

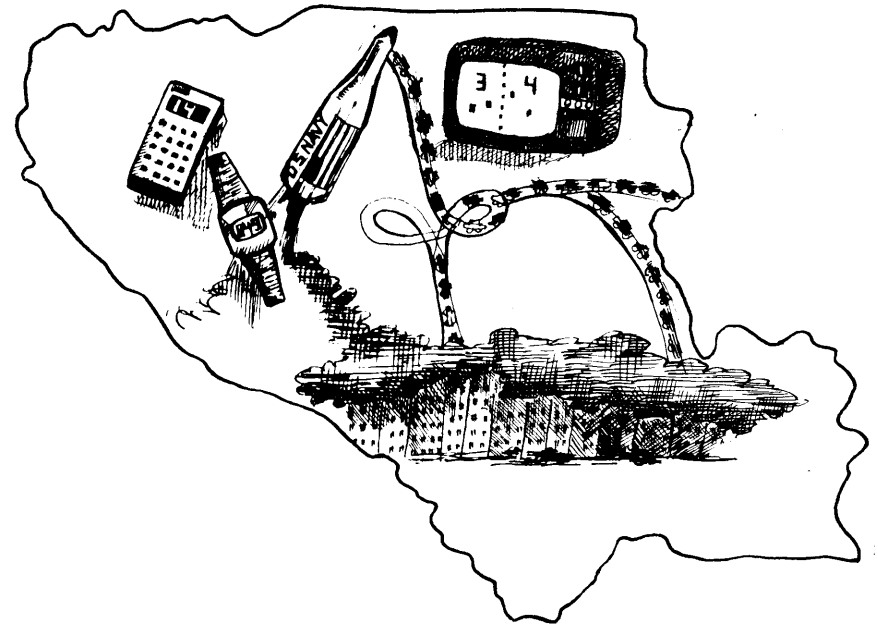


3 2044 141 198 044

HDWID

ICON VALLEY:

Paradise or Paradox?



*The Impact of
High Technology Industry
on Santa Clara County*

SILICON VALLEY: Paradise or Paradox?

*The Impact of
High Technology Industry
on Santa Clara County*

This pamphlet was prepared for the Pacific Studies Center by Alan Bernstein, Bob DeGrasse, Rachael Grossman, Chris Paine and Lenny Siegel, in October 1977.

For more copies, write or phone the Pacific Studies Center, 867 W. Dana, No. 204, Mountain View, CA 94041 (415—969-1545).

TABLE OF CONTENTS

Introduction	1
1. History and Structure of High Technology Industry in Santa Clara County.....	4
2. Applications of Technology	15
3. How It's Made: The Organization of Production	24
4. Impact on Labor	28
5. High Technology Industries and the Land Use Crisis: Housing, Transportation and the Environment.....	39
6. Taxes and Services.....	51

Introduction

The "Fruit Bowl of America," fertile Santa Clara Valley, has come of age. Suburbs, shopping centers, freeways and industrial parks are marching through the orchards that until recently produced half the world's prunes and a bounty of apricots, cherries and walnuts.

—Living in Santa Clara County,
Bank of America

Within the past twenty five years, Santa Clara County has developed from a peaceful valley of orchards and canneries into a suburban metropolis of sprawling towns and a center of high technology industries. The county has changed rapidly, but the coming of age brings problems as well as maturity. Growth and development, has brought prosperity to many people, but has also spurred severe urban problems and accelerated environmental decay. The image of industrial parks marching through orchards is appropriate, for local corporations have become a center of the war industry. The expansion of industry has also introduced new hazards for people working in high technology firms.

Santa Clara County, which opens out from the southern end of the San Francisco Bay, is one of the fastest growing regions in the United States. Population, now 1,200,000, has nearly doubled since 1960. Economic development as well as population growth has been concentrated in the northwest part of the county, extending from Palo Alto in the north, to San Jose, the county seat and population center. In 1956, San Jose covered 22 square miles. Today it spreads over 140 square miles of surrounding land. The southern towns of Morgan Hill and Gilroy, while still predominantly rural and agricultural, may soon become "bedroom communities" housing workers employed in North County cities.

Santa Clara County is one of the most affluent counties in the nation, having a strong economic base in the electronics industry and a median family income of \$18,500 in 1976. Wealthier residents enjoy the elegant homes and tree-lined streets of Palo Alto, as well as the rural luxury of Los Altos Hills. The area has a pleasant climate all year long, and a beautiful landscape of foothills and plains.

Prosperity and growth have flowed directly from the expansion of high technology industries in Santa Clara County. Orig-

nally spawned by Stanford University's Engineering Department, the industry is composed of hundreds of firms located mainly in Palo Alto, Mountain View, Santa Clara, and Sunnyvale. Manufacturers specialize in state-of-the-art innovations in semiconductors (the building blocks of computers), and military, medical, and consumer electronics.

Local high technology industries are generally touted as the key to a future technological paradise as well as the guarantor of prosperity. This pamphlet will examine other aspects of the industry not usually dealt with in the laudatory feature stories in business journals and newspapers.

Approximately 200,000 people are directly or indirectly de-



pendent on the industry for jobs, according to the Employment Development Department. High technology firms employ many scientists, engineers and managers who enjoy a high standard of living. On the other hand, the large number of blue-collar workers in the industry, often non-white women, face comparatively low wages, frequently unhealthy working conditions and periodic layoffs.

The rapid expansion of industrial parks and electronics plants has accelerated the process of urban sprawl, covering the old orchards with low-density factories and tracts. Because industry has chosen to concentrate in the northwest county, and cities provided more land for industry than housing, many employees, particularly lower income workers, are unable to find housing near their jobs. This has created a housing shortage and has also helped to drive up housing costs. The housing and employment pattern has increased commuting and heavy traffic flows snarl local highways and roads. Increased automobile use has intensified local pollution problems.

The imbalance of housing and jobs also affects the distribution of taxes and services in the county. Northern cities have a good industrial tax base, plus the benefit of not having to provide services to the employees of corporations who live elsewhere. Cities to the south however, lacking a lucrative tax base, are given the additional burden of providing services to the workers of North County firms.

Most residents of Santa Clara County are familiar with the problems they face: pollution, housing, taxes, job security, local over-dependence on military spending, etc. Solutions to these problems are seen very specifically: enact stricter legislation, build more housing, organize a union. Issues are addressed as isolated problems and the result is a patchwork of individual and inadequate solutions. By demonstrating that these problems have common origins in the development of high technology industries, we hope to aid the process of finding integrated solutions approaching these problems as part of a unified process.

The questions underlying these issues concern the fundamental distribution of power in our society; in this case business being left alone to make decisions which have socially harmful consequences. This study is not simply meant as an exercise of finger-pointing at business, for individual city governments, through short-sighted and self-interested policies, as well as educational institutions, played crucial roles in the formation of these problems. However, it is only by challenging unquestioned business prerogatives and asserting the public right to control processes which shape how we live and work that we can ever achieve more than partial and temporary solutions to the problems which we face.

History and Structure

The remarkable concentration of high technology industry in Santa Clara County is far from accidental. Entrepreneurs chose the area because, in addition to a naturally pleasant climate, it offered a combination of land, labor, technological resources, financing, and access to markets. These factors were not always present, so the history of the electronics industry and other modern production here is in fact the story of all those elements.

In the early 19th century, Santa Clara County primarily produced animal products, but by 1870 it was one of the nations leading wheat-growing areas. The completion of the transcontinental railroad — and a spur to San Jose — in 1869 brought populated markets “closer” to Santa Clara County, enabling the transformation of the county into a prime producer of fruits and vegetables, notably apricots and prunes.

The railroads had a further-reaching, but less direct impact upon the county. Railroad tycoon Leland Stanford bought Rancho San Francisquito, at the northern edge of the county, and bred race horses there. When his son, Leland Stanford Jr. died in 1884, Stanford and his wife Jane determined to create a university in his memory on the farm site. The doors of Stanford University opened in 1891. Endowed with the Stanfords’ fortune and the land of the 8800-acre stock ranch, Stanford University developed into one of the nation’s top universities.

For its first half century, Stanford University retained somewhat of a country club atmosphere. It received national prominence in 1928, when alumnus Herbert Hoover was elected president, but not until the years after World War II did the university evolve into the primary engine of local industrial development.

Events in the first half of the century, however, foreshadowed the post-war industrial complex. In 1909 Stanford graduate Cyrus Elwell formed the Federal Telegraph Company (FTC), in Palo Alto. Financed by Stanford officials and faculty, Lee de Forest of FTC invented the vacuum tube, the original building block of the electronics industry. FTC moved to New Jersey in 1931, and FTC engineers went on to establish what later became Litton Industries and Magnavox.

During the 1930’s, Stanford engineering professor Frederick Terman, Jr. encouraged his students to establish their own electronics firms rather than migrate to the east coast. Terman had developed an appreciation of the benefits that universities and industry could share when he did his graduate work at M.I.T. In

1936 Terman student John Kaar formed Kaar Industries. During World War II Kaar was the leading west coast builder of two-way radios, but the company is no longer in operation.

In 1938 Terman helped Bill Hewlett, who designed an audio oscillator, and David Packard form a company in a Palo Alto garage. Crocker Bank loaned the two engineers \$1,000 to start production. Hewlett-Packard’s first big order came from Disney Studios, which wanted nine oscillators to produce the stereophonic sound for *Fantasia*. H-P not only grew to be the world’s largest manufacturer of electronic measuring equipment, but it became a pace-setter and leader of Santa Clara County industry.

In 1937 Stanford’s physics department offered lab space to Russell and Sigurd Varian. There the Varian brothers developed the Klystron tube, an essential component of radar. Though the Varians did not establish their own electronics company until after World War II, the university reaped immediate benefits in the form of royalties for the invention.

World War II had a dramatic impact on the entire Bay Area. Local industries, from canned vegetables to shipbuilding to electronics geared up for the Pacific war. San Jose-based Food Machinery and Chemical Corporation (FMC) transformed its factories from the assembly of tractors to tank production.

PERMANENT WAR ECONOMY

At the end of World War II, national leaders determined to continue the war economy. The Federal government funded the continued development of aircraft and electronics, and the Korean War, which broke out in 1950, re-fueled the west coast assembly lines. Though World War II mobilization had passed Stanford University by, the university was prepared to take full



advantage of "post-war" military spending.

First, in 1946, Bay Area financial and industrial leaders joined university officials to establish the Stanford Research Institute, in Menlo Park, at the southern end of San Mateo County. Though SRI's chief function was to conduct applied research for California industry, the institute ended up doing more work directly for the Department of Defense.

Also, at the end of World War II Terman returned to Stanford from Harvard's Radio Research Laboratory. From that lab he recruited several promising engineers, building Stanford's electrical engineering department into the nation's best. In 1948 Stanford faculty members teamed up with the Varian brothers, who had also returned from the east coast, to establish Varian Associates.

The pleasant climate of Santa Clara County helped create the suburban lifestyle which many young scientists found addictive. The professionals, who provided the brainpower essential for the development of high technology industry, found it hard to leave the area.

The climate, SRI, and the engineering school might have propelled Santa Clara County into the space age without further planning, but the conscious vision of Frederick Terman established the Peninsula as America's leading center of high technology industry. "We have been pioneers in creating a new

type of community, one that I have called a 'community of technical scholars,' " he explained. "Such a community is composed of industries using highly sophisticated technologies, together with a strong university that is sensitive to the creative activities of the surrounding industry. This pattern appears to be the wave of the future."

As Terman rose to become dean of the engineering school and provost for the entire university, he provided local industry with more than bright young graduates and helpful faculty consultants. In 1951 the university leased a section of its vast lands to Varian Associates, and the following year it leased to Hewlett-Packard as well. In 1954 the university board of trustees announced a formal policy, the development of an industrial park for high technology industry on Stanford lands.

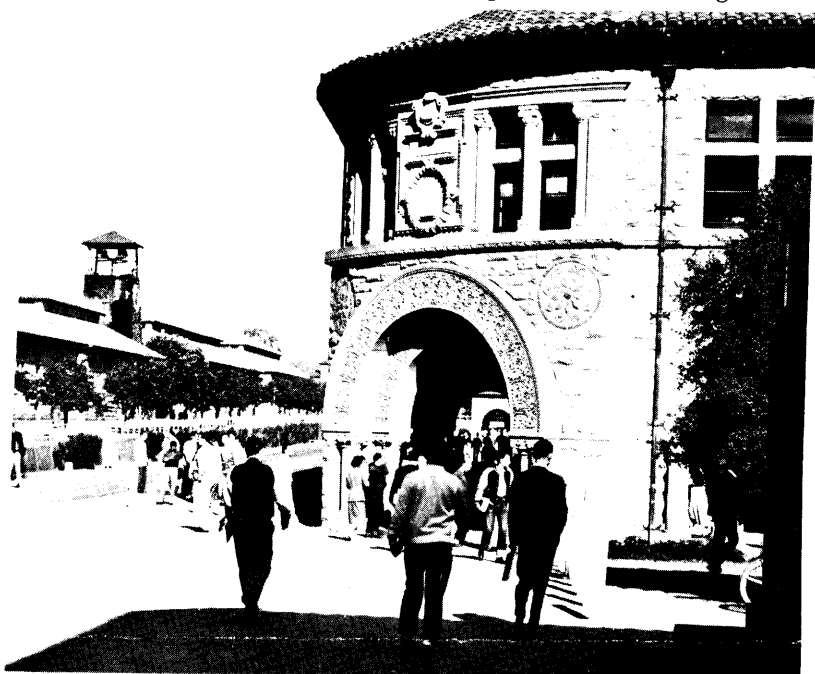
Stanford's landscaping standards, making factories and private research buildings resemble campus buildings, not only increased the attractiveness of employment in the industrial park, but it set a standard for light industrial development throughout the Bay Area.

In addition, the engineering school pioneered in providing continuing education for engineers. Hundreds of professionals in local industry took courses at Stanford through the Honors Cooperative Program, which established its own television network — providing on-the-job classes — in 1969.

Continued military spending and the beginnings of the space race fueled the growth of new Stanford spin-offs. Typically, university scientists would develop an idea for production and establish a plant in the industrial park. Some companies, such as Watkins-Johnson, would develop into major companies in their own right, while others, including Applied Technology and Microwave Electronics, would eventually be swallowed up by national corporations — Itek and Teledyne respectively.

As the complex grew in the 1950's, it attracted major firms from other parts of the country. Sylvania (GT&E), Philco, and GE set up plants in Santa Clara County. In 1956 Lockheed set up a research laboratory in the Stanford Industrial Park, and it liked Santa Clara County so much that in 1957 it purchased 700 acres in Sunnyvale for its new Missiles and Space Division. As prime contractor for Polaris, Poseidon, and Trident undersea missile systems, Lockheed has been the county's largest military contractor and greatest employer. Lockheed official Douglas Moffat reported, "We moved to get better access to the right sort of manpower so that we could establish a working environment with the right intellectual atmosphere." In Sunnyvale, Lockheed found it much easier to recruit scientists and engineers than back in Burbank.

By the early 1960's, the industrial complex that grew from Stanford was a power on its own. Local firms plowed money



Stanford Engineering School

back into Stanford, particularly for the construction of engineering and science buildings, and officials of Santa Clara County corporations — especially Hewlett-Packard — were appointed to the Stanford board of trustees.

Stanford continued to germinate high technology firms, making Santa Clara County a center for the production of lasers, data processing equipment, magnetic tape equipment, medical instruments, and modern pharmaceuticals, as well as military electronic systems and electronic components. Once the major firms were in place, they attracted and spun off numerous smaller firms, which took advantage of Terman's "community of technical scholars" but had few direct ties with the university. The proliferation of high technology firms has been most evident in the development of the semiconductor industry, the largest industry (by employment) in the county.



Frederick Terman

SEMICONDUCTORS

William Shockley, one of three scientists who invented the transistor at Bell Labs in 1947, returned home to Palo Alto and Stanford in 1955 to form the Shockley Transistor Corporation, with backing from Beckman Instruments. Shockley recruited a number of talented young engineers, but he was incapable of managing them. Eight leading Shockley officials left the pioneer company in 1957, arranged financing from Fairchild Camera and Instruments Corporation of New York, and founded Fairchild Semiconductor in Mountain View.

Fairchild went on to become the leading semiconductor manufacturer in the valley and one of the nation's "big three." Dwarfed by the new division, Fairchild Camera moved its corporate headquarters to Mountain View in 1968. Eastern management and western technologists have not always seen eye-to-eye at Fairchild. Consequently, many engineers and scientists, including the original eight from Shockley, have left the corporation over the years to establish companies in which they have more direct control. Today, nearly all of Santa Clara County's semiconductor manufacturers can trace their ancestry to Fairchild.

The first general manager at Fairchild, Ed Baldwin, left after only one-and-one-half years to form Rheem Semiconductor, backed by the New York-based diversified manufacturer. Litigation over the theft of trade secrets handicapped the new company, which survives today as Raytheon's semiconductor division, down the street from Fairchild in Mountain View.

In 1961, a group of Fairchild scientists formed Signetics, which became a subsidiary of Corning Glass Works. In 1967, Massachusetts investor Peter Sprague recruited Fairchild general-manager Charles Sporck and other key personnel to head National Semiconductor. They quickly built this losing company into an industry leader. In 1968, Robert Noyce, head of Fairchild Semiconductor, and Gordon Moore, another of its founders, left to form Intel. Starting from scratch less than a decade ago, Intel is now among the top five integrated circuit makers in the country. Fairchild Camera selected a new president, Lester Hogan, who took direct control of the semiconductor operations and brought in his own top staff from Motorola. When Hogan removed Jerry Sanders from his position as head of marketing, Sanders and a group of seven others formed Advanced Micro Devices.

Many more firms formed in the late 1960's and early 1970's. Since brainpower is the most important factor in the semiconductor industry, it was not difficult for promising scientists and engineers to set up their own firms when conditions at larger companies became undesirable. The concentrated technological complex made such spin-offs easy, since entrepreneurs could

hire assistants and consultants proficient in management and electronics, lease appropriate industrial space, and contract out for data processing and other services. Satellite firms, specializing in semiconductor processing equipment and materials — silicon chips, printed circuit boards, chemicals, etc. — were always pleased to serve new clients. Stanford continued to crank out engineers and scientists, versed in the latest technology through their campus research projects — funded by the Defense Department and other federal agencies.

But the new industry also needs large amounts of unskilled assembly labor. The highly competitive manufacturers, anxious to hold down costs, liked Santa Clara county because there was no tradition of electronic workers' organization. The only comparable scientific community, the Route 128 complex around Boston, was surrounded by unionized consumer electronics plants. It is no surprise, therefore, that eastern firms like Fairchild, Raytheon, and Sprague's National chose to develop the semiconductor industry out west. The two top semiconductor makers not based in Santa Clara County, Motorola and Texas Instruments, are also based in the traditionally non-union southwest of the country.

Competition among U.S. companies drove them to seek even cheaper labor than the unorganized women of Santa Clara County. In 1963, Fairchild extended its assembly lines to Hong



Shockley, Noyce, and colleagues in 1957

Kong. Today it has plants in five Far Eastern nations, all of which specialize in unskilled assembly of products fabricated in the U.S. Even the smaller manufacturers of semiconductors in Santa Clara County take advantage of the dramatically lower wage rates at foreign shops.

FINANCING

Stanford, the Santa Clara County climate, and the suburban life-style attracted the technologists who built the industries of Santa Clara County, but throughout the history of the high technology complex, most of these entrepreneurs have had to go outside the county for financing. The funding of new ventures, known as "venture capitalism," is a risky business. Most investors prefer to sink their money in bonds, blue chip stocks, and real estate. The banks, corporations, and individuals who have backed Santa Clara County industry have been willing, however, to back these innovative companies in the expectation that they might be buying into "another Xerox."

The first semiconductor producers, Shockley, Fairchild, and Rheem, were all backed by industrial firms from outside the area — Beckman, Fairchild Camera, and Rheem Manufacturing. New York investment bankers originally financed Signetics, but it sold control to Corning Glass. New England investor Peter Sprague built up National Semi with his own fortune. The Bank of America provided Memorex, the Santa Clara manufacturer of magnetic tapes and computer equipment, with the bulk of its financing. The *Wall Street Journal* reported that the B of A's loans to Memorex were perhaps the bank's largest single commitment.

As the early firms spun off competitors, the complex developed its own financing system. The major San Francisco banks established offices in Santa Clara County, where bankers versed in the new technologies still weigh the proposals of venturesome scientists. While the banks provide loans, investment groups that specialize in venture capitalism buy stocks. Though most venture capital firms represent individuals or families, Exxon Enterprises has invested oil profits in Zilog.

By the mid-70's, however, most of the financing of new ventures had dried up. According to investors, new tax laws and government regulation had taken away some of the incentive. In addition, the cost of starting a semiconductor firm had risen from about \$1 million in 1966 to \$6 million in 1977. Venture capitalists started looking for more mature enterprises, and the pace of new incorporations has slowed down considerably. Existing firms still attract financing, however. For instance, in June, 1977 Prudential Insurance provided old-timer Fairchild with an expanded line of credit.

The technological superiority of the American electronics industry has opened up new sources of funds. Foreign electronics firms have bought into Santa Clara County to gain access to American technology. In 1972 Fujitsu, a major Japanese computer maker, provided Amdahl Corporation with funds to compete, head-on, with IBM in the large mainframe computer business. In 1976 the Dutch electronics giant Philips bought the foundering Signetics from Corning Glass, and in 1977 Siemens, the German multinational, bought a controlling interest in bankrupt Litronix and purchased a large block of stock in Advanced Micro Devices.

Santa Clara County still contains a large number of small electronics manufacturers, interspersed with H-P, Sylvania, Intel, Itel, etc. The small companies, however, are not independent small businesses. They are closely tied to major banks, venture capital financiers, and other, larger corporations.

STRUCTURE

The American economy can be divided into three basic categories. The *public sector* includes government operations — such as local schools, military bases like Moffett, and special facilities like Ames Research Center. It also includes private firms that do most of their work on government contracts, such as Lockheed, ESL, and the local branch of Sylvania. Within the electronics industry, public sector firms depend on the federal budget. In general, they have grown with the government's commitment to aerospace, and they have lost ground when weapons systems have been abandoned. They stand to gain as the military increases its reliance on electronic weaponry. Responsible to a government susceptible to pressures from organized labor, government contractors — Lockheed, for instance — are frequently unionized.

A second sector of the U.S. economy is generally called the *monopolistic sector*. This consists of industries — automobile manufacturing, for instance — in which a few companies dominate the market. Within the monopolistic sector, technology is stable and competition is confined to advertising and minor product variation. Though monopolistic firms — such as GE in San Jose — are generally unionized, this is not the case in the heart of Santa Clara County's electronic complex.

Among local companies, Hewlett-Packard, Varian, and Litton Systems are "monopolistic," by virtue of their stable shares of their prime markets. However, all three do substantial production for the government and H-P products compete with the semiconductor industry. Within the semiconductor industry, the production of discrete components such as transistors — the oldest solid state technology — is monopolistic, dominated by a

few firms: Fairchild, Texas Instruments, and Motorola.

The *competitive sector* of the American economy consists of generally small businesses which fight for market shares through price competition. Even though somewhere above a third of the integrated circuits produced by the semiconductor industry are assembled into military products — that is, sold to the public sector — the market for solid state components is still extremely competitive. Historically, integrated circuit manufacturers, including the big three transistor producers, have priced new products below their own costs to establish their shares of the market. New firms with either new products or production technologies have quickly become serious contenders for the market. And once-profitable companies have folded, merged into larger ones, or have been re-organized because they incurred major losses.

In general, it is difficult for unions to become established in competitive firms because any company which pays higher wage costs than its competitors has trouble competing. While monopolistic GE can easily pay its workers more because it can hike prices — without losing sales — competitive companies cannot. For instance, should Fairchild offer substantial wage hikes, its higher prices (assuming the company maintains its profits) would shift consumption to its competitors. Therefore, semiconductor and other competitive electronics firms fight hard against unionization. Local electronics industry associations regularly sponsor seminars on preventing unions in the plants of members, and they provide legal aid to companies subject to organizing drives.



There are signs, however, that the industry is maturing. New technologies are appearing less frequently. As pointed out above, it is becoming difficult for unhappy engineers at one company to find financing to establish new competitors. As small companies merge into larger ones or fail outright, the industry will consolidate into the familiar monopolistic pattern. Prices will rise, and if the workers organize, wage levels will rise too. Eventually, innovation will decline.

The geography of Santa Clara County, federal contracts, venture capital, and the concentration of technological resources put together by Stanford University have built an industrial complex characterized by what *Fortune's* Gene Bylinsky has called "an innovative ferment on a scale without precedent in industrial society." Only now are the residents of the county recognizing that the glamorous electronics industry has brought some problems, too.



Stanford Industrial Park, circa 1967

Applications of Technology

The accomplishments of Santa Clara County companies are already legendary. *Fortune* writer Gene Bylinsky wrote:

Utilizing components and entire technologies that didn't exist only a few years ago, they are fashioning the telephones and thermometers of tomorrow, electronic games, computerized process-control devices for a wide range of industries, and many other fabulous products.

Bylinsky's view is commonplace: that advanced technology is thrusting humanity into an era of unparalleled achievement.

In fact, however, the remarkable inventions and processes which the county is known for are oriented as much toward military destruction as toward social progress. As in the past, technology serves the existing social order. Instead of liberating humanity from meaningless labor, technology has increased specialization, centralization, and unemployment.

WEAPONRY

The most powerful institutions within society are the first to utilize new technologies. Since the 1950's, the government-funded aerospace industry — primarily those corporations producing weaponry — has been the major engine of American economic growth. Though some of the most important scientific breakthroughs of this era — transistors and lasers — occurred at the private Bell Telephone Laboratories, these innovations were put to work first by the Department of Defense, in the Minuteman Missile Program and laser-guided missiles. Military reconnaissance techniques predate even the long distance television techniques of the space program.

The Pentagon has led in the race for technology because it has been able to spend vast funds on university and think tank research — at places like Stanford and SRI — and contract to private industry to develop and produce expensive weapons systems. Since the early 1950's, when the Pentagon spent nearly \$3 billion a year on research and development (R&D), the Federal government has supplied well over half of R&D funding in the U.S. By 1977, combined Pentagon and space program R&D funding had risen to \$15 billion, two thirds of total federal science spending.

Locally, the Pentagon spends about \$1.5 billion a year on weapons and military research. Though slightly less than half is officially categorized as "research, development and test evaluation," most involves advanced electronics or missile technology. The propulsion systems built by United Technologies and Trident missiles built by Lockheed involve complex technology, but their applications are clear. Most people, however, are unfamiliar with the growing role that electronics plays in modern warfare.

Military electronics can be lumped into several overlapping categories:

COMMUNICATIONS: The transmission of voice, scrambled voice (for secrecy), teletype, computer data, and television messages from the deepest submarine, highest satellite, and remotest foot patrol to the relevant base area, and back. Locally, Ford Aerospace is a prime contractor for one of the Pentagon's most sophisticated worldwide networks, the Defense Satellite Communications System, while Aydin Energy Systems manufactures AN/TRC-97 transportable radio terminals.

INTELLIGENCE: To keep track of "enemies" and potential enemies, the U.S. employs photography, infrared photography, radar, sonar, and a variety of radio listening devices which collect "enemy" radar and communications information. ESL in Sunnyvale specializes in Army intelligence equipment, and Watkins-Johnson in Palo Alto produces a large number of reconnaissance devices. GTE Sylvania, in Mountain View, produces detectors for the "electronics battlefield," a scheme which in Vietnam unsuccessfully kept track of NLF guerillas.

In addition, several local companies service the Air Force's "Satellite Test Center" in Sunnyvale, which processes intelligence data from satellites and outposts around the world.

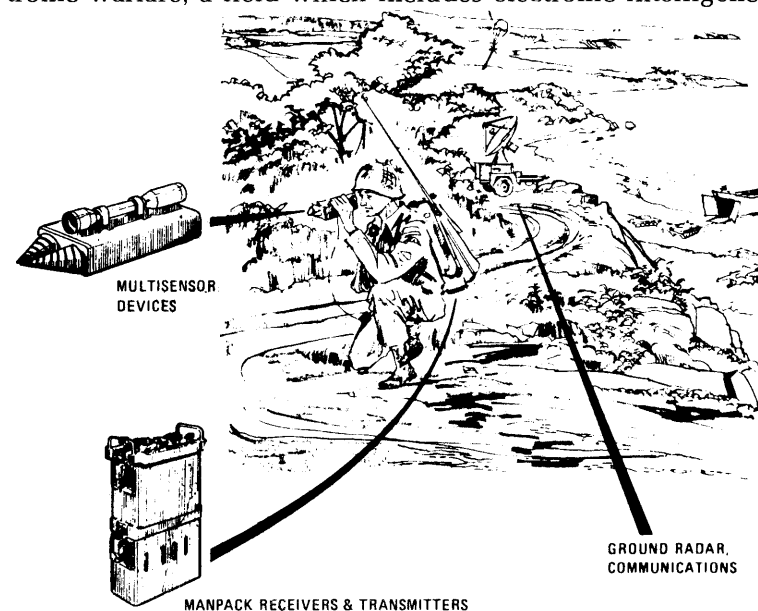
NAVIGATION AND GUIDANCE: The armed services utilize a number of systems to help ships, planes and missiles stay on course. Within the last decade they have introduced "smart" weapons — bombs, torpedos, and other explosives which are guided to their targets by lasers, television cameras, or other pieces of sophisticated equipment. Kaiser Aerospace, in the Stanford Industrial Park, manufactures pilot navigational displays for a large number of aircraft, including the A-6 and F-14. Data Dynamics in Mountain View reportedly produces stabilization equipment for secret reconnaissance satellites and Varian, in Palo Alto, makes a fire control system for F-4 "Phantom" jets.

COMMAND AND CONTROL: In this computer age, the Pentagon is the number one user of computers. To supplement its legendary system of multiply forms, the military uses computers to keep track of ships, fuel, men, lettuce, toilet paper, or whatever. It uses other machines to regulate the vast communications network it operates. Many of the computers and other

control equipment come from large computer manufacturers such as IBM, which operates a major research facility in San Jose, but a Santa Clara company, Rolm, calls itself "Number 1 in MIL-SPEC (military specification) Computer Systems."

RESEARCH, TEST, AND SIMULATION: Military contractors at locations like Stanford, SRI and Lockheed use laboratory equipment to research a large number of technological questions of importance to the military. Small computing firms such as Systems Control in Palo Alto conduct analysis for military agencies. And Ames Research, a facility of the "civilian" National Aeronautics and Space Administration (NASA), houses the Pentagon's ILLIAC IV computer, the world's most powerful data processing system. ILLIAC, among its tasks, conducts simulation of wind tunnel activity, global climate modeling, and anti-submarine warfare research. In addition, Hewlett-Packard, located in several peninsula towns, contracts to provide the military with test equipment for a wide variety of electronics systems.

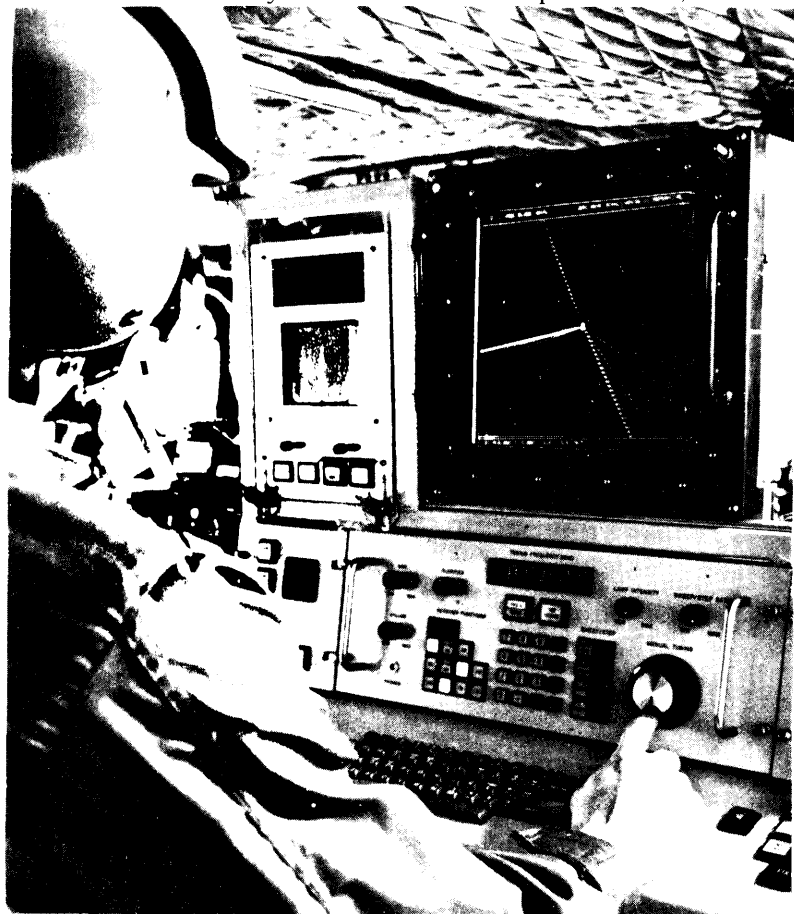
ELECTRONIC WARFARE: To counter enemy radar and other detection devices, U.S. ships, planes, and missiles employ a wide variety of jamming, deception, and other countermeasures, including missiles which home in on hostile radar emissions. Itek's Applied Technology Division in Sunnyvale and Textron's Dalmo-Victor operation in Belmont, are leading manufacturers of such "radar homing" equipment while GTE Sylvania produces two of the Navy's top electronic countermeasure systems. The Peninsula includes so many organizations involved in electronic warfare, a field which includes electronic intelligence,



direction finding, and countermeasures, that two trade magazines devoted to the subject are produced in this area: *Electronic Warfare* and *Countermeasures*.

WEAPONRY: In the past decade electronic "death rays" have risen from comic books to a billion dollar Pentagon project. To solve the enormous technical problems of producing such weaponry, the Pentagon has contracted with a battery of aerospace firms, including local plants of Lockheed, Varian, and Mark Systems (Cupertino).

COMPONENTS AND OTHER OFF-THE-SHELF EQUIPMENT: Most of the companies mentioned above produce military systems. Many other local firms produce components for these systems. Ampex (Redwood City) sells magnetic tape "recorder-reproducers" to the Air Force, to be used for navigation or countermeasures on aircraft such as the B-52 and B-1. Varian, Watkins-Johnson, and Litton (San Carlos) sell electronic tubes to the military. Varian even has a publication, "Varian



Products and Capabilities for Countermeasures." And while local laser manufacturers do not specialize in military production, the military still holds the biggest share of the laser market.

The Army, through the Minuteman missile system, spurred the development of solid-state components in the early 1960's, pouring hundreds of millions of dollars into the semiconductor industry at a very important time in its history. Today, the Peninsula's vast semiconductor industry not only provides components for computers and other equipment purchased by the military, but, of the 23 companies that qualify as producers of "military spec" integrated circuits, the peninsula has 11: Advanced Micro Devices, Fairchild, Intel, Interdesign, National, Nitron (McDonnell Douglas), Precision Monolithic, Raytheon, Signetics, Siliconix, and Zilog. Signetics, in fact, has a separate division for designing and producing military products, while Fairchild ships some of its components to Syosset, New York, where its Space and Defense Systems Division manufactures military electronics systems.

Spurred by the anti-war movement, particularly students at Stanford University, many local residents have questioned the County's heavy involvement in military technology. Not only have they challenged the uses of the weaponry — either their actual deployment in Indochina or the threat of their use in nuclear war — but they have pointed out the problems of building an economy so dependent on weapons funding.

A few people have quit the industry over such issues, but the majority of the workforce has avoided the criticism. Some, especially production workers at plants producing off-the-shelf equipment for the military, are unaware of the military applications of local production, while others — be they scientists or assemblers feel trapped economically. Others, of course, support U.S. military policy and are pleased to contribute, while yet another group sees specific electronic systems — such as satellite reconnaissance — as a force for peace. The satellites, they contend, permit monitoring of disarmament agreements.

But military research and production would continue here regardless of local sentiment. The men and corporations who run our country want high technology military products, for both economic and strategic considerations. This area, as it has developed since World War II, has little choice, unless drastic political change occurs here and in other parts of the country

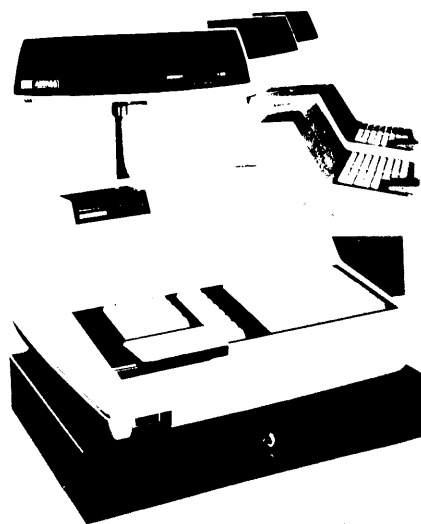
AUTOMATION

Many of the products of Santa Clara County industry are considered labor saving devices. From computerized bookkeeping systems to manufacturing control systems to automatic cash registers, they relieve people of drudgery or difficult tasks. But

labor-saving is a two edged-sword. The same "point of sale" cash register/inventory systems that engineers at National Semiconductor find rewarding to design put clerks out of work wherever they are installed. Computers — either built locally or from local components — have supplanted bookkeepers in many institutions, replacing them with computer programmers. Frequently the computerized systems have created less rewarding tasks, requiring the services of unskilled white collar workers — who merely code data for computerized processing.

Computers have done more than make old jobs more efficient. The enormous capacity to process data has created new industries. It is easy to see how computers have made the complicated task of space travel workable, but data processing technology has enabled insurance and credit companies, government agencies, and utilities to keep up with their paperwork. Tymshare, Inc. of Cupertino not only operates a Medical Data System and a data communications network, but it recently took over computing for the Master Charge system. Master Charge is often a convenience, but as anyone who has tried to correct a billing error knows, it is hard to talk back to the computer.

Technological unemployment, increased specialization, and centralized "do not fold, spindle, or mutilate" systems are not the necessary result of advanced technology. Rather, as in the past, they accompany a specific form of industrial growth, in which the nature of technology is controlled by a small number of people in corporations or government.



Point of Sale Cash Register

"GOOD" USES

Santa Clara County companies produce many "good" electronics products, with indisputable positive impact. They make machines to help the blind see, ultrasonic x-ray equipment, solar energy generators, pollution control devices, and birth control pills. Frequently, these devices are developed using technology originally funded by the military. Thus, scientists and engineers point to the "good" applications when they either defend military research or explain how different their work is from military production. In fact, a major thrust for diversification or conversion from military work comes from dissatisfied military technologists.

High technology corporations, like any other profit-making business, favor new product lines when they can make money on them. In general they do not look at society and develop products to meet social needs. Rather, they look at their proprietary technology and capabilities, and decide how to take advantage of the market situation. To the extent that government agencies, such as the federal medical system, fund new products, the companies respond to someone else's calculation of social need.

While medical electronics systems of course aid individual patients, the current process of development has a fundamental flaw. The companies, government agencies, and foundations that have dominated the field have utilized the most advanced technology available, rather than the most appropriate. Modern drugs and patient monitoring systems — many of which are produced here in Santa Clara County — have increased the cost of health care so significantly that the medicine available to many people has actually diminished in quality. Since the expensive cures do save lives, they are sacrosanct, but if society were to put the same resources into alternative technologies — especially preventive medicine — more lives could be saved, and good medical care would no longer be the privilege of a few.

In typical American fashion, technology is substituted for social and economic change. Local semiconductor firms are selling auto manufactures on the benefits of microprocessors, which for little cost will effect great energy savings. In itself, this is positive, but the real solutions to energy waste in America go much deeper, to de-emphasizing auto travel and making social, not individual or corporate decisions, on energy use.

Frequently, when a new product is associated with social and economic progress, it is touted as the cause of change. Technological achievement, however, is more the result of social change than its cause. Take the case of the birth control pill. Carl Djerassi, the Stanford chemist who synthesized the first oral contraceptive and went on to serve as an executive at Syntex and



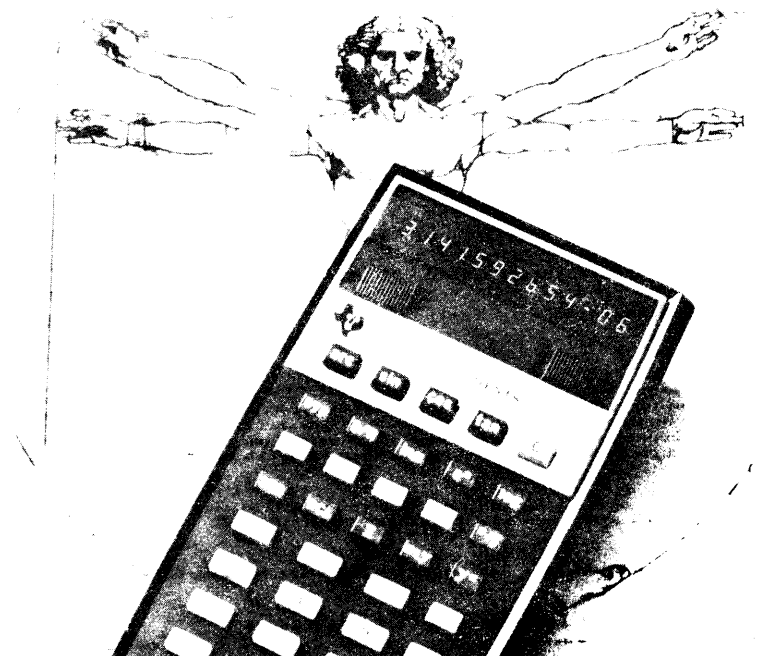
Zoecon Corporations, has said about the pill, "Nothing has had a bigger impact on the emancipation of women and on the fostering and stimulation of women's rights." Djerassi conveniently forgets that contraceptive research, a process which took many people and laboratories decades, was pushed by women such as Margaret Sanger and Emma Goldman, precisely because they demanded liberation from the exclusive role as childbearer. The pill was developed for women, not men, because women faced the consequences of childbirth — both physically and raising a family — more directly than men. Only today, as society begins to consider child-rearing to be a male responsibility as well, are studies of male contraceptives making progress.

GREAT EXPECTATIONS

Computers, modern communications systems, medical electronics, and digital watches are visible symbols of Santa Clara County technology. To the workers in local plants, or the people laid off elsewhere as a result of the technology, they also represent aspirations. In this role, advanced technology has its greatest potential for social change. Should the corporations and government agencies that control modern technology not take steps to meet those aspirations, they are then threatened with social upheaval.

At this point, however, rebellion of any sort seems unlikely, but this is partially because the powers-that-be are applying modern technology to forestall upheaval. Computerized data banks and modern police communications systems aid government agencies in the suppression of protests that "get out of hand," and the sophisticated, centralized broadcast media system provides America's rulers with the power to mold, though not control, the thoughts of the citizenry.

The uses of the fantastic technology of Silicon Valley can improve life in this area, this country, or even worldwide, but they can also worsen or even destroy it. Its impact does not depend merely on the technology itself, but upon who controls it.



How it's Made

Most people are mystified by high technology industry and the issues that it raises, precisely because they are unfamiliar with the industry's advanced level of technology. Even many of the people who work in the factories and offices do not know how it all fits together. In the rapidly developing electronics industry, this is particularly true.

Industries which produce more traditional kinds of equipment, such as cars, trucks, or refrigerators, are easy to understand. Most of the work goes into actually fabricating parts and assembling them into familiar products. Relatively little human power is spent on research and development. In Santa Clara County's electronics industry this is not the case. Companies succeed only if they are able to conceive, design, and produce innovative products. Large amounts of funds are spent on research.

SMALL QUANTITIES

Government statistics show that Lockheed Missiles and Space Company, the county's largest employer, is the local manufacturer most dependent on research. Fully two thirds of its hundreds of millions of dollars in military contracts each year is categorized "research, development, test, and evaluation." But those figures are misleading. Rather than conducting university-style basic research, Lockheed builds prototype weapons systems. It employs a large number of scientists and engineers to produce small numbers of complex devices. Thus, Lockheed and other major systems manufacturers — such as Ford Aerospace — differ from other local high technology firms in that they do not carry out mass production.

MASS PRODUCTION

The production of smaller weapons systems, electronic equipment, and specialized electronic tubes at companies such as Itek, Hewlett-Packard, Varian, and Spectra-Physics, resembles the assembly lines of traditional equipment manufacture. Research and development, whether funded by the government or by the company, is generally independent of the production process. Hewlett-Packard has experimented with other methods of mass production, having single workers carry out several tasks, but this is the exception rather than the rule.

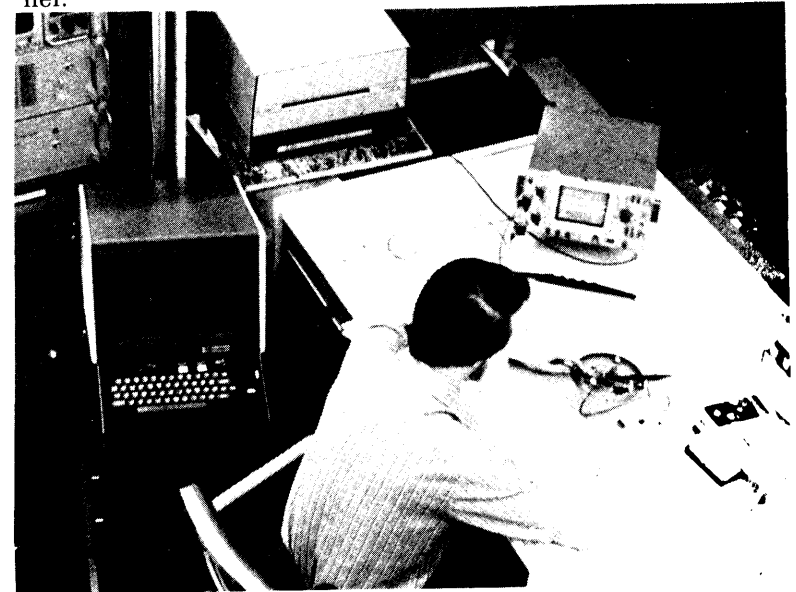
SEMICONDUCTORS

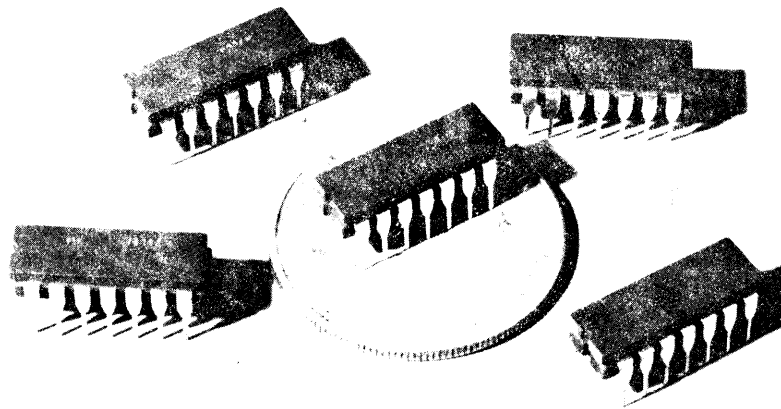
The semiconductor makers that build integrated circuits — the essential components of solid-state electronics — have developed a system of mass production with a new wrinkle. Products are shipped overseas midway in the assembly line. Like the systems and equipment manufacturers, semiconductor firms center their research and development activity in Santa Clara County. Scientists and engineers in local labs and headquarters constantly come up with new products and new techniques for producing old ones.

Regardless of the function of an integrated circuit, production always begins with capital-intensive (requiring expensive equipment and little labor) *wafer fabrication*. Advanced Micro Devices president Jerry Sanders explains:

This process consists of a series of chemical and physical processes in which photomasks are placed in contact with a thin slice of silicon called a "wafer" 2 or more inches in diameter. Additional chemical processing prepares the wafer for selected introduction of certain chemical impurities. These selective impurities impart to the silicon the properties necessary to form electronic components. Upon completion of the wafer fabrication, each wafer contains hundreds — or in some cases thousands — of identical monolithic circuits — "die" or "chips."

Most Silicon Valley companies carry out wafer fabrication locally, close to their management, engineers, and skilled personnel.





Plastic-Encapsulated Integrated Circuits

Once the wafers are fabricated, each of hundreds of circuits on each wafer must be tested individually, and those circuits which do not perform adequately are identified. Computerized test equipment, valued at \$350,000 or more per tester, is required for this wafer sort process. This work is consequently also carried out in Santa Clara County plants.

Wafer circuits are useless unless wires are bonded to them. In the assembly process, the wafers are split into individual chips, and defective ones (already identified in wafer sort) are discarded. Wire leads thinner than a human hair, and sometimes only one tenth of an inch long, are bonded to the chips. These assemblies are then sealed in ceramic, metal, or plastic.

This microscopic work is highly repetitive, involving large amounts of manual labor. It requires little technology, equipment, or skill. Because it costs little to transport the lightweight circuits, even by air, all semiconductor companies conduct most of their labor in areas where labor is cheap. Although many companies carry out some assembly in Santa Clara County, where they can carefully watch the production process and test new methods, all also conduct assembly work in one or more Asian countries. (See the section on LABOR.)

Although a major portion of the semiconductors assembled in Asia are eventually marketed in Japan, Europe, and other lands, most companies ship their assembled circuits back to the U.S.

for final testing. Like wafer sort, final testing requires both high technology and expensive equipment. Special provisions in the U.S. tariff code — which the industry defends with vigorous lobbying — allow companies to pay tariffs only on what they say is the value added by the foreign assembly. That is, they need not pay duties on the imported chips, just the costs of the wires and frames and the pay of the assemblers.

MARKETING

Only a small percentage of the electronics manufactured in Santa Clara County is marketed directly to the public — digital watches and calculators, for instance. The sophisticated communications equipment, electronic weaponry, measuring devices, lasers, computers, and components that dominate production require marketing personnel familiar with high technology. Thus, the engineers and sales force at both ends of the production sequence of high technology industry are well versed in the mechanisms and applications of the technology. On the other hand, production workers, as well as consumers and taxpayers, remain basically uninformed.



Workers in Asia

Impact on Labor

Satellites, computer memory disks, light emitting diodes, kidney dialysis machines . . . this list of ultra sophisticated products continuously grows in the annals of Santa Clara County electronics firms. This industry is proud of these technical achievements. However, in focusing on these technological breakthroughs, one can not forget the thousands of workers who have planned, blueprinted, and assembled these products.

Approximately 200,000, or one third of the work force, are directly or indirectly involved in the electronics industry in Santa Clara County. The State Employment Development Department (EDD) totals these figures from the hundreds of electronics companies, chemical manufacturers, computer programming services, employment agencies and other local businesses that are directly tied into the electronics industry.

120,000 people are employed in the 175 major electronics companies alone. This figure diverges from other EDD surveys that peg local electronics employment at approximately 85,000.

These electronics companies constitute a major industrial center. However, their elegant industrial parks camouflage the many serious problems that workers face on a day to day basis. These workers deal with some of the most dangerous health and safety conditions in the United States. Workers constantly face the threat of forced overtime or layoffs due to the rapid fluctuations in market demand. Large portions of the workforce are employed in low paying, low skill assembly line jobs. Workers are becoming increasingly divorced from the results of their labor as a result of increased automation and specialization. Workers suffer these and other problems in isolation, as they are virtually unorganized in the Santa Clara County area.

COMPOSITION

"85% of the production workers are women and 50% of those are third world. They are promoted very slowly, although affirmative action is helping that now. An Hawaiian woman is supervisor. There is only one woman engineer in the whole place. And almost all of the electronics technicians are men. So its pretty blatant discrimination." — assembly line worker in a Santa Clara semiconductor firm.

Large portions of the electronics workforce are involved in direct production activities, despite the industry emphasis on research and development activities locally. Nearly 50% of the workers in the semiconductor branch are actually on the assem-

SEMICONDUCTOR INDUSTRY: SURVEY OF 5 PLANTS

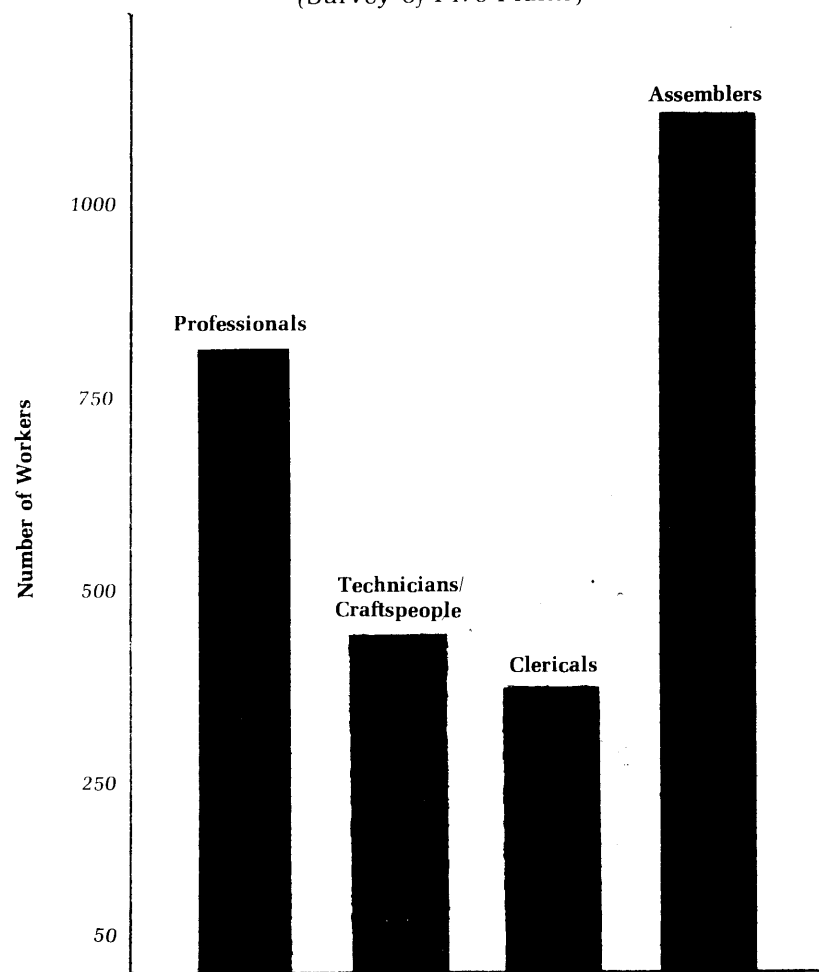
	Total	Professionals & Managers	Technicians & Craftspeople	Clericals	Assemblers
Total	2837	811	434	389	1106
Male	1282	786	327	67	52
Female	1555	25	107	322	1054
Minority Total	796	91	83	51	571
Male	168	82	58	12	16
Female	628	9	25	39	555
Black Total	89	5	10	5	69
Male	16	3	9	1	3
Female	73	2	1	4	66
Spanish Speaking Total	417	24	45	30	318
Male	70	21	28	8	13
Female	347	3	17	22	305
Asian Total	279	60	28	16	175
Male	80	56	21	3	0
Female	199	4	7	13	175
Am. Ind. Total	3	2	0	0	1
Male	2	2	0	0	0
Female	1	0	0	0	1

bly line. Five local semiconductor plants with a total workforce of 2837, employ 1106 assemblers and 434 technicians. Another survey of four electronics equipment manufacturers found 1039 assemblers and 701 technicians out of a total of 3369 employees.

There are distinct patterns of racial and sexual discrimination in the electronics workforce. There are 704 white males out of a total of 811 professional and management staff in the five semiconductor plants. Men also predominate in the categories

SEMICONDUCTOR INDUSTRY

Occupations by Category
(Survey of Five Plants)

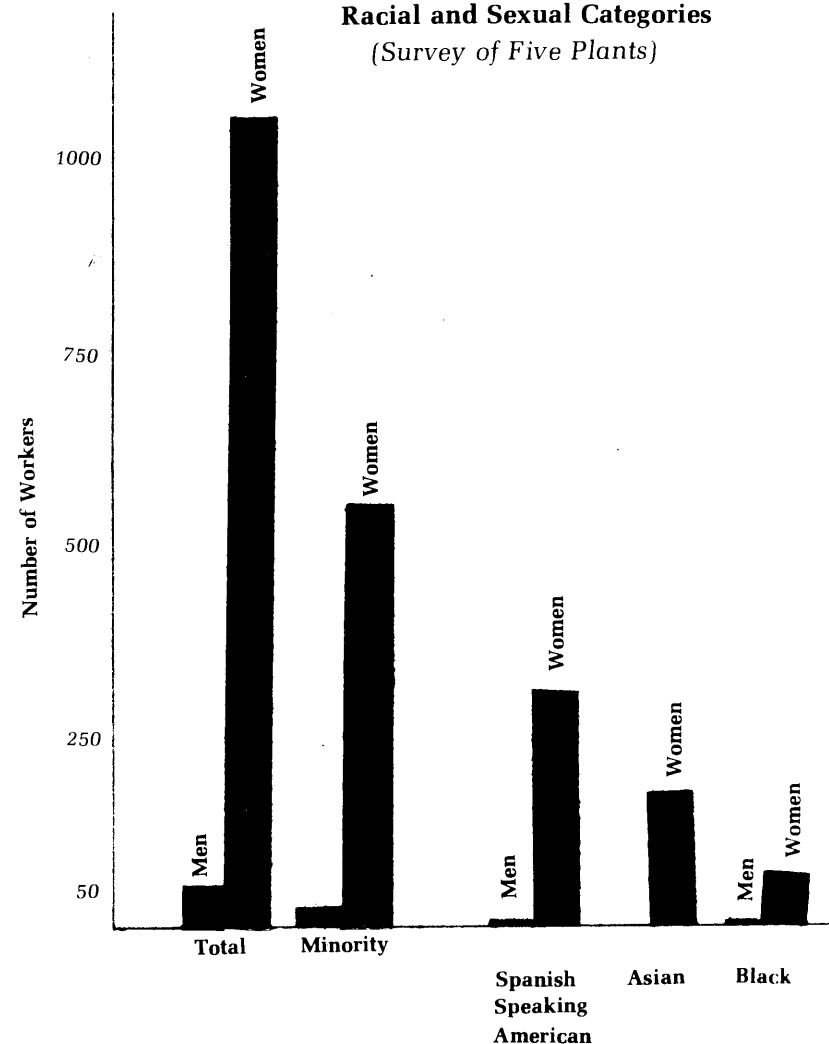


of technicians and craftsmen, 327 out of 434. Clericals consist mainly of women, 322 out of a total of 389, 84% (283) of these are white. The overwhelming majority of assemblers are women, 1054 out of 1106. Of these women, 54% (555) are minorities, mainly Spanish speaking and Filipino Americans.

Wages and salaries for these different categories vary dramatically. Starting wages for assemblers begin at the legal minimum wage of \$2.50/hour. Technicians earn entry level wages of \$3.50-\$5.00/hour. Engineers start at salaries ranging from \$12,000 to \$35,000 a year.

SEMICONDUCTOR ASSEMBLY

Racial and Sexual Categories
(Survey of Five Plants)



"We work with acids, one woman was asked when she was hired if she knew anything about acids. She said 'no,' the supervisor said, 'Good then you won't be scared by them.' Also its crowded and things aren't organized. Just recently a bottle marked acetone was filled with waste acid, and a woman poured and it all started steaming and the vapors are very dangerous to breathe in and are caustic. We work with solvents too which are dangerous. I get headaches from all this as do other people." — an assembly line worker at Siliconix, Santa Clara

"Since I've been at Lockheed, I've been laid off a total of 5 times in 9 years, for a total of 3 years. Layoffs are real severe problems, to people who are married, people who have house payments, families to bring up." — a machinist at Lockheed, Sunnyvale

These two workers have raised some of the many serious issues workers in the electronics industry have to face, dangerous health and safety conditions, constant cycles of hiring and firing, stressful and pressured jobs, unorganized work places.

Health and safety problems are immediate to every worker's life. The industrial and scientific instruments industry is the first most dangerous and the electrical instruments industry is third most dangerous for workers in terms of exposure to carcinogenic substances according to the National Institute of Occupational Safety and Health (NIOSH).

Electronics production work, particularly in the semiconductor industry, is a series of sophisticated chemical reactions. Workers use a number of solvents, acids, fiberglass materials and gases from the initial fabrication of a silicon "chip" through the final assembly and testing phases.

Workers complain of physical problems after using these chemicals, ranging from nausea, headaches, dizziness, skin rashes, respiratory problems to liver and kidney problems. Researchers are very concerned about the long term carcinogenic (cancer-causing) effects of these chemicals, particularly the possible connection between TCE and breast cancer. TCE has been proven to cause breast cancer in test animals. Other suspected carcinogens include benzene and chloroform.

The industry will not openly acknowledge that these health and safety hazards are a problem or even its responsibility to worry about. Workers have reported of harassment by management if they complain about the safety conditions. It is difficult for workers to prove that health problems are job related. There are federal and state regulatory agencies, the Occupational Safety and Health Administration (OSHA) and Cal OSHA which have regulations about many chemicals but are too bureaucratic and slow, according to workers. Also workers report becoming ill even when air levels of specific chemicals are within OSHA

standards. At one California plant women complained of nausea and dizziness after using TCE in amounts one-half those of the OSHA maximum.

The relative infancy of the electronics industry and the constant innovation in production processes also contributes to dangerous health and safety conditions. Because of intense competition, companies develop new production techniques rather than research health and safety.

Companies bear the responsibility of providing the safest possible conditions and informing their workers about dangerous chemicals. According to workers, the companies are not fulfilling this responsibility. Several assemblers at a small semiconductor plant reported that despite the publicity about the dangers of TCE over the past several years, their employer has just installed vents in the past six months.

Workers must deal with other serious problems besides the dangerous chemicals. Workers often experience eye strain, after peering through a microscope for hours at a time. Workers also report of migraine headaches, ulcers, high blood pressure, and



Soldering can produce dangerous fumes which result in nausea, chest pains, or liver damage.

dependency on amphetamines, because of the intense pressure to increase production. Since companies have not fulfilled their responsibility, pressure by organized workers is needed to force the companies to provide optimal health and safety conditions — adequate ventilation, protective clothing, decreased production pressures, and worker controlled health and safety committees.

ORGANIZATION

One of the paradoxes of the local electronics industry is that despite the poor working conditions, very few companies have union organizations. Those companies that have unions are generally the established large systems firms such as Lockheed and Westinghouse rather than the newer semiconductor companies. Since the local electronics industry is generally an open shop, workers are inexperienced with the potential benefits of unionizing. Company attempts to put down any unionizing efforts and their threats to move production overseas also hinder union organizing.

The electronics industry has built up its presence in Santa Clara County, after shifting from the highly unionized areas of the East Coast. It has found the unorganized workforce of Santa Clara County to suit its needs.

Statistics show that the production workforce in the local industry is primarily minority and women. Many of these women come from farm labor backgrounds and consider these factory jobs to be a step up. Many workers are recent immigrants from Asia and Latin America and can only find assembly jobs. The majority of these workers who are women are particularly



vulnerable as many are raising families alone.

The transiency of assembly line work also prevents unionizing efforts from developing. The frequent fluctuations in production levels mean that workers are constantly being hired and laid off. Companies often have a policy of maintaining a temporary workforce on the assembly line to avoid paying the legally required fringe benefits. Companies reportedly use the excuse of decreased production levels as a means of laying off workers suspected of being active in organizing attempts.

The Western Electronics Manufacturers Association (WEMA) provides companies with many resources to fight any unionizing attempts. WEMA maintains close surveillance on any union campaigns. It also provides seminars for executives on how to keep unions out of the plants. Recently, at one such seminar, executives simulated a unionizing drive in order to better understand and control potential union drives in their plants.

INTERNATIONALIZATION

The electronics industry creates a tangible bond between Santa Clara County and many other countries, particularly those of Asia and Latin America. While the industry is primarily headquartered in Santa Clara County, it literally spans the globe with production, warehousing, administrative and sales facilities. Lester Hogan, Vice-Chairman of the Board of Directors of Fairchild Camera and Instrument Co. of Mountain View, explained. "Because of this international structuring, the U.S. semiconductor industry has been able to compete, and in fact dominate world markets."

The history of this internationalization process has been a quest for ever cheaper production costs. In this technically competitive industry, the main means of cutting production costs has been to cut labor costs. Companies have gone overseas in order to pay wages a fraction of those in the U.S. These corporations have paid wages in Asia ranging from \$90.00 (U.S.) a month in Taiwan, to \$43.20 in Malaysia, to approximately \$30.00 a month in Indonesia for assembly work.

Fairchild serves as an example of this international frontier breaking. It currently operates facilities in at least 18 countries, at least 10 of which have production facilities. Fairchild was the first U.S. electronics corporation to begin assembly operations in Asia, when it set up a factory in Hong Kong in 1963. It followed this with a plant in Korea in 1965/66, in Singapore in 1968, in Indonesia in 1973/74. When Fairchild set up its Hong Kong plant it was primarily interested in setting up a system in which "the advanced countries would concentrate on the high-technology work and managing and the poor countries would

mainly do the manual work," according to Hogan. Fairchild has recently moved a major warehousing facility to Singapore in order to have greater access to markets in Asia and Europe.

Asian governments have invited these corporations in with the hopes of gaining technological expertise, increasing foreign exchange and soaking up some of the large pool of Asian unemployed. However, these societies have received negligible benefits if any, from these corporations. First, the corporations bring only the lowest level technology to Asia, that of the assembly and warehousing operations. These corporations have a strict policy of retaining research and development in their U.S. installations; to keep the research closely synchronized with top level policy decisions and to protect the vital technology from competitors.

The electronics firms only make a minor contribution because they do not integrate their activities into the Asian economies. They bring the components to Asia and then re-export them immediately to the U.S. for final testing.

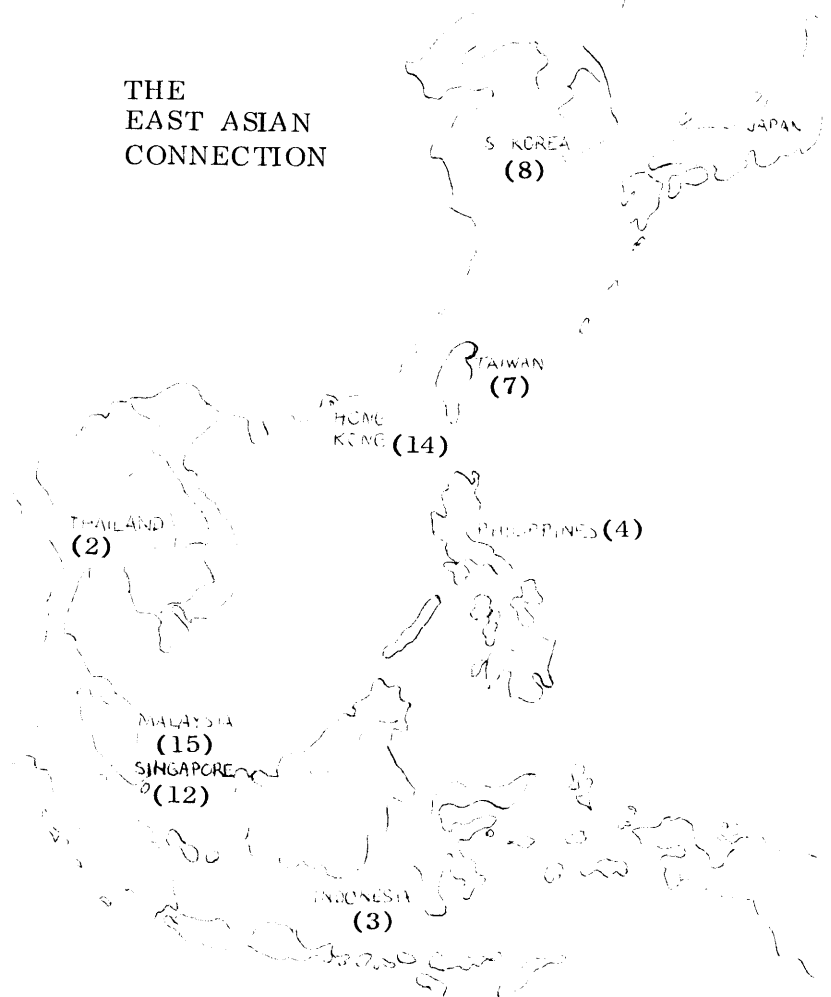
Finally, these companies do not alleviate the terrible unemployment problems in the Asian societies. They offer only the lowest paying, low skill jobs and retrench workers as frequently as in the California plants. Fairchild in Singapore, for example, fired almost half of its 3600 employees in response to a recession in the semiconductor market in 1974 and 1975.

These companies also bring dubious benefits from the point of view of an Asian assembly line worker. These workers are almost exclusively women between the ages of 16 and 25. Many of these workers support their families with these incomes. In Korea, young women are required to have nearly perfect vision to get an assembly job. However, within the first year of employment, 87.5% have severe eye problems including chronic conjunctivitis, near sightedness, and astigmatism, according to one study.

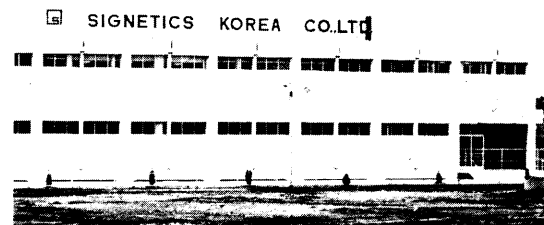
These Korean workers receive inadequate wages. Workers at Signetics earn \$98.00 (U.S.) a month despite the Korean government's statistics that a family of five needs at least \$200 a month minimum income, causing great hardship for women financially responsible for their families.

These workers are thrust into alien cultural and social settings with these jobs in foreign owned factories. They are often required to live in factory dormitories, cut off from their communities. In Penang, Malaysia, the electronics companies sell cosmetics, provide beauty classes, play continuous rock music in the factories. They even sponsor "Miss Intel" or "Miss National Semiconductor" beauty contests. These young Malay workers are so barraged with media that they respond with attempts to assimilate the Western ideals of beauty — they often spend a substantial part of their already meager salaries of 50 cents a day on cosmetics and other products in the hopes of

THE EAST ASIAN CONNECTION



Assembly Plants With Parent Companies
In Santa Clara County



appearing like the women pictured in the advertising. Tragically, these young Malay women are then sometimes branded as "loose women" by their conservative communities.

Government labor policies in these Asian countries are very attentive to the needs of the employers. Most of these governments prohibit or severely regulate labor unions, and ban strikes. The South Korean government enacted laws purportedly to eliminate lengthy labor disputes. In practice, the government steps in to "solve" any labor disputes with police troops. Korean workers have no right to organize, to bargain collectively, to strike. Knowing that striking was illegal, Korean workers at Signetics staged a five-day hunger strike and sit-in demonstration in the company cafeteria to gain higher wages. They won an increase from U.S. \$80.00 to \$98.00 a month. Despite two repressive government policies, these workers found that organized action was successful.

The situation of the Korean workers points out the common problems Asian and American labor face. Essentially, they are on different sections of the same assembly line. Workers experience the same dangerous health and safety conditions, the same repression of unionizing attempts, the same inadequate wages, and the same lack of control.

The companies and established labor unions in the U.S. have undermined this potential unity. The unions have launched a "buy American" campaign and are urging Congress to restrict imports of foreign assembled products. They have blamed Asian, Latin American, and other workers for the job cut-backs and other problems American labor is facing.

But these transnational electronics corporations make the decisions to move to Asia, to Latin America. These corporations rather than foreign workers bear the responsibility for cutbacks in American jobs.

This high technology owes much to the thousands of workers who labor here and abroad. However, it has consistently ignored the welfare and needs of these workers. Conditions will not improve until these assemblers, technicians, and engineers organize to form health and safety committees, unions and communication links with co-workers in other countries.

Land Use Crisis

Residents of Santa Clara County, while blessed with a naturally beautiful environment and a prosperous economy, face many problems in their search for the good life. All but the very rich are aware that finding a decent place that you can also afford is a difficult task these days. Costs are astronomical and still rising, and there are few vacant housing units to be found. The high price of housing means less money to spend on food, clothing and health care.

Those lucky enough to find housing (not everyone does — there are 50,000 people who work in the county but commute from other areas) are likely to face a long daily commute to work. Since public transportation is inadequate, commuters have an expensive and time wasting trip along congested highways to get to and from work every day.

Not only are housing and transportation problem areas, but the once beautiful climate of the region is increasingly threatened by the pallid layer of smog which hangs over the valley. Next to Livermore, Santa Clara County has the worst level of air pollution in the entire Bay Area.

Housing, transportation, environment. Too often these problems seem separate and distinct. In fact, however, the origins of these problems are inextricably linked to the growth and development of local high technology industries. The private decisions made by the electronics industry have affected the housing problem, shaped the commuting pattern of the county, and contributed to environmental degradation.



HOUSING: WORKERS WITH NO PLACE TO LIVE

Housing in Santa Clara County is rapidly approaching a crisis situation. The average wage earner cannot afford the lowest priced new single family home even in South County, not to mention a house in the higher priced Palo Alto area. Many families spend too much of their income on housing. Many of the available units are in need of heavy repairs and are overcrowded. Most housing is located too far from centers of employment. And finally, many people still face blatant and illegal discrimination in their search for a place to live.

Several reasons are often given for the lack of affordable housing: prohibitive building costs, the high price of land, soaring interest rates. While each of these explanations is true, there are more fundamental reasons behind the housing crisis. The electronics industry expanded rapidly, first in Palo Alto, and then south to Sunnyvale and Santa Clara. Firms concentrated in the northwest part of the county to be near Stanford University, so managers and engineers could live more conveniently in Palo Alto, Atherton, or Woodside, and to be near suppliers and customers. Industry growth, however, from the Stanford Industrial Park in the 1950's to the latest Santa Clara site, was and is planned with no concern for where the majority of employees would be able to live.

Cities encouraged industrial expansion by offering land and financial incentives, often changing land zoned for housing to industrial use. Robert Mang, head of the Santa Clara County Housing Task Force, explained

Palo Alto showed the rest of the county in the late 1950's that it was more beneficial to have a clean industry base which yields a net gain in revenues than to have a lot of single family homes which, below a certain assessed valuation, use more services than they yield in taxes. So Mountain View, Sunnyvale, Santa Clara, Cupertino, and San Jose picked up on this and where many of them used to be the bedroom communities that served Palo Alto's jobs, they've now become the competitors for industry and also not balanced their industrial expansion with sufficient housing.

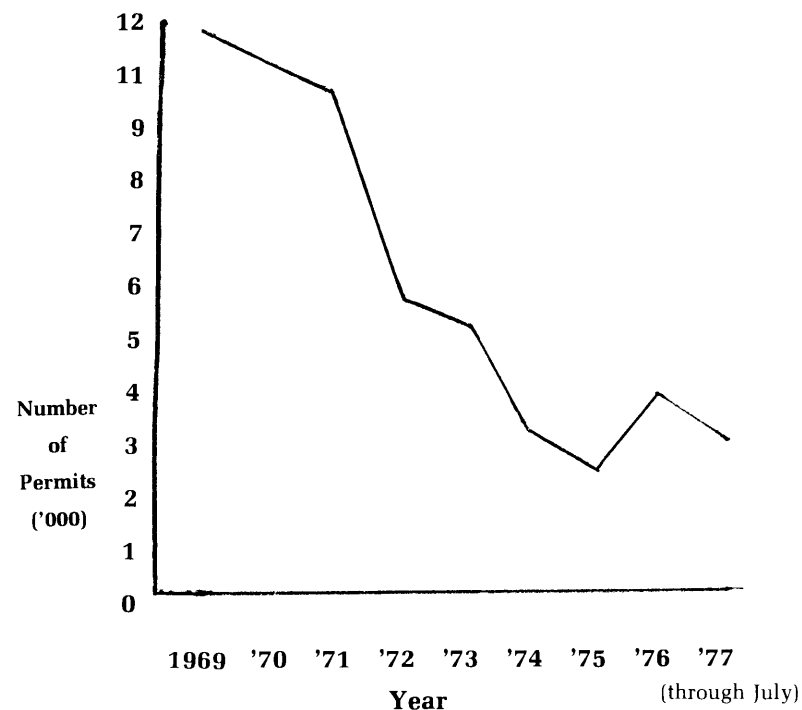
In other words, encourage industry to locate in your town, but don't worry about housing the employees of those firms since that isn't profitable. The costs of this imbalance are borne by middle and lower income people forced to live elsewhere.

Cities rezoned residential land for industrial use. Between 1965 and 1975, the total number of housing units that could be accommodated by cities zoning plans fell from 978,000 to 561,000, a decrease of 417,000 housing units. In addition, fewer multi-family dwellings are being built. The number of permits

issued for construction of buildings housing more than one family has fallen off drastically since the 1960's.

The recent upsurge does not reflect an increase in the number of rental apartments, but rather the new-found profitability of condominiums, which cater to more affluent residents.

Decline in Permits for Multi Family Housing



Source: Santa Clara County Planning Dept.

The worsening housing crunch is also seen in the very low vacancy rates. In 1971, the county as a whole had a rate of 13.1%. In 1976, this figure was down to 3.1%. In Palo Alto, rental housing has become so scarce that the vacancy rate has plummeted to .4%. These steadily falling rates are now "as low as you can ever expect to get," according to Dirk Wasserman, director of the Institute for Business and Economic Research at San Jose State School of Business.

While every city has been trying to attract industry and discourage residents, some have been more successful than others. Palo Alto, for example, had 70,000 people employed in the city in 1976. Only 11,000 of these live in Palo Alto itself. The other 59,000 live outside the city, mostly to the south.

1970 Palo Alto Inflow and Outflow of Workers		
Location	Homes of Persons Employed in Palo Alto	Work Places of Palo Alto Residents
Palo Alto	10,325	10,325
Stanford University (unincorporated portion)	500	1,479
Mountain View	5,804	1,042
Sunnyvale	4,675	1,059
Santa Clara	2,071	336
San Jose	5,310	665
Remainder S.C. Co.	9,400	1,256
San Mateo County	9,750	3,762
San Francisco	578	1,335
Alameda County	1,258	277
Elsewhere	608	1,886
Sources: 1) 1970 Census of Population, Journey to Work 2) Final Report, Palo Alto - Menlo Park Area Transportation Project		

While Palo Alto is the most extreme in this imbalance, other North County cities have similar patterns of employment immigration. In turn, communities in the San Jose area have been given the burden of housing these workers and providing them with education and other services.

Housing problems are not, however, simply the fault of the local cities planning and zoning strategies. The problem is more fundamentally the result of expansion of the high technology electronics industries. The rapid population growth of the past two decades was based on the increased availability of jobs in these industries. High technology firms gained a labor force which was utilized for corporate growth and guaranteed profitable investment. As is fundamental in the private enterprise system, the profits of these industries are privately appropriated by those who own them. The social problems which industrial expansion causes, however, belong to the public.

THE HIGH PRICE OF HOUSING

The net effect of corporate expansion and city government policy has been to restrict the number of housing units and drive up the cost beyond the means of most people who live and work in Santa Clara County. Local residents, particularly lower and middle income people, are finding that housing costs are rising

much faster than their earnings.

While the cost of buying a single family home has risen severely in the country as a whole, local costs have gone up faster than the national average. Between 1970 and 1975, the average home price rose 68% nationally, but 92% in Santa Clara County. In the past year alone, average home prices in the county rose from \$52,500 to \$73,500, an increase of 40%.

Santa Clara is by all standards a well-to-do county, having the highest per capita income of any California county. Despite this affluence, earnings are by far outpaced by housing cost increases. Between 1970 and 1976, median family income rose 42.5%, compared to an increase of over 150% in the median value of a new home.

Urban planners and economists estimate that a household should spend approximately 25% of its monthly income on housing. Using this figure, fewer than 10% of Santa Clara County residents could afford the price of a new home. Fewer still could afford to live in areas like Palo Alto or Los Altos, where new homes average over \$78,000 and \$88,000, respectively. In addition, the price increases have tended to be steepest on lower price homes, accentuating the impact on lower income residents.

For people who rent, the situation is easier in terms of cost, but more severe because of the low availability of rental units. The cost of renting has also risen faster than income, but only by a few per cent. Residents with children have an even harder time finding a place to rent. A recent survey in Mountain View and Sunnyvale found that of 156 apartment complexes, only 37 accepted children. We noted earlier that permits for multi dwelling units have fallen off dramatically since the 1960's, and that vacancy rates were very low. In addition, many apartment complexes are being converted to condominiums, further reducing the rental supply. If condominium owners do happen to rent, the rental cost will be substantially higher to cover two layers of profit taking, one for the original developer, the second for the new owner.

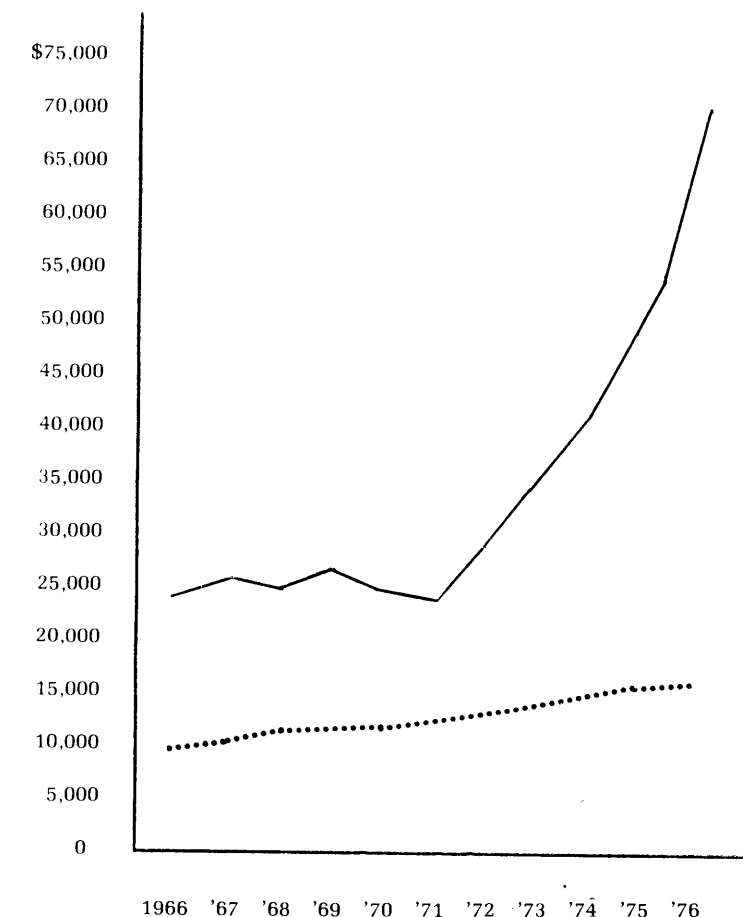
IMPACT ON LOWER INCOME RESIDENTS

Economic hardships such as inflation and unemployment impose a burden on all people, but those of moderate and low income are always hit the hardest. According to the recent county Housing Task Force Report, the high cost and low availability of housing in Santa Clara County has meant that

a low income household, in order to afford any housing at all, must live in a small, crowded unit, spending an inordinate proportion of its income for inadequate shelter.

The Santa Clara County Planning Department describes 168,340 households as low income, meaning that they earn less than 80% of the median county income. Let us consider the

Median Household Income and Median Value of New Houses Occupied in Santa Clara County



Median Value of New Houses Occupied —————

Median Family Income

Source: Harrington Housing Research Co.,
Santa Clara County Planning Department

situation in practical terms for the highest of low income families. Gross income would be approximately \$1200 per month, with take home pay about \$800. Deducting 25% for rent leaves the family with \$497 for other expenses. The United States Bureau of Labor Statistics estimates that a middle income family needs \$671.39 a month for food, transportation, clothing, and medical expenses. At this rate, the household winds up short \$174.39 every month for what it needs to live decently.

This example is for the best off of the low income households, and assumes only 25% for rent. For the tens of thousands of families in Santa Clara County who earn less and pay more for rent, the economic pressures are more intense. Poorer families are forced to spend less on obtaining decent health care or buying enough food to eat.

Based on current city plans, only a small percentage of low income families who need housing assistance are slated to receive help in the near future. The chart below shows the portion of households who will receive some form of government assistance between 1977 and 1980.

	Palo Alto	Mountain View	Santa Clara	Sunnyvale	San Jose
Families	8.4%	23.2%	4.2%	16.5%	13.0%
Elderly	11.0%	44.4%	13.8%	24.5%	13.1%

Families form 81% of the households requiring housing assistance, elderly, the other 19%. The elderly in Mountain View are the only group which can expect to receive significant help. For others, particularly families in Santa Clara, San Jose and Palo Alto, no relief is in sight.

Two factors exacerbate the problems faced by low income families. The first is the practice of "redlining," where banks and other lending institutions restrict loans to certain areas, which, on the basis of low income and non-white population, are deemed poor credit risks. This practice makes mortgages and home improvement loans difficult to obtain. Therefore redlining contributes to the deterioration of existing housing and constricts the building of new units. It is too soon to judge whether the recent enacted laws against redlining will be effectively enforced.

Discrimination is the other factor which prevents people from securing decent housing. Despite the Fair Housing Act which prohibits discrimination by landlords on the basis of race, sex, or ethnic background, local studies indicate that illegal racial discrimination for housing is widespread on the peninsula. While this affects people of all classes, lower income people are most likely to suffer from this practice.

Mid-Peninsula Citizens for Fair Housing estimates that 40-60% of the rental units in North County are under management practicing some form of racial discrimination against blacks. The San Jose Human Relations Commission surveyed local housing and found that 31% of apartment complexes discriminate against Chicanos, while 27% discriminated against blacks. Similarly, a recent polling by the San Jose Mercury confirmed this pattern of discrimination, but pointed out that discrimination was more widespread in North County cities.

Minorities, particularly Filipinos and Hispanics, form a disproportionately large share of the lower paid production workers in local electronics industries. It is ironic that this same group of people who, because of economic inequality and racial discrimination cannot live near their jobs and are forced to move south.

PROSPECTS FOR THE FUTURE

All indications are that the trends of new jobs unmatched by housing will intensify in the near future. The continuing high demand for housing will keep prices high and availability low. The Santa Clara County Housing Task Force Report examined the general plans of local cities which zone industrial and residential areas. The report found that if land is built up according to plan, the number of jobs will increase by 500,000 (up 100%) while only 170,000 housing units would be built (up 43%). Continuing past trends, North County cities, where industry is currently concentrated, plan to add 64,000 jobs but only 7,000 housing units. Planners predict that 75% of population growth will occur in San Jose or in South County. However, even San Jose land is zoned to accommodate more jobs than housing, meaning that new "bedroom communities" will have to be developed.

More than 50,000 county workers now commute to work from outside the county. If employment grows as predicted, it is possible that by 1990, 325,000 county workers will be unable to find housing inside Santa Clara County, regardless of the price they would be willing to pay.

TRANSPORTATION

The patterns outlined in the previous section, where industry expands in North County faster than housing in South County, form the core of Santa Clara's transportation problems. Because many employees can't afford or can't find housing in Palo Alto, Mountain View, or Santa Clara, they commute to work daily from Central or South County. Anyone who has ever driven on the Central Expressway or the Bayshore Freeway is familiar with



the daily traffic jams along these congested routes. The worst jam-ups take place, of course, heading north in the morning, and south after work in the late afternoon.

"The private automobile dominates our daily lives in Santa Clara County" states the Planning Department. Statistics confirm this statement. In 1976, there were more than 660,000 cars registered in the county, nearly one third of all cars in the Bay Area. Ninety per cent of local residents arrive at work by car, and the Transportation Agency estimates that commuting to work constitutes 35% to 40% of all county travel. By 1990, expected development trends will bring this figure over 50%.

In particular areas, these patterns of heavy job-related auto use are even more severe. In 1970 in Palo Alto, for example, more than 50% of all vehicle trips were work related. Since employment has grown since then by about a fifth and population remained constant, the percentage of work trips has increased.

The commute to work averages about 15 miles a day, which gets to be expensive when considered over a period of months or years. The costs of automobile use, in terms of purchase price, gas, insurance, etc., are also going up each year. Like the housing situation, transportation costs function as a regressive tax. Middle and lower income people, those least able to afford extra expenses, live farthest away from the employment centers and therefore are forced to spend more on commuting. For those commuting greater distances from San Mateo or Alameda County, costs are likely to be even higher. In addition, since new housing will be located in South County, the Planning Department estimates that the average commute will go up to 22 miles in the next few years, an increase of almost 50%.

It is more convenient and profitable for industry to locate in the north. While well-paid managers and engineers can generally afford the higher priced North County housing, the social costs are borne by the lower paid employees of the local electronics industry, among others.

If the pattern of heavy population growth and expanded employment is allowed to continue, it is likely that the existing

transportation system will be totally inadequate to handle the increased traffic flows. The county Planning Department studied the prospects for increased roadway construction and concluded, "It presently appears that state and federal transportation funds will become increasingly more difficult to obtain for freeway construction as funding priorities shift toward public transit systems."

New road construction is not necessarily a sensible way to solve transportation problems, and several local and regional studies are evaluating mass transit alternatives. However, some alternatives, which are being proposed, entirely ignore the housing and jobs imbalance. The recent Santa Clara County light rail evaluation study (light rail is a modern streetcar system) suggested a light rail network that didn't even come close to Palo Alto, a major employment center.

Other studies, such as the joint Association of Bay Area Governments and the Metropolitan Transportation Commission's Corridor Evaluation Study, are seeking to accommodate employment and housing patterns. As well as examining light rail and expanded bus service, the ABAG-MTC committee is studying two land use development alternatives. The first is the "build out" of land according to existing general plans described previously. The second is the "reduced commute" alternative, which allows expanded jobs and population, but proposes that new employment and housing be located closer to one another to shorten the trip to work.

This means more industry moving to San Jose, while building more housing in North County. Increasing social control of business, while desirable, would meet with some resistance. North County cities, protective of their comfortable, low density housing and lucrative industrial tax base, will probably object to changing their development plans.

The problem, however, is not only a political one relating to local governments. Power based on economic position, in this case the powerful local electronics industry, will also stand in the way of making sensible planning policies. Since industry has found good reasons to locate in the north it will take concerted public power to challenge industry's prerogative to make socially harmful decisions.

In the current debate over transit alternatives, the Palo Alto Comprehensive Plan suggested that a tax be levied on industries based on the number of their employees who drive to work. The result would be to provide funds to finance transit, and to encourage alternatives to single occupant commute trips. There are problems with such a tax, notably how to prevent the costs to the employer being borne by workers receiving lower salaries or customers paying higher prices. Nevertheless, the realization that business should help bear the costs of problems which it

helped create should be incorporated into any transit planning project.

ENVIRONMENT

Long time residents of Santa Clara County have seen the valley transformed from a peaceful expanse of farmlands and orchards to a center of high technology electronics and military industries. The San Jose to Mountain View area is one of the prime examples of the land use phenomenon labeled "urban sprawl." Low density economic development has blotted out the natural beauty of the land. Industrial parks, freeways and housing tracts have covered the once fertile land with asphalt and concrete. Population growth and industrial development have caused the visible deterioration of our land, water, air and other natural and human resources. If future development proceeds as currently planned, these problems will intensify and become more difficult to solve.

Among the most visible and harmful of these environmental problems is the deteriorating quality of the air in Santa Clara County. Except Livermore, the county has the worst air pollution problems in the entire Bay Area, even worse than the heavily industrialized East Bay.

Part of this is due to the prevailing wind patterns which blow pollutants from other parts of the Bay Area. These substances subsequently become trapped in the valley. Local sources, however, particularly automobile emissions, contribute substantially more to pollution problems. Every day, cars in this area release 850 tons of the poisonous gas carbon monoxide into the air, as well as 240 tons of organic gases, an ingredient of smog. Both of these amounts are the highest recorded in the Bay Area.

The worst air pollution is around the San Jose area and extends north to Sunnyvale. This is the heart of the commute route from Central County homes to North County jobs. While the electronics companies generally think of themselves as a "clean industry," with no smokestacks bellowing harmful gases, the location of industry which forces daily commuting is directly responsible for the declining air quality.

The pallid layer of smog which hangs over the valley is not only an eyesore, it is also a significant health hazard. In 1976, the Federal standard for carbon monoxide levels in the air was exceeded on 61 days, while the oxidant standard was exceeded on 32 days. These pollutants, which come from automobile exhaust, cause, among other disorders, respiratory and nervous system problems.

The center of the worst pollution has shifted in the past decade from Livermore to eastern Santa Clara County and local pollution problems are expected to last long term. Regional pollution

control experts estimate that the situation will improve somewhat in the next few years due to emissions control requirements, but after that air pollution problems will intensify. This is due to the expected increases in population and vehicle use. For example, according to a recent study by the Association of Bay Area Governments, carbon monoxide levels are expected to decrease about 10% by 1985, but by 2000 "a substantial increase in CO levels beyond those experienced in 1975 will occur." The same is true of the smog-causing organic gases which also result from auto emissions.

There is a more direct environmental threat from local high technology industries. These firms, particularly semiconductor manufacturers, use large quantities of toxic and corrosive chemicals as part of their production process. These chemicals must be neutralized before being discharged by sewage treatment plants into the Bay or being reclaimed for irrigation and other outdoor uses.

Industrial chemicals are not only harmful once they leave the factory. Inside the plant, workers are daily exposed to an array of dangerous organic solvents. These chemicals cause nausea and dizziness, as well as more severe liver and kidney problems, and possibly cancer. Little has been done to improve the environment for workers who must handle chemicals on the job. (See chapter on Labor.)

The final area of environmental impact of high technology firms is their heavy use of water even in time of drought. Local industry uses from one quarter to one third of the water supplied to the cities in which they are located. Most municipalities, with the exception of Palo Alto, actually encourage heavy water consumption by charging less the more you use. Homeowners are thereby charged higher rates than industrial users, who use more. For example, Fairchild Camera and Instrument Corporation has been known to use as much as 20% of the water supplied to Mountain View in a single month. In Sunnyvale, there are more than 60 corporations each using more than 50,000 gallons of water a day.

While some plants have been taking measures to conserve water, as have individual residents, the impact of heavy water use by the local electronics industry needs to be further explored and assessed.

Palo Alto recently revised its water rates so that large users are charged more. Other cities could encourage industry conservation by enacting similar measures. In addition, a small Sunnyvale semiconductor manufacturer recently installed a water recycling system to reduce the 120,000 gallon per day water use. While this process is expensive, at least from the corporate viewpoint, perhaps other local manufacturers should be required to do the same.

Taxes and Services

Santa Clara County's high technology industry generates valuable property tax revenue for the county, local cities, school districts, and other public agencies. Most local cities promote industrial development, to take advantage of the revenue, since the corporations require few direct services in exchange. However, the companies have found it profitable to concentrate in north county areas where engineers and managers live. Lower-income employees must commute from areas with proportionately less industry. They help earn the money that their employers pay to north county taxing agencies, but they and their families need public services in the San Jose area. Since industry provides relatively little tax revenue in San Jose, governments in that area have a particularly difficult time paying for those services.

San Jose, of course, has been aware of the problem for some time, and this year the state Office of Planning and Research discussed it in its draft "Urban Development Strategy for California."

Palo Alto has been very successful in attracting high-quality industrial development, and equally successful in protecting its quiet, older neighborhoods from the intrusion of apartments. Therefore, the great majority of those who work in Palo Alto must commute from other towns located in Santa Clara County to the south. Palo Alto reaps the benefits of the high tax value of its industrial development, while other cities bear the high tax cost of schools, welfare, police, fire and other expensive services.

In fact, the problem crosses county lines. Workers commute to the Palo Alto area from Alameda and San Mateo counties as well.

HOW LOCAL GOVERNMENT IS FINANCED

In California, cities are generally responsible for providing public safety (police and fire) services, land use planning (zoning, permits, etc.), local parks and recreation, local public works (such as streets, sewage systems), and libraries. Some cities provide much more, from health care to gas and electricity. The funds to provide these services, as well as investment in public works and public buildings, come from a variety of sources: a percentage of state-collected taxes, particularly the sales tax; grants from the state and federal governments; "profits" on city-owned enterprises such as utilities; permit fees; and the

PROPERTY TAX AS A PERCENTAGE OF CITY REVENUES, 1975-76

Campbell	21.4
Cupertino	10.7
Gilroy	12.8
Los Altos	25.7
Los Altos Hills	20.6
Los Gatos	26.7
Milpitas	29.8
Monte Sereno	8.0
Morgan Hill	22.4
Mountain View	20.4
Palo Alto	13.4
San Jose	21.5
Santa Clara	15.4
Saratoga	14.8
Sunnyvale	23.2

The property tax is only one source of city revenue. Its importance varies from city to city.

property tax.

Property taxes supply Santa Clara County cities with anywhere between 10% and 30% of their revenues. Since certain other fund sources — federal money, permit fees, etc. — are tied to particular programs, the property taxes are even more important in financing the general operations of cities.

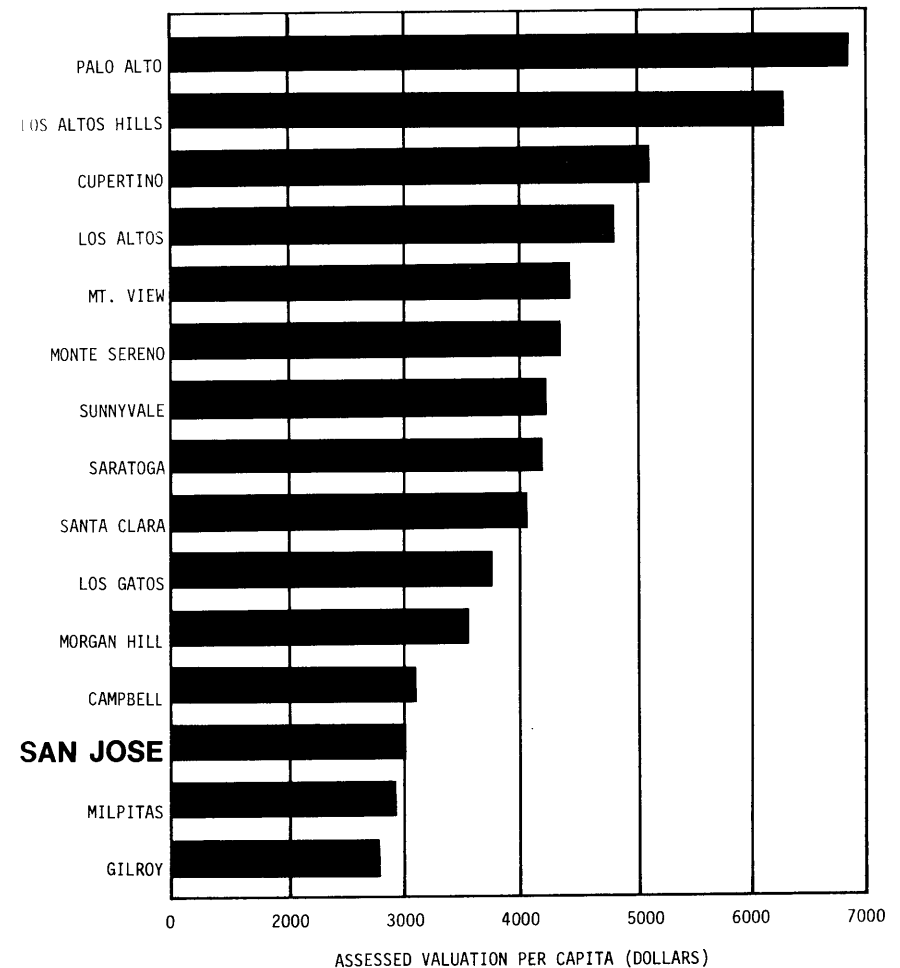
Schools, which actually spend more money than the cities they serve, are more dependent upon the property tax. Their only other major sources of funds are state and federal assistance. In Santa Clara County there are a mixture of districts. Some areas, such as Mountain View, Cupertino, and parts of San Jose have elementary school districts (including junior high schools) separate from high schools, while Palo Alto, Santa Clara, and a large chunk of San Jose have "unified" school districts, including both elementary and secondary schools. In addition, there are several community college districts within the county, combining the areas of high school and unified districts.

Property taxes also provide a substantial portion of funds to the county government and special districts. Some special districts, such as the Midpeninsula Open Space District, rely on property taxes for their entire budget, while others, such as water or hospital districts, also earn income by providing goods or services.

Each agency has its own tax rate. The amount of taxes a property owner pays is based on the sum of the tax rate for all the districts, including the city and county, in which the property sits.

All property taxes are collected through the county assessors office. The assessor, who is an elected official, manages a staff of property appraisers who periodically assess the market value of

1975 - 76 PER CAPITA ASSESSED VALUATION Santa Clara County Cities



land, homes, businesses, and their contents. The assessed value which they assign is supposed to be 25% of the market value of the property. Once a year the assessor mails all property owners in the county a tax bill, which equals the combined tax rate times the assessed value. For example, the owner of a home assessed at \$20,000 (supposed to be worth \$80,000 at the time) who lives in an area where the total tax rate is \$11.00 per \$100 assessed valuation (or 11%), would have to pay \$2.200 that year in property taxes. Since property owners face that large expense at once — while sales taxes, and even income taxes, are spread out over the year — the annual mailing of property tax notices sparks protests over both assessment increases on particular pieces of property and the general level of public expenditures.

Assessed valuation and tax rates vary from area to area. For instance, in 1976-77 (public agencies generally work on a fiscal year running from July 1 of one year to June 30 of the next), San Jose had a total assessed valuation (or tax base) of \$3,000 per resident. The city of Palo Alto, had a much higher assessed valuation of \$6,800 per capita. San Jose's city tax rate was \$1.705 per \$100 a.v., but Palo Alto's was only \$.83. Coincidentally, both cities ended up with total property tax revenue of about \$50 per resident (\$53 for Palo Alto, \$50 for San Jose).

Within certain limits — including voter approval — cities and school districts can set their own tax rates. The San Jose city government, deciding that it needed about \$29 million from property taxes to operate the city in 1976-77, set its tax rate at \$1.705. Because San Jose is poorer, as a city — that is, it has a lower assessed valuation per person — than Palo Alto, its residents must pay higher property taxes on property of the same value. For example, the owners of a \$50,000 home in San Jose pay as much to their city government as the owners of a \$100,000 house in Palo Alto. Of course, San Jose could reduce the tax rate, and thus city revenues, but this would reduce city services.

Palo Alto's per capita tax base is bigger than San Jose's for two reasons. First, as a town of several exclusive and high income neighborhoods, the average residential unit is worth more than the average home or apartment in San Jose. Second, it contains a disproportionately large amount of industrial property.

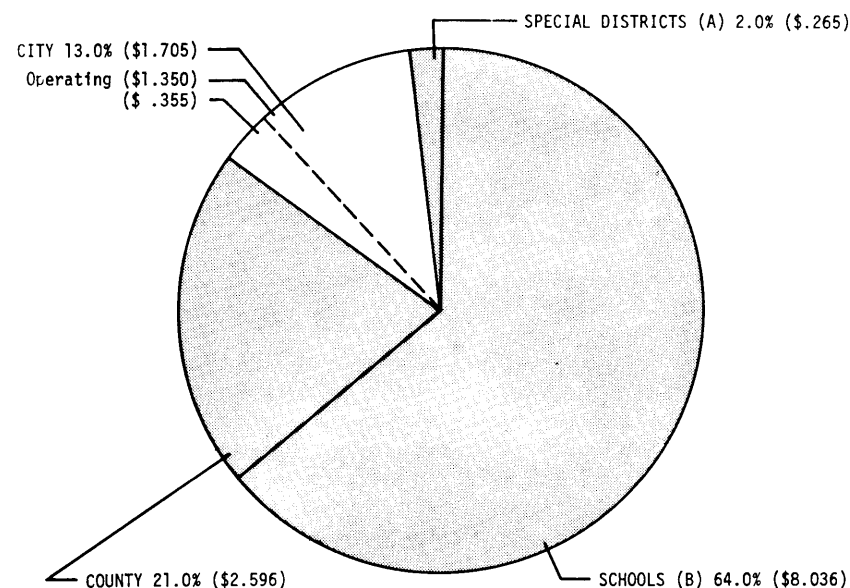
It is possible for cities to develop a strong tax base with residential property. For instance, Los Altos Hills, which contains no commercial or industrial property, has the second highest assessed valuation (per resident) in the county. But a rich residential tax base is beyond the reach of San Jose, unless all its residents become extremely rich, like the people in Los Altos Hills.

Most cities, with an average or below average income level, attempt to construct a strong tax base by encouraging industrial and commercial development. Most of the cities within Santa

PROPERTY TAX LEVIES 1975-76

For Tax Code Area 40-001*

\$12.602 = 100%



(A) SPECIAL DISTRICTS

Santa Clara Valley Water	
Central	\$.140
District	.021
Water Fund	.070
Zone W-4	.018
Total	\$.249
Bay Area Air Pollution	.016
TOTAL SPECIAL DISTRICTS	\$.265

(B) SCHOOLS

San Jose Unified School Maintenance	\$ 6.068
Elementary/Unified Bonds	.661
San Jose Community College Maintenance	1.019
County School Service	.058
Juvenile Hall Schools	.024
Capital - County Schools	.049
Development Centers - Handicapped	.021
Institution Tuition Tax	.017
Equalization Aid	.037
Special Trainable Minors Tax	.025
Physically Handicapped - San Jose Unified	.057
TOTAL SCHOOLS	\$ 8.036

*This tax code area is the City's largest in terms of total assessed value and is taxed at the maximum San Jose debt service rate.

A typical San Jose tax rate includes many districts, with schools drawing a majority of the property tax dollar.

Clara County have zoned the largest portions of their vacant land for industrial, rather than residential development. Some cities, such as Palo Alto, have permitted the environment to deteriorate — in Palo Alto this has taken the form of increased congestion — in their competition for industrial growth. Santa Clara has offered low electrical rates and even — in the case of Marriott's amusement and industrial development — helped finance a special freeway overpass.

Largely because of Stanford University's role in originating, attracting, and actually providing prime land for industrial growth, north county cities have proportionately much larger industrial tax bases than San Jose and its neighbors. Reliable figures on the size of industrial tax bases in Santa Clara County cities are not available, but the uneven distribution is obvious. Within the city of Palo Alto, Stanford University's Industrial Park (not including the shopping center) had an assessed value of over \$95 million in 1974-75. Had that industry, by no means all of Palo Alto's industrial property, been in San Jose, it would have increased the larger city's tax base by 6%, adding \$1.7 million to the city's income.

It is not merely a mathematical exercise to consider what would happen if the industry were in San Jose — or if the residents that San Jose now serves lived in Palo Alto. This is because so many San Jose residents work in the Palo Alto area. Central county residents help pay property taxes in Palo Alto by working in Palo Alto factories. The income they help generate pays the property taxes of their employers.

FUNDING THE SCHOOLS

The income disparity between school districts is equally dramatic. North county districts have strong tax bases. Central county districts are poor. For instance, in 1975-76, the Palo Alto Unified School District had well over twice the assessed valuation per high school student (based on attendance figures) as the East Side High School district in San Jose, and three to six times the assessed valuation per student as the elementary school districts — Alum Rock, Berryessa, Evergreen, Franklin-McKinley, Mt. Pleasant, and Oak Grove — served by East Side high schools.

Palo Alto, however, does not have the highest tax base per student in the county. The Los Altos-Mountain View High School District and the Mountain View Elementary School District are richer, largely because there are relatively few children living in Mountain View's apartments. But those apartments do not generate a large amount of residential property tax. Mountain View relies on its industrial belt to supply a substantial portion of its property taxes.

District	Modified assessed valuation per unit of second period a.d.a., 1975-76	
	Elementary	High school
Campbell H.S.		40,931
Cambrian Elementary	22,371	
Campbell Elementary	30,250	
Luther Burbank Elementary	24,380	
Moreland Elementary	21,355	
Union Elementary	14,544	
East Side H.S.		40,473
Alum Rock Elementary	9,109	
Berryessa Elementary	12,487	
Evergreen Elementary	14,544	
Franklin-McKinley Elementary	18,624	
Mt. Pleasant Elementary	9,715	
Oak Grove Elementary	15,286	
Orchard Elementary	224,671	
Fremont H.S.		56,250
Cupertino Elementary	22,013	
Montebello Elementary	62,372	
Sunnyvale Elementary	46,575	
Gilroy Unified	21,617	54,301
Los Gatos H.S.		51,840
Lakeside Elementary	49,483	
Loma Prieta Elementary	29,432	
Los Gatos Elementary	35,050	
Saratoga Elementary	31,759	
Milpitas Unified	16,463	39,462
Morgan Hill Unified	23,386	56,661
Mountain View-Los Altos H.S.		100,480
Los Altos Elementary	52,872	
Mountain View Elementary	64,499	
Whisman Elementary	37,696	
Palo Alto Unified	56,734	96,010
San Jose Unified	26,262	54,935
Santa Clara Unified	35,950	68,593

Within the county, the tax base of school districts varies considerably. North county districts have considerably larger assessed valuations, per student, than school districts in the San Jose area.

With their larger tax bases, north county districts can raise more funds than San Jose schools while actually applying a lower tax rate. Although the tax rate of the San Jose Unified School District is substantially higher than Palo Alto's School District (\$6.45 vs. \$5.34 per \$100 a.v.), Palo Alto raised \$1,900 per student from property taxes in 1975-76, compared to \$1,150 for San Jose. Similarly, the Mountain View-Los Altos High School District raised \$1,775 per student on a tax rate of \$1.77, versus \$1,100 per student in the East Side High School District on a higher tax rate of \$2.67.

EAST PALO ALTO

The unincorporated area of East Palo Alto, just across the San Mateo County line from Palo Alto, suffers most from the concentration of industry in Palo Alto. Those East Palo Altans with jobs work outside their "town," in Palo Alto, Menlo Park, and other employment centers. As the Midpeninsula's only black ghetto, East Palo Alto suffers a high crime rate, deteriorating property, and a high demand for social services. The San Mateo County Board of Supervisors, who represent 580,000 people, most of which are wealthier and more active politically than East Palo Alto's 19,000 residents, have never paid much attention to East Palo Alto's problems.

East Palo Alto's political leaders have an obvious solution — incorporation of East Palo Alto as a city. The leadership is there, and so are the plans, but the tax base isn't. With cheap housing and little industry, East Palo Alto's per capita tax base is only about \$1,250, less than one third of San Jose's poor base! The area is caught in a vicious cycle. Without a citizen-controlled government to improve planning and services, as well as reduce crime, East Palo Alto cannot attract the industry which could pay for that government. There is valuable industrial development on its fringes — such as Menlo Park's Cavanaugh Industrial Park — but other jurisdictions have gerrymandered their boundaries to capture the taxes paid by the factories.

FAIR VALUE?

Though industrial property provides substantial tax revenues, homeowners' groups have charged that they should provide much more. One such organization, the Valley Coalition, conducted a study of land occupied by the Lockheed Missiles and Space Company in Sunnyvale. By comparing five sections of Lockheed land to nearby parcels that had recently been sold — the method the assessor's office uses to raise residential assessments — it found that Lockheed land was under-assessed by 30%, or more than \$600,000. If such a discrepancy exists

PROPERTY TAX AS A PERCENTAGE OF SCHOOL DISTRICT REVENUE, 1975-76

Campbell High School	55.5
Cambrian Elementary	51.0
Campbell Elementary	62.5
Luther Burbank Elementary	51.2
Moreland Elementary	52.9
Union Elementary	45.8
East Side High School	55.2
Alum Rock Elementary	22.9
Berryessa Elementary	32.3
Evergreen Elementary	38.1
Franklin-McKinley Elementary	38.8
Mt. Pleasant Elementary	30.9
Oak Grove Elementary	35.5
Orchard Elementary	74.8
Fremont High School	71.9
Cupertino Elementary	62.7
Montebello Elementary	88.0
Sunnyvale Elementary	73.5
Gilroy Unified	53.0
Los Gatos High School	72.5
Lakeside Elementary	83.4
Loma Prieta Elementary	64.6
Los Gatos Elementary	75.5
Saratoga Elementary	69.6
Milpitas Unified	43.9
Morgan Hill Unified	59.6
Mountain View-Los Altos High School	76.9
Los Altos Elementary	76.7
Mountain View Elementary	76.4
Whisman Elementary	66.5
Palo Alto Unified	78.2
San Jose Unified	60.5
Santa Clara Unified	71.7

The differences in tax bases mean that certain school districts get more money from local taxes. This means they can afford to spend more per student, and it also means that property taxes provide a larger percentage of their budgets.

county-wide, it is causing a massive underpayment of industrial taxes.

SERVICES

Obviously, the high technology industries of Santa Clara County place a demand on local agencies for services. Other than for utilities, however, no one keeps track of which services are provided to industry per se. Most city planners agree that the relatively clean local industries do not cost local government much money. More money is spent on providing police and fire protection, planning, and educational services to residents. City councils, which budget the services, rarely discuss services for industry.

However, the electronics assembly industry has indirectly increased the demand for one particular service, child care. By providing employment to large numbers of young women, many of whom have children, it has created a need for increased babysitting and child care centers. So far, industry has ignored the problem. Child care officials have asked several major companies to support child care programs, but they were turned down.

Even if the industry, local schools, and the cities get together to provide additional child care, programs would be hampered by the same commute pattern that affects the tax structure. Should programs be provided in San Jose neighborhoods, where the production workers live, they would have difficulty raising funds from property taxes. More important, parents feel uncomfortable leaving their kids at centers far from their workplaces, since it is difficult to respond quickly should emergencies arise.

Child care centers provided near factories are more convenient, but they remove children from their own neighborhoods. On-site factory child care would probably create a more stable, satisfied workforce, but companies are unwilling to go into the social service business and many parents are justifiably unwilling to give the corporations a role in bringing up their children.

POLICIES

There are five basic types of policies that have been proposed to reduce the inequality in local tax bases. Agencies can be consolidated. Taxes can be shared. New types of taxes can replace property taxes. Cities can alter zoning. And public agencies can take over control of the siting of industrial production.

Consolidation. Simply, this means creating larger cities, larger school districts, or even regional government. It would solve tax disparities by including rich and poor areas in the same budget. As with any program to equalize tax revenues, consoli-

dation has been opposed by richer agencies — witness the attempts to consolidate elementary school districts in Los Altos and Mountain View. More important, citizens would lose access to public officials, which they have, to some extent, in small agencies. Furthermore, poor residents in large cities with substantial tax bases — San Francisco, for instance — do not necessarily get adequate services.

Tax sharing. Either through cooperation between local government, or through state intervention, tax revenue from one jurisdiction can be passed to another. In one form, this is being practiced by the State of California, which, because of the famous *Serrano vs. Priest* court decision, must try to smooth out the spending disparities between school districts. Under recent state legislation, the state places limitations on taxation by local districts while offering larger amounts of state assistance to poor districts. It is too early to know how well the state plan will work, but without a doubt it will increase state authority over local school districts.

Alternate taxes. It seems that everyone wants to find an alternative to the property tax, but no one can come up with a package that wins widespread support. Financing local cities and schools through income taxes on residents or commuters would help some areas, but it would leave other areas with little industry and/or poor residents with inadequate revenue.

Zoning. Since the root of the tax disparity problem is in the county's land use pattern, zoning could be used to help solve it. Most of the cities in Santa Clara County have zoned vacant land for industry, reserving very little for housing. In the north





county, there is little room set aside for residential development, and that which is built is generally for higher income people without children. Cities — particularly Palo Alto — which import lower income workers can alter zoning and create incentives to increase the availability of housing for workers. However, they are unwilling to do so without pressure. Whether the cities are convinced or forced to alter their plans, it will mean that the residents of exclusive neighborhoods will have to accept less affluent neighbors.

Should housing for workers — especially workers with children — be provided near existing industry, this would also improve the quality of child care. Children could be cared for within their neighborhoods, yet be close to their working parents.

Industry siting. Most discussions of the Santa Clara County commute pattern focus on city and county planning, for those are the most logical areas for immediate reform. The source of the problem lies much deeper, however. Industries have concentrated in the north county because it is most profitable, in general, for them to do so. They are closer to Stanford, the most attractive housing for managers and engineers, and to other high-technology firms. While it may be most profitable for the company stockholders and financiers, it is not profitable for the citizens of the county as a whole. Local, regional, and state governments could minimize the social costs of industrial development by actively siting plants. This could be done through regulation, or by active investment from a state development bank — such as the proposed bank for state pension funds. However, the companies and a sizable number of citizens would oppose such an approach because it tends toward socialism.

Regardless of the particular solution to regional tax inequity, at this time the most important step is to win recognition that there is, in fact, a problem to be solved.