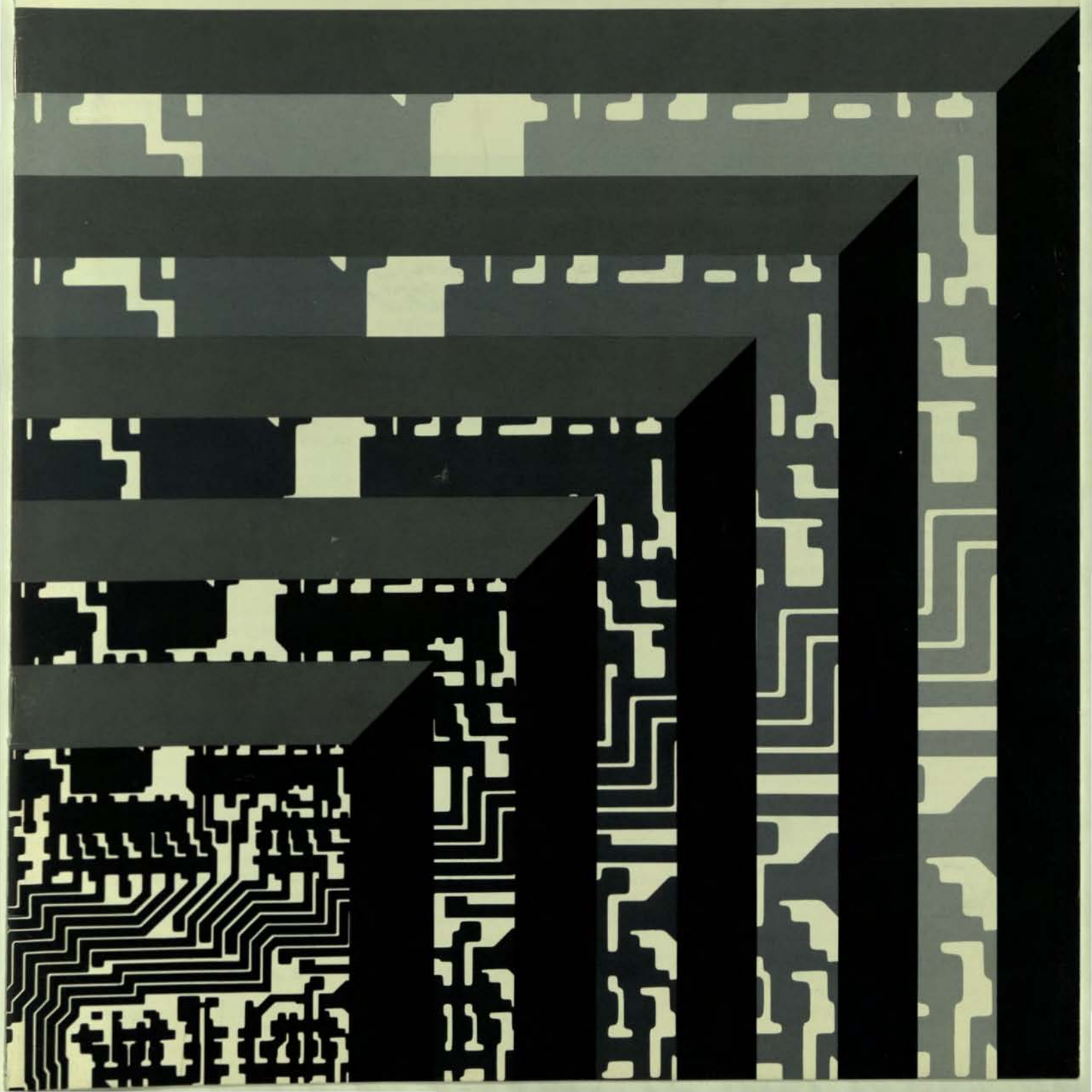
SPRING 1980

HORIZONS

FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

1979: HOW WE GREW AT FAIRCHILD



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FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

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NEWSCLIPS

SCHLUMBERGER REPORTS 1979 RESULTS

On Feb. 14, Schlumberger Limited reported record revenue and earnings in 1979. Net income was $658 million compared to the $502 million reported the previous year, a 31 percent gain. Earnings per share were $5.18 compared to $3.94. Revenue was $3.6 billion, 36 percent ahead of 1978. Results of Fairchild have been consolidated with those of Schlumberger as of July 1, 1979.

Net income in the fourth quarter was $196 million, 42 percent ahead of the $137 million earned in the same quarter the year before. Earnings per share were $1.54 compared with $1.08. Revenue was $1.1 billion, a 52 percent increase over the last quarter of 1978.

Jean Riboud, Chairman, stated that all groups of Schlumberger had higher revenue and net income. He noted that the oilfield service operations—both Wireline and Drilling & Production—were substantially higher. Strong gains throughout the Eastern Hemisphere and South America more than offset the decline in Iran oilfield activity. The sharp upturn of the U.S. drilling activity in the second half of the year also helped Schlumberger oilfield services to record the best year ever.

Measurement, Control & Components groups—Fairchild and Sangamo Weston in the U.S., Measurement & Control–Europe—had improved results. Demand for every type of semiconductor continued strong through year end.

MOS INTRODUCES UNIVERSAL COMMUNICATIONS PROTOCOL CIRCUIT

The MOS Products Division has introduced a general purpose MOS/LSI communications protocol controller circuit designed to provide a low-cost method of achieving compatibility between most line control protocols used in data communications terminals, controllers and computers.

The new device, the F6856, provides both bit and byte oriented protocol capability, including complete Bisync protocol processing on the chip.

Four 16-bit addressable registers within the F6856 can be programmed by users to specify the desired protocol as well as options within that protocol. The device then performs the bulk of the required processing. Contents of these registers can be altered on-line to change protocols, thus achieving compatibility between different protocols as well as a high degree of universality. The F6856 can interface with most microprocessors, microcomputers and minicomputers with either 8 or 16-bit data buses.

A PROFIT SHARING ANNOUNCEMENT FROM FAIRCHILD'S PRESIDENT

Tom Roberts

1979 has been a year of improvement for Fairchild, a year of progress made by Fairchild people in all parts of the company, in many places throughout the world.

In Semiconductors, revenue increased 28% and the backlog of orders at the end of 1979 was 65% higher than the previous year. Good progress was made in Bipolar and Digital; market share increased and product lines were strengthened by the introduction of new devices. In other divisions, initial steps were made to improve Fairchild's competitive position for the future.

Test Systems revenue grew 72% and represented close to 20% of total Fairchild sales. Orders were good in all product lines and the backlog increased, although demand for component testers softened in the last quarter. New general purpose and memory testers were successfully launched in early 1979, and Membrain functional board testers were introduced into the United States near the end of the year.

Capital investments were $73 million—more than twice the 1978 level. Four inch wafer fabrication lines were installed at Digital and Linear, and work began to transfer Bipolar to new four inch facilities at South San Jose. By year end, a new assembly plant had begun operations at Cebu, in the Philippines. At Test Systems, new manufacturing facilities were added in Florida and New York, as well as in California.

The achievements of 1979 are both real and important, the combined effort of many people and the result of hard work during the past twelve months. But these achievements are best viewed in the perspective of the future—as a beginning, a base on which to build. For although Fairchild improved in 1979, its competition improved also—and there were many problems at Fairchild yet to be solved at year end.

1980 is the year when we must focus on these problems and begin to solve them. It is a year when we must begin to increase our effort in research and development, to improve the equality and efficiency of manufacturing, and to re-emphasize the importance of customer service. 1980 is a year when we must extend our leadership in test systems; it is the beginning of a decade when Fairchild must regain a leadership position in the semiconductor industry—a leadership in technology, in quality and in profitability.

The commitment and the resources of Schlumberger will help in that effort, but the effort can only be made by Fairchild, by its people. In the past weeks, I have begun to discuss that effort—the problems and the opportunities—with many of you. In California and London, in Seoul and Jakarta, I have met with Fairchild people—and I know that the effort will be made and that Fairchild will succeed.

I am pleased to announce the contribution of $7.7 million to the Fairchild employees' profit sharing plan fund for the year 1979. This contribution represents approximately 7.3% of each participant's salary to a maximum of $25,000.*

Thomas C. Roberts
President and Chief Executive Officer

**Complete details of the profit sharing contribution, including eligibility requirements, are available from the compensation and benefits office at your location.*

Editor's Note:

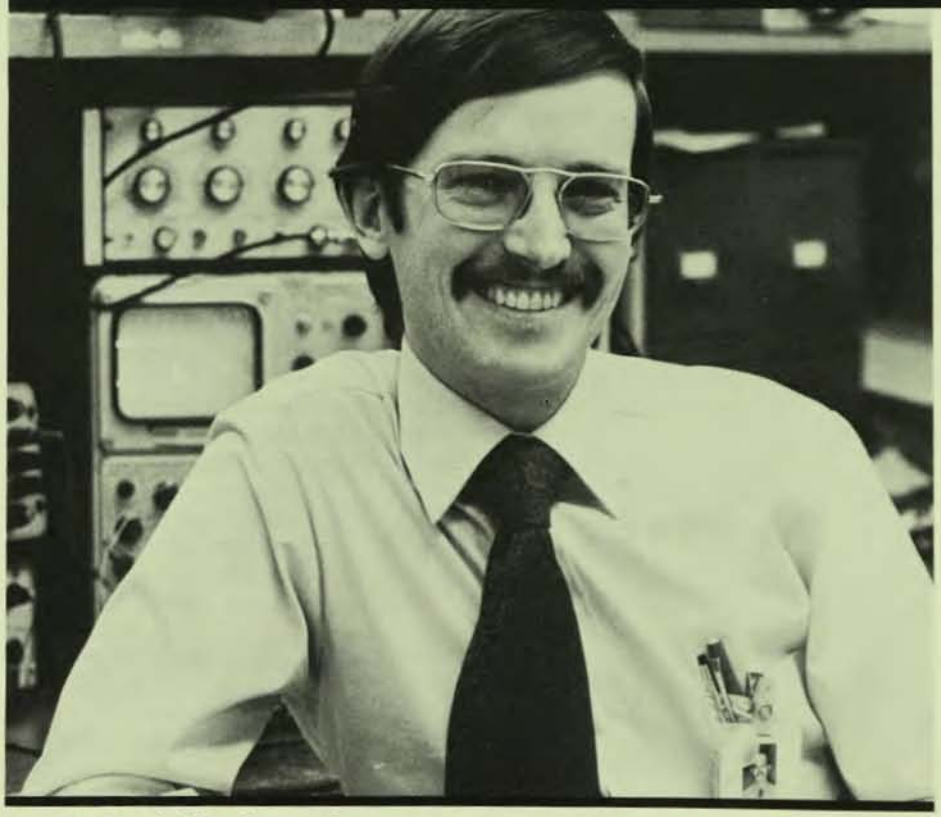
Tom Roberts was named President and Chief Executive Officer of Fairchild last November 7. He had previously been General Manager of Schlumberger Limited's Measurement and Control operations in the United Kingdom. In July, 1978, he was promoted to Vice President and Chief Financial Officer of Schlumberger. With his appointment at Fairchild, he was also elected an Executive Vice President of the corporation.

Tom is a 1964 graduate of West Point. He joined Schlumberger in 1969 from IBM Corporation.

New ideas and the products that result from them are the stock in trade of a high technology company. Last year, thanks to a lot of mental muscle and some elbow grease, Fairchild people developed hundreds of new ways to use electronics better.

Examples of their inventiveness are everywhere. Here, some Fairchild engineers recount their work on two key products that came to market in 1979.

Steve Goodspeed
Design Engineering Manager
Digital Division



FAST—Fairchild Advanced Schottky TTL

"Memories were getting so fast that a computer's performance was being limited by its logic parts. FAST is a solution to that problem."

To find that solution, Steve and design teams at South Portland, Maine and Digital's design center in Bristol, England, created FAST. This family of complex digital logic products offers speeds better than standard Schottky technology but with power consumption close to that of low power Schottky (LPS). (Schottky is a type of transistor-transistor logic circuit where special diodes built into each transistor enable faster turn-off times, increasing the circuit's speed.)

Introduced in mid-1978, with shipments beginning last year, the FAST family of integrated circuits employs Fairchild's proprietary high speed Isoplanar technology. Nearly 60 of the 80 planned FAST circuits have already been designed, with 20 of them in production on South Portland's new four-inch fab line.

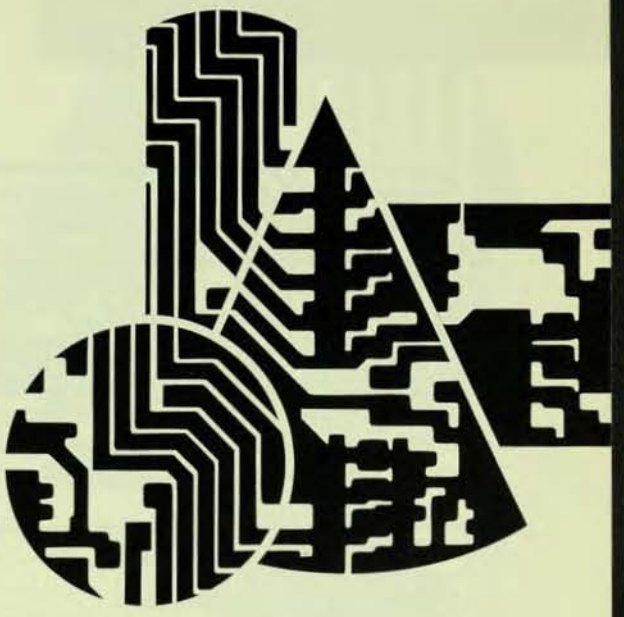
"We began to see the need for these products about three years ago," Steve says. "Before that, a system's performance was often limited by memory access times. Advances in the bipolar memory area increased those speeds significantly, but TTL-compatible logic wasn't keeping up.

"Standard Schottky logic circuits, with power consumption of up to 20 milliwatts (vs. 2 mw for LPS and 4 mw for FAST), was a sort of 'brute force' approach to making a faster part. Design engineers who wanted TTL compatibility in their electronic data processing equipment would use standard Schottky only when there wasn't any other way to get the speed they needed. LPS doesn't dissipate much power, but doesn't provide the necessary speed.

"So, two years ago, we set out to hit the middle ground—to make a logic part faster than anyone else's TTL (transistor -transistor logic) products, but with a reasonable die size and power use."

Since the introduction of the FAST line, Steve's been talking to a lot of new customers, including people from the military and telecommunications companies who typically haven't been big users of Fairchild Schottky.

"FAST has given us visibility as an innovator in the logic area," Steve says. "When you can build something that has better performance than anything else currently on the market, both new and old customers get very interested!"



Sukkin Fong
Manager, ECL Process
Bipolar LSI Division

Isoplanar S

One micron—one-thousandth of a millimeter—is an area too small for most of us to even imagine. But Sukkin and the 10 engineers and technicians developing newer, faster ECL (emitter coupled logic) circuits think about it a lot.

Developing fine-line geometry devices with dimensions down to one micron was the goal Sukkin and her group had in early 1979 when they set out to improve the performance of high-speed ECL logic circuits. They accomplished it by "shrinking" the devices through use of Bipolar's newly-developed Isoplanar S processes.

The Isoplanar process has been in use at Fairchild since the early 1970s, when it was introduced as a way to improve device speed. Evolving since then have been Isoplanar II, used to produce ECL logic, and I^3L,™ or Isoplanar Integrated Injection Logic, which is used on microprocessors and low-power TTL logic.

Isoplanar S is a step beyond Isoplanar II. It means finer geometries, smaller die size, higher packing density and superior performance. Using the most advanced step and repeat cameras available, which expose only a small section of a wafer at one time, fine-line geometry devices became reality.

"For the customer, this means we can make a part that is the same chip size as one in use now, but with more capability," Sukkin explains. "Our first ECL circuit using Isoplanar S is a gate array being developed for high-speed mainframe computer manufacturers. Design work began on that early last year, and we got our first good die just before Christmas. The speeds were slightly faster than we anticipated—as fast as 300 picoseconds per gate delay. It was a busy—sometimes—frustrating year.

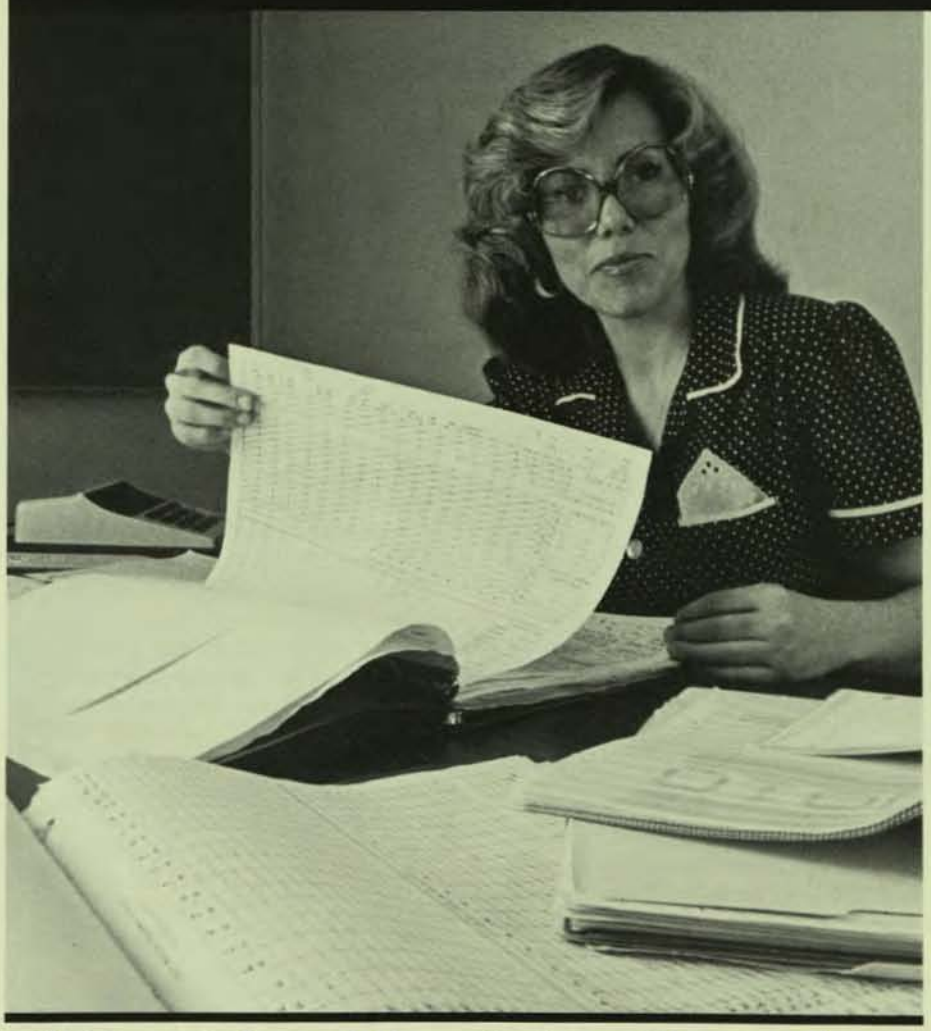
"Our first problem was learning to work with these very tight geometries. In fact, we discovered that our first design layout was too difficult to make—after several months of experiments. We had to change the design rules for several mask layers after our initial run, and the revised set of masks yielded our first good parts. These problems are pretty normal, but that didn't make things any easier at the time!"

Now that the new super-fast gate array is being designed into advanced computers, Sukkin said the effort was worth it. "We made it, after a lot of struggles. And I don't think anyone commercially has made a faster bipolar device than ours."

Fairchild people grew last year, too—in their professional and personal lives, as well as in numbers. At every level in the company, employees earned promotions that helped them reap increased rewards and fulfill ambitions. The company received the benefits of the challenges they accepted.

In California, employees can take advantage of the Job Opportunity and Career Opportunity Systems (JOS/COS). Other locations offer different programs. But wherever it is earned, a promotion is an exciting, gratifying experience. These Fairchild people share their feelings on advances they made last year.

Maria Torres
Production Planner
Manufacturing Services Division



Maria is on a sturdy career ladder that has carefully measured steps. She can't see the top rung yet, but it's obvious that she's sure of her direction—up. "Anyone can dream about becoming a company president," Maria says, "but you must also have an image of your next step. If you can't see it, you'll never get there."

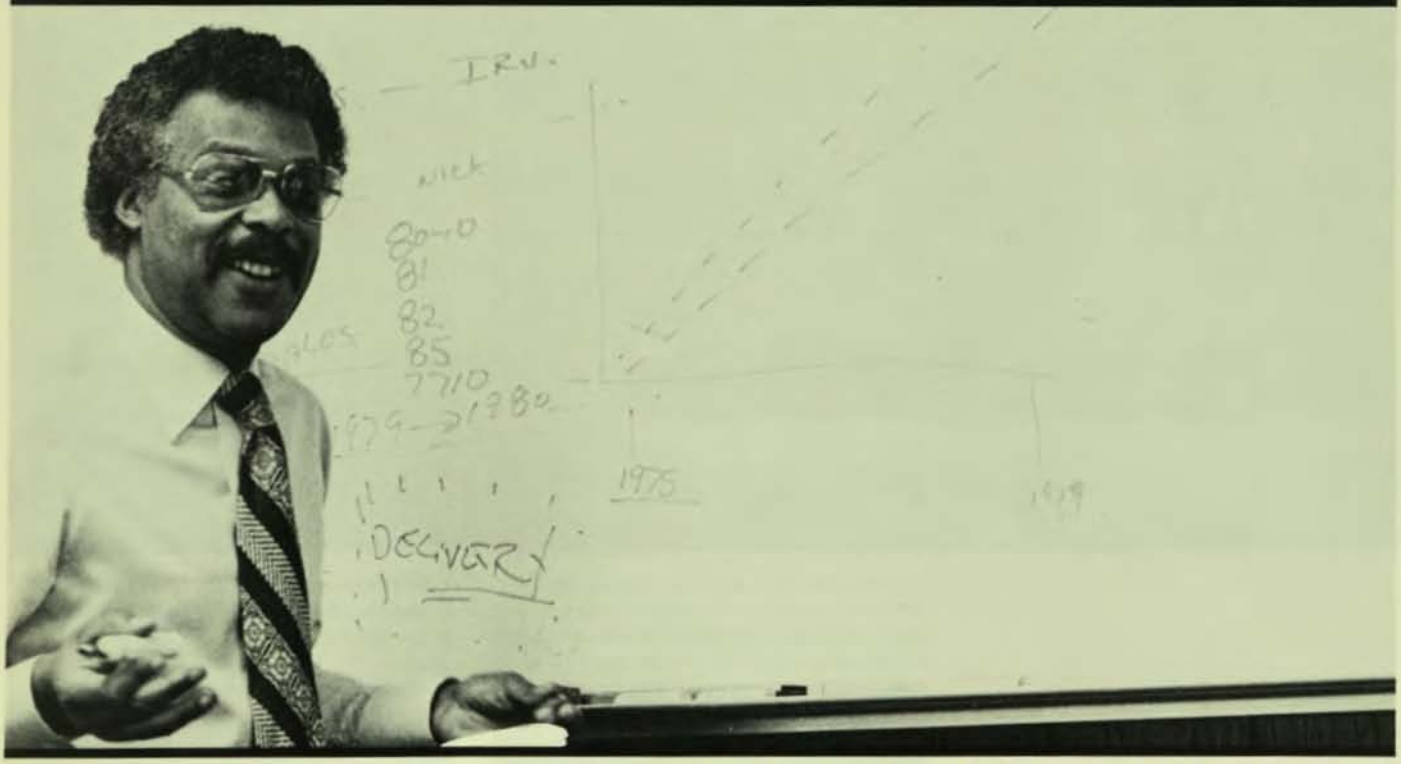
Since 1976 Maria has won two promotions through JOS/COS in Mountain View. She started as a Senior Clerk in Personnel, where occasionally she worked on the JOS desk. When she spotted a request for a Business Planner, Maria asked for an interview and eventually got the job.

"In an interview you swim for yourself. I didn't have any experience in production control, but I did have a good business background. Under the requirements listed for the job, that was all I needed to get an interview. From there it was up to me."

Last September Maria moved up to Production Planner, an exempt position that was listed on the COS bulletin board. She's responsible for planning, procurement and distribution of piece parts to Fairchild's assembly plants overseas.

"It's a tremendous challenge. The key is to react immediately to various divisions' needs. I like my position and the responsibility of planning and making decisions," Maria says. "I believe I've made some progress. When I started as a Business Planner I didn't even know what a device was. People talked about wafers and I thought about pancakes. The strangeness is nearly gone, and I have goals for the future. But my first priority is to become more familiar with the job I'm doing now before I take my next step up."

Harold Johnson
Product Sales Manager
Xincom Division



Growth, reorganization and a successful record over four years helped bring opportunity to Harold and the Xincom Division. Xincom, located in Chatsworth, Ca., doubled its sales last year, added numerous new people, and began moving to larger quarters. Harold was promoted to Product Sales Manager, a position in which he provides technical support to sales.

"I'd been a Product Sales Engineer since 1976," Harold said, "and I was ready to move into management. The position is meeting a real need and it challenges me. I'm motivated because I now have the opportunity to set goals and accomplish them. And let's face it, having a challenge is a prime consideration. None of us crawl out of bed in the morning because we can't find anything better to do."

Although Harold's day-to-day work is mostly administrative, he works closely with four product sales engineers and still draws on his technical background. "The biggest change has been in my understanding of the business side of a sale. I spend a lot of time considering the factors that will help Xincom grow most effectively. What will a sale return to the company? Will a special order increase the likelihood of future orders? What resources will be tied up by a particular sale? I spend a lot of time explaining these aspects to my product engineers.

"Working in an expanding division is exciting and frustrating at the same time. We see new possibilities as the division grows, but we're also constantly playing catch-up with resources and structure."

Press reports throughout the electronics industry last year repeatedly focused on the "capacity crunch" hitting semiconductor companies—there wasn't enough manufacturing space to meet the big demand for microelectronic products and related systems.

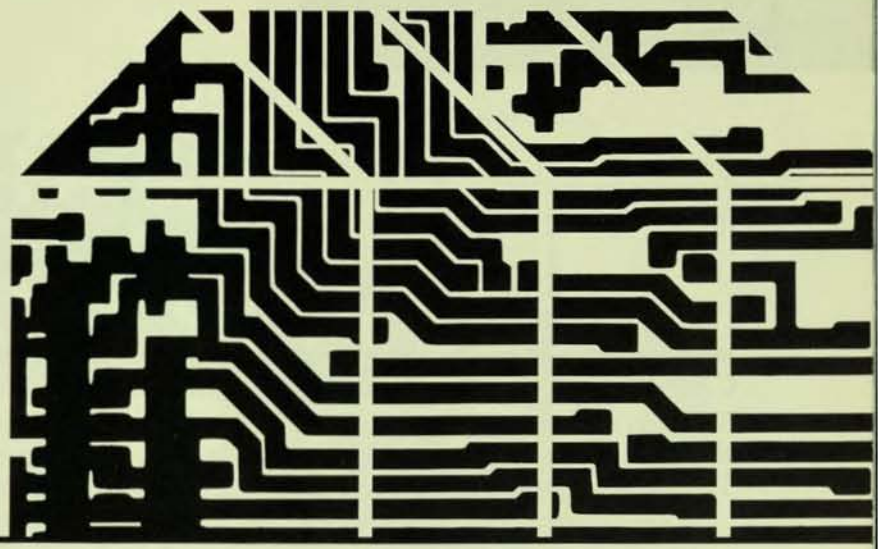
We felt the crunch at Fairchild, in addition to the normal growing pains of an expanding company. Here are some photographic highlights of additions completed or begun last year to help ease the squeeze.

Headquarters for the Subassembly Test Systems Division in Latham, N.Y.

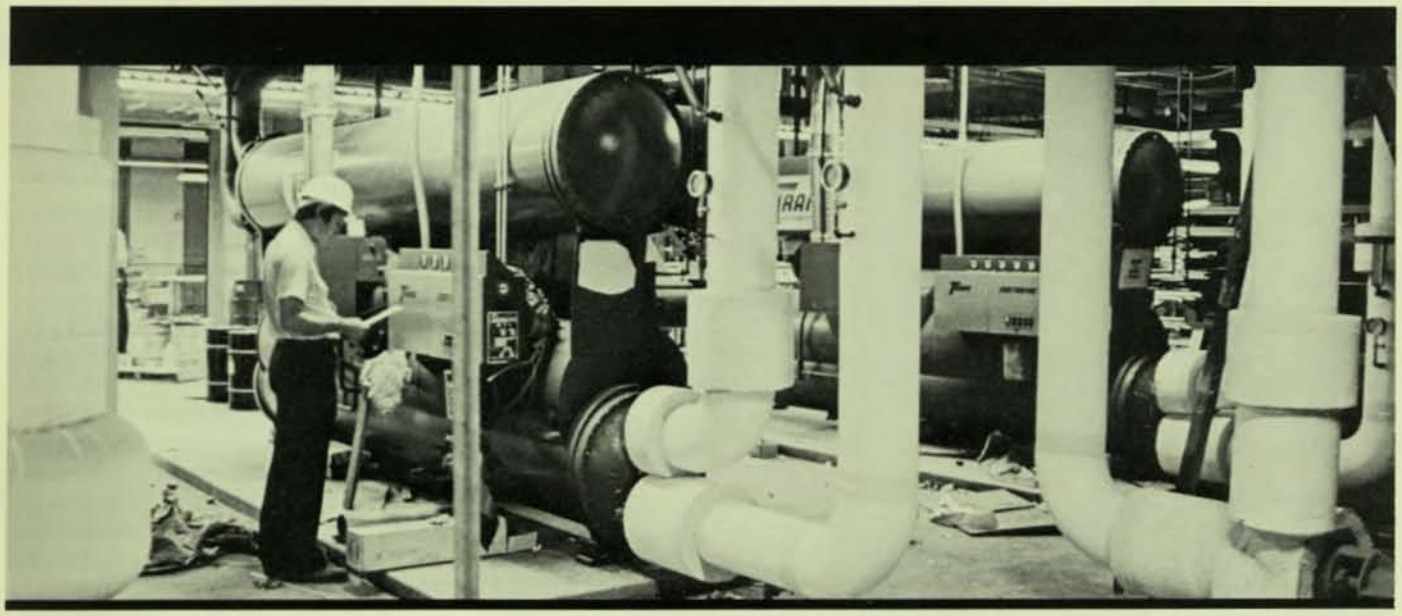
Xincom moved some operations into leased space in this building in Canoga Park, Ca.

A new four-inch fab—shown in the early stages of construction—was a significant expansion for the Linear Division.

The Wappingers Falls, N.Y. MOS Division plant doubled its capacity with a conversion to four-inch wafer fab last year.



Bipolar LSI Division began operations early in 1980 in additional facilities at South San Jose, Ca.



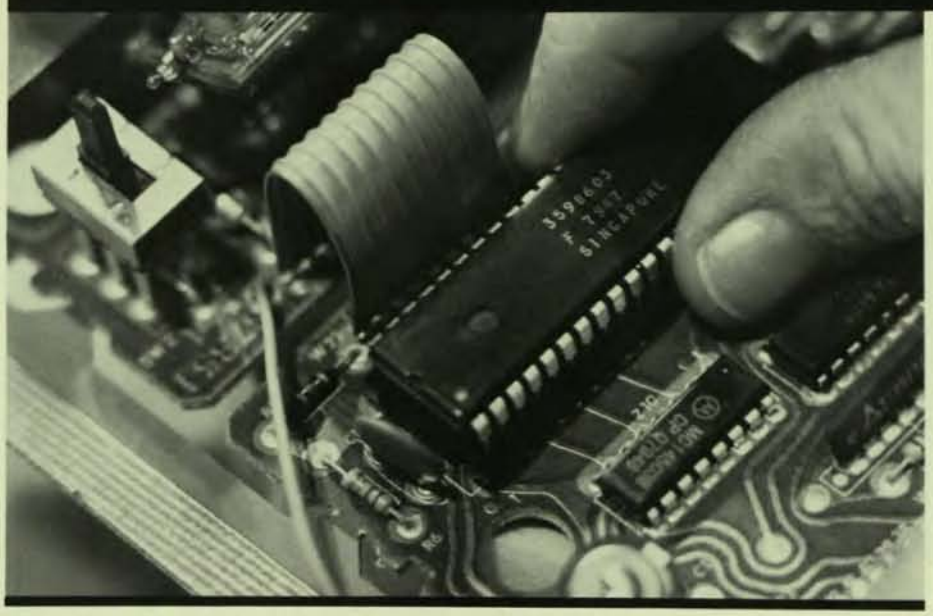
Digital Division's plant at South Portland, Maine, added this four-inch line, which gave SPOR one of the company's most advanced fabs.

Set for completion this spring is Fairchild's first plant in the Philippines.

CAR TREK

This isn't science fiction. Cars with electronic "smarts" can compute mileage, warn of breakdowns and someday even help avoid crashes. They are being brought to you by GM, Ford and Chrysler.

Fairchild products are key parts of systems from all the Big 3 U.S. automakers.



It's coming. One day, not too far away, you'll be able to get into your car, press some buttons, and close your eyes for a nap. When you arrive at your destination, the car will stop and the door will open.

Far-fetched? Not at all, according to experts at the Big 3 U.S. automakers. Advanced electronic components and LSI circuits will make it possible. Where a car's use of electronics ten years ago was mostly limited to parts in the radio, today's automobile comes equipped with everything from an electronic ignition to a microprocessor-based system that lets you open the door without a key.

And the implications for the semiconductor industry are enormous. While the automotive industry spent about $400 million last year on semiconductor products, the industry's tab for the 1984 model year will be about $1.2 billion. Government fuel economy and emission regulations, coupled with the consumer's rising attraction to electronic automobile options, have put the automobile companies on one of the steepest new-product acquisition curves in their history.

Ten years ago, electronics in the average U.S. car consisted of transistors in the radio. Today, components and circuits in engine control systems, dashboard message centers, trip computers and electronic ignition modules run the value of electronics to about $100 per car.

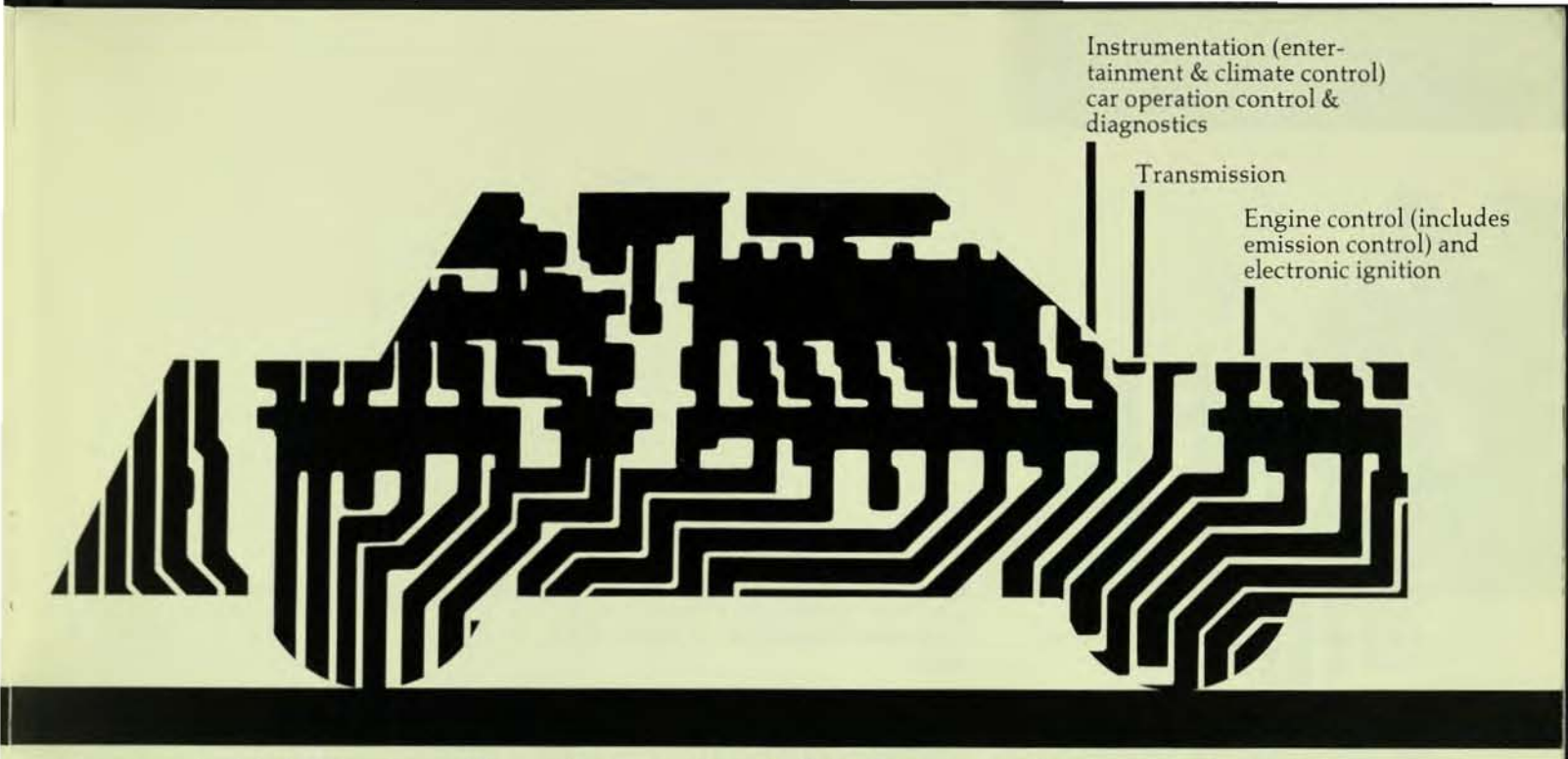
At Fairchild, this exploding market has meant an equally steep ramp to meet the automakers' proction needs. Fairchild products including microprocessors, memory circuits, integrated circuits and discrete devices designed to make cars "smarter" and more efficient are being installed in vehicles of all three major carmakers, plus several European manufacturers.

"Electronic functions in cars today fall into four major categories—engine controls, power distribution systems including ignition modules, instrument panel and dashboard displays and vehicle control systems. All three major U.S. carmakers offer some version of the first three and are working on the fourth," according to Sid Bagwe, Worldwide Automotive Marketing Manager.

"Government regulations in the early 1970s mandating specific fleet fuel economy averages and emission standards were the catalyst that got the auto industry into large scale use of electronics.

"Electronic ignition modules had been introduced prior to this, and the industry was doing some other exploratory work, but on a small scale compared to today.

Electronic emission and engine control systems were the obvious answer to meet the government requirements, and once such things as microprocessors were introduced into car manufacturing, the compa-



nies recognized that electronics could increase the capabilities and market attractiveness of their products."

The electronic ignition improves fuel economy by replacing mechanical parts, such as points, that frequently wear out and cause more fuel to burn. Fairchild's Automotive Division has been producing electronic ignition modules for the automotive industry for the past six years, and is a world leader in the production of the High Energy Ignition (HEI) module. HEI modules are used by major manufacturers in both the U.S. and Europe.

Meeting government-required pollutant emission levels and corporate average fuel economy (CAFE) standards of 20 miles to the gallon in the current model year and 27.5 mpg by 1985 has been made possible by development of engine control systems such as GM's C-4 system. This year, all GM cars sold in California come equipped with the C-4, a computer-controlled catalytic converter which regulates emissions and provides an on-board diagnostic system which can alert the driver if repairs are needed. With the 1981 model year, all GM cars, except diesels sold in the U.S., will have a similar system. At the center of the sophisticated C-4 system is a Fairchild-produced 6800 microprocessor. Performing other functions in the C-4 system are Fairchild ROM circuits, a-to-d converters and discrete devices.

Systems such as the C-4 reduce emissions of the three main pollutants from cars—nitrogen oxide, hydrocarbons and carbon monoxide—by continuously computing the fuel-air mixture that will provide enough operating power with low enough emissions to meet standards.

Paradoxically, the more air and less fuel in the air/fuel mixture, the fewer the hydrocarbons and carbon monoxide released into the air. But a richer fuel mixture (of more fuel and less air) is required to limit nitrogen oxide emissions.

Only at the air/fuel mixture of 14.7 parts air to 1 part fuel are the emission standards for all three pollutants met while still providing enough operating power for the car. Use of a microprocessor is the only way to continuously maintain this mixture under all conditions—from sea level to the mountains, from desert heat to snow storms.

While some fuel economy and performance has been sacrificed in the past to achieve lowered emissions, U.S. carmakers now feel the systems available will reverse that. According to both GM and Chrysler, the engine control systems installed on their 1980 and 1981 model cars will reduce emissions plus improve fuel economy and "driveability" for the first time.

Creation of the electronic instrument panel is the second major expansion for automotive electronics. At Ford, for example, the 1980 Continental Mark VI and Lincoln Continental offer an electronic instrument cluster, including a message center which tells you the time, can compute and display your miles per gallon and provides warning messages for such functions as door-ajar, oil pressure, and headlamp-out. Message center operations are directed by a 6800 microprocessor, supplied by Fairchild. Other Fairchild components and circuits performing in the system include diodes, transistors, op amps and regulators.

Ford also offers a micro-processor-based keyless door-lock option which allows a driver to open the door by punching a five-digit code on numbered buttons underneath the driver's-side window. Besides providing the obvious convenience, the option is expected to reduce car theft.

A 3870 microprocessor from Fairchild is found in the trip computer developed two years ago by Chrysler for use on two cars sold in France. The system, which has a built-in clock, features a fuel flow meter that computes and displays critical measurements including fuel efficiency in miles per gallon.

In a year of extreme semiconductor shortages, the logistics of locating and obtaining the huge number of

Final checkout of trip computers at Chrysler's Huntsville Electronics Division.

Electronic engine control system production at General Motors' Milwaukee plant.

parts needed meant long hours, dozens of plane trips and planning, planning, planning for automotive industry purchasing people.

General Motors, for instance, will jump from a consumption of 28 million integrated circuits in the 1979 model year to 188 million in the 1981 model year (MY). They used 70 million diodes in MY 1978, and 328 million in MY 1981. Delco Electronics estimates that GM will use 56 percent of all the 8K PROM circuits produced by the entire U.S. semiconductor industry in MY 1981.

"Setting up the network to qualify vendors and get the parts in the quantity and quality we needed took about two years," says Dr. Bob Costello, Director of Purchasing for Delco Electronics. "We looked for large companies with broad product lines—we wanted to work with companies that had a lot of resources, engineering talent, large production capacity and a strong managlement team. Out of that group, we chose vendors willing to commit the resources necessary to meet GM's needs."

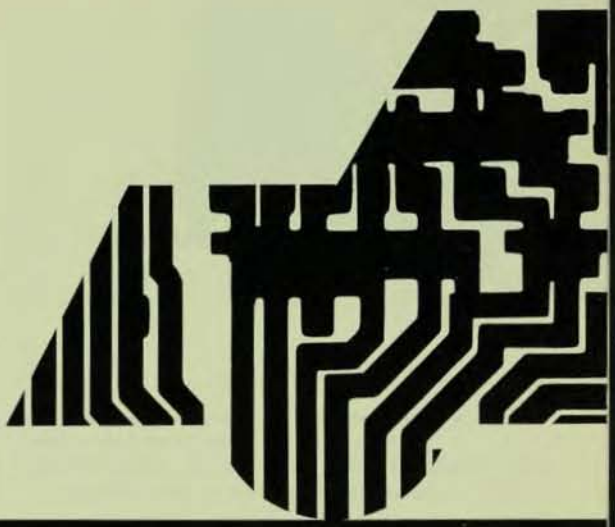
During vendor selection, GM purchasing and engineering people spent time visiting major facilities of most of the major U.S. semiconductor manufacturers, as well as some in Japan. The familiarity they developed with each company's capacity helped them realistically project parts availability.

"With the 1981 model year, there will be an on-board microprocessor on every GM gasoline-powered car," Bob says. "Once it is there, it can be used for at least half a dozen other functions not currently mpu-linked. It's easy to see applications for the microprocessor doubling in ten years. With this future in mind, we consider our relationship with the semiconductor industry of vital importance."

Electronic parts installed in today's cars must perform under temperature extremes running from −40°F to +185°F, and up to +250°F under the hood. According to Sid Bagwe, these requirements mean automotive parts must meet, often exceed, the specifications of military hi-reliability parts.

"Our job is often harder than if we were building military parts, because obvious cost restrictions on cars mean we can't build in the backup systems military and aerospace have. There's no room for system redundancy."

Jerry Rivard, Chief Engineer for Ford's Electrical and Electronics Division, stresses the importance of quality. "Reliability and quality assurance have been the biggest challenge for the semiconductor manufacturers working with us. They have not traditionally had to face large-scale production of circuitry meeting military-type specs. These products must perform under stress of heat, cold, vibration and shock, for the life of the warranty, and yet must be made at low cost.



Fairchild's Sentry automatic semiconductor test system evaluates parts at Ford's facility in Lansdale, Pa.

"With the rapidly increasing use of electronics in Ford vehicles, we must depend on this quality a great deal. In our entertainment products, for example, we can have up to 1000 components—a high level of reliability for the customer on the road is essential to us."

Carmakers are designing systems to achieve reliability, and Fairchild's automatic test equipment is helping to ensure it. Ford has Sentry and Sentinel systems operating in Dearborn, Mich. and Lansdale, Pa.

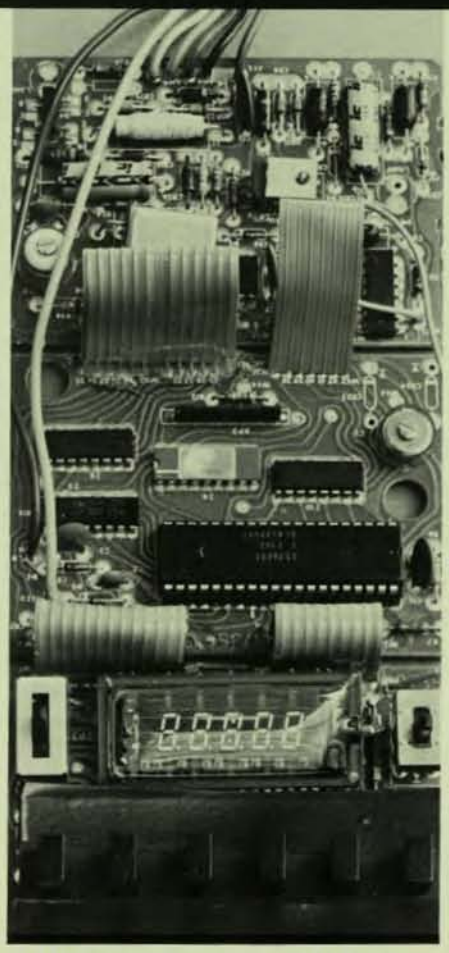
Ford indicates that this emphasis on reliability is bound to increase, since today's car buyer wants more electronics features. "Not only do people accept the new electronic systems, they're demanding more," Jerry says. "Actually, we underestimated the demand. We've gotten used to electronic watches, microwave ovens —these things have become accepted in our daily lives. So, our customers find it only natural to have it in their automobiles, too—they want to be part of the electronics evolution."

John Webster, Manager of Engine Controls for Chrysler's Huntsville, Ala., Electronics Division, cites the advantages of electronics to the customer. "Trip computers give precise data on fuel economy, and engine control systems such as Chrysler's Spark Control Computer improve it. Electronic dash panel trip computers give information on how the car is behaving, and we are now developing onboard self-diagnosis systems which will increase the accuracy of repair and lessen the inconvenience to the motorist.

"Vehicle control systems, including collision avoidance and radar-directed braking, are farther off. Right now, the industry is wrestling with the phenomenon of 'false targeting,' in which a collision avoidance system might sight on a metal signpost and think it was a car, stopping your car unnecessarily. But, this system will be perfected eventually. All these systems will make the car more efficient and make automobile travel more pleasant and convenient."

Breakdowns are definitely inconvenient to all drivers. Increased use of electronics—particularly in ignition modules and engine controls, which govern starting and running the car—mean parts failure can make the car inoperable. To avoid this, systems from all the Big 3 automakers include a "limp-home" feature, which enables a car with a system failure to be driven to a garage.

Chrysler's trip computer, based on a Fairchild 3870 microprocessor, computes key measurements including fuel efficiency.



Vehicle maintenance will also drastically change as more and more cars have black boxes instead of mechanical parts. For some U.S. car lines, these electronic systems may put the Saturday home mechanic out of commission, and may also mean the neighborhood garage must invest in expensive new diagnostic equipment to stay in the repair business.

At Ford's plant outside Toronto, Canada, an electronic instrument cluster with a message center is packed for shipment.

"Microprocessors mean we will soon be able to keep diagnostic histories on our cars, just as our doctors keep medical histories on us," Sid says. "On-board diagnostic systems will alert a driver to take his car to have a specific system checked. The serviceman will hook up the car to electronic diagnostic equipment, which will tell him what is wrong and refer him to a specific section of the repair manual for instructions on how to fix the problem. The garage or dealer will have a record of all repairs made and the owner can keep a copy.

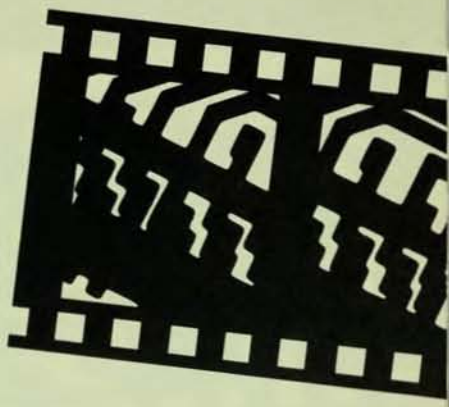
"These printouts will also show an owner what needs to be repaired. Estimates are that 82 cents of every dollar is wasted on car repairs because mechanics often repair more than necessary.

"Obviously, this means people will no longer be able to repair their cars with screwdrivers. To offer the sophisticated repair service needed for today's cars, the dealers and garages will have to install expensive computerized diagnostic equipment. The automakers realize this, and are working with their dealers and independent garages to develop the equipment and provide necessary training."

One of the systems created to meet these more sophisticated repair needs is Chrysler's Electronic Engine Performance Analyzer (EEPA), which can test hundreds of electronic functions on a car in about 15 minutes. The EEPA system being built for dealers is based on a 6800 microprocessor and evolved from equipment Chrysler developed for final car checkout. By clamping current probes over primary cables, the system automatically tests the electrical system of the car, providing a readout of instructions for the mechanic and a copy for the car owner.

"All this change is happening so fast that it is making both the manufacturer and the consumer a little nervous," Sid comments. "Ten years ago, when television makers started putting solid state electronics into the sets instead of a lot of tubes, people were also skeptical. There's always a confidence-building period.

"But it would be impossible to meet government and consumer demands without electronics. In the next 10 years, in fact, we'll probably have a workable electric car. It seems that almost anything is possible."



The man in the old movie sang he was "Goin' Hollywood." Those people who brought you *Buck Rogers* are making today's movies go electronic.

Special effects engineers Bud Elam, right, and George Brennan, left, install part of their automated camera system at Universal-Hartland.

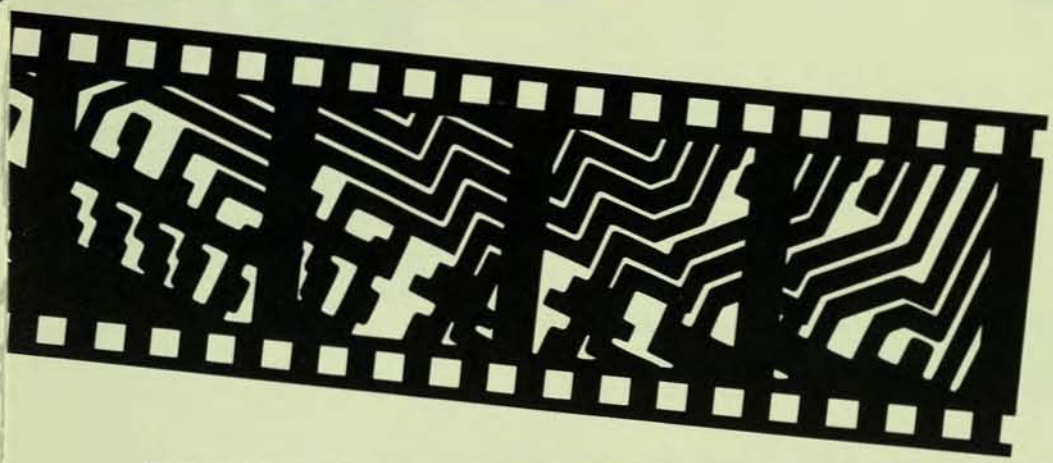
At the California State Polytechnic University, Walt Disney Productions is interviewing for electrical engineers, right along with Fairchild. At Universal Studios, famous for its tour that draws thousands of visitors to Hollywood every year, science fiction is being produced with technology developed by real science.

Using some of Fairchild's FAST™ (Fairchild Advanced Schottky Technology) and low power schottky devices, special effects engineers are taking some of the drudgery out of creating futuristic magic.

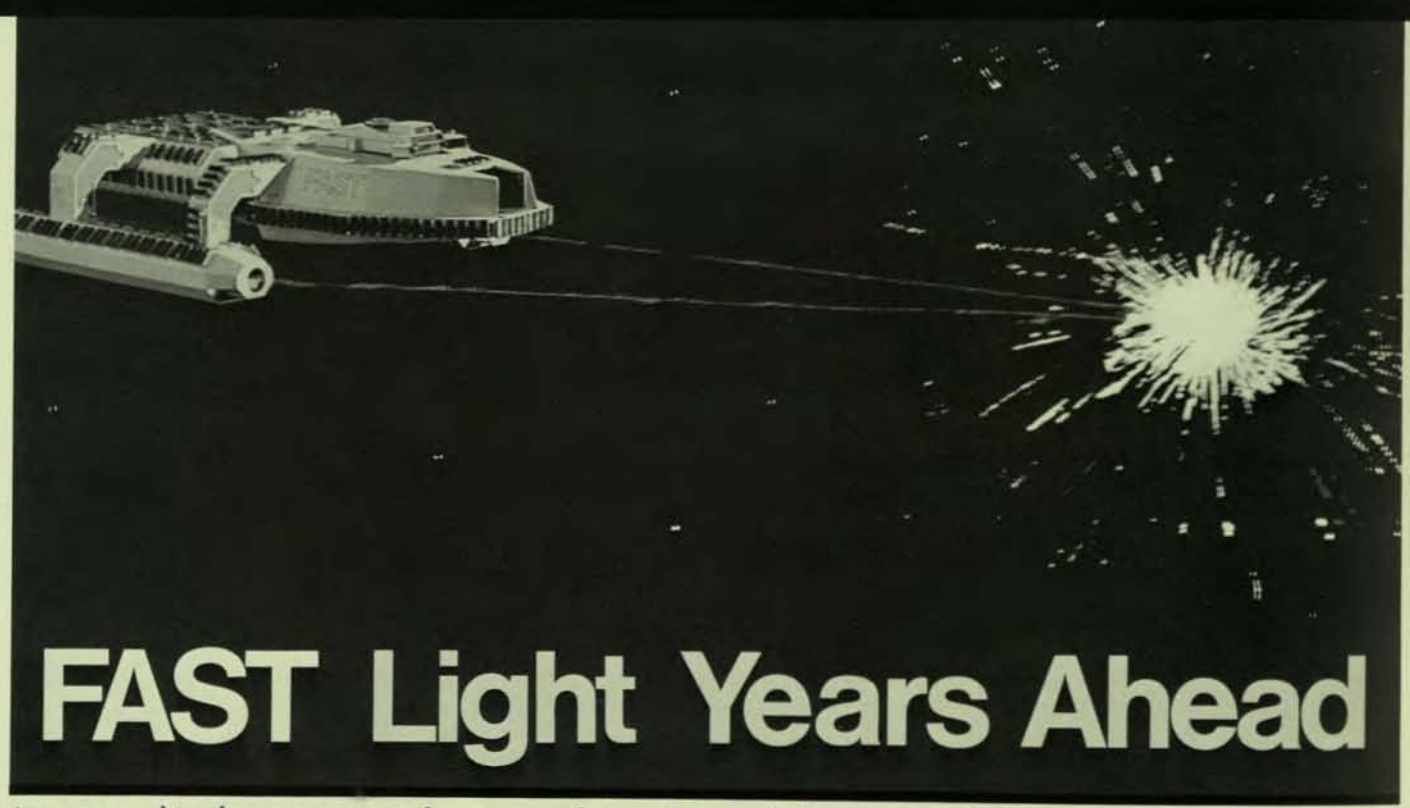
One of Universal's most successful TV shows this season has been *Buck Rogers*—a revival of a series that once made kids at the Saturday matinee marvel at the then-unreachable world of outer space. *Buck Rogers* and a TV movie based on last season's *Battlestar Galactica* have showcased the talented people in Universal's special effects department.

When Buck fights it out with another spaceship, the zaps of light flying back and forth, mixed with occasional explosions of enemy craft, come courtesy of days of camera and optical work.

A simple spaceship-in-flight shot, taking six seconds on the screen, takes at least two days of shooting and "film-sandwiching." This is a process in which shots of a spaceship model in different posi-



FAST advertising got a rocket boost from this poster, produced by Universal's special effects department.



FAST Light Years Ahead

tions are combined onto one piece of film to simulate movement in flight.

"The battle scene at the end of Star Wars, which took only a few minutes on the screen, probably took Twentieth Century-Fox at least a month to put together," says Bud Elam, Director of Engineering at Universal-Hartland, a facility in North Hollywood where the special effects department is housed.

"This is because the methods traditionally used in the movie industry are very time-consuming, a lot of painstaking repetition of camera shots and manual alignment of film images to very tight tolerances. These take a lot of time—and cost a lot of money. But the computerized systems we're developing will help change that."

Here's how a typical special effects sequence is done: A small plastic and epoxy model of Buck Rogers' spacecraft is built in the Universal-Hartland model shop. Then, cameramen mount it on a rotating metal pole, which can move the model in several directions. Shots are then taken with the camera moving towards the model, away from it, and with the model moving up, down, and sideways. This sequence is first shot against a black background, then repeated against white and blue, to allow for flexibility in assembling the final scene.

Later these pieces of film will go to the optical shop, where they will be sandwiched together to show a spacecraft moving through space. Therefore, they must be exactly in focus and shot at the same camera light and shutter speed settings. This forces the cameramen to shoot each

Cameraman Bob Bailey programs in a series of shots of a Buck Rogers *spaceship model, rear left.*

of dozens of separate shots at a slow one frame per second.

After the camera work, special lighting effects (fire from rockets and laser guns, for example) and animation are also added. When shown on TV, the film is speeded up to television's standard 24 frames per second, which simulates flight movement. All this effort adds up to only 6-10 seconds on the screen.

To relieve the resulting eyestrain, headaches and boredom, Bud and two associates have built computerized control systems for the television camera and the special effects animation stand.

Using a CRT display unit connected to a microprocessor-based controller, cameramen and technicians can set up a series of shots once, put them in memory, and they will repeat automatically. "Because these images must be superimposed on each other, the repeatibility of each shot must be exact," Bud explains. "In the past, the cameraman had to attempt this by moving a lot of dials and settings on the camera each time, which was very difficult. Our system simplifies and speeds up this process by giving this job to the computer.

It also gives the cameraman a chance to use creativity. If he wants to change part of a shot, or experiment with a new idea, he can easily do it without messing up what he's already done. There are a lot of techniques which can produce spectacular effects, but people don't do them because the present equipment is so cumbersome to work with."

Mike Hollabaugh, Advanced Products Planning Manager for the Digital Division, first supplied Bud with some FAST and low power schottky logic circuits early in 1979. "The movies haven't been big users of electronics before, but special effects production is getting prohibitively expensive—I've heard estimates up to $10,000 a minute for battle scenes a la Star Wars. Automated systems could get very popular."

It's certainly become popular at Universal. "At first, not too many people understood what we were trying to do," Bud recalls. "After we got the systems working, everyone wanted them yesterday. Now, someone always has to be on standby in case the computer breaks."

Bill Bryan developed software for both the camera and animation stand automated systems.

Here, Bill adjusts settings for the animation stand camera, top, before setting up animation of lasers, bottom.

ALPHABET SOUP

Frustrated with your daily diet of alphabet soup? In this business, even the veterans occasionally scratch their heads at the acronyms that come floating by. Save this guide for the next time you need to strain a little meaning out of all that soup.

A to D (D to A) converter: analog to digital (digital to analog) converter. Analog systems product signals that vary continuously over a range; digital systems handle information in steps or two states, such as high/low or on/off.

AFIT™: Automatic Fault Isolation Testing. The SATS group manufactures a line of AFIT systems that isolate faulty components or bonds on PCBs in both field and production environments.

ATE: automatic test equipment. Electronic systems for testing semiconductor devices that range from a portable "suitcase" field service tester for PCBs to general purpose systems for the most complex devices in R&D labs.

CCD: charge-coupled device. CCDs use a technique in which information is stored and transported by means of minute packets of electrical charges as opposed to varying amounts of current flow or voltage levels.

CMOS: complementary metal-oxide-semiconductor. A MOS device which incorporates both positive-channel and negative-channel structures within the same silicon substrate. It is noted for low power requirements and high immunity to electrical noise.

CPU: central processing unit. The section of a computer system that controls the interpretation and execution of instructions.

DTL: diode-transistor logic. A type of integrated circuit structure in which diodes perform the logic function and are coupled to transistors for amplification. Largely replaced by higher speed TTL.

ECL: emitter-coupled logic. A type of integrated circuit structure noted for extremely high speed operation.

EPROM: erasable programmable read only memory. A type of memory in which the stored information can be erased by exposure to ultraviolet light through a window in the package. It can be reprogrammed repeatedly.

FAST:™ Fairchild Advanced Schottky TTL. A Digital Division transistor-logic product that uses Fairchild's Isoplanar process to improve Schottky circuit density. Schottky circuits have special diodes built into each transistor that enable faster turn off times, increasing the speed of the entire circuit.

FET: field effect transistor. A transistor controlled by voltage rather than current. The flow of current through a channel is controlled by the effect of an electric field resulting from the voltage applied to an area called the gate. It is a unipolar device, as opposed to a bipolar transistor.

FST-1 and FST-2: Fairchild Systems Technology -1 and -2. The controller unit in Fairchild's Sentry™ and Sentinel™ automatic test systems. It performs computer-like functions, but is an integral part of the two test systems.

IC: integrated circuit. A semiconductor circuit combining the functions of many electronic components in a single monolithic substrate, which is usually silicon. (DIC: digital integrated circuit; LIC: linear integrated circuit.)

I^3L:™ Isoplanar Integrated Injection Logic. A proprietary Fairchild circuit structure which combines Isoplanar processing with injection logic circuitry for high performance circuit structures. Injection logic used transistors that are structured both vertically and horizontally in the same silicon substrate, thus increasing density and speed.

K: abbreviation for kilo (1,000). A 1K memory, however, contains 1,024 bits because it is a binary device based on powers of 2. A 64K memory thus contains 65,536 bits (64 x 1,024).

LCD: liquid crystal display. A display device made of semiconducting liquid that does not emit light as do LEDs, but forms images visible by either transmitted or reflected light when electrically stimulated.

LED: light-emitting diode. A special type of semiconductor diode that emits light when current is applied in the proper direction.

LSI: large-scale integration. A term that is generally applied to integrated circuit chips containing from 100 to 5,000 logic gates, or 1,000 to 16,000 bits of memory.

MIS: Management Information Services. A Fairchild corporate department that oversees electronic data processing of company information.

MOS: metal-oxide-semiconductor. Originally a term applied to field-effect transistors and integrated circuits that used a metal gate insulated by an oxide layer from the semiconductor or silicon channel. Now applied to a wide class of field-effect devices, even though metal gates have been largely replaced by silicon-gate devices. (CMOS: complementary MOS; HMOS: high-speed MOS; NMOS: negative channel MOS.)

MSI: medium-scale integration. A term generally applied to integrated circuit chips containing from 20 to 100 logic gates, or less than 1,000 bits of memory.

OEM: original equipment manufacturers.

PCB: printed circuit board. A metallized conductor pattern deposited on a non-conductive board to which discrete components are attached to perform a circuit function.

PROM: programmable read only memory. Information can be stored in this type of memory after the device is manufactured, but cannot be altered.

RAM: random access memory. A memory in which information can be entered into or retrieved from any storage site at the same speed. Its contents are always electrically alterable.

ROM: read only memory. A memory in which the information is stored during the manufacturing process and is then permanent.

SATS: Subassembly Test Systems (Division). Headquartered in Latham, New York, with another plant in Titusville, Florida, SATS manufactures automatic test systems, test access fixtures and interfaces for printed circuit boards.

SSI: small-scale integration. A term applied to integrated circuit chips containing from 1 to 20 logic gates.

TTL: transistor-transistor logic. A type of digital integrated circuit structure that utilizes a transistor input coupled with an amplifying transistor output.

VLSI: very large-scale integration. A term applied to integrated circuit chips containing a minimum of 5,000 logic gates, or more than 16,000 bits of memory.

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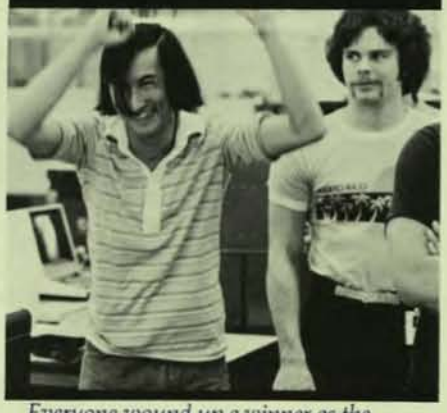
Provides equipment for measuring and controlling electrical power distribution. Produces data acquisition, transmission and control systems; electronic components; measuring instruments; data recorders. Manufacturing in the United States and Canada.

Measurement & Control —Europe

Provides equipment for electrical energy transmission and distribution, produces instruments and test systems for the aerospace and electronic industries; process controls; petroleum, nuclear and other industrial valves; water and gas meters; other mechanical and electronic products. Manufacturing in various European countries.

Fairchild

Electronic components and circuitry, automatic test systems, electronic end products. Offices and manufacturing in the United States, Canada, South America, Europe and Asia.



Everyone wound up a winner as the Olympic Gold Referral Sweepstakes came to an end on February 6. Three employees won fabulous vacations, including two weeks at the 1980 Winter Olympics. Fairchild gained 666 referrals and 119 new employees. The U.S. Olympic Team received more than $6,300 from Fairchild, donated in the names of employees who made referrals. Employees at all participating facilities received numerous prizes for their referrals.

Ed Romero, a Senior Systems Technician who joined Fairchild as an employee referral last summer, won the grand prize trip to the Olympics. He works at the Sentinel Division, part of the Test Systems Group in Santa Clara, Ca. Bill Noard, Purchasing Specialist in the Manufacturing Services Division in Mountain View, won the second-place trip to Aspen, Colo. Tony Cobanoglu, Interface Products Marketing Manager in the Linear Division in Mountain View, won a mini-vacation—four days and three nights—in Lake Tahoe, Ca.

Dr. James M. Early, Division Vice President for Research and Development, has been awarded the 1979 J. J. Ebers award, presented annually by the Institute of Electrical and Electronics Engineers for outstanding technical contributions to electronic devices.

The award is the highest given by the Electronic Device Society of IEEE. It consists of a certificate and $1,000 cash prize.

Jim joined Fairchild in 1969 from Bell Laboratories. He has been responsible for the development of new integrated circuit technologies, including the company's Isoplanar and buried-channel charge-coupled device technologies. He is one of five Fairchild employees who have been selected IEEE Fellows.

PATENTS

Fairchild's technological leadership depends, to a great extent, on the creativity of its people. Inventors listed on patents issued to Fairchild from November 1979-January 1980 appear below:

Semiconductor Products
Len Molloy and Mark R. Schneider
Method of Manufacturing a Battery Cover for Placement in an Opening in a Battery Container
Patent No. 4182020

MOS Products Division
Anthony G. Bell
Insulated Gate Field-Effect Transistor Read-Only Memory Array
Patent No. 4173791

James A. Hayes
Insulated Gate Field-Effect Transistor Read-Only Memory Cell
Patent No. 4173766

R&D Telecommunications
Don W. Lake, Nagaraja Subramanian
Switch Selector and Actuator
Patent No. 4178487

NEWSMAKERS

JIM BALLARD has been appointed General Manager for the Semiconductor Products plant in Sao Paulo, Brazil... **GEORGE COPPINGER** has been named Industrial Relations Manager for the Research and Development Division, Palo Alto... **RONNIE PETERSON** has been named Manager, Customer Relations for Semiconductor Products Worldwide Marketing... **GARY GOERZ** has been appointed Risk and Insurance Manager for Fairchild... **MARCIE MONTAGUE** has been named Fairchild's Tax Manager.

Do you need to file a new W-4? Could be. Read on...

The maximum amount of taxes withheld for Social Security is going up this year. In 1979, the most anyone paid to Social Security—or FICA (Federal Insurance Contributions Act) was $1,403.77. This year, the maximum amount has risen to $1,587.67.

The change affects you if you earn more than $25,900 a year (up from last year's figure of $22,900). FICA taxes your earnings at a fixed percentage rate up to a certain base salary for the year, so the base salary increase this year ups the maximum amount of Social Security tax that can be withheld.

Fairchild's Tax Department suggests that all employees review the withholding allowances claimed on Form W-4 (which has replaced the old W-2). Your claim is made under penalty of perjury, and Fairchild must inform the Internal

TECHNICAL WRITING AWARDS

Fairchild employees authoring technical articles for presentations or publication in appropriate professional journals receive cash awards as part of the Technical Writing Incentive Awards Program. To qualify, get approval of your idea from your supervisor, then submit the final article to your Division General Manager, the Corporate Communications Department and the Patent Department for approval.

Technical Writing Awards appearing below were given from October 1979-January 1980.

Bipolar LSI Division
William H. Herndon
"The Impact of Processing Technology on the Historical Evolution of Bipolar Random Access Memories"
Semicon East

Devereux Rice
"Isoplanar S Allows Bipolar to Strengthen Leadership in High-Speed Marketplace"
Electronics

Digital Division
Chuck Erickson
"Datenschutz clurch Datenverschlusselung"
Electronik

"TTL Circuit Implements IEEE-488 Logic"
Electronic Design

Bill Roehr
"Significance of Inductive Switching Specifications"
Solid State Power Conversion

Linear Division
John Conover
"A Microprocessor Compatible, Precision, Low Voltage, Low Current DAC" ISSCC

"A Voltage-Controlled One-Shot for Servo Control"
Progress

"Remote Control Applications of the uA9706"
Progress

Don Lewis
"Compensation of Linear IC Test Loops"
Progress

"Operational Amplifier Testing" *Progress*

MOS Products Division
G. F. Amelio, N. W. Chanoski
"The Buried Channel CCD: An Inherently Reliable Technology"
International Conference on Solid State Devices

G. F. Amelio, C. L. Chen, K. Venkateswaran, J. Seto
"The Effect of Interpoly Structure Variation on Charge Transfer Efficiency of a Buried Channel CCD"
International Electron Devices Manufacturing Conference

Dean Bennett, Eric Breeze
"The Microprocessor in TV Receivers"
Progress

Paul Chu
"Byte-Wide Building Blocks for Micro-programmed Systems" *Progress*

"Design Philosophy and Architecture of an 8-Bit Microprogrammable ECL Bit-Slice Family" Wescon

Gary Craig, Theodore Vaeches
"MOS/CCD Memory Interfacing" *Progress*

Research and Development
J. J. Barnes, J. M. Deblasi, B. E. Deal
"Optimization of the Low Temperature Differential Oxidation Rates for Double Poly-Silicon VLSI Structures"
Electrochemical Society Meeting

Bruce E. Deal
"Reduced Temperature Processing of Integrated Circuits"
Electrochemical Society Meeting

Howard Murphy
"Performance Characteristics of a Producible NTSC-Compatible CCD Image Sensor"
SPIE Symposium

Reda Razouk, Bruce Deal
"Dependence of Interface State Density on Silicon Thermal Oxidation Process Variables"
Electrochemical Society Meeting

"ESR Centers, Interface States, and Oxide Fixed Charge in Thermally Oxidized Silicon Wafers"
Journal of Applied Physics

Keith Riordan
"Recent Developments in LCD Technology"
Society of Automotive Engineers Congress

David Wen
"Advanced CCD Line Imaging Devices"
SPIE Symposium

"Analog Image Storage Using CCDs"
SPIE Symposium

Sentinel Systems
Harold Vitale
"Take the Time to Interface Properly and Production Can Keep Rolling"
Circuits Manufacturing

Test Systems Group
Jim Healy
"A Method of Collecting Empirical Test Data Throughout a Production Process for Correlation and Analysis" *ATE Journal*

"Pattern Recognition—Enhancing Benefits of LSI Statistical Analysis"
ATE Seminar

"Testing Random Access Memories"
ISCM Conference

Randall Hughes
"The Way I See It"
Circuits Manufacturing

John Van Ness
"High Technology Memory Testing: It's Past, Present and Future"
Semiconductor International

Leon Winfrey
"LSI Tester Brings Engineering Program Compatibility to Production Testing"
Electronics

Xincom Division
Phillip Burlison
"Criteria for Magnetic Bubble Memory Test Equipment"
IEEE

Jim Hook
"What's So Tough About Testing High-Speed Memories"
Electronics

Revenue Service if the company believes the number of allowances you have claimed is greater than the number to which you are entitled.

If your exemptions decrease, then you must file a new W-4 within 10 days of the date the change occurs. In addition, if you claim that you are exempt from all withholding, you must file a new W-4 form each year by April 30.

The IRS is developing more stringent requirements for employer review of W-4s. The Tax Department urges you, therefore, to review your claims.

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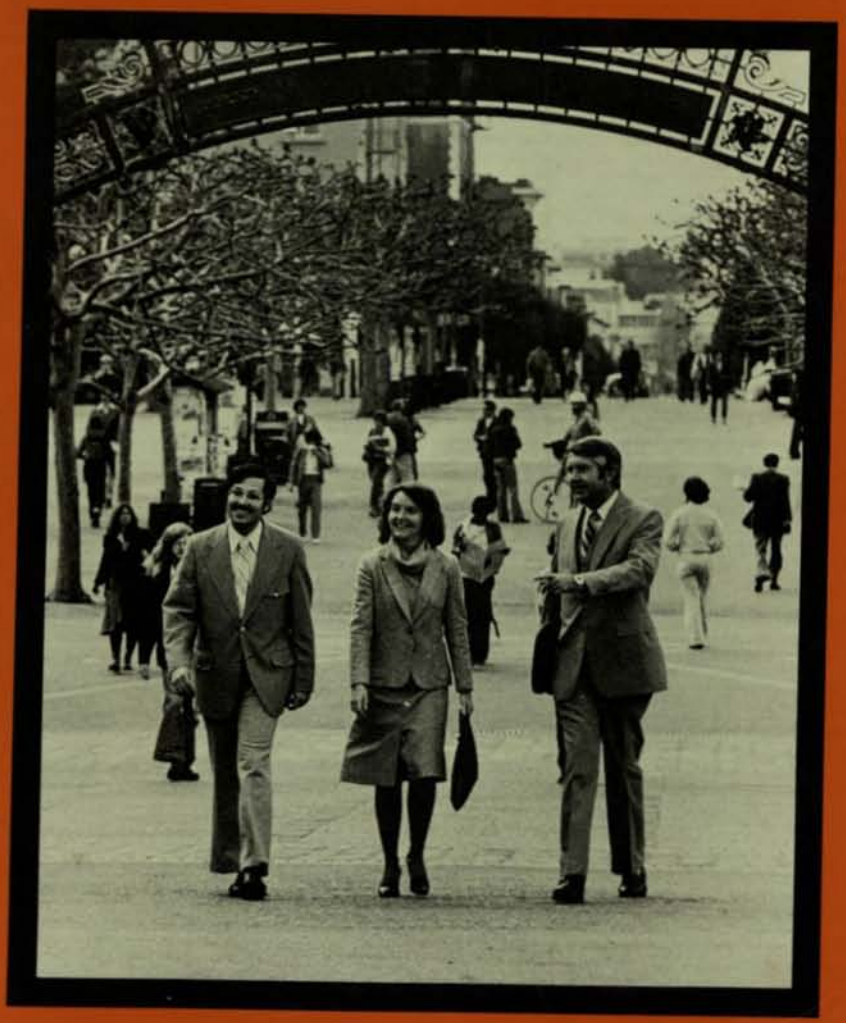
SUMMER 1980

HORIZONS

FAIRCHILD CAMERA AND INSTRUMENT CORPORATION



Scouting Campus Talent

SUMMER 1980
HORIZONS
FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

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Cover: Nancy McAuliffe, College Recruiting, heads for a day of interviews at the University of California at Berkeley with Joe Ferro, left and Chuck Schmitz, Bipolar LSI Division.

ELECTRONICS NAMES HOGAN 'GREAT INNO-VATOR'

Top left, Dr. Hogan in the late 1960s with Sherman Fairchild, right, and Tom Hinkleman, currently Executive Director of the Semiconductor Industry Association. Top right, at his home in Atherton, Calif.

Dr. C. Lester Hogan, a member of Fairchild's Board of Directors, has been chosen one of eleven Great Innovators of the last 50 years by ELECTRONICS magazine. In an April commemorative issue marking the fiftieth anniversary of the publication, ELECTRONICS honored a group of electronics pioneers including Vladmir Kosma Zworykin, inventor of television and Jay Forrester, designer of one of the first high-speed digital computers. Also selected was retired Stanford University professor Frederick Terman, co-winner of the Nobel prize for physics and a catalyst for much of the Bay Area's development as a center for electronic innovation.

Dr. Hogan was cited for his work in microwave technology, and for his many contributions to development of the electronics industry. The text is reprinted here*, along with some photos from Fairchild's archives.

C. LESTER HOGAN

Because C. Lester Hogan has played such an outstanding managerial role, most notably in leadership positions at Motorola, Fairchild, and the Institute of Electrical and Electronics Engineers, his role in research is sometimes overlooked. But in 1950 at Bell Laboratories in Murray Hill, N.J., Hogan built the first microwave gyrator, isolator, and circulator on a single circuit, passive nonreciprocal elements without which microwave communications would be impossible.

A graduate of Montana State University in 1942 with a bachelor's degree in chemical engineering, he served as a Naval Officer in World War II prior to earning master's and doctorate degrees in physics from Lehigh University. In August 1950 he became a member of Bell Laboratories' technical staff where "a guy set out to develop something and did so in a very short period of time," he states.

Working in the Physical Research department, Hogan came across an article written by B.D.H. Tellegen, a member of the Dutch Philips organization, who developed a four-pole network, or gyrator, that was in effect a one-way transmission system. Hogan set out to build some similar devices and found that the physical phenomenon on which Tellegen's work was based was known in optics as Faraday's rotation of planar polarization.

At this point, Hogan sought the help of Bell Labs' William Shockley, who immediately began writing equations that showed him he needed materials with a large rotation of optical frequencies. "Magnetic materials will do it," said Hogan, seeking aid from Bell's chemistry department in developing a very weak magnetic material with low dielectric loss.

"By Nov. 1, all the pieces fit together," he recalls. "They thought I was a genius," he adds, "but I had just put together everything that existed."

Hogan knew the circuit elements were very powerful tools that would be used in microwave systems: "Today, there's not a single microwave system that doesn't use these devices. In fact, there are 200 on Intelsat 5."

Nearly three years later, Hogan accepted the position of associate professor of applied physics at Harvard University, where he extended the knowledge of ferrites. He remained until June 1958, when he joined Motorola Inc. to run its Semiconductor Products division in Phoenix, Ariz., which had had sales of about $3 million and a similar net loss that year. By the end of 1959, the division had sales of $10 million and was profitable. "That took me longer than three months, so I must have been getting older and slower," jokes Hogan.

In 1968, the year Hogan left Motorola to become the president and chief executive officer of Fairchild Camera and Instrument Corp. in Mountain View, Calif., Motorola posted a profit of about $25 million on sales of about $200 million. Largely responsible for that growth was a gamble Hogan took on epitaxial processing. "Using Bell designs, we made the first commercially available epi devices, mesa transistors. They were much better that non-epi devices," Hogan says, "and sales skyrocketed."

Today, the 60-year-old Hogan is the technical advisor to the president of Fairchild Camera and Instrument Corp., as well as executive vice president of the Institute of Electrical and Electronics Engineers. He also serves as member of the board of directors of about half a dozen corporations and on the scientific and educational advisory committees of several universities.

Despite his active schedule, Hogan has time to reflect on his experiences. "It was very exciting and thrilling. None of us visualized the impact we would have on the electronics industry, but we knew it was going to be great." However, he continues, "it wasn't the golden age of electronics. That still lies ahead of us."

"When I went to Bell Labs in 1950," Hogan recalls, "IBM's 701 was the first commercially available computer. Even the simplest of today's microprocessors will outperform that system. Today, the future is overwhelming. My mind is boggled by the potential of VLSI. It is the greatest revolution and it will allow us to do things that were totally impractical before. For years, I've been talking about the pervasiveness of electronics. Finally, it is coming," he states. "A cost barrier had to be broken, and it was done with LSI and the microprocessor."

* Reprinted from the 50th anniversary special commemorative issue of ELECTRONICS, April 17, 1980.

PELTZER & HERNDON TAKE TOP $ AWARDS $ AT FIRST KEY TECHNOLOGISTS SEMINAR.

President's Award winners are shown in these six photos. At left, John Chu and Andy Adamian, Linear Division.

Ludwig Arndt, Bipolar LSI Division

"The heartbeat of an industry is its technology. I have seen that the heartbeat of Fairchild is still sound and... there exists at Fairchild the base to build a stronger future."

The people who provide Fairchild's mental muscle—more than 160 Key Technologists—heard this diagnosis from President Tom Roberts at the first Technical Achievement Awards Banquet on March 27. The awards presentation was held in conjunction with the Sherman Mills Fairchild Memorial Technical Seminar in Palo Alto, Calif. Both events are associated with the one-year-old Key Technologist Program.

Thirty-five of Fairchild's top engineers won Technical Achievement Awards and shared more than $100,000 in cash prizes (see list). The prestigious Founders' Award, given for overall technical excellence, went to Bipolar LSI employees Bill Herndon, Design Engineering Manager, and Doug Peltzer, Technical Director. They were honored for the development and applications of Isoplanar, a proprietary bipolar technology that has made Fairchild's RAMs and PROMs leaders in the bipolar market.

Dr. Tom Longo, Chief Technical Officer and master of ceremonies at the banquet, presented each award, and also announced the promotion of five people to Scientist. This senior job grade is one of two developed by Fairchild's Techical Development Committee for key technologists who wish to remain in engineering or research while advancing in compensation and status. Rudy Dyck, from CCD Imaging, and Ramesh Varshney, from MOS/CCD, were named Scientists, along with Bob Berry, Bill Herndon and Bill Owens, all from the Bipolar LSI Division.

The two-day seminar featured 21 papers on the company's most recent advances in processing, circuits and systems technologies, and guest speakers from Stanford University and IBM Corporation.

TECHNICAL ACHIEVEMENT AWARDS

Sherman Mills Fairchild Founders Award

Cash prize of up to $20,000 awarded for achieving technical excellence.
Bill Herndon, Design Engineering Manager, Bipolar LSI Division
Doug Peltzer, Technical Director, Bipolar LSI Division

Founder's Award winners Doug Peltzer, left, and Bill Herndon, Bipolar LSI Division.

Bill Owens, left Bipolar LSI Division and John Muschinske, Advanced Technology/ R&D

Dave Maxwell, Advanced Technology/ R&D

Front, David Wen and Don Baylis, CCD; back, Douglas Debs and Mohan Yegnashankaran, CCD

Left to right, Eugene Conley, Skip Chase, Harold Short, Advanced Technology/ R&D

President's Award
Cash prize of up to $10,000 awarded for an outstanding technical achievement.
Andy Adamian, Design Engineering Manager, Linear Division
John Chu, Product Engineering Manager, Linear Division
Ludwig Arndt, Design Engineering Manager, Bipolar LSI Division
Bill Owens, Manager—Design and Test, Bipolar LSI Division
John Muschinske, Senior Member of Research Staff, Advanced Technology/R&D
Dave Maxwell, Manager—VLSI Development Line, Advanced Technology/R&D
David Wen, Senior Member of Research Staff, Advanced Technology/CCD
Don Baylis, Process Engineering Manager, Advanced Technology/CCD
Douglas Debs, Product Engineer, Advanced Technology/CCD
Visuamohan Yegnashankaran, Senior Design Engineer, Advanced Technology/CCD
Eugene Conley, Engineering Manager, Advanced Technology/R&D
Harold Short, Mask Making Engineer, Advanced Technology/R&D
Harold Chase, Mask Making Engineer, Advanced Technology/R&D

Technical Achievement Awards
Cash prize of up to $500 awarded for a notable technical achievement.
Keith Riordan, Product Engineering Manager, Discrete Products Division
Andy Adamian, Design Engineering Manager, Linear Division
Jim Holt, Consumer Design Manager, Linear Division
John Conover, Staff Engineer, Linear Division
Phil Burlison, Product Marketing Manager, Xincom Division
Ed Chang, Engineering Hardware Manager, GP-LSI Division
Brad Seward, Staff Design Engineer, GP-LSI Division
Allan Futterman, Department Manager, GP-LSI Division
Bert Graeve, Engineering Manager, GP-LSI Division
Anthony Taylor, Engineering Applications Manager, GP-LSI Division
Joe Fincutter, Supervisor Engineer—Masking, Bipolar LSI Division
Dave Pilling, Senior Staff Engineer, Bipolar LSI Division
Steve Radigan, Supervising Engineer, Bipolar LSI Division
Howard Murphy, Senior Member of Research Staff, Advanced Technology/CCD
Don Baylis, Process Engineering Manager, Advanced Technology/CCD
Lloyd Walsh, Senior Staff Process Engineer, MOS Products Group
Reda Razouk, Member of Research Staff, Advanced Technology/R&D
C. L. Chen, Process Staff Engineer, MOS Products Group
Kalyanasondaram Venkateswaran, Design Engineer Manager, MOS Products Group
John Seto, Process Development Engineering Manager, MOS Products Group
Kamal Aggarwal, Product Manager, MOS Products Group
Tony Bell, Microprocessor Design Manager, MOS Products Group
Jim Gordon, Product Engineering Supervisor, MOS Products Group

The Rites of Spring

"Any company that wants top-notch college hires," says Rocky Francis, "is going to have to get out there and track them down. You won't find young engineers knocking at your door or answering a classified ad. If they've got talent, they don't have to look. They're pursued."

Rocky, who has been Fairchild's Manager of College Relations for two years, believes there's no way a high-technology company can stay alive in today's marketplace without college recruiting. It's not an option, he says. It's a matter of survival.

Rocky Francis, left, meets with Robert Weatherall, MIT's Director of Career Planning and Placement.

"We need talent and we need future managers. And so do our competitors. Since at least 95 percent of graduating engineers are recruited on campus, that means we have to travel, we have to sell, and we have to think about what we can offer people in terms of a career."

As of April 1, 330 new employees had come to Fairchild through the college recruiting program (begun in March of '78). By the end of the year, the figure should approach 450.

In order to find the best and the brightest, Rocky, the three professional recruiters in College Relations, and a number of Fairchild employees who serve as technical recruiters visit nearly 80 campuses a year. If the goal is 300 new hires, as it was for the '79-'80 school year, they will have to interview well over 2,000 students to meet it. (Top students often get a dozen offers apiece.) Almost all of the interviews will be in technical areas—engineering, chemistry, computer science—since that's where the demand is.

The Sherman Fairchild Building at MIT houses the School of Electrical Engineering

For College Relations, a new year begins each summer when the staff gets together with representatives of the major operating groups to find out how many college hires they need—and in what disciplines.

Old School Ties

Then they start recruiting recruiters. "Nobody can sell an engineering job at Fairchild better than an engineer—someone who can tell a college senior in detail about what she or he may expect to find on the job," Rocky says. "So we look for technical people with expertise in each product area. We also look for recent alumni who want to go back to their alma maters—they're very effective at selling the company."

At training seminars, recruiters learn the do's and don'ts of interviewing, the best ways to present Fairchild, and subtle cues that help them 'read' students.

The College Relations Staff gets additional help from Industrial Relations managers at Fairchild facilities around the country. Besides handling full interviewing schedules, these IR managers "advance" the campus visits much in the manner of a political campaign. They organize special events—such as a cocktail party for the students or a luncheon for key professors—and make important arrangements including getting a good day for the interviews (not a Friday or the day before a vacation) and a favorable location.

Strategy Counts

Working most effectively with each school is a very individual thing, Rocky points out. "We obviously try to use whatever advantages we have. Fairchild employees, particularly Ph.D.s, can be very helpful in attracting quality recruits from their alma maters. When you're

Joe Ferro, Nancy McAuliffe and Chuck Schmitz compare interview schedules at Cal in Berkeley.

putting together a recruiting strategy, you can't afford to overlook any link."

On campus, the 30-minute interview schedule is adhered to religiously. "Actually, you only have about 23 minutes with the student," says Rocky, "since you need a couple of minutes at the beginning to re-familiarize yourself with the resume and at least five minutes at the end to jot down notes

Nancy explains Fairchild career possibilities to a University of California student.

for the evaluation you'll write later. In that short time, I have to find out who that student is and what his or her interests are. I also have to sell them on Fairchild, the technology we offer, and our career paths. It's all VERY compact."

Serious candidates are later invited to visit Fairchild facilities in California or on the East Coast. During their on-site visits, they'll interview in several functional areas. "By this time," says Rocky, "they've already chosen among the Semiconductor, Test Systems and Technology groups, so we become more specific about their preferences. At the end of the day for a semiconductor visitor, for example, we ask what area interested them most—MOS or bipolar, design vs. process, etc.

"We also try to find out what other companies are in the running, since we want to counter with relevant strengths

Doug Beaubien, Bipolar LSI Division, checks in at the University of Washington placement center.

in our organization. And when we say good-bye, we don't leave it there. We follow up from this office, making sure they have no unanswered questions as they're deliberating about which offer to take."

Experience By Co-op

Fairchild is now laying the groundwork for that senior year decision by recruiting some students as early as their sophomore year. The vehicle is a cooperative education program with four of the nation's top schools: MIT, Rochester Institute of Technology, the

Doug listens to the career objectives of a U-W student.

University of California at Berkeley, and Cal Poly at San Luis Obispo. This summer about 15 co-op students will be assigned to Fairchild plants in the San Francisco Bay Area, South Portland, Maine, or Wappingers Falls, NY, earning college credit for their work experience.

"They will be given substantial technical projects," says Rocky, "ones that you'd normally hire experienced people to do." The idea behind the co-op system, of course, is that the students in the program will come to work for Fairchild when they graduate —though they are under no obligation to do so.

Three Career Track

Although hiring is the focus of College Relations, that's not where attention to the new grads ends. He or she is followed for three to five years in a program called Career Track. Each group of new hires gets together for a meeting about three months after they're employed. According to Rocky, "We may have a panel discussion about corporate adjustment, tell them about a new Fairchild product, or talk about career paths." After that, the group meets once a year or as needed.

Starting this spring, College Relations staffers began meeting with "Phase II" Career Trackers—those who have been with the company a year or more—to find out how their experience with the company jibes with their expectations. "What we want to learn," says Senior Recruiter Nancy O'Neill, who heads both the Career Track and co-op education programs, "is whether or not they are where they intended to be when they came here two years ago. If not, what can we do to help? Career counseling is going to become an increasingly important function for our department—and we will be involving a number of key people in the company in it."

"Results from our program improve every year," Rocky says. "We've really prepped people on how to interview. Our advertising is good. We've cultivated relationships with professors and donated equipment to universities. Word's gotten around that our salary offers are very competitive, that our relocation package is unsurpassed. We're also earning the reputation for paying a lot of personal attention to recruits. And, we don't pay attention just until they're hired. We do a lot afterwards, too. All that counts. It's what keeps those acceptance letters coming in."

Tim Reifsteck

Tim Reifsteck

Tim Reifsteck might be considered a classic case. An ace electrical engineering student at Southern Methodist University in Dallas, he was hotly pursued last year by a number of companies—he probably lost count by just how many around mid-February. "I started going to campus interviews in the fall," he says, "so I could get the hang of it. By the time I got to Fairchild, I'd probably talked to 15 recruiters."

At the end of February, Tim started traveling—"every weekend for a month and a half"—to the companies that were seriously interested. He was courted by firms in Dallas, Houston, San Antonio, Loveland, Colo., St. Louis, Los Angeles, Philadelphia, and of course, Mountain View. "I could have gone more places," says Tim, "but I did have to go to classes and take a few tests."

He signed up to talk to Fairchild "because it was a semiconductor firm, and it had a good reputation." In the interview, Rocky Francis, a fellow Texan, immediately put Tim at ease. "He talked about the people at the company, the atmosphere, where I might fit in. It was relaxing, and I was impressed."

Tim visited Fairchild in April, and received an offer several weeks after his return to Dallas. "I got my choices of companies down to three, then to two. Then I agonized. I think what really helped me decide was that Fairchild is close to some of the finest graduate schools in the country."

Since joining Fairchild's Research and Development Division last June as a Process Engineer, Tim says the thing that's impressed him the most is "the technical expertise that exists within the company and the willingness of other engineers to help you out."

Success Stories:

Jaime Martorell

Jaime Martorell

Unlike Tim, Jaime (HI-me) Martorell didn't spend a lot of time company-shopping. His was the case of being in the right place at the right time for a job that seemed to have been created just for him.

He was finishing his MBA at the University of Santa Clara two years ago when he saw a notice on campus that Fairchild was looking for a product marketing manager. He sent his resume to Rocky Francis and soon got a call back: "I don't think that's the job you want," said Rocky, "but let me tell you about another opening."

The position was LSI Division Product Marketing Manager for southern and central Europe. He took the job, and five months later, was promoted to his current position as MOS Division International Product Marketing Manager. Jaime, who was born in Barcelona, Spain, lived in Zaire for eight years, worked in Belgium, and speaks three languages. He seemed to have the perfect cosmopolitan qualifications. His education was on target, too: a French baccalaureate in physics and math, followed by a BSEE from the University of Santa Clara, and then the MBA, with an emphasis on international finance.

"The job was what I was looking for—it allowed me to use my technical background while working in the international marketplace. It's been quite a challenge from the beginning. I really like the pressure, the competitive nature of the industry, and the fact that the decisions you make determine the success of your long-range relationship with the customer. Yes, I'm ambitious. I have long-range goals. Fairchild gave me a great opportunity, and I'm taking advantage of it."

Denice Denton

Denice Denton

Denice Denton isn't a full-time Fairchild employee—yet. But as an MIT co-op student starting her second summer of work at Fairchild, she could well be headed in that direction.

Denice is in the "6-A" electrical engineering sequence at MIT—a program which gives students a year of work experience (in two three-month periods and one six-month stint—all at the same company), combined with four years of coursework. At the end of five years, the student earns both bachelor's and master's degrees in engineering.

Lots of companies want MIT co-op students; they have to compete for them just as hard as if they were recruiting graduates for regular jobs. The MITers can be choosy—many of them get 10 offers. Denice has 20 companies after her. "Being a woman in electrical engineering really helps," she says candidly.

How did she ever make up her mind? "Well, it was really Dr. Early who helped me decide." (Dr. James Early, who manages Research and Development, helped recruit at MIT.) "He has such an outstanding reputation, and he told me how much he believed in co-op, that it really should be a significant educational experience. He didn't want us to be bored in our summer jobs—he wanted us to be challenged. And he wanted us to feel we'd made a contribution."

Denice was not bored in her job last summer. She worked in the CCD design group in Palo Alto, starting out by writing data sheets ("By the end of the summer, MY data sheets were being handed out to customers!") and ending up analyzing problems on a new device "so the engineers could fix it. That was great. It was research where I was on my own, and I loved it."

Forget about last week... This week we are getting organized.

"Fairchild has made a commitment to get out of the green eyeshade world of production control. We are now dictating what should happen to our inventories in the fab—the fab is not dictating to us."

Bill Wield knows what he's talking about. As Bipolar LSI Division Operations Manager for Mountain View, Bill is helping Bipolar install a first for

Fairchild—an automated fabrication area planning system.

Before the end of the year, the Bipolar, Digital, Linear and CMOS Divisions will be using a new computerized system that will automate the complex task of planning and controlling wafer flow through each division's fabs.

Busy line supervisors and sometimes harried production control people can cut tedious number crunching and scheduling tasks from days to minutes. And most importantly, the object is to meet the critical "first schedule date" for shipment to a customer.

Task force

Bill's work with the fab planning system actually goes back to 1978, when he was appointed to a task force charged with producing recommendations for automating inventory and planning control systems throughout the semiconductor production process—from wafer fabrication through final test.

Chairing the task force was Mike Klyzseiko, currently Hi Rel Operations Manager for the Linear Division. The third member was Peggi Jewett, now CMOS Division's Product Control Manager. "Our group was formed," Mike

explains, "at the suggestion of the Information Systems Planning (ISP) task force. This was a senior level management group appointed by George Wells to do a complete study of the information systems within Semiconductor Products. One of their recommendations was the total production planning system, and we decided to take it in modules, beginning with wafer fab."


Mike Klyszeiko

Step one was to gather representatives of interested divisions together to develop a list of requirements. This nearly stopped the project before it got started. "We set up a committee of PC managers from Bipolar, CMOS, Digital and Linear," Mike recalls, "but we couldn't agree on what we wanted. That had to happen first, before we could bring MIS in to develop a software program."

Logjam broken

To solve this problem, the group began interviewing outside firms that had developed computerized production planning systems. "We came across a Bay Area firm called Consilium Associates," Mike says, "which was the only company we found that had actually developed a program for semiconductor manufacturing.

"Their system solved all of the conflicts we had, and went a lot farther into operations management than we'd thought possible. We brought them in, got a group from MIS headed by Don Zeigler assigned to our project and we were on the way."

Peggi Jewett comments on the problems the planning group had in reaching an agreement on system essentials. "We all had different needs. Some divisions have 25 different processes used on their wafers, and make several hundred products. Others have a few processes and a few dozen products. Each process must be treated as though it is a separate fab, but yet the same pieces of equipment must be used for all the processes.

"Add to that the different cycle times (total fab time) for products of various complexities, throw in some customer priorities, and you can see that it's hard enough to come up with a system that will work in one division, let alone several."


Peggi Jewett and Jim Carlson, CMOS Factory Planning Supervisor, check fab production data on their division's newly-installed terminal.

Discouragement gave way to "a ha" when they saw the Consilium system. Structured in two parts, the system stressed planning at the process level and total scheduling capability at the product level. It provided a way to accurately forecast the completion time of wafer lots moving through fabrication, which can greatly improve hitting shipping target dates.

The right 5000

"If you schedule 5000 wafers out in one period," Mike says, "you might get 5000 wafers out. But if they're not the 5000 you've committed to a customer, and if he gets half his shipment two weeks early and half two weeks late, it doesn't make us look very organized."

Organizing and tracking workflow is the key to the new fab planning program, which consists of an activity planner and a dispatch system. Issued by the system once a week, the activity planner provides an overview of all work going on in one fab area. It summarizes how long wafers will take to go through each fab process, and forecasts potential bottlenecks.

When production control sends a new schedule to a fab supervisor, the activity planner makes sure new lots entering the fab are "Work in Process (WIP) and capacity feasible"—that is, the fab can absorb the new work scheduled, given its present load and available equipment.

The dispatch system, which is being introduced after each division begins using the activity planner, takes the lot scheduling a practical step further. Once a workable schedule has been determined, the dispatch system assigns a priority to all lots in the fab, based on their "due-out" date. At the beginning of every shift, supervisors will get reports telling them what has to happen on their shifts to keep on schedule.

"Clearly one of the biggest benefits will be to improve our customer service," Mike says. "This system enables us to take an organized approach to planning overtime, rearranging lot priorities and avoiding bottlenecks. No fab has been able to do this successfully before, because of the tremendous volume of data."

Terminal trauma

To be valid each day, of course, production control staffers and fab supervisors must feed production data into terminals in their areas. For someone

unfamiliar with this task, it can be a little unnerving. Tina Smiderle is User Coordinator for the fab planning program, and training is among her responsibilities.

"People are always a little afraid of a computer terminal at first," she says. "They're afraid to touch it, afraid the whole Fairchild computer system will crash if they make a mistake.

This system is very 'user simple,' so we encourage people to bang away at the keys and make mistakes galore until they get used to it."

"People aren't aware that the computer segments different programs," adds Don Zeigler, who headed the MIS software development group that adapted the Consilium package to Fairchild's needs. "If you're practicing writing an activity planning report, there is no possibility that you could accidentally damage all the information stored in our computer. If mistakes weren't acceptable, we would have been in a lot of trouble during this project."

Tina and Don are now working with people who will actually use the planning program in the various divisions. Once the four divisions now installing the program are "up" on the system, plans call for adding the divisions in the Components group.

Starting up

"Getting our hardware delivered and running has been—unexpectedly—the most difficult part of this whole thing," Tina comments. "However, everyone is very enthusiastic about getting the program into operation, and they accept some start-up problems as inevitable."

"We've had support for this project from the beginning," Mike says, "because it was directed by the people who were going to use the system. In the past, if someone who was not in operations suggested a planning system, the response would be 'every division operates differently, every fab is different, and besides, you don't understand my job anyway.' And the idea would fade away.

"This time, since operating people developed the idea, other operating people would say 'Well, if you guys think it's that good, we'll listen.' That confidence helped, as did the tremendous effort from our development committee and the MIS task force assigned to us. The result of this cooperation is a system that's on schedule and within budget."

WATCHING OUT FOR NUMBER 1 YOU!

"Lately, it has become popular to criticize the electronics industry—semiconductor companies in particular—as unsafe by comparison to other industries. Our statistics show that is not true. Of course, every company may not have as complete a program as we have at Fairchild. We spent half a million dollars last year on safety equipment and training in the United States alone, and that does not include such things as safety-related equipment installed in new buildings and equipment added in plants outside the U.S.

Fairchild is a professional company. We understand the hazards we have, and take every possible step to control them. If people believe their work area isn't safe, they should contact the Safety Department. The company will do everything possible to solve the problem."

You wouldn't ignore a match smoldering in your kitchen wastebasket or use furniture finish stripper without wearing protective gloves. Using the same common sense at work can help keep you off the injured list. Ken Rohner, Fairchild's Director of Safety and Labor Relations, talks about the company's safety responsibilities—and yours.

HORIZONS: Ken, can you describe the Fairchild Safety Department?

KEN: Our Safety Department was one of the first established in the semiconductor industry. Many of the training

programs and equipment designs being used by semiconductor companies in the Bay Area are modeled after the ones developed here. Our Safety Department people have over 75 years of combined occupational safety related experience. For instance, Bernie Yurash, our industrial hygienist and toxicologist, has spent 19 years in the semiconductor industry. I know of no one more qualified in semiconductor related chemical safety than Bernie. Members of the Safety Department are specialists in their field.

What is Fairchild doing to protect the employees' health and safety?

It's the responsibility of the Safety Department to assure a safe working environment, and we take that responsibility very seriously. Through our ongoing programs of monitoring, inspection, engineering design and training, the Safety Department looks for ways to improve safety and health on the job. Any workday you can find a member of the Safety Department training, redesigning equipment, writing a new policy or procedure, conducting an inspection,

or investigating an employee complaint. This all adds up to a program in which we don't have to guess if our employees are safe.

How do we control hazardous chemicals in the work area?

In fabrication areas, where most chemicals are used, exhaust ventilation

is provided to remove hazardous vapors and fumes from the work station. The process is quite simple. Our handling systems bring in 100% outside air into the fabrication area. Exhaust hoods are then balanced at each work station to draw contaminants out of the work area. Before this air is released into the environment, scrubbers wash the air, removing contaminated particles.

How do you know if the exhaust systems are doing their job?

Depending on the chemical process, various kinds of monitoring equipment are used to measure the air flow in the plenum and room air environment. Also, if employees detect a strange odor or feel uneasy about their work area, they can contact the Safety Department. A member of the Safety Department will respond and perform an evaluation of the work area.

Federal and state regulatory agencies establish threshold limit values, (TLV) which represent legal limits on the concentration of a chemical in air. Our department uses instrumentation to monitor for compliance with these standards. In fact, it is a common practice of our department to establish standards more restrictive than the federal and state requirements.

What does Fairchild do to minimize injuries or illness from working with chemicals?

There are four components involved in our preventive chemical safety program—personnel protection, exhaust systems ventilation, safety training and environmental monitoring. Also, medical evaluations are conducted by the Medical Department in certain work areas.

What part does training play in the Fairchild program?

I believe it is one of the most important ingredients in any safety program. Last year 7500 Fairchild production employees in the United States participated in safety training programs. All new employees who will be working with hazardous materials receive safety training. Our accident experience has shown us there is a direct correlation between the reduction in accidents and safety training.

What can people do to reduce risk on their own?

People can obviously help themselves by applying what they learn in our safety training classes. Good ordinary common sense also helps people avoid getting injured. You wouldn't let a child play with a bottle of caustic drain opener, or be careless when using an electric saw at home. In the same way, using your head at work can help keep the rest of your body from getting hurt. Wearing the proper protective clothing and handling chemicals carefully are things we should do, but sometimes we don't. When we don't, we increase the chances we'll be injured.

It was reported in a newspaper that Fairchild was fined $1500 for using carcinogens.

This is absolutely untrue! Fairchild has never paid a fine for using carcinogenic chemicals. Fairchild does not use any known carcinogens in its production processes. The newspaper report involved two one-ounce bottles over ten years old, found in one of our research laboratories. They were removed immediately and no fine was paid by Fairchild.

What role do the divisional Safety Committees play in this cooperative effort?

Safety committees are active in each division at every Fairchild plant in the United States, and their role is critical. The committees are made up of volunteers from manufacturing, facilities, industrial relations, and division management. They are responsible for plant inspections and training. They operate on a participatory management structure to solve safety problems.

Well over half of our training is done at the request of safety committees. They may have recognized a specific need, or noticed a jump in a particular type of accident. They help us spot trends in recurring kinds of accidents and problem locations. Without them, we'd just be responding to individual accidents or complaints. Each Fairchild employee should know the safety committee member in his or her work area. Report hazards or emergencies to them immediately!

Isn't maintaining safe working conditions up to the safety committees?

No, it's up to each employee. The company can do a big part of the job—through installing the equipment I've mentioned, providing the training, and organizing the safety committees. But none of those things will keep an employee safe if he or she doesn't take some of the responsibility.

How does the electronics industry compare to other industries in terms of safety?

Figures compiled by Cal-OSHA (the California compliance branch of the Occupational Safety and Health Administration) show that for 1978 Fairchild's accident rate per 100 employees was 4.7 for the year, vs. 9.1 for all semiconductor device manufacturers (which is how Fairchild is classified), 14.2 for all manufacturers in the state, and 10.6 for all California industry.

HAROLD DIDN'T FEEL THE NEED FOR PROTECTIVE GLOVES.

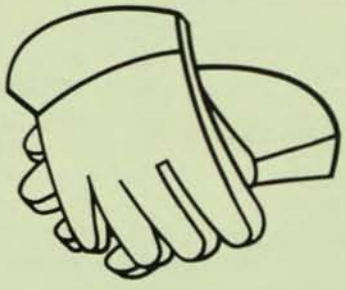
NOW HE CAN'T FEEL ANYTHING.

What precautions should I take to avoid getting burned, or injured by very cold equipment?

New employees who will work with very hot or cold substances and equipment get special training in protecting themselves. These people usually start out cautious, but sometimes get careless as they become accustomed to working in the hazardous environment. It's extremely important to be safety-conscious all the time.

Keep your training in mind when

WHEN YOU'RE HOT, YOU'RE HURT.



working around soldering equipment, diffusion furnaces, baking furnaces, silicon crystal growers and other equipment that can cause serious burns. Always use the protective clothing that's provided for working around heat.

Padded gloves and extra caution are your best protection against substances like liquid nitrogen that must be kept well below the freezing point of water. Condensation on pipes and tanks warn you that they are dangerously cold—some cold enough to freeze skin in just a few seconds.

DANGEROUS WEAPONS IN THE OFFICE.

But I don't work in a manufacturing area—I work in an office. What hazards should I look out for there?

If you remember every time you've almost tripped, burned your fingers or banged your head, you know that offices can be dangerous places—especially because people usually consider them safe. Spilled coffee and things on the floor, such as pencils and paper clips, are common causes of falls in the office. Many people also trip on extension cords, telephone lines and computer cables stretched across walkways.

The unassuming file cabinet can be particularly hazardous. People often trip on open drawers, or they open several drawers at once, causing the whole cabinet to tip over. If your desk is next to a file cabinet, look out for books and other heavy items stacked on it. Someone slams the door, or there is a small earthquake, and you wind up with everything on your head.

Coffeemakers put out a lot of heat and can cause painful burns. They are also a serious fire hazard when left on after working hours.

IN CASE OF EMERGENCY

1 In locations with red emergency hallway phones, pick one up. It will ring directly through to Security. In locations without red phones, call the emergency Security number listed in the front of your phone book.

2 When a guard answers, you **must** stay on the line until you have given the following information: your name, the location of the emergency, what the situation is, what is being done. **Don't** just blurt out "there's been an accident here," panic, and hang up.

3 While you are making the call, ask someone else to notify members of the First Aid and Safety teams in your area. They are trained to use the emergency equipment that may be needed.

HOW TO ENTER YOUR CAR IN THE DEMOLITION DERBY.

So the safest place is the parking lot, right?

If you think so, just drive through a Fairchild parking lot at shift change. Near-collisions happen all too frequently simply because drivers and pedestrians don't follow the same rules they do all the time on public streets. When you're the driver, keep your speed under 15 mph, obey all stop signs and keep your eyes open for people and vehicles coming out from behind buildings and parked cars.

When you're on foot, be as careful as you would on a busy street corner. Give forklifts an especially wide berth. While forklift drivers have the same responsibilities as automobile drivers, they don't have nearly the same maneuverability or braking power. The average forklift used at Fairchild weighs almost as much as two Cadillacs and is equipped with brakes on only two wheels. Watch out for them coming out of driveways and from behind buildings.

DON'T PUT SAFETY LAST ON THE LIST.

If I see something that I think is a safety hazard, who should I tell?

Every division at Fairchild has a safety committee—a group of volunteers who work with management and the professional, medical and safety staffs to solve day-to-day problems. Ask your Industrial Relations Manager who is on your committee, and talk to one of them. They can convince management to go directly to people who have authority to change hazardous situations.

Of course, if the problem you see can cause immediate injury or damage, tell your supervisor or call Safety. But be sure to tell **somebody.** You'll be glad you reported a potential hazard instead of an accident.

I didn't know that!

Contracting for a service?
Planning to add new space?
Stop!
Don't pass go until you talk to our new risk and insurance manager.

It seemed like a great idea for the annual customer Christmas party: hiring that new little catering outfit just down the street. They promised gourmet food, classy service, and a price the local sales office could afford. And the party did go beautifully—until one of the caterer's helpers slipped on an ice cube, hit his head on the corner of a table, and wound up spending several months in the hospital. His employer, a business neophyte, hadn't yet bothered to get workers' compensation insurance. The injured man's family sued Fairchild.

For anyone working in San Diego, going to nearby Tijuana is about as routine as commuting across town. It doesn't seem like international travel. It certainly didn't to the Fairchild salesman who made the trip probably 100 times in the last year. Then one Wednesday morning he was side-swiped just on the other side of the border. He had U.S. car insurance, but not Mexican coverage. That oversight cost Fairchild a tidy bundle, and the salesman risked going to jail.

Neither of the above events actually happened. They are both might-have-been stories. "But either of them could have happened if someone hadn't been paying attention," says Corporate Risk and Insurance Manager Gary Goerz. "The possibility of such losses is very real."

As Gary sees it, the first step in cutting losses is making people more aware that there can be insurance risks in almost every aspect of our business, from hiring outside contractors to building a new plant. "I want to raise employees' risk consciousness," he says.

Gary joined Fairchild last year as the company's first in-house insurance manager since 1975. The work had previously been handled by Marsh & McClennan, a worldwide broker that manages insurance purchases and claim settlements for hundreds of corporations.

Fairchild spends about $3 million a year just on property and casualty premiums. In addition, the company is self-insured in several areas, meaning that funds are set aside internally to cover potential losses.

Seeing that the company buys enough insurance—that everything is covered that should be—is only half of Gary's responsibility. "I'm just as concerned about preventing the loss in the first place," he says. "Insurance is just what you're happy to have when everything else falls apart."

In his preventive efforts, Gary works closely with the Safety, Legal, Facilities, and Security Departments. When a new plant is under construction, for instance, he joins the Safety and Facilities staffs in checking the blueprints at each stage for things such as proper exit and sprinkler head locations.

Recently, Gary helped reduce Fairchild's risk in a very critical area—chemical transport. For a long time Fairchild has trucked chemicals from Mountain View to its other Bay Area plants. As a risk manager sees it, that process involves hazards that could be avoided. So Gary helped make several changes. Outside trucking firms with drivers experienced in moving chemicals are now being used. Wherever possible, chemicals are being delivered directly to the plants using them instead of being funneled through Mountain View.

"Sure, it's cheaper to buy in quantity and have everything delivered to one location," Gary says, "but when you calculate the cost of a chemical spill on a freeway or bridge at rush hour, the risk just isn't worth it."

One of the most serious losses Fairchild could sustain is the failure of its central computer. Without the computer, the company business the world over could come to halt. Plants in the Far East wouldn't know how much product to turn out. Orders couldn't be processed, sales couldn't be recorded—and there wouldn't be any paychecks. So Gary is putting a program together to protect against problems that could be caused by such a business interruption.

A power failure for the computer could be caused by something as dramatic as a 5.9-strength earthquake or as mundane as too many air conditioners going full blast on a sweltering July afternoon. As an example of good risk management, Fairchild now has protection against such a disaster: an auxiliary power supply. A diesel generator has been installed near the computer facility in Mountan View and will automatically switch on within 20 seconds of a power outage. The Security and MIS departments were responsible for getting this precautionary equipment installed.

Risk consciousness is something that one has to cultivate. It takes in everything from reporting the broken step in the chem lab to calculating what a business interruption would cost in Wappingers Falls. And it's easy to overlook the obvious. Gary recalls a fire a few years ago that wiped out a magnificent home being built in Palm Springs by a famous entertainer. The loss amounted to $1 million. Someone had forgotten that a building under construction needs insurance, too.

Any new endeavor, Gary points out, is sure to require some expert insurance consultation. "This applies to starting up a new plant, hiring outside contractors, leasing office space, buying a piece of equipment or launching a product line."

Preventing losses is a complex business. But, as Gary says, "This department exists to answer your questions, to give you guidance, to keep you out of trouble. When in doubt, call."

Gary, right, and Corporate Services Manager Russ Cooley inspect a new generator which can provide backup power for the company's central computer.

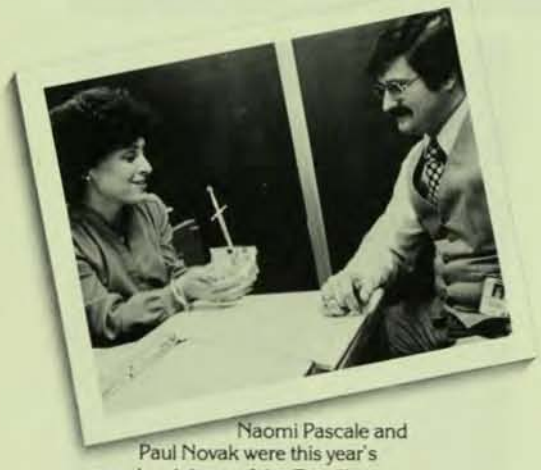
LAKE TAHOE HOSTS SEMICONDUCTOR SALES "FORCE 80"

The Semiconductor Products Group's sales team transformed themselves into "The Force of the 80's" as they invaded Lake Tahoe, Calif. in April for the annual Domestic Sales Conference. Their mission—to collaborate with the operating divisions on strategies, new targets and invincible products—was enthusiastically accomplished, according to Hal Mumma, Division Vice President—North American Sales.

The week-long conference opened with the annual Excalibur Awards Banquet. The highly-prized awards for Professionalism in Sales and Sales Support went to Paul Novak, Senior Sales Engineer in the Santa Clara, Calif. field office, and Naomi Pascale, OEM Marketing Manager for Bipolar RAMs. Each winner received a silver and gold sword imbedded in a block of polished Steuben crystal and a check for $1,000.

Fairchild executives who spoke at the conference included Tom Roberts, President, George Wells, Senior Vice President—Semiconductor Products Group, and Dr. Les Hogan, Fairchild Director. They described technological and organizational advances that will strengthen the company's position and enhance the effectiveness of the sales force.

"Our goals are to give you a better product—better in terms of both technology and manufactured quality—to give you better support, and to make Fairchild more sensitive and more responsive to your customers," Tom Roberts said. "In semiconductors, we intend to be one of the top five companies in the world, including the Japanese, within the next five years."



Naomi Pascale and Paul Novak were this year's proud recipients of the Excalibur Awards, given by Semiconductor sales.

TEST SYSTEMS "TEAM 80" GATHERS AT SCOTTSDALE

In the spirit of the Olympics, Fairchild's Test Systems Group (FTSG) sales force rallied its concentration and competitive drive at "Team 80," this year's FTSG Sales and Customer Service Conference. Held March 29 through April 1 in Scottsdale, Ariz., the conference combined traditional product sessions and sales reviews with unusual sports events—everything from tricycle races to a kayak race across a large lake.

Ken Daub, Division Vice President—Sales and Service, said during opening remarks that the meeting's olympic theme is symbolic of the effort and team spirit that will be needed to strengthen Fairchild's leadership in the automatic test systems industry. Fairchild President Tom Roberts, who spoke at the closing night Decathalon Banquet, also emphasized the challenges that lie ahead.

"The goals before us are quite clear," he said. "We must begin by being solidly number one in the United States in all of our major business areas. And...we must capitalize on that base as early as possible to build our position in Europe and in Asia. Within a five-year period, I see no reason why Fairchild's automatic test business...should not be recognized as the leader throughout the world."

Seventeen outstanding achievers received "Salesman of the Year" and other top awards at the conference.

Dick Noren, left, Components Test Systems Sales Manager, presents an award to CTS Salesman of the Year Marvin Cox, Dallas.

IN THE NEWS...

Fairchild has entered into a cross-licensing agreement with Western Electric Company, under which Western Electric will manufacture Fairchild's FAST (Fairchild Advanced Schottky TTL) low-powered Schottky integrated circuits for its internal use...**JIMMY LEE** has joined the company as Executive Vice President of Fairchild and General Manager of the Test Systems Group...**HORST SANDFORT** has been named General Manager, Central Europe, of the Fairchild subsidiary in West Germany with responsibility for Semiconductor Products marketing in Central Europe...**PAUL WINTERS** has been appointed Fairchild's Patent Counsel...**RICHARD VALENTE** has been named Plant Manager at the Healdsburg, Ca., Semiconductor Products plant...**BOB BLAIR** has been appointed Director, Industry Marketing for Semiconductor Products worldwide marketing...**RANDY HUGHES** has transferred to VLSI Development at the Central Research and Development Labs, Palo Alto...**JOE CONSOLI** has been named Manager, Corporate Accounting and Consolidation.

Lighting the "Olympic torch" officially opened Test System's conference.

WHAT'S IN A NAME?

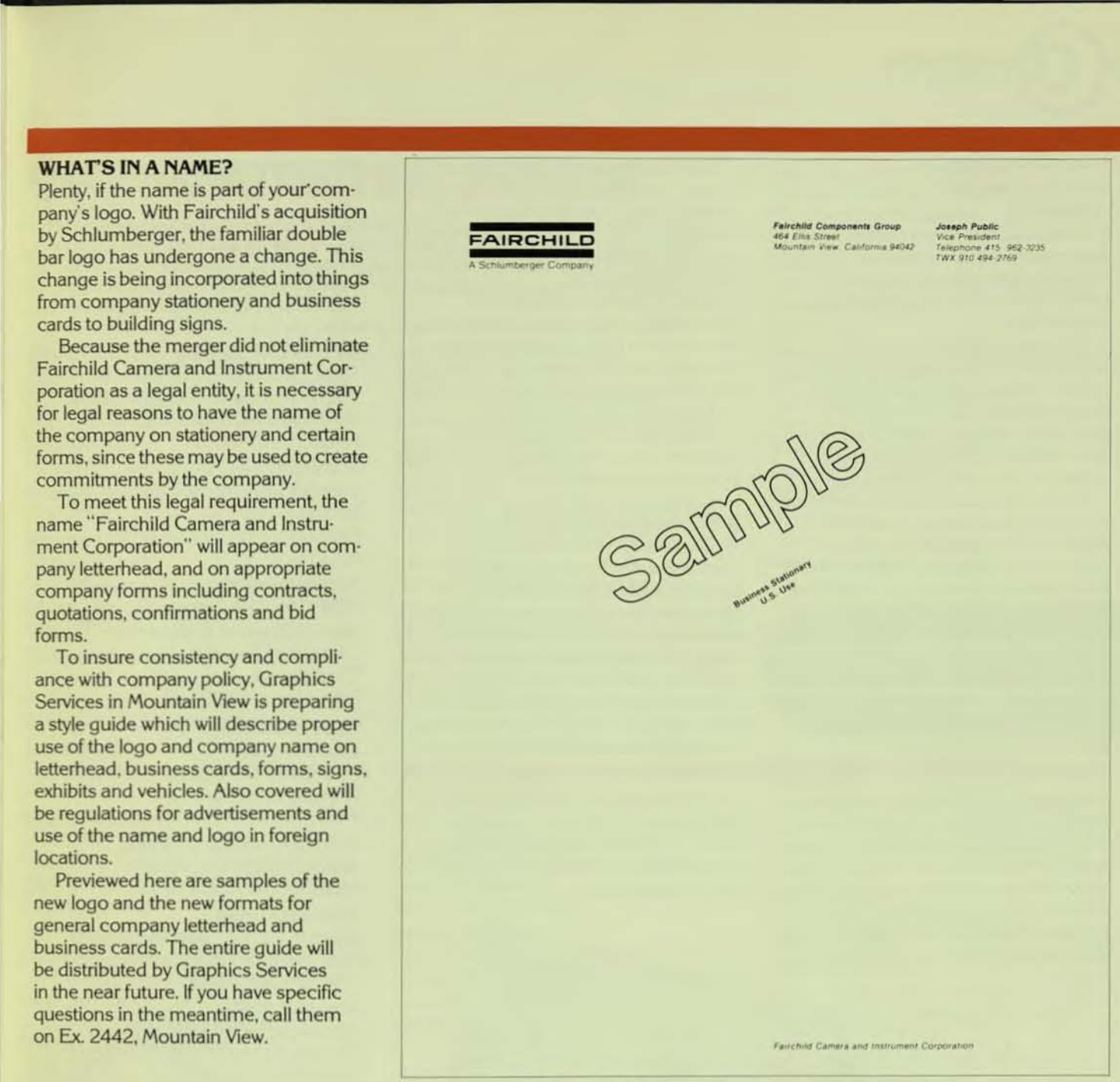
Plenty, if the name is part of your company's logo. With Fairchild's acquisition by Schlumberger, the familiar double bar logo has undergone a change. This change is being incorporated into things from company stationery and business cards to building signs.

Because the merger did not eliminate Fairchild Camera and Instrument Corporation as a legal entity, it is necessary for legal reasons to have the name of the company on stationery and certain forms, since these may be used to create commitments by the company.

To meet this legal requirement, the name "Fairchild Camera and Instrument Corporation" will appear on company letterhead, and on appropriate company forms including contracts, quotations, confirmations and bid forms.

To insure consistency and compliance with company policy, Graphics Services in Mountain View is preparing a style guide which will describe proper use of the logo and company name on letterhead, business cards, forms, signs, exhibits and vehicles. Also covered will be regulations for advertisements and use of the name and logo in foreign locations.

Previewed here are samples of the new logo and the new formats for general company letterhead and business cards. The entire guide will be distributed by Graphics Services in the near future. If you have specific questions in the meantime, call them on Ex. 2442, Mountain View.

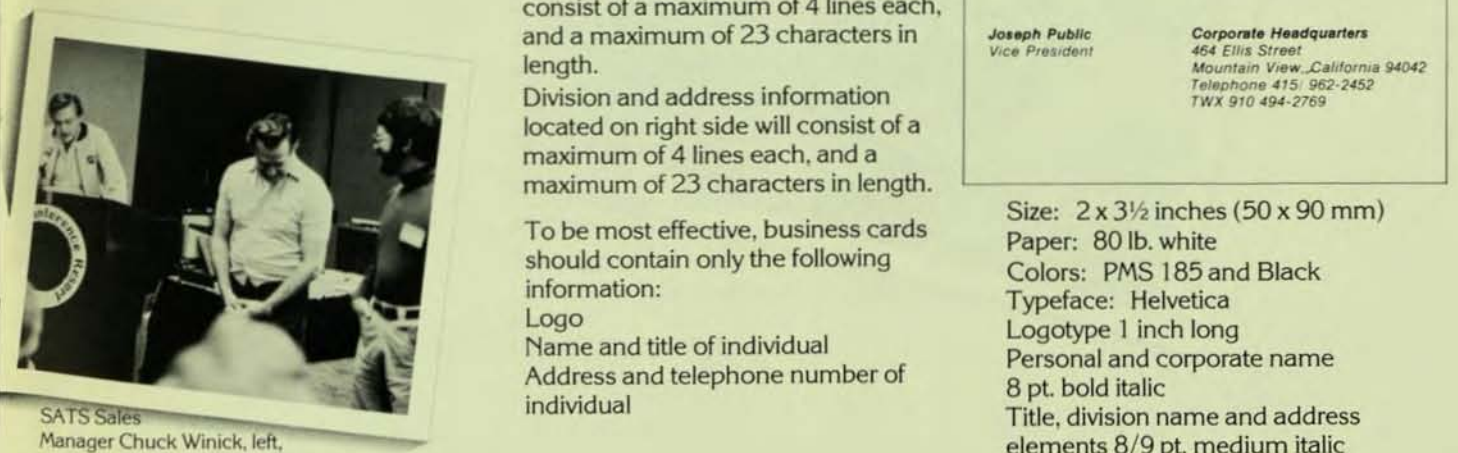


New Business Card Standards:

Title and department information located on left side, under name, will consist of a maximum of 4 lines each, and a maximum of 23 characters in length.

Division and address information located on right side will consist of a maximum of 4 lines each, and a maximum of 23 characters in length.

To be most effective, business cards should contain only the following information:
Logo
Name and title of individual
Address and telephone number of individual



Size: 2 x 3½ inches (50 x 90 mm)
Paper: 80 lb. white
Colors: PMS 185 and Black
Typeface: Helvetica
Logotype 1 inch long
Personal and corporate name
8 pt. bold italic
Title, division name and address elements 8/9 pt. medium italic

SATS Sales Manager Chuck Winick, left, congratulates joint SATS Salesmen of the Year Tom McLaughlin, Waltham, Mass., and Harry Bowers, Santa Clara.

FIVE FAIRCHILD SCHOLARSHIPS AWARDED

Five outstanding young people will study engineering, psychology, marine biology and the humanities this fall with the help of Sherman Fairchild scholarships.

This year's winners, who were announced in April, are the children of Fairchild employees who work in Mountain View, Calif., Syosset, N.Y,. and South Portland, Maine. Each student will receive $2,000 annually for up to four years of full-time study.

Susan Aboussleman is the daughter of Joe Aboussleman, a Maintenance Mechanic in Mountain View. Susan plans to study English, Creative Writing and Art at the University of Santa Clara this fall.

Eleanor Dehoney, daughter of Bob Dehoney, Consulting Engineer in Syosset, will attend Mount Holyoke College in Massachusetts. She has not yet chosen a major but enjoys and excels in liberal arts studies.

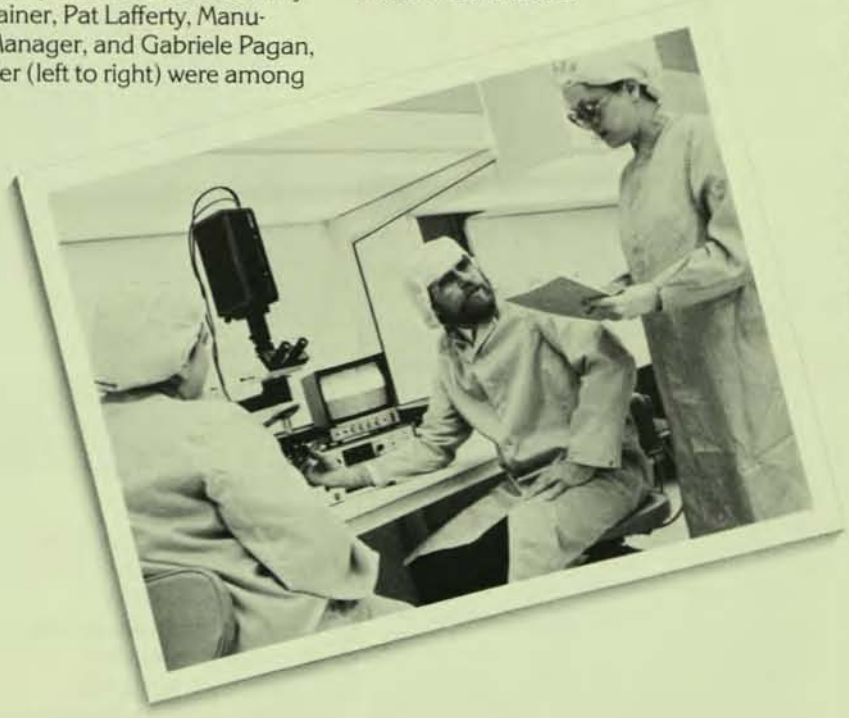
Deborah Fowler, daughter of Bob Fowler, Tactical Marketing Manager for the Digital Division in South Portland, plans a career as a Marine Biologist. She will attend the University of Rhode Island this fall.

Liliana Riga is the daughter of Georgio Riga, Manager—Central Analytical Lab in the R & D Division in Mountain View. She will major in psychology at the University of California at Berkeley, and plans a career in medicine.

Julio Tapia is the son of Martha Gonzalez Tapia, Mask Making Specialist in the Mountain View Mask Shop. Julio is considering a major in engineering at Stanford University in California.

The winners were selected by a committee of educators chosen by the Educational Testing Service. The committee bases its decisions on the candidates' scholastic achievement, high school activites, community involvement and scores on the College Entrance Examination Board's Scholastic Aptitude Test (SAT). Next year's competition opens in September.

The Bipolar LSI Division's new wafer fab at the South San Jose plant is full of ultra-modern equipment, like these tools for measuring the critical dimensions of mask patterns on wafers. Mary Aldrete, Trainer, Pat Lafferty, Manufacturing Manager, and Gabriele Pagan, Work Leader (left to right) were among the 125 employees at work in the new facility when it officially opened on April 17. By the end of the year, 500 people will be producing RAM and PROM wafers there.



PATENTS

Fairchild's technological leadership depends, to a great extent, on the creativity of its people. Inventors listed on patents issued to Fairchild from February—April, 1980, appear below.

Bipolar LSI Division

Steve Barton, Brian Sadler
Television Reference Signal Digital Identification Circuit and Control
Patent No. 4198651

Robert Berry
Memory Cell Structure Utilizing Conductive Buried Regions
Patent No. 4198649

Rajni Kant
Headless Resistor
Patent No. 4191964

Warren Ong and Walford Ho
Chip Select Power-Down Control Circuitry
Patent No. 4198698

Linear Division

James R. Butler
Input Stage Using Junction Field Effect Transistors for Biasing
Patent No. 4194136

John Conover, Larry Kendall
Analog Multiplexer
Patent No. 4196358

Systems Group

Bruce R. Cairns, David B. Crockett
Filler-in-plastic Light-scattering Cover
Patent No. 4191943

James W. Pfeiffer
Technique for Applying Polarizer Material to Liquid-Crystal Displays
Patent No. 4193287

Nicholas F. Talesfore
Programmable Digital Clock
Patent No. 254601 (Design)

TECHNICAL WRITING AWARDS

Fairchild employees authoring technical articles for presentations or publication in appropriate professional journals receive cash awards as part of the Technical Writing Incentive Awards Program. To qualify, get approval of your idea from your supervisor, then submit the final article to your Division General Manager, the Corporate Communications Department and the Patent Department for approval.

Technical Writing Awards appearing below were given from February—April, 1980.

Advanced Technology

Chuck Erikson, Milan Momirov
"Using the 9414 Data Encryption Set"
ELECTRONIC DESIGN

Milan Momirov
"Implementation of the Data Encryption Standard (DES)"
COMPUTER DESIGN

Bipolar LSI Division

Tom Goodman
"F300 Advanced Gate Array Offering Power/Delay Tradeoffs"
ELECTRO 80

Bill Herndon
"The impact of Fine Line Lithography on Static Bipolar RAMs"
University of California at Berkeley

Devereux Rice
"A Look Into the Bipolar-VLSI Future"
PROGRESS

Digital Division

Bill Roehr
"VMOS—A Giant Step Toward the Ideal"
CANADIAN ELECTRONICS ENGINEERING

Test Systems Group

Kent Goheen
"A Working System for Simplifying Inventory Management"
JOURNAL OF THE AMERICAN PRODUCTION AND INVENTORY CONTROL

Randy Hughes
"Test Data as a Management Tool"
ATE SEMINAR

International Marketing

Georg Dumsky
"uA78S40 Switching Regulator (Arbeitsweise und Anwendung Monolithischer Schaltregler)"
ELEKTRONIKPRAXIS

Josef Esch
"Motor Speed Controller (Moterregler)
ELECKTRONIK INFORMATION

Klaus Piotter
"DMA F3854 (DMA-Zusatz fur Mikrocomputer)"
ELEKTRONIK-ANZEIGER

"ECL Bit Slice (Superschnelle-Bit-Slice-Familie in ECL-Technik)"
ELECTRONIK

Tony Pope
"Designing with High Current Regulators"
ELECTRONICS INDUSTRY

Hans Tonn
"CCD Image Sensor (Halbleiter-Bildensoren-Eine Neue Generation von CCD-Zeilen)"
ELEKTRONIKPRAXIS

Linear Division

Chuck Alford
"Speed Up, Simplify—IEEE-488 System Peripheral Interfaes with a Bipolar Talker/Listener"
ELECTRONIC DESIGN

John Conover
"Circuit Idea-Remote Control Applications of the uA9706"
RADIO ELECTRONICS MAGAZINE

Evan Aurand
"Codec—An Integrated Circuit in Telecommunications"
IEEE Electron Devices Society, Santa Clara Valley Chapter

MOS Products Group

Peter Alfke
"Circuit Idea—Hara-Kiri Circuit"
PROGRESS

Paul Chu
"8-Bit Slice ECL Computer Component Family"
COMPUTER DESIGN

Paul Chu, Bruce Klingensmith
"A High Performance Interruptible Microprogram Sequencer"
ELECTRO 80

Roy Kole
"An Advanced Telecommunications Protocol Controller"
PROGRESS

"New LSI Protocol Control Chip Offers Extensive Capabilities"
ELECTRONIC DESIGN

Dennis Lunder
"Microcomputer Education and Training for the '80's"
PROGRESS

Ted Vaeches
"Circuit Idea—Multichannel A/D Converter Evaluation System"
PROGRESS

Research and Development

Michael Farrier, Rudolph Dyck
"The IDI-CCD Image Sensor for the LOPATCH Periscope Camera System"
International Solid State Circuits Conference

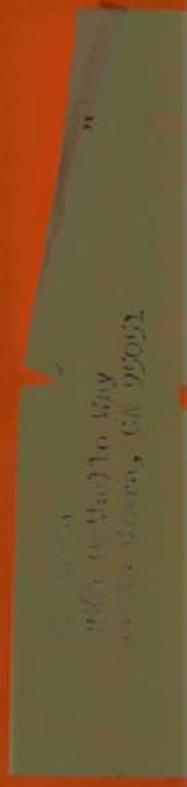
Keith Riordan
"LCD Multiplexing Perplexing?"
PROGRESS

Xincom Division

Phil Burlison, John Ahlstrom
"Testing Bubble Memory Devices"
ELECTRONIC TEST

ADDRESS CORRECTION REQUESTED

BULK RATE
U.S. POSTAGE
PAID
FAIRCHILD
CAMERA AND
INSTRUMENT
CORPORATION



FAIRCHILD
Schlumberger

464 ELLIS ST., MT. VIEW, CA 94042

FALL 1980

HORIZONS

FAIRCHILD CAMERA AND INSTRUMENT CORPORATION

R&D: New Steps Toward Technological Leadership

New Structure Announced for Semiconductor Business Units

On July 30, Roland Genin, Executive Vice President—Operations for Schlumberger Limited, made the following announcement:

"After thorough analysis by Fairchild management of the company's various business activities, a decision has been made to restructure the basic organization of the company. The new organization will provide the necessary framework for increasing the technological capabilities of the company; for clarifying and decentralizing management responsibility and for improving the efficiency of the company's operations.

"The following organizational changes are effective August 1, 1980:

1. Tom Longo, Chief Technical Officer of Fairchild, is elected Vice President of Schlumberger Limited. He is responsible for:

- ☐ direction of long-range research programs at the company's laboratories in Palo Alto
- ☐ coordination of technical activities and product development programs among the operating units of Fairchild
- ☐ coordination of Fairchild's technical efforts with other parts of Schlumberger

2. Semiconductor products is organized into two business groups, the Analog and Components group and the LSI Products group:
☐ George Wells is appointed Executive Vice President of Fairchild and General Manager of the Analog and Components group. Reporting to George Wells are Jim Hazle, General Manager—Components; Jerry Schoonhoven, General Manager—Optoelectronics; and Doug Sullivan, General Manager—Linear Products. Andy Procassini, in charge of Semiconductor Marketing, and Chuck Smith, responsible for Semiconductor Manufacturing Services, continue to report to George Wells.
☐ Dick Abraham is appointed Executive Vice President of Fairchild and General Manager of the LSI Products group. Reporting to Dick Abraham are: Gil Amelio, General Manager—MOS Products; Ed Browder, General Manager—Digital and Advanced Bipolar Products; and Tom Popek, General Manager—CMOS Products."

Tom Longo, George Wells and Dick Abraham, as well as Jimmy Lee, Executive Vice President of Fairchild and General Manager of the Automatic Test Equipment group, all report to Tom Roberts, President and Chief Executive Officer of Fairchild.

A Strong Pulse in Palo Alto

"In short, we will make Palo Alto the true heartbeat of Fairchild... using it as our university, as the force to push the rest of Fairchild."

Tom Roberts, President
in a speech to Fairchild's Key Technologists
March 27, 1980

Tom Longo, Vice President of Schlumberger Limited and Chief Technical Officer of Fairchild.

Vitality is a good word for the feeling in the air at the Central Research and Development Laboratories in Palo Alto, California. Significant capital investment in programs, facilities and people is bringing a new goal to life: restoring Fairchild to a position of technological leadership through research and development.

Dr. Tom Longo, Fairchild's Chief Technical Officer who was recently named a Vice President of Schlumberger Limited, talks about the challenges and opportunities that lie ahead for his organization.

Q. What major projects will R&D undertake in the next few years?
A. Although it's not characteristic of many of our long-range projects, let me comment first on the 64K dynamic RAM program, which is in final development stages. During the past 18 months, we've established all the design rules and developed a very advanced Isoplanar n-channel process with implanted source and drain. We're starting the processing for the newest design version, and we expect to make successful product this fall.

During the latter part of this year, we expect to transfer the project to the South San Jose plant, where the MOS Memory group will carry the 64K RAM into pilot production. They expect to move from a pilot line into manufacturing by the middle of next year.

Q. What are your longer-range goals?
A. Most future investment will be in projects that stretch from two to six years out. We'll be looking first at the 256K dynamic RAM and the 64K static RAM; later at million-bit RAMS and very advanced non-volatile memories. A whole host of new process technologies will be required for the evolution of these device technologies, not only for n-channel MOS, but also for CMOS.

Bipolar also has particularly exciting long-range potential. Many of the new device technologies which we will develop will also have application in bipolar products. We see I^3L, Fairchild's proprietary bipolar technology, as being the only viable way of achieving bipolar-like characteristics with VLSI complexity. I think we're less than five years away from devices that have in excess of ten thousand gates on a chip and that give us one nanosecond performance. I^3L will be an important VLSI technology at Fairchild because of such exciting potential.

We'll also be exploring direct writing on silicon with electron beam technology, x-ray exposure of silicon, computer-aided design involving new modeling and simulation technologies and the applications of artificial intelligence to circuit design and testing. We'll probably also work in the area of magnetic bubble technology and non-volatile semiconductor memories that are electrically alterable.

Further out than that, say in six to ten years, we'll probably explore gallium arsenide integrated circuits for use in extremely fast logic. We may also be doing more work in advanced materials technology. I think investigation in this area is critical if silicon technology is to keep up with the longest-range goals of VLSI device technology.

Q. Will these efforts encompass all R&D being performed at Fairchild?
A. No. This only describes directions of programs at the central R&D laboratories in Palo Alto. Our philosophy is—and should be—that a very sizeable portion of Fairchild's research & development will always be carried out in the operating groups.

Research that has relatively short-term objectives, such as taking a product to market in one or two years, definitely needs to be in an operating division. On the other hand, it's not wise for short-term thinking to dominate the activities of a central R&D program.

This doesn't mean that central R&D activities will necessarily be generalized. Many times our work is very specific, but it may be in areas that involve technologies that take a long time to evolve, or that require different materials, design and process technologies, even different physics. It's easier to start this type of activity in a central laboratory and establish a certain level of capability before focusing on applications. That's much more difficult to do in an operating entity.

A good example is our CCD imaging business. It's a silicon-based technology, but its design, physical concepts and applications are so different than our other device interests that it made a lot of sense to start and continue CCD imaging in R&D until it is a reasonably well-established business. The CCD imaging technology was also a good example of how pioneering in the R&D laboratories can be responsible for an exciting new direction in one of our operating groups. This is exemplified by the strong position Space and Defense at Syosset has developed in cockpit TV using the CCD area arrays.

Q. Is that how guidelines for R&D projects are formulated—advance a technology without limiting it to specific applications, and then transfer it to the groups that have developed the most successful applications?
A. Yes, along with a couple of other philosophies that I think are pretty important. First, to do good long-range research and development, you have to take on technological risks. It's like drilling for oil: the wells with the biggest potential payoff are usually the least predictable, while the ones with the most certain predictability are usually the ones with the lesser financial payoff.

Technical innovation requires the same kind of risk. If you work on projects that carry minor risks, they usually produce achievements which have modest returns. The projects which have major potential returns usually require you to incur great risk.

The key is to avoid taking sizeable risks for modest potential payoffs. But first you have to be willing to take a chance—even to occasionally encounter failure. Obviously we don't want to fail often. In the final analysis, the success of an R&D program must be measured by the impact of its technical achievement on future business. And that will always involve judging the risk.

I also believe that persistence is absolutely necessary for successful technical innovation. I've said from time to time that there are many opportunities to quit on the way to success.

Q. Can you name some examples where persistence has paid off at Fairchild?
A. I can give you lots of examples. The bipolar Isoplanar technology was transferred from the laboratories to an operating group in 1971. We worked through a very dark period in the last part of 1972 before we started realizing success. It's now 1980, and our bipolar memories have been successful since 1973. So much time has passed that most people associated with these products now don't understand the kind of persistence it took to eventually break through.

Our F100K sub-nanosecond ECL, which today is a world leader, is another prime example. We worked on that technology from 1972 into early 1976. We hadn't had a significant presence in the ECL business prior to that, and we were working with a new process technology and some new design concepts. There was a long period of uncertainty before it became apparent, in about 1978, that we were establishing a new industry standard for F100K sub-nanosecond ECL technology.

I wouldn't want everything to work out that way. But you do have to be careful not to stop as soon as you run into difficulty. In this business, many projects will encounter a period of intense difficulty before success is established.

Dr. P. A. Crossley, a Senior Member of the Research Staff, works in the new VLSI laboratory in Palo Alto. He's operating a wafer stepper, which permits tighter tolerances and smaller geometries than any equipment used previously. It will be used to develop processes for the 256K RAM and other VLSI devices with feature sizes of less than two microns.

Q. Mr. Roberts has stated a goal for the central R&D activities: to recreate the Palo Alto of 15 years ago. What commitments do you feel will be necessary to accomplish this goal?

A. We've already made important steps in that direction. In 1979, we essentially doubled our financial investment —in telecommunications R&D, in advanced logic, in advanced process capability, in all other areas we've discussed.

We have an excellent staff that will be growing, and, for the moment, we have a good basic facility here in Palo Alto. For a long period it has been occupied by activities other than R&D. Those activities are gradually moving out, so that within a year, this facility will be focusing totally on research as it did 15 years ago.

We're enhancing this facility with some major capital investments, including a multi-million dollar VLSI laboratory. The first phase of this three year facilities program becomes operational this fall. We have also recently acquired a second generation 40 megahertz electron beam mask maker, the only one of its kind in the world. Its writing speed is twice as great as our previous capability, and it can make masks for wafers as large as six inches. That capability should take us through the end of this decade.

Probably one of the most critical areas of expansion for R&D will be in the acquisition of new talent. As everybody knows, it's difficult to attract talented scientists to this area because of the cost of real estate. To offset this, we've strongly increased our college recruiting activity. As a company, Fairchild plans to bring in 40 to 50 percent of its new technical employees from college. A high percentage of R&D's college hires will have advanced degrees from the major semiconductor and computer science universities in the U.S. And soon we will recruit from universities all over the world.

There are also a lot of outstanding people already in this valley, some of whom were trained at Fairchild. They are beginning to perceive that Fairchild, as a subsidiary of Schlumberger Limited, is going to have a strongly supported R&D program. We've already hired some extremely talented individuals, and we expect to find more who are attracted to the change in our philosophy and the commitment to solid research and development.

Q. Will R&D be working with groups outside of Fairchild, such as universities?

A. We've always had significant relationships with top semiconductor and computer science schools. I would say that those relationships will become stronger where they already exist, and also that we will expand our on-going relationships to include even more schools.

John Muschinske, a Senior Member of the Research Staff, uses an electron microscope to scan a 64K RAM, a device that will move from Palo Alto into pilot production at the South San Jose MOS plant late this year.

Q. You were recently named a vice president of Schlumberger Limited. How does this affect your role as Fairchild's Chief Technical Officer and head of the central R&D program?
A. There are really three facets to this new responsibility. The first, of course, is leading the central R&D program here in Palo Alto or wherever central R&D might occur in the future.

The second is serving as Chief Technical Officer of Fairchild. That means being involved not only with central research but also in the coordination of technical programs throughout the company.

I try to monitor key programs, both in semiconductor and systems operating units, giving assistance and counseling where necessary, helping to solve problems and so on. There will be times when I'll help define technical programs, but those programs will always be managed by the operating division.

The third area of responsibility is to oversee significant technical interactions between Schlumberger and Fairchild. This includes defining needs and assigning capabilities wherever Schlumberger operating units interact on a technical level with Fairchild operating units. My organization is also a technical resource on electronic technology for Schlumberger management.

Q. Are interactions already taking place?
A. Yes. There is activity between Enertec and Fairchild's Linear Products group on a new linear integrated circuit that will be used in the printing head of a CCD-based telecopier. There have been discussions between various entities of Schlumberger and the R&D Labs about signal processing, and about very high temperature applications of some of our advanced LSI technologies. The artificial intelligence laboratory, which is being established here in Palo Alto, will serve not only semiconductor and ATE needs, but also needs within Schlumberger. There are some very exciting prospects ahead in these interactions and collaborations.

Q. Speaking of prospects where do you see this industry heading?
A. In the foreseeable future, I think silicon will remain the primary material used by the electronics industry. The most significant developments will continue to center around the use of silicon technology in more and more advanced states.

Eight to ten years out, we'll be working with sub-micron technology in bipolar, NMOS, CMOS and CCD. We'll be building greater and greater complexity into both memory and logic, incorporating perhaps as many as 100,000 gates on one chip—and 100,000 gates is the complexity of the CPU of fairly good sized computers today.

The big challenge will come in the logic area—how to design and interconnect tens of thousands of gates into useful functions. There are significant problems associated with that complexity which will demand much greater use of computer-aided design technology, as well as the use of artificial intelligence. To be successful, it will be necessary to augment our intellectual productivity with machines.

Eventually there will be other materials. For example, gallium arsenide devices some day may be used for higher performance logic than we can get from silicon. But before that happens, there is an enormous amount of progress to be made with silicon, and there will have to continue to be a very solid silicon research.

Vic Mitrisin, Manager of Mask Making, demonstrates the new 40 megahertz electron beam mask maker, the only one of its kind in the world, for Jim Early, Manager of VLSI and Advanced Process Research.

QC Circles:

"I can make a difference"

It seems so simple; give everybody the chance to solve problems and you'll get more problems solved. Bipolar takes this "new" approach to improving product quality and gets first-rate results.

This, the audience soon realized, wasn't just a "little presentation." The speakers up front were whipping through charts, statistics, a detailed cause-and-effect diagram. They'd thought of every angle. And who could argue with the solution? Losses had been cut from an average of 20 per day to one or two. At the end of the hour, the impressed board members burst into applause.

The problem-solving experts were hourly production workers; the audience, seasoned managers. They had come together through the Quality Control Circle program—launched early this year in Advanced Bipolar. It's a program that's already having a major impact on the company.

"Suddenly people are realizing, 'Hey, I **can** affect my existence here. I can make a difference. Somebody's going to pay attention,' " says Circle Facilitator Jerry Muff. "It's an exciting feeling—and it's contagious."

There are now 15 QC circles in Mountain View and three in South San Jose. All members are production employees who meet for an hour a week, on company time.

The circle idea was planted at Fairchild last summer when J. M. Juran, an internationally known quality consultant, met with Bipolar management. During one session, he talked about quality circles in Japan, a movement that developed in the early 1960s.

"The concept intrigued us," recalls Frank Durand, Bipolar's Reliability and Quality Assurance Manager. "We pursued it with Juran and learned that circles were springing up all over the U.S. Dick Abraham (then Bipolar LSI Vice President and General Manager) thought the idea was terrific, so we started a program here."

Clockwise from right: Dorothy Ferguson, Circle Facilitator in Mountain View, was trained as discussion leader in one of the first circles; Jill Balde, Process and Device Specialist, explained to management the records kept in Fab 5 that showed the severity of the lost test wafer problem; Maria Patterson, P&D Specialist, speaks out during a brainstorming session of Final Test's circle, "The Untouchables;" the shift C circle in Fab 5, the "E.C.L. Pioneers," break from a typical meeting.

To get the program going, Jerry Muff, a former production supervisor who has a master's degree in counseling, was named fulltime facilitator. Two more facilitators have since been hired—Dorothy Ferguson, a longtime fab supervisor, and David Crowther, a former educator.

If companies want to improve product quality, say Juran and other experts, they should tap the experience and creativity of those who know the products best: the workers on the line.

"We've overlooked this resource in the past," admits Al Woodhull, Hi-Rel Business Unit Manager. "I think we've been plagued by the assumption that hourly people were here just to get a paycheck, that they didn't have any particular concern for the company. Well, we've certainly seen in the last few months that that isn't true. There's incredible talent on the line. Hourly people **are** concerned about the product, and they have great ideas for changes.

"At the same time, the people on the line have learned through their circle experience that management **will** listen. There's been education on both sides and benefits for both sides."

There are six to ten people in each circle, all volunteers. When the circles first started last January, Dorothy says she encouraged a few people she knew to join. "We sure don't need to encourage sign-ups anymore. Now when we go into a fab to make a presentation, about 95 percent of the group volunteers. We have to pull the names out of a hat."

People are clamoring to get in because the circles have gotten things done. Consider what's happened so far:

- The E.C.L. Pioneers, the circle whose presentation was described above, solved the problem of lost wafer runs in Fab 5. They did it by creating a special card that travels with the wafers that are pulled for testing. This card also tracks reasons for rejection. A videotape on the Fab 5 project will be shown in circle training sessions in Mountain View and overseas. It will also be shown to customers, because in management's view, nothing could better underscore Fairchild's commitment to quaity.
- Fab 8's circle created a "what-to-do-in-case-of emergency" poster that will be used throughout Bipolar; 500 copies are due off the press shortly.
- The Fab Maintenance circle asked Engineering for a presentation on chip design. They wanted to understand the purpose of the machines they repaired. That initial lecture was expanded into a 12-part series and has since been incorporated into Bipolar's regular training program.
- Genesis, the circle for Mark and Pack swing shift employees, said their area didn't have enough storage space. Supplies weren't organized, and they often wasted time hunting for things. The solution: several tiers of easy-access storage tubs and floor-to-ceiling shelves.

Some circles want more information on the company; others want to talk to managers who always seem to be on the run. Safety, supplies, communication, cross-training—no topic of concern is considered inappropriate. As Jerry explains, "We have a very broad definition of quality. It's **anything** that affects the quality of the product. It's not just how many good die are on the wafer."

Within the circles, people meet as peers. Though first-line supervisors are trained as discussion leaders, they function as one-vote members just like everyone else. Brainstorming, with no put-downs allowed, is always the first order of business with new projects. All decisions are made by consensus.

"Probably 80 percent of the problems we talk about can be solved at the supervisory level," says Jerry. Sometimes the facilitators can take care of a simple request in one phone call.

Clockwise from right: P&D Specialist Renee Bartholomew receives a test wafer along with the card developed by her QC circle; Lucy Moules, Senior Training Specialist, explains the reasoning behind the test wafer card; Jerry Muff, the original QC Circle Facilitator, is pleased with the program's progress; after a massive reorganization that was planned by "Genesis," the swing shift circle in Mark and Pack, Amelia Cabutage, P&D Specialist, has no trouble locating the correct size shipping tubes.

Major projects call for a presentation to first line managers. If management decides a circle proposal can't be implemented, the managers make a presentation to the circle to explain why.

One of the most important byproducts of the QC circle program, according to Jerry, is that is has given people a better idea of how the rest of the company works and of the problems faced by other areas. Take the matter of the tape shortage in Mark and Pack.

"The problem came up at a circle meeting," Jerry recalls. "It sounds like a little thing, but it was pretty irritating for the people in Mark and Pack. When there wasn't any tape, products couldn't be labelled and shipped."

What to do? How about a face-to-face meeting with representatives of Direct Stores? The meeting was arranged. Mark and Pack learned how the supply planners work, and the kind of inputs they need. They came away with a better understanding of the process—and their tape.

Just as circle members are coming to appreciate other departments, other groups within Bipolar are learning how helpful the circles can be. Before installing new equipment in Mark and Pack, Maintenance management brought blueprints to a circle meeting. As a result, they made several important layout changes.

As Al Woodhull points out, "In any manufacturing area, there's a whole maze of problems. Management can usually only tackle the big things like cost and productivity. Now there are a lot of people working to solve problems, not just managers and supervisors."

"I guess what's surprised me most," said South San Jose Facilitator Dave Crowther, "is how quickly people have become committed and involved. I thought they'd be more reluctant. This is just the third week of the program here, and already we're into a problem-solving mode!"

Frank Durand, a staunch backer of the concept from the beginning, says he was confident that it would catch on. But he wasn't quite prepared for the intensity of the enthusiasm. "People are so excited about being problem-solvers that many of the areas that don't yet have circles are lobbying for them. Hourly employees are discovering that their ideas **are** appreciated. Nothing inspires people more."

(As for the areas that don't have circles yet, Frank says be patient. The program has to grow slowly to be effective. Eventually, every department on every shift in Bipolar production will have a circle.)

But to really find out what the program has meant, you have to ask someone who belongs. Mary Cedoline, who has worked in Fairchild production for nearly 19 years, has some pretty strong opinions about quality circles.

"Without these meetings," she says emphatically, "we wouldn't get such quick action on problems. We're not afraid to speak up now. Management seems to care. It's been a big improvement in our area. People are listening, and things are getting accomplished. We should have had circles a long time ago."

Clockwise from right: Ann Bingham, P&D Specialist, and Teri Neal, Mark and Pack Supervisor, admire new storage tubs for flat pack carriers; David Crowther, Circle Facilitator, is getting new groups started at the South San Jose plant; Ann shows what the storage area looked like before her circle's ideas were implemented; all circle members participte in presentations to management, like Teresita Barrios, P&D Specialist, who here shows the remarkable drop in lost wafer runs resulting from her circle's solution.

Accommodating the Handicapped: A More than Equal Exchange

How many times have you heard a story about someone who became handicapped as the result of an accident or illness? You think about it for a few minutes, imagining how you might feel if you lost an arm or became paralyzed. But you quickly forget about it because you **know** it would never happen to you.

Forgetting about it hasn't been easy for Carl Horstmann, John Zimmer and Kevin David. Being handicapped is a reality they experience everyday. Like other Fairchild employees, however, they do—and enjoy—their jobs. And that makes anything the company can do to accommodate them more than worthwhile.

How does Fairchild accommodate employees with handicaps? According to Theresa Ramos, Employee Relations Specialist at the corporate offices in Mountain View, "Fairchild builds general accommodations into all buildings, making them accessible to handicapped people. Our accommodations include wide aisles, specially equipped restrooms, elevators and special parking facilities. If a facility is not accessible, plans are probably being drawn up to make it so," she says.

In addition to these general accommodations, Theresa emphasizes that she looks at each case individually. "If we find applicants who are qualified and we want to hire them, we'll make further arrangements to accommodate their disabilities," she says. "We also hold training sessions for all supervisors to familiarize them with the laws concerning handicapped employees."

Fairchild hires many handicapped people who have been trained by rehabilitation agencies such as Goodwill Industries. "We also utilize the Electronics Industry Foundation's 'Project With Industry', which is designed to bring together all outside sources," Theresa says.

Here Carl, John and Kevin talk about their experiences and job responsibilities at Fairchild.

Carl Horstmann says his battle with polio at the age of nine has taught him to strive for —and achieve—the important things in life.

John Zimmer uses a myo-electric prosthesis, an artificial limb that can grasp and carry nearly as easily as a human hand. Sensors in the elbow end pick up electrical impulses in John's arm as he thinks about picking up a mask layout, causing the fingers to open and then hold on.

A big part of Kevin David's job as Maintenance Mechanic is trying to figure out what's wrong with machines on GP-LSI's production floor, such as this socket inserter.

As a buyer, Carl enjoys finding cost-effective ways to fill the orders for production operations at Sub-Assembly Test Systems.

This schematic drawing of a new MOS microcomputer, the F3881, took John 60 hours to complete.

Carl Horstmann
Sub-Assembly Test Systems
Latham

Most nine-year-old boys enjoy sports and adventure, and they feel that life is waiting to give them the best. Carl Horstmann was no different—at least until he was stricken with polio.

That was in 1946. Now, 34 years later, Carl is a Buyer in Purchasing at Sub-Assembly Test Systems (SATS) in Latham, New York, and he's learned to live with the effects of the disease.

"I was so young, I didn't really understand what was happening," says Carl, who must wear mid-body and leg braces and walk with the aid of crutches. "I guess the experience of battling the disease has changed my outlook on life. Now that I'm older and have a family, I see how important it is to concentrate on striving for certain goals and achieving them. I know what it's like to go through physical therapy when you can't move a muscle in your body. If you're determined, you can do it."

Carl's father, a farmer in New York, found the only place for his son to receive proper treatment was the Children's Hospital in Utica, 100 miles from their home. "It was the only place that used the Sister Kenny treatment for polio, a hot blanket wrap method," Carl says. "I was in the hospital for two years and my family drove 100 miles every week to visit me. It was really hard on my parents because I needed everything except an iron lung. I couldn't even speak."

But Carl didn't let that stop him. Gradually he was able to speak and move again, and he completed his schooling at New York State University.

In 1972, he came to work for Faultfinders (one of the companies acquired by Fairchild to form SATS) as a Mechanical Assembler. Since then, he has been promoted several times and has held a supervisory position. "I've seen a lot of growth at this facility and been through a lot of changes. My coworkers have treated me well and I really enjoy my work," Carl says.

His supervisor, Jim Smothers, values Carl's contributions. "Carl is a very conscientious worker and has played an active part in cutting costs for us," he says.

In order to better accommodate Carl, Jim allows him to work 7:30 a.m. to 4 p.m., the hours he had while working in production. "Carl drives a specially equipped vehicle with a hand-operated gas and brake pedal, and the earlier hours allow him to commute in lighter traffic," Jim says. "These hours have also benefitted the department, because we're able to have coverage for the production floor when those workers begin their shift."

Carl's job has grown with the Latham operation, and his own goals continue to expand with the company. "Most of my job includes working with outside vendors," Carl says. "My experience has allowed me to get to know our products and I eventually hope to move into sales and marketing."

John Zimmer
Mask Designer
South San Jose

Have you ever stopped to think how much work your hands do for you? John Zimmer has.

John is a Mask Designer at the MOS plant in South San Jose. He lost his left hand and forearm in a logging machine accident two and a half years ago, but that hasn't stopped him from doing his job or enjoying life.

Six months after the accident, John went ahead with plans to get married. Now he's the father of a six month old son. He's even remained involved with sports, and was a starting player for the South San Jose softball team this summer.

"I played left field in every game," John says. He doesn't let his one-handed batting hinder him either: he got a hit in every game except one, helping his team make the league playoffs.

John's enthusiasm also shows in his job, designing circuits for MOS products. "We get the information from engineers either verbally or written," John explains, "and draw the design for manufacturing to follow."

"Once the drawings are complete, they are programmed into a computer which prints them on a reel-to-reel tape," he says. "The information from the tapes is fed into a machine called a plotter, which plots the drawings on copies and color-codes them."

John has been at Fairchild a little more than a year, and is a professional who knows his job. But it hasn't been easy for him. "I used to be a logger until

New electronic equipment, like this machine to automatically insert dozens of integrated circuits into printed circuit boards, gets a diagnostic run-through before being added to the production line at the San Jose Test Systems plant.

my accident and was used to working outdoors all the time," he says. "It was quite an adjustment for me to be inside at a drawing table most of the day."

Having always had an interest in art and drawing, John decided drafting would be the best career for him.

"I had to go back to school and start all over," he says. "Fairchild hired me from the California Academy of Drafting in San Jose and I've been here ever since. I don't need any special accommodations and everyone treats me as if I have two hands. I can put out the work just as accurately and as fast, in fact, maybe even faster than my co-workers," John says with a smile.

John uses a myo-electric prosthetic hand and forearm. "I'm right-handed but I use my left hand to hold instruments while drawing," he says, as he demonstrates how his prosthetic hand can grip his drawing tools.

A visit to John's work area confirms that his easy-going, self-confident approach to work has also helped him establish normal relationships with co-workers. "We get along well and keep each other on top of things here."

John says he plans to be with Fairchild for quite a while because "the growth opportunities here are tremendous. Fairchild is one of the only companies where a designer can progress without limit."

Kevin David
Line Maintenance
GP-LSI Systems
San Jose

Crash! "It happened so fast. My friend turned to me and asked if I was alright. I said yes, then in the next few moments realized I couldn't move my legs."

That was the beginning of a three and a half year rehabilitation and a lifetime of adjustments for Kevin David.

Kevin, a Mechanic for Line Maintenance at GP-LSI Systems in San Jose, became paralyzed below the waist as the result of an automobile accident. "It was two weeks after I graduated from high school," Kevin says. "My brother had just returned from Vietnam and my parents had this to face."

During the next several months, Kevin underwent hours of surgeries and physical therapy and tackled the adjustments of life in a wheelchair. "I have lots of friends who really helped me at that time. Fortunately, my parents are strong people and were very supportive too."

Before the accident, Kevin had planned to attend college and major in forestry or agriculture. "I wanted to be a fish and game warden, but luckily I've always had mechanical ability too," he says. "I enrolled at the Goodwill Training Center in San Jose and completed their program in electronic assembly. Fairchild came to Goodwill and hired me in May of 1976. I think one of the reasons I like my work so much is because I did have an interest in mechanics before my accident."

That same year, because of his success at Fairchild, Kevin was a runner-up in the Handicapped Worker of the Year competition sponsored by Goodwill Industries.

Kevin's job includes preventative maintenance and repair work for many of the machines at Test Systems. He is also capable of programming a VCD machine, which is used to automatically insert resisters and diodes on printed circuit boards.

"Fairchild sent me to Massachusetts last April to learn the programming and mechanics of one of our auto-insertion machines," Kevin says. He hopes to gain more electrical and technical training to become a technician and, eventually, an engineer.

Kevin doesn't need special accommodations to do his job, in part because the San Jose plant is accessible for wheelchairs. In fact, he seems to know someone in every department and has a good relationship with his co-workers both on the job and in company activities.

"I played on our softball team as umpire and even did a little pitching this year," Kevin says. "Sometimes people try to limit my capabilities, but once they get to know me, they let me handle things myself."

New Plant in Town

Fairchild comes to Cebu City

In July 1979, Fairchild began clearing a five-acre parcel of palm trees just outside Cebu City, the Republic of Philippines. Three months later the first building was up, and the first technicians had started training. By December, boxes of TO-92 transistors were rolling off the assembly line.

"When we announced our construction schedule, a lot of local observers shook their heads and said, 'no way,' " recalls Chuck Smith, smiling. "But everything's happened right on target. In fact this has to be the smoothest Far East start-up ever."

As General Manager of Manufacturing Services, Chuck is justifiably proud of what Fairchild has done in the Philippines during the past year. This August, only a year after groundbreaking, the 100,000-square-foot facility was completed.

Cebu City, 400 miles from Manila, is in the heart of the Philippine "South." Like the country's other urban centers, Cebu is densely populated: 800,000 people live in the metropolitan area. Fairchild, the first semiconductor company to locate there, will be the largest employer in Cebu when the plant reaches peak production in about three years.

In the spring of '79, Chuck Smith began scouting Southeast Asia for a new plant site. Fairchild already had plants in South Korea, Singapore, Hong Kong, and Indonesia. But rapid growth spelled the need for another.

Though other locations were considered, the Philippines quickly became the logical choice. "So many factors pointed to it," says Chuck. "The government is friendly to American industry. Labor is readily available. The country has a well-educated, English-speaking work force. And they have plenty of engineering talent, although most are not experienced in electronics."

Attracting industry has become a key focus of Philippine President Ferdinand Marcos. He is eager to diversify the country's export base, to move beyond the mainstays of timber, metals, and agriculture (sugar and coconuts). Eventually, he wants two-thirds of this country's exports to be factory goods.

"A member of the government's Ministry of Industry, Theodore Pena, was the one who really sold us on Cebu," Chuck says. "His helpfulness has really left no doubt that Fairchild made the right choice in selecting the Philippines for this operation."

New business, of course, means jobs —a prize commodity in the Philippines where unemployment, according to most estimates, runs about 25 percent. "We once put up a small sign saying that Fairchild would be hiring," says Chuck. "The next morning 500 people were waiting outside the door."

When Fairchild began operating out of temporary quarters last October, a few experienced semiconductor engineers were recruited in Manila. Most of the other 400 employees are from the Cebu area. However, six managers came from other Fairchild locations in the Far East and California. Plant Manager Y. I. Lee has worked on start-ups in South Korea and Jakarta, Indonesia. Three members of this management staff were born in the Philippines, and only one was new to the company.

Cebu General Manager, Y. I. Lee (left), pauses at the entrance to his facility with Karl Stahl, Process Engineering Manager, and Vera Quijano, Executive Secretary.

A temporary canteen for employees was erected outside while the inside cafeteria was being completed.

Like Fairchild's other overseas plants, the Cebu facility is a precision assembly operation. "We have all the latest equipment," Chuck says. It's highly automated, very sophisticated. There's no real parallel among our domestic facilities. Cebu is a big volume plant with a lot of pressure. But the people have shown they can handle it."

In addition to discrete products, the Cebu plant will also assemble integrated circuits. At present, the transistors they assemble are shipped to Hong Kong for testing. But Cebu will soon have its own testing capability.

The Fairchild plant is on Mactan Island, just off the east coast of Cebu. It was at Mactan that Ferdinand Magellan landed in 1521, claiming all the surrounding islands for Spain, and it was there Magellan was killed by native chieftan Lapu Lapu. In 1565, Spanish conquistadores came again to Mactan, this time to establish a colony.

The oldest city in the Philippines is now home to high techology. The contrasts between the old and the new, the rural and industrial, still strike outsiders. A few hundred yards from the brand new, highly sophisticated semiconductor plant lies the jungle; on the other side, a tropical beach. Construction laborers carry huge palm fronds with them to provide portable shade while they work. Water buffalo roam near the plant boundary. It's not like any Western industrial scene.

Since the groundbreaking the Cebu community has taken a real interest in Fairchild. On most weekends there's an informal open house to which 10-15 local residents, often families of employees, are invited.

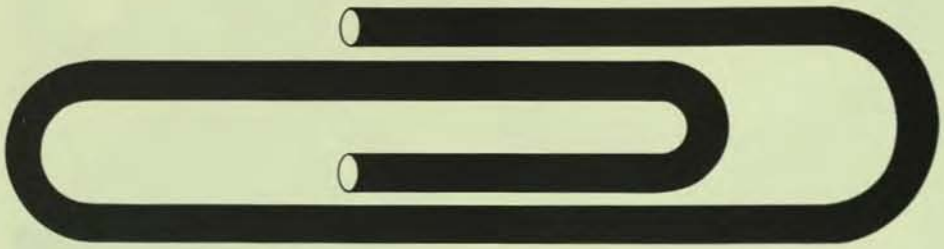
"We have a show-and-tell," says Chuck, "and they get to see where their relatives are working." This October, when the formal dedication ceremonies are held, it's expected that community leaders will turn out in full force.

Already a number of small businesses are springing up near the plant—stalls selling soft drinks and local delicacies. "But they're just a hint of what's to come. The companies in this industrial zone will soon send ripples through the entire economy. You name the service, we'll need it—shipping, construction, maintenance. We'll be heavy utility users. The growth here is just going to affect everything—from real estate offices, to grocery stores."

"Sometimes you see a new plant start up, and you wonder if anyone besides the employees knows about it. You never hear the name mentioned around town. Well, in Cebu, it seems like everyone's heard of Fairchild. People know this plant. And it's already making a difference in their community."

Fairchild's new assembly plant in Cebu City, Republic of the Philippines, stands at the edge of a palm grove near the coast of Mactan Island.

Operators use the most advanced equipment to assemble TO-92 transistors.



Schlumberger Stock Splits; Earnings Are Up

On July 17, Schlumberger Limited's Board of Directors voted a three-for-two stock split to shareholders of record September 15, 1980. Certificates of the new shares will be mailed on or about October 14, 1980. Shareholders entitled to fractional shares may purchase up to a whole share or sell their fractional interest at the prevailing market price.

The Board also declared a quarterly dividend of 37.5 cents per share on a pre-split basis, up from 33 cents per share. This corresponds to an annual dividend of $1.50 per share, compared to $1.32 per share previously. After the split, the quarterly dividend will be 25 cents per share, corresponding to an annual dividend of $1. The dividend will be paid on October 15, 1980, to holders of record on September 15, 1980.

During the second quarter, Schlumberger's net income rose 46 percent to $234 million. Earnings per share were $1.85 compared to $1.26 in the same period last year. Second quarter revenue increased 55 percent to $1.24 billion. Excluding Fairchild, the revenue increase was 28 percent.

R & D To Study Artificial Intelligence

On September 12, Fairchild announced the formation of an Artificial Intelligence Laboratory at the Research and Development facilities in Palo Alto.

Dr. Peter Hart, formerly Director of Artificial Intelligence at SRI International, will direct the new laboratory and will report to Dr. Tom Longo, Vice President of Schlumberger and Fairchild's Chief Technical Officer. Dr. Hart will be joined by Dr. Harry G. Barrow, Dr. Richard O. Duda and Dr. Jay Martin Tenenbaum.

The new laboratory will undertake a broad range of research activities with the objective of introducing artificial intelligence technology into the operations of both Fairchild and other businesses within the Schlumberger group. Important applications for artificial intelligence include such areas as VLSI design, automatic testing of complex components, software program generation and expertise modeling.

Schlumberger agrees to merger with manufacturing Data Systems

On September 18, Jean Riboud, Chairman of Schlumberger Limited, and Kenneth R. Stephanz, President of Manufacturing Data Systems Incorporated, announced that they had reached an agreement in principle for the combination of MDSI with Schlumberger. The transaction would involve a tax-free exchange of securities on the basis of .425 share of Schlumberger common stock on a pre-split basis (or .6375 share on a post-split basis) for each share of MDSI common stock.

On the basis of approximately 2,987,000 MDSI shares outstanding, approximately 1,270,000 Schlumberger shares on a pre-split basis would be issued. MDSI stock options will become options to purchase Schlumberger shares on a comparable basis.

Completion of the transaction will be subject to approval by the directors of both companies and stockholders of MDSI, execution of a definitive agreement, certain governmental approvals, receipt of a ruling that the transaction will qualify as a tax-free reorganization, qualification of the transaction as a pooling of interests, and other customary conditions. It is expected that the transaction will be completed late in 1980.

MDSI, headquartered in Ann Arbor, Michigan, provides computer assisted software services for numerically controlled machine tools and other specialized computer services for manufacturing industries.

Annual Competition Opens for Fairchild Scholarships

Sending a high school senior back to school this fall? Then you're probably already worrying about the high costs of college looming on next year's horizon.

Fairchild can help ease the burden of college expenses through the company scholarship program for employees' children. Five grants of $2,000 each, renewable annually for up to four years, will be made for the '81-'82 school year. The grants are good for full-time undergraduate study at any accredited U.S. college or university.

The competition is conducted by the College Scholarship Service, a division of the Educational Testing Service, Princeton, N.J., where a board of educators evaluates the applications based on scholastic achievement, community and school involvement, and scores on the College Entrance Examination Board's Scholastic Aptitude Test (SAT).

Students applying for Fairchild scholarships must be either high school seniors who will graduate during the current academic year, or high school graduates who have not previously attended college.

Scholarship recipients must be the dependent children of full-time Fairchild employees or retired, permanently disabled or deceased former employees. The parent must have completed at least two years of full-time service by September 1, 1980.

Except for retired, permanently disabled or deceased former employees, the parent must also be employed by the company on September 1, 1981 for the student to accept the award. The parent must also be, or have been, employed in Fairchild U.S. operations, or be an expatriate (an employee temporarily working outside the U.S.).

Application forms and complete scholarship program information are now available from all personnel managers. The deadline for filing applications is December 1, 1980.

Opto, Northern Europe honored with sales awards

Presentation of the year's top sales awards led off the 1980 International Marketing Conference, held at the Marriott Hotel during the last week of July.

Barry Davidson, Sales Manager for the Northern Europe area, Scotland office, won the International Sherman Fairchild Award for Sales professionalism. Eric Epding, then Product Marketing Manager—International for Optoelectronics, received the honors for Professionalism in Sales support.

The awards, which are also known as the Excalibur Awards because a beautiful silver and Steuben crystal replica of the legendary sword in the stone is given to each recipient, recognize outstanding development of customer relationships, motivation, organization, creativity and sensitivity to the needs of co-workers. Nominees are proposed by each of the seven international semiconductor sales regions and are selected by top management.

This year's conference attracted 65 of Fairchild's managers and key marketing people from around the world, as well as 150 domestic employees. During the week-long meeting, they traded needs, plans and projections about marketing strategies for the year ahead.

Eric Epding (left), Product Marketing Manager—International for Optoelectronics, received a silver and crystal award and the congratulations of Components Vice President George Wells for his outstanding work in sales support.

Barry Davidson, who is Sales Manager for the Northern Europe area in Fairchild's Scotland semiconductor sales office, acknowledges the award for Sales Professionalism that he received at this year's International Marketing Conference.

Latham Building Honored for Architecture

The Latham, N.Y. headquarters building for Sub-Assemly Test Systems has won an award for the architectural firm that designed it.

Einhorn, Yaffee and Prescott, an Albany-based firm, received recognition for innovative used of concrete from the Eastern New York Chapter of the American Concrete Institute. The 90,000 square-foot facility, located on a 21 acre site, houses both manufacturing and offices for the division.

The building is described as "somewhat unique" in its use of two different methods of concrete construction. The manufacturing area is walled by precast, insulated concrete panels, while the offices are enclosed by poured-in-place concrete. The office area is also surrounded by a grassy earth berm.

The building's architects estimate the combination of insulated concrete and earth will save about $10,000 per year in energy costs over conventional construction.

An innovative use of concrete that will save $10,000 in energy bills each year is an award-winning feature of Fairchild's Sub-Assembly Test Systems headquarters building in Latham, New York.

PATENTS

Fairchild's technological leadership depends, to a great extent, on the creativity of its people. Inventors listed on patents issued to Fairchild from June-August, 1980, appear below.

Bipolar LSI
Robert Berry
Integrated Circuits Structures Utilizing Conductive Buried Regions
Patent No. 4197143

Components
David Krupp and Robert B. Hood
Electronic Control System
Patent No. 4209833

MOS Products
John Y. Chan
Use of DC-Less Ratio State In Conjunction With/Without Delay Transisitor To Operate In An Erase Mode Condition and Sense Input Data Applied to MOSFET Dynamic RAM
Patent No. 4214175

Systems
Richard W. Holland
Electrical Device Connectors
Patent No. 4217020

Nicholas F. Talesfore
Digital Clock
Patent No. 255432 (Design)

TECHNICAL WRITING AWARDS

Fairchild employees authoring technical articles for presentations or publication in appropriate professional journals receive cash awards as part of the Technical Writing Incentive Awards Program. Technical Writing Awards appearing below were given from March-June, 1980.

Advanced Bipolar and Digital
Paul Chu
"Implementation in 8-Bit Slice ECL"
DIGITAL DESIGN
PROGRESS

Hemraj Hingarth
"4000 I^3L Gates in Array"
DIGITAL DESIGN
PROGRESS

Linear Products
Theodore Vaeches
"Circuit Idea—Multichannel Aids Converter Evaluation System"
DIGITAL DESIGN

MOS Products
Dennis Lunder
"Microcomputer Education: Present and Future"
PROGRESS

Semiconductor Marketing
Tony Pope
"Designing with High-Current Regulators"
PROGRESS

Research and Development
Bruce Deal
"Standardized Terminology for Oxide Charges Associated with Thermally Oxidized Silicon"
JOURNAL OF THE ELECTROCHEMICAL SOCIETY
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IN THIS ISSUE

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Cover: Janet DeBlasi, Process Engineer, and Dr. Ron Glaze, manager of CCD—Computer Aided Design, put a computer to work on integrated circuit design at the Research and Development laboratories in Palo Alto.

HORIZONS

FAIRCHILD CAMERA AND INSTRUMENT CORPORATION ▪ SUMMER ▪ 1981

Fairchild's Ultra-Marathoner Ron Kovacs

IN THIS ISSUE

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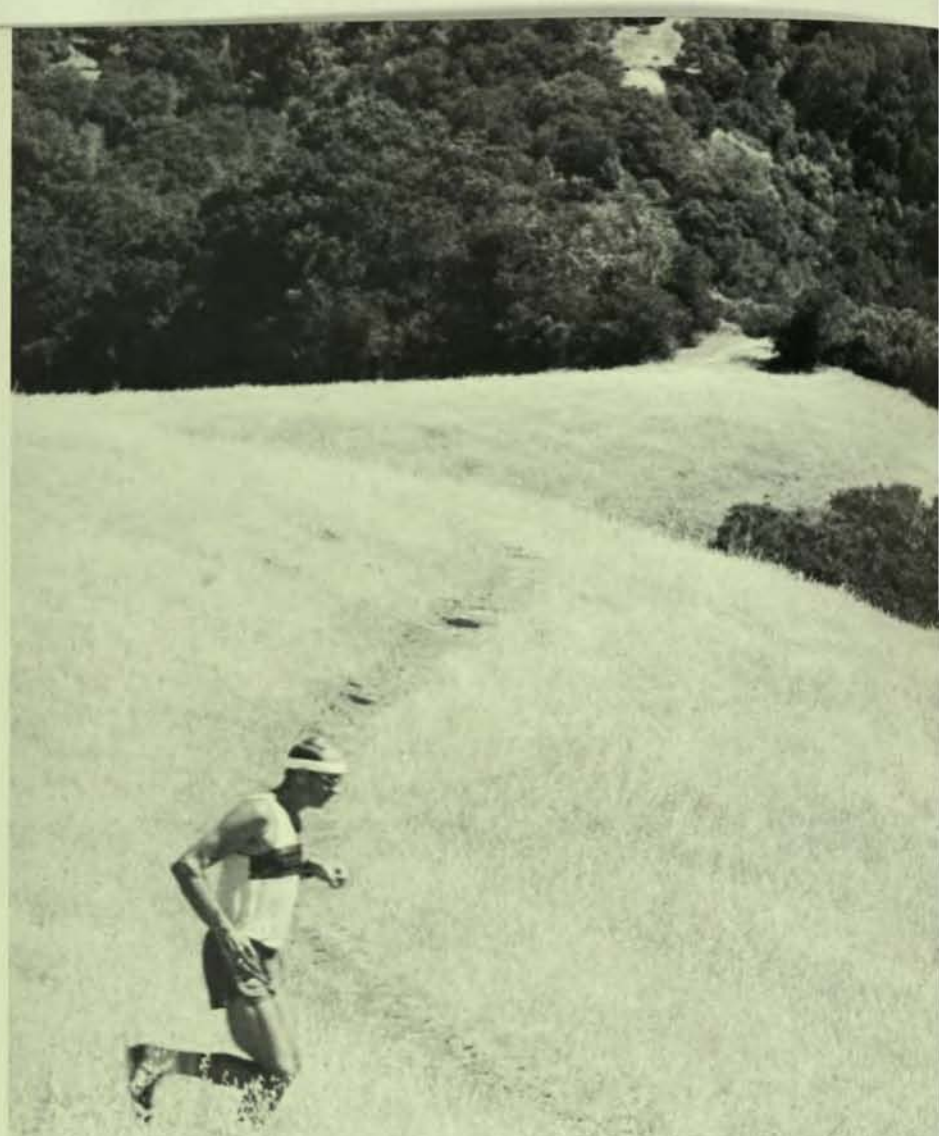


See How Far He

Some people climb mountains. Ron Kovacs runs. And how he runs. Not five or 10 or even 15 mile races, but ultra marathons: runs that are 50 to 100 miles.

Ron is a Research Project Engineer for the Bipolar Development Line at Fairchild's Advanced Research and Development Laboratory in Palo Alto. He's been at Fairchild for 15 years. In fact, although he lives six miles from work, he takes the long, hard way of commuting: he runs a circuitous 35 mile route through the foothills one day a week as part of his rigorous training, in addition to his normal five mile lunch hour jog in the hills above the lab, and after work runs of 10 or so miles. All of this training prepares Ron for the ultimate race: the ultra marathon.

"Ultra running is anything over the marathon length of 26.2 miles," Ron explains. "A 50 miler is the most common race. There are also 50km (31 mile) and 100km (62 mile) runs. Many of them are run on a track so that accurate records can be established. And there are special runs that are picked for the course, such as the 72 mile run around Lake Tahoe."

Ultra running may be relatively new to modern running enthusiasts, but it's an old and venerable form of sport which began in the thirteenth century in Europe and peaked at the end of the nineteenth century. In the late 1800s "pedestrian races" with big money sponsors were a popular form of entertainment in the United States. They were six day events, usually held indoors in a track

Runs *Ultra-Marathoner Ron Kovacs takes 100 mile races in stride*

or stadium, and the participants were permitted to run or walk. The record pedestrian race runner covered 650 miles in six days. The pedestrian race declined after World War I, possibly because the advent of the automobile made any kind of pedestrian travel unfashionable.

The marathon itself has an honorable history. In 490 B.C. the Greeks won a major victory over the Persians and heralded their conquest via a courier who was a long distance runner. The 26.2 miles he covered to carry his message home to Athens became the traditional marathon distance of the modern Olympiad.

After Frank Shorter won the Olympic marathon for the United States in 1972, marathon fever spread. In 1971 there were only 10 annual marathons in the United States; now there are more than 200, with 26 on the West Coast alone. However, some distance runners seek a still greater challenge.

For Ron Kovacs, the evolution from runner to ultra runner, was linked to a progression of small, but significant events in his life.

"I was an 880 (½ mile) runner in high school, but in college I got involved in other things," he remembers. "A few years ago I found that even though I was playing tennis three times a week and riding my bike to work, I was still overweight. The problem is I like to eat. So a friend took me to the Sunday fun run at Foothill College. That got me hooked on running — but running short distances only."

Ron entered his first marathon, The Paul Masson Cupertino, Calif. Run in 1979. He finished it in three hours and 28 minutes, a respectble time which placed him among the top third of the finishers. Then he began to run in earnest. Long distance running is a sport that seems to improve with age, like wine. "At 42 I'm in the master 40-49 year old category, but my age doesn't seem to influence where I finish in the field of runners of all ages. Maybe I've developed endurance or a philosophical attitude which helps. I don't know."

Ron entered his first ultra marathon in 1979: the Western States 100 mile run. To qualify he ran a 50 miler, the Pacific Association Championship run from Marysville, Calif. to Sacramento. "The Western States Run

made me realize what my potential was. I came in eleventh in the race, which draws top runners from throughout the world. My personal record in 50 mile ultra runs to date is 6:10 (6 hours, 10 minutes). The United States Masters record is 5:25." Ron also went on to achieve his personal best of 2:56 in a 26.2 mile marathon, and to test his endurance in the Hawaiian "Iron Man" Triathlon in January 1980.

This event requires participants to plow through 2.4 miles of rough-water ocean, bike 112 miles around the island of Oahu — and then run a standard marathon. Out of a field of 114 entrants, Ron finished sixty-fourth. "I fell back in the swimming part of the race at Ala Moana Beach; I was next to the last out of the water," he apologizes. "It wasn't the easiest way to sight-see Oahu either." Once, during the 14 hours and 48 minutes of the race, Ron lost the course and ran through the lobby of a Waikiki Beach hotel before he got back on track.

Ron has developed a rigorous training program and a positive mental attitude when he runs. "During the first half of a race I feel wonderful, confident, in control of my body, physically powerful. I try to keep that feeling to deal with the pain that comes inevitably in the last quarter of the race. My head controls the first three quarters of the race; the last quarter it's the body fighting the mind. It's not so much sore muscles, but a draining of energy that occurs. You can run 20-30 miles on blood sugar, then you start burning fat. Everything loses importance except finishing the race. To make sure I'm alert I do mental calculations, like figuring out the pace I have to keep to complete the distance."

The fat burning process of ultra running dropped Ron's weight 45 pounds. He's a lean 6'2" and 175 pounds. "That's still too heavy for a runner," he protests. "Every pound can slow you down."

Ron's usual diet includes plenty of salads and liquid. The week before a race he'll load up on protein and three days before switch to a high carbohydrate diet. During a race he'll eat candy, fruit and juice to raise his blood sugar.

For his once-a-week run to work, Ron rises at 4:30 a.m. and is on the

road by five, carrying liquid, aspirin and other runner's paraphernalia. It usually takes him five and a half hours to complete the route; he works late that night, then runs six miles home.

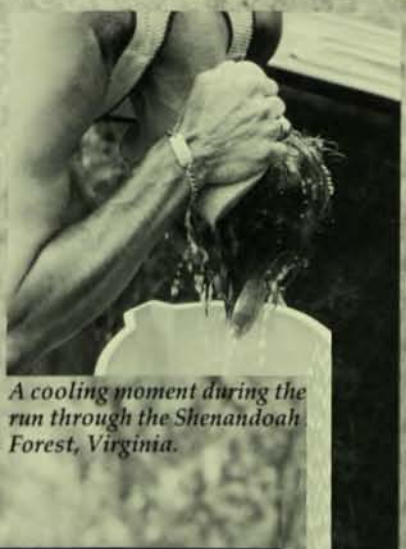
"Running has actually helped me at work and with my family," he says. "I'm able to put everything in the right perspective. My wife runs, too, and my son does age-group running. In fact, my wife and son serve as my running crew for my races. I find that I'm more efficient with my time, at work and off. I won't watch a television show unless it's really good. My socializing is selective."

How does it feel to be 75 miles into a 100 mile run — and know that you still have 25 long, rough miles to go?

Ron, waxing philosophical, searches for an analogy. "It's as if you've had a long day at the office, with the usual stresses and strains, gone shopping after work, run a few errands, and come home to find everything in complete disorder — and you have to clean it up. You have to summon that last ounce of energy to do it." Then he adds a more joyful comparison. "You can't be impatient. You have to feel as if you're on a trip, enjoying what you're doing while you're doing it — not thinking so much of the destination."

And why does a man with a satisfying career and family life push himself to the limits of his endurance?

"I've done some things pretty well in my life and I've had a few failures — but I can deal with those. Now I want to know that I've developed my potential and done my very best. I'd like to do one thing very, very well in my life. Right now, at least, that thing is running."



A cooling moment during the run through the Shenandoah Forest, Virginia.

It's full speed ahead for the

All systems are "go" for Fairchild's F9445, the world's fastest 16-bit microprocessor. This single-chip device, which Fairchild is providing in sample amounts to customers this summer, is scheduled for shipment in limited production quantities this fall.

The F9445 zooms into the marketplace after two and a half years of team effort by Fairchild scientists and engineers in Palo Alto, and at the new Microprocessor Division's headquarters in Santa Clara.

Says Peter Verhofstadt, Engineering Manager for the division: "The F9445 is a high performance 16-bit microprocessor designed for use in systems that need high speed computation such as in real time environments, controller applications, and digital signal processing. It is also an excellent processor in adverse environments — for example, where there are high temperature conditions or exposure to severe radiation — which prohibit the use of other microprocessor types."

The people who developed the product drew heavily from Fairchild's previous experience in microprocessor design.

"There was a blending of skills and experience from a team of process engineers, circuit designers, software designers, equipment and systems experts," explains Peter. "We also drew from Fairchild's technological leadership in bipolar semiconductor devices."

Ashok Suri, Manager of Software Architecture and Systems, directed the overall program of software, architectural and logic design. Shai Mor and Gary Burke, Supervising Engineers for Processor Development, carried out most of the actual architectural design tasks. Hem Hingarh, Manager of Circuit Design, was the major contributor to the actual layout of the F9445 chip itself; and Chuck Erickson, Manager of Systems Development, was responsible for the design of support circuits, which allow the microprocessor chip to cooperate with other system elements such as memories and printers.

Fairchild's F9445 is the fastest microprocessor on the market today

"Software development alone was an incredible task," says Ashok Suri. "We had to define our software requirements, form a team to design and develop it, find equipment to do the job, and develop and debug 100,000 lines of instructions in computer code — all in two years time. Normally, that effort would require five to six years of development time."

Speed is important in any computer function, and awesome speed is the F9445's key attribute. For example, the hardware multiply and divide instructions are three to five times faster than other 16-bit microprocessors.

This speed means that the F9445 can handle the high frequency signals used in telecommunications systems, and it can perform control functions in a "real-time" mode. For example, in the steelmaking process, it can receive information about temperatures and flow rates and make the proper adjustments in "real time" — or while the operation is still in progress.

This capability, combined with the F9445's tolerance for harsh environments and low power requirements, makes the device truly a super-processor.

What is a microprocessor?

A microprocessor is a small, powerful computer built on a single chip of silicon less than a quarter of an inch square (about the size of your finger nail).

In the early 1970s advances in semiconductor technology made it possible to pack more and more functions on a single chip. For example, in a pocket calculator, one chip (rather than three or four) could perform all the necessary mathematical functions. However, each calculator manufacturer wanted to offer unique features — and economical production of customized calculators became increasingly difficult.

The solution to the problem was the microprocessor: a small, standard chip which could be customized with software (programming that instructs the chip) while the basic design remained the same.

Today's microprocessors have thousands of applications in industry and consumer electronics. They receive and process information and perform a wide variety of functions — from running the fuel system of an automobile engine to controlling an entire manufacturing process.

The first microprocessors were 4-bit devices. Bits are electronic symbols of "ones" and "zeroes" that form the "words" in computer language. Any word or number can be represented by a selected combination of ones and zeroes. A 4-bit microprocessor can accept words in lengths of 4 bits. The improved microprocessors of the 1970s advanced to 8-bit and 16-bit capabilities and also became faster in their processing ability. And Fairchild's F9445 is the fastest microprocessor on the market today.

More than 100 years ago, Clara Barton inspired an idea for nursing which is legend today. During the Civil War, she could be seen leading medical supply wagons through mud up to her knees, her long skirt pinned around her waist. And when a tent was not available, she wrapped herself in a blanket and slept on the ground. She was called "angel of the battlefield," and went on to found a great nursing organization, The American Red Cross.

Clara Barton brought nobility to the nursing profession—and nobility is still the nurse's hallmark. Today's nurses also prevent, as well as respond to, disaster. And they carry their professionalism into a specialty that is becoming increasingly important: occupational health nursing.

ANGELS OF INDUSTRY

Fairchild's occupational health nurses at work

"Occupational health nursing is specialized nursing," says Dr. John McCue, Fairchild's Medical Director. "It means working with people in an employed status, dealing with accident and safety concerns, and providing health counseling or maintenance." Dr. McCue emphasizes that our nurses "have always been encouraged to be independent. They are professional people who work independent of immediate supervision, and who have the initiative to make nursing decisions within the guidelines of our medical directives."

Marlene Pereira, Brazil Plant Nurse: "For me nursing is a complete devotion, without discrimination because of age, color, creed or social condition."

Just what do Fairchild nurses do? Take blood pressure? Help employees with drugs or alcohol abuse problems? Counsel employees with family problems? Yes, all of the above—and much more.

Like Clara Barton, they still dress wounds—the result of on-the-job accidents. But they also dispense over-the-counter medication, control bleeding, manage toxic inhalation cases

B. H. Lee, Korea Plant Nurse: "In my role as safety and mental health counselor I am like a sister or mother to our young employees — especially those who are of marriageable age."

and prevent shock. They counsel employees with health problems and provide referrals to medical and community services. They maintain records and reports required by the government, such as the Occupational Safety and Health Agency (OSHA). They promote health education.

Each Fairchild facility places unique demands on our nurses' time and expertise, depending on the type of work done in a particular operating unit, the manufacturing environment, and the community in which the Fairchild facility operates.

Pat Alvarado

For example, Pat Alvarado, Senior Health Counselor for Component Test Systems (CTS) in San Jose, has been a Fairchild nurse for eight years, serving in almost all Northern California locations. Because Jan Dahlin, Personnel Manager, Component Test Systems Sales, is particularly active in recruiting handicapped workers for CTS, Pat finds that working with these employees has become an important segment of her job.

"I try to accommodate them in their jobs," she explains, "For instance, I see that our employees in wheelchairs find the best way to do their jobs and that obstructions to wheelchair access are removed. I also work with several hearing-impaired employees on our staff. They are interviewed with an interpreter prior to employment, and the interpreter also accompanies them

Diane Dunn

through orientation. All physically handicapped employees have an 'able buddy' who can assist them during emergencies such as building evacuation."

In addition to her work with handicapped employees, Pat also operates a special weight control group—a "thin group" as she calls it. "We have weekly weigh-ins, review instructional literature, have group discussions, and select a special diet plan. I'm proud to say that three of our people lost 10 pounds during 10 weeks in this program."

Pat is very involved in the counseling aspects of her job. "I try to resolve problems here first, then I turn to community resources. I work with the employees, their families, neighbors and friends. It's a very satisfying role to play."

For Mary VanHollen, Health Counselor at the Xincom facility in Canoga Park, Fairchild nursing represented a change of career direction. She has also done critical care work at a major hospital and has taught nursing. With a Master's Degree in Nursing Education and a B.A. in Political Science (including a specialty in Public Law), Mary is proficient in dealing with Worker's Compensation cases in particular.

Mary joined Fairchild in August 1980 "because I wanted to keep healthy people healthy. I like getting to know people on a long-term basis and learning about their jobs. If I know what their basic health pattern is, I know how to help when they do get sick."

Mary has run preventative programs, such as a no-smoking campaign. She also supervises fire drills, and, like other Fairchild nurses, coordinates Worker's Comp classes for supervisors, and Red Cross training in cardio pulmonary resuscitation (CPR) and first aid. She sees pregnant employees monthly for weigh-ins, blood pressure checks, and to monitor their activities and their diets. "We have an OB kit so I could deliver a baby, but that hasn't happened yet," she adds, with a tone of both chagrin and relief.

At Fairchild's Advanced Research and Development Laboratory in Palo Alto, you might expect a diminished number of industrial accidents. But it turns out that Diane Dunn, the laboratory's nurse, confronts many problems related to hazardous chemicals. Diane also handles administrative details on the radiation badge program, designed for employees who work with radioac-

Wilhelmina Bollozos, Day Shift Nurse, Cebu Plant: "Industrial nursing at Fairchild Cebu embraces not only medical care for employees but also safety and accident prevention, constant monitoring of cleanliness and food served at the canteen, and a lot of counseling."

tive material. The badges are collected periodically and monitored to see if they have absorbed any radiation.

"There's a lot of paper work involved in this kind of nursing, a lot of contact with people, and a great variety of work," says Diane. "It's a real change from hospital or clinic nursing."

Administrative work, employee and staff problem solving and training programs are also a big part of Jane Hall's work. As Manager of Medical

Jane Hall

Services, Analog and Components Group, Jane is currently developing a training program, through the Resource Development Center, to help meet government requirements. Jane also helped develop the medical portion of the orientation for new employees in wafer fabrication areas.

Linda Smith, Senior Corporate Nurse, who practiced almost every aspect of her profession before joining Fairchild ("I taught psychiatric nursing, was a visiting nurse, worked in hospitals, did clinical work"), sees her role as Corporate Nurse still evolving. "Essentially I assist and represent Dr. McCue in developing and carrying out all aspects of the corporate medical program."

All Fairchild facilities have staff nurses and consulting physicians from their communities. Jakarta has doctors on staff, in addition to nurses. Dr. McCue, reiterating Linda's statement, notes that "our nurses are very receptive to our teaching efforts. They are eager to learn and I've found my two visits to our Far East facilities very rewarding."

Although there is nursing coverage during the day, swing and graveyard shifts at most facilities, occasionally the midnight to 5 a.m. slot is not covered by an on-site nurse.

Maria Torres, Mexico Plant Nurse: "I supervise staff nourishment, safety equipment, and medicine."

In such cases, trained First Aiders (employees who have completed Red Cross classes on first aid) are available on site to administer CPR and handle other medical emergencies. However, a nurse and a consulting physician are always on call.

The health and safety of Fairchild employees is of primary importance. Dr. McCue emphasizes repeatedly that our nurses are here to help. Employees do not have to have an immediate medical emergency in order to see them, he says: health counselor's offices are always open for information and guidance on any problem related to physical and mental health. Keeping Fairchild healthy is what the nursing business is all about.

Dr. John McCue

International Year of Disabled Persons

The United Nations proclaimed 1981 as the International Year of Disabled Persons (IYDP), and chose as its theme "the full participation of disabled persons in the life of their society."

"The theme for this year was established by the United Nations with the cooperation of individual nations and businesses within those nations," explains Theresa Ramos, Employee Relations Specialist who serves as Fairchild's liaison to the IYDP Corporate Partnership Program. "As a Corporate Partner Fairchild has made a firm commitment to the IYDP goal for disabled persons' full participation in the life of their society."

Theresa is also a member of the National Advisory Board of the U.S. IYDP Council. "Fairchild has been a leader through our efforts to take affirmative action on behalf of disabled people," she says. "I continually see the advanced level of our program. Fairchild has already integrated many programs into everyday operations that help meet the goals for the IYDP."

How can an organization, and its employees, make full participation a reality for the disabled?

"There's no limit to the creativity we can use in the human relations area," Theresa comments. "Although we realize disabled people are valuable resources to the business community, we can always do more to achieve our goals. We still have to deal with some basic attitudinal problems."

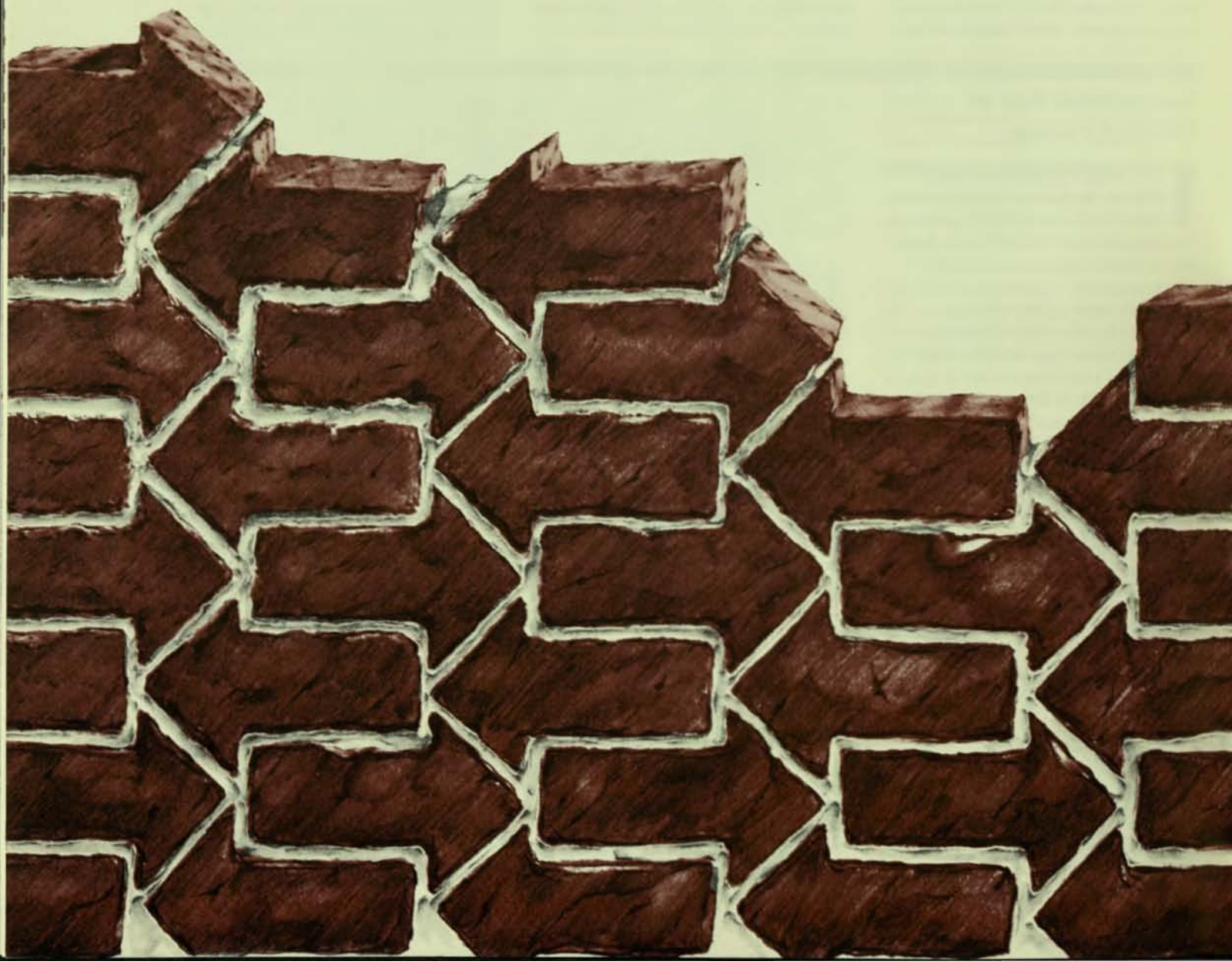
Pat Alvarado makes sure that assembler Robert Valencia can maneuver his wheelchair through the work area.

Fairchild's Corporate Equal Employment Opportunity (EEO) Department conducts a training seminar for management personnel throughout the corporation. The seminar deals with all aspects of EEO and includes a film entitled "A Different Approach." The film takes a humorous approach to the problems of disabled people—showing that we all have handicaps in some form, whether visible or not.

"We can help make the theme of this International Year a reality by considering a person's abilities first—not the disabilities," Theresa says. "'A Different Approach' shows very emphatically that handicaps can be overcome."

HOUSE BUILT ON A STRONG FOUNDATION

Industry & universities cementing cooperation in electronics research



A thriving partnership, based on research, is being built between major universities and companies such as Fairchild. Its foundation is the belief that the future of electronics rests equally on the pillars of industry and the ivy-covered walls of academia.

"Basic research is being done in the universities," said Dr. C. Lester Hogan to graduating engineers at the University of California, Berkeley. "We (in industry) can and should... nurture and encourage these sparks of genius."

"Our university system has more people with the skills necessary for tomorrow's industry than does any other university system in the world. Our future depends upon our ability to bring forth another explosion of research in the next 10 years. Industry itself must support research at American universities."

Dr. Hogan, former Fairchild President and Vice Chairman, now a Director and Consultant, is also a member of an advisory board of corporate sponsors for Stanford University's new Center for Integrated Systems. Designed to accelerate the development of electronic technology, the center is typical of programs springing up around the U.S. which combine resources of academic and industrial institutions. Similar research centers exist at the University of California, Massachusetts Institute of Technology (MIT) and the California Institute of Technology.

Stanford has set ambitious goals for its new venture: to increase the complexity of silicon chip circuitry, to develop the software needed to design and utilize the new circuits, and to turn out graduates able to design radically new communication and computational systems using such circuitry. The University estimates that 100 masters degrees and 30 Ph.Ds will be awarded per year.

Fairchild's support for the Stanford center demonstrates the company's interest in reviving old relationships and initiating new cooperative programs with universities in all parts of the world. Says Rob Brandt, Corporate College Relations Manager:

"Until now, much of the work we have done with colleges and universities has been on an informal basis. Fairchild employees remember their alma maters when it's time to donate equipment, consult with faculty members who are setting up new technical programs, or provide guidance in a one-on-one framework."

However, formal liaisons between Fairchild and universities are rapidly expanding. The Advanced Research and Development

Laboratory in Palo Alto administers a growing number of university research and affiliate programs. For example, the Cooperative Education Program already in place offers undergraduate and graduate engineering students an opportunity to gain real world experience while they're still in school. At universities such as MIT students spend two undergraduate summers and six months of graduate training working at Fairchild. This summer there are 15 MIT students at Fairchild's San Francisco Bay Area locations and two at the South Portland, Maine plant.

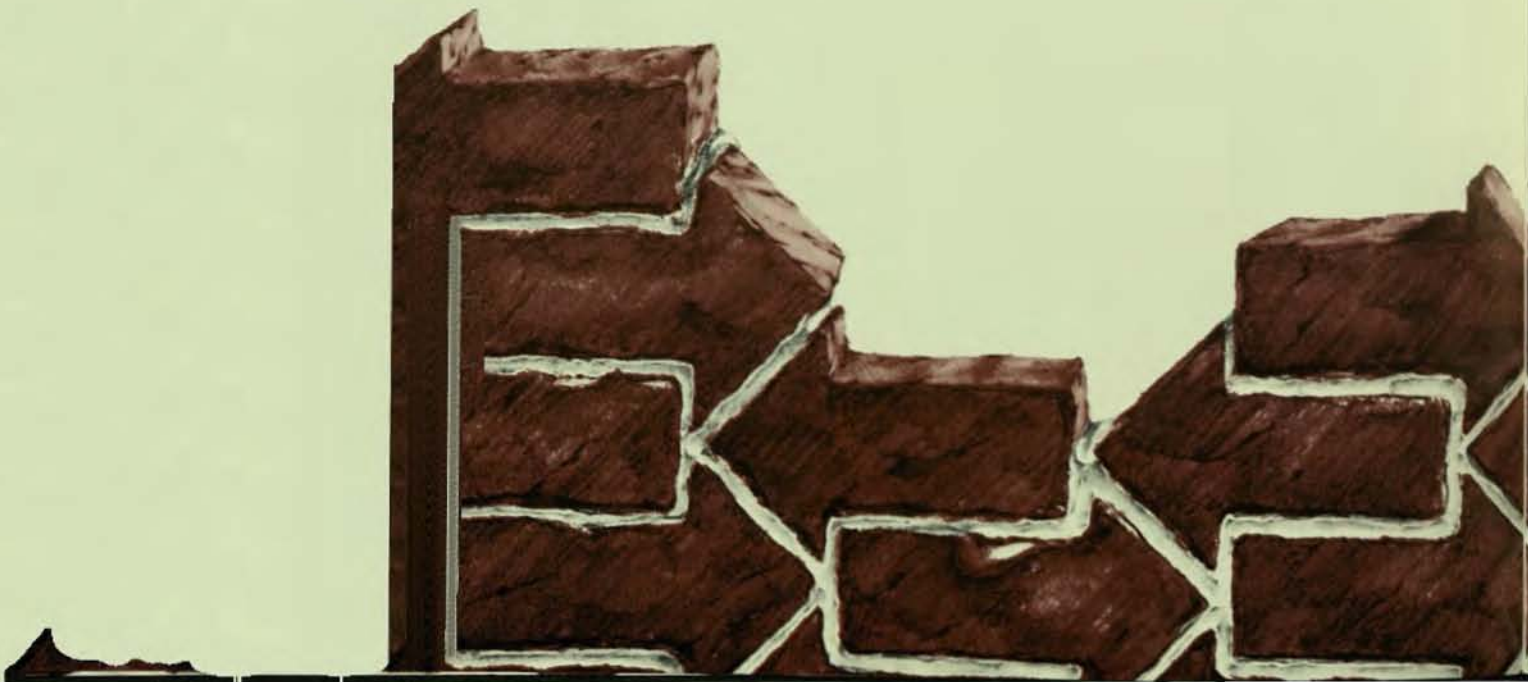
"The value of the cooperative program is qualitative," comments Rob. "It's the best kind of exposure for Fairchild. Equally important, the students gain in-depth information about our company and it becomes an industry model for them. When they return to school in the fall, they talk about the time they've spent at a high technology company rather than working for a fast food restaurant or playing on the beach."

Fairchild is also involved in a number of faculty internship and mutual development programs at the University of California, the University of Hawaii, Georgia Tech, University Park in North Carolina, Rensselaer Polytechnic Institute, Cornell University, the University of Michigan and California Polytechnical Institute. "Some of these programs enable faculty members to take sabbaticals in order to work in industry," Rob explains. "It benefits both the universities and Fairchild."

Cooperation between industry and universities is increasingly important as electronics enters an era in which the complexity of its devices will pose the greatest challenges. "There is more to be gained by bringing together the talents of complex architecture and computer science than ever before," Dr. Hogan emphasizes. "In the next 10 years the prize will go to companies who have expertise in system architecture of the chip and computer-aided layout. We're in the transition process now; industry leaders are changing."

Fairchild President Tom Roberts has also spoken of the transition phase of the electronics industry, and he places Fairchild "in the forefront of the change that is taking place. We are in the technologies that will drive a new cycle, technologies that will have a profound impact on the social fabric of the world, on the society in which we live. We have the resources — philosophical, human and financial — to participate and to eventually lead in that change."

"The transistor was developed from pure research, more than any other technological advance, and in its early phases this research came from the university environment," comments Dr. Hogan. "Then industry ran with the device and the universities were left behind."



Dr. C. Lester Hogan addresses engineering graduates at the University of California, Berkeley commencement.

Now, once again, industry recognizes that many talented people are at the universities. At the University of California, Berkeley's Third Industrial Liaison Meeting in February, 1981, Fairchild was well represented with more than 25 technical experts in attendance. The meeting brought industry leaders together with the faculty of the University's engineering college. "It was a pitch for support. They need our help and we need theirs," Rob Brandt adds.

Support means more than financial help, although money is certainly important. Through the University Affiliate Program, Fairchild provides financial support to colleges and universities and sends technical experts to university sessions at which graduate students present their theses. "This program offers us a closer tie to the universities and their students," explains Tom Longo, Vice President of Schlumberger Limited and Chief Technical Officer of Fairchild, and a member of the advisory board for the Stanford center.

The Advanced Research and Development Laboratory's VLSI and Advanced Process Research Department also supports a Berkeley graduate student in work directly related to VLSI. Thus, university research becomes an integral part of Fairchild operations through the direct involvement of the company and its representatives.

"We need research output," Dr. Hogan stresses. "We have technological leadership throughout the world and we should not build a wall against the Japanese or anyone else. What we need to do is run to stay ahead — otherwise we don't deserve our leadership. With industry, government and the university working together, the United States can afford all the technology it needs."

Sherman Mills Fairchild

KEY TECHNOLOGISTS HONORED AT SHERMAN MILLS FAIRCHILD SEMINAR

Promotions for scientists represent excellence in research and development

Fairchild President Tom Roberts and Dr. Tom Longo, Vice President of Schlumberger Limited and Chief Technical Officer of Fairchild, presented technical achievement awards to scientists and engineers at the second annual Sherman Mills Fairchild Memorial Technical Seminar. The seminar and awards banquet on April 14 and 15 were at Rickey's Hyatt House in Palo Alto, Calif.

"The Fairchild Key Technologist Program began in 1980" explains Tom Longo. "Its concept is simple. Since it's the technologist—the scientist or engineer—who is the primary resource of any technology-based company, the program represents Fairchild's commitment to continued technical excellence."

The program offers advanced educational opportunities, grade classifications comparable to management levels, and awards for exceptional technical contributions.

This year there were four promotions to the advanced grade classification of scientist; six President's Awards for outstanding technical achievement (divided among 17 people); and 16 Technical Achievement Awards (divided among 30 people). More than 70 abstracts were submitted for consideration as topics for presentations at the seminar. The technical papers were selected by the seminar leaders and presented by engineers on topics dealing with state-of-the-art developments throughout Fairchild.

PRESIDENT'S AWARDS

Advanced Research and Development Laboratory
Claude Alleaume
Richard Crippen
P. A. Crossley
Hemraj K. Hingarh
Don Lake
Dave Maxwell
John Muschinske
Ashok Nalamwar
G. R. Padmanabhan

Tom Longo (with Tom Roberts, center) congratulates Jay Shideler on his promotion to Fairchild Scientist at Key Technologist Awards Banquet.

Bipolar Division
Robert Bechdolt
Darryl Delano
David Ferris
Steve Goodspeed
Umeshwar Mishra
Mike Pawlick
Johnathan Stinehelfer

Component Test Systems Division
Egbert (Bert) Graeve

TECHNICAL ACHIEVEMENT AWARDS

Advanced Research and Development Laboratory
Jim Clark
Rudy Dyck
Michael Farrier
Elmer (Dion) Hoskin
Thomas Keyser
Dale Means
John Pierce
Ken Radigan
Bob Veach
Madhukar B. Vora
David Wen

Automotive Division
Len Arguello
Larry Blaser
Nick Johnson

Bipolar Division
A. Austin
Robert Burrarazzi
John Finnel
Vahak Sahakian
Terry Weymouth

Component Test Systems Division
Arthur Downey
Rudy Garcia
Charles Schwarz

Linear Division
Jerome Frazee
Mike Kretchmer

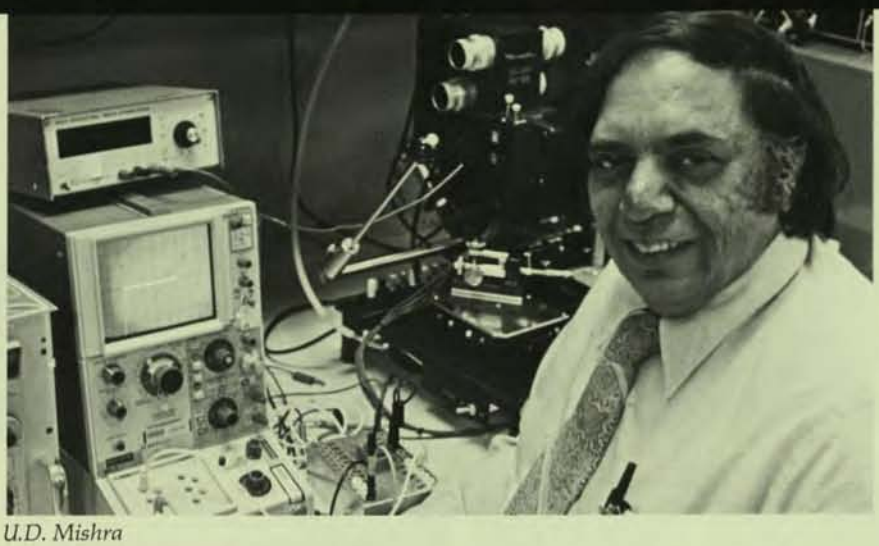
LSI Products/Singapore
Stanley Tan

MOS Division
C. Berls
Chris Galfo
V. Mathur
H. C. Travers

Microprocessor Division
George Bunting

Subassembly Test Systems Division
Bruce Barnett
Joseph DeGearo
Sally Fabian
Herbert A. Knowlton
Ihor Korhun
Linda Matlock
Terry Mickey

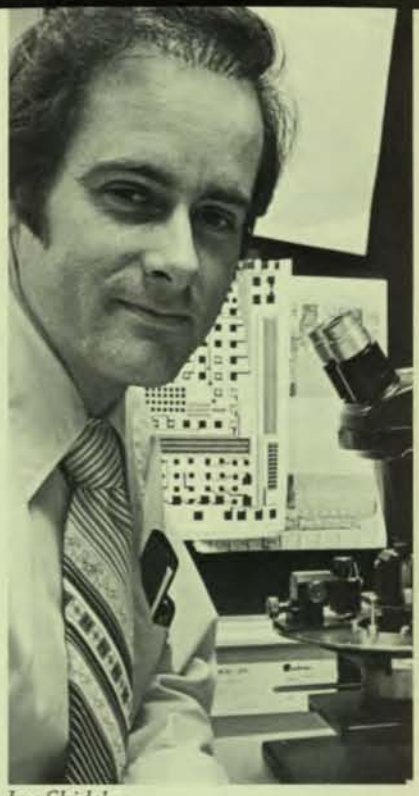
Optoelectronics Division
Ray E. Brown
Guy Robby



U.D. Mishra

This year Fairchild promoted four key technologists to the advanced grade of Fairchild Scientist. Umeshwar (U.D.) Mishra, John Chan, Jay Shideler, and Hemraj (Hem) Hingarh represent our reservoir of excellence in research and development. Their promotions acknowledge their significant contribution to the company.

We honor them — and we take pride in their accomplishments for Fairchild.



Jay Shideler

Umeshwar (U.D.) Mishra joined Fairchild in 1973 as Process Development Manager for the Bipolar Division. He has played a key role in the development of Fairchild Advanced Schottky Technology (FAST)™ — a circuit and process concept that provides a balance of speed and power in semiconductor processing.

U.D. feels that the Key Technologist Program is a real incentive to contribute and is enthusiastic about the free exchange of ideas that took place at the seminar. "We heard the details of various projects — including the problems involved in each. If you give a presentation outside the company you talk only about the good things, but sometimes learning about the problems is very helpful. In other words, if you know what went wrong with a design, you might be able to avoid doing the same thing in your own work."

U.D. lives in Sunnyvale, Calif. with his wife and three children. His oldest son is at the University of California, Davis, and his youngest son will attend Davis this Fall. U.D. thinks his older children may pursue medical careers. "Everyone else in my family are doctors — my father in India and my two brothers. But I always wanted to be an engineer."

Jay Shideler, project coordinator for the Bipolar 16K RAM, has a long history of concentration on yield improvement for bipolar technology. Right now he's involved with theoretical and experimental studies of redundant memory circuits.

"When extra memory bits are incorporated into a chip you can interconnect the desired number of bits, even if some bits are defective," he explains.

Jay, who's been at Fairchild for eight years, recalls that "for a long time Fairchild had a problem keeping key technical people. If you didn't go into management you were 'topped out.' There were a few people who didn't care about promotions, salary or position — they were happy just being in the lab. But many people were frustrated and the 'brain drain' pulled them to other companies."

Now Jay feels that the Schlumberger acquisition, coupled with the Key Technologist Program, has focused Fairchild's attention on applied research. He predicts that key people will remain at Fairchild, and that recent college graduates will have an additional incentive to join the company. "The Key Technologist Program is a step in the right direction," he says.

About the seminar itself Jay comments: "It was handled very professionally. I was honored that I was selected to present my paper. I gained an overview of the work being done throughout Fairchild and had the chance to rub shoulders with my colleagues in other disciplines. In Bipolar we have monthly seminars similar to this one, but on a smaller scale. It's an excellent way to share ideas."

Jay lives in San Mateo, Calif. with his wife and 17 year old son. He spends his free time as a horologist: one who collects and repairs clocks.

John Chan

Hem Hingarh

John Chan joined Fairchild in 1976 and has been working on the Dynamic Random Access Memory (DRAM) ever since.

John is part of the Advanced Research and Development Laboratory in Palo Alto. But his work has him traveling to Mountain View and San Jose as well, where he directs small teams of scientists and technicians. He has been actively involved in designing all MOS DRAMs since he joined Fairchild, including the design of the 16K DRAM circuit. He is the principal designer of the 64K DRAM, which incorporates more than 64,000 bits of memory on one chip.

"It's exciting to work with a small group on the design process," John says. "I like staying close to the technical area in order to solve a problem. The Key Technologist Program allows me to concentrate on my area of expertise, free from the diverse problems with which many managers deal."

John was very honored to receive his promotion to Fairchild Scientist at the Second Annual Key Technologist banquet. "I was privileged to receive the award from Tom Roberts, and I enjoyed meeting other scientists who have been involved in technical achievements throughout Fairchild. In a large company it is very important to meet your colleagues from other disciplines."

John, his wife and two children (aged two and three) live in Belmont, Calif. "It's too early to tell whether they have a scientific interest yet," he comments with some amusement.

Hemraj (Hem) Hingarh is the co-inventor (along with Dick Crippen and Peter Verhofstadt) of the graduated collector — a development which improves the performance of high speed bipolar technology. He is the circuit designer of Fairchild's new F9445 microprocessor and other logic circuits, and is presently working on very advanced bipolar devices.

Hem's promotion to Scientist represents "an important commitment by Fairchild," he says. "In the past there were very few incentives for our engineers — nothing to make us want to stick with the company. Now, through the Key Technologist Program, we are recognized for our involvement in technology development. Our status is earned through our technical achievements."

Hem says his participation in the Key Technologist Seminar was a valuable way to share ideas with other Fairchild scientists. "There is no other way for all of us from throughout the company to get together. I would like for us to have these meetings more often, even on a less formal basis."

Hem is modest about his work and pays tribute to his colleagues who assist him: Dick Crippen, Ramona Way, Betty Sears, Dan Asuncion and Madhu Vora.

Away from Fairchild, Hem enjoys outdoor pursuits — tennis and picnicking — in his leisure time. He lives in San Jose, California with his wife and three children.

Fire Proof Traveling

FIRE!

The word evokes a vivid picture of three recent disasters in major hotels in Las Vegas, Nevada and New York. Guests stranded in hotel rooms, smoke filtering its way through air conditioning systems, helicopters hovering above a multi-story building while victims await an air-lift to safety.

Alarming, yes. With summer at its apex, you're probably preparing for a long-awaited vacation. And

Bob Cleveland

you may be worried that your hotel may be a deathtrap during a fire.

Rest assured. You don't have to live in fear behind the closed doors of your home. It is safe to travel—and to stay in large hotels. And you can ensure that the hotel you stay at uses the most modern fire prevention methods. If a fire does break out, you can make sure that you're not one of its victims.

Bob Cleveland, Fire Inspector and Acting Fire Marshal for the City of Palo Alto, sees new building plans, reviews fire protection systems and conducts public assembly inspections regularly as part of his job. Bob has been with the fire department since 1957 and an inspector since 1963. In this article, written especially for HORIZONS, he gives some serious thought to the subject of fire prevention and public awareness.

During my 24 years with the Palo Alto Fire Department I've seen a lot of fires and fire hazards. And when I travel as a private citizen I always do a thorough inspection of our hotels. My wife says I drive her crazy when I spend 20 minutes checking the exits. I'm always looking for the fastest, safest way out. She finally understood my concern when we stayed in a hillside hotel in Delphi, Greece, one summer. The corridor was 300 feet long, with the only exit at the other end of the hall from our room. Our only window looked out onto the hillside, a drop of 40 feet. After that visit she realized the importance of fire exits.

If you're traveling for business or pleasure this summer, here are some common sense precautions you can take to make your trip enjoyable and safe.

1 Don't be shy

Whether you use a travel agent or make trip arrangements yourself, ask the hotel manager about the hotel's fire protection program. Determine if the facility is protected by automatic fire sprinklers. You should be able to see the sprinklers on the ceiling of your room. Ask whether the hotel fire alarm system has been tested recently. Inquire about written fire safety instructions. Some hotels may post instructions for guests to see. If not, it's your right to find out what these instructions are. You don't have to be reticent about asking.

2 Look for exits

Exits are the key to a safe evacuation in case of a fire or any other emergency. As soon as you're in your hotel room, look for the nearest way out. Almost 90 percent of hotel guests will try to exit the way they came in—usually through the elevator and the main lobby. Elevators *should not* be used during a fire. In fact, some hotel elevators are taken out of service automatically during a fire. Find the best route out of your hotel. There should be at least two exits on each floor of a large hotel. If there are stair wells, make sure that access doors open from both sides. Some stair wells have access from the inside of the hotel only, for security reasons, and you may have to descend to the first floor to exit the stair well. Also, determine if there is roof access via the stair well.

3 If there is a fire

The very first thing you should do if you detect a fire anywhere in your hotel is to call the fire department. Give the dispatch operator the name and location of the hotel, and your name and room number.

If you cannot leave your room because of smoke in the hallway, try to attract attention through your hotel window. *Do not* break the glass of your room window unless you absolutely have to for fresh air. Remember, smoke rises, and if the fire is below, you may complicate the situation by letting in smoke from the outside. However, if you can open and close the window, it's okay to step out onto a balcony to attract attention and then return to your room if it is smoke-free inside.

If you have done everything you can to attract attention, wait for help. Never attempt to jump from a building more than two stories high. Jumping is more dangerous than the fire itself! Movies and TV shows which show jumps are dramatic—but unrealistic.

Above all, don't panic. You can wet towels, bedding and handkerchiefs to stuff under your door and over the air-conditioning unit—the places smoke is most likely to enter your room. In most fires it is smoke inhalation, not burning, that causes injury. If smoke enters your room get close to the floor. Place a wet handkerchief or towel over your face. You may experience symptoms from severe smoke exposure: swollen eyes and a runny nose. These symptoms are your body's natural mechanism for protecting itself.

4 Be alert

Although the building owner must provide safety features and inform hotel guests of fire prevention methods, it is your responsibility to know that these methods exist and to stay away from hotels which do not have modern fire prevention methods. We are all responsible for our safety. Stay alert and you'll ensure optimum personal safety. Good education and preparedness are always the best protections against disaster. If you take sensible safety precautions, you'll have a safe and happy trip.

(A special section devoted to employee news culled from Fairchild's divisional newsletters)

OVER THE HORIZONS

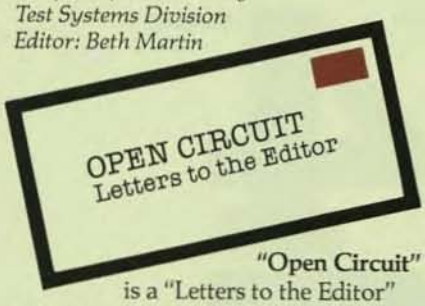
Xincom employees listen to Fairchild president.

President Tom Roberts has been meeting with employees at facilities he has been visiting. At Subassembly Test Systems in Latham, N.Y. Tom talked about Schlumberger's confidence in Fairchild and "the goal of becoming number one in Semiconductor and Automatic Test Equipment." He reiterated this message at a visit to Xincom in Canoga Park, Calif., on April 6, where he spoke with employees at both the Vanowen and Plummer buildings of the facility. At both visits Tom stressed that being the "best" means that we have the best technology, quality, and profitability — and to accomplish these goals "we must have the best people."

He noted that additional training has been emphasized to allow for personal growth and expression. These programs are being reviewed and introduced to each division.

The Xinformer, Xincom Division
Editor: Linda Stouffer

Factfinder, Subassembly Test Systems Division
Editor: Beth Martin



"Open Circuit" is a "Letters to the Editor" column — a forum for upward communication. We'll select for publication the letters that are the most timely and interesting to our readers. And we'll get the answers to your questions from the best company sources. Of course, questions of a local or personal nature should be discussed with your supervisor or personnel manager. Please sign your letters, although we will not identify you if you so request.

Address all correspondence to HORIZONS, M/S 20-2260, P.O. Drawer 7281, Mountain View (TWX 910-379-6435 MVWP)

A tactile tour on April 9 enabled two blind participants in the National Sensory Aids Foundation Conference to learn about the Automotive Division's production areas in Mountain View. The conference goal was to familiarize people from throughout the United States with Silicon Valley manufacturing technologies in order to analyze accommodations and develop jobs which can be performed safely by visually handicapped people. Walt Winlaw, Manufacturing Manager, and Lou DeFillo, Group Leader, along with Pam Normington, Employment Representative, coordinated and conducted the tour. The visitors were given "hands-on" exposure to the equipment we use and products we manufacture. The conference rated Fairchild's tour among the best experience in the valley.

The Spark, Automotive Division
Editor: Diane Cushman

Feeling their way through the Automotive Division, blind tour participants learn what an ignition module is like.

Doug Debs, with locomotive he's restoring, at rest.

Pick a hobby, any hobby. Doug Debs, Product Engineer, CCD Imaging, spends his spare time restoring old locomotives to workable condition. Several years ago, Doug joined forces with other railroad enthusiasts to repair and maintain steam locomotives. Currently, they are working on a 3000 horsepower engine built in 1921 and weighing 135 tons. Eventually Doug hopes to restore one of the three locomotives located in parks around the San Francisco Bay Area.

Technolog, Advanced Research & Development Laboratory
Editor: Penny Fletcher

OVER THE HORIZONS

Bill Mulloy, Maintenance Mechanic, Discrete Division, San Rafael, puts his B.A. in Anthropology and Archeology to good use in his spare time, by doing artifact analysis and field site surveys for Environmental Impact Reports. On weekends Bill is usually up at Point Reyes National Seashore, north of San Francisco, working as a volunteer at the replicated Coast Miwok Indian Village. "The study of prehistoric stone technologies is an area of specialized research in which I've been involved for the past six years," Bill explains. "Knowing how to make stone artifacts gives me insight into the methods available to prehistoric artisans." In his work, Bill uses prehistoric tools such as deer antler flakers and stone hammers. He also owns a large collection of spear and arrow points, some of which are on display in England as part of a Drake Society Exhibit.

Discrete Newsbeat, Discrete Division
Editor: Gretchen Healy

Bill Mulloy, works on a teepee at Coast Miwok Indian Village, Point Reyes National Seashore.

TECHNICAL WRITING AWARDS

Fairchild employees authoring technical articles for presentations or publication in appropriate professional journals receive cash awards as part of the Technical Writing Incentive Awards Program. Technical Writing Awards appearing below were given from March-June 1981.

Advanced Research & Development Laboratory
Tich Dao
"Recent Multi-Valued Circuits"
COMPCON '81

Bipolar Division
Bill Owens
"Gate Array versus Custom LSI"
IEEE COMPUTER SOCIETY

Bristol — Digital Design Group
Jonathan Summers
"GPIB Programmable Power Supply"
PROGRESS

Component Test Systems Division
Ed Sloan
"Dynamic Converter Testing Using Walsh Functions"
PROCEEDINGS OF SEMICON EUROPA '81

Linear Division
Bipin Shah, V. N. Srinivasa
"Evaluating Goldless — TO-5 Devices"
ELECTRONIC PRODUCTION

Microprocessor Division
Dave Corbin
"Microsphere — F8 System I/O Expansion"
PROGRESS

Roy Kole
"Microprocessor Architecture Attacks the Software Problem"
PROGRESS

Steve Landry
"Design Prototype and Debug with the F68 PEP"
PROGRESS

Subassembly Test Systems Division
Keith Blackey
"Field ATE"
DATAQUEST MONTEREY

Stephen DeSimone
"In-Circuit Testing of ECL Loaded Boards"
PROCEEDINGS OF THE ATE SEMINAR

John Jughes, Bruce Barnett
"In-Circuit LSI Testing"
ELECTRONIC PACKAGING & PRODUCTION

Steven Scheiber
"In-Circuit Testing — Testability Requirements"
PROCEEDINGS ATE SEMINAR

PATENTS

Fairchild's technological leadership depends, to a great extent, on the creativity of its people. Inventors listed on patents issued to Fairchild from March-June 1981 appear below.

Anthony G. Bell
"Electrical Identification of ROM Orientated Devices"
Patent No. 4,268,911

Lawrence M. Blaser, Leonard E. Arguello
"Ignition Control System"
Patent No. 4,275,701

Falke Henning
"Merged Bipolar/Field-Effect Bistable Memory Cell"
Patent No. 4,276,616

John Pierce, William I. Lehrer, Kenneth J. Radigan
"Process for Patterning Metal Connections On A Semiconductor Structure By Using A Tungsten Titanium Etch Resistant Layer"
Patent No. 4,267,012

Ramesh C. Varshney
"Charge-Coupled Device Analog-To-Digital Converter"
Patent No. 4,275,387

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Mountain View, CA 94042

Address Correction Requested

HORIZONS

A MAGAZINE FOR FAIRCHILD PEOPLE AROUND THE WORLD • FALL • 1981

Harvest Festivals: Our International Thanksgivings

IN THIS ISSUE

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Member, IABC

LETTER FROM THE EDITOR

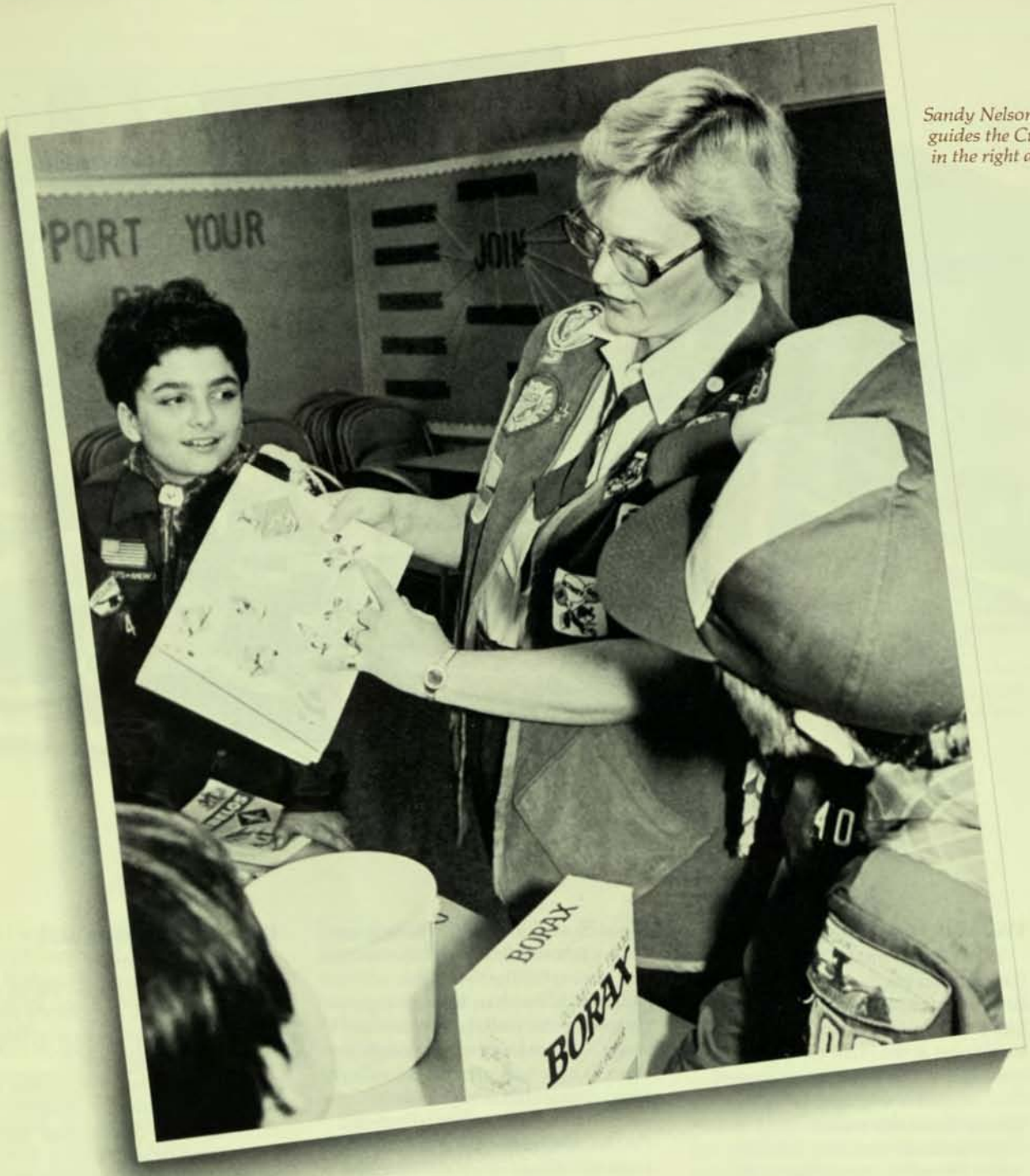
If you look closely at the HORIZONS masthead you'll see a slight change. We've added the words "A magazine for Fairchild people around the world."

This statement is especially true for the fall issue of HORIZONS because, for the first time, the magazine is going to every Fairchild employee throughout the world.

Although we come from many countries and cultures, speak a variety of languages, and have different jobs, we all work for the same company and share common goals. Through HORIZONS we can learn about each other, about Fairchild, and about our role in the semiconductor industry.

We hope that you'll enjoy this first international edition of HORIZONS—and that you'll show it to family and friends. Through reading, sharing and contributing to HORIZONS, *you* can truly make it "a magazine for Fairchild people around the world."

Ellen B. Burgess
Editor



Sandy Nelson guides the Cub Scouts in the right direction.

Fairchild People Lend A Helping Hand in Communities Around the World

Fairchild has facilities around the world with employees of many nationalities and customs. But there's a common bond that crosses international boundaries: the willingness to help others. In Indonesia and Mountain View, California, Singapore and South Portland, Maine, Brazil and Titusville, Florida, Fairchild employees find time to help fill community needs in a variety of ways.

HORIZONS surveyed our plant locations for a sampling of community relations work. While we can't mention every activity in which our employees are involved, here's a good cross section of the volunteer efforts we discovered.

Jubilant Fairchild Hong Kong workers finish a Community Chest "Walk for Millions."

The traditional snake dance is part of Jakarta's annual Kartini Day celebration.

When the alarm goes off, Latham's volunteer firemen are ready!

Working together

In Bonfim, a small district near the Fairchild plant in Campinas, Brazil, there's an orphanage called Lar Caminho Da Verdada. Each year employees at the plant contribute food and clothing to the orphanage. Four employees take the extra time to coordinate this mass effort. Marcos Cesar Mathias, Francisco Carlos Solder, Benedita Jesus Manini and Jose Carlos Vanucci, from the Campinas Maintenance Department, make sure that the orphanage receives items on a regular basis, especially in winter when warm clothing and shoes are necessities. Christmas 1980 was a time of special giving for Fairchild's Brazilian employees, who donated to more than 100 orphans. And some of the children even spent Christmas with the families of the four men who coordinated the project.

In Hong Kong, Fairchild employees turn athletic for an annual Community Chest event. Last year they raised more than 12,000 Hong Kong dollars (about $2,000 U.S. currency) in a 12 km (7 mile) "Walk for Millions." More than 100 employees completed the walk and Fairchild Hong Kong management pledged its support by sponsoring each employee who participated. They donated prizes to the five fastest walkers and the five who raised the most money for this worthwhile cause. Fairchild people proudly displayed their company T-shirts and caps as they walked the "Millions" course along the Shatin hillside paths of the New Territories.

The big community event for workers at Fairchild's Jakarta plant is the annual Kartini Day Commemoration. R.A. Kartini, 1879-1904, was a young woman who worked for the education of Indonesian women. The Fairchild Jakarta community honors her contribution to the emancipation of Indonesian women with a celebration which includes a national dress fashion show for the women, volley ball and other sports for the men.

Boy Scout leaders and volunteer firemen

There's a place for giving on a plant-wide basis, and there's also room for the extra help that only an individual can give.

Fairchild seems to be replete with scouting enthusiasts, who often spend up to 15 hours of volunteer time each week working with young people. Sandy Nelson, a Plant Maintenance officer worker at the Advanced Research and Development Laboratory, Palo Alto, California, has been training Cub Scout leaders for Santa Clara County for the last two years. Sandy works on leadership training and scouting events for the county, and is also a Cub Master for the district in which her three sons are scouts.

Another dedicated Boy Scout leader, John Kenda, works in Fairchild's Test and Checkout Department, Titusville, Florida by day and spends his after work hours as Advancement Chairman for the local scout councils. "I make certain the boys can qualify and receive the

Bob Christensen with his extended family.

Bob Flewwellin's work with the handicapped rewards him with some special friends.

Mike Hernandez is in the middle of the action on the football field as a ref for young athletes.

awards they've earned," John explains. John's two sons are both active scouts: Richard is earning his Eagle Scout badge and Mark is working on his Star.

The Boy Scouts don't have a monopoly on the expertise of Fairchild workers who practice the motto "be prepared." In Latham, New York, Bill Murphy, Product Marketing, Jim Baldwin, Manager Training, and Ed Rhynders, Maintenance Department, find time to help the local Verdoy Volunteer Fire Department. They carry monitors which alert them to fire alarms and rescue calls anywhere from the Latham plant to the Albany airport. They're on call 24 hours a day, at work and at home.

Good will ambassadors

Other Fairchild people help by making special efforts in areas as diverse as international relations and aid to the handicapped.

Robert Christensen, Technical Maintenance Supervisor in the Automotive Division, Mountain View, California, has his whole family involved in Inter-Study, a program for Japanese college students. During their stay in the Christensen household the students learn American culture and practice their English. "They become regular family members," Robert says. "And we gain new friends who continue to write us long after they've returned to Japan."

Physically and mentally handicapped children get a boost from Bob Flewwellin at Fairchild's Testline plant in Titusville, Florida. Bob helps out in a special recreation program for the handicapped in his community. And Muscular Dystrophy has had the support of Fred Harland for seven years. Fred, a machinist at the Optoelectronics Division, Santa Clara, California, is on the Executive Committee of the Muscular Dystrophy Mission Counties chapter. The committee coordinates fund-raising events in four counties, and also plans parties for patients. Fred helped organize this year's Labor Day event at the San Jose Convention Center, to coincide with the Jerry Lewis Muscular Dystrophy Telethon. The local event raised almost $235,000 for Muscular Dystrophy.

Scoring a goal

Fall is a busy time of year for Fairchild sports-lovers who decide to devote their volunteer time to teaching young athletes the rudiments of the game.

Says Mike Hernandez, Corporate Personnel Manager, who dons a striped jersey and referees high school, college and Police Athletic League (PAL) football games: "I like working with young people and helping them reach their personal fitness goals. It doesn't really matter if they continue with the sport later on or not. They've learned about teamwork, conditioning and sportmanship."

In fact, teamwork seems to be the goal of all Fairchild participants in community programs. Whether they're working for the Community Chest in Hong Kong or PAL football in California, our employees are creating goodwill at our facilities and the communities they serve. For Fairchild people around the world, giving truly does honor the giver.

The microprocessor, or "computer on a chip," has been making waves in silicon technology for the last five years. Now a chip which Fairchild pioneered in the last decade is spawning an undercurrent of excitement among solid-state physicists and users who foresee a myriad of applications.

"CCD imaging devices are the computer eyes of the future," says Will Steffe, Manager of the CCD Imaging and Signal Processing Division at Fairchild's Advanced Research and Development Laboratory in Palo Alto, California. "They are more precise and more rugged than the human eye. A growing family of these VLSI devices, manufactured with an extension of MOS technology, has been in production here for two years. The combination of solid-state imaging, readily available computer power, and artificial intelligence concepts will revolutionize industrial automation and change our lives."

Christened the "chip that can see" by Fortune Magazine (August 10, 1981), the charge-coupled device (CCD), or imager chip, collects light and converts it into electrical signals. While the transistor replaced the vacuum tube, the imager chip can replace the relatively large vidicon tube which functions in cameras to reproduce photographic scenes.

The chip manipulates photons, or particles of light, as well as electrons. Because silicon can absorb light better than the human eye, the chip is 80 percent more effective than photographic film, and 60 percent more effective than vidicon tubes. The photons in the chip are absorbed by pixels—picture elements—which conduct away electrons to reproduce a picture on a TV screen, print it out as a still image, or store it on magnetic tape for later use.

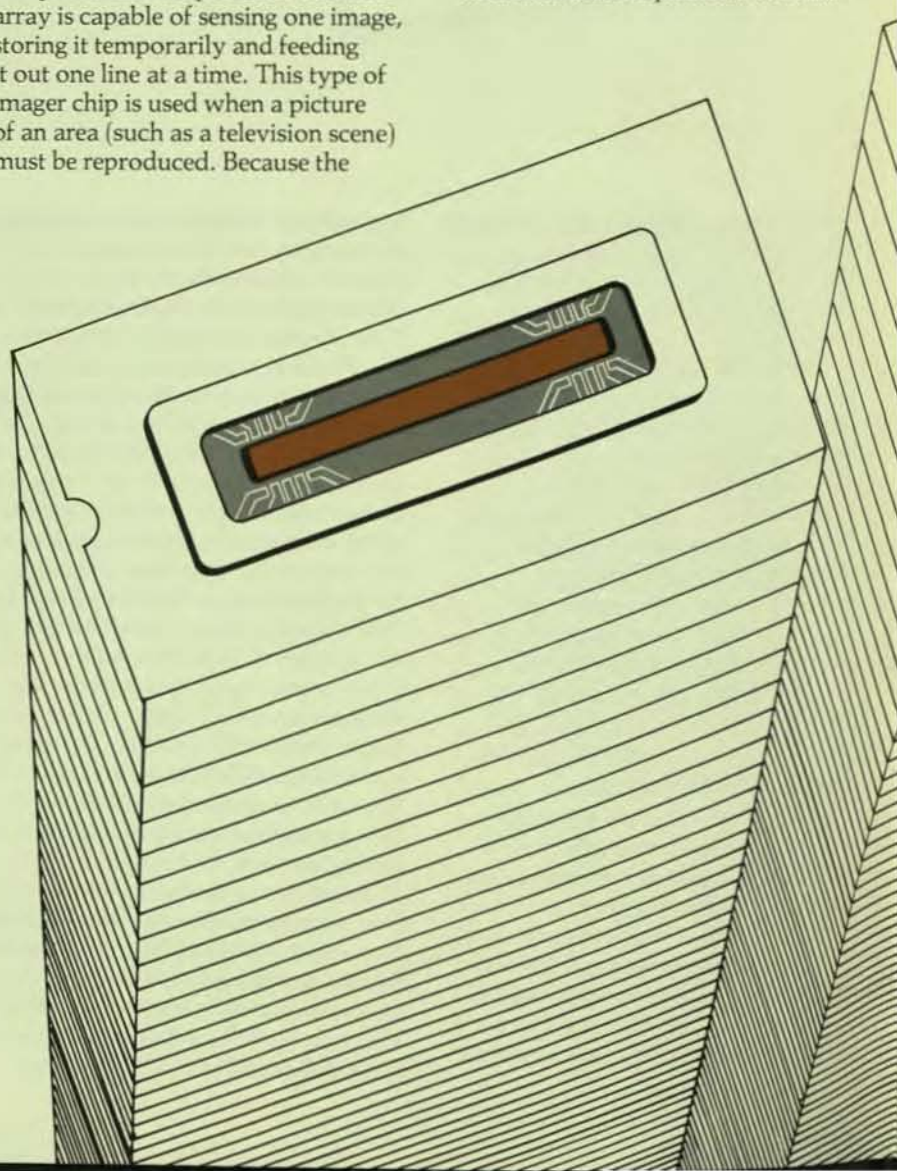
"During the 1970s Fairchild led the development of CCD technology," explains Joe Rothstein, Marketing Manager for the division. Fairchild introduced the first CCD on the market in 1973. The original device was designed for use in slow scan TV systems, document reading, optical character recognition and imaging applications in military reconnaissance and weapons systems.

Today, two kinds of CCDs manufactured by Fairchild are in wide use in industrial applications: the line sensor and the area array. In both devices light generates the electrons in silicon until a charge is built up. This charge is then transferred out and shifted sequentially to an amplifier as an electrical signal which represents values of black and white.

The line sensor is commonly used in the office facsimile machine, or telecopier. Close examination of the machine copy will show that each character, or letter, is actually composed of multiple lines. The area array is capable of sensing one image, storing it temporarily and feeding it out one line at a time. This type of imager chip is used when a picture of an area (such as a television scene) must be reproduced. Because the sensor is very sensitive, precise, and able to operate in dim light, it is also useful in astronomy and for aerospace applications.

The most exciting applications for the imager chip are in varying stages of development. The image sensor now is used in aircraft cockpit television systems and ground support equipment by the U.S. Air Force. The cockpit television sensor (CTVS) system is comprised of a small sensor head and a remote electronics unit, installed on tactical fighter aircraft for documentation of combat and training missions. It enables video tape recording of real-time situations as seen by the pilot, plus mission symbols projected on the pilot's display screen.

Industrial applications of the imager chip are becoming increasingly exotic. A Bureau of Mines contract with Fairchild several years ago used the chip in a camera small enough to be injected through a three inch diameter hole after mine explosions. The cam-



era was able to determine the extent of the damage and locate workers trapped in the mine.

Today the food industry is using the tiny camera for orange and carrot sorting in factories — and even for discerning the "nooks and crannies" in a good English muffin. Joe forecasts that "the chip has the potential to scan a book and reprint it in braille, sit in a periscope that can see in the dark using only starlight and moonlight, and fulfill such medical applications as recording images of the brain and performing diagnostics, such as blood cell analysis and iris pattern recognition.

From the line scan cameras in the wands used by checkout clerks, to film to video conversion, the chip is literally reaching into the future of electronic vision.

"Robotic vision is the greatest single opportunity for the imager chip," predicts Joe. "The chip could be fitted into industrial robots which would have the intelligence to 'see' the difference between a nut and a bolt, and through computer hookup, instruct a robotic arm to perform the necessary manufacturing tasks."

Since various scanning methods have been in wide industrial use before, what makes the imager chip so exciting and different?

"It's small, precise, efficient, discriminating — and virtually indestructible," Joe explains. "You can place the camera which houses the chip in a parachute fired by a Howitzer and it doesn't break."

If that statement sounds like a TV commercial for a familiar indestructible consumer product, pay attention. The imager chip has a bright place in the electronic vision market of the future.

LOOKING TO THE FUTURE

The imager chip has a bright place in the growing electronic vision market

A NEW BEGINNING FOR FAIRCHILD PEOPLE

RETIREMENT IS THE THRESHOLD OF A FULL LIFE

You've been to the farewell party, exchanged telephone numbers and addresses with your co-workers, and taken a last look at the familiar building in which you've worked for 10, 15, or maybe 25 years. It's Friday afternoon and you've made your usual weekend plans. But Monday morning the alarm goes off as usual at 6:30. You've forgotten that you don't have to wake up early! You close your eyes and try to go back to sleep. Then, 10 minutes later, you decide to get up.

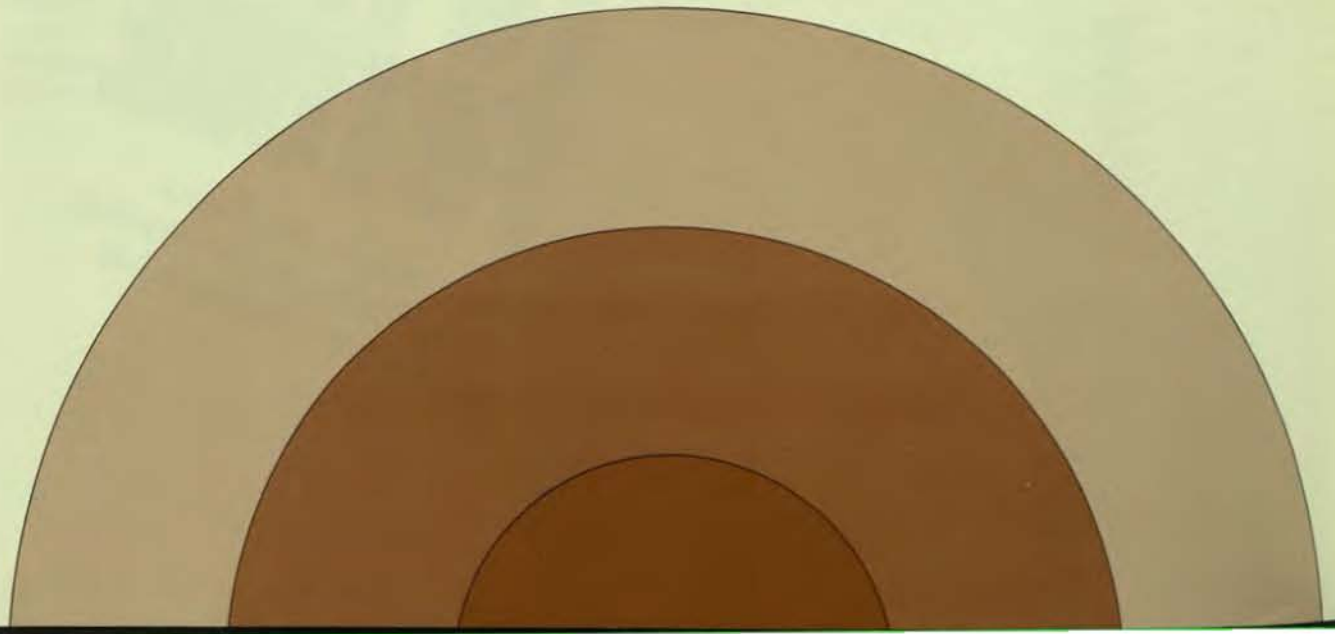
You don't have to go to work today — or ever again — and you're not sure whether you feel good or bad about it.

For many people who've worked all their lives the transition to retirement is relatively easy. Community and family involvement, hobbies and travel offer inviting leisure time pursuits. But the psychology of being a retiree has its variables. True, you can qualify as a senior citizen for reduced rate public transportation fares, tickets to the movies and other cultural events. And you can join the senior citizens clubs that seem to abound in larger communities. But you may not really feel like a senior citizen yet. You have energy, good health, and you don't feel ready to sit home in front of the TV or watch the young folks beginning careers and families.

Retirees don't have to retire from life simply because they've retired from work. If you have maintained friendships and interests during your working life you can continue your activities with renewed energy after retirement.

For example, the League of Women Voters has an active contingent of retirement age women. Schools welcome the volunteer efforts of grandparent types who can help in the classroom or with school safety programs. Some retired people keep active in the business community as part-time consultants — or share their expertise with young people involved in groups such as Junior Achievement or Project Business. Older people who enjoy solitude can spend time working on house and garden projects, reading, or preparing special meals.

HORIZONS talked to two retired Fairchild employees who clearly feel that life is just beginning. One was an hourly production worker, the other a salaried employee. We heard firsthand how they coped with the day when the alarm no longer went off.



Not one to "get behind the eight ball," Anna Boyd enjoys family, gardening and pool in her active retirement life.

Finishing a kitchen remodeling job is top priority for retiree Jim Boyce.

Anna Boyd, an hourly production worker who joined Fairchild in 1966, retired in 1981. Anna started her Fairchild career doing assembly work and spent her final working years in the diffusion area of CMOS, now a part of the MOS Division in South San Jose, California.

"I liked working at Fairchild and I felt that I was well paid," Anna says. "I had to work because my husband was disabled (he died in February 1981). Most people have to work for one reason or another. I had lots of friends at Fairchild and I still keep up with the people I knew."

Anna moved to her home in Newark, California, 12 years ago. She has two daughters who live nearby and grown-up grandchildren whom she sees regularly. For Anna there are no idle retirement days. "The days just speed by," she comments. "I keep up the yard myself and I spend a lot of time on the house. I wasn't able to do that while I was working. I also like to crochet. Right now I'm working on an afghan and a baby blanket. I like staying home. I enjoy my home and I don't feel lonely."

Although Anna's retirement income makes her feel financially secure, her life-style is simple enough so that she doesn't need to spend a lot of money. She splurged recently on a trip to Idaho and Colorado where she visited her brother and sister. She also plans to visit her husband's family in Mississippi. "I have the freedom to travel now," she says.

Anna is no longer working, but she's passed on the Fairchild tradition to her youngest daughter, Joanna Hernandez, who has been with the Automotive Division for two years. Anna Boyd is enjoying life after Fairchild — and for her daughter, life at Fairchild has just begun!

For Jim Boyce, who retired in June 1981 after a 20-year career, "retirement is a time to start enjoying life. I'm physically fit, in a good economic position and my children are grown. I'm free from responsibilities. It's a good time in my life."

Jim joined Fairchild as Insurance Manager at Syosset, New York. He came with the company to Mountain View in the same position in 1959. "I transferred to California because I saw the prospects for company growth — and I looked forward to the lovely climate." Jim retired as an accountant in the Corporate Payroll Department before that function was decentralized.

"Retirement wasn't a shock to me because I eased into it," Jim explains. "I took long weekends when I neared retirement age (he'll be 64 in February). I think people should start planning for retirement in their 50s and do it as soon as it's economically feasible."

Jim and his wife live in the Los Altos home they bought when they first moved to California. His current retirement project is remodeling the kitchen. "I'm rounding third base and heading for home on that one." Four years ago Jim bought a cabin in the woods in the mother lode town of Pioneer, California. "There's clear air up there at 3500 feet altitude. It's great for fishing, chopping wood and playing golf."

Jim's grown son and two daughters live in the Bay Area. He also has family in New York whom he visited recently — and his future travel plans look to more distant horizons (perhaps Hawaii, perhaps a cruise to Panama). "Right now I'm adjusting to my new life. I feel lucky to have a home that I bought when mortgages and interest rates were low. We retirees are pretty lucky. Although the cost of living has increased, most of our expenses are fixed. We can really have some good times."

WHAT'S IN A NAME?

That all important trademark is the key

Names like "Cheerios," "Exxon," and "Bank of America" make us think of certain products or services. In the electronics industry, so do "Fairchild," "Sentry," "Faultfinders," and "Testline."

These names, designs or symbols are called "trademarks," "service marks" and sometimes "brand names." They are protected under the Trademark Act of 1946, a law dealing with unfair competition.

Fairchild actively pursues the registration of its trademarks in many foreign countries. Says Warren Becker, Senior Patent Attorney, who is responsible for the registration of Fairchild's domestic and foreign trademarks: "We register Fairchild trademarks in the United States and foreign countries to enhance our company image, give recognition to trademark laws and policies in other countries, and prevent the inaccurate and unauthorized use of our trademarks in those countries." In the United States the first user has the rights to a mark, but in other countries the first to register a mark has the rights.

Many people are confused by the meaning of "trademarks" and other methods used to protect proprietary rights, such as patents and copyrights. Explains Warren, "Patents protect ideas; they are a grant from the government. Copyrights are original works by authors and artists that are registered, and trademarks are letters or designs that distinguish products and services from other providers. Their registration formally advises the world that these products and services belong to a particular company."

A tradename identifies a company; a trademark distinguishes the origin of a commodity or service from other origins of the same or a similar commodity or service—whether it is natural, manufactured or processed. However, not all words, names, phrases or designs can function as marks. The generic (or common) name by which a product or service is known—such as "semiconductor"—is free for all businesses to use to refer to their products.

Often a lot of time and money go into promotion of trademarks to attract customers. The mark then becomes a valuable business asset. It becomes the only way of distinguishing the origin of the product or service from those of other businesses.

When the mark is the key factor in the success of a particular business, it must be carefully protected. For example, if a business loses its right to use a mark, or is geographically restricted in the use, it cannot capitalize on the goodwill established under the mark. If another business uses the mark, it loses its impact. Signs, labels and promotional material no longer serve their purpose, and a company would have to inform the public that its mark has been changed.

If the same mark is used in the same area, or in different areas of the country, by two or more unrelated businesses, all of the businesses would have problems. A business that features its marks in advertising and publicity to promote its product might damage a competitor. Prospective customers might purchase the competitor's products by mistake. Too, a poor reputation associated with the mark of one business could become attached to all users of the same or similar mark.

Many of these problems can be avoided if the trademarking process is called to the attention of the business's legal department so that protective measures can be taken or appropriate changes can be made.

In the United States it's not difficult to acquire trademarks. The only requirement is the actual use of the mark to identify the product or service. The mark must be used in an open manner reaching the public. It should be registered with the Secretary of State and the United States Patent and Trademark Office. However, the mark must be used to establish trademark rights.

In the United States the right to use a mark exclusively occurs on the date it is first used in a public manner to identify particular products or services. This right lasts as long as the mark is used continuously and properly to identify the product or service. This date is very important; the user must be able to establish the date of first use; he then has the right to the mark and the legal right to use it exclusively throughout every geographc area where the first use occurs.

If you use Fairchild trademarks in your work, here are some simple guidelines that should help:

—The generic (or common) name for the product should be used with the mark the first time it appears on labeling or in advertising copy.

—A trademark is an adjective and should be used as one.

—A trademark should be used only to designate the product on which the owner uses the mark and not on prepared products that another makes from it.

—A trademark should not be used in the possessive or plural form.

When a trademark appears in printed copy it should stand out from the rest of the copy by being depicted entirely in upper case letters or by capitalizing the first letter. Italics, quotation marks, underlining or bold face type may also be used.

To distinguish a trademark from other common words, the designation "tm" or "Brand" may be used. The notations "Reg. U.S. Pat. & Tm Off" or an encircled letter "R" should be used only if the mark is registered in the U.S. Patent and Trademark Office.

Among Fairchild's registered foreign and domestic trademarks now in use are the following:

AFIT
FAIRCHILD
FAIRDATA
FAIRDIAL
FAIRTEX
FFI
FAULTFINDER
I^3L
INFINITY
INTEGRATOR
KV
MICROFLAME
MICROLOGIC
QUADRAFET
SENTINEL
SENTRY
TESTLINE

Editor's note: Excerpts from the article "How to: Acquiring and protecting trademark rights" by David A. Weinstein are reprinted with permission from the California State Bar Journal, August 1981. The original article has been edited for HORIZONS.

HARVEST FESTIVALS: OUR INTERNATIONAL THANKSGIVINGS

Autumn in the United States evokes memories of Thanksgiving sights and smells. The family gathers around a festive table; outside, red and golden leaves fall to the ground. The delicious aroma of long-roasting turkey and fresh fruit pies blesses the air. It is a celebration of the first harvest in the new land of America, when pilgrims and native Americans gathered together to enjoy bountiful gifts from earth and sea.

But the Fairchild world extends beyond the horizons of the United States, both geographically and culturally. Although Fairchild is headquartered in Mountain View, California, we have plants in the Pacific and Southeast Asia (Hong Kong, Indonesia, Korea, the Philippines, Singapore) and Latin America (Brazil and Mexico). New facilities are in the offing for Germany and Japan. Our sales offices dot both hemispheres. And our domestic population reflects a variety of cultures and nationalities.

Almost every culture has its own unique "thanksgiving." In this issue of HORIZONS we pay tribute to the festivals of some of the many nations and cultures which comprise our Fairchild world.

Japan: Bright orange kaki, delicious matsutake

In Japan autumn is the season for fruits and nuts. In modern times Western fruits such as apples, pears, grapes and peaches are plentiful. But for the tradition-minded Japanese the fruit that truly says autumn is the bright orange kaki, or persimmon. All autumn long the kaki is served as a dessert; it is dried too, in preparation for the New Year holiday. October also brings chestnuts and the gingko nut. Chestnuts go into a dish called fukiyose, a colorful melange of nuts, shrimp, matsutake and vegetables, arranged to suggest a pile of autumn leaves. Some rural areas celebrate a

chestnut festival, presenting cooked chestnuts in rice for a special sweet cake. The gingko nut also has its autumn homage; it is cracked and roasted over the hibachi coals and eaten hot, much like the American roast chestnut.

Another Japanese specialty appears at this time of year, bringing office workers and parties of families and friends into the reserved forest areas where matsutake, a giant and delicious mushroom appears. People swarm into these areas carrying sake, rice and cooking pots. They pick the matsutake and cook and eat it right on the spot.

China: The Moon Festival

The Chinese Moon Festival comes at harvest time: the eighth month of the lunar year, or close to September in the Western calendar. At this traditional celebration, Chinese people gather outdoors in the bright moonlight, eating, drinking and reciting poetry. During the festival the traditional gift is a box of four mooncakes — sweet fruitcakes laced with spices, almonds, nuts and fruits. Sometimes other round fruits that suggest the moon (apples, peaches, pomegranates) are piled on the festival table for guests to enjoy.

Pacific and Southeast Asia: two harvests a year

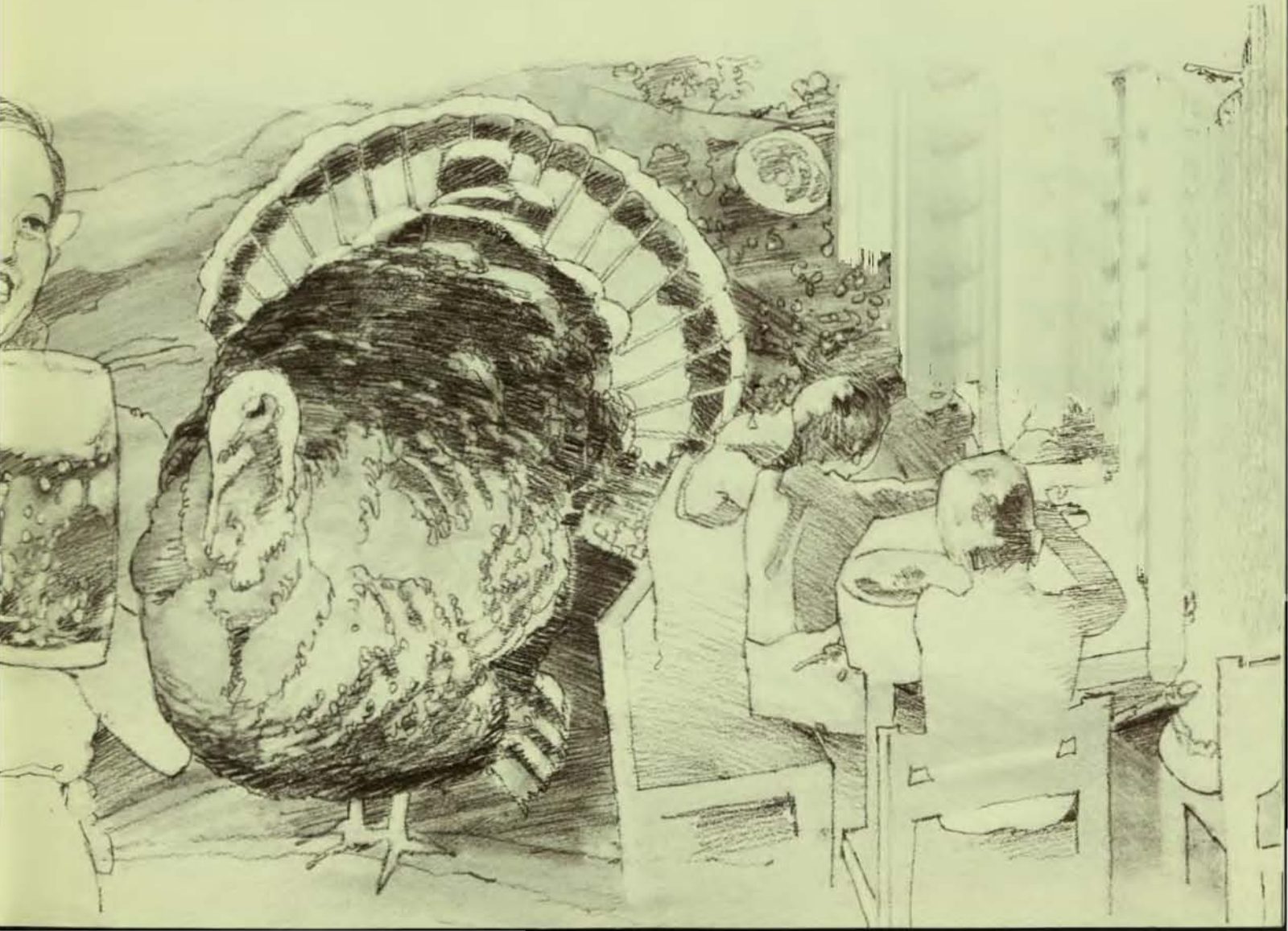
In Fairchild's Pacific and Southeast Asian cultures, the fall harvest festival is nonexistent. The mild climate permits not one, but two harvests each year.

In the Philippines, for example, a spring Festival of the Holy Cross is celebrated in coastal towns with some of the old traditions — including the election of a festival queen, and a lot of eating. The festival food is gathered by the men and cooked by the women, then eaten communally to nourish both the diners' and the community's spirit. The feast offers a lot of seafood, including mussels cultivated in the ocean shallows.

As it is in the Far East, rice is a mainstay of the Philippines, Singapore, and other nations of Southeast Asia. Grown on paddies (or padis, from which the American word derives), rice is the sacred grain around which many festivals and traditions have emerged. During the rice harvest the "rice soul" is protected by hiding seeds in corners of a house, where visitors cannot sit or walk over them, jinxing their growth. The planting, cultivation, harvesting and processing of rice is a complicated occupation and most of these countries have a rice culture which carefully defines the role men and women play in it.

South of the Border: turkey is a holiday bird

Mexico does not have a Thanksgiving festival as such, but it does have



turkey as a holiday bird, reserved for special occasions as it is in the United States. Mexico's national dish is mole poblano, an adaptation of an old Indian recipe calling for turkey and a chile sauce made with chocolate. The modern version adds cinnamon, cloves, raisins, almonds and sesame seeds — requiring elaborate preparation for almost any special occasion.

The national dish of Brazil is a mixture of the African, Portuguese and Indian cultures. Called feijoda completa, it is a meat and bean combination which Brazilians of all classes enjoy. The feast table resembles our Thanksgiving cornucopia (horn of plenty). At large festival gatherings the feijoda completa includes dried and fresh beef, smoked tongue, bacon, sausage, spare ribs and pigs feet, served in an attractive platter arrangement. Rice, manioc meal (a root plant from which tapioca is derived) and greens, hot sauce and cachaca (sugar cane brandy) accompany this feast. The black beans are served in a large container next to the meat platter.

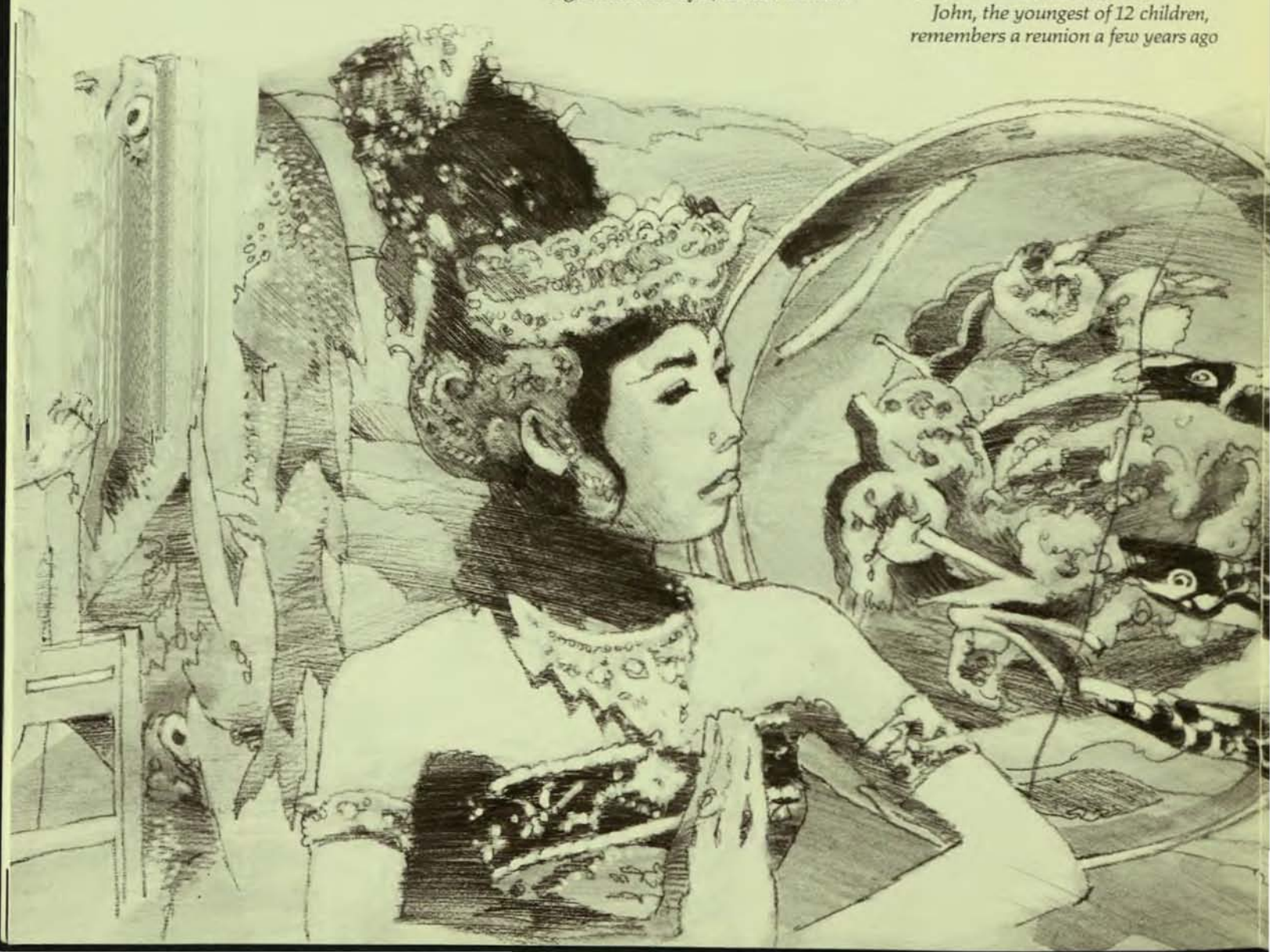
Sukkoth: The Jewish Thanksgiving

In late September or early October (the date, based on the Jewish calendar, varies each year) Jews around the world celebrate a seven day festival called Sukkoth. The festival comes during the season when all harvest work is finished and everyone is free to celebrate. The sukkah — an outdoor booth — is built to recapture the spirit of the early harvest festivals in ancient Jerusalem. Decorated with greens, and furnished with tables, benches, and a place to light festival candles, the sukkah is a charming creation. During the harvest ceremony children carry fruits and vegetables representing the seven fruits of ancient Palestine. In the United States, a special Sukkoth dinner might feature turkey and stuffing, American style, as well as other Jewish foods such as dill pickles, beet relish, and chicken soup. Other Sukkoth feasts offer stuffed vine or cabbage leaves — an appropriate tribute to the grape harvest — culminating in a delicious dessert: strudel, a pastry filled with fruits. Today, most Sukkoth festivals take place at synagogues or Jewish community centers where participants enjoy the celebration of their ancestors.

John Salazar remembers a Chicano Thanksgiving

In the Western United States the cultural influence of hispanic Americans is largely Mexican. John Salazar, born in a small Chicano community in Colorado, is now Fairchild's Director of Communications. John is his family's historian and can trace his roots back to the 1700s, when Mexicans migrated north to settle in what is now Arizona, California, Colorado and New Mexico.

John, the youngest of 12 children, remembers a reunion a few years ago



with 100 family members who gathered in the San Luis Valley of Colorado where he grew up. "My ancestors were a mixture of Spanish, Mexican and Pueblo Indian. We were the Chicanos who had migrated to this area when it was still part of Mexico. We stayed in a cloistered community — almost like an island — and the culture remained the same for centuries. Unlike Mexican Americans who have come to the United States more recently, we kept to the old ways of this Mexican Indian heritage."

Because the community was so isolated, it wasn't until World War II that the cultural influence of the rest of the United States reached into Chicano life. "Thanksgiving was one of the influences that reached us rather quickly. We were a farm community; we grew crops such as beans, potatoes and peas, and there was always rejoicing after the harvest. In fact, the farm children attended school from August to October, and then everybody was off to help with the harvest."

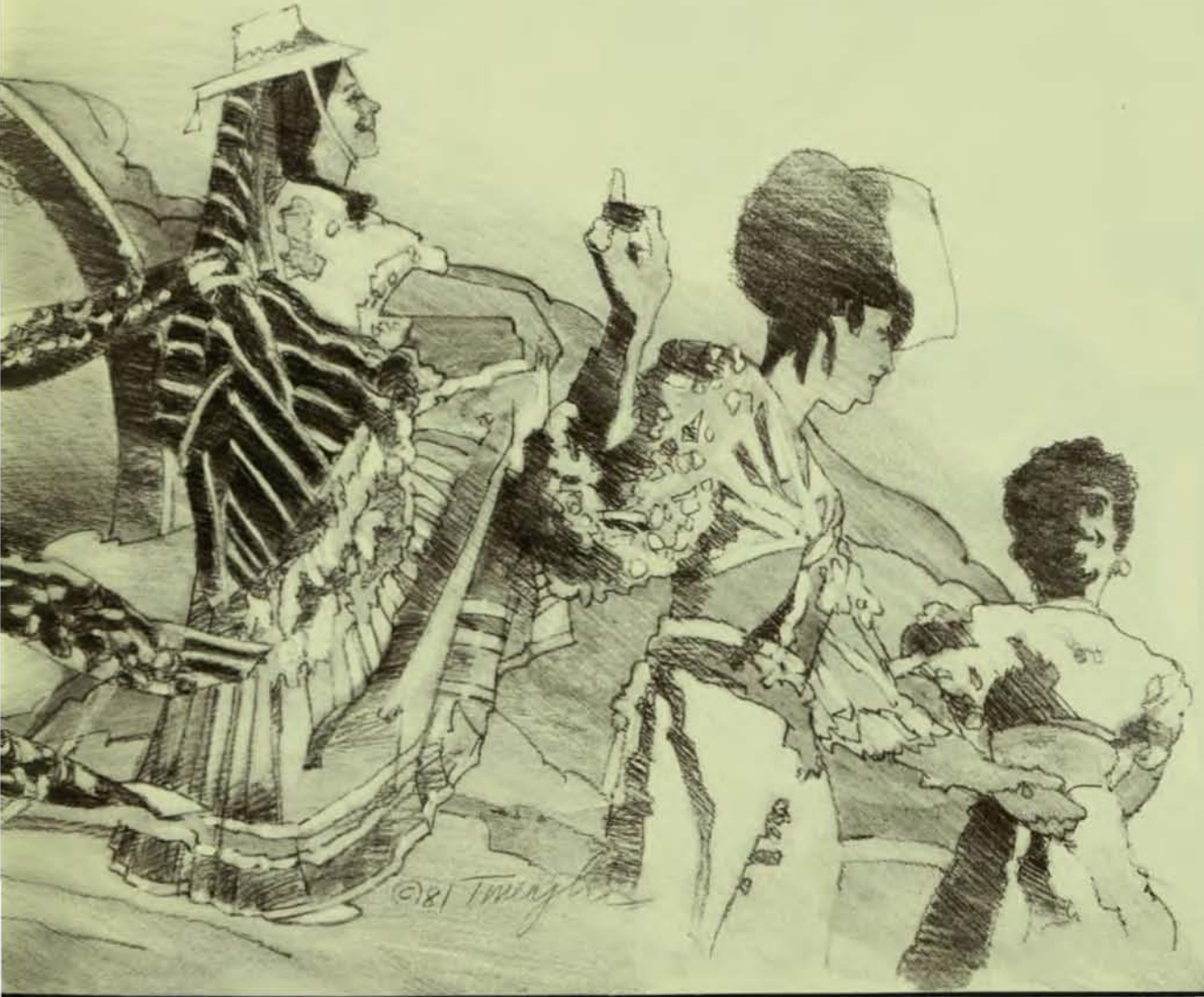
Thanksgiving began with a Catholic mass, followed by a day of celebration. "We raised turkeys and chickens and would roast them over a wood stove with a special sage stuffing. The wood added a unique flavor. We also had white Indian corn, singed on the wood stove and buttered, sweet curdled cheese with molasses or syrup, rice with cinnamon and raisins, and fried potatoes fixed with chile, corn and pimientos. We also harvested pumpkins and fruit for pies."

The harvest celebration was a joyous one. The men in the community dressed for the occasion with white frilled chemise blouses and slacks. There would be harmonica and guitar playing during the day.

Today, at Thanksgiving especially, John remembers these early years well. "My world was bordered by the Sangro de Cristo mountain range," he recalls. "I used to look at those mountains and wonder what was on the other side. When I moved to Denver at age 12 my life changed completely. I had opportunities — but I missed the close-knit community and the adobe house where I grew up."

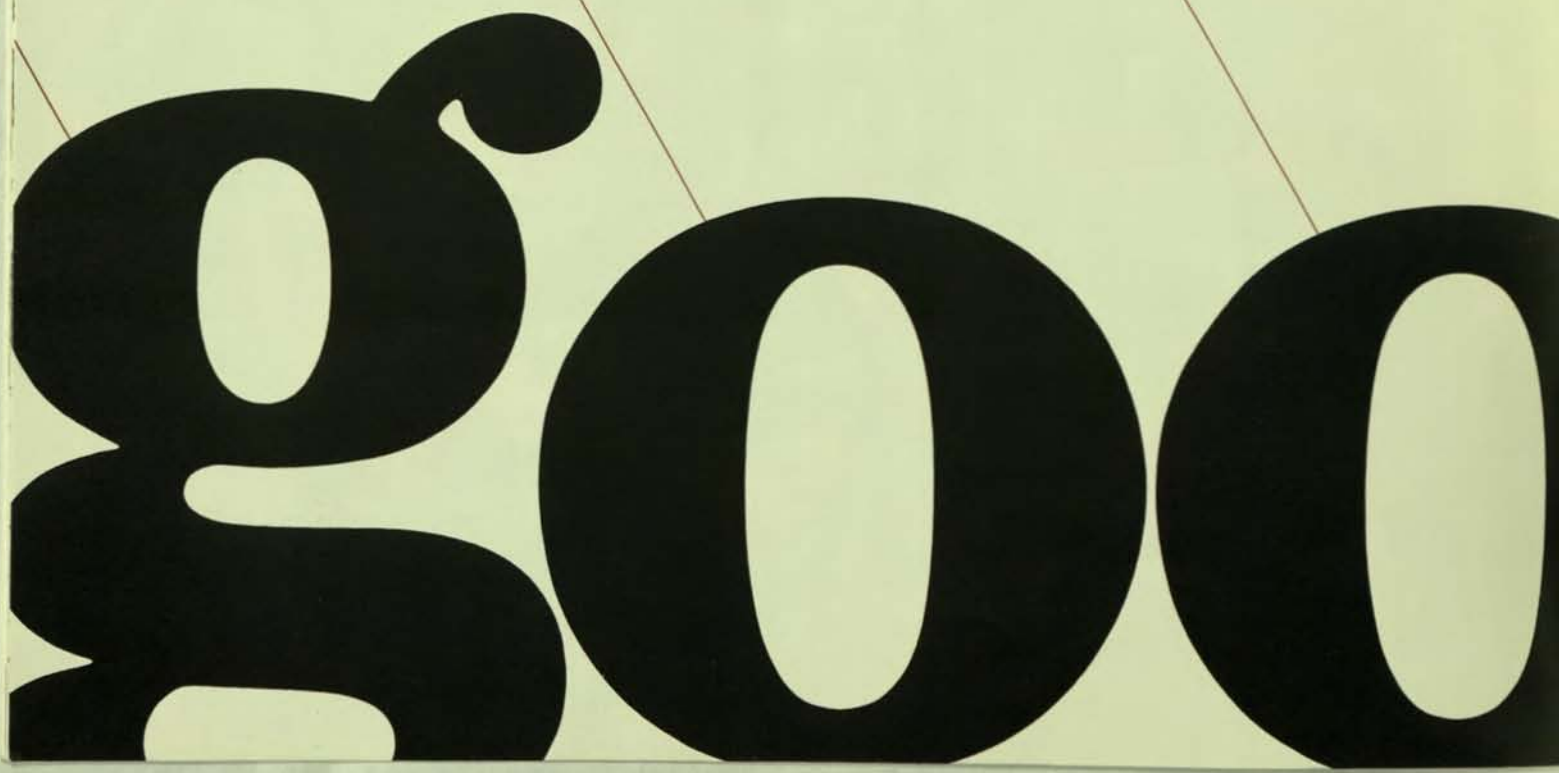
John keeps a picture of his home on his office bulletin board — a reminder of his Chicano roots and his community.

John Salazar in typical attire for a Chicano Thanksgiving.



e·lec·tron·ics et·y·mol·o·gy

Finding the verbal roots of scientific language is educational and fun



Even in Tennessee, one may extract square roots without running afoul of the law.

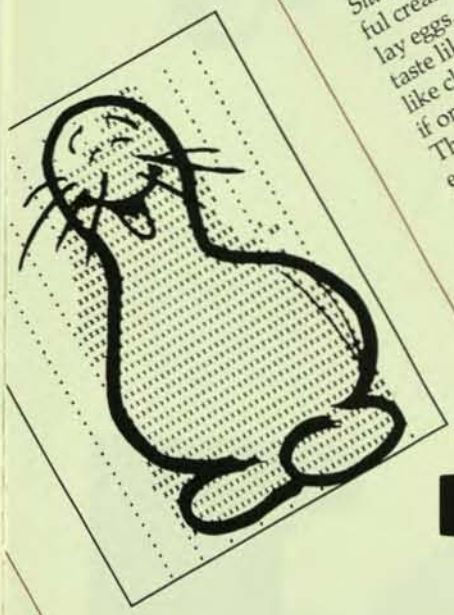
Edward Kasner, describing mathematical evolution in Mathematics and The Imagination

Whence come those strange and intriguing words of electronics. Many of us at Fairchild use them automatically, without a second thought. But some of us have never paid any attention to them.

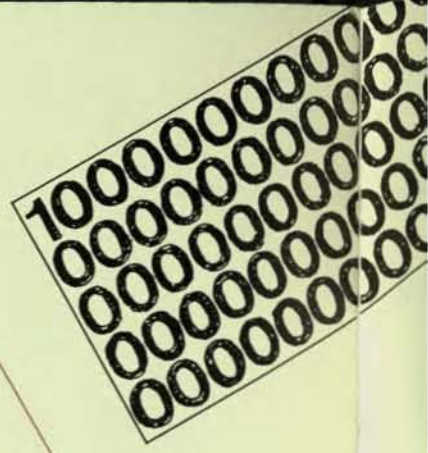
The name of this game is etymology, or the history of words. With the etymology of scientific terms, it becomes even more complicated. Here, for your information and enjoyment, are some mind-teasers that HORIZONS uncovered through dictionary and encyclopedia sleuthing, and through conversations with physicists, engineers and other industry old-timers.

gol

shmoo plot—The original plot of data as a function of two parameters was called a "shmoo" plot because it looks like the shape of the mythical animal Al Capp originated in his famous comic strip "Li'l Abner." Says the *Dictionary of American Slang* about shmoos: "These wonderful creatures multiply very rapidly, lay eggs, give milk, when broiled taste like steak, when fried taste like chicken, and lie down and die if one looks at them hungrily. They symbolize the richness of the earth, abundance, or a simple, good life. The word might be taken from the Yiddish word 'shmoo'—meaning profit, especially unethical profit." HORIZONS could not discover who first used the word to describe the plot (if you know, please tell us), but the lovable Li'l Abner character now has an honorable place in both electronics and American folklore.



transistor—In 1948 John Bardeen and Walter Brattain, working at Bell Laboratory under the direction of William Shockley, developed the first successful semiconductor triode. They called their germanium diodes varistors, and since this new device used a varistor with a third connection in order to *transfer* signals, the word transistor (TRANSfer, varISTOR) was coined. The transistor allows current to pass through a central area known as the base, which controls the flow between the other two semiconductor areas known as the emitter and collector. The transistor provided amplification and control functions which spawned the development of the semiconductor industry between 1960 and 1980. Unlike the earlier vacuum tube, the transistor is small, stable, solid, and does not need to be heated.



semiconductor—Literally half, or partly, a conductor. Most materials are either electrical conductors (copper, brass), or electrical insulators (rubber, glass). But there is a class of materials lying between these two extremes—materials which are neither good conductors nor good insulators—and so are known as semiconductors. Silicon, a non-metallic element, is the most commonly used semiconducting material. When pure silicon is "doped" with chemicals, its conductive properties can be changed dramatically.

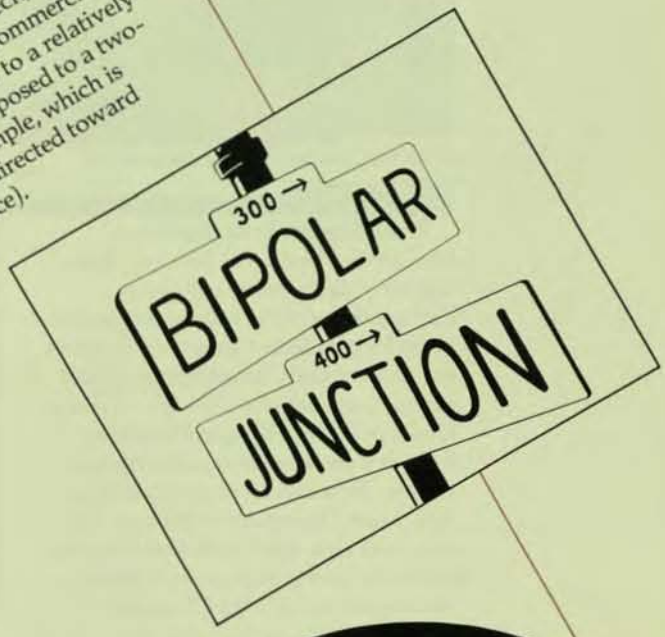
Sh

googol—In mathematics, 1 followed by 100 zeros (10^{100}). A googolplex is a 1 followed by a googol zeros ($10^{10^{100}}$ or $10^{(googol)}$). The American mathematician, Edward Kasner, in his book Mathematics and the Imagination credits the word's derivation to his nine year old nephew Milton Sirotta. "Words of wisdom are spoken by children at least as often as by scientists," Kasner wrote. "There would not be enough room to write a googolplex if you went to the farthest star writing zeros all the way," he explained. As for a googol: "It is less than the number of raindrops falling on New York City in a century, but larger than the largest numbers used in physics or astronomy. The number of all the electrons in the entire universe can be found by means of Einstein's physics—perhaps 10^{79}—which is less than a googol." Adding a little wit to mathematical philosophy, Kasner noted that "Googol is not even approximately a Russian author."

broadcast—A farmer's term, meaning to scatter or sow seed over a large area. Although still used in its archaic form, the word more commonly refers to the transmitting of speech, music or visual programs for commercial or public-service motives to a relatively large audience (as opposed to a two-way radio, for example, which is utilitarian and is directed toward a limited audience).

radar—An acronym for RAdio Detecting And Ranging. The word is also a palindrome—a word or sentence that reads the same backward or forward. Thus radar, which describes a system that measures distance (and usually direction) by determining the amount of time required to travel to and return from an object, actually describes its function through its name.

Bipolar Junction—The street name selected for Fairchild's new Bipolar Division facility in Puyallup, Washington. In electronics the term describes the joining, or junction, of two types of semiconductor material—positive and negative—which are bipolar devices.



de—Derived from the Greek, e word literally means "separate paths". The earliest vacuum tube consisted of two metal plates sealed inside a glass tube: hence the name diode, or two element. The semi-conductor diode performs the same function as the earliest vacuum tube—it conducts current in one direction or another.

triode—Also from the Greek, triode means "three paths" or three elements. The vacuum tube triode was first introduced in 1907, allowing a wide range of control over a flow of current, as opposed to the simple on/off action of the diode. The current was supplied to a third element placed between two elements of the diode, making electronic amplification possible for the first time. Thus radio, television and telecommunications emerged.

OVER THE HORIZONS

(A special section devoted to employee news culled from Fairchild's divisional newsletters)

Mike McCumber proudly displays his wrestling medals.

Wrestling for bronze is Mike McCumber, Technical Services, Subassembly Test Systems Division, Latham, New York. Mike participated in the Empire State Games (also known as the New York State Olympics) last summer and came away with a bronze medal in Grecco Roman Wrestling. Mike is a member of the Adirondack Region Team which practices at New York State University in Albany. The team has won eight gold medals in the National Sports Festival and plans to participate in the 1984 Olympics. "Pin," "takedown," "bigbird," and "throw" are common vocabulary words for Mike McCumber in his wrestling life.

Factfinder,
Subassembly Test Systems Division
Editor: Beth Martin

Annette Amereh samples the Microprocessor Division's new telephone system.

A new dimension in telephoning is part of the Microprocessor Division's facilities in Santa Clara, California. The Dimension 2000 Telephone System gives employees special signals on calls: one ring means an inside call, two rings an outside call, three rings a priority call within the plant. Employees making a call hear a "tail" at the end of the ring which tells them they're in a holding pattern until the party on the other end hangs up. The phones can be programmed to call back when there's a busy signal, and also provide a "speed calling" feature which allows callers to use a two or three digit code for making an outside phone call. Microprocessor people are proud of their new system and hope it will facilitate telecommunication in and with the division.

The Microprobe,
Microprocessor Division
Editors: Lisa Perri, Ed Glass

OVER THE HORIZONS

Lights, camera, action! The Media Center at Component Test Systems (CTS), San Jose, California provides customer and in-house training with videotapes for the entire CTS product line. Says Gene Mendoza, Media Center Supervisor and Executive Producer: "We try to make our tapes entertaining as well as educational — to present a subject in a new and interesting way." Gene's creative crew is comprised of Joe Peterson, Program Director and Editor, Joe Vogel, Studio Engineer and Judy Bostic, Script Writer. The Media Center is growing and going strong. Center staff would like to encourage use of video for areas other than training: for example, new production information, recruitment tapes, and even a news/information service for the division. "I think you'll see a radical change in what's happening with video during the next year," predicts Gene. "More people will be using it for all kinds of things."
Databits,
Component Test Systems Division
Editors: Denise Hutson, Norma Rouge

Media Center crew gets ready to shoot a scene.

Fir trees are towering background scenery for Jack Mills and Bob Wolf at Puyallup construction site.

Mount Rainier, towering firs and "occasional" rain characterize the environment of the Bipolar Division's wafer fabrication plant now under construction in Puyallup ("pew wallop") Washington. "The 95 acre Fairchild site in the Tacoma area, has 65 acres of Douglas fir and cedar," reports Jack Mills, Site Manager. "We're keeping most of the trees and building the facility into the landscape." The building will have an adjoining energy core so that nothing will detract from its appearance. Plant startup for checkout is scheduled for the third quarter of 1982, with production startup planned for the first quarter of 1983. "We've already begun to recruit next year's startup team for the wafer fab," Jack says. "If you like trees and don't mind occasional rain, contact your personnel representative."
Bear Facts, Bipolar Division
Editors: Dorothy Ferguson, Jerry Muff

TECHNICAL WRITING AWARDS

Fairchild employees authoring technical articles for presentations or publication in appropriate professional journals receive cash awards as part of the Technical Writing Incentive Awards Program. Technical Writing Awards appearing below were given from July-September 1981.

Advanced Research & Development Laboratory

John J. Barnes, John Y. Chan, Chen Wang
"64K MOS Dynamic RAM"

Rudy H. Dyck, Michael G. Farrier
"Single-CCD-Sensor Demonstration Color Camera"
PROGRESS

Hemraj Hingarh
"Integrated Injection Logic"
ART SEIDMAN'S IC APPLICATIONS JOURNAL

Hemraj Hingarh, Robert Marshall
"Advanced Gate Arrays Offering Power/Delay Tradeoffs"
IDA CONFERENCE PROCEEDINGS

Bipolar Division

Robert Marshall, Hemraj Hingarh
"Advanced Gate Arrays Offering Power/Delay Tradeoffs"
IDA CONFERENCE PROCEEDINGS

Bristol-Digital Design Unit

Chris Jay
"Microcomputer-Controlled Programmable PSU"
PROGRESS

Component Test Systems Division

Ed Belt, Roy Kole
"Testing Microprocessors"
PROGRESS

Microprocessor Division

Tich T. Dao
"SEC-DED Non-Binary Code For Fault Tolerant Byte Organized Memory Implemented with Quarternary Logic"
IEEE TRANSACTIONS ON COMPUTER

Jim Howell
"Reliability Study of Plastic Encapsulated Copper Lead/Frame Epoxy Die Attach Packaging System"
1981 INTERNATIONAL RELIABILITY PHYSICS SYMPOSIUM

Roy Kole, Ed Belt
"Testing Microprocessors"
PROGRESS

MOS Division

J.Y.W. Seto, P. P. Sharma, T. G. Wear
"Electrical Properties of Heavily Doped Low Pressure Chemical Vapor Deposited Polycrystalline Silicon"
JOURNAL OF THE ELECTRO-CHEMICAL SOCIETY

Southern Europe

Enzo Della Calce
"Gate-Array La Logica Degli Anni '80"
ELETTRONICA OGGI

Subassembly Test Systems Division

Dan Friedman
"Understanding and Successfully Implementing In-circuit Testing"
1981 BOSTON ATE SHOW PROCEEDINGS

PATENTS

Fairchild's technological leadership depends, to a great extent, on the creativity of its people. Inventors are listed on patents issued to Fairchild from July-September, 1981.

Peter A. Crossley
"Mesfet Gate Termination To Field"
Patent No. 4,277,882

Theodore Vaeches
"Electronic Testing System"
Patent No. 4,280,220

Steven N. Goodspeed
"A Method For Reducing Consumption for Tri-state Devices"
Patent No. 4,287,433

Donald J. Labriola
"Electrical Validator For A Printed Circuit Board Test Fixture"
Patent No. 4,290,015

Steven J. Radigan, Robert L. Berry
"Process For Patterning Metal Connections on a Semiconductor Structure By Using An Aluminum Oxide Etch Resistant Layer"
Patent No. 4,289,574

THE SHERMAN MILLS FAIRCHILD KEY TECHNOLOGIST PROGRAM

CALL FOR PAPERS

The Fairchild Key Technologist Program has begun planning for its third annual technical seminar by asking for submission of technical papers authored by Fairchild employees. The Sherman Mills Fairchild Memorial Technical Seminar is tentatively scheduled for March, 1982.

The Key Technologist Program provides recognition and well-rewarded scientific careers for Fairchild's technical community. In addition to the seminar the program has resulted in the creation of two senior job grades, Scientist and Senior Scientist, substantial additions to Fairchild's technical awards program, and additional opportunities for professional development in technical areas.

Employees should submit abstracts, 300 to 500 words in length, of papers on advanced technological subjects. The papers may include Fairchild proprietary information. Appropriate subjects include, but are not limited to, the following:

Semiconductor: Processing, materials, device modeling and design, circuit design, logic design, new products, layout, computer-aided design, and testing and packaging.

Systems and Automatic Test Equipment: System architecture, hardware designs, software simulation and applications.

All abstracts must be submitted no later than January 6, 1982. Send them to Rocky Francis, 4001 Miranda Avenue, Palo Alto, California 94303, Mail Stop 30-0106 MDRD. Individual authors will be notified by January 20, 1982 if their topics have been selected for presentation. For further information call Rocky at 415/493-3100, Ext. 2391.

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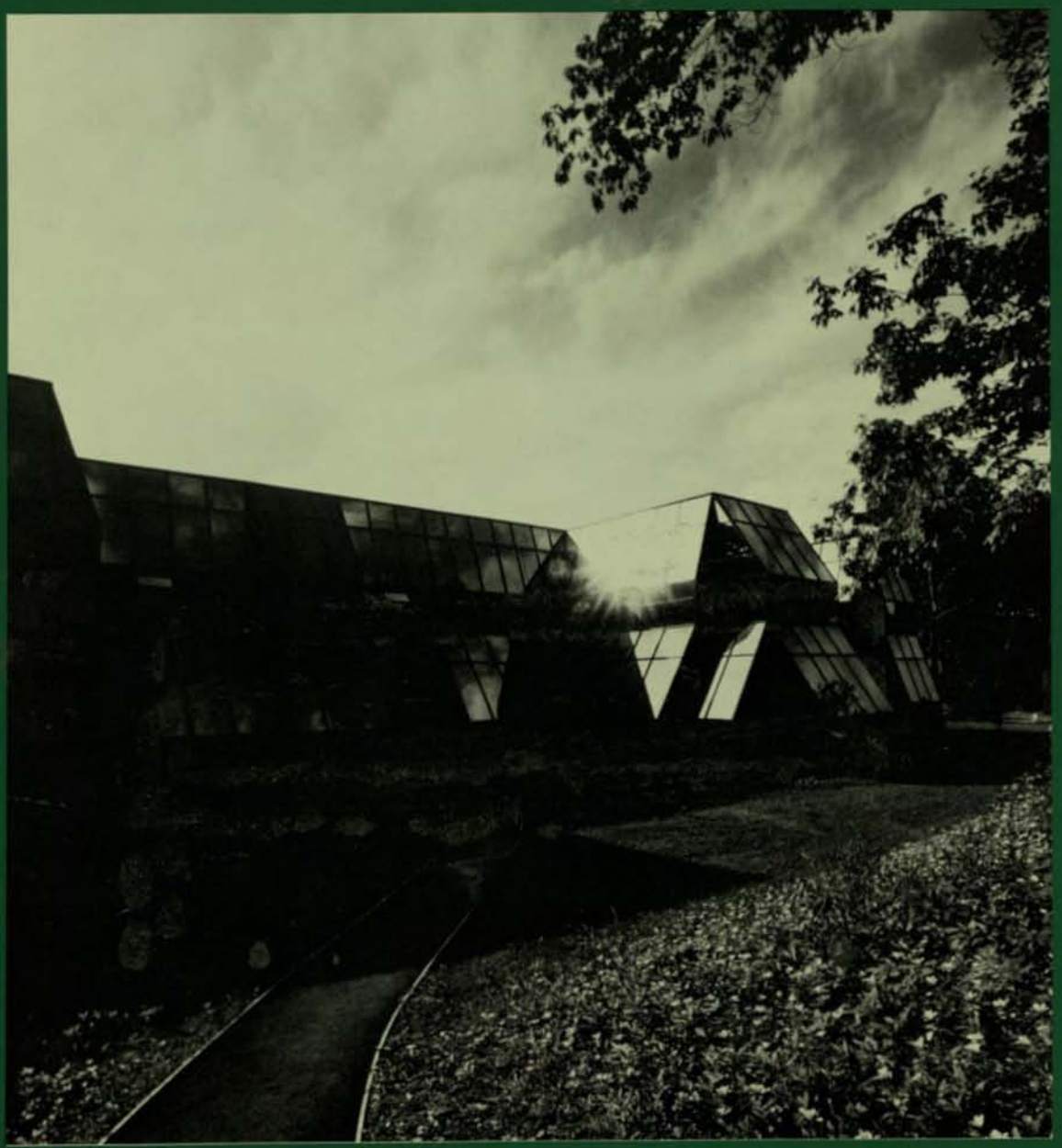

Schlumberger Doll Research Laboratory

IN THIS ISSUE

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THOUGHT FOR FUEL

Schlumberger oilfield research

Heavy woods surround the Q-shaped center, ensuring a tranquil view out of the lab's hundreds of windows.

Nestled in the gently rolling hills of Ridgefield, Connecticut, a cluster of contemporary buildings houses Schlumberger-Doll Research (SDR). Here some 240 scientists and technicians support Schlumberger Limited's oilfield services operations, improving existing tools and techniques, and conducting advanced studies of basic physical properties that will lead to new measurements methods and equipment.

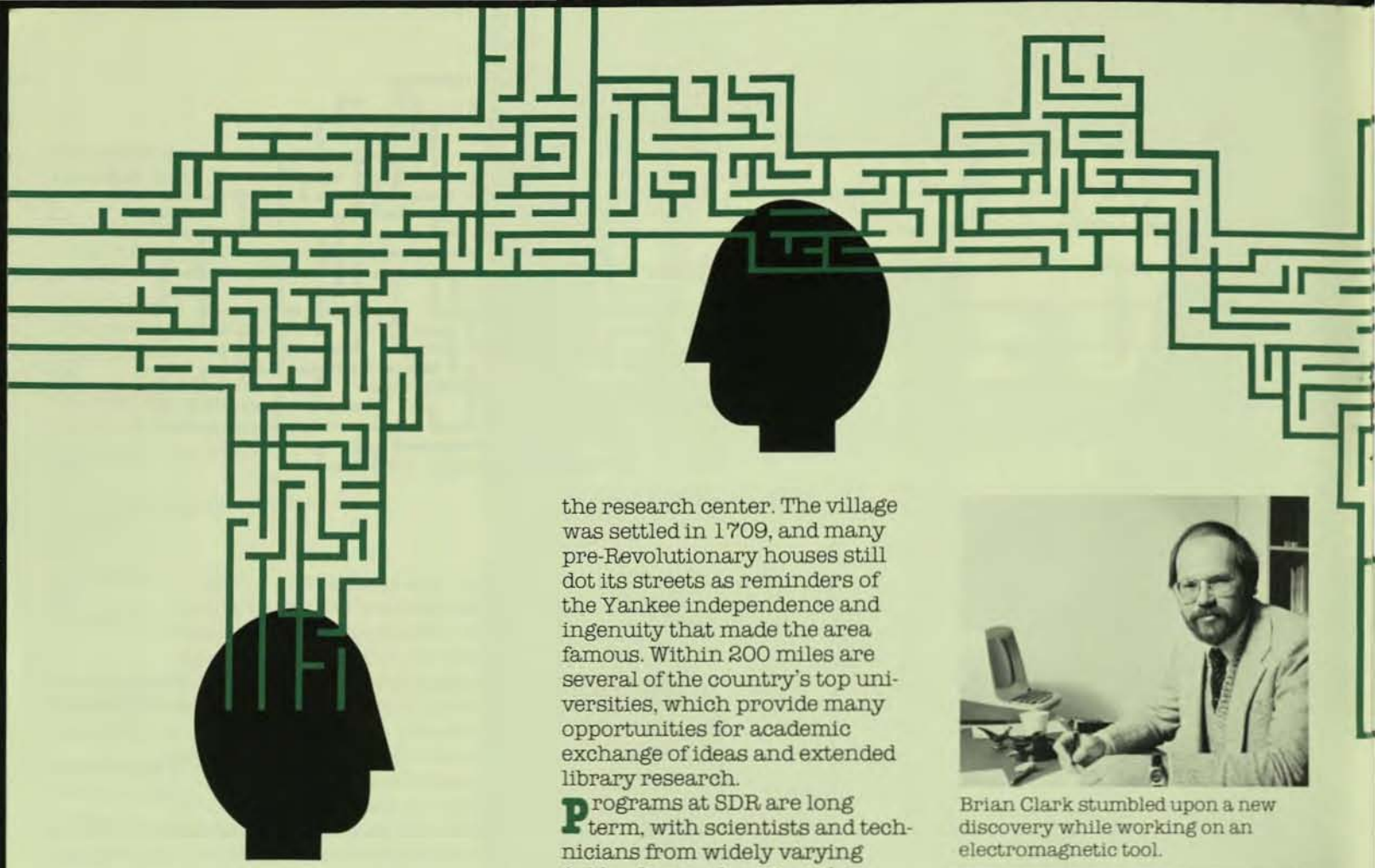
SDR is named for a former Schlumberger chairman, Henri Doll, who built the original facility in 1948. The structure's mirror-like facade reflects hundreds of oak, maple and birch trees that seclude it from neighboring industrial parks. Inside, research in five major areas, Mechanics-Electrical, Nuclear, Petroleum Science, Systems Science and Fluid Mechanics, contribute to Schlumberger's efforts to continually improve its oilfield technology.

Locating oil and gas reserves, and then efficiently developing them, has always been a high-priced game of blindman's bluff. Even with the best of techniques, two-thirds of the oil or gas may be trapped in the ground after a well has been drilled, developed and finally capped off.

Since 1927, Schlumberger has pioneered sophisticated techniques for locating and evaluating the characteristics of underground reservoirs. To provide these services, a series of subsurface rock and fluid measurements are obtained by lowering instruments, called sondes, into a borehole. Measurement data are transmitted up an electrical cable to the surface, processed by computer and printed onto a graphic "log" for interpretation. Study of these logs determines the locations and quantity of oil and gas, and also provides useful information about the best methods of extracting the reserves.

The original logging technique simply measured electrical resistivity of the area surrounding the borehole. Sedimentary rock formations of interest in petroleum exploration are porous and usually contain water, typically salty. When oil and gas hydrocarbons are also present they can usually be detected by electrical measurements, since hydrocarbons and salt water have very different resistivities.

Over the years, Schlumberger has led the industry in developing new electromagnetic, and, today, acoustic and nuclear measuring techniques. SDR is the breeding ground for these concepts and methods. Its devel-



Walls of windows and computer terminals are standard equipment in the offices of most Ridgefield scientists, including that of artificial intelligence researcher David Barstow.

opments are supplemented and extended for field use by the engineering arms of Wireline Services in Houston, Texas, and Clamart, France, which also serve as manufacturing centers for logging equipment.

Historic Ridgefield, a town of 20,000 just 60 miles from New York, is an appropriate site for the research center. The village was settled in 1709, and many pre-Revolutionary houses still dot its streets as reminders of the Yankee independence and ingenuity that made the area famous. Within 200 miles are several of the country's top universities, which provide many opportunities for academic exchange of ideas and extended library research.

Programs at SDR are long term, with scientists and technicians from widely varying fields often exchanging ideas and contributing to a variety of projects. Frequently, research on one subject will lead to a totally unforeseen discovery, or to a brand new method of measurement or completely new tool.

"Generally, the principle of a tool is studied here," says Michel Gouilloud, SDR's director for the past four years. "We solve problems of physics which are involved. Houston and Clamart work from our principles to make the tools."

This cooperation between research and engineering has been essential to the development of a new tool called the DPT, or deep propagation tool. A method was needed to differentiate hydrocarbons from water which happens to be fresh and has a resistivity similar to that of oil. Existing electromagnetic tools could make such measurements, but only within a few inches of the bore hole, where conditions are drastically changed by the drilling process. To penetrate the rock further, a tool that operated at lower frequency was needed.

It was decided that SDR and Clamart would develop different

Brian Clark stumbled upon a new discovery while working on an electromagnetic tool.

parts of the project. SDR, because of its strengths in theory and concept, handled the basic physics of the DPT. Clamart's engineers developed electrical and mechanical designs for the tool itself, based on the properties explored at SDR.

The DPT is also an excellent example of how work on one project often leads to another discovery. Brian Clark, Program Leader in electromagnetic spectroscopy, explains how the discovery grew out of a problem in testing early models of the DPT.

"We took a small version of the new tool and tested it in a tank of water. Since the characteristics of water are known, the response of the tool could be related to the theoretically expected performance of the tool. But we found that there was always an unexplained problem in the test results—and it wasn't the water."

It turned out that an unforeseen phenomenon existed: there was another way for electromagnetic energy to propagate from the transmitter to the receiver that was distorting the test results. Eventually a way to

Jan Brown is conducting basic studies of the physical properties of quartz.

compensate for this phenomenon was designed into the tool, and the problem was eliminated.

"But," says Brian, "we decided to look at this phenomenon and see if we could do something useful with it, perhaps make it the basis of a new logging technique. It's a case of taking a problem that could have been very harmful to our initial project, fixing it in the tool and then exploring the possibility of basing a new technique on the discovery.

"That is the history, I think, of all discoveries."

Another example of how the course of research can change as the work progresses was provided by Jan Brown, an experimental physicist in Mechanics-Electrical. Jan was working on the development of a pressure sensor that would have accuracy and resolution requirements far in excess of any commercially available sensor. She had decided that the best approach to the problem was to extend the performance of quartz resonator technology (the technology used in quartz watches) since this type of device came closest to the oilfield's requirements.

At this point the research direction was clear. "I felt what was needed was to provide detailed analytical models of quartz resonators and to work on the engineering design and fabrication technology," Jan explains. "I was confident that all the basic properties of quartz had been thoroughly measured. Then I discovered that the basic measurements just weren't adequate to meet our detailed models."

So now she is conducting an investigation into the physical properties of quartz, that has included building a highly sensitive ultrasonic spectometer in her environmentally controlled laboratory. Results of her basic research will benefit the entire scientific community as well as have direct application in a new, better way for Schlumberger to measure underground pressures.

Cubes of rocks are packed into huge cannisters to simulate an underground environment for testing new tools.

SDR's scientists realize that even with the best of laboratory simulations, actual conditions in an oilfield put every theory to a hard test. By deliberate design, then, Ridgefield is a place where theoreticians and experimentalists work together constantly. Scientists frequently travel with their support staffs to oilfields around the world to test new concepts and tools.

"In the laboratory we have nice, straight boreholes," remarks Paul Albats, a researcher in the Nuclear department. "Quite often real boreholes are angled and uneven with caves and washouts and nasty materials that absorb a neutron just like that."

Paul's group is investigating two types of nuclear measurement for Schlumberger: one that categorizes materials in a forma-

Technician Stan Lawrynovicz, who has been with Schlumberger for 33 years, adjusts a spectroscopy sonde with Ralph Menente.

tion by measuring its natural radiation; and a second type that involves sending penetrating particles—neutrons and gamma rays—into the formation and measuring radiation echoes that result from collisions with atoms in the earth.

"The basic microscopic properties of nuclear physics are well known," Paul continues. "We project what happens in a microcosm out to reality. Our challenge is to understand which variables will change a reading, to look at the whole problem."

One fairly new department at SDR, the Case Study program, applies new phenomena and methods discovered in the laboratory to interpretation problems encountered while running logs for Schlumberger customers. Ercil Hunt, a veteran and expert in field interpretation, runs the program.

"We bring a practical problem to the lab and try to mesh it with pure science," he says. "We've always done problem solving for customers, but never on this scale. Our field operators call these 'super cases' because they deal with significant problems, ones that affect a large percentage of our business."

Schlumberger does run some of its own test wells, but in the case study program, experimental measurements and field testing of new tools is done on customers' wells. "One of our most rewarding case studies was in a formation that had maybe 50 rigs on it. We found a small operator who didn't have his own research lab. He was willing to add two standard commercial logs to the normal package, plus run four or five experimental logs and give us core samples and drill-bit data.

"In return, we were able to give him as much data—to take advantage of as much new technology, really—as Chevron or Exxon or any of the big guys. It's paid off for him in the development of his wells, and he also knows that he's contributed something very important to the industry."

The reams of data generated, manipulated, processed and stored by each department at Ridgefield are kept organized by an in-house network of five computers. All scientists have terminals, and they emphasize that much of their work would be impossible—or at best, years in the making—without the speed and mathematical modeling ability of computers.

As might be expected in this environment, SDR's Systems Science Department provides essential services. Department members are responsible for designing and handling computer systems used by the entire facility. However, they are also developing computer science itself, including the emerging technology known as artificial intelligence (AI).

David Barstow, a member of the Systems Science staff, says AI describes machines that can perform tasks normally associated with human intelligence. Robotics, writing computer

Discussion is the seedbed of creativity; both formal and informal meetings between project members occur frequently.

programs or understanding human speech, for example.

Expert programs are perhaps the best example of AI today, and are of particular interest to Schlumberger. SDR is working on an expert geologist program with the goal of assisting in the interpretation of wireline logs.

"We accomplish this task by defining the techniques of human experts," David explains. We interview them to find out how they make deductions and decisions, what rules of thumb they use.

"We've found that their rules don't necessarily rely on any scientific model, so we have to codify what are essentially methods of behavior. If we can write these down and put them in a computer program, then, in theory, the program will behave in a way that imitates the experts."

David is working on a different type of expert program: software research in which the goal is to use computers to assist in writing computer programs.

Fairchild also recently initiated an AI research program in its Central Research Laboratory at Palo Alto, with emphasis on computer-aided design and computer-aided manufacturing techniques. And, of course, information will be exchanged between Palo Alto and Ridgefield in areas where the two programs overlap.

Nearly three-fourths of Ridgefield's professional staff have doctorate degrees, says Personnel Manager Janet Curow, and most are recruited directly from the 10 to 15 best university departments (physics, engineering, chemistry, math, geology and computer sciences) at the top schools in the world.

Ridgefield's professional staff come from many academic disciplines. Nuclear department member Paul Albats has his doctorate in astrophysics.

"Our PhD's are sought out and rewarded for being expert in a small area of science," she says. "Once they're here, they maintain that expertise as a resource for all of Wireline. But they also grow in many other areas. We frequently take an interdisciplinary approach to the subjects we study, and our people always seem anxious for more projects that cross departmental lines. We stretch people's minds here."

Everything about the Ridgefield center—its approach to science, its sunny clusters of offices and wide hallways, and especially the relaxed, informal communication between people—everything contributes to the cross-fertilization of ideas. Scientists are familiar with each other's work and count on support, advice and consultation from others. At the same time, close ties with the field ensure that SDR's accomplishments will continue to advance Schlumberger's technology and services.

DIAL-A-REPAIR

After desk-top computers and calculators the size of a credit card, what comes next? Dial-an-engineer?

Not exactly. House calls are still the specialty of Fairchild's field service engineers—the people who repair and maintain automatic test equipment in the field. But they have found a way to "dial a computer," using a new service tool developed by the Field Engineering unit of Fairchild's Automatic Test Equipment Group (ATE). And, strangely enough, it's called DIAL.

DIAL is the Diagnostics, Information and Analysis Library—a computer and software system that can substitute for a human expert. Field engineers (FE's) who encounter tough problems in installed testers can call and "talk" with the computer using an ordinary telephone and portable terminal. It contains up-to-the-minute technical data related to service and test programs that help diagnose the source of breakdowns.

Communications equipment used with Remote System Control is much the same as with DIAL—terminal, modem and telephone. But RSC lets an expert like Gerry Goshaw control and program the customer's tester from the Fairchild factory.

Faster Field Service

Customer Services Manager Wayne Carlson is counting on automated service tools like DIAL to help get new FE's into the field quickly. Fairchild's number one service reputation in ATE has always been based on the work of highly trained and qualified people, he says. But on-the-job training takes time, and a shortage of experienced FE's has compounded the problem of keeping up with sales of new systems.

"Experienced people are pretty scarce," Wayne explains. "The military has really dried up as a source, so we rely mostly on trade and technical schools. New graduates rarely know the ins and outs of Fairchild systems, so we've always had to do a lot of training. Now we're concentrating on ways to speed up that training and to make individuals more productive."

New FE's receive several weeks of classroom and hands-on training for an additional

OUT IN THE FIELD

The very title Field Engineer implies working away from home base. In the field—whether you're 2 or 2,000 miles away—you're on your own and a long way from home.

HORIZONS talked to FEs Jim Schraith and Fran O'Hare, who bring similar backgrounds but diverse perspectives to their jobs. Jim works out of the Irvine office as a Field Support Specialist; Fran works out of Santa Clara as a Senior Field Engineer. Both have training as technicians but little professional schooling. And both derive satisfaction and some frustration from their jobs.

Jim Schraith: "I like the challenge of finding out what's wrong and making it right. It's nice to really clean up a system and have everyone all smiles again."

"When I started with Fairchild there were maybe eight Faultfinders field engineers in the whole country. Now there are about 20 working for SATS alone. My training consisted

period before tackling installations, preventive maintenance and repair jobs on their own. Technical Support people—the experts located at ATE factories in California and New York—back up field personnel by telephone when necessary. "In the past, somebody back here might have stayed on the phone for hours with a new FE, walking him through a tough problem," says Gerry Goshaw, Technical Services Supervisor for Host Computer Systems. "With DIAL, we've automated that process. Now, as long as he has a terminal with him, an engineer can call the factory for help, 24 hours a day, 7 days a week. And one computer can help 8 people at the same time.

"I think DIAL helps instill self-confidence in our new people more quickly," he says. "The diagnostic programs in the computer lead the engineer to the problem step-by-step, just as a human expert would. But the FE is really solving the problem himself, using a very sophisticated tool. That has to make a difference in the way he feels about his work."

An Engineering History

Gerry directed the development of DIAL, beginning in September of 1979 when the project was "essentially a heap of hardware and a good idea," he says. That hardware included Fairchild's host computer, Integrator™, and some basic telecommunications equipment. It was left to Gerry, whose specialty is software design, to make needed modifications to Integrator and to coordinate the writing of diagnostic programs and compilation of data for the library.

DIAL contains the engineering history of each printed circuit board in a tester. When the FE suspects a particular board is causing a problem, he can compare its configuration with a printout provided by DIAL. If an improvement has been recommended by product design engineers, a detailed explanation of what it will do and instructions for making the change are instantly available.

"Even our old hands, the veterans who've seen every kind of problem, benefit from the library," Gerry says. "We keep it updated every day, while the paperwork they carry around might be several weeks old."

Eventually DIAL will contain data for every tester Fairchild makes. Library programs for Sentry™ and Sentinel™ were installed last summer. By the end of 1981, a team of Tech Support people working with Gerry will have finished programs for the Series 20, Series 80 and Xincom™ systems as well. A separate DIAL system for Faultfinder™ testers, using a second

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of a short course in the factory, two weeks on one system in the plant and another week manipulating the software. Then I worked for a few weeks with another more experienced engineer before I was on my own.

"I spend about 40 percent of my time in the field because I coordinate the work of several field engineers. When I was an FE, I was spending about 90 percent of my time in the field. I was well-traveled, I can tell you—we went out in the boondocks, as they say.

"Yes, there ***are*** *problems with that much travel. It's tough to keep in touch with people at home, and once I missed a friend's wedding because I had to fix a system at the last minute. But I like to travel. I like being in different cities with different people and problems.*

"A majority of SATS equipment is still under warranty, and we're also putting a lot of emphasis on service contracts. We feel that a system on contract is 'our system.' We want to keep it running all the time. I like to know that our people are maintaining the system. It's better than finding that the customer pulled the cable trying to fix something and plugged it back in the wrong place.

"I can usually go in and know exactly how to quiet down a machine. Some customers are hard to satisfy—but you learn how to deal with them. The customer is always sure something's wrong with the machine. You've got to let him know when it's not the machine—when it's the programming or the operators. But you still can't get him mad. The customer's always right, you know.

"There are career opportunities for me here, but often it seems that I don't have time to plan for the future. The traveling makes it hard to take college courses at night, and

Problems in a tester can almost always be tracked down to a printed circuit board, says Field Support Specialist Jim Schraith.

host computer, will be in operation by the end of the first quarter of 1981, reports Joe Mahar, Technical Support Manager for the Sub-Assembly Test Systems Division in Latham, New York.

Remote System Control

Gerry has also guided the development of another automated service tool, Remote System Control (RSC). Like DIAL, RSC links the field to the factory via a portable terminal and telephone lines. But the RSC connection allows a Field Support Specialist in a remote location to take actual control of the tester in the field.

"RSC lets someone in San Jose talk directly to a tester in Burlington, Vermont," says Wayne. "It allows an expert—sometimes even the person who designed the system in the first place—to run diagnostic routines, write minor programs, really study the symptoms of a malfunctioning machine. RSC is the last bastion before we put somebody on a plane."

"As far as I know, we're the first in ATE to have RSC," Gerry notes. "Fairchild is the only test house to use remote control for diagnostics. We're counting on it to give us a real edge as our markets grow."

Best in the Field

Why all the fanfare about new ways to repair and maintain Fairchild test equipment? Wayne explains: "Our goal is to be recognized as absolutely the best field engineering group in the industry. There's a growing perception among customers that automatic test systems are very complex, that they require regular preventive maintenance and the expertise of an engineer who specializes in ATE.

"More and more, our ability to provide the best service is key to a customer's decision to buy Fairchild systems. We can justify the development of new tools like DIAL and RSC because of the long term return in sales on our investment," he says. "Customer service is an important business for Fairchild because it's an important buying criteria for our customers."

ATE's field engineering group has grown rapidly over the past two years. In 1977 fewer than 30 engineers covered the entire U.S.; today there are about 115. Yet Wayne believes that there are alternatives to pegging expansions in staff to increases in the number of systems they must service.

"Either we keep growing indefinitely," he says, "or we become more productive. DIAL, RSC, continual training, more software education—all of these tactics are making us more productive."

because I have experience on all SATS systems, I'm kept very busy. I know I can get into technical support, design or test engineering, applications and sales—any number of avenues. But it's difficult to think that far ahead.

"Basically I'm happy with the FE group: I like the people I work with, I'm comfortable with the systems and the customers. And I like that pat on the back from a salesman every once in a while. It really helps."

Fran O'Hare: "Field engineering can get really exciting—especially when you've been working on a problem for a couple of hours and you finally break through."

"I was a maintenance technician working on Sentrys for two other companies before I joined Fairchild. I've liked the opportunity field engineering offers to specialize in one system. You don't have that in maintenance work where there are always a lot of smaller pieces of equipment that need to be maintained and repaired.

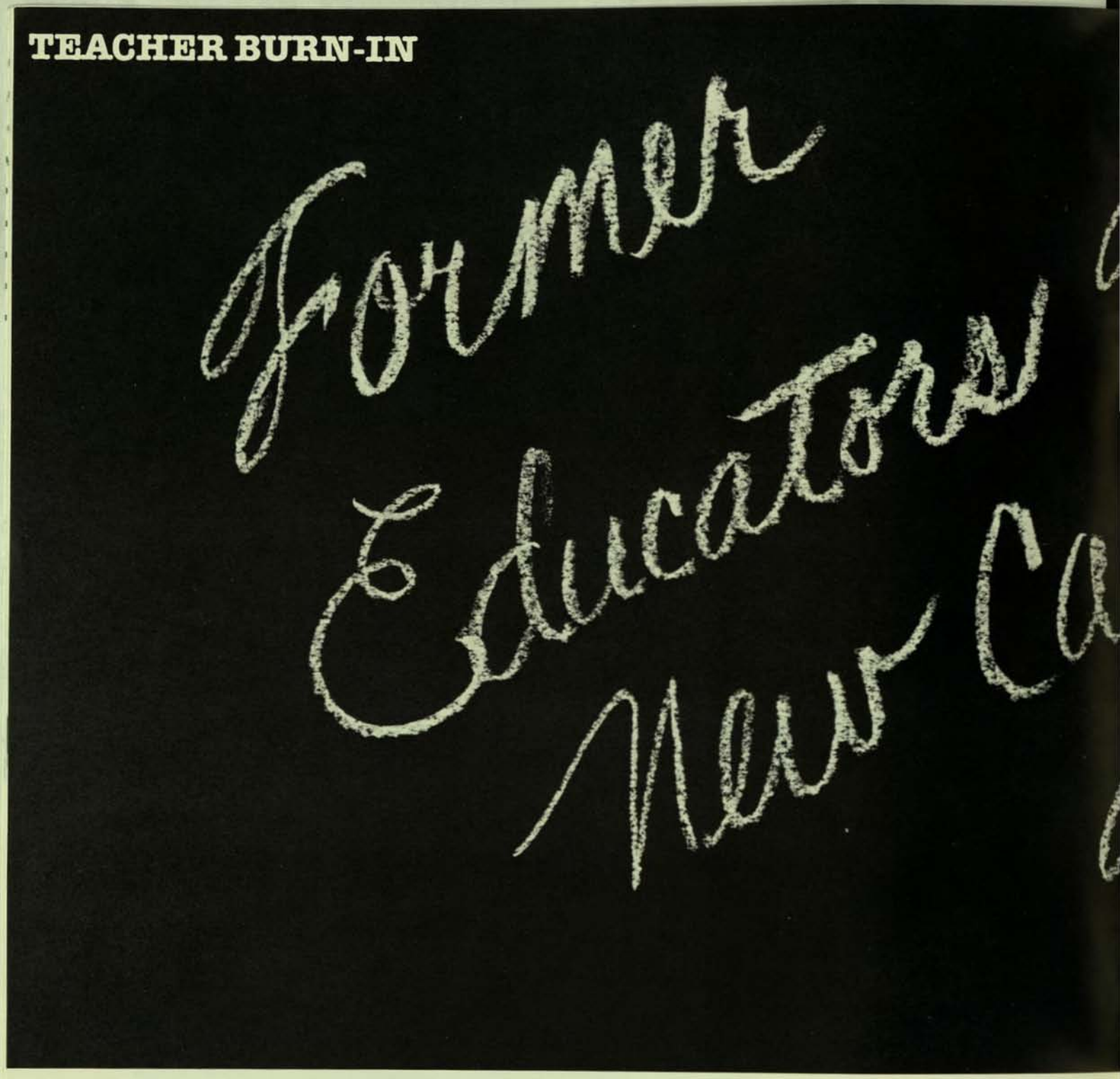
"As a Fairchild FE, I also have had the chance to learn about new systems as they're developed. We're so close to the factory, we see the evolution of new products. And we can get good technical support for our work in the field any time we need help.

"Many of us in the Santa Clara office hardly travel at all. Once I went to Pocatello, Idaho, and our group also covers Utah and Oregon. But there are so many customers in this immediate area that travel isn't a big part of my job. And that's fine. In fact, I've started to do a lot of paper work associated with scheduling and contract quotes recently, so I'm spending even less time in the field now.

*"You can take a lot of pride in your job when you're a field engineer. You're really on your own: **you** have to fix the system and satisfy the customer. You can make the job as challenging as you like.*

"Eventually I'd like to move into management. But right now I'm having a lot of fun doing my job."

A portable terminal goes with Senior Field engineer Fran O'Hare to the customer's manufacturing floor, where she uses a telephone to connect with the DIAL computer.


former
Educators

The electronics industry has discovered that educators can do much more than teach reading, writing and 'rithmetic.

It may be bad news for parents around the country, but good news for Fairchild and the men and women whose unique skills are readily adaptable to a variety of industry careers.

This year thousands of teachers did not return to their classrooms. Some of the reasons: loss of status, lack of respect from students, parents and society in general, and diminishing job security. For women, the benefits that used to look good—being there when the kids come home from school, long summer vacations, and relatively good pay—have been diminished by the newly opened career opportunities in industry.

Too, many teachers leave their profession because of the phenomenon popularly called "teacher burnout." An actual psychological condition produced by stress, it can lead to "psychological, emotional and attitudinal exhaustion," said University of California Social Psychologist Ayala Pines at the first national conference on teacher burnout held in New York City last spring.

Several former educators have found unexpectedly appropriate niches for themselves at Fairchild. They are putting their teaching skills to work in a variety of promising careers.

Dennis Lunder

Julie Mikaelian

Richard (Rip) Dyer

Dennis Lunder, Director of Microcomputer Education, MOS Products Division:
"This position is tailor-made for me."

Dennis Lunder is the Director of the new Microcomputer Training Center for the MOS Products Division in South San Jose. The Center offers a variety of courses on Fairchild microcomputer products for employees and customers. The classes, for engineers who design the microprocessor into a working system and designers who need knowledge of microprocessor software and hardware, also help Fairchild customers learn about microprocessors so they can train their own employees.

Dennis taught math and computer science for the Fremont Unified School District for 12 years and also served as wrestling coach for the high school team. His first advanced degree was a masters in math and computer science from the University of Oklahoma. In 1976 he took a sabbatical to do PhD work in math at the University of Denver.

"I received my PhD and returned to California, only to find my high school had changed principals and closed the computer center which I had begun —and transferred me to a junior high school. I taught one more year at the junior high school level before I returned to the high school, but discovered I was burning out as a teacher. During the summer of 1979 I decided to explore the computer industry. I received six job offers —one of them from Fairchild.

"This position is tailor-made for me. I have the funds for promoting courses, I can travel (for example, Singapore and Hong Kong last May, and Wappingers Falls last month to give training sessions). I have also written two articles for **Progress** (Fairchild's technical journal). What's more, I write curriculum and design the program, and when I teach I have 10-14 very interested adult students in each class."

Dennis is enthusiastic about his job but does not denigrate his 12 years of teaching experience. "It was an excellent training ground for what I'm doing now," he says.

Julie Mikaelian, Policy Administrator, Corporate Industrial Relations:
"Many of the skills are the same, but the business world provides more opportunities to learn new skills."

Julie Mikaelian taught third grade for six years in Illinois and California. "Teaching was very rewarding but time consuming. I had worked as a secretary before I became a teacher and knew that some day I would return to the business world," she recalls.

Julie joined Fairchild in 1967 as a secretary for the MOS Bipolar Development Line at the R&D laboratory in Palo Alto. There she improved her technical typing skills and learned about the industry. She transferred to the MOS Division in Mountain View in 1970 and two years ago joined Corporate Industrial Relations as Policy Administrator.

Her function involves reviewing and updating corporate policies and distributing policy manuals to managers and supervisors.

"Teaching skills involve planning, documentation and communication," she says. "All of these skills are applicable to my work at Fairchild. Coming from teaching, I find the electronics industry a challenge and a key to the future."

Richard (Rip) Dyer, Safety and Industrial Hygienist, Advanced Bipolar—Digital Division:
"Teachers are always in the public eye. You're always 'on stage' and that helped a lot when I joined Fairchild."

"Everybody calls me 'Rip'," says Fairchild's new Safety and Industrial Hygienist in the Digital plant, South Portland, Maine.

Rip's outgoing personality manifests a quality that he feels is essential for teaching **and** working in industry: the ability to be prepared for meetings, presentations, and face-to-face encounters with a broad spectrum of Fairchild employees.

After 10 years of teaching physical science at Winthrop High School in Massachusetts—and serving as head track coach for cross country, indoor, and outdoor track—Rip received his M.S. in environmental and health sciences from Northwestern University. An athlete as well as a teacher and coach, Rip was the 1980 long jump national champion for the AAU submaster meet (for people over 30)

Vic Shrader

Angela Dickey

in Syracuse, N.Y.

"I liked teaching but I wanted some new excitement, a change from what I'd been doing," Rip explains. "And I wanted a chance to apply what I'd learned in graduate school to an industrial environment."

Rip joined Fairchild in September 1980 and adjusted quickly to the industrial life. His teaching and his coaching had prepared him for working with different types of people, grasping what workers want in safety education, and most importantly, "being prepared to work under pressure."

"Teachers are not complacent," he emphasizes. "They're always on the go. That helps a lot at Fairchild."

Vic Shrader, Personnel Manager, Advanced Bipolar—Digital Division:

"Industry recognizes and rewards your efforts. In teaching there's a ceiling on creativity and challenge."

Vic Shrader has two advanced degrees: a master's in history and a PhD in educational foundations (the history, philosophy and sociology of education) from Stanford University. He taught social studies at San Mateo High School and Serra High School in San Mateo, where he also served as department chairman for five years. He also taught educational sociology at San Francisco State, and California and U.S. history at Skyline Junior College on a part-time basis while he did legal research consulting for Bay Area law firms.

Why does a man with the diversity and depth of Vic's experience in education change careers mid-stream?

"In 1974 when I got my PhD there was a paucity of jobs in education. The lay-offs and cutbacks were just beginning," he explains. "I saw no opportunities for career development or financial advancement—and no challenge."

Although he stayed with education until 1980, Vic began to explore the industrial world. He found "an incredibly direct application of skills. The management skill of motivating and directing teachers, counseling skills, and the interface between people are extremely valuable, particularly in the electonics industry.

Vic believes that schools of humanities and social sciences at major universities will produce students who will gravitate toward business rather than education. "At some universities these students actually take condensed business administration courses," he notes.

Angela Dickey, Training Program Coordinator, Advanced Bipolar—Digital Division:

"When I first left the academic world for work in industry I had some initial fear. But I learned that the end results of training are the same here as they are in education."

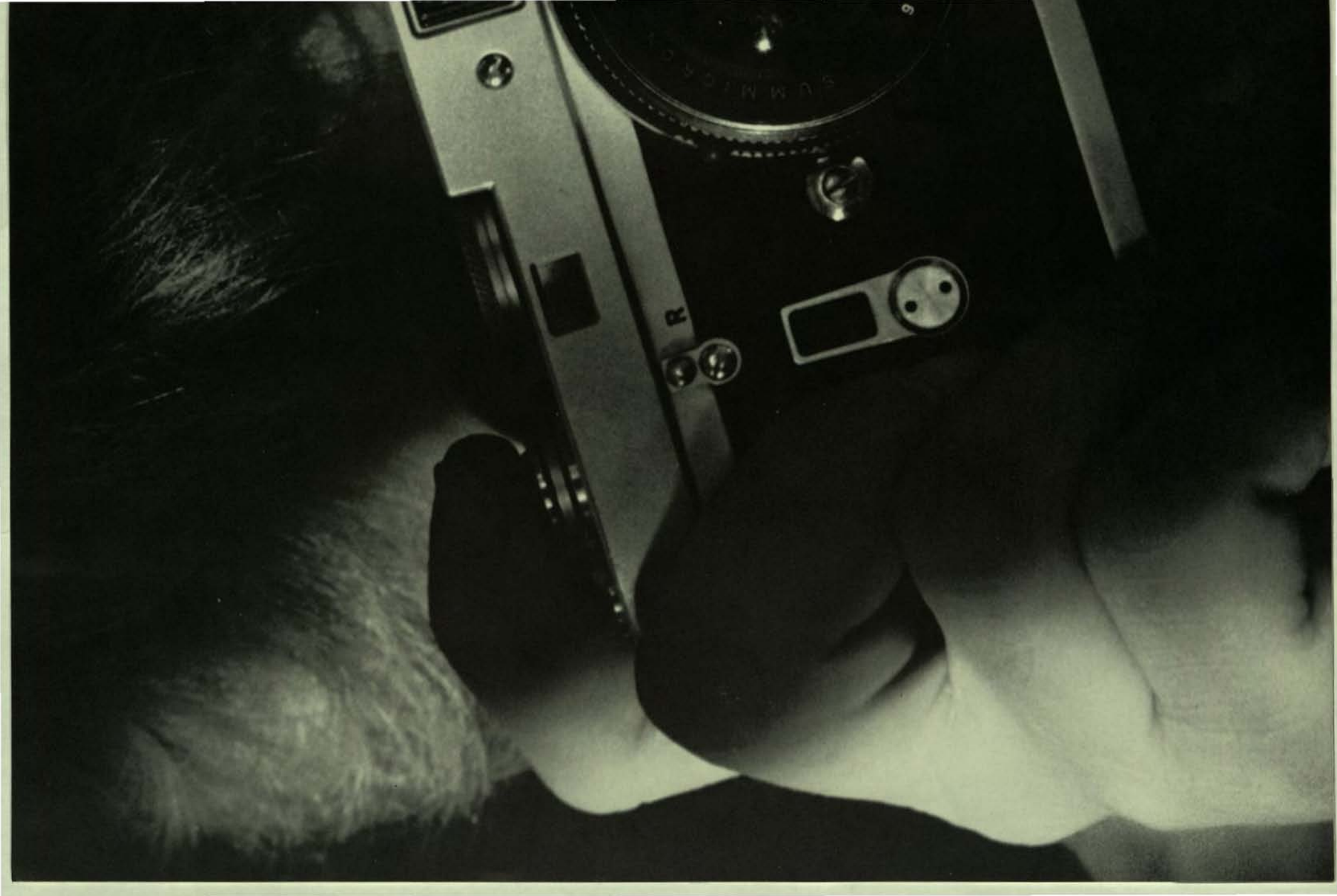
Angela Dickey, who taught high school French and English at Notre Dame High School (a Catholic school in San Jose, California) from 1970-1979, felt she had reached the "end of my rope" after Proposition 13 passed.

"I knew that reduced property taxes would mean reduced funds for education and that it would be impossible to find a job teaching in public school. The pay was poor at my school and, frankly, I needed more money."

Angela took word processing and business courses at local junior colleges and found her perfect job at Fairchild. After a year as supervisor of the Word Processing Center in Bipolar, Angela moved into the training field.

She analyzes training requirements in Bipolar and tries to implement appropriate programs to fill the need. She examines training programs for their objectives, and often finds that she is called upon to make the transfer from teaching skills to training. "I have to find and organize programs, critique materials, make sure good teaching methods are employed, and meet certain goals and objectives."

"Once you're in industry and you have a teaching background you find there are lots of opportunities," Angela continues. "Initially I was afraid of entering the technical world—afraid because I was unfamiliar with the technology and also because I was unfamiliar with the red tape and paperwork involved in large organizations. But people generally underestimate the skills you develop in teaching. Teachers are seen as teachers and not doers. You learn how to communicate and plan; you develop leadership and motivational abilities. All of these skills can be creatively applied to the industrial world in general and for me at Fairchild in particular."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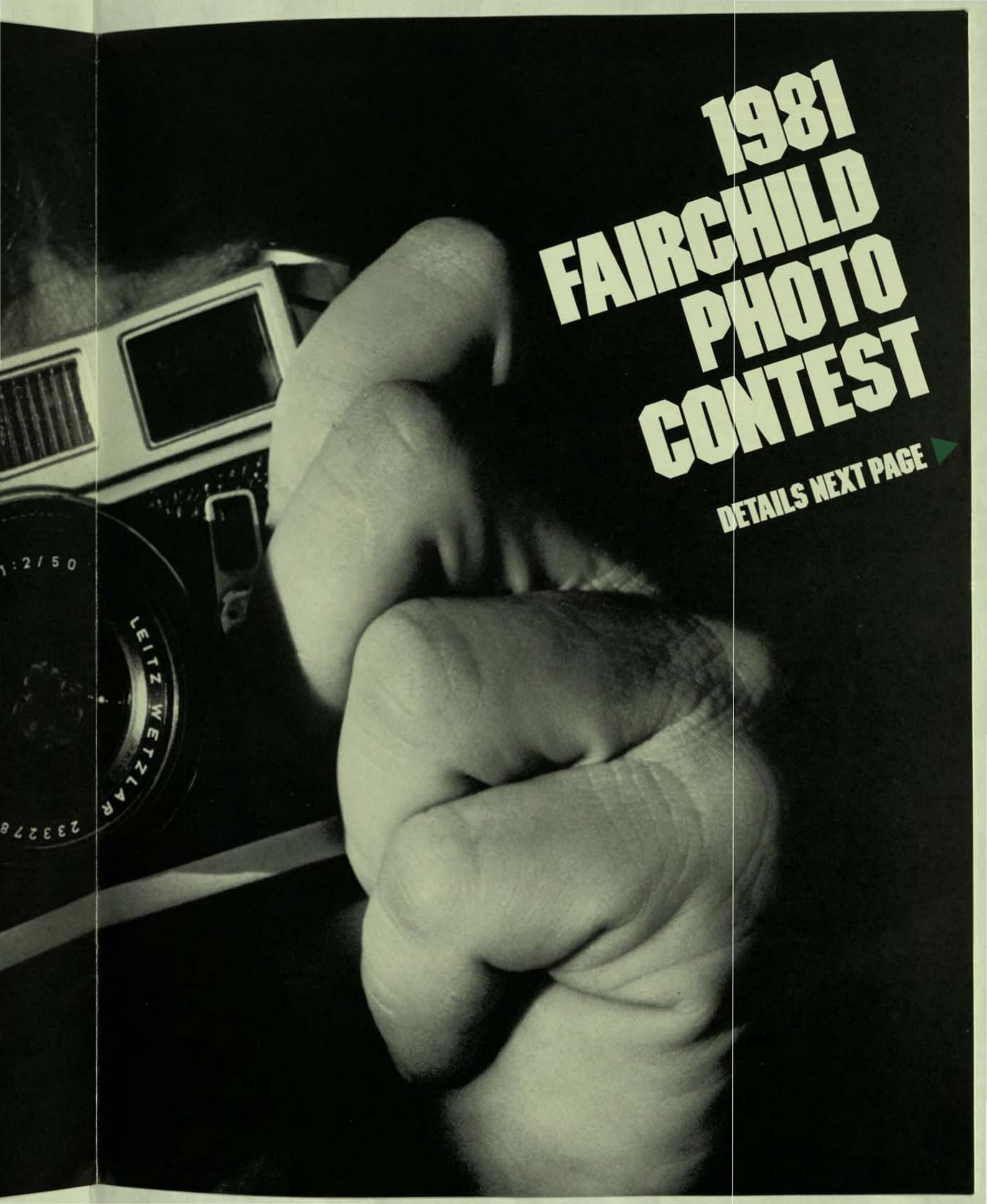


1981 FAIRCHILD PHOTO CONTEST

DETAILS NEXT PAGE

PHOTO CONTEST DETAILS

Find a face, a scene, a picture that should be remembered. Get it on film. Send us your best.

To share joy: We encourage all photographers to participate. You can live in the Far East, Europe, the United States or somewhere in between, just as long as you are a Fairchild employee. Send us your entry (or entries) marked for one of these three categories: PEOPLE, ANIMALS, or SCENERY.

For inspiration: There will be three prizes in each category and a "Best of Show" photo selected from the first place winners. The first prize in each category will be $25.00, second prize $15.00, and third prize $10.00. Winning photos will appear in the spring issue of **Horizons** magazine and the "Best of Show" will be the cover feature.

Just for starters: Photos should be black and white or color prints (no larger than 8 x 10 inches) or slides. Entries are limited to two per individual. Identify each photo with category, title (untitled are okay, too), name, mail stop, telephone extension and plant location. Entries must be received by March 16, 1981.

With a smile: All entries will be happily judged by Fairchild photo experts. Winners will be notified by March 31, 1981. We will return all photos to participants after the contest.

Just for kicks: All camera buffs should send their entries to Corporate Communications, M.S. 20-2260, 464 Ellis Street, Mountain View, CA 94042. For any additional information, contact Myra Scofield, (415) 962-3617.

'81 Ideas: Who, What, When, Where, Why, and How to Take Pictures

1. Be prepared
2. Be playful
3. Be serious
4. Sneak up
5. And get that candid shot
6. Have a steady hand
7. And a warm heart
8. Use your head
9. Carry extra film
10. Open your eyes
11. And your shutter
12. Travel
13. Stay at home
14. Show good taste
15. At a party
16. On a mountain top
17. Under water
18. From a rooftop
19. From a tree top
20. From a new angle
21. Or an old angle
22. At the Super Bowl
23. In your living room
24. In Rome
25. In Paris
26. In Singapore
27. In Wappingers Falls
28. In Mountain View
29. At your daughter's graduation
30. And your son's wedding
31. On Chinese New Year's
32. On a bus
33. In a car
34. On a roller coaster
35. With a smile
36. With gusto
37. Of your new baby
38. Of your new dog
39. On top of Old Smokey
40. On Super Bowl morning
41. With a new camera
42. With an old camera
43. Of your best friend
44. Of your grandmother
45. Singing
46. Shouting
47. Jumping
48. Running
49. Sleeping
50. Sneezing
51. Crying
52. In a bind
53. For a loved one
54. For a holiday
55. Out on the town
56. Coming home
57. Playing the piano
58. On your head
59. From the hip
60. From the soul
61. To share joy
62. To speak up
63. Cooking
64. Cleaning
65. Playing golf
66. Hitting a home run
67. On horseback
68. On piggyback
69. For old friends
70. With a soft touch
71. Jumping rope
72. Just for kicks
73. Just for starters
74. For a birthday card
75. Just in case
76. To remember when
77. For inspiration
78. For a prize
79. For the wall
80. For the scrapbook
81. For Fairchild's 1981 Photo Contest

PICTURE PROFILES: STEVE ALLEN AND ED GARRIGUES

Fairchild's two staff photographers, Steve Allen and Ed Garrigues, will help judge entries for Fairchild's first photo contest in six years.

Steve has been at Fairchild for more than 14 years, shooting still photos, portraits, photomicrography, and slides.

He started taking pictures when he was a junior in high school, and during his army stint at Ft. McClellan, Alabama, he was a photo-journalist for the post paper. He worked briefly for Dumont Manufacturing Company as an in-house photographer, then joined Fairchild and received on-the-job training for his variety of photographic assignments.

Steve feels beginners should "start by doing, but don't start on a box camera or fully automatic camera. When you can control aperture, shutter speed and focus you learn much more about photography.

"Beginners can take advantage of numerous classes offered at night schools, community centers and local colleges," he continues. "You might want to learn the darkroom side of photography and do your own developing."

Steve's tip for photographers: "Shooting with a camera is much like shooting a rifle or pistol. Hold the camera still, bear down gradually on the shutter and release it steadily."

Ed Garrigues, an 18 year Fairchild photographer, started working for Research and Development in the early '60s. Over the years his Fairchild clients grew to include Test Systems, Optoelectronics, and Marketing.

Like Steve, Ed's career began in the Armed Services. "I joined the Navy when I was 18. I wanted to fly, and someone suggested aerial photography. After six months at the Navy training school in Pensacola, Florida I was a Navy aerial photographer for four years."

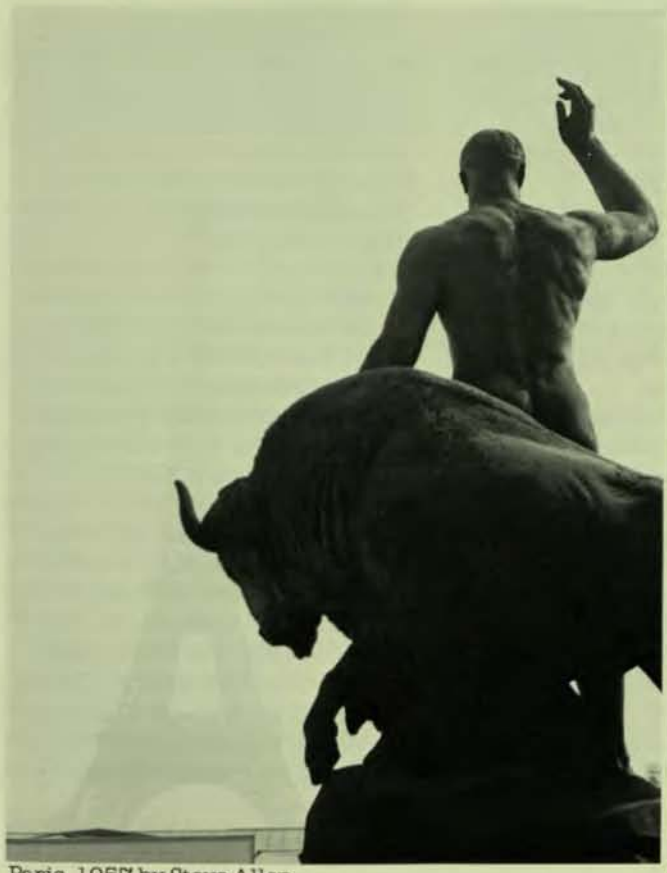
After the Navy, Ed joined Lockheed as a staff photographer. He also took a variety of courses at San Jose City and Foothill Colleges which he found helpful to his career: optics, chemistry, business, advertising and business law.

Ed encourages beginning photographers to ask themselves if they want the camera to take the picture or if they want to do it themselves. "If you buy a camera that can accommodate extra lenses you've got more options than you do with an automatic," he notes.

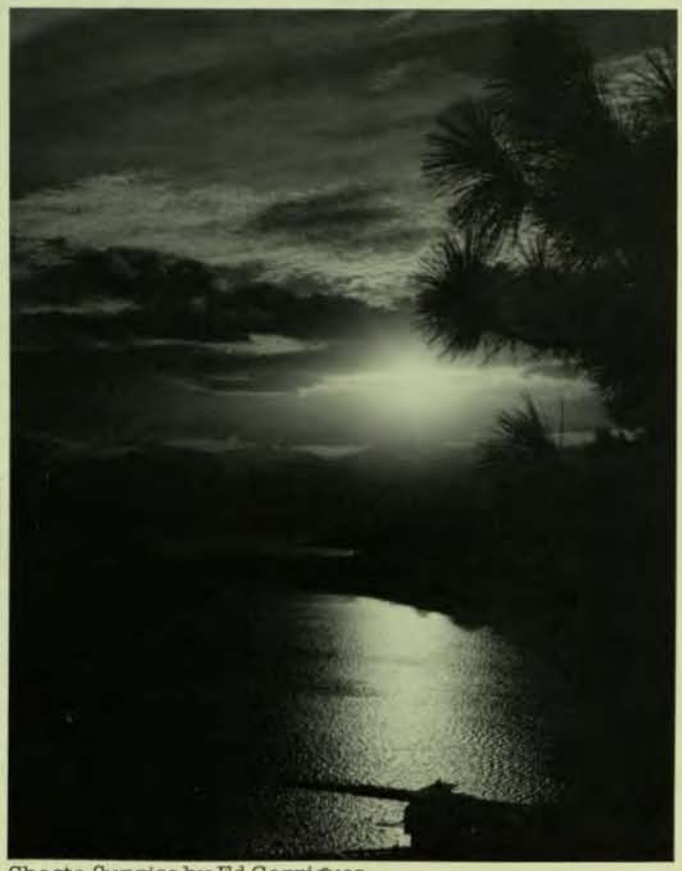
Ed looks for drama in a picture. "If you're outdoors, the more you face into the sun, the more dramatic the picture—the more highlights and shadows."

Ed also urges choosing "an environment that lends itself to interesting shots. Places where there are lots of people, like San Francisco's Chinatown, for example. And if you shoot scenery, look for a new approach. Stay away from the cliches, like the perennial shot of Half Dome at Yosemite."

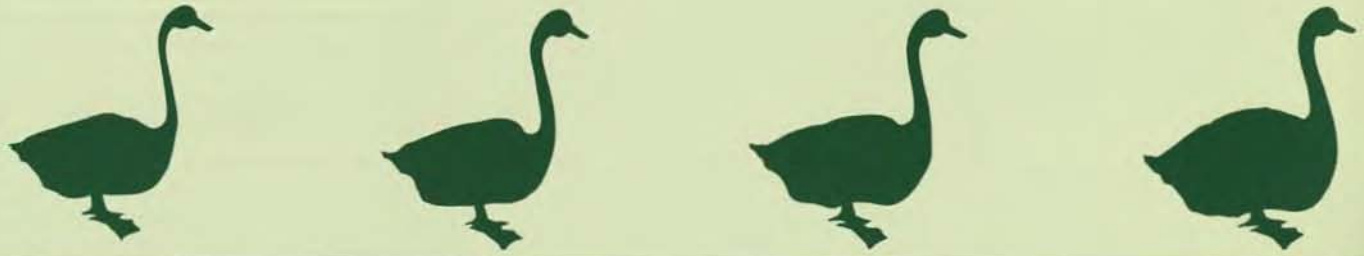
Ed's tip for photographers: "Carry your camera with you as often as possible. You never know when the opportunity for a great picture might arise."



Paris, 1957 by Steve Allen



Shasta Sunrise by Ed Garrigues



Christmas is a-coming and

RESOLVED: TO BE PHYSICALLY

The goose isn't the only one who got fat at Christmas!

From Thanksgiving through January, many people tend to put on weight. The combination of holiday parties, diminished outdoor activity, and post-season bowl games lead to much indoor munching.

But being Christmas-season plump can lead to a post-season slump. To help you feel better year round, the American Heart Association recommends a sensible guide for weight reduction:

1. A visit to your doctor to be certain that you do need to lose weight and that a low calorie diet is appropriate.
2. A nutritious, well-balanced eating pattern suitable to your life style.
3. Perseverance in retraining your tastes for low calorie foods and moderate size portions.
4. A sincere desire to lose weight.

The American Heart Association reports that most women will lose an average of one to two pounds a week on a daily intake of 1200-1500 calories; most men will lose this amount on an intake of 1500-1800 calories a day. One to two pounds a week is an ideal rate of loss. Your doctor can tell you exactly which calorie level will be best for you.

Dr. John McCue, Fairchild's corporate medical director and a practicing internist, recommends a positive mental attitude towards fitness. "Make a decision to be fit—you'll feel better, function better, and you'll probably live longer," he urges.

Diet is only one aspect of physical fitness. Perhaps you've heard the expression "sound mind in sound body." More and more, scientists and researchers are linking the ideas of physical and mental fitness.

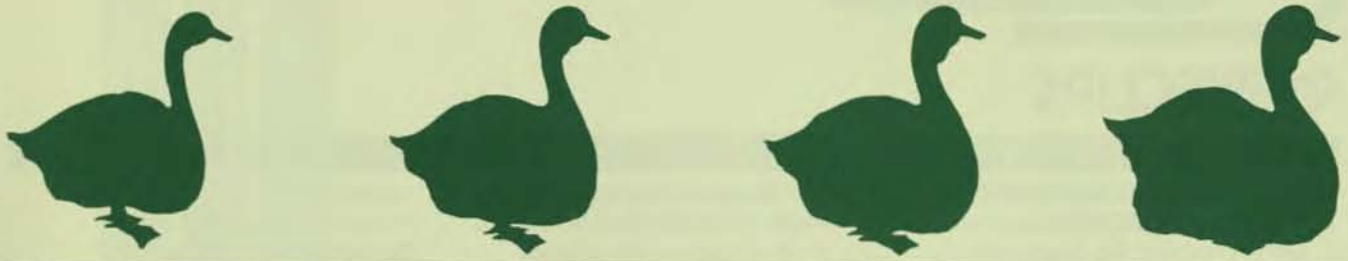
For example, the American Psychiatric Association has studied the effect of diet on mental processes, and the National Institute of Dental Research recently received a grant to study the relationship between physical activity and stress. More Americans are taking responsibility for their own personal health—and relying less on the psychiatric profession.

"Certainly it is necessary to have a medical checkup," Dr. McCue says. "But frequent examinations are not considered as essential as they were in the past, unless you have a specific medical problem. You can be selective in choosing the type of exam you need at a certain age, thus receiving more return for your effort."

Exercise as well as good diet should fit into your 1981 fitness program. Jane Hall, Manager of Medical Services advises: "Everyone's on a tight time schedule. But a few minutes of exercise will add days, months, and even years to your life."

So you work all day and drive to work, you say. The only activity you get is walking to the coffee machine for a break. **The Cardiologist's Guide to Fitness and Health Through Exercise** recommends ways to get more exercise from daily activities.

1. Park your car farther away from your workplace and walk. If you commute, get off the bus a few stops early and walk the extra distance.
2. Stop taking elevators. Climb the stairs instead. And once you've got used to climbing them, run up the stairs.



t h e g o o s e i s g e t t i n g f a t

— Nursery Rhyme

FIT IN 1981

3. If you're going out to lunch, find a restaurant at least 1/2 mile from work and stride briskly to and from.
4. If you're going to the shopping center, walk there. If it's too far to walk, ride a bicycle. and if you have too many groceries to carry, make a second trip.

In addition to these common sense fitness tips, you can increase your commitment to exercise that is fun during the year.

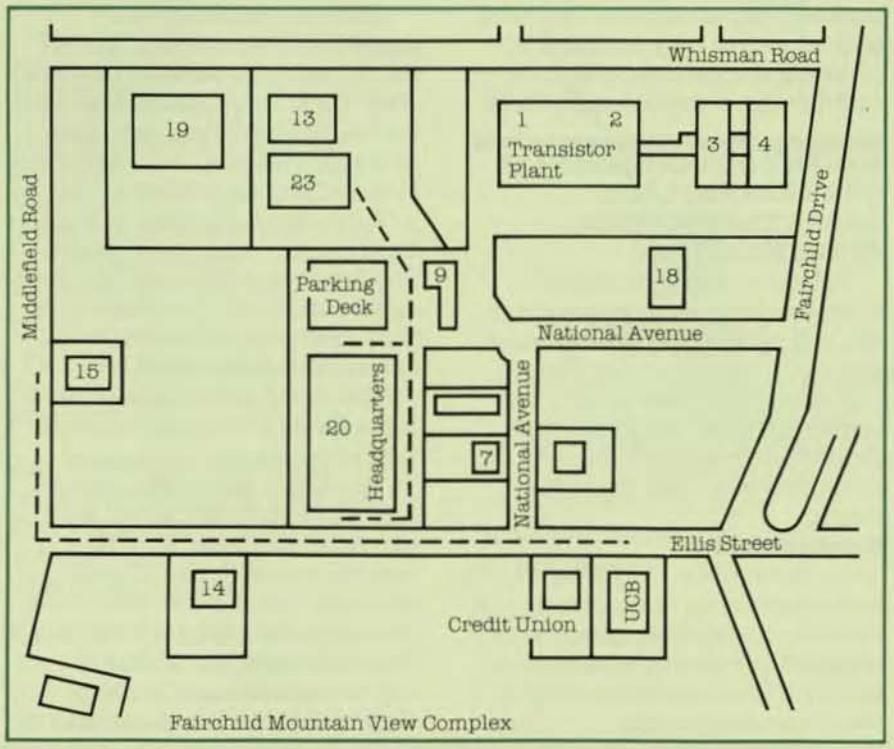
You don't have to jog, for example. A good brisk walk around Fairchild when you have an errand to do in a "far away" building can do your body just as much good. Regular housework and yard work provide exercise and use up calories. Put on some music while you're working. The rhythm will pick up your own work beat. Music is good to dance to also, and many men and women are finding "jazz exercise" a new form of rewarding physical activity and recreation.

Finally, whatever you do, stick to a regular schedule and enjoy what you're doing. Enjoyment will help make your 1981 fitness resolutions a reality.

WALK AROUND FAIRCHILD

Ever wonder how much mileage you cover during a work day? We clocked the daily business wanderings of one corporate communications staffer at the Mountain View complex. Total: slightly over 3 miles. Here's how it broke down:

Round trip Bldg. 20-Bldg. 15	1.0 mile
Round trip Bldg. 20-Bldg. 23	.6 mile
Round trip Bldg. 20-Parking Deck	.4 mile
Round trip Bldg. 20-Corporate Area (24 hour lobby)	.2 mile
Bldg. 20-Bank	1.0 mile
TOTAL MILEAGE, ONE FAIRCHILD DAY	**3.2 miles**



NEWSCLIPS

FAIRCHILD INTRODUCES NEW TEST SYSTEMS

On September 26, Fairchild announced a digital in-circuit printed-circuit board test system for LSI, MSI and SSI components. The Series 30, Model 3500 is designed to meet requirements of PCB test and repair operations. Emphasis is on diagnosing a wide variety of relatively low volume PCBs.

Fairchild also introduced a new high-speed general purpose VLSI test system at the IEEE Test Conference in Philadelphia on November 11. The Series 80 analog test system is used for design characterization and production testing of analog and mixed-signal integrated circuits.

Also new at the IEEE show: model 5588, a 24-megahertz (MHz) memory test system with a new host computer and a new test head with 72 channel; Sentry Series 20, a 20 MHz system with a new 120-pin test head; and a new option for Sentinel which makes it expandable to 120 pins and improves it by adding a 16-phase multiple timing module and a pattern processor module.

RECENT ORGANIZATIONAL CHANGES REFLECT DECENTRALIZATION, STREAMLINING

Fairchild organizational changes during the last quarter of 1980 reflect the trend toward decentralization and streamlining. Major changes came in the semiconductor marketing and personnel organizations, and in the Automatic Test Equipment Group.

Semiconductor

On November 13, the personnel and advertising functions for semiconductor operations were changed to reflect the decentralization of the organization into two business groups.

John Salazar is now Personnel Manager of the Analog and Components Group in Mountain View. Greg Klein now holds the position of Personnel Manager of the LSI Products Group, and is also located in Mountain View.

Andy Procassini is Marketing Manager, Analog and Components Group, with Geri Hadley serving as Advertising Manager for that group. Jim Ellick heads LSI Products Group Marketing, with Diane Ross serving as Advertising Manager.

Automatic Test Equipment

On December 4, the Automatic Test Equipment Group (ATE) was organized into two business units: the Components Test Systems Division (CTS) and the Sub-Assembly Test Systems Division (SATS). Joe Rivlin was appointed General Manager of CTS, located in San Jose. Lanny Ross, General Manager of General Purpose-LSI Systems, and Gil Williams, General Manager of Xincom, report to Joe.

Michael Chalkley was appointed General Manager of SATS, headquartered in Latham, New York. Terry Beers, Manager Series 70; Jim Fitch, Manager Monitor Systems; John Matrone, General Manager Mechanical; and Bill Wirth, General Manager Testline, all report to Michael. Joe Rivlin and Michael Chalkley report to Jimmy Lee, Executive Vice President of Fairchild and General Manager of ATE.

The North American Sales force for ATE was also reorganized to reflect group changes.

Ken Daub, San Jose, California, was appointed North American Sales Manager for CTS and reports to Joe Rivlin. Chuck Winnick, Great Neck, New York, was appointed North American Sales Manager for SATS and reports to Michael Chalkley. Wayne Carlson, Manager of Customer Service, continues to report to Jimmy Lee.

Corporate Finance

On December 15, Jerry Taylor, formerly Fairchild Controller, became Controller of Schlumberger Limited's North American Wireline (NAM) operation in Houston, Texas. Replacing Jerry is Bill Spengler, who held a variety of positions for Schlumberger, most recently the position of Controller of NAM.

FAIRCHILD, NATIONAL TO DEVELOP 16000 MICROPROCESSOR FAMILY

On January 7 Fairchild and National Semiconductor announced an agreement to jointly develop and support the 16000 microprocessor family.

The 16000 family includes a high performance 16-bit processor and related processor series, systems support circuits, floating point co-processor, and a series of programmable peripheral support circuits. The first product, the 16032 high performance 16-bit processor, is designed to efficiently execute high level compiler code and support a true virtual memory management concept. In addition, it can be programmed to support address-independent code for creation of standard software library concepts.

Under the terms of the five-year agreement, the initial 14 circuits have been defined and will be designed and exchanged under a bilateral second source transfer between the two companies. The agreement also provides for the development of future circuits.

The 16000 microprocessor family will be supported by both companies with complete development systems, compilers, operating systems and board level products.

TECHNICAL WRITING AWARDS

Fairchild employees authoring technical articles for presentations or publication in appropriate professional journals receive cash awards as part of the Technical Writing Incentive Awards Program. Technical Writing Awards appearing below were given from July-December 1980.

John Conover
"An Introduction to Sampling Filters"
PROGRESS

"Applications of The μA9708 and μA9706 DIA in Industrial Control Systems"
ELECTRONIC DESIGN CONFERENCE

Gary Craig
"Transmission Line Drivers And Receivers"
PROGRESS

Jeff Thompson
"Circuit Idea—Variations on A Peak Detector"
PROGRESS

"Quadrafet™ Operational Amplifiers"
PROGRESS

MOS Products Division
P.P. Sharma, T.G. Wear, J.Y.W. Seto
"Application of Ellipsometry to Monitor Surface Cleanliness of Silicon Wafers"
THE JOURNAL OF ELECTROCHEMICAL SOCIETY

Research and Development
Richard Crippen
"The Use of A PCB Router for IC Metal Layout"
COMPUTER VISION CONFERENCE

Hemraj Hingarh
"High Speed Data Encryption Using The 9414"
MIDCON '80

Akio Tanaka
"The Crystal Oscillator—An Analysis"
PROGRESS

Semiconductor Marketing
David Myers
"Design Guides: Radiation Susceptibility of CMOS"
ELECTRONICS

"Semiconductor in A Nuclear Environment"
PROGRESS

Digital-Advanced Bipolar Division
Paul Chu
"High Speed Data Encryption Using The 9414"
MIDCON '80

Tom Goodman, Bill Owens
"Flexible Subnanosecond Gate Array Family"
PROCEEDINGS OF WESCON

Tom Goodman, Bill Owens
"High Speed Custom LSI Gate Array With Macro-Selectable Speed Power"
GOMAC '80 DIGEST

Keith Lobo, Michael Wendt
"Circuit Idea—Bench Program for Fairchild TTL Proms"
PROGRESS

Fairchild Camera and Instrument (UK) Limited
Jon Summers
"GPIB Programmable Power Supply"
WIRELESS WORLD

Mathew Throwbridge
"Development Aid for Fairchild Micros"
MICRO FORECAST

"Microcomputers—The Customer Is Always Right"
SEMINAR AND EXHIBITION OF SEMICONDUCTOR STATE-OF-THE-ART AND APPLICATIONS

"Single Chip Micros Add Standby Memory"
NEW ELECTRONICS

Linear Products Division
Evan Aurand
"The Codec—An Integrated Circuit in Telecommunications"
TELECOMMUNICATIONS

PATENTS

Fairchild's technological leadership depends, to a great extent, on the creativity of its people. Inventors listed on patents issued to Fairchild from September-December, 1980, appear below.

Bipolar
Jonathan Stinehelfer
X-Address Before Y-Address Circuit
Patent No. 4231110

BULK RATE
U S POSTAGE
P A I D
PERMIT #7577
SAN FRANCISCO CA

H. White
3064 Orthello Way
Santa Clara, CA 95051

H
110

FAIRCHILD
A Schlumberger Company

464 Ellis St., Mountain View, CA 94042.

HORIZONS

A MAGAZINE FOR FAIRCHILD PEOPLE AROUND THE WORLD ▪ SPRING ▪ 1982

Fairchild Expansion: Certain Balance, Sure Growth

Letter from the President

Dear fellow employees:

1981 has been a difficult year for the semiconductor and automatic test industries. The recession, which began in the latter part of 1980, continued unabated. It grew more widespread and deepened as high interest rates, tight money and currency devaluations affected the economies of Western Europe and the United States. Customer demand was reduced in most major market areas; prices fell substantially, particularly for semiconductor products. These conditions have continued in 1982, and economic recovery, which is anticipated for the latter part of the year, is expected to be slow.

Fairchild was not immune from the severe economic conditions affecting the industry as a whole. 1981 revenue fell 12% compared to 1980; orders were down 24%, and the backlog at December 31 was substantially lower than the prior year.

— At LSI Products, revenue was down 25% as customers curtailed demand and prices fell throughout the year, particularly for MOS and digital components. New orders were 45% lower than the prior year, although order rates for digital and bipolar products increased slightly in the fourth quarter.

— Revenue at Analog and Components fell 9%. Orders were weak throughout the year, especially for linear and optoelectronics products. The Discretes Division was more stable, and the Hybrid Products Division was relatively strong; shipments of automotive ignition modules and voltage regulators were up 30% compared to 1980.

— Revenue rose 7% in the Automatic Test Equipment Group; orders were about flat with the 1980 level. Sales of component test systems declined 10%, mainly due to reduced capital spending by semiconductor manufacturers, but sales of printed circuit board test systems remained strong, increasing 53% over the prior year.

Despite these conditions — reduced demand, severe price erosion, declining revenue and disturbing economic news month after month — Fairchild has continued to rebuild, to push with increasing strength and focus toward the goal of leadership in both the semiconductor and automatic test industries. We have used this recession to our advantage, as a breathing space to concentrate on strengthening the basic foundations of the company — its people, its technology and its manufacturing efficiency. While others have focused on the short term, curtailing research efforts and delaying capital programs, Fairchild has not; we have increased efforts in both areas. We have continued to recruit, to improve training and to strengthen management.

— During 1981, the company was reorganized into four business groups: Automatic Test Equipment, responsible for Fairchild's ATE business throughout the world; LSI Products and Analog and Components, serving the U.S. semiconductor markets; and the European Semiconductor Group. An Asian Semiconductor Group will be established in 1982.

— Management responsibility and authority was decentralized to the newly formed groups and to the operating divisions within them. Emphasis was placed on improved techniques for recruiting, training, evaluation and promotion; employee communication programs were begun.

These programs are new; they must be improved, but already the results are beginning to show. Employee turnover, the rate at which employees leave the company, has steadily declined, improving from one of the worst rates in the industry in the years 1975-1979 to one of the best, or lowest, rates in 1980 and 1981.

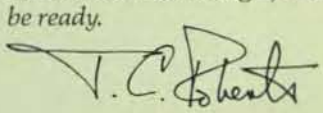
— Expenditure for research and development increased 44% in 1981, reaching a level of $71 million. At Fairchild's Advanced Research and Development Laboratories in Palo Alto, California, spending was doubled as efforts in VLSI design, manufacturing processes, computer sciences and artificial intelligence were strengthened. Division R&D spending was up 31%. During the year, Fairchild began customer sampling of its new 64K DRAM, 9445 microprocessor family, Advanced Shottky (FAST) circuits and advanced linear telecommunications products. At Automatic Test, five new test systems were introduced. These are the first in a broad range of new products that will be brought to the marketplace in 1982 and beyond — the fruit of our research efforts during the past two and a half years.

— Capital spending rose 75% in 1981 to $166 million. New manufacturing facilities for GPLSI and Memory Test Systems at San Jose and Los Angeles, California were occupied by year end. Construction of three new semiconductor facilities was begun during the year at Puyallup, Washington, South Portland, Maine, and Wasserburg, Germany. Plant expansion or renovation was underway for Microprocessors at Wappingers Falls, New York; for Linear, Optoelectronics and Discretes at Mountain View, Santa Clara and San Rafael, California, and for Subassembly Test Systems at Latham, New York. The Gate Arrays operation moved into new quarters in Milpitas, California, and site selection was finalized for a new semiconductor manufacturing complex in Japan.

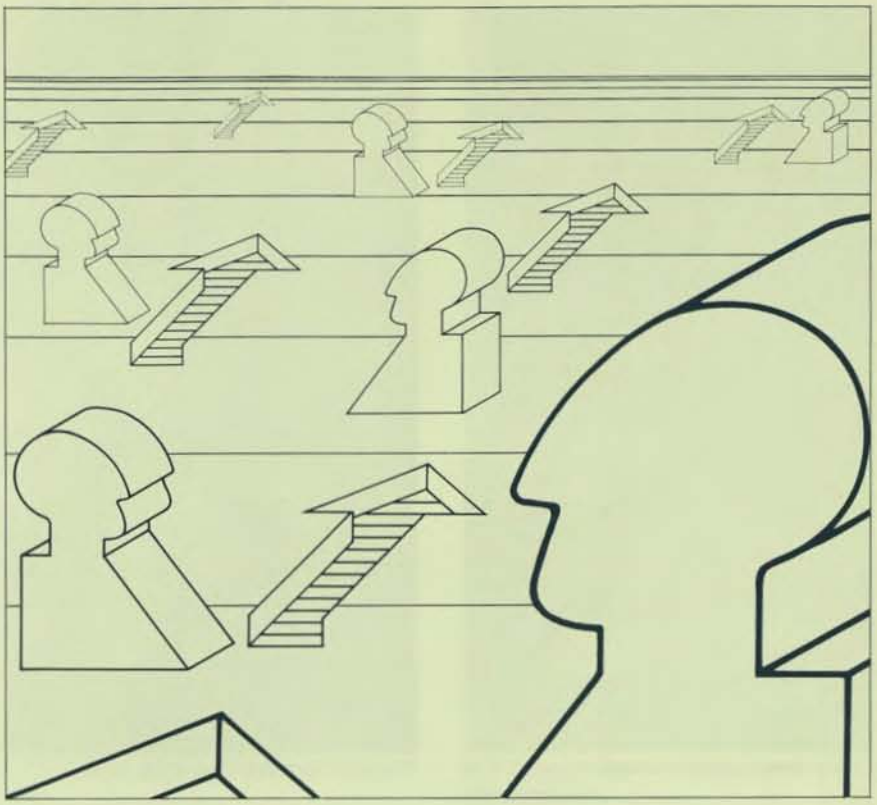
Sharp competition, price cutting, economic booms followed by steep declines — these are not new forces in our industry, they are part of it. The current recession was anticipated, and we have not bowed to it; we have used it to build for the future.

Much has been accomplished in the past twelve months and the plans and programs for 1982 are a continuation of those efforts. In the coming months, we must continue to enrich Fairchild as a challenging and rewarding environment for its people. We must accelerate new product introductions, continue to increase manufacturing efficiency and further enhance product quality. And we must improve all aspects of our service to the customer.

In January of 1980, we began the task of rebuilding Fairchild as a leader, as the best in both semiconductor and automatic test. It is a difficult task — but with courage, with patience and with commitment, it can be done. I have seen the courage and the commitment of Fairchild people during the past two years; I have seen the progress. When the recession ends, sometime in the coming months, Fairchild will be stronger, it will be ready.



WHERE DO THEY GO FROM HERE?



Job rotation means work-place schooling for college hires—and helps them settle into a permenant position in the Hybrid Products Division

The Hybrid Products Division's (HPD)* first Associates are six college hires who joined Fairchild between July and October 1981 and are rotating through various departments in training modules designed to give them experience in many aspects of operations before they settle into their permanent positions.

Although the program is not unique in industry, it *is* unique at Fairchild, and may well serve as a model for implementation in other divisions. If success has many fathers, the Associates Program can indeed claim some proud parents. Among them are General Manager Dick Belcher, Research and Engineering Manager Steve Michael and Personnel Manager Suzanne Carlisle—all of whom have nurtured the program in its infant stages. "We're having more success than we ever imagined we would," Steve candidly admits.

The philosophy behind the Associates Program, according to Dick Belcher, is to give the Associates experience in areas which are most likely to affect their decisions once they assume their regular jobs. It is designed to enhance their potential as employees by giving them a true

*Formerly the Automotive Division

Georg Kuhnke tests a program.

Manuel Perez develops stress specs.

Jeff Lamperter writes a PC program.

"The program was a key factor in my decision to join Fairchild"

understanding of their place in the organization.

Says Suzanne Carlisle: "The College Hire Associates Program is naturally a risk and a learning experience during the first year. We are making an investment; but as it turns out, the Associates are paying their own way after the first few months with HPD."

Careful screening process

A key factor in the success of the Associates Program is the careful screening the applicants get during the interviewing process. They are told about the rotation process and then actually rotate through interviews with as many as six Fairchild people before they are offered a job. The candidates are evaluated on their technical ability and background, and also rated on such qualities as adaptability, stability, communications skills and confidence.

"We wanted to make sure the candidates were really as good as we thought they would be initially and also that they would fit into our work environment," explains Steve Michael. "Interviews with their peers, their potential supervisors and HPD staff improved our ability to make accurate evaluations. We encouraged candidates to ask questions about the program during the interview. The interviews were really two way. And we interviewed so carefully that we were able to select the best people before we got to the offer stage."

"I've been given real responsibilities — I don't just observe"

In fact, the screening process worked so well that supervisors in departments where the Associates are working during their training modules want to keep them after their assignments are completed.

From the Associates' viewpoint, the job rotation aspect of the program was a major factor in their decision to join Fairchild. Manuel Perez, a Materials Science and Chemical Engineering graduate from New York's Stonybrook University, joined Fairchild in August 1981 and says he's already learned "to work as part of a team." Now moving on to his second assignment, Manuel jokes that the program's only drawback is "the paper I've collected on my first job. I took it all with me to my new office because I wanted to keep track of everything I've learned."

Financial Analyst Jeff Lamparter, now working in Production Control, has a B.S. in Aeronautical Engineering from Purdue University and an MBA from Ohio State University. He's looking forward to his assignment in marketing and sales forecasting. George Kuhnke, with a degree from Cornell University, has a background in robotics and will be working on automating the production line. And Bob Schuster, from Virginia Tech, spent two weeks at the HPD assembly plant in Hong Kong, meeting the people and learning about the manufacturing process.

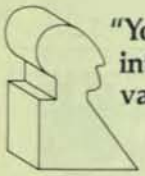
"It's broad-based training — more than I could gain at another company during one year"

Gus Kiniris, Test Engineer, who has a BSEE from the University of California, Berkeley, assesses the program as "just great. I've gained so much knowledge in my first assignment that I can now handle the problems that arise in my new department with more confidence. You begin to

Mercer Curtis III takes inventory.

Gus Kiniris with Inocencia Mara in test area.

Bob Schuster, Susie Hartle examine subassemblies.



"You begin to see the interconnection of various departments"

see the interconnection of the various departments within the division." And Business Analyst, Mercer Curtis III, who worked in several Fairchild divisions during the summer while he was going to California's Chico State University, has now returned after graduation to join the HPD Associates Program. He will ultimately be assigned to the Production Control Department. Right now he's gaining experience as a Production and Quality Assurance Supervisor.

Mentor system

Another plus to the program is the HPD advisor system. As an advisor Steve Michael sees his assigned Associates regularly to discuss problems and questions that arise at work. "Their questions could be technical in nature — or they could be personal." This personal counseling helps the Associates adjust to a new work and geographical environment.

The Associates also meet with General Manager Dick Belcher, keep abreast of their progress with their supervisors, receive an evaluation after they complete each module, and are constantly in touch with Personnel about a variety of job-related questions. There is also a specially appointed College Program Committee which reviews progam adaptations and changes that might occur during the year.

The modules are individually tailored to give optimum background to the Associates. For example, an Associate in Production Control gains exposure to manufacturing techniques and products, learns about quality control, helps to solve production problems, and gains exposure to distribution logistics and procedures.

"I've learned to work as part of a team"

The six Associates are all men this time — a result of the "great demand for qualified women engineers and MBAs," according to Suzanne Carlisle. "Certainly we interviewed women and are eager to have them join the program. But the competition for women engineers is really severe."

Graduation time

The class of 1981 came on board at Fairchild between July and October and the first "graduate" will finish the program in July 1982.

"Originally we wanted to have all the new hires join at the same time," says Suzanne. "But this expectation proved unrealistic. We have now settled on a third quarter framework."

"I took all my paper work with me — to keep track of everything I've learned"

One advantage in hiring within a relatively tight framework is the professional and personal rapport that has developed among the Associates. Some Associates expressed a desire to meet with each other on a more formal regular basis to discuss and evaluate their experiences. In fact, it's likely that the HPD's Associate Program will be evaluated as a model for other Fairchild divisions, should they choose to establish similar programs.

"We're halfway through the program with the 1981 hires and we're extremely pleased," concludes Dick Belcher. "I don't think we could have asked for a more qualified group of young people to join our division and Fairchild. Everyone involved in its success should be congratulated — especially the Associates themselves!"

Do you have all the Fairchild facts?
Take this company quiz to find out.

POP Q

Circle the correct answer(s) to each question

1. **Fairchild's President is:**

- [a] Tom Jones
- [b] Tom Roberts
- [c] Thomas Jefferson
- [d] Thomas Edison

2. **Fairchild's parent company has corporate offices in Paris and New York City. The company is:**

- [a] IBM
- [b] National Semiconductor
- [c] Schlumberger Limited
- [d] Sony

3. **A new Bipolar manufacturing facility will open in Washington State in:**

- [a] Pittsfield
- [b] Puyallup
- [c] Nantucket
- [d] The Poconos

4. **Fairchild has a contract to develop and manufacture the F9450 microprocessor for a branch of the U.S. Armed Services. Which branch:**

- [a] Coast Guard
- [b] Marines
- [c] Air Force
- [d] Boy Scouts

5. **Fairchild has an assembly plant in which South American country:**

- [a] Brazil
- [b] Peru
- [c] Jamaica
- [d] Colombia

6. **Fairchild also has an assembly plant in a Central American country:**

- [a] Panama
- [b] Tijuana
- [c] Mexico
- [d] Guatamala

HOW DO YOU RATE?

Add up your points. Then give yourself a bonus of 50 if you've been at Fairchild for less than one year, 48 if you've been here between one and five years, and 46 if you've been here for more than five years. A score of 90 or more makes you a Fairchild Factfinder; 80-89 means you're a Fast Student. If you scored lower you need a crash course on Fairchild. Study your bulletin boards for company-wide announcements, read your division newsletter, and stay tuned to HORIZONS in 1982.

QUIZ

7. Fairchild will expand manufacturing to Europe when we open a plant in which West German city:

- [a] Salzburg
- [b] Wasserburg
- [c] Berlin
- [d] Vienna

8. In 1980 a new unit was formed in the Advanced Research and Development Laboratory to develop a growing technology called:

- [a] Artificial Intelligence
- [b] Semiconductor Manufacturing
- [c] Organization Development
- [d] Health and Welfare

9. The Chief Technical Officer of Fairchild heads the Advanced Research and Development Laboratory. His name is:

- [a] Tom Roberts
- [b] Joe Montana
- [c] Tom Longo
- [d] Margaret Thatcher

10. The semiconductor manufacturing process involves two high technology processes. What are they? (Hint: the technologies are also the names of two divisions in the LSI Products Group)

- [a] MOS
- [b] Long Range Planning
- [c] Bipolar
- [d] EKG

11. Ignition modules for automobiles are manufactured by which Fairchild division:

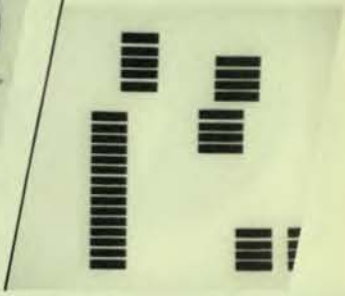
- [a] Hybrid Products
- [b] Telecommunications
- [c] Corporate
- [d] Optoelectronics

12. Fairchild's parent company provides two major types of services to oil companies:

- [a] Wireline Logging
- [b] Drilling
- [c] Demolition
- [d] Construction

A

ANSWERS: 1 (b) Tom Roberts (10 points); 2 (c) Schlumberger Limited (10 points); 3 (b) Puyallup (4 points); 4 (c) Air Force (2 points); 5 (a) Brazil (4 points); 6 (c) Mexico (4 points); 7 (b) Wasserburg (2 points); 8 (a) Artificial Intelligence (2 points); 9 (c) Tom Longo (2 points); 10 (a, b) MOS, Bipolar (4 points); 11 (a) Hybrid Products (2 points); 12 (a, b) Wireline Logging, Drilling (4 points)



DESIGN-A-CHIP

Gate Arrays provide new options for the '80s

A systems designer sits in a recessed alcove, his fingers "playing" the keys of a computer terminal to call up the forms and functions of a design. Here, man and computer interact to create a changing, growing pattern on the CRT—a pattern which will become a new chip.

At his beck and call are a vast library of metal macro cells which can be combined into a myriad of logic functions on a standard diffusion set, creating a semi-custom chip with the support of Computer Aided Design (CAD).

In contrast to the muted interior of the alcove (the walls ensure privacy for customers' proprietary work) the visual display on the screen creates its own beauty in the elaborate design of an integrated circuit, and announces that Fairchild's newest offspring—Gate Arrays—has joined the vast number of firms that have sprung up in the last few years in the custom chip market.

Elegant solutions

Ed Caldwell, Manager of Gate Arrays—an operating unit within the Bipolar Division of the LSI Products Group—describes the aesthetics of this new technology with the ease of an engineer who recognizes the appeal of design to the intellect just as form appeals to the eye, or music to the ear.

"A professor I had in college told us to always look for elegant solutions. Gate arrays are an elegant solution to the problem of custom circuit needs and fast design turn around. The customer provides the schematic, CAD accepts it, performs the circuit simulations to make sure the design is correct, connects the whole thing up, and makes tapes which produce the metal masks," Ed explains.

In this service intensive industry, the people at the Oak Creek facility (near Milpitas, California) seem to have elegant solutions to just about everything. From the emerald green upholstery on the lobby chairs, to the paintings on the rich natural wood walls, to the interior landscaping of office work space, the Gate Arrays business unit articulates state-of-the-art service.

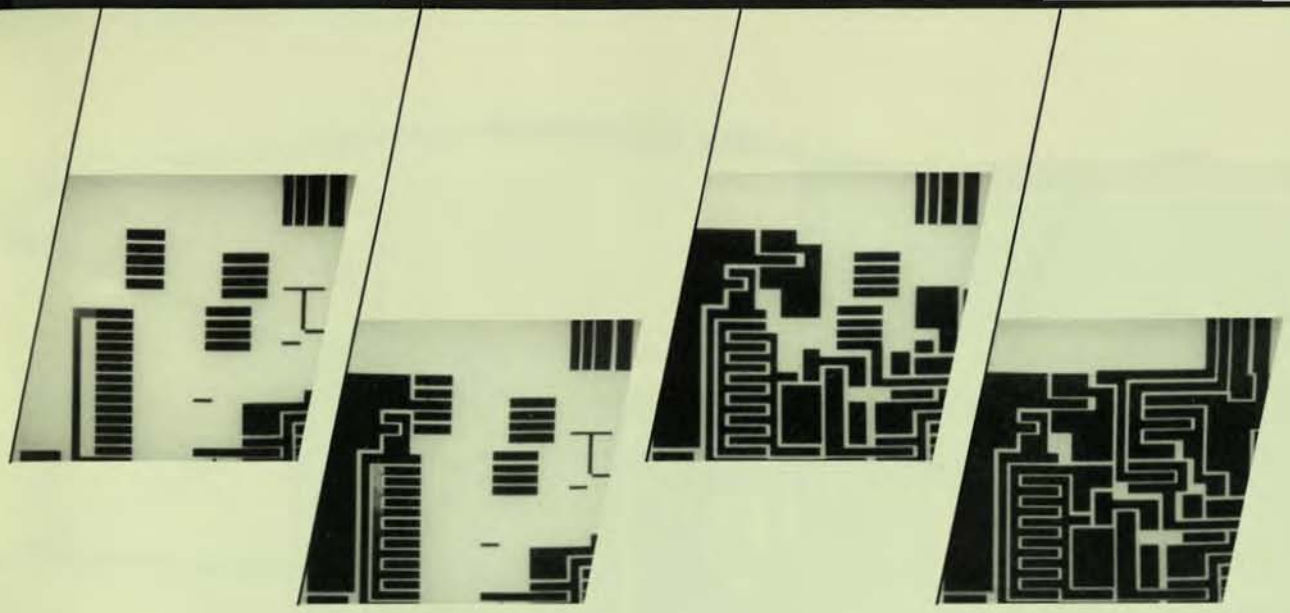
"We give the customer training, one-on-one support, and quick turn-around time for the semi-custom chip," Ed comments. "When our regional design support centers are in place, the service will be even better. In this business the service leaders will be the industry leaders."

Custom chips

Mass-produced standard chips have been part of the semiconductor industry's growth pattern in the last decade. Now, predicts *Business Week* (January 18, 1982), more than half its sales will come from chips designed specifically for a single user, or from chips that can be tailored to serve unique needs. This custom chip business means a shift to a manufacturing services industry. However, the increasing complexity of silicon chips, each housing thousands of transistors, calls for increased design time and cost.

John Hicks, Gate Arrays CAD Engineering Manager, explains that "as we go to higher chip complexity we need to design more quickly. Although we're still in the infant stages at Fairchild, we have the advantage of superior software, the back-up of CAD support at our Advanced Research and Development Laboratory in Palo Alto, and the remote centers we are establishing in the United States, Japan, and Europe (the first will be in Reading, England). Our European design support center will connect via a communication link to our facility at Oak Creek."

Custom ECL and TTL Gate Arrays have been in production at Fairchild since 1975, with the nucleus of the group within the Bipolar Division. Now the new Gate Arrays organization



at Oak Creek offers customer design and prototyping capabilities which will enable Fairchild to meet its objectives of supplying ECL, TTL, I^3L and CMOS gate arrays with complete CAD support.

The Gate Arrays facility trains customers to use the CAD system to personalize chips. Moreover, by 1983 Gate Arrays at Fairchild will have the capability of English language instruction to the computer. "The goal is 'user-friendly' interface," Ed comments. "Soon even non-technical designers will be able to sit at a computer terminal and design the chips needed for their products."

How does CAD help?

While a microprocessor is customized by loading it with a list of instructions or software, the gate array is programmed in hardware by interconnecting its transistors into the exact circuit a designer needs. The final step makes the circuit a custom chip. Otherwise the device is merely a standard array of unconnected gates that can be mass produced. Although the idea surfaced in the 1960s with the hand-held calculator, early arrays could not yield circuits as powerful as standard products, and the computer time needed to draw the patterns was too expensive. But the development of CAD programs reduced the cost of the interconnection process.

Using CAD technology, design and development processes can be accomplished in a fraction of the time it would take using manual methods—minutes rather than weeks or months. By simply pushing a few buttons, the user creates precise designs in seconds. Once a design is completed, the information can be stored in the computer memory for easy access.

"The key to our system is the ease with which the designer can describe his circuit to the computer," John Hicks explains. "Then the computer takes over and does the job. However, the designer can override the system and interact with the process at any stage."

For example, the user at the terminal picks logic symbols out of the computer library. These symbols are displayed and hooked up on the CRT. Or, in a more advanced system, the user sits at a tablet (similar to a formica drafting board) and uses a digitizing pen to translate the symbols to the screen without the use of the traditional keys. He uses a joystick to maneuver between the coordinates on a large scale circuit design that can display any given segment on the screen. Hard copy is printed out simultaneously so that the user can study the text of the design at his leisure.

Winning approach

Although this growing technology has brought a host of competitors into the marketplace, the Fairchild Gate Arrays people feel confident that their approach to customers is a winning one.

Says Marketing Manager Martin Harding: "Our morale here is very high. There are no communication barriers; there's an open approach, a team effort to our work. After all, we're on the frontier of technology. We're growing during a sluggish economy. Our employees are all vital links in the decision-making process and their morale and motivation show how good they feel."

"Because we rely so heavily on CAD to service our customers, we offer multi-service: we're both a design house and a manufacturer," Ed Caldwell concludes. "The feeling of excitement about Gate Arrays is a breath of fresh air in this industry. We're responding to the needs of thousands of potential customers and we've got the back-up support from Fairchild to do it properly."

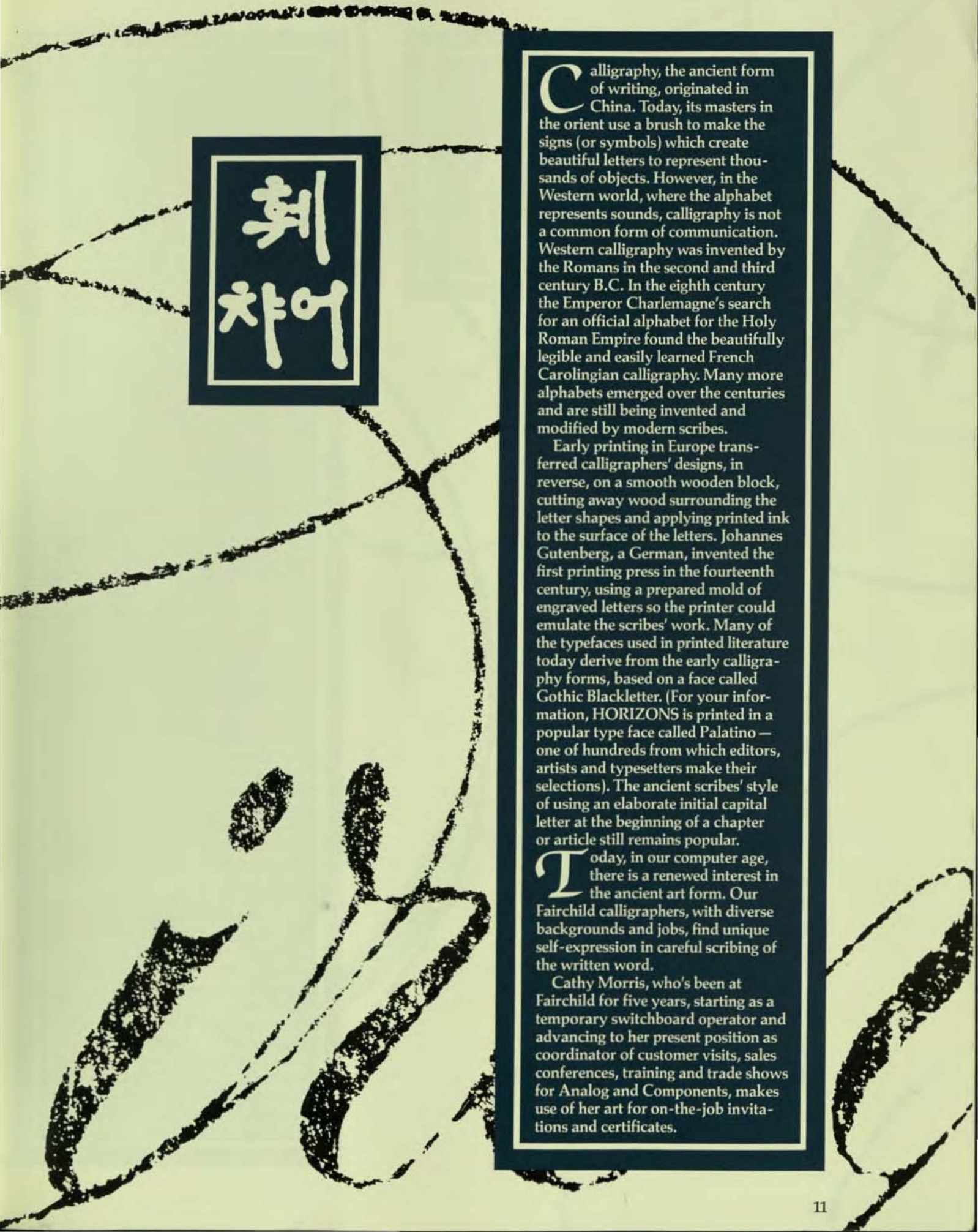
Calligraphy:

Fairchild scribes make art a part of their work lives

We live in a world of typed memoranda, engineering specifications and computer printouts. But a refreshing art form—calligraphy—elucidates employees' names on locker room doors at the Optoelectronics Division and graces the invitations, certificates and place cards used at important functions throughout Fairchild.

For example, in May of 1981 the Schlumberger Board of Directors met at Fairchild. Some in-house investigation found the special talents of Cathy Morris, Customer Service, Analog and Components Group, and Carlyle (Carl) Bindhammer, Reliability and Quality Control Manager, Optoelectronics Division. Cathy and Carl carefully lettered the names on the place cards for the Directors' dinner.

HORIZONS did a follow-up search and unearthed Process Engineer Bob Wickstrom, also in Optoelectronics, and thousands of other unsung Far Eastern calligraphers for whom this art form is their common method of written communication.



Calligraphy, the ancient form of writing, originated in China. Today, its masters in the orient use a brush to make the signs (or symbols) which create beautiful letters to represent thousands of objects. However, in the Western world, where the alphabet represents sounds, calligraphy is not a common form of communication. Western calligraphy was invented by the Romans in the second and third century B.C. In the eighth century the Emperor Charlemagne's search for an official alphabet for the Holy Roman Empire found the beautifully legible and easily learned French Carolingian calligraphy. Many more alphabets emerged over the centuries and are still being invented and modified by modern scribes.

Early printing in Europe transferred calligraphers' designs, in reverse, on a smooth wooden block, cutting away wood surrounding the letter shapes and applying printed ink to the surface of the letters. Johannes Gutenberg, a German, invented the first printing press in the fourteenth century, using a prepared mold of engraved letters so the printer could emulate the scribes' work. Many of the typefaces used in printed literature today derive from the early calligraphy forms, based on a face called Gothic Blackletter. (For your information, HORIZONS is printed in a popular type face called Palatino — one of hundreds from which editors, artists and typesetters make their selections). The ancient scribes' style of using an elaborate initial capital letter at the beginning of a chapter or article still remains popular.

Today, in our computer age, there is a renewed interest in the ancient art form. Our Fairchild calligraphers, with diverse backgrounds and jobs, find unique self-expression in careful scribing of the written word.

Cathy Morris, who's been at Fairchild for five years, starting as a temporary switchboard operator and advancing to her present position as coordinator of customer visits, sales conferences, training and trade shows for Analog and Components, makes use of her art for on-the-job invitations and certificates.

"I've always been fascinated by writing and enjoyed creating design ideas for social functions," Cathy says. "I took some adult education courses, consulted reference books, and then just started writing. My regular handwriting is erratic—but if you can hold a pen you can be a calligrapher."

Carl Bindhammer feels strongly that "handwriting is important. It's as important as speaking in creating an image for other people."

Unlike Cathy, Carl has a commercial art and photography background. "When I joined the Air Force my career aspirations changed. I returned to college to study engineering and business—yet I didn't want to exile myself from art."

Now at Fairchild for eight years, Carl uses his art in both his personal and business life. "I do calligraphy for my daughter's 4H club and use it for lettering on leatherwork and woodcarving. All my personal correspondence is scribed, and occasionally I scribe business correspondence." On a recent trip to Fairchild, Korea, Carl noticed workers practicing their calligraphy in the cafeteria at lunch hour, using rice paper and brush. "They (the Koreans) didn't know that calligraphy existed in the Western world. I scribed my name and formed an instant bond of communication."

Bob Wickstrom, a process engineer at Optoelectronics, began his career as a photographer. His interest in photography led to work as a plating supervisor, then photomasking.

Bob learned calligraphy from a do-it-yourself book and now scribes division Christmas cards, meticulously letters his own files, and creates certificates for participants in a local campaign for Muscular Dystrophy. Although Bob's business correspondence is not extensive, he pens what he does himself. "Venders always read what I've written and comment on the form. It makes an initial impression. When our department secretary is busy, I scribe my memos." Bob has also lettered the instruction and warning signs in photomasking. "Employees pay attention to the signs and they remember the content."

The interest in content emerges from our Fairchild calligraphers' comments about literature. All three are involved in the content they choose for their personal scribing. Cathy likes to find unique quotations. Carl often chooses poetry or short pieces of prose to create a designed piece. And Bob keeps a weekly journal in his scribed hand and may hand letter a sacramentary (the book used by a priest during Catholic mass).

A collection of pens and nibs are important to any calligrapher. "And if you're left-handed, remember to find a lefty nib," Bob cautions.

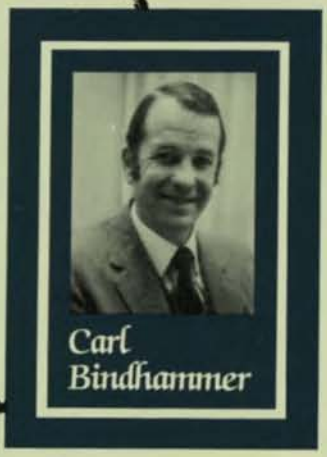
Although calligraphy is an art form, you don't have to be an artist to develop your skill. Calligraphy books exhort the scribe to "exhale with the stroke—and remember you're not a typewriter. Admit your mistakes, correct them and continue."

Our calligraphers agree that quality and perfection are important aspects of art and life. "If you can write neatly it changes your whole personality, your entire concept of yourself," says Bob. "It becomes a personal expression of quality that carries into the rest of your life."

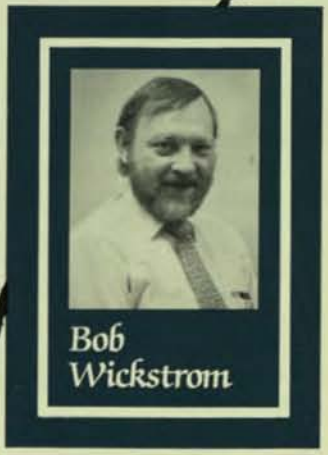
Adds Carl: "You see changes in people when they master calligraphy. Positive changes which help them gain respect and appreciation from others."

So, for the myriad of us unartistic souls who would never approach calligraphy or any other art, the emphasis on form and perfection can teach a universal lesson. The manner in which we present ourselves and our work is a goal our calligraphers teach through their own example.

Cathy
Morris



Carl
Bindhammer



Bob
Wickstrom

Fairchild facilities are growing, growing, grown at

SIMI VALLEY PUYALLUP WASSERBURG

Simi Valley, Puyallup, Wasserburg. In California, Washington State, and Germany, Fairchild broke ground for new facilities that sprouted like trees symbolizing company growth.

Fairchild's Component Test Systems Division moved its memory tester operation into a new 200,000 square-foot facility in Simi Valley, California, 30 miles northwest of Los Angeles. Right down the street: the site of numerous John Wayne movies and the present set of the popular "Little House on the Prairie" television series.

In Puyallup, ("pew allop") Washington the first of two buildings will be operational in mid-1982. Surrounded by towering fir trees and built right into the environment, with Mount Rainier as a backdrop, the Bipolar Division complex will eventually house five buildings for all operations.

And in Wasserburg, outside of Munich in West Germany, a new assembly and test facility for bipolar and digital circuits is scheduled for completion in June 1982. The Wasserburg facility establishes a Fairchild manufacturing presence in Europe for the first time.

Modern exterior lines of completed memory tester facility, Simi Valley, California.

Inside and looking out at Fairchild's first European factory in Wasserburg, Germany.

On target for the future at Fairchild's Puyallup, Washington site.

1982 FAIRCHILD PHOTO CONTEST

1981 Fairchild photo contest winners

In 1981 we held the first Fairchild photo contest in eight years. We had hoped for good employee participation — but we never anticipated that we'd have more than 150 entries from all over the Fairchild world.

Remember "Free Spirit" by Dennis Roberts, the "best of show" photo that graced the cover of the Spring 1981 HORIZONS. Or the touching photo by Dick Rhodes of a grandfather and a granddaughter on a shimmering beach — two generations captured by the camera for eternity. Or the delightful "Andy," the cat in a tree that Candy Keys portrayed so beautifully with her camera.

The photos on these pages is a potpourri of Fairchilders' "personal bests" in photography from 1981. The enthusiasm they generated has encouraged us to expand the photo contest for 1982.

So, dust off your camera! It's time to enter Fairchild's 1982 photo contest. As long as you're a Fairchild employee you're eligible to enter. You can submit entries of Animals, People, Still Life, Scenery, or Science and Technology.

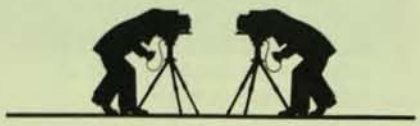
A panel of photography and design professionals will judge all entries, as they did last year. They'll look for technical quality, artistic execution and subject matter in making their selections.

The "Best of Show" photo, selected from the first prize winners of each category, will appear on the cover of the summer issue of HORIZONS. First prize winners will receive $50.00 and second prize winners $25.00.* First and second prize winners will also appear in the magazine.

Photos should be black and white or color prints (no larger than 8 x 10 inches) or slides. Entries are limited to two per employee. Photo contest entry forms are available from your Personnel Department. Identify each photo with your name and contest category on the reverse top corner of the entry and submit the form(s), along with the photo(s) to the Corporate Communications Department, M/S 20-2260, 464 Ellis Street, P.O. Drawer 7281, Mountain View, CA 94042. The deadline for all entries is June 15, 1982. HORIZONS will return all photos after the contest.

Be a part of Fairchild's history and tradition and enter the contest. Remember, a picture is forever.

**Contest judges reserve the right to eliminate prizes in categories where entries are not appropriate for publication.*



Fairchild's San Rafael employees watched neighborhood streets become a canal system during severe winter rains.

Monsoon season hits Bay Area

Although employees at Fairchild's Far Eastern locations are used to a monsoon season, the wetwashing California's Bay Area received in January caught many Fairchild employees in this part of the United States unprepared. However, San Rafael Discrete Division employees seem to have accepted the record-breaking rains with good humor and an eye to posterity. Ed Kemp, Hi-Rel Quality Assurance Manager, got up at his usual time on January 4 and prepared for work. When he opened his garage door he found his neighborhood afloat. Lyn Harris, Production Control, started her commute home from work by avoiding the freeway and got caught in a "submarine playground. I pushed my car out of the swamp to high ground, then proceeded to wade to downtown San Rafael." Few employees were able to make it to work and those who did had trouble getting home. Several of them took the last available rooms at a nearby inn. The employees who did make it to work reported that "parking was no problem for a change."

Discrete Newsbeat
Discrete Division
Editor: Gretchen Goldsworthy

CPR is the gift of life—and more than 20 employees at the Fairchild Silicon Materials plant in Healdsburg, California are now certified as its practitioners. Cardio-pulmonary resuscitation (CPR) classes were conducted by the Healdsburg Fire Department for Fairchild employees. First Aiders and members of the Emergency Response Team took the classes, learning artificial respiration and artificial circulation techniques for emergency situations in which the victim has stopped breathing and the heart has stopped pumping. Heart attack, electric shock, drowning and drug overdose are some of the situations requiring CPR. Only trained individuals can perform this vital life support procedure.

Wafer News and Views
Silicon Materials Division
Editor: Richard Marin

Healdsburg employees practice CPR on a cooperative dummy.

Softballer Nelson Lim is the pride of Fairchild's Singapore plant.

He's no Joe Dimaggio, they claim—but Fairchild's Singapore employees are clearly proud of technician Nelson Lim. An outfielder on the National Softball team, Nelson will make a trip to Manila this year to participate in the 1982 Southeast Asia games—in tough competition with the Philippine ballplayers. Nelson says, "Softball is in my blood." He's returning to the game after a four year retirement. Nelson represented Singapore in 1974 at the Asian Softball Championships in Manila, at the ASEAN games in Kuala Lampur, and at a 1977 tournament in Manila. "The physical attributes of a good softballer are quick reflexes, stamina and speed," explains Fairchild Singapore's star athlete.

Fairtimes
Fairchild Singapore
Editorial Committee: Heng Nga, Peggy Lee, Amir Saifuddin, Heng Liang Eng

OVER THE HORIZONS

Cebu employees support "Panaghiusa Para Sa Kaugmaon — Unity and Togetherness for a Better Tomorrow."

A springboard for communication is in place at the Fairchild Cebu plant to ensure that the two-way communication process really happens. An innovative program called "Panaghiusa Para Sa Kaugnaon" (PPK), which means "Unity and togetherness for a better tomorrow" in the Cebuano dialect, has created a committee with representatives from all levels of the Cebu plant. Any representative can bring issues before the PPK for assessment and evaluation by management. Cebu employees, including General Manager Y. I. Lee, expressed full support for PPK by signing a pledge when the program was first implemented in the fall of 1981.

Fairchild Review
Fairchild Philippines
Editor: Cesar Maureal

INTERNATIONAL DATELINE

Potter's Bar, U.K.....A two-year-old recruiting program for the Northern European Sales forces focuses on hiring graduate engineers specifically for a marketing career, reports Peter Turner, General Manager, Northern Europe.

The four recent graduates hired to date — Geoff Kates, Andy Paul, Rudi Ryshway and John Cosmos — work within the Northern European Sales headquarters for up to 18 months as inside sales engineers during their training period. "They learn about most aspects of semiconductor sales and marketing, answer technical questions, negotiate with distributors, handle inquiries and provide customer service. After the 18 month period they are transferred to factory support or marketing functions."

Although the concept of the plan is similar to the job rotation program for college hires at Fairchild's Hybrid Products Division in Mountain View, California, the training period for the European marketing people is seen as a "qualifying period" so that hires can obtain visas. Their salaries are shared by their host division and Northern Europe. After a period of factory training the engineers are expected to fill senior marketing positions within the company.

Singapore....Did you know that Christmas is celebrated with jubilation in the Far East? At our Singapore facility people of Chinese, Malaysian and Indian nationalities decorated an office Christmas tree much as it's done in Western countries.

HORIZONS

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