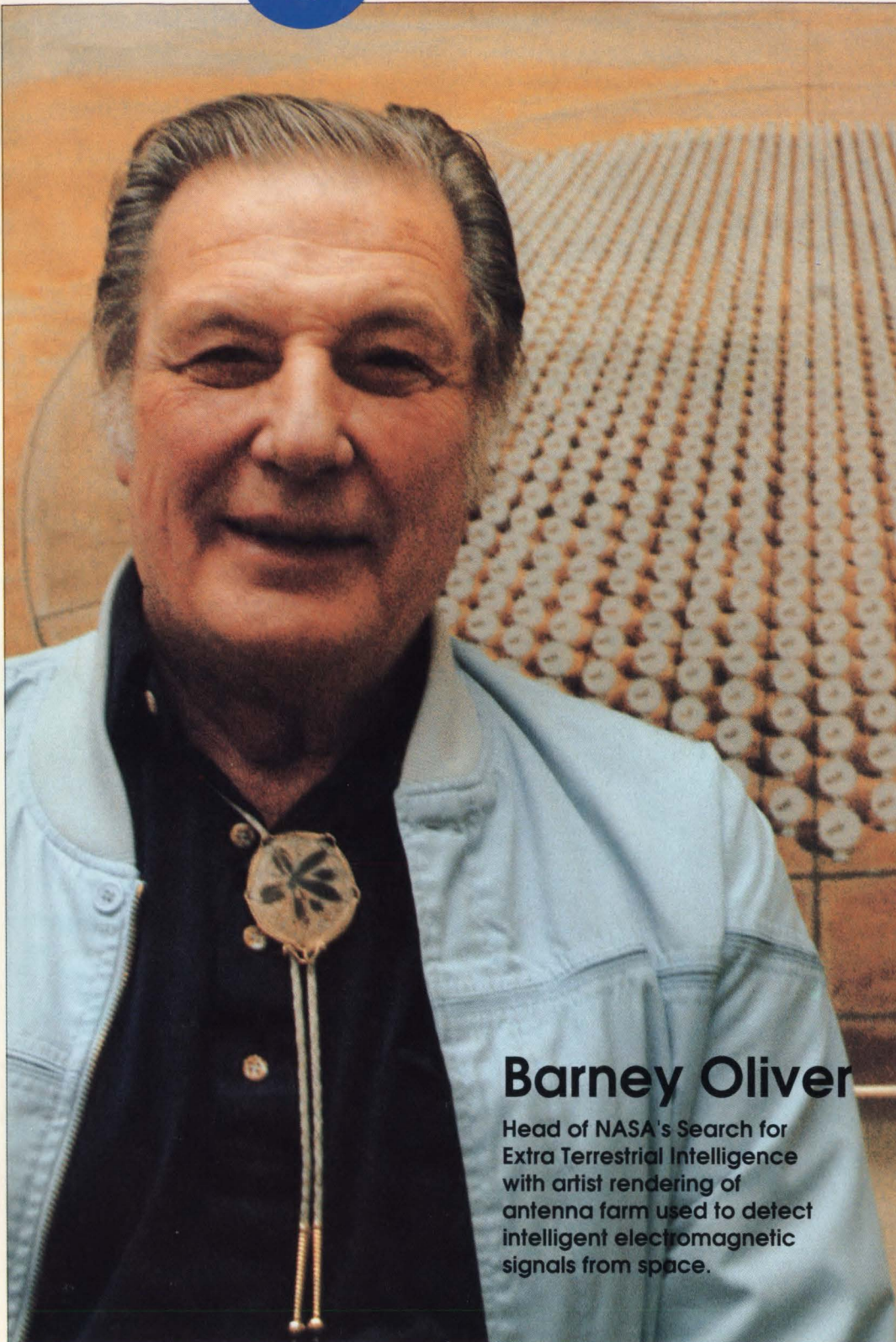


February/March 1989

SILICON VALLEY Engineer™

Vol. 1, No. 1
Complimentary



Barney Oliver

Head of NASA's Search for Extra Terrestrial Intelligence with artist rendering of antenna farm used to detect intelligent electromagnetic signals from space.

• **WELCOME!**

The rationale for Silicon Valley's new magazine is explained on page 6.

• **ENGINEER'S ENGINEER**

Hewlett-Packard veteran Barney Oliver managed R&D for 29 years until he "retired." Now with NASA, he shares how engineers created Silicon Valley.

• **DATELINE RUSSIA**

What it's like to live and work as an engineer in the Soviet Union. Profile of a man who has been there.

• **YOU CAN MANAGE!**

Columnist and Psychotherapist Jean Hollands shows why engineers make good managers.

• **CAR BUFFS**

Engineers share their love for high performance cars and the excitement it brings.

• **PLUS...**

Inside stuff on careers for scientists and engineers, and a whole lot more.

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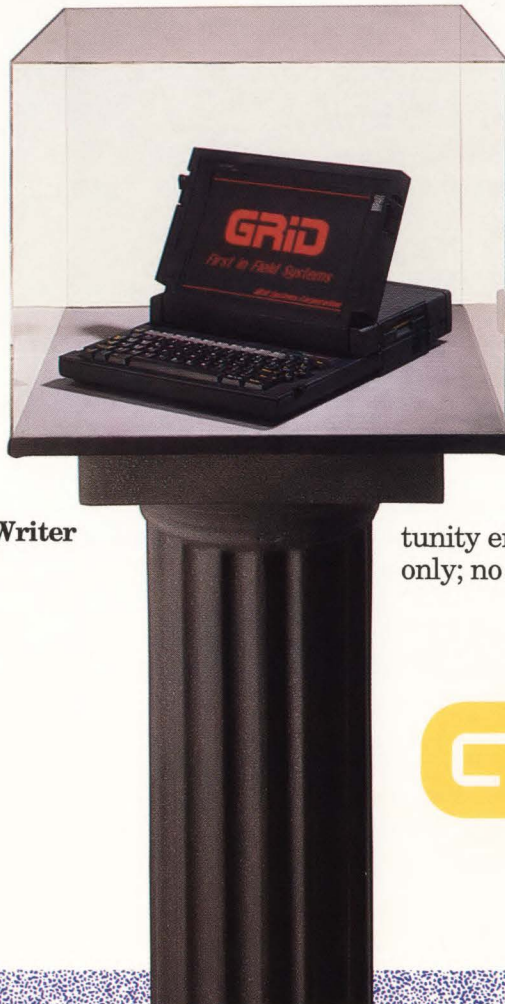
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CIRCULATION STATEMENT
Silicon Valley ENGINEER is circulated free of charge to engineers by subscription and through a network of pickup points throughout the Bay Area. Free copies are available at stereo stores, restaurants, hotels, motels, fitness centers, computer stores, public libraries, engineering societies and other selected locations. For a free subscription see page 30.

ADVERTISING INFORMATION
415-941-6200

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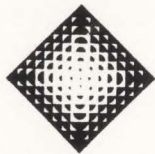
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The content of this new periodical is intended to entertain, inform and maybe even provide a bit of inspiration. We do not intend to add one more periodical to your *technical* reading "pile," but rather provide verbal and pictorial essays about the people who fuel the nation's knowledge explosion from here in Silicon Valley: you and your fellow engineers!

Senior Editor John Joss calls Silicon Valley "The World Headquarters for the 21st Century!" Certainly this is the most stimulating technological area on earth.

Envied and copied around the world, but never matched, Silicon Valley epitomizes the spirit of innovation, imagination and entrepreneurial effort in technology. And it all starts in the minds of the men and women here.

Watch for opinion, commentary and advice from some of the best minds in the Valley. Tips on career development, on communication inside and outside the technical environment, on startups and how to finance them.

Silicon Valley Engineer Magazine will also provide a forum for engineers of all disciplines to exchange ideas, speculate, dream, question and postulate.

Let us hear from you. We believe every engineer is a potential author. Article ideas, photo essays, reports on special hobbies or avocations, humor, news and activity reports of engineering societies are encouraged. Send your letters to:

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Most important job satisfaction factors

WHAT DO ENGINEERS WANT?

A recent study reveals what engineers want on the job and how they describe their ideal employer.

Challenge is the most important factor in job satisfaction for engineers, according to a nationwide survey done by *Experienced Engineer* in conjunction with Thompson Recruitment Advertising. In fact, substance, or quality of work factors were rated higher than image or reputation as factors for job satisfaction. Salary, often regarded as the main interest of engineers, ranked fifth. Benefits and other compensation factors received unexpectedly low rankings. Technical reputation and the reputation of the company as an employer also received low ratings as a reason for job satisfaction.

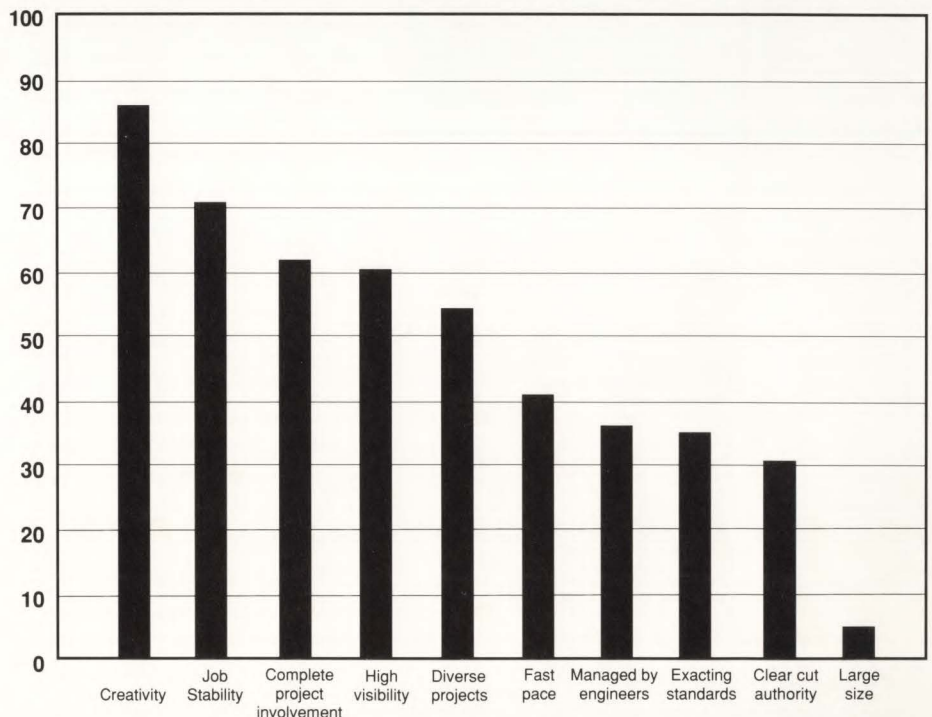
In fact, the most illuminating and consistent finding was that engineers see themselves as creative people in search of employers with the imagination and willingness to support them. Overwhelmingly, they see the quality of their work as the key to happiness in the work place. The same attitude is reflected in their descriptions of the ideal employer whose most important characteristic is encouraging creativity in employees. The ideal engineering employer not only encourages creativity, but encourages

project involvement from start to finish and high visibility via small workgroups. The most surprising finding is that being managed by engineers is rated "very important" by less than half the engineers in the study. Close to three quarters of the engineers ranked job stability as the second ideal employer characteristic, but large size ranked last as an important characteristic.

Would these rankings be the same here in Silicon Valley? Check and see how you would rank these factors. What differences do you perceive? Then see how your company stacks up—how would you rank them in terms of these ideal characteristics. Remember, no one company has them all!

This information was excerpted and reprinted from an article called "Engineers on Engineering" by Lura S. Harrison with permission from COG Publishing, Inc., of Van Nuys, CA.

Most important characteristics of ideal employer to engineers changing jobs



DATELINE RUSSIA

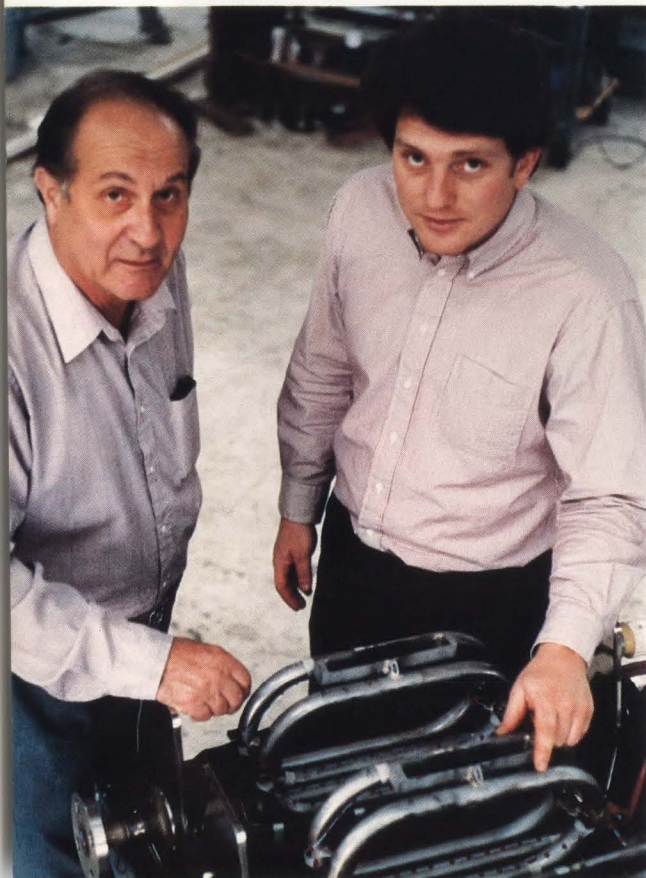
An engineers' life in the USSR.

By Fred Levien

"What's it like?" . . . I asked Ilya . . . "to be an engineer in the Soviet Union?" This question had burned in my mind for years. Now, sitting across the table was someone who could finally fill in the answers.

Ilya Velednitsky. Born 1922, in Kiev, the Soviet Union. Educated as a mechanical engineer. Specialty: hydrodynamics. Graduated with honors, 1959, Leningrad Maritime Institute. Experience, 26 years in the USSR, working on design and construction of Soviet ships.

Ilya and EXAC's Director of Engineering, Andrew Levien, check the weld joints for integrity on EXAC's model floor meters made using Ilyas newly designed fixtures.



Emigrated to the U.S.A. in late 1979.

Why did he emigrate? Actually, coming here was a decision not of his own choosing. The chain of events started with his eldest son, who was trained as an engineer in the USSR. When he entered the working world, he found that being Jewish was a heavy liability in finding adequate work in his chosen profession. Career opportunities were denied him. Eventually he chose to come to the U.S.

Shortly after his son's departure, Ilya's supervisor at the Maritime Institute informed him that his son's leaving the USSR for the U.S. reflected badly on both Ilya and the Institute, and accordingly "his services were no longer needed." He was fired! So Ilya followed his son to the United States.

Ilya looked back at me, furrowed his eyebrows and in a heavy Russian accent answered my opening question. "As an engineer in Soviet Union . . . is vedy, vedy different from United States." I nodded like it was clear to me what he meant. But not until we were done talking did it become apparent what Ilya really meant.

Schooling

Our conversation began naturally enough with the educational process an engineer goes through in Russia. In the USSR primary education ends at 10

years rather than 12. Then application must be made to the school of his or her choice (a very high percentage of the engineering students in the USSR are female). Competitive exams for these schools are held in August of every year. Based on the results of these exams, the schools select their new students. If not selected, students must wait until the following year to retake the exams and apply to another school. Only the "best and brightest" who apply to the two most prestigious schools in Russia, Moscow University and Leningrad University can take their examinations in July so that if they are not selected, they still have time to apply to less prestigious schools by August. Once selected, time requirements are roughly comparable to the U.S.: Four

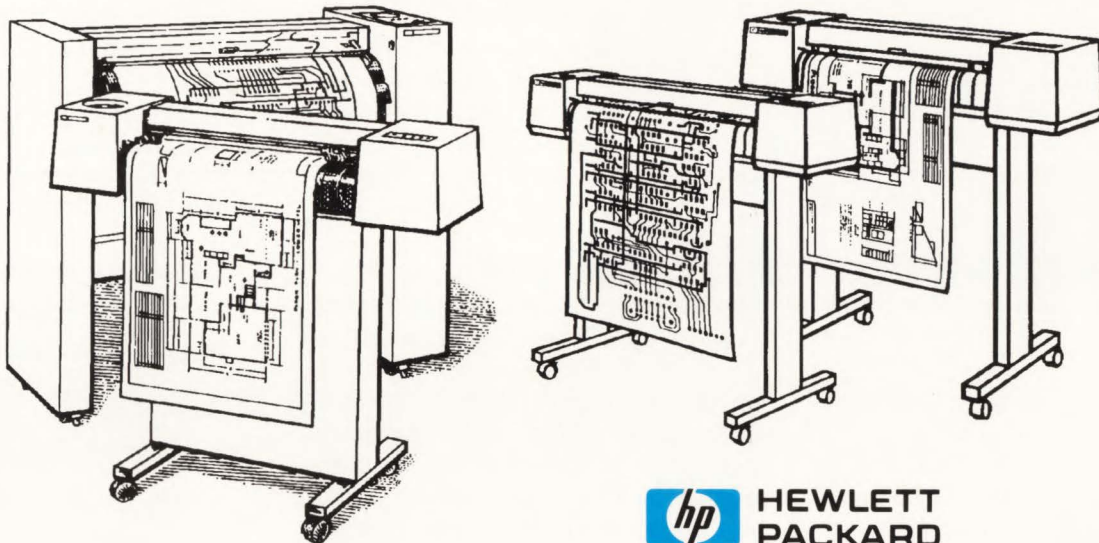
If a student fails his course examinations in the USSR, he has the right to retake these exams...

years to a B.S., two more to an M.S. and two more years for a Ph.D.

Although time requirements are similar, content of the program differs. For example, not only are Ph.D. candidates exposed to approximately 1500 hours of mathematical instruction, as they are in the U.S., but they are also required to attend political classes in Leninism and Marxism totalling more than 3000 hours. "Of course," he added, "once you enter industry or move into any management position, upward advancement is almost always restricted if you are not a member of the Communist Party."

Another interesting difference is in responsibility of professors toward their students. If a student fails his course examinations in the USSR, he has the right to retake these exams as often as necessary until he has passed. In addition, he is entitled to added instruction from the professor to assist in his quest for a passing grade. This could place a heavy burden on a teacher who is ei-

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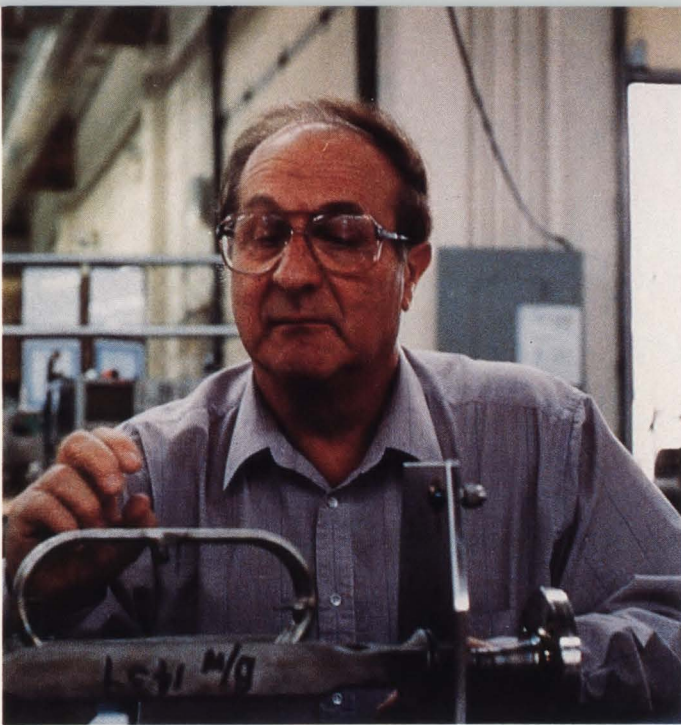
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Ilya puts the final touches on floor meter instrumentation prior to testing.

you can work. Those who graduate with "honors," get the better assignments. Ilya's honors stamp secured him a preferred position in Leningrad.

Once in the working world, the economic future for an engineer looks grim, compared to his American counterpart. Pay compression is stultifying. Ilya cautioned that his recollections have dimmed somewhat over the past nine years, but he felt a

young graduate engineer could expect a salary in the 120 ruble range. After 25 years of experience, plus outstanding performance, he might look forward to a salary of 210 rubles per month. When I mentioned profit sharing, stock options or bonuses, Ilya smiled. "Remember," he said, "all factories are non-profit, owned by the government." These capitalistic ideas are simply non-existent in Russia.

An economic indicator of how engineers are regarded in the Soviet Union can be gleaned from the range of salaries that are typical. Although these were from the 1979 period, when Ilya last worked in Russia, he said that not much had changed.

Occupation	Rubles per month
Engineer	120-210
Doctor (M.D.)	100-150
Teacher	80-120
Day Laborer	60- 80
Factory worker	80-300
Management	200-500
Salesman	no such position exists

Remarking on the fluidity of employment in the Silicon Valley, I queried Ilya about the Soviet engineers' experience in finding a different job after their first three year obligatory stint. Accurate statistics are not kept. But it is clear that an engineer's job mobility is much, much less in Russia. The internal passport requirements mentioned earlier

are a massive part of this problem.

Another severe deterrent is the difficulty of communicating engineering manpower needs from one geographic location to another. Advertising in newspapers and magazines is not done. Telephones are hard to come by. The only dependable way to ascertain engineering job needs is to visit a factory and see if a job is posted on one of the huge employment boards typically set up at the front gates.

However, the most constraining factor on job mobility may be the reluctance of engineers to talk freely about personal opinions, hopes, fears, and dislikes. Ilya pointed out that there is always present the resident KGB agent whose job it is to monitor all discussions, and record what he hears. These

New ideas, new thoughts...do not go down smoothly in the USSR...

agents, are known to all employees. In addition, there is a shadow network of KGB informers, who are not openly identified, that further act as information gatherers for the KGB. I could easily sense from Ilya's tone of voice, how this had a dampening effect on the universally practiced "bitch sessions" that we so accustomed to here in the U.S.

Russia: 18 Months US: 24 Hours

Ultimately though, the most striking difference a Soviet engineer faces from his American equivalent is in the many day to day problems he encounters as he tries to get his job done. Ilya thought about this for a long moment, and tried to sum up for me the comparison in a single experience which he recently encountered while doing his work at EXAC (where he is currently employed.) This small company, a division of Fisher Controls, specializes in fabricating high precision mass flow meters. It is a young organization with an outstanding reputation for innovative quality products.

Ilya's knowledge of hydrodynamics

ther very poor at conveying the knowledge, or very strict on grading.

Education through the Ph.D level is essentially free. There is no tuition. Books are very low cost, and government assistance for living expenses keeps out-of-pocket costs close to zero.

First Job—Not What, But Where?

As one approaches graduation in Russia, anxiety mounts. Not over getting a job, since work is guaranteed, but over where the job will be! Due to government restrictions on relocation, the first job is liable to be the deciding factor on where he is to live for the rest of his life in the Soviet Union.

Citizens in the Soviet Union are unable to move freely within its borders. As Ilya explained it to me, separate passports are issued not only for international travel but for travel within the country as well. Soviet authorities must give final approval for an individual to move his residence. Since most Russians would prefer to live in a city rather than in the country side, this government practice insures that cities do not become overcrowded. So an assignment to a work station in a less than desirable area of the country has long term consequences.

And the choice of jobs at graduation is entirely at the discretion of the Soviet government. Since they pay for your education, they get to choose where

has served him well at EXAC. He sets up the testing and calibration procedures and designs many of the jig and assembly fixtures used in the production of the flow meters. Ilya, as a lead design engineer, had come up with a new part one day that needed a special type of stainless steel. He picked up the phone, called an Oakland metals company, and twenty-four hours later, the material he needed was on EXAC's loading dock. Not an unusual occurrence in this competitive American environment. After explaining this reaction to his need for new materials, Ilya stopped. He looked at me very intently, and spoke very deliberately. "That process," he explained, "would have taken me eighteen months back in Russia." I was dumbstruck. He was dead serious, but then he explained the laborious step by step procedure that he had himself faced many, many times in order to get things done at the Institute in Leningrad. Slowly, I came to understand. New ideas, new thoughts, changes in plans; these do not go down smoothly in the USSR. It is a grossly inefficient economic system, highly resistant to change.

Finally, I asked Ilya, "How then do new ideas get into the system? How do young companies get started?" There was a very long silence.

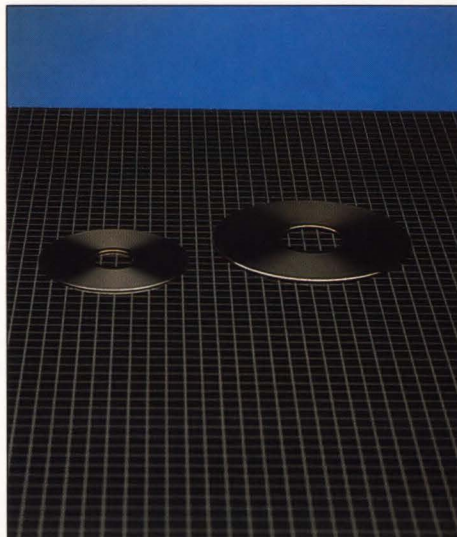
As we both groped for an answer to this question, I realized that there really is no answer. There are no entrepreneurs in the USSR. There are no market forces at work. No one "sells" to another in the traditional sense. The government decided what products to build. If no one buys the product, no matter. The product is simply shipped to a warehouse and stored. There it sits. No need to worry about declining sales. Nor competition. Nor lay-offs. There are no bankruptcies. The government owns it all!

As Ilya warned when we first started to chat, "An engineer in Soviet Union . . . is vedy, vedy different from the United States."

By now, he'd convinced me of that.▲

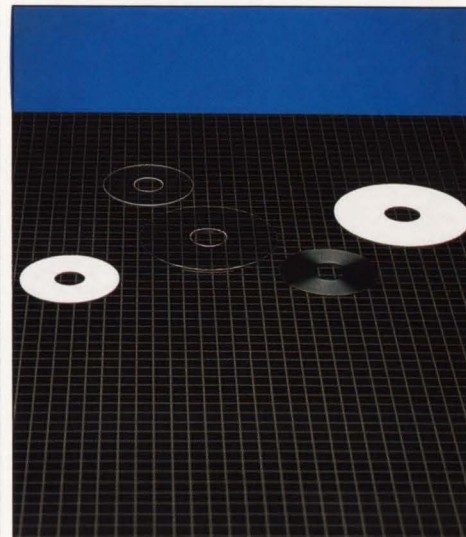
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What's ahead for the new Silicon Valley "exploratorium" now being developed in San Jose.

••HOBBIES: COPING WITH STRESS

What some engineers do in their spare time to "unwind" i.e. river raft guide; violins, making and playing; celestial navigation; winemaking.

••LIKE FATHER, LIKE SON

"Like mother, like daughter." Impact on children of engineering parents.

••SILICON VALLEY 2001

A few hundred points of light from the minds of many about life and living here a decade from now. Technology, housing, transportation, jobs, lifestyles.

••SWORDS VS. PLOWSHARES

Implications of the end of the "cold war." Current top ten players in DOD throughout U.S. Engineers speak out on moral issues for engineers.

••EDUCATION: DOES IT MATTER?

Rating colleges, grads. Continuing education resources.

••FROM "ADAMS RIB"

How women have advanced into the previously "all male" dominance in engineering.

••DEGREES AFTER 50

Who has gone to advanced degrees at mid-life and the results.

••ENGINEERS AND THEIR MONEY

How to manage discretionary income. Best investments. Preparing for retirement. What has worked for others.

For subscription info see page 30.

HIGH-TECHNOLOGY ADVERTISING

Engineers can have a role.

By Brice Schuller

Advertising is an expensive form of communication. Most technology companies do it. Few do it well. That's because engineers are rarely trained communicators, and few advertising/communications people are trained engineers. Thus engineers' communications skills become essential. To create advertising that works (or data sheets, brochures or other technical marketing communication), engineers must clearly explain the benefits of a new or improved widget, and the agency people must understand why these benefits are important.

It doesn't take an advertising or marketing genius to recognize that much high-technology advertising wastes the reader's time and the advertiser's money. That's a shame. Generally the problem is communication. Client and agency both talk but neither understands the other. Result: marginally effective communication in a very expensive medium.



Whether it's selling the benefits of a new IC to another engineer or the investment potential of a new concept to a venture capitalist, crackerjack communicators concentrate on getting ideas across. Just the benefits. Features of the 'deal' come after comprehension is established.

The ability to communicate product benefits is particularly important when dealing with your marketing department and your advertising agency.

One success story is Intel and its advertising agency Chiat/Day. They have produced consistently compelling work. Client staff has changed. Agency people have come and gone. But Intel keeps on getting great stuff: high-technology advertising that sells, speaks plain English, neither cutsie-poo nor a boring litany of 'features.'

The agency and company aren't just talking, they are *communicating*. Somewhere at Intel are engineers who have learned to tell ad people about product benefits, forcing non-technical copywriters and art directors to understand. The agency obviously has a culture that encourages their people to understand Intel products they sell. That combination consistently produces what I consider to be the best advertising in the IC business. The same needs and solutions apply throughout high technology, in every discipline.

Advertising is a delicate art form. The concept is to give readers or viewers enough information to say 'Yes' or 'Maybe' but not enough to say 'No.' Feature advertising often gives potential buyers just enough information to reject. To my knowledge, neither Intel nor their agency commit that sin. Features are used only to buttress benefits, and that's the crux of communication. When you get into an airplane, you're not particularly interested in coefficients of lift and drag. Your concern is whether the damn thing flies, where and when you want to go. If you need technical features, you call the plane manufacturer. ▲

Brice W. Schuller is Managing Partner of Vaughn & Schuller, an advertising creative service to high-technology advertisers and agencies. He is a 17-year veteran of the wars between engineers and copywriters.



The NEC 4600 car phone from CelluLand.



The NEC 4600 car phone from about 100 other local dealers.

MAKE THE WRONG CHOICE AND YOU'RE DEAD.

30% MORE POWER

Many car phones seem identical. But one from CelluLand produces about 30% more power than others from about a hundred Bay Area cellular dealers. Which means ours will provide clear communication in parts of the Bay Area when theirs goes dead.

How come? Even top quality cellular phones, from leaders in cellular technology like NEC, require tuning on arrival from the factory. It can make a difference of up to 30% in their power output.

But of nearly one hundred cellular dealers in the Bay Area, only a handful have the proper tuning equipment.

And four of them are CelluLand cellular car phone centers.

33% LONGER WARRANTY

We also add a full year to the term of the manufacturers' warranties on all the phones we carry—and we carry a wider selection than any other dealer in California. In the case of the NEC 4600, we extend the warranty period 33%, from 3 to 4 years.

In the unlikely event that your phone does re-

quire warranty work, we'll provide a replacement while it's being repaired.

And we'll guarantee our installation work on any phone we supply, for as long as our customer owns the car.

99.9% MORE SUPPORT

A nationwide network of locations offering you support across the country as far away as Boston, Massachusetts and Jacksonville, Florida.

For full details of this service, and all the other reasons why CelluLand is the place to buy your cellular phone, call the centers listed below.

Authorized Agent For

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Mobile Services

A Pacific Telesis Company

CelluLand®

Portable Communications Centers

SOME CHOICES IN LIFE ARE AS BLACK AND WHITE AS THIS AD.

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(415) 882-9626

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SANTA CLARA
3170 El Camino Real
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(415) 932-0442

Barney Oliver: Engineer's Engineer

Few engineers or scientists have impacted our world of technology more than the man who headed R&D at Hewlett-Packard for nearly 30 years.

By John Joss

Few individuals have affected the lives of as many colleagues, directly or indirectly, as has Barney Oliver. The legacy of his contributions will endure wherever the world's technology community calibrates its achievements.

In a career spanning 12 years at Bell Labs and 29 at Hewlett-Packard, innovations and inventions poured from Oliver and from the staffs to whom he was mentor. These advances came to

"Discovery is the fruit of science, invention the fruit of engineering."

be used by hundreds of thousands of engineers and scientists who were themselves creating the electronics explosion of the second half of this century. Such instrumentation built HP to world prominence.

Dr. Bernard Oliver, an engineer's son, was born May 27, 1916. His grandfather was a Swedish merchant-ship tailor named Olsen, who changed his name to Oliver after jumping ship in San Francisco. "I guess," says Barney Oliver, "he thought that changing his name would make it more difficult to

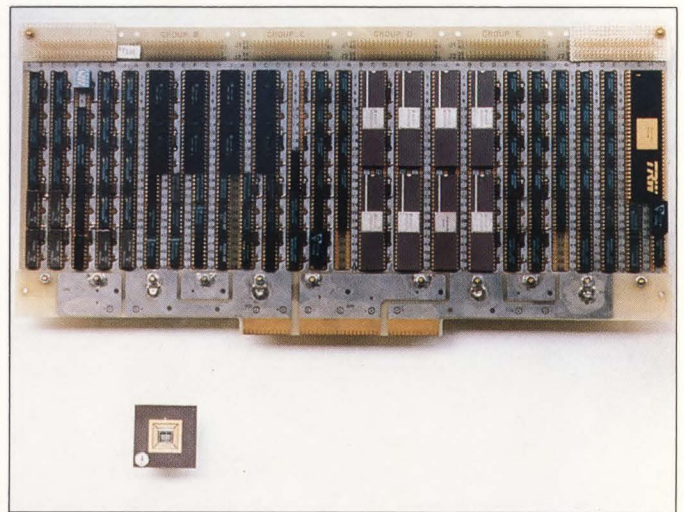
trace him ashore." The 160-acre ranch Oliver-Olsen acquired in 1858 in the Soquel Valley is California's oldest recorded tract owned continuously by one family.

From Bell Labs to HP

Barney Oliver studied electrical engineering at Caltech, where he received his Ph.D. He went directly from Caltech to Bell Labs in New Jersey. There his reputation quickly became established. Bill Hewlett, building a growing company with David Packard and on the lookout for talent, knew about him and tried to lure him from Bell in 1951. "In 1951 I was busy doing something I liked," recalls Oliver. "Bill just said, 'I'll be back. You're not off the hook yet.'" A year later Oliver was HP's Director of Research (later VP) in a company with just 400 employees vs. today's 85,000 worldwide. "I started by giving engineering seminars for six months to establish a common base of technical understanding, before we could proceed with long-

term, focused work."

Oliver became the architect of HP's long-term technical thrust. His credits, in a long and illustrious HP career, in-



The miracle of microcircuits: Stanford-developed integrated circuit for SETI Project replaces huge printed circuit board, shrinks 30 equipment cabinets to two (photo to scale).

clude the hand-held calculator now used by millions worldwide—the achievement that gives him the most pride and won him the 1968 National Medal of Science.

Retirement...To Full-time NASA Job

Retired from HP since May 1981, at age 65, he is still hard at work at age 73, managing a project of larger scope—

the Universe—as head of NASA's \$70million/10-year SETI (Search for Extra-Terrestrial Intelligence) project.

Why did he go on working? He was simply unable and unwilling to quench his passion for innovation or to put out to pasture perhaps one of the most inquiring minds in science and technology. Today Barney Oliver has the attack and intensity of a man half his age. He has the gaze of an eagle, proud and fearless: "It was to be a half-time job at NASA. It soon consumed me full time."

"SETI is wonderfully interdisciplinary—astronomy, paleontology and exobiology, as the core sciences; then RF engineering for the huge antenna 'farms' that will scan the Universe to detect coherent signals, mechanical and structural engineering to build them, computer hardware and software . . . this is a global, long-term and multi-national technical effort." Anything less would not fully exercise that mind, that curiosity, those talents.

One SETI team achievement under Oliver is particularly noteworthy—the creation of a single VLSI circuit, developed under contract at Stanford by Jim Burr in a group headed by Professor Allen Peterson, to process the billions of incoming antenna signals, replacing a huge 35-component circuit board. The chip shrinks 30 cabinets of signal-processing hardware into two.

Oliver embodies a lifetime's wisdom in science and engineering. He distinguishes between the two. "Discovery is the fruit of science, invention the fruit of engineering. They're different—scientists are curious, analytical, they wonder about our Universe; engineers, on the other hand, are creative—they want to synthesize, do the 'sweet job,' exercise their craft.

"Where do these people come from? I've long believed that people simply 'are' scientists or engineers, formed



Barney Oliver with an antenna that uses the single VLSI circuit created by his SETI team. Antenna 'farms' (cover) will be sited worldwide.

rather than forced, perhaps because of upbringing, such as their environment, or early exposure to technical matters. I'd advise youngsters considering science or engineering to 'go for it,' start by reading the stimulating books available."

He chuckles: "If they're serious about a technical career, I'd warn them that they face becoming part of a minority—those who reason quantitatively." What criteria has he relied on to hire and motivate budding engineers and scientists? "They must interest me. If I find myself falling asleep, I wouldn't want them. I seek vitality, energy, curiosity, ideas. Once hired, I must give them problems they want to solve, create environments in which that's possible."

Silicon Valley—Applied & Practical

Asked how Silicon Valley science and technology compares with work being done elsewhere, he says: "We've become excellent at engineering here, for example in refining fabrication techniques, such as in semiconductors and disc memories, whereas much of the rest of the world—for example,

Oxford University—does truly fine original science. There's a different emphasis here. Silicon Valley is more 'applied' than 'basic' in its research and science, more 'practical' than 'theoretical' in its engineering."

Broad-gauge Impressions

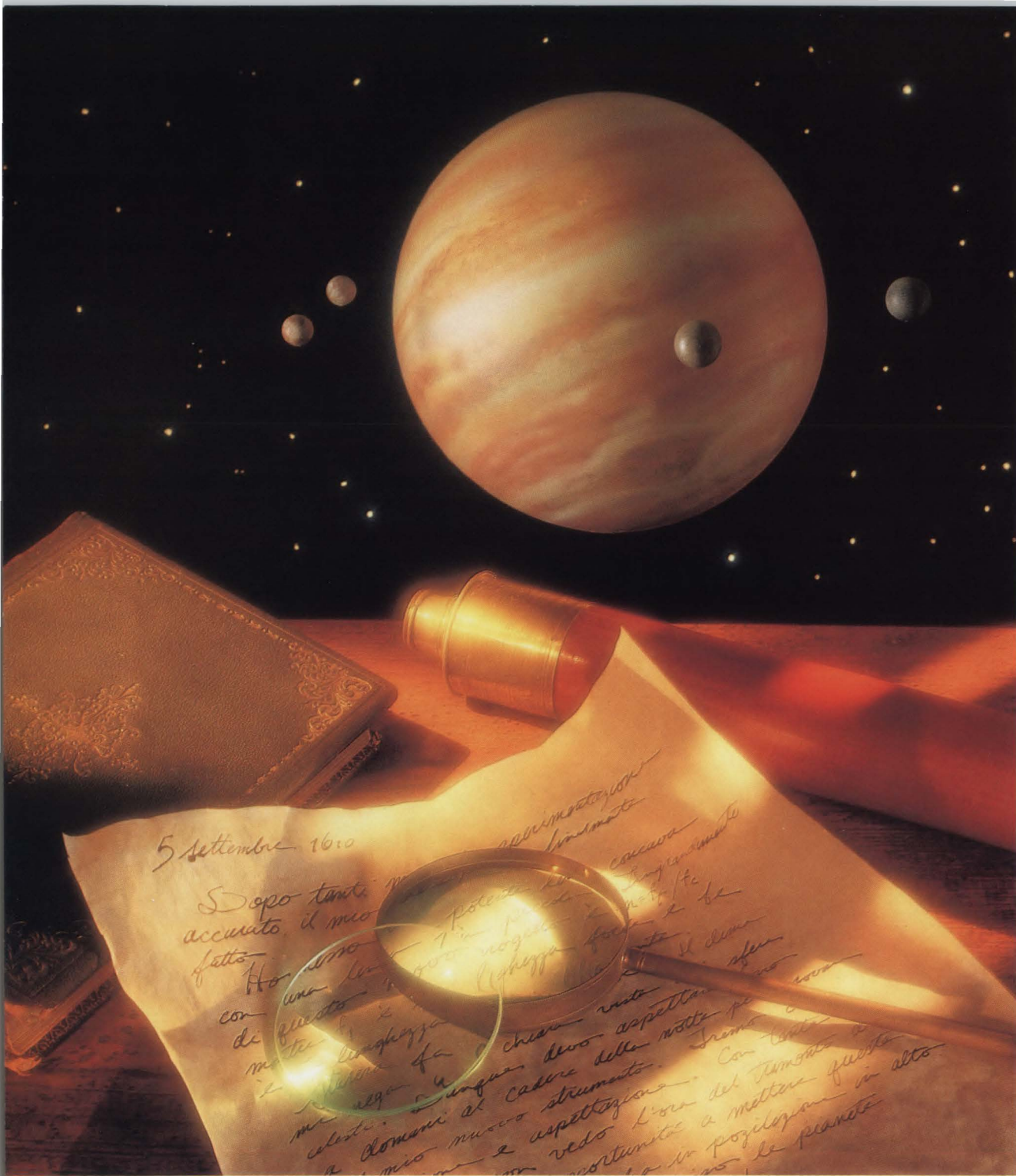
Of all the scientists and engineers he has met from around the world, who impressed him the most? "Well, the list includes a wonderful Frenchman, Pierre Aigran, who would not join us at Bell Labs and is now high in his government. Also Bell Lab's John Pierce, now at Stanford with John Chowning at CCRMA, working on music systems. Bill Hewlett has an extraordinarily broad range of interests. The late Luis Alvarez. Bob Noyce. The annual Wright Prize winners (from Harvey Mudd College)

exemplify this kind of valuable broad-gauge individual."

An intellectual omnivore with wide-ranging human interests, Oliver cites music from classical to jazz (all forms except rock) as his favored non-work interest. As a young man on the East Coast, he lived two blocks from a jazz club where Billie Holliday used to sing, with the young Barney Oliver listening raptly.

By way of perspective, Oliver repeats and responds to a conundrum once posed rhetorically to the scientific and engineering community by the late Richard Feynman, physicist and author noted for his propensity towards asking difficult questions: "If you had one bit of knowledge to communicate to later generations, what would it be?" Oliver remembering Feynman with affection and respect, thinks about how to respond. Then he says, in light of his current SETI quest: "That all stars are suns." ▲

John Joss is an active writer, editor and broadcaster with a twenty year record in high technology communications.



Galileo examined an assortment of magnifying lenses and asked, "What if..."

At Hewlett-Packard, we never stop asking, "What if..."

At the beginning of the 17th century, Galileo experimented with a new combination of magnifying lenses. He then used his discoveries to create an incredibly powerful telescope. A telescope that enabled him to closely observe the topography of the Earth's moon — and to discover four of Jupiter's moons.

This quest to push the limits of existing knowledge—to always ask, "What if..." — underlies the innovative spirit you'll feel at Hewlett-Packard.

LABORATORIES

Hewlett-Packard Laboratories is the central R&D organization of Hewlett-Packard Company. The Lab performs significant long range research and development leading to the creation of new and enhanced products and services. To this end, we need insightful professionals with the technological versatility to contribute to the underlying principles, advanced development and assessment of experimental prototypes. To become part of a team that's continually breaking new ground, consider one of the following positions:

Development Engineer

As part of a multidisciplinary team, you will be a technical leader exploring methods for optimizing performance and manufacturability to electronic hardware designs. You will be responsible for developing analytical models and evaluating empirical rules related to the development of an AI tool to help designers rapidly generate manufacturable alternatives, as well as optimize performance, cost and time-to-market.

Solid software skills and proven follow-through abilities are essential. We require a PhD in Applied Physics or Applied Math and at least two years of experience in computer modeling/simulation. Industry experience and/or knowledge of electronic packaging and interconnects are desired. Position #: 5703.

CAE Development Engineer

As part of our Design and Validation Systems Department within the Measurements and Manufacturing Systems Laboratory, you will provide technical leadership in the research, design and concept verification in the implementation of a knowledge-based management system for use in knowledge-based mechanical CAE systems. You will be responsible for consistency and maintenance of knowledge and data bases, distributed data base, input/output and modification of both knowledge and system structure by end users.

You should have a minimum of an MS degree in Computer Science with experience in knowledge/data bases and research using object-oriented languages. Additionally, you should be fluent in UNIX, C and have proven ability to effectively interact with system end users. Experience with geometric modeling, truth-maintenance systems, persistent objects, Lisp and C++ are desired. Position #: 5707.

CIRCUIT TECHNOLOGY GROUP

Hewlett-Packard's Circuit Technology Group is the company's primary research and development group chartered with conducting research leading to new businesses in the areas of printed circuit and new packaging technologies. We currently have the following openings in these areas:

High Density Printed Circuits Engineer

As an R&D engineer working in the area of printed circuit boards, you will be responsible for conducting research in electrical performance of new PCB materials and constructions as well as developing future high density printed circuit board design strategies. You will be expected to take a leadership role in the project strategy, planning and internal customer relations.

Requirements include an MSEE or related discipline and at least 3-5 years of experience. Strong written and oral communication skills are critical because of the ongoing cooperation and communication with multiple divisions. The preferred candidate will have experience in printed circuit design and manufacturing as well as familiarity with statistical design of experiments. Position #: 5728.

Metrology Engineer

As a key member of our Lithography group within the Silicon Processing Laboratory, you will investigate and develop metrology techniques applicable to VLSI manufacture at submicron dimensions for CMOS and bipolar development. You will need to collaborate closely with our integrated circuit divisions located in Fort Collins, Colorado and Corvallis, Oregon.

To qualify you must be experienced with SEMs and integrated circuit processing and have at least an MS in Applied Physics or Electrical Engineering. Knowledge of basic physical science and engineering concepts and a strong math background are desired. The ability to initiate innovative solutions to complex problems and employ effective

experimentation methods is preferred. Position #: 5747.

For Laboratories and Circuit Technology Group positions, please forward your resume, indicating the position you are applying for, to: **Hewlett-Packard, P.O. Box 10490, Palo Alto, CA 94303-0971, Attn: Labs Staffing Dept.**

COMPONENTS GROUP

The dynamic environment of Hewlett-Packard's Components Group offers you the opportunity to be part of an engineering team utilizing a unique cross-section of leading edge technologies. Outstanding positions are available at the following divisions of the Components Group's San Jose Site.

The Microwave Semiconductor Division develops and manufactures market-driven semiconductor devices for RF, microwave and digital applications. We continue to meet the diverse needs of OEM, military, industrial communication and consumer markets worldwide, providing the highest levels of performance, quality and reliability.

The Optical Communication Division is a world leader in optical technologies and applications for optocoupler, fiber optics and scanning/sensing market segments. Serving as bold leaders, many of our product areas are tapping the potential of exciting new markets — and creating challenging growth opportunities.

The Optoelectronics Division is one of the largest manufacturers of optoelectronic products. Recognized industry-wide as a leader in creating, introducing and marketing a variety of breakthrough products, this division is currently at the forefront of new innovations in GaAs technology.

As part of the team at Hewlett-Packard, you can reach your personal best... with the best. If you have a BS in EE, ME, or CS and at least 2 years of experience in one of the above areas, here's your chance to make a meaningful contribution and earn the recognition your skills deserve. To build a more rewarding engineering career at Hewlett-Packard's Components Group, forward your resume to: **Hewlett-Packard, 350 W. Trimble Rd., San Jose, CA 95131, Attn: Staffing Dept.**

Hewlett-Packard Company is an Equal Opportunity/Affirmative Action Employer.



AS A WOMAN THINKS...

*Julia G. Michael overcomes obstacles and climbs
the ladder of success.*

By Helga Hayse

In one of his most popular books, "As a Man Thinketh," author James Allen writes: "...its object being to stimulate men and women to the discovery and perception of the truth that 'they themselves are makers of themselves' by virtue of the thoughts which they choose and encourage; that mind is the master weaver, both of the inner gar-

ment of character and the outer garment of circumstance..."

I was reminded of this passage the other night when dining with Julia G. Michael, Manager of Long Range Planning for Ford Aerospace. Julia was one of 38 women honored by the YMCA's Tribute to Women and Industry (TWIN) awards for 1987. Her career spans two

decades as a mechanical engineer specializing in environmental impact control and energy conservation.

Even growing up in Communist Rumania, it never occurred to Julia Michael that she wouldn't have exactly the career she wanted. Her expectations and mental pictures virtually assured her of success.

Encouraged by her parents and an excellent school system, Julia decided on mechanical engineering as her profession. "There are many negative things about the Communists, but the education system was

very good," she said. "It was free, it was based on the merit system and you were expected to practice your profession when you graduated. Unfortunately, they didn't count on my wanting to practice engineering in the United States."

Julia spent five mandatory years in a factory, learning about a variety of manufacturing jobs. She then chose to work at an industrial design institute that specialized in designing power plants and sewage treatment facilities. That choice proved to be an excellent specialty when she finally arrived in the United States.

Her escape from Rumania was also carefully planned.

"Unlike thousands who flee the Communists by scaling the Berlin wall or swimming across the Danube, I was a coward," she said. "Even though I was intent on getting to America, I had a good life in Rumania and didn't want to wind up in jail. With her first husband, also an engineer, Julia arranged for a three-day transit visa through Yugoslavia on their way to vacation in Hungary. Taking advantage of the crush of Austrian tourists returning to Vienna at the end of a hot summer weekend, they slipped across the border into the free world.

You've probably observed by now that Julia's approach to planning her life closely resembles the design and implementation of an engineering project. She knows what results she wants; she knows what the design

Educated in Romania, Julia always planned to practice in the U.S.



requires. Her moves are measured and systematic and, most important, she doesn't keep telling herself that "it probably won't work" while she sets her plan in motion.

Arrival in New York in 1969 provided new challenges. Hired to do drafting work by a small engineering firm, Julia was grateful to have her first job in America. Deciding to update her professional credentials, she also attended Columbia University to update her engineering education. "I knew I would need the professional credentials from a respected American university," she said. "My master's degree from the university in Rumania didn't have the same impact as an engineering degree from Columbia."

"No one ever told me that math wasn't for girls..."

By 1973, Julia's experience in environmental conservation and facilities design opened the door to a job with a larger firm. Starting as a project manager with three employees, Julia's department grew to 28 people, at one point representing 12% of the work force and accounting for one third of the revenues and, "Professionally, those were some of the most rewarding years of my life," she said. "I handled my own business development, so I decided to get a professional engineering license and open my own consulting business. That was my first exposure to private enterprise, which was foreign to me because I grew up in a Communist environment."

In 1976, Julia joined Ford as Manager of Plant Engineering of a 20,000-employee Production Division in Dearborn, Michigan. Eventually, she assumed responsibility for the design and maintenance of plant equipment, including environmental control and energy conservation for all Division's facilities.

Except for the early months of accli-

mation to a large corporate environment, Julia experienced few doubts about her ability to do the job. With five departments, 55 people reporting directly to her and courses in the Advanced Management Program at Harvard School of Business, Julia moved into the ranks of management and eventually into her present role as long-range planner for capital resource at Ford Aerospace.

As I listened to her story, it was clear that Julia sees nothing unusual in the way she thinks. Her attitude about her expected success is matter of fact; she knows what direction she wants to move towards and how to analyze what needs to be done to get there. For Julia, career moves are not risky. Her thinking goes "This is what I know. This is what I am trained to do. Here is where I need additional support or information."

Each of us tells, to an altogether unsuspected extent, our own fortune. We become what we think about. If we fear discrimination, we see it everywhere. If we worry about unseen obstacles, they soon become visible.

Julia Michael is a Senior Member of the Society of Women Engineers and the American Society of Mechanical Engineers. Whenever she can, she enjoys speaking to high school students about some of the misconceptions about math, science and engineering. She believes that the study of engineering offers a base from which to launch into other professions, such as finance and management.

"Engineering was a logical choice for me," she said. "It was a practical decision. I personally encountered no barriers in entering the professions and no sexism in the industry. Engineering is universally accepted. No one ever told me that math wasn't for girls. My father and grandfather were both engineers and they were so proud when I decided to become one too. I guess there were no negative messages to overcome," she added. ▲

Helga Hayse is President of PROS Communications, a corporate publications marketing service based in Foster City. She is also Marketing Executive with ETM, Inc. of Newark, California.

ENGINEERS

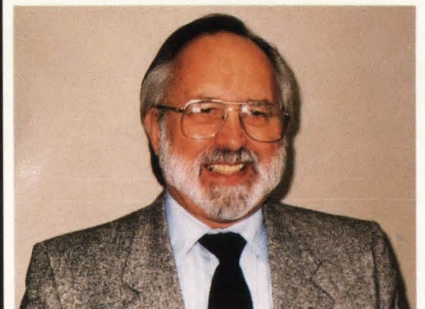
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Santa Clara County is second only to Napa Valley in its number of wineries.

VALLEY LIVING

The original Indian residents called it paradise.

Is popularity spoiling Silicon Valley?

Why here? Why now? It's simply that Silicon Valley, and the Bay Area and Northern California environs that surround it, have become identified as among the world's most desirable areas in which to live and work.

No one characteristic can claim prime responsibility for making this *the* place everyone wants to be. The year-round climate is benign, housing is available (if expensive), schools are among the State's best, and access to recreation of every conceivable kind is only a few hours away at most.

Each of these desiderata, individually, may be equalled or bettered in some other region. It is the special combination of advantages and their ready accessibility that has drawn people to the area from all over the United States and around the world, causing the

regional population to double, then redouble, since the mid century. The pace of growth, although slowed from time to time in some of the industry's down periods, shows little sign of slackening in the foreseeable future. The pauses seem less a sign of weakness and more an attempt to take a break and assimilate the radical changes that have transformed the region.

This population explosion has not been without its undesirable side effects. Places that once were considered vacation retreats are now bedroom communities. But today, in 1989, Silicon Valley is still, on balance, a locale of exceptional desirability.

Today the Valley's cities and towns, such as Palo Alto, Sunnyvale, Los Altos, Los Altos Hills, Santa Clara, Saratoga, Los Gatos, Cupertino, San Jose

and Mountain View have become home to more than a million engineers, scientists and technicians, in addition to their families.

The magnet of high technology and its related work, and the challenging, rewarding jobs in every discipline from electronics to biotech have created a world of unprecedented power and influence.

Neighboring cities and counties have felt that influence—San Francisco, Oakland and the East Bay, the Marin-Sonoma-Napa areas to the north, Santa Cruz and Monterey to the south, even Sacramento and the Central Valley have become the beneficiaries, either as a home to Silicon Valley workers, as sites for support or as locations for mainstream activities spilling over from the Valley. ▲



Santa Clara Convention facilities attract a myriad of shows—like this one on cars. Engineers here are avid car buffs.



Interstate 280 between San Francisco and Silicon Valley, has been declared the most beautiful freeway in the world.

NATIONAL ENGINEERS' WEEK

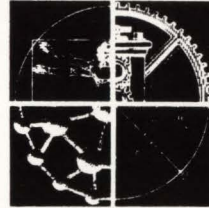
February 19-25, 1989

SANTA CLARA VALLEY ENGINEERS' WEEK BANQUET Thursday February 23, 1989

Hyatt Rickey's Hotel
4219 El Camino Real, Palo Alto

• No Host Cocktails 6:00 PM • Dinner 7:00 PM • Program 8:00 PM
MENU: Chicken Oscar, Roast Sirloin

ENGINEERS



TURNING IDEAS INTO REALITY.

FACTS ABOUT ENGINEERS

■ National Engineers Week, initiated by the National Society of Professional Engineers in 1951, is always celebrated around George Washington's birthday. Our nation's first President was a military and agricultural engineer and a land surveyor. He founded the first U.S. engineering school at Valley Forge Pennsylvania, which later became the U.S. Military Academy at West Point, New York.

■ In 1987, there were over 2 million engineers in the United States and 700,000 lawyers (National Science Foundation, American Bar Association).

■ Nearly 80,000 bachelor's degrees were granted in engineering in the 1985-86 academic year, and over five percent went to minority students. Top five schools granting these degrees were Texas A&M, Pennsylvania State, Purdue University-West Lafayette, University of Illinois-Champaign and the Georgia Institute of Technology. In 1986, over 11,000 degrees were earned by women; 6,300 by foreign nationals (Engineering Manpower Commission).

■ By 1995, engineering baccalaureates earned by foreign citizens may increase to 9,000, accounting for 13 percent of degrees awarded (NSF).

■ Employment of engineers rose substantially from 1972 to 1986, increasing from almost 900,000 to over 2.2 million (avg. growth rate of seven percent per year) (NSF).

■ The annual number of new engineering bachelor's degrees increased at an average of seven percent per year between 1976 and 1985 (NSF).

■ A marked scarcity of Ph.D. scientists and engineers is likely at the beginning of the next century (NSF).

■ The number of women graduates in mathematics and computer science fields could drop from a high of 22,400 in 1986 to only 9,600 in 1989 (NSF).

■ The number of science and engineering baccalaureates in 1996 will fall short of demand by 45,000. By the year 2010, the shortfall will be 700,000 (NSF).

GUEST SPEAKER:

Dr. Andrew S. Grove—President & CEO, Intel Corporation

TOPIC

"COMPETITIVENESS: An Engineering Issue"



Dr. Grove is a graduate of City College of New York with a Bachelor of Chemical Engineering degree and the University of California, Berkeley with a Ph.D. Upon graduation, Dr. Grove joined Fairchild Semiconductor. In July 1968, he participated in the founding of Intel Corporation, and was named President in 1979 and CEO in 1987. Dr. Grove has authored several books, including *High Output Management* and *One-On-One with Andy Grove*. He has also authored articles in *Fortune*, *The Wall Street Journal*, and *The New York Times*.

He currently writes the weekly column, "Managing at Work," which is carried by several newspapers including the *San Jose Mercury News*. Dr. Grove is a Fellow of the IEEE and a member of the National Academy of Engineering.

Dinner is \$25, tables of ten (10) available at \$250 each table.

For further information, please contact:

IEEE SFBAC, Gerry Helmke, Office Manager (415) 327-6622
701 Welch Road, Suite 2205, Palo Alto, CA 94304



Tom's engineering skills helped him restore this vintage Lola Sports racer, shown here "at speed" during last year's Annual Monterey Historic Races at Laguna Seca.

ENGINEERS AND THEIR CARS

These wheels are more than just a way to get around.

By Myles H. Kitchen

They say, "You are what you drive." Nowhere is this more true than here in Silicon Valley. Engineers in our valley tend to "express" themselves with technically interesting, high performance cars. Some use these cars for basic transportation - mixing commuting with high performance excitement. Others have developed a profitable hobby around special interest cars. Such is the case for Tom Thinesen.

When Tom, who is a Product Engineering Manager for Timex Corporation, is not designing and implementing new watch circuits, he is thinking cars! Tom and his wife Tish own a 1972 Ferrari 246GTS Dino Spyder (1 of 1200), a 1966 Shelby GT350 (1 of 1438), and a vintage Lola MK1 sports racer (1 of only 32 made). While initially purchased because he just liked the cars, this mini-collection now holds the promise of a substantial retirement invest-

ment. In the last twelve months alone, the value of Tom's cars has increased over 100% and is now approaching an estimated \$250,000!!

Tom is active in events organized by the Ferrari Club, the Shelby Club, and C.S.R.G. (Classic Sports Racing Group), a group of vintage race car enthusiasts.

Another Silicon Valley engineer with

an interest in high performance cars is Peter G. Blaney. Pete is Chief Engineer for Zemco Group, Inc., a small Bay Area manufacturer of Automotive Electronic products. Pete's car interests are satisfied by both his work and his transportation. His everyday commute car to Zemco where he designs cruise controls, security systems, and other auto-

motive electronics systems, is a 1985 Corvette. According to Pete, "At the time, it was one of the few American cars I considered buying. Its performance per dollar, made it a bargain." Since he's owned it, Pete has added a few enhancements of his own, such as an improved security system with a remote control entry system and an automatic hatch release. He also added a convenience timer that allows operation of the power windows up to three minutes after the key has been turned off.

Ask anyone in the Bay Area



"Hoke" might enjoy commuting when he completes this 427 Cobra replica.

about Panteras, and undoubtedly Homer (aka "Hoke") Dean will be mentioned. By day, Hoke is a Development Engineering Manager for IBM in San Jose and helps "Big Blue" establish new manufacturing lines. But his off hours time is spent with his cars.

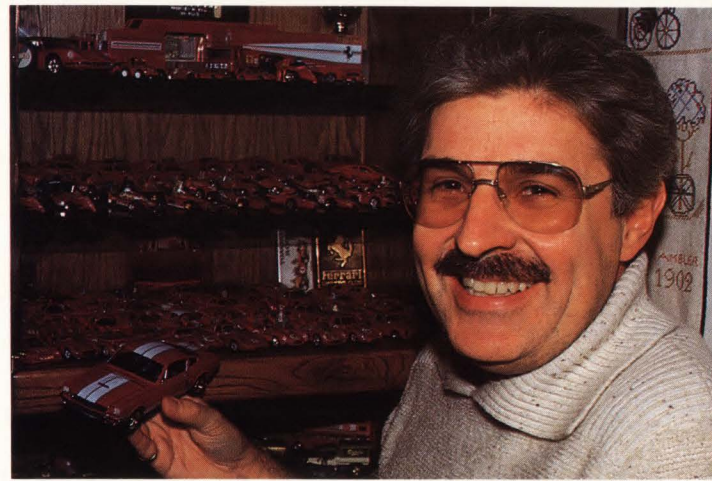
Hoke's garage is filled with a 1984 Corvette (his everyday commuter), a 1974 Pantera L and a 427 Cobra replica that he is fabricating from the ground up! The Cobra is a work of art, putting Hoke's years of engineering experience to good use.

Hoke's Pantera has also benefited from his engineering experience. Panteras have been known to have a few engineering deficiencies, but Hoke has found and solved every one of them. His restored example is one of only ap-

proximately 5000 that were imported between 1971 and 1974. Hoke claims he chose the Pantera because it had "great Italian styling and a powerful American engine for which performance parts were plentiful". He enjoys using the car for club events and weekend outings, including some events "at speed" at Laguna Seca with the Ferrari and Shelby Clubs. ▲

Myles H. Kitchen, with over 15 years in Automotive Electronics, has his own consulting practice providing automotive market research and assistance to companies launching new

products. He is a member of the Society of Automotive Engineers, Ferrari Club of America, CSRG and Golden Gate Lotus Club, and is restoring a 1966 Lotus Cortina for vintage racing.



In addition to his hobby with the real thing, Tom also collects models.



Pete Blaney takes the boredom out of commuting with this 1985 Corvette.



"Hoke" has re-engineered a Cobra replica, a 1984 Corvette and a 1974 Pantera.

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BOOK REVIEW:
**THE HOME
PLANET**

Edited by Kevin Kelley
For Association of Space Explorers
Addison-Wesley: 256 pages
\$39.95

Reviewed by Fred Levien

Mankind is often overtaken by emotional ideas whose "time has come." They are triggered by a confluence of events which seem at first unconnected. Appearing early as thoughts of single individuals, slowly like small streams flowing together, they build. Finally they become a torrent of words and writings. Ultimately they coalesce into one giant upwelling of global awareness.

The growing wave of just such an idea has now crested, crashing with a thunderous roar upon the beach of human consciousness. Witness the December 1988 cover of TIME magazine titled: "Endangered Earth—Planet of the Year."

Basic to this growing human awareness of earth, a planet headed for trouble, has been man's recent ability to break free of his gravitational bonds and travel into space. From this vantage point, he has recorded in photographs and words, images of the shimmering jewel beneath him that we call earth.

The Home Planet, a large size, 10 1/2 x 14-inch, lavishly assembled book, places in your hands 150 of some of the most stunningly beautiful photographs of earth ever taken from space. Selected from the entire combined Soviet and American archives, these images portray with startling clarity and superb detail the unimaginable beauty of our planet as viewed from on high. We see a broad range of subjects, from a haunting view of the entire globe at an altitude of 23,000 miles in space, to a close-

in, 200-mile-high image of the Gulf of Suez, bordering on three dimensional.

Like astronauts watching earth with their noses flattened on the shuttle viewing porthole, you are slowly drawn further and further into the book as each page is turned.

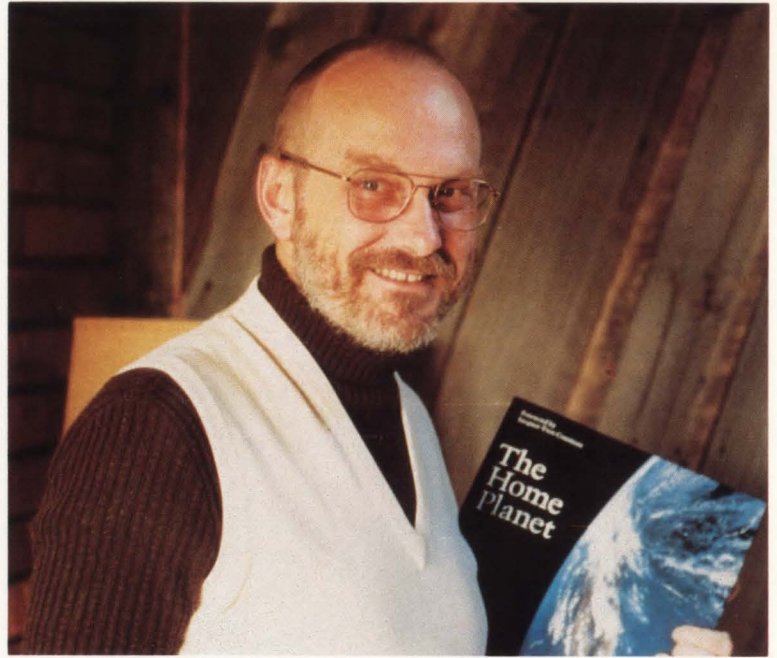
Adding to the aura are the narratives accompanying each page of photographs. There is no continuing text. Rather, individual thoughts and feelings of both astronauts and cosmonauts are given. These quotes, from 76 of the 200 orsomen and women who have circled the earth, have been gleaned from the logs of radio transmissions in space, public writings and direct interviews. These personal insights into the minds of these space travellers cover a broad gamut of emotions.

The pragmatic Lockheed scientist shows through in Loren Acton's (Challenger 8 flight) remark: "When you look out the other way toward the stars, you realize it's an awful long way to the next watering hole." Contrast the more philosophical musing of Mexican Rudolfo-Neri-Vila: "From space, I see myself as one more person among the millions and millions who have lived, live and will live on earth. Inevitably this makes me think about our existence and the ways in which we should like to enjoy, to share our short lives as fully as possible."

The book is in itself a monument to international cooperation. It was prepared under the aegis of "The Association of Space Explorers," an international, independent, non-governmental organization of individuals who

have orbited the earth. Cooperating with them were the Soviet Space Agency, MIR, and NASA. Printed in Italy, it contains the thoughts of both astronauts and cosmonauts in sixteen different native tongues. Each quote is printed in both the language of the author and in English as well.

Perhaps the most prescient quote in the entire book is that of Ulf Merbold from the Republic of Germany, aboard



Palo Alto resident and Lockheed engineer, Loren Acton helped spark the publication of this fascinating book, "The Home Planet."

Spacelab Flight STS-9. "For the first time in my life, I saw the horizon as a curved line. It was accentuated by a thin seam of dark blue light...our atmosphere. Obviously this was not the ocean of air I had been told it was so many times in my life. I was terrified by its fragile appearance."

Indeed, if the earth were the size of a bowling bowl, then this 'fragile' layer of atmosphere that keeps us alive would be scarcely thicker than the sheet of paper you now hold in your hand. ▲

Reviewer Fred Levien is President of the Levien Group, advisors to management, headquartered in Los Altos. He holds an M.S. in both mechanical and electrical engineering and is author of a book on micro-waves.

New "Umbrella" Engineering
Group Forming

SILICON VALLEY ENGINEERING COUNCIL

The "Silicon Valley Engineering Council" is the proposed name for a federation of engineering societies represented in the Valley. A grass roots effort is taking place supporting the formation of this umbrella engineering group.

The purpose of the council would be to promote the stature of the engineering profession by the utilization of collective resources to publicize events, common concerns, achievements. This body would attempt to establish accessibility to the community leadership and facilities such as the Technology Center now under construction in San Jose.

The Silicon Valley Engineering Council would encourage engineering career development by coordinating and supporting youth activities, including educational outreach programs, technical seminars, and the dissemination of information about engineering. This effort would greatly enhance the contribution and extent of community interfaces and help to focus the technical input or participation on local problems by coordination of technical expertise of all engineering resources for commissions and committees as requested.

If you want to know more or if you have some comments to offer, please call on the committee members. Your input would be greatly appreciated. Call Joe Louis 408-297-3100; Mario Baratta 408-432-8763; Becki Wright 415-858-1152; Jim Hill 408-289-4721; or Fred Barex 408-924-4298.

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SILICON SLICES

Edited by John Joss

Remember when the 101 Freeway ended at Embarcadero Road in Palo Alto?... It did, in 1960... There was a traffic light there, and a dirt-sided two-lane road to San Jose... the year before, in '59, the so-called 'Traitorous Eight,' led by **Bob Noyce**, left Shockley Semiconductor, at the corner of what is now Foothill Expressway and Page Mill Road, to form Fairchild Semiconductor on Whisman Road in Mountain View... 'Traitorous Eight' was semiconductor pioneer **Bill Shockley's** angry term... Although the history books talk about H-P, Ampex and Varian, the first 'big time' semi outfit was to be Fairch, before all those amazing spinoffs, though the semiconductor material of choice then was germanium, not silicon.

Money made much of it happen, of course... If you go to 3000 Sand Hill Road you'll find out what engineers want to become when they grow up—high-tech VCs... One of many who scored spectacularly was **Tom Perkins** (Kleiner, Perkins, Caufield and Byars) who had been at **Narinder Kapany's** laser company back in the late '60s before running sales for the H-P Computer Division in Cupertino... Perkins was an early player in many startups... Now he has time to play with fabulous antique cars and worry about the



Tom Perkins of Kleiner Perkins.

San Francisco Ballet... Tough life... but Renaissance, since most people think the Valley is a cultural desert where the denizens have chips for brains. Do they? Well?

It has been 20 years since Noyce bailed out to form Intel (at 365 Middlefield Road, in Mountain View) on July 18 1968... "What the hell is an Intel, Bob?" asked a visitor a year later. Noyce was in a cast from a bad leg fracture skiing at Aspen, but he managed to reach over and fish out a photomicrograph of a monster (then) integrated circuit, the 1103, a 1,024-bit RAM. "What does it do?" Noyce rattled off 30 applications. "But can you actually make a circuit this big?" "Good question," answered Noyce. "If we can, we'll be heroes. If we can't, **Art Rock** (the VC who put up Intel's first big bucks) will never talk to us again..." The jury was out for a while, though 20/20 hindsight would bet on any team that included **Gordon Moore** and **Andy Grove** and later added luminaries like **Federico Faggin**... Faggin's team created the first micro-processor, the 4-bit 4004 ('72).

Read all about these doings, and a whole lot more, in two places: EETIMES for September 1988, on the "30th anniversary of the IC", and in Intel's INTELEADS for July 1988... These are 'keepers' and they name names—

just about all of them... 'Ask' **Jerry Brown** (yes, that one)... at least he initiated a formal State program to communicate California technology.

Fixing busted companies is big biz in the Valley, and among the heaviest hitters is a little known firm called Regent Pacific Management of Cupertino, run by two low-profile geni, **Bill Krehbiel** and **Gary Sbona**... Krehbiel is the engineer, ex G.E. Nuclear (Hanford and San Jose), but he leans on money



Gary Sbona (left) and Bill Krehbiel of Regent Pacific Management.

wizard Sbona for financial smarts... sensibly, they won't discuss clients ("Mustn't do it in the street and frighten the horses") except in rare cases... okay, but Valley watchers estimate upwards of \$3 billion in potential paper losses to lenders if some marginal outfits go feet in air... At risk: Brits, French, Germans (yes, they watch the Valley closely) as well as mountains of domestic money... Will we name names? No way—who wants another lawyer on your case?

How soon we forget... Heavy hitting Silicon Valley woman engineer **Sandra Kurtzig** started her hugely successful ASK Computer (CIM software running on HP minis) on the kitchen table of the apartment she shared with then-husband Ari... Ari and Sandra Kurtzig = ASK. I thought you'd never, ahem, ask... Yes, there are many tough, terrific women in this Valley and they'll be featured here..

Add big winners: physicist

Sheldon Breiner, who had been working on rubidium magnetometers at Varian before forming Geometrics to explore the world for minerals... Breiner sold out to EG&G, to form his new company Syntelligence, one of the few clear winners in the murky AI biz ("We did it by concentrating on a narrow application in finance," explains Breiner)... Rock put bucks into Syntelligence, too... does he know something? Does he!

Who else? There were thousands, but few have had more impact on our brave new technological world in Silicon Valley than the Mephistofelian **Carver Mead**, whose IC design concepts (with Xerox PARC partner **Lynn Conway**) changed forever the way circuits were designed and made... hours instead of months from idea to silicon... Mead splits his time between Valley and Cal Tech where he is Full Professor... look for him soon on our cover.

Not an engineer, but he affected a bunch of us and should get an honorary degree, preferably a B.S. in B.S.: Fast **Freddy Hoar**, until recently Genentech VP Corporate Communications... If you lost your program or went out for coffee, he came West from RCA to Fairch and when Schlumberger took over he went to Syntex briefly, then to Apple, a spell at Gavilan before it went down the tubes (with ex-Fairch **Manny Fernandez**, now at Dataquest). Next Raychem before going to Genentech. Now Fred is consulting on corporate communications for high technology. No decent engineering or management meeting is really complete without his razor-sharp quipment.

News, views, tidbits, info on life in the Valley—all are welcome for this column. Send your letters to: Silicon Valley Engineer, 4600 El Camino #208, Los Altos CA 94022.

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however, always get the best offers. That's why CCC Technical and Affirmative Action Career Conventions incorporate a conference program designed to give you new job-

search knowledge. Because being a better candidate, and getting the best offers takes more than searching through the Sunday classifieds, sending out reams of resumés and booth hopping. It takes understanding the employment process, self-marketing skills and practice.

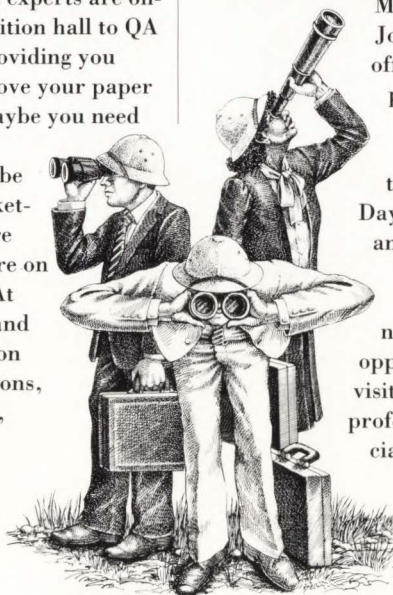


viewing Game," "The Art of Networking: One-on-One" and "Marketing Yourself Effectively." At 2:30 on Thursday and Friday a special Q & A session, "Recruiters' Roundtable," has a panel of employers candidly answer questions you'd never be able to

ask in an interview. At CCC Technical and Affirmative Action Career Conventions the bottom line is to give you every possible edge towards getting the results you want, as well as the opportunity to meet employers who have the best jobs.

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proclaimed this day "Affirmative Action Day." Attend and take advantage of a valuable networking opportunity by visiting with professional associations and minority community organizations includ-

ing The Society of Women Engineers, The NAACP and the San Jose City Manager's Office For The Disabled.

CCC Technical Career Conventions follows on Friday and Saturday for individuals with three or more years experience in Engineering, Computer Hardware & Software, MIS, Semiconductors, Communications, Data Processing and Technical Sales/Marketing.

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CAN ENGINEERS MAKE GOOD MANAGERS

People with highly technical minds tend to get a bad rap about their savvy in working with others, but we know better.

By Jean A. Hollands

David Jones was overlooked for potential leadership because he appeared to lack management skills. He was a superior designer who made his own decisions with little apparent concern for the impact on others. Could he have made a good manager? Yes.

If engineers are given the management nod, they often count themselves out before the game begins. John Smith equivocated with: "I don't think I've got people skills, and, besides, the technical work is more interesting." Could he have made a good manager? Yes.

Most engineers can be good managers. Here's why:

Engineers are systems oriented: They know that important sub-sets make up a whole. In people systems, they can assess personality differences, individual needs and customized approaches to satisfy the big picture. They know the art and science

of collaboration even though their colleagues don't practice it. They can give the extra inch or extra mile for the sake of the whole system, whole team.



Jean Hollands, Silicon Valley management consultant and trainer (right), says that management is a learned behavior . . . that it is a skill attainable through special efforts by those who chose this route to move forward in their career.

Caution: Don't 'spec' people requirements without accounting for individual variability. If too focused on your own project, you can tunnel-vision yourself out of the whole system.

Step back regularly.

Engineers regularly calibrate equipment: They believe in taking care of valuable assets, even people. The excellent managers believe in maintenance contracts for machines as well as subordinates.

Caution: Things are easier to predict than people. Inanimate objects obey the rules! People don't. Plan on much more energy for people malfunctions and surprises than for technical valuables. 'Taking care' does not mean avoiding conflict, enabling excuses or stretching limits. It does mean accounting for differences.

Engineers lust for data. They want to find out what makes things work. The same investigator/manager will also want to figure out what makes colleagues work. Curiosity makes the people discovery process energizing. The good manager doesn't give up too soon. He/she tries round two, three, four...

Caution: Don't get lazy when someone seems too complicated to understand. Approach with, "I just can't figure out how to work with you—and

I want to—so how about some hints about better ways for the two of us to do this project together?"

Engineers can be specific. This pragmatic approach can ensure that employees know exactly what is expected of them. Engineers measure value by tangible output and, if trained, can create a program for subordinates that even measures the difficult to measure—like self confidence, satisfaction, burn-out.

Caution: Watch out for the non-linear thinker, no matter what the degree or title. Learn to speak the 'other language' to access your colleague. "Tom, I'm sorry

you didn't feel my support in the meeting. I was not reading you well, and missed your call for help. Now, here's what I want from you..."

Engineers can coach and stimulate

others. Good managers know that creative thinking requires creative inspiration. They are not afraid of participative management. Without the oft-accused authoritarian approach, and with a sense of humor, this manager interacts with a subordinate in a personal and customized way.

Caution: If you are excited about a project, let it show. Enthusiasm is contagious. Err on the side of intruding on the will of others. Engineers usually keep the boundaries far too narrow. If you worry about your own personal charisma, check it out. Believing in *leadership charisma* is the first step. The second step is believing in the human frailty of others.

Engineers are not trouble-makers: In fact, they avoid conflict, taking on the boss or giving negative feedback. Engineers keep meetings task and not personality oriented, keeping their egos off the table. The excellent manager, will, however, watch for personality flash fires.

Caution: Engineers can become good managers when they speak up. Learn to take up the cause when somebody's integrity (not just yours) is at stake. The 'stuffed' feelings ultimately pop up in physical pain, need for alcohol, or desperate isolation. Get trained to speak up and pro-actively 'sniff' for trouble even when conflict is not your best suit.

Engineers are cool under fire—the 'band of emotion' is thin. The good engineer can be logical without having a tantrum or being emotionally dry. With rare outbursts, they can easily learn the art of 'reflective listening.' The ideal technical manager smoothes the way for complaints and looks for compromise.

Caution: Watch that your narrow emotional band doesn't serve as a damper. Let people know what you care about and don't be afraid of a little passion once in a while. Your expression of high feeling is probably much more filtered than you experience. Turn up the heat!

Engineers tell it like they see it. No sales talk here. Just the straight message; thus, games are out. Since engineers are not usually accommodaters or pleasers like their salesmen counter-

parts, they will not mince words. They are not manipulative, in fact, are repulsed by the tactic.

Caution: Mince a few words! Even if you feel inadequate, start with, "You know, this is awkward for me; I'm not usually expressive when it comes to..." Stumbles may actually earn you important points in the long run. Learn that we all subtly manipulate everytime we shake our heads or raise an eyebrow. Being political does not mean playing dirty; it means accessing the power base and approaching those who make decisions.

The good engineer is more creative than rigid. Despite all the talk about rigidity and the scientist, conceptual block-busting requires seeing more than meets the eye. The good manager will react creatively when ambiguity pours in around him. He will practice 'as if behavior' when colleagues want new gestures out of his range of performance.

Caution: Don't be afraid to look clumsy. Creativity with people management means admitting you are wrong, acknowledging uncertainty, and posturing yourself in a new and sometimes provocative position.

Engineers can know the importance of 'managing up'. Besides developing their own subordinates, they are not afraid to train their own bosses or managers. They know that management is a *learned behavior* and they expect that sometimes supervisors can be weak, inadequate or narcissistic. With systems theory in mind, they realize they have work to do from top to bottom on the organization chart.

Caution: Weigh your own authority phobia or rebellious instincts. If you feel less powerful around managers above you, plan on necessary esteem boosts and then proceed to train your managers in the same ways you train subordinates. ▲

Jean A. Hollands is director of Growth & Leadership Consultats in Mountain View. Her book "Silicon Syndrome" was published by Bantam in 1986.

Coming Next Issue: Passive Men/Wild Women! Don't miss this.

Test for Good Managers

1. Can you see the big picture even when a pet project is at stake?
2. Can you let others express exaggerated feelings without trying to cut them off or leave the premises?
3. Are you a good 'reflective listener'?
4. Do you concern yourself with more than right or wrong and blame?
5. Can you speak your mind when you or a subordinate are jeopardized?
6. Can you give an evaluation which includes positive and negative constructive criticism?
7. Do you plan on people-maintenance programs?
8. Do you think politically when it is important to do so without worrying about being manipulative?
9. Do you know that 'doing the job' means 'doing the people' around you too?
10. Do you believe you can be trained to lead, motivate and inspire others without losing yourself?
11. Can you bend when the situation demands it, welcoming change and giving up rigidity?
12. Do you believe you are not through changing? (If you don't, you are probably all through!)

Scoring:

1-4 Yes answers: Get in a management class quickly. 4-6: Still in trouble, but there is some hope. 6-9: Show this to your boss. 10-12: Ask for a raise!

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AIME—AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS. The objective of AIME is the prompt dissemination of technical information to keep its members and others in the metallurgical and materials science community at the forefront of progress in these fields. Chair: John Smugeresky (415) 294-2910

ASCE—AMERICAN SOCIETY OF CIVIL ENGINEERS. Founded in 1852, ASCE is the oldest national engineering society in the United States. ASCE has three main goals; to train and educate civil engineers in order to improve the practice of civil engineering as a whole, to promote the dedication and technical capability of its members, and to advance the professional stature of civil engineers. San Jose Branch President: Stan Wolfe (408) 265-2600. Membership Chair: Christina Robinson, P.E. (408) 723-7311.

ASHRAE—AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS. An international membership organization operated for the exclusive purpose of advancing the arts and sciences of heating, refrigeration, air conditioning and ventilation, the allied arts and sciences, and related human factors for the benefit of the public. Membership: Saul Villanueva (408) 996-7711.

ASM INTERNATIONAL. The objective is the advancement of scientific and technical knowledge, particularly with respect to the manufacture, use, and treatment of metals. In recent years, the scope of the society has been widened to include materials in electronic and other material uses throughout the world. Chairperson: Rosemarie Koch (415) 723-4875. Membership: Brian Boggs (408) 756-9103.

ASME—AMERICAN SOCIETY OF MECHANICAL ENGINEERS. An organization for promoting the arts and sciences in the field of mechanical engineering. The Bay Area has five ASME Sections, including the Santa Clara Valley Section, which has over 2000 members. Chair: J. Gilbert Hwang. Membership Chair: Theresa Cummings. For further information, call the ASME Newsline at (408) 997-6007.

ASNT—THE AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING. The ASNT has three sections in the Bay Area that meet monthly. The sections provide an opportunity for the exchange of information and ideas, technical training, and a meeting place to interact with other NDT professionals. South Bay—Frank Sherlock (408) 245-4323; Golden Gate—Dan Coleman (408) 289-0111 ext. 5595; Sacramento—Claude Dunn (916) 621-1766.

CSPE—CALIFORNIA SOCIETY OF PROFESSIONAL ENGINEERS. The objectives of CSPE are the advancement of the public welfare and the promotion of the professional, social and economic interests of the Professional Engineer. President: Christina Robinson, P.E. (408) 723-7311; Membership: Bill Zehrbach, P.E. (408) 365-8100.

ECSJ—ENGINEERS CLUB OF SAN JOSE. The objectives of the club are to keep current with engineering developments, to promote and assist in the promotion of public improvements insofar as the club is peculiarly adapted, and to promote acquaintance and good fellowship among the engineers and related professionals of San Jose and vicinity. President: Herman A. Janzen (408) 998-4019.

IEEE—THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS. The world's largest professional engineering society, IEEE's purposes are directed toward the advancement of the theory and practice of electrical engineering, electronics, computer engineering, computer sciences, and the allied branches of engineering and the related arts and sciences, and toward the advancement of the standing of the members of the professions it serves. The IEEE has three sections in the Bay Area, the largest of which is in Santa Clara Valley. SCV Section Chair: Dr. Jim Opfer; Vice-Chair: Sid Hollander; IEEE Bay Area Council Office: (415) 327-6622.

SME—SOCIETY OF MANUFACTURING ENGINEERS. The SME shall be an operating organization for the advancement of scientific knowledge in the field of manufacturing. This society shall provide the means and methods for applying such knowledge in practice and in education. Bay Section Zone 3 Chair: Frances Jackson; Membership: William Forbes (408) 736-6323.

SWE—SOCIETY OF WOMEN ENGINEERS. SWE is a non-profit educational service organization of engineering graduates, men and women with equivalent engineering experience, as well as students in engineering curricula. The objectives include informing young women of the qualifications and achievements of women engineers and the opportunities open to them. To serve as a center of information on women in engineering and to encourage women engineers to attain high levels of education and professional achievement. President: Rebecca Wright (415) 858-1152; Membership: Helen Morris (408) 743-0565.

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