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M A G A Z I N E

Founding Fathers

In the midst of the depression, two sons of Stanford started a company in a Palo Alto garage. How Did Bill Hewlett and Dave Packard end up launching the high-tech revolution?

by David Jacobson

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The tale of The Garage that launched a high-tech revolution is now official legend, a silicon cliché. Too bad it mostly misses the point.

Sure, college pals Bill Hewlett and Dave Packard started in that Palo Alto garage 60 years ago. They had a mere \$538 in start-up capital, banked from sources like Lucile Packard's job as secretary to the Stanford registrar.

Hunkered down in a one-car shed in a valley of fruit orchards, they were green engineers taking on oddball contract work, stuff like bowling alley foot-fault indicators and harmonica tuners.

And yes, they ended up with their names indelibly linked to digital age touchstones such as the pocket calculator and the desktop laser printer, ended up the famed builders of a \$43 billion global company that's taken its place in the Dow Jones index as a bellwether of the modern economy. As for that garage on Addison Avenue -- it now bears a bronze plaque proclaiming it the "Birthplace of Silicon Valley."



PARTNERS: Packard, left, and Hewlett share a laugh at a company skit in the 1960s.



BIRTH OF A NOTION:
The one-car shed at 367 Addison Avenue in Palo Alto was the company's workshop and launching pad in 1938.

But if that genesis story has inspired generations of engineer-entrepreneurs, from Apple to Yahoo, it doesn't explain Hewlett and Packard's true greatness. Far from being lone-wolf inventors, their contribution (to use an HP corporate mantra) was ultimately social, not solitary, and as much organizational as technological. Their own engineering prowess aside, Hewlett, '34, Engr. '39, and Packard, '34, Engr. '39, were visionaries in creating a corporate culture and management style -- the HP Way -- that could keep pace with the ever-accelerating evolution of the electronics industry. They came up with an approach that respected personal autonomy and stressed corporate decentralization. They systematically nurtured employee satisfaction and morale, which led to a steady stream of leading-edge, highly profitable products.

If all this sounds familiar today, maybe that's because the HP Way was assimilated by thousands of company alumni, many of whom went on to start their own companies. As these new ventures flourished, HP's focus on openness, education and endless information swapping became a model for the networked modern Valley.

Terman's Vision

The beginnings of the HP Way -- and of Silicon Valley -- can be traced to the years before World War II and directly to Stanford engineering professor Frederick Terman. It was the brilliant, driven, horn-rimmed Terman who envisioned not just a Western electronics industry, but a knowledge-based region centered around the University much the way earlier industrial regions had been built around coalfields or ports.

During the 1920s and '30s, Terman worked virtually alone at generating enthusiasm for the pockets of local industry. He took his classes, including one attended by Hewlett and Packard, on field trips to San Francisco, where Philo Farnsworth was inventing television, or to the Redwood City shop where Charlie Litton was making cutting-edge vacuum tubes.

And he conveyed the spirit of these techno-pioneers. They were manipulating and measuring electron flows amid plum orchards and pruneyards. "They were not copying things that people were doing in other parts of the country or trying to do them a little cheaper," Terman would say. No, out on this new frontier, they were making

contributions.

Terman had his eye on Hewlett and Packard. "He knew my interests and abilities in athletics," Packard would recall. "He had even looked up my high school record." He also knew they had talked about going into business together. But in the depths of the Depression, the professor watched his prime protégés graduate and follow the then-standard brain-drain East: Packard to management training with General Electric in New York and Hewlett to graduate work at MIT. Three years later, Terman wooed them back with Stanford fellowships and part-time jobs.

After they'd set up shop in the garage, it was Terman who suggested their first really marketable product -- an audio-oscillator based on a principle of negative feedback he'd taught them. Soon after, the partners made their first big sale -- eight oscillators going to Disney to fine-tune the soundtrack of *Fantasia* -- and built up enough business to move to Page Mill Road and hire their first employees. It was Terman, too, who brought around Melville Eastham, founder of the nation's biggest electronic instruments company at that time: General Radio Co. of Cambridge, Mass. "A kind of social institution as well as a very successful company," Terman noted.



RINGERS: Throughout their careers, Hewlett, left, and Packard joined in company picnics like this one at Cupertino's Blackberry Farm in 1942.

Eastham spent an entire afternoon in the young partners' little shop giving constructive and, for 1940, unconventional business advice. General Radio had generous benefits, a retirement plan and profit-sharing. And while fledgling Hewlett-Packard was hardly a competitive thorn in his side, the older man's openness was itself deeply instructive.

Inventing the HP Way

Early on, David Packard was jeered, not cheered, for his views on management. In 1942, at age 29, he attended a Stanford conference on wartime production. Dominated by industrialists from giants like Standard Oil and Westinghouse Electric, it was presided over by business school professor Paul Holden, a major management guru of the day. "Somehow, we got into a discussion of the responsibility of management," Packard later told Peninsula journalist and historian Ward Winslow, '52. "Holden made the point that management's responsibility is to the shareholders -- that's the end of it. And I objected. I said, 'I think you're absolutely wrong. Management has a responsibility to its employees, it has a responsibility to its customers, it has a responsibility to the community at large.' And they almost

laughed me out of the room.”

Now that so many HP management practices are the gold standard in Silicon Valley, it's hard to realize just how unusual, even radical, the company founders were then. To start, there were every-worker bonuses tied to productivity (one of Eastham's ideas) that evolved into all-inclusive profit-sharing. When one employee couldn't work because of tuberculosis in the 1940s, HP not only helped him financially, it established something almost unheard of at the time: a companywide catastrophic health-insurance plan.

In the age of William Whyte's Organization Man and military-style management, Hewlett and Packard went to great lengths to instill a sense of teamwork and egalitarianism, insisting on first-name informality and dismissing visible trappings of hierarchy. Their accessibility to others' concerns and ideas was reinforced by HP's first custom-built office space, with its purposely wall-less design, and by an open-door policy (where there were doors) for airing grievances without fear of retribution.

HP's personnel practices have remained in the vanguard. The company was among the first in the United States to adopt flex-time work schedules in the late 1960s. And hit by a recession in the 1970s, HP avoided layoffs by ordering an across-the-board 10 percent pay cut and requiring employees to take every other Friday off. "The nine-day fortnight," as company lore dubbed it, was imitated in subsequent Valley downturns. More recently, the company has allowed teams in manufacturing to choose their own leaders and has fostered telecommuting, with up to 10 percent of its U.S. employees working via modem.

This kind of commitment to workers has paid off in loyalty and stability -- and helped get HP through the tough organizational adjustments of the 1980s and early '90s. That period saw the company transform itself from a maker of high-end scientific instruments into a computer company with broad business applications and consumer appeal.

Standardizing Innovation

The HP Way worked because it wasn't just a high-minded mission statement. It was reflected and reinforced by the down-to-earth character of the co-founders.

Hewlett, now 85, is an engineer's engineer: Once, handed a calculator as a prop during a photo session, he became utterly absorbed in checking whether it had a subtle programming flaw. "Hewlett allowed you to dream with him," recalls former HP manager Bruce Woolpert, MBA '76, now president of Granite Rock in

Watsonville. "I can't tell you how many times he would just sit with engineers and dream about what the possibilities were. He would become a 20-year-old asking, 'What do you think? Could we do that?'"

Packard, who died at age 83 in 1996, was a born leader, rising to the top of every organization he ever joined, whether it was the Palo Alto school board, the Stanford board of trustees or the national Business Roundtable. But he was also unpretentiously hands-on, a lifelong gardener and fisherman, a man who personally bulldozed 20 miles of roads at San Felipe, the ranch he and Hewlett owned near San Jose.

When Queen Elizabeth toured an HP plant in 1983, Packard limped through the royal visit. Only afterward, when a manager asked what was wrong, did he admit that he'd been molding impeller blades that morning for a home irrigation system and had dropped a bucket of hot bronze on his foot.

Yet if the company's policies reflected its founders' character, the practices triumphed not because the ideas were completely new -- Procter & Gamble, for example, had profit-sharing in the 19th century -- but because of Hewlett and Packard's conscious recognition that such enlightened approaches perfectly fit their fledgling industry. Having started their company without a particular product in mind, the partners grasped that the key to success in the mercurial electronics field was to cultivate constant innovation.

As early as the mid-1950s, an internal HP study showed that sales of most of the company's products declined in the fourth or fifth year as their technological advantage slipped. So, in order to grow, the company had to generate an increasing amount of its revenues from newer ideas. (Today, product cycles are even faster, and HP earns three-quarters of its revenues from items introduced in just the past two years.)

As bred-in-the-garage entrepreneurs, Hewlett and Packard recognized that such high levels of invention could not simply be dictated. Older top-down models would not work because HP was already operating in a postindustrial world, one that required fully enlisting the creativity of motivated, highly educated workers. Ultimately, Hewlett and Packard believed innovation sprang from grander lures than good wages and benefits. It grew out of an organization where people felt they were scaling Maslow's pyramid of self-actualization, not just climbing the company ladder.

"I think many people assume, wrongly, that a company exists simply to make money," Packard told an HP management training session in 1960. "While this is an important result of a company's existence, we have to go deeper to find our real reason for being A group

of people get together and exist as an institution that we call a company . . . to do something worthwhile -- they make a contribution to society The real reason for our existence is that we provide something which is unique.”

To Packard, these weren't empty words. In the '50s and '60s, HP actually titled its annual product list “Contributions to the Test Equipment Field.” This cutting-edge equipment -- including microwave devices that fueled the company's Korean War boom -- fulfilled the company's yearning to break new ground. It also provided higher profit margins.

Certainly, leadership in a fast-changing field would have to be fertilized by continuing education. HP, working with Terman, was among the first companies to use Stanford's honors co-op program, sending hundreds of its salaried engineers to school for advanced degrees. Hewlett and Packard set up shop as the second tenants and unofficial pitchmen at the Stanford Industrial Park, which became a linchpin in building University-industry relations.

When HP expanded in California, it was the first company to use closed-circuit television to bring teaching from the Farm to its facilities. When divisions moved even farther afield -- to Colorado and Oregon, to Europe and Asia -- HP was the first to use videotaped Stanford classes combined with tutors.

Indeed, as their business boomed, Hewlett and Packard sought to maintain the human scale of a start-up. In 1957, when HP topped 1,200 employees and risked becoming another vast, impersonal bureaucracy, the co-founders took their managers on a retreat to craft a kind of corporate constitution. They agreed on a set of objectives that would guide them without micromanagement from on high. These included an insistence on making techno-contributions while also providing “a sense of satisfaction and accomplishment” for employees working with “great freedom of action.” Eventually, dozens of divisions were spawned, each acting like an independent business and paying “taxes” to fund central administrative and research operations.

Life on Planet HP

Paul C. Ely Jr., MS '65, will always remember the sight of millions of dollars worth of parts and tools lying unprotected on a Palo Alto production floor: “You walked in and out the door. No one inspected anything you were carrying.”

For Ely, who eventually became executive vice president, coming to HP in the early 1960s was like landing on another planet, a place where respect and integrity were self-perpetuating. Back East, where

he'd spent nine years at Sperry, guys in the machine shop bragged about sneaking out an entire lathe under the guards' noses.

By then, of course, every company veteran knew the legend: How Hewlett came in one weekend to work and found the equipment storeroom locked; how he supposedly broke it open and left a note insisting that it not be locked again because HP trusted its people.

Additionally, there was an openness, not just as a social aesthetic but as a means of cross-pollination, a way to keep management in touch. Ely had been at his lab workbench only a few weeks when Hewlett dropped by to ask, "Aren't you the guy from Sperry? What are you doing?" There were about 3,000 employees at that point, but somehow Hewlett came by every other week to learn about Ely and the new high-energy physics he was working on. This so-called "management by wandering around" was part of every HP manager's job. When Ely himself became a division manager in 1968, he moved his desk, complete with file drawers on rollers, into the middle of the production floor.

In the lab, such interplay led to what HP veterans called "the next-bench syndrome." At its simplest, one engineer would create a device that would help or intrigue the guy at the next workbench. Together, they would stumble across a new product. A famous example was Bill Hewlett's wish for a smaller version of the company's electronic calculator, one he could carry in his shirt pocket. When the marketing department questioned who would pay 10 times the going price of a slide rule, Hewlett simply said that he would. Thus, a whole new market was born.

Like any culture, HP's wasn't perfect. "Next bench" could produce engineer-driven duds; the cumbersome \$795 wristwatch-calculator of the mid-1970s was perhaps the most notable. That ultimate nerd fashion accessory quickly sank in the marketplace. And the insistence on collaborative openness, which made the place ideal for some, drove others away: "I just went utterly bonkers there," recalls James Collins, '80, MBA '83, who worked at HP in the 1980s and later lionized the company as co-author of *Built to Last: Successful Habits of Visionary Companies*. "I really like quiet space. At HP, I was in a room with a bunch of other people, my desk right next to someone else's."

Likewise, given its reputation for fair dealing and generous personnel policies, HP could appear warm and fuzzy to some outsiders. ("Boy Scouts on a Rampage," went a typical magazine headline about the company's success.) But inside, the atmosphere was intense and ferociously focused on core principles and performance. For example, returning from his stint as deputy secretary of defense in the early 1970s, Packard found the company on the verge of borrowing \$100 million in long-term debt to cover cash-flow shortfalls.

To his mind, this was a violation of HP's Depression-born policy of financing growth strictly from profits.

He immediately undertook a companywide tour, delivering what became known as "Dave Gives 'Em Hell" speeches. At a stop in Santa Rosa, he lined up the division's managers in front of assembled employees and explained, "If they don't get inventories under control, they're not going to be your managers for very long." Within six months, the company righted itself -- and had a \$40-million cash surplus.

Seeding the Valley

One could argue that the semiconductor business, which gave Silicon Valley its name, did more to populate the region than HP. But as venture capital flowed into the Valley in the '70s and '80s, HP alumni eventually launched or took the helm of dozens of influential firms. "There are more companies that have spun out of HP," says Valley historian Michael S. Malone. "It's just taken a lot longer."

As significant as their numbers was the philosophy that HP veterans brought to their new ventures: a fundamental sense that a culture of innovation is just as crucial as riding any particular technology wave. A classic example is Tandem Computers, which was acquired by Compaq last year. The company was founded in 1973 and led by former HP manager James Treybig, MBA '68, until his departure two years ago. Tandem boomed by selling ultrareliable machines to institutions such as banks, phone networks and stock markets that can't risk a glitch. In just over a decade, it reached \$1 billion in annual revenues and employed thousands of workers.

Tandem may have looked like a free-wheeling reflection of the larger-than-life Treybig, a drawling Texan with an in-home dance floor who led the staff in Friday beer busts and took squadrons of top performers to Disney World. But while other high-fliers of that era, from Osborne to Commodore, burst like balloons in the stratosphere, Cupertino-based Tandem held together due partly to an HP-like culture of employee recognition and intense, informal communications.

Tandem's soaring growth made "management by wandering around" and open-door policies a bit unwieldy. But to ensure regular exchanges, the company held "town meetings" and instituted companywide e-mail as early as 1978. In the 1980s, Tandem even established an "office of philosophy" that assessed core company values through employee focus groups, then taught classes in applying those values to decision making.

"HP instills a certain value set in you," Treybig says. "You can

micromanage cost, but I don't think you can micromanage understanding and thought. One person who thinks and is motivated can be more powerful than a hundred who don't. That's what Silicon Valley is about."

Silicon Graphics Inc. is another company that has successfully applied principles its executives learned at HP. Almost from its start in 1984, the Mountain View-based workstation and supercomputer company was led by Edward McCracken, MBA '68, a 16-year HP veteran. (When McCracken stepped down this year, he was replaced by another longtime HP executive, Richard Belluzzo.) The company built a multibillion-dollar franchise and a workforce of 10,500 on 3-D graphics used in everything from special effects (Jurassic Park's dinosaurs) to automobile design.

Being a visual computing company with Hollywood spice makes for major stylistic differences between SGI and buttoned-down HP. But in the curving, purple hallways of SGI, Packard's old insistence on making contributions instead of merely grabbing market share has taken deep root, McCracken says: "The culture of innovation is so strong here that if a design team comes up with a me-too product, it's almost like the white corpuscles come out of the walls and destroy it."

Likewise, HP-cultivated ideas about continuing education, decentralization and autonomous decision making are pushed to extremes at SGI. The result is an almost granular organization that constantly shifts and re-forms, with individuals reporting to different bosses as part of different teams and acquiring the latest knowledge primarily via in-house intranet.

It's hundreds of firms like this, large and small, that make Silicon Valley what it is. But the Valley is not just a geographical agglomeration of companies spawned by Stanford's presence and endless spin-offs. Rather, it is an especially intertwined economy, a great conga-line of joint ventures, cross-licensing and second-sourcing, wending its way through every lab, fabrication plant and open-office cubicle from San Jose to Palo Alto.

"There's an enormous amount of conversation going on here with competitors, as long as you're not talking about something on your strategic path," says former engineering dean James Gibbons, now the University president's special counsel for industry relations.

Hewlett and Packard were vital to creating this distinctive networked economy. In part, their division structure served as a model for in-house competition and collaboration. But HP also made a habit of nurturing outside entrepreneurs like ASK Computers Systems founder Sandra Kurtzig, MS '68. ASK's small staff literally set up camp inside HP in the mid-1970s, rolling out sleeping bags in supply

closets and writing software to run on HP's room-size computers. Eventually ASK grew into a \$400 million global force that helped spur sales of HP hardware worldwide.

And then there's the story of 12-year-old Steve Jobs, a Valley kid who dialed up Bill Hewlett at home to ask if he had any spare parts for a frequency counter. When Hewlett finished laughing over the boy's chutzpah, he not only gave him the parts, he also gave the future co-founder of Apple Computer his first summer job in an HP assembly area.

The Valley's Anchor

In the gold rush of hot ideas and instant fortunes that is modern Silicon Valley, lots of companies are winging it, barely aware of Hewlett-Packard's paternity. But the management style of most companies in the region, and even the careers of many of its leaders, are built in response to HP. "Hewlett-Packard haunts Silicon Valley," says Valley historian Malone. "It is the measure of everything good about the technology business. It's enduring. It has integrity. It has strong employee loyalty. It has strong community presence. [Valley] companies start out to imitate HP or they start out not to be old boring HP, but at some point in their history they become obsessed with HP."

Take the case of Apple Computer, probably the most famous of all Valley companies. Technically, the company is an HP offspring. Co-founder Stephen Wozniak worked as an HP engineer in the 1970s and used the company's accessible spare parts to build the Apple I personal computer. Wozniak showed his creation to Hewlett, but couldn't get him interested in manufacturing it, so he and Jobs went off to a garage and did their own Bill and Dave act.

When Apple was flying high, the story of Hewlett passing on Wozniak's handiwork was told as a parable of HP stodginess. But now that HP sells almost 1.6 million more personal computers per year than Apple, it can be seen as an example of the older company's willingness to stay its course, to balance perpetual innovation against fundamental stability in an industry of meteoric launches and subsequent burn-outs.

More than a progenitor, "HP is the great counterbalance to Silicon Valley," Malone says. It is not just the Valley's largest employer, not just a computer powerhouse in everything from workstations to palmtops to Internet commerce, not just a diverse techno-Goliath with more than 25,000 products. It is history in a place where time is measured in access milliseconds; it is roots in a place where addresses hover in cyberspace.

And Hewlett and Packard themselves? “They’re the role models for everybody who wants to become a major player. They set the road map,” Malone says. And, he adds, as entrepreneurs willing to delegate, as lifelong partners who were models of collegial collaboration, Hewlett and Packard added a sense of sane humility to that map.

Indeed, it’s just a few minutes’ drive from the landmark garage to the open doors of Hewlett and Packard’s last offices, preserved upon their retirement as a sort of museum of nonpomposity: The linoleum tile floors, overhead fluorescent grid and sagging side chairs speak volumes about men intent on more important things.

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