Packard has no means for pedestrians to walk from public sidewalks to the entrances of their

plant. Apparently it is assumed that all people will arrive by automobile or private motor vehicle.⁹⁶

It is little wonder that alternative transportation was so limited given the design requirements of the Park, which despite their numerous requirements about setbacks and landscaping made no mention of sidewalks. Stanford's model industrial development was designed for the worker who commuted by car, even though the design of the park took pains to disguise its car dependence by placing the company parking lots behind the buildings.⁹⁷ The findings of the study also might have raised some warning signals about the ability of high-tech employees to find or afford housing in the immediate area. Because of developments like the Industrial Park, the Peninsula was on the leading edge of the trend toward living in one suburb and working in another. The residential and commuting patterns seen in the Park in 1962 also presaged the later housing shortages that would face the Bay Area, particularly Palo Alto, where by the end of the twentieth century few professionals could find available and affordable places to live.

The Park had its critics, some inside Stanford. During a 1959 meeting of the University's Advisory Committee on Land and Building Development (at which, significantly, committee member Fred Terman was not present), some administrators and faculty expressed concern that "the type of industry attracted to the Industrial Park [tended] to lend strong professional support to one part of the University's academic program, but not to other parts. The question was raised whether a more aggressive effort should not be made to attract regional governmental centers, professional society headquarters, and other leasees which would support a wider range of faculty interests." The committee members present generally agreed "it would be highly desirable to attract more diversified activities to Stanford lands, but that it is not immediately clear how to proceed."⁹⁸ While the committee made no further mention of diversification efforts after this meeting, the minutes reveal the tensions within the University about whose interests the Industrial Park was furthering.

The concerns that members of Stanford's liberal arts faculty might have had about the University's relentless focus on science-based economic development were drowned out by the avalanche of public attention, political power, and revenue that Stanford received as a result of the Park. By 1963 the Park was home to forty-two firms employing about twelve thousand workers.⁹⁹ By 1969 the number of tenants had swelled to sixty, and the number of employees to nearly eighteen thousand.¹⁰⁰ Between 1955 and 1968, the Industrial Park brought in over \$13 million in net revenues, becoming by far the most lucrative of Stanford's land developments and a smashing economic success in terms of commercial real estate development.¹⁰¹ In a very short time, Stanford's administrators had turned Palo

Alto from a residential suburb and college town into an important center for innovative, advanced scientific industrial production.

A Model City

Almost from the very beginning, journalists, politicians, and business leaders hailed the Industrial Park and the other Stanford land developments as a national and international model for regional economic development. By the mid-1950s, the Stanford projects, and particularly the Industrial Park, were the subjects of numerous glowing national magazine features and newspaper articles. Although in the midst of the suburbs, these observers quickly took to referring to the Stanford developments as a new sort of city. The Stanford land program was “a model city” that “dwarfs ordinary town development schemes,” enthused the *Saturday Evening Post* in 1955.¹⁰² The *Los Angeles Times* reported in 1956:

Parts of the 9,000-acre university landholdings are fast taking on the appearance of a fully integrated city. When completed it is expected that 45,000 people will live in homes on the land and thousands will be working at light industry or in business offices and buying at a shopping center. And, of course, there will be many gaining a higher education on the campus.¹⁰³

The Park’s greatest public relations coup came in 1958, within only a few years of its opening, when it was featured in an exhibit at the World’s Fair in Brussels. “A color film showing the park and the life of its workers and enlarged color transparencies of its buildings are in the exhibit ‘Industrial Parks USA’ co-sponsored by the Society of Industrial Realtors and the Mobil Overseas Oil Co.,” noted the *Stanford University Bulletin*. “Of the nine parks featured in the display, the co-sponsors considered the Stanford Park the most photogenic. The six-minute continuous loop film taken at Stanford is the closing element in the exhibit. In addition to the Industrial Park, the film shows scenes in local residence areas and at Stanford Shopping Center.”¹⁰⁴

After the World’s Fair, the Park began to attract a steady stream of visitors from other countries and elsewhere in the United States who wanted to see for themselves this wonder of modern industrial development. Charles DeGaulle specifically asked to tour the Park during a visit to the United States in 1960; eight members of the Japanese Diet visited the Stanford developments shortly thereafter. Other foreign dignitaries followed.¹⁰⁵

To the hundreds of other cities and regions in the United States who were seeking potent and fast-acting economic development strategies, Stanford University and its surrounding area seemed to have stumbled upon the perfect and

easy solution: parklike industrial real estate, located near good housing and quality schools, whose tenants could take advantage of the resources of a world-class university. As other local economic-development authorities embarked upon their own schemes for industrial development—high-tech and otherwise—they often invoked Stanford as a model. Newspapers from Oregon and Idaho to Texas, Kansas, and Mississippi gave glowing reports of local initiatives inspired by the Stanford Industrial Park.¹⁰⁶

The University's administrators were understandably pleased with this recognition and did what they could to provide technical assistance to other universities and communities. Lyle Nelson, Stanford's director of university relations, proudly wrote in 1962 that the Park was a "development which has become a national model for city-University cooperative action in attracting science-based research activities."¹⁰⁷ On the top of a 1963 newspaper clipping describing a Stanford-inspired research park at the University of Illinois, one excited University administrator wrote "Pace Setter!"¹⁰⁸

While localities interested in advanced scientific development in general were drawn to the Stanford Industrial Park as a model, the development served as a particularly instructive example for universities and university towns who wanted to enter the real estate and economic development business. Representatives of four Southern California college towns—Pomona, Claremont, Le Verne, and Montclair—toured the facility in 1959. Pomona's city administrator commented that "Pomona Valley wants to look closely at Stanford because we feel that we have very nearly the same set of factors in Pomona Valley which led to Stanford's success, namely industrial sites in proximity to colleges and good residential areas."¹⁰⁹ Universities with land endowments were particularly interested in learning from Stanford. In Canada, the *Vancouver Sun* editorialized in 1964 that the University of British Columbia should develop its lands not only for immediate profit, but also for the long-term benefits to society: "A scientific-industrial complex on our own university endowment lands in the light of this experience takes on almost the appearance of a necessity. Its immediate benefits are obvious. But beyond that, it shapes as a doorway into a new social and economic age."¹¹⁰

Yet projects without overt ties to universities also looked to Stanford for inspiration. In 1958 Bernard Hegeman, the president of the Brooklyn Real Estate Board petitioned the New York City Planning Commission to create an industrial park like the one flourishing in Palo Alto. "New York City ... can try to make fairly extensive areas available for large plants which like to have all their working space on one level," he argued. "Since no smoke or other noxious fumes will be permitted in an industrial park, there should be no fear on the part of the people living in the area that the new development will be in any way objectionable.... Stanford University ... has such an industrial park on land which

it owns adjacent to the campus.”¹¹¹ Hegeman was not alone in invoking the association between “clean” industry and the Stanford Industrial Park. Officials in neighboring Santa Clara, California, a few miles to the south of Palo Alto, announced that an industrial park to be developed there in 1960 would be “ ‘similar to the Stanford Industrial Park’ in that smoke, noise, and odor will be restricted.”¹¹²

The success of Stanford’s land developments also influenced broader trends in campus planning. The regents of the University of California, for example, chose the lightly populated coastal mountains of Santa Cruz as a site for a new campus in 1961 because they “want their new installations to be more like Stanford and less like UCLA.” Building on an open and unpopulated site, the regents announced, would “make possible provision for faculty and staff housing and other features of a model university community.” Rather than being limited by existing surrounding development, like the urban UCLA campus, “the university will be able to control the commercial, industrial, and residential districts surrounding the campus—much as Stanford has done.”¹¹³ Stanford’s experience showed others the value of having large open tracts of land at a university’s disposal; the “model city” in Palo Alto could not have come about within the confines of an already-developed urban area.

The story of the University of California at Berkeley, across the Bay from Stanford, is instructive in this regard. Berkeley enjoyed many of the advantages Stanford did during the early Cold War period. It was the home of huge federally sponsored scientific research projects and some of the nation’s finest physicists and engineers. It was located in a metropolitan area that enjoyed a favorable climate and good natural amenities, and that was experiencing massive economic growth, much of it stemming from military investment. Like Stanford, the University was in a suburban area that was a desirable place for its faculty and other professionals to live. With all these conditions in place, it initially seems puzzling that Berkeley did not also become a center for high-tech industrial development.

In 1961 Berkeley city officials visited the Stanford Industrial Park to assess whether similar economic development could be possible in their university town; one local reporter sarcastically called the visit “a reverent Pilgrimage ... to the Site of the Miracle of Palo Alto.” The officials “returned home painfully aware of the differences” between the two towns. One of these was the issue recognized by the University of California regents in their choice of Santa Cruz: available land and population density. While technically suburban, the City of Berkeley was much larger and more densely populated than the towns of the Peninsula: “Palo Alto has an area of 22.27 square miles and a population of 53,000. Berkeley has an area of 17.87 square miles (almost half of it under water) and a population of

111,000, more than twice that of Palo Alto.”¹¹⁴ City and University officials did not have the freedom to develop land enjoyed by Stanford as a result of its unique land grant.

The other factor limiting industrial development of this kind in Berkeley was a very different political environment, both inside and outside the University of California. As a public institution, the University had fewer resources and much less entrepreneurial agility. The pro-business views of Stanford’s administrators had made it eager to form alliances with industry in ways that were almost unprecedented at the time. The University at Berkeley, although led by the great champion of the “multiversity,” Clark Kerr, did not provide the extension programs and special faculty exchanges that Stanford gave the tenants of its Industrial Park.¹¹⁵

Outside the University, the demographics of the town of Berkeley were a stumbling block to attracting this kind of high-tech development. “Palo Alto’s population is almost completely Caucasian, whereas Berkeley’s is 26 percent non-white,” noted the article about the Berkeley officials’ 1961 “pilgrimage.” “Berkeley, in the immediate future, at least, would probably have a harder time providing the highly skilled and professional personnel needed by the new glamor [sic] industries.”¹¹⁶ While the reporter’s frank observation reflected the racial politics of the time and the fact that few minorities then had professional careers in the sciences, he hit upon an important truth behind Stanford’s success—the racial and economic homogeneity of Palo Alto. The professionals who worked in high-tech industry already lived near Stanford, or wanted to live there. Part of what made the “city of knowledge” on the Peninsula so desirable to professional workers and employers during this time of racial change and social upheaval was its whiteness.

Because of constraints like those experienced by Berkeley, many of the university communities that aspired to recreate the “miracle of Palo Alto” were not able to replicate Stanford’s success. Yet the Stanford model had an enduring legacy on the economic development strategies of the 1960s in two respects. First, it helped make state and local leaders pay closer attention to the role research universities played in attracting businesses and educated workers. “A tremendous complex of clean industry has grown up around Stanford University because of its outstanding research facilities,” Oregon governor Mark Hatfield exhorted an audience of his state’s business leaders in 1961, “and this is where we should make improvements.”¹¹⁷

Second, Stanford’s real estate developments further solidified the association between science-based economic development and a low-rise, low-density environment in the minds of public policy makers and business leaders. Stanford’s imitators quickly recognized that Stanford’s ownership of a large parcel of

undeveloped land had been essential to the success of the Industrial Park and the other real estate projects sponsored by the University. They also saw that the Park's cachet derived in part from its lush landscaping, its generous use of space, and its modern facilities. This design made electronics and computer manufacturing plants blend in well with a high-income suburban landscape and, perhaps even more importantly, attracted workers who were, by and large, well-educated professionals who added financial and social resources to the community.

By the mid-1960s the Stanford Industrial Park—a project developed under extraordinary conditions of university land ownership, massive regional economic growth, and location in an affluent suburb—had become the gold standard for science-based industrial development elsewhere in the country and the world. By 1965 economic-development officials and business leaders as far away as Scotland were concluding that “the establishment of ‘industrial parks’ on the Stanford University model would bring about the most profound interpenetration” of university and industry.¹¹⁸

The communities that appear to have most eagerly embraced the Stanford land developments as a model were often in economically struggling regions of the country and were sometimes rural or semi-rural. However, larger cities and equally prestigious research institutions also noted Stanford's success and, while usually refraining from an open acknowledgement of Stanford as a model, proceeded to develop industrial projects along very similar lines. Whether in cities or in rural areas, Stanford's imitators felt that they had to be similarly exclusive and suburban in look and feel in order to replicate the successes of Palo Alto. While rarely discussed, Stanford's imitators also noted the role that racial and economic homogeneity played in the success of the Industrial Park and the other developments. Placing a “city of knowledge” in a suburban, white, middle-class setting appeared to greatly reduce community opposition to these projects. Universities and economic development officials would take these lessons from their visits to Stanford and attempt to replicate the “miracle at Palo Alto” elsewhere around the country, with mixed results.¹¹⁹

“The Battle of the Hills”

While closely observing the features that contributed to Stanford's success, the steady stream of visitors to Palo Alto and the Industrial Park did not seem to have taken much notice of another outcome of these real-estate-development efforts: community controversy. Palo Alto residents did not unilaterally welcome the incursion of industry into their town, and the conflicts that emerged between community members and Stanford administrators over the course of the late 1950s

and early 1960s demonstrated that building the city of knowledge could generate resentment and community antagonism, even in a homogeneous, low-density suburb.

By the late 1950s, it was clear to the elected leaders of Palo Alto and Menlo Park that their acquiescence to Stanford's land developments was paying off handsomely in increased tax revenue and enhanced economic visibility. The Industrial Park and the other Stanford land developments were a huge boon to the finances of the towns of Palo Alto and Menlo Park. Both the Shopping Center and the Industrial Park were on land that had been annexed by Palo Alto, and their presence caused a huge jump in the city's tax revenue. "Assessed valuation of property in Palo Alto has jumped almost \$14 million to a record high of \$95,742,760, city assessor Harold L. Marty has announced," the *San Francisco News* reported in 1956. "Prime reason for the increase is shopping center and industrial developments on Stanford-owned land. The new shopping center ... for example, is assessed at more than \$5 million." This jump in revenue caused tax rates to decrease, making Palo Alto an even more attractive place for residents and businesses.¹²⁰

However, by the end of the decade, local officials also could not ignore the growing discontent among their constituents about the effects the new commercial and industrial activity was having on Palo Alto. Even during the relatively complacent 1950s, there had been scattered complaints from local businesses and residents. In 1953 Palo Alto's downtown merchants had been sufficiently distressed by the prospect of the Stanford Shopping Center to propose razing the existing downtown and building the shopping mall there instead.¹²¹ In 1956 some residents of the unincorporated neighborhood of Roble Ridge, which bordered the back side of the Industrial Park, protested to the Palo Alto city council that the famous ninety-foot buffer zones of green space in the Park were not required on the back of facilities, thus bringing the buildings very close to their homes. In a rare incidence of the city wielding its zoning authority over Stanford, the council forced Park tenants to increase the buffer at the rear. The debate over this issue reveals the brewing tensions between local residents and the University regarding industrial development. One councilman "charged the university had been 'negligent' in its treatment of the public, and was 'selfishly developing its property from a dollars and cents angle.'"¹²²

This situation was not improved by university administrators' approach to community relations. Stanford's leaders operated under the strong and ingrained belief that Palo Alto existed only because of Stanford, and they were reluctant to think of the city as anything but a college town whose cultural and economic center was the University. While their opinion had its root in fact, it caused Stanford to be rather impatient and heavy-handed in dealing with its neighbors

and caused it public relations problems that might have been unnecessary had they treated Palo Altans with more respect in the first place.

The administrators had been well aware of community resistance from the beginning. As Stanford was beginning to crystallize its plans for creating an industrial park on its lands, university administrators participated in local community meetings where, as Alf Brandin noted “it was evident that certain factions in attendance were attempting to put in the minds of those present the fact that industrial property, as such, holds little or no advantage for the City of Palo Alto.... I took the opportunity of presenting the point of view that industrial property, as we are planning and developing, has a great many more advantages to the City of Palo Alto than otherwise.”¹²³ University allies in local government and in the local Chamber of Commerce joined the University in trying to assure skittish Palo Alto residents that the Park would not bring the “noxious” by-products of the air and noise pollution usually associated with industrial development. Brandin noted later, “when it came to the industrial park, our problem was semantics. What were we producing out there? We tried to say it has got to be clean, no smoke, no heavy manufacturing. Light manufacturing that is clean and electronic.”¹²⁴

Despite official assurances, some residents—many of whom were Stanford alumni whose loyalties otherwise lay with the University—remained highly skeptical of the development. Brandin recalled: “I remember people in town saying we would build right to the sidewalk with a sea of asphalt parking lots—nothing but cars. They’d say, ‘They can talk about all these pretty pictures and this sort of thing, but that’s a lot of hogwash. Developers don’t do that.’ One of them was a classmate of mine and I said, ‘I want to remind you of something. We can’t sell this property, we’ve got a university we’re trying to help finance and we’ve got a cultural center we are proud of. We’re not going to desecrate our land for a buck. We have to keep it in tune with the university.’ ”¹²⁵

Stanford administrators and Palo Alto officials may have grown impatient with some residents’ continued reluctance to welcome industrial development to Palo Alto, but to a certain degree these residents had good reason to be fearful. High technology manufacturing was not always as “clean” as its proponents claimed it to be. By the early 1960s the volume of industrial activity in the Stanford Industrial Park made this fact clear to the surrounding neighborhoods. People who lived in subdivisions adjoining the Stanford Industrial Park experienced various sorts of pollution, from the irritating to the potentially lethal. In 1962 a group of residents petitioned President Sterling with complaints about early-morning noise coming from Varian Associates’ Industrial Park facility:

[T]hey use machines that make a high pitched whine. All last week we were

awakened mornings—usually around 5:30.... And the noise and fumes from their stack continues unabated 24 hours a day. On certain days the acid odor is very strong and the acid fumes has [sic] damaged many of our trees and shrubs, our cars and much of our patio furniture. When we contact Varian directly we usually have a few days respite—then it all starts again.¹²⁶

Stanford used its clout as a landlord to try and limit these sorts of disturbances. When Hewlett-Packard's nighttime lights began to create another community-relations problem at a time when the company had indicated a desire to expand its facilities in the Park, President Sterling's Advisory Committee on Land and Building Development wrote that it "strongly recommends that corrective measures be taken promptly to remedy this situation, particularly in view of the proposed Hewlett-Packard expansion in Industrial Park."¹²⁷

While lights and noise were problems that could usually be remedied by "corrective measures" on the part of Stanford, the fact remained that the manufacturing processes at some Industrial Park plants never could keep the area completely clean. A more disturbing kind of pollution resulted from manufacturing processes that used radiation. One resident who lived adjacent to Lockheed's plant wrote the *Palo Alto Times* in 1960 that "it is disconcerting ... to have a federal agent pick leaves from our shrubs once a month, to test them for radioactivity."¹²⁸ The artful landscaping and architecture of the Industrial Park could not disguise various types of pollutants created by its tenants. Although Stanford had successfully made a place of industrial production look and feel like a college campus, its neighbors could see firsthand that high-tech manufacturing produced undesirable side effects that would rarely be found within the confines of a real university.

The Palo Alto residents' fears for their health, alumni nostalgia about Stanford's lands, the shaky and inequitable alliance between the university and the city's political leadership, and the dismissive manner in which Stanford often dealt with community concerns all came to a head in 1960, when the University proposed expanding the Industrial Park toward the rolling foothills that were a near sacred part of Stanford's property. The neighborhood opposition to this expansion led to a fiercely fought ballot referendum campaign that President Sterling called "the Battle of the Hills."¹²⁹

Stanford's decision to expand the Park demonstrated how the runaway economic success of the development had subtly changed the University's attitudes about careful planning. The University had embarked on its first real estate developments after exhaustive study and planning and, during the early- to mid-1950s, had tried its best to develop in a deliberate and conscientious manner that would reserve open space and preserve land values. As one resident noted in a

letter to the editor of the *Palo Alto Times*, the expansion of the Industrial Park in 1960 grew not out of a similarly deliberative process but out of the demands of its tenants for more space.¹³⁰

As word spread through community and alumni networks that the Stanford foothills were allegedly going to be defaced by industrial development, indignant letters poured into President Sterling's office and swamped the editorial offices of the *Palo Alto Times*. Sterling received approximately four hundred letters of opposition and about fifty of support; all the correspondents lived in the immediate area, and most were alumni.¹³¹ One telegram to Sterling summed up the emotional nature of this opposition: "Official request to annex Stanford foothill land to Palo Alto in advance of scheduled Board of Trustees meeting today shocking. Complete disregard to objective alumni and community public opinion evident. Irresponsible attitude clearly shown. Apparent moral deterioration and decay and abandonment of high Stanford University standards and principles is sickening."¹³²

Nostalgia and environmentalism, not just objection to an industrial presence in the suburbs, fueled Stanford's opponents in the Battle of the Hills. As the above telegram shows, expanding into the "foothills"—a topographical feature so closely associated in the alumnus's mind with the beautiful campus landscape—was what made Stanford's plan so objectionable. The outcry generated by the connection between the development and the Stanford foothills led Stanford administrators to abandon use of the term "foothill" altogether when describing the park. One university official protested: "there are only about 275 acres which could be used for industry—extremely unusual industry, too, but I won't go into that—and they have one little foothill in their midst."¹³³

Stanford administrators had never responded very well to community conflict, but by 1960 the University's power had grown to a degree that it did not need to be overly solicitous of residents' concerns or of local political niceties. As a result, it behaved as somewhat of a bully, paying lip service to community concerns but privately rolling its eyes at the protesters. Donald Carlson, one of Sterling's assistants, left a vividly worded trail of correspondence from the Park expansion controversy. Responding to one alumna who had written an angry note accusing Stanford of all sorts of greed and selfishness, Carlson dryly replied: "I am so impressed by your knowledge of the University and its land problems that I feel compelled to address you a personal acknowledgement. The consideration, logic, and unselfish interest you have demonstrated surely must have given inspiration to the Trustees."¹³⁴

Stanford administrators firmly believed that they had the public's best interests at heart in expanding the Industrial Park. The existing development had already brought huge tax benefits to the community and, by enriching Stanford's coffers,

had enabled the University to raise its profile and that of the Peninsula in general. Many in Palo Alto and neighboring towns certainly would have agreed with these conclusions, and Stanford might not have faced such a large amount of opposition if it had had a more public decision-making process at the outset. But, as one resident put it, “there has been growing concern over Stanford’s policy of presenting pre-packaged zoning requests.... They resemble closely the tactics of many a Land Developer asking for variances from planned uses.”¹³⁵ President Sterling angrily challenged that accusation, asserting, “Stanford has made a conscientious effort to keep the communities surrounding the campus informed of our plans, an effort which could easily be documented.”¹³⁶

Outside Palo Alto, the press took some notice of the controversy but generally dismissed it. “Stanford University ... is being niggled by a small but vociferous group,” reported the *San Francisco Examiner*; sounding much like a Stanford administrator, the reporter referred to the “wild-eyed claims” of the protesters.¹³⁷ Yet within Palo Alto, residents were not placated, and the decision to expand the Stanford Industrial Park became a referendum on Palo Alto’s November 1960 ballot. A “yes” vote would allow the expansion to go along as planned. Some of Stanford’s staunchest allies were against the measure. Dorothy Varian, wife of Industrial Park tenant Russell Varian, wrote the *Palo Alto Times* urging a “no” vote on the referendum.¹³⁸

Yet over the course of the year, Stanford managed to muster more public support from alumni and other members of the community. One letter to the *Palo Alto Times* turned the protester’s nostalgia-infused laments about the loss of the foothills on its head: “I feel that an expression of gratitude is due Stanford for so generously permitting thousands of people to freely enjoy the rolling, tree-studded hills, the lakes, and views of the campus, with a minimum of restriction, for over sixty years. As a result of this privilege having been granted for so long a time, many have come to feel that they have ‘rights’ to the Stanford land and should have a voice in determining what use Stanford will make of it.”¹³⁹ As the election neared, the *Times* itself spoke out in favor of the referendum, reminding Palo Alto residents of the debt they owed Stanford for keeping its lands open for so long: “Stanford’s 9,000 acres have constituted a free park for the people of Palo Alto and surrounding communities. If these broad acres had been owned by other private interests, they long ago would have been converted to the houses, business places and industries where so many of us live and work—including those who oppose Stanford’s industrial expansion.”¹⁴⁰

In the end, Stanford’s arguments—and its successful marshaling of its own grassroots support—won the “Battle of the Hills.” The referendum passed by a comfortable margin in November 1960, and Stanford proceeded to expand the Industrial Park. Although the community protesters lost this battle, their actions

had an impact. The University had a new awareness of community sensitivity and public relations after this debacle. It scaled back future plans to build on the hills, and sought to defuse community suspicion by giving the development a softer title, the Stanford Research Park. “The term ‘Industrial Park’ serves as a real red flag,” warned some administrators in a 1961 internal memorandum.¹⁴¹ The mobilization of community opposition also signaled a changing power dynamic in Palo Alto and elsewhere on the Peninsula. No longer would development, even pleasantly landscaped development, be universally welcomed. The planning process could no longer occur behind the closed doors of town halls or university offices. Plans had to now win the seal of approval of grassroots “community” groups—and Stanford needed to mobilize its own base of support among Peninsula residents in order to execute further land development.

The lessons that Stanford learned about community politics were evident in its handling of another local controversy a year later. In 1961 Palo Alto officials began to consider expanding Oregon Avenue, a thoroughfare running through some of the town’s most desirable residential areas, into an expressway intended in part to accommodate industrial traffic to and from the research park. Residents opposing this plan immediately mobilized in opposition, but no sooner had they done this than another group of Oregon Avenue residents, calling itself the Traffic Action Committee, rose up in support of the measure. The pro-expressway movement might have had its grassroots partisans, but the Traffic Action Committee was hardly a grassroots organization. Stanford development chief “Alf’s [Brandin’s] hand was damned obvious” in the process, Donald Carlson noted privately to a colleague. “There is more politicking here than meets even my jaundiced eye.” But, he mused, intervention of this sort wouldn’t hurt:

Because of our Industrial Park and all of the emotion the just-off Oregon Avenuers have stirred up about it, Stanford is a nasty word down in that area. We are not going to suddenly turn on any lights, show the truth and make them love us. So I don’t see much harm in our taking a background role in the Traffic Action Committee. It could improve our relations with the Menlo people because the peripheral plan proposes to put a heck of a lot more truck traffic on the proposed Willow Freeway.... there are at least a half dozen councilmen (including the mayor) who are anxious to get the thing turned around somehow and get some of that bond money applied to the city’s traffic problem where it hurts the most. So they are looking for public support.¹⁴²

In the end, this strategy worked. While the community opponents of the Oregon Expressway won on some points, managing to downsize the original plans and redirect the route so that it would be slightly less disruptive to residential areas, university officials got the traffic artery the research park needed. The

“community” support that Stanford officials worked to mobilize made the project politically saleable to local officials and attested to the new power of the community-level activist in local politics.

The political furor generated by Stanford’s plans to expand the Industrial Park, while not successful in blocking the university’s plans, was an early and important instance of resident activism against uncontrolled suburban growth. The intensity of community opposition reflected not simply hostility toward Stanford’s actions, but the encroachment Peninsula residents were facing on all sides. By 1960 persons who had lived there for ten years or longer felt besieged by new subdivisions, highways, office complexes, and shopping centers. In the Bay Area and across California, this rising concern about growth began to generate a host of publications decrying the “slurban” landscape that had resulted from rapid, decentralized, and haphazardly regulated growth. In many of these early environmental tracts, the Santa Clara Valley became the prime example of the excesses and environmental degradation resulting from postwar suburbanization. This political movement gained steam over the course of the 1960s and 1970s and spurred a host of open-space preservation and growth-control efforts in the region, making the Bay Area home to some of the environmental movement’s most important early battles and precedent-setting land-use-planning measures.¹⁴³

The great irony about the Battle of the Hills and other moments of community opposition faced by Stanford in its development plans was that the protests were coming from precisely the sort of educated professional residents whom these developments were designed to recruit. The “brains” that were essential components of Stanford’s city of knowledge were fighting to keep their community as residential and unspoiled as possible—the natural response of people who had already made a significant financial and psychic investment in their new hometown. The complaints residents voiced to Stanford administrators were the same ones they held about real estate development in general. But Stanford was a known quantity and hence an easy target for their anger. In many ways, it was residents’ (and particularly alumni’s) love for and faith in Stanford that made them try to change its development plans. The real estate developers were strangers, Stanford was “family.”

The community tensions generated by the Industrial Park reveal the pitfalls that could plague even the most successful city of knowledge and the uncontrollable elements that were present in even the most rigorously controlled urban development. Environmental passions, nostalgia for the “old” Stanford, concern about industrial development, and tension between residential and industrial interests were all factors underlying this community conflict. The Battle of the Hills revealed that even the place that had seemingly perfected the magic formula for a city of knowledge could not completely escape the messy realities of local

politics.

Conclusion

Over the course of the 1950s and 1960s, Stanford administrators built what was arguably the prototypical city of knowledge, creating a desirable high-income, highly educated community of scientific men and women and serving as a catalyst for the most important concentration of advanced scientific industry in the world. The Stanford story is a vivid example of how the federal attention to science and scientists in the early Cold War set in motion forces that had a defining effect upon urban spatial and demographic patterns. The militarization of Northern California was a major reason behind population growth and the consequent increase in the value of Stanford's lands. Stanford's new wealth and political clout as a favored Cold War university drew many private-sector allies, particularly young high-tech enterprises that sought prestige and profit through alliances with Stanford laboratories and faculty. The Cold War gave Stanford the opportunity and the tools with which to create an ideal environment for scientific production, one which borrowed from American campus-planning traditions of low density, intensive landscaping, exclusivity, and enclosure.

In its active entry into real estate development, community planning, and economic affairs, Stanford University was also a trendsetter in creating partnerships between the American university and American industry. Stanford's great "educational example" of land development in the 1950s and 1960s created a community of scholars, as Fred Terman argued, that, rather than being cloistered away from the rest of society, was integral to the workings of modern industrial production.¹⁴⁴ The fact that the regional civic leadership shared Terman's entrepreneurial ideology helped to foster this close and mutually profitable affiliation between the university and local industry. In this respect, Stanford was ahead of its time, entering into partnerships with corporate America and its allies in ways that would become common by the close of the twentieth century, but were rare fifty years earlier. Even the University of California at Berkeley, whose chancellor conceived the idea of the "multiversity," did not have the close ties to industry—nor did it act as a force for regional economic development—as its neighbor to the south.

However, while Terman's entrepreneurial, capitalist university was becoming more and more involved in the wider world, it did not adapt its shape to fit existing industrial architecture. Instead, it took the pastoral, isolationist principles of campus planning, combined them with distinctively Western architectural and planning motifs, and created a new prototype for the shape and appearance of places of high-tech industrial production. While this approach to planning created

an industrial space that, by outward appearances, fitted seamlessly into the surrounding upper-class suburbs, there was not always a smooth relationship between the development and its neighbors. The Stanford example illustrates the pitfalls inherent in suburban industrialization, even in the most successful of advanced scientific industrial developments. Placing industry in close proximity to upper-class residential areas created the potential for community conflict, especially at a political moment of increased environmental awareness. Yet although the stunning economic example of the Stanford Industrial Park enjoyed extensive and favorable worldwide publicity, the Battle of the Hills—and the fact that the “clean” industries of science might not be so clean after all—received little notice.

Other cities, states, and research universities took note of Stanford’s stunning economic success and sought to imitate it with developments that mirrored the look and feel of Stanford’s research park and the surrounding community. Stanford became a model for other universities to imitate—both in the way it managed its land and its relationship with private-sector tenants, and in the way it used the aesthetics of postwar Californian architectural styles to allow industrial activity to blend harmoniously into the surrounding residential landscape of affluent suburbia. Yet these other institutions did not have the great and unique advantages enjoyed by Stanford: location in an economically booming region with good climate and affluent, homogeneous population; a set of unusually entrepreneurial administrators; and sole ownership of large tracts of undeveloped, desirable land. Stanford University’s unique position as a large landowner greatly affected its fortunes, as did its physical location in a supremely beautiful and temperate region. Stanford’s imitators often did not have such a tabula rasa on which to build; replication of the Stanford model, then, would prove quite difficult to accomplish.

Built by complex and often contradictory relationships between public and private, federal and local, the Stanford story demonstrates that it is impossible to exclusively credit the development of high-tech regions either to the forces of the market or to the state. It is also incorrect to chalk the success of this exemplary high-tech region as the result of the actions of certain individuals or companies. The “Valley of the Heart’s Delight” would never have become “Silicon Valley” without the leadership of people like Fred Terman or the innovations of high-tech entrepreneurs like Varian, Hewlett, and Packard, but we must not forget that these men were able to capitalize upon an extraordinary array of regional assets—not the least of which was a bucolic suburban location. As the next two chapters will show, other universities and regions also had visionary leaders, but they did not have similarly fortuitous regional, economic, demographic, and political conditions. Re-creating Stanford’s quintessentially suburban model proved difficult

elsewhere, and nearly impossible amid the radically different landscape of large and heterogeneous industrial cities.