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THRILLS—AND SPILLS— IN THE “THEME PARK” BUSINESS

**Where the Promising New
Companies Are Being Born**

**Can Businessmen Afford to
Work for Government?**

**What’s Really Wrong with
Bank Regulation**

by Gene Bylinsky

In 1973 a highly inventive young British chemist named John Peers figured out how to build a small computer that could be instructed, not in one of those convoluted computer codes misnamed "languages" but in plain English, or any other human tongue. An entrepreneur as well, Peers was already running his own computer-manufacturing company in London, so he had the means to make some models of his novel machine. But 1973 Britain was the worst imaginable place to turn his revolutionary idea into reality. A slowdown strike in the coal mines, coming on top of the Arab oil embargo, had nearly knocked out the British economy. Electric power, for instance, was available only every other four hours a day. An ardent believer in free enterprise, Peers sold his firm—the third he had founded—and set out for that promised land of high technology, the famous complex of nearly 1,000 science companies in Santa Clara and San Mateo counties just south of San Francisco.

Some initial hardships awaited him there. Working without pay in cramped rented

Both scientist and salesman, John Peers, the founder of Logical Machine Corp., staged a "Whistle-Off" to demonstrate the lifelike qualities of his computer, Adam. At the finale in Carson City, Adam whistled a rather shrill version of "My Way." All the contestants defeated the machine, "which made them all happy, and made us happy," says Peers.

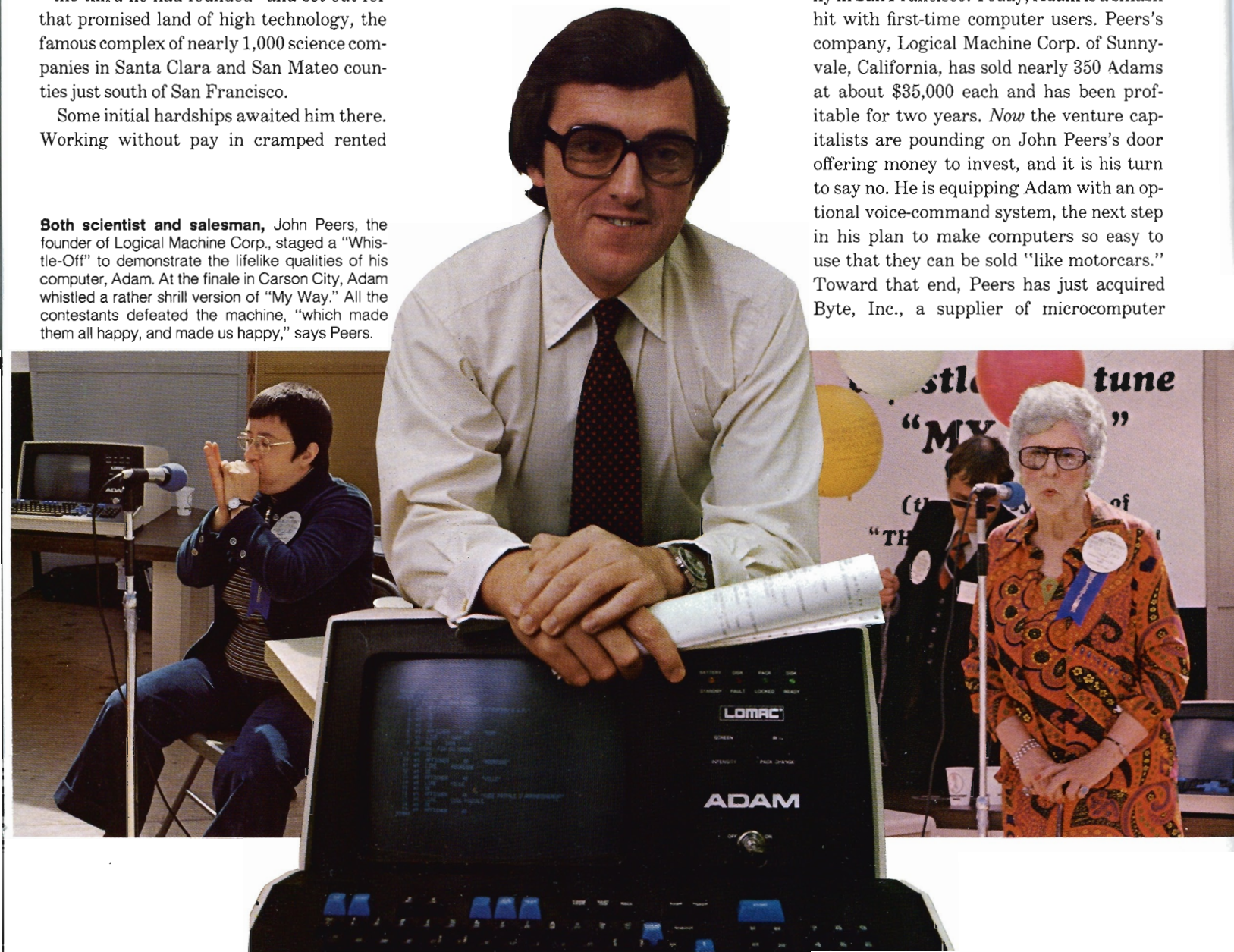
NEW COMPANIES THAT BEAT THE ODDS

Starting high-technology ventures has never been tougher, but the best of them still succeed.

quarters in Burlingame, California, Peers and half a dozen confederates constructed his dream computer, christened it Adam, and then told all those vaunted local venture capitalists that they could help launch Adam into a waiting world. "We talked to thirty or forty of them," Peers recalls, "and received every kind of support imaginable—except money." Stock prices were crumbling, and the investors had retrenched. Besides, they were hesitant to support a sharp departure from "normal" computer programming.

Now they're knocking on his door

Undaunted, Peers raised \$650,000 from other sources: a surgeon in Florida, a real-estate man in Los Angeles, a well-to-do family in San Francisco. Today, Adam is a smash hit with first-time computer users. Peers's company, Logical Machine Corp. of Sunnyvale, California, has sold nearly 350 Adams at about \$35,000 each and has been profitable for two years. *Now* the venture capitalists are pounding on John Peers's door offering money to invest, and it is his turn to say no. He is equipping Adam with an optional voice-command system, the next step in his plan to make computers so easy to use that they can be sold "like motorcars." Toward that end, Peers has just acquired Byte, Inc., a supplier of microcomputer



systems and accessories to the Byte Shops, a nationwide chain of computer stores. He estimates the potential market for Adam at 1.3 million machines—not such an outlandish vision in light of the explosive growth of the small-computer market and the savings that can be realized by the elimination of expensive prepackaged software. Many computer specialists think that Adam's arrival signals the beginning of the end of conventional computer "languages" in almost all business applications.

To be sure, communicating with Adam via a typewriter-like keyboard is like teaching one of those bright but obviously limited chimpanzees that scientists have been instructing in symbolic languages. A user has to define his program steps in great detail. But he is doing it in his native tongue, a big breakthrough compared with the use of computer codes. One I.B.M. programming expert calls the ability to program in natural languages "revolutionary."

The story of John Peers and his Adam makes two important points about the state of new-enterprise formation in this country: the game has never been so tough, and yet dozens of promising new companies have made their way into being and even into the black. As John Peers puts it: "The hard way is really the easy way." He means that a true entrepreneur thrives on difficulties and

in overcoming them builds a sounder company than he would have if lavishly financed.

There are plenty of troubles for Peers and his fellow entrepreneurs to thrive on these days. It's more expensive to start a new company because of inflation and burgeoning government regulations, and at the same time the rewards for the entrepreneurs have decreased substantially. "The carrot has gotten smaller," as one of them puts it. It is much harder for new companies to go public in a stock market that seems not to have recovered from the recent recession, and higher taxes on stock options and capital gains make it difficult for company founders and their principal associates to reap a payoff for the risks they take.

As John Peers learned, these discouraging developments have driven away the venture capitalists who once specialized in bankrolling new enterprises. They got out of the game in the 1974 bear market—when only two high-technology companies with a capitalization of more than \$1 million managed to raise the money to go into business—and many of them never returned.

Still, despite all, a FORTUNE survey of new high-technology companies in California, in the Boston-Cambridge area, and elsewhere in the country, indicates that the entrepreneurs never gave up, even in the

Research associate: Alicia Hills Moore

midst of the bleakest season for venture capital. They have continued to form significant companies in such traditionally fast-growing fields as electronics, energy, and medicine, as well as in the brand-new area of microcomputers for hobbyists and small businesses.

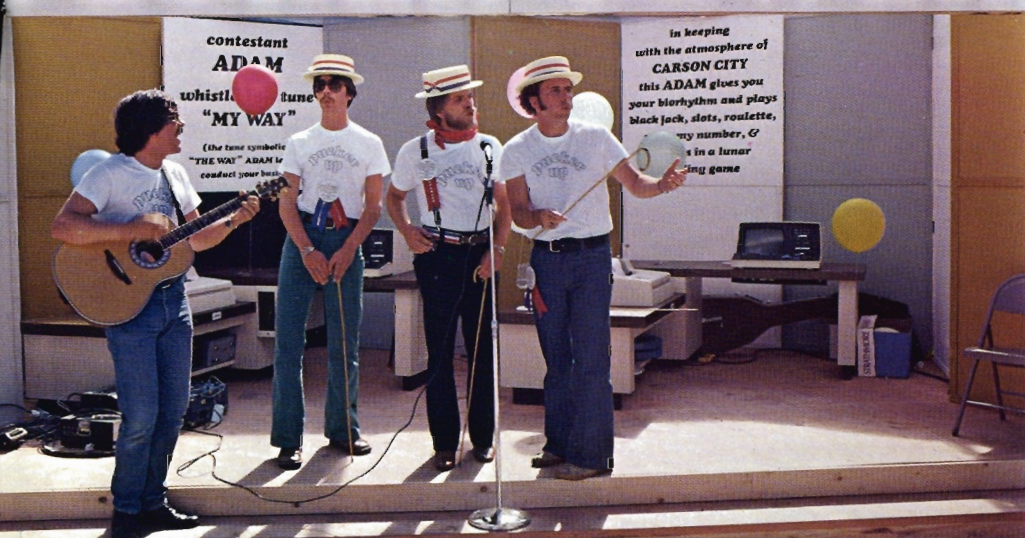
Having lost venture capitalists as a main source of financial support, the entrepreneurs have scrambled for money wherever they could find it. Some got it at established companies that were interested in taking a flier in a new field. Others drew on their own savings and on their families and friends. Often, the venture capitalists were willing to come in on the second or third round of financing when the new company needed more money to expand.

A "fail-safe" computer for banks

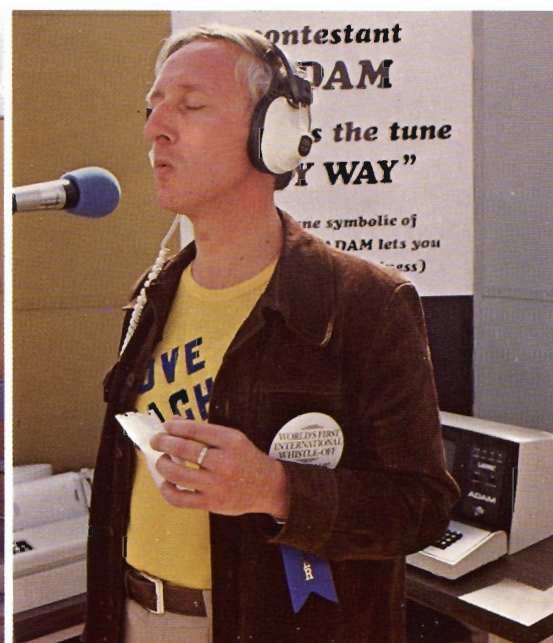
There are notable exceptions, of course. Undeterred by the gloomy economy of 1974, San Francisco venture capitalists Eugene Kleiner and Thomas Perkins founded Tandem Computers Inc. that year to make a "fail-safe" computer with dual processors for use by banks, hotels, airlines, and other businesses where computer failures can be costly. The company has been so successful that it is in the process of going public, one of the few companies able to do so.

A group of venture capitalists, including

PUCKER POWER



Marvin Lichtner



Idanta Partners of San Diego and Greylock Management Corp. of Boston, put a total of \$3.6 million during 1972 and 1973 into Prime Computer, Inc., of Framingham, Massachusetts, after the founders ran out of money. It turned out to be a wise investment: the company, which makes powerful small computers, has been highly profitable since 1974 and has emerged as probably the fastest-growing new computer company in the country. Only five years old, it expects to report sales of about \$50 million this year.

Some successful entrepreneurs can well afford to fund new projects themselves. In Palo Alto, Dr. Robert N. Noyce, chairman of Intel Corp., teamed up with two former

executives at Memorex Corp. to launch Arbor Laboratories, a successful manufacturer of computerized balance scales. In Nashua, New Hampshire, Harlan Anderson, co-founder of Digital Equipment Corp., helped start Termiflex Corp., which makes hand-held computer printers. And in Irvine, California, Robert A. Kleist, who calls himself a "scientific businessman," left his second successful company, Pertec Computer Corp., to found a third, Printronix, Inc.

The company's novel computer printer, first built in the proverbial California garage, forms characters electronically and reproduces them on paper as tiny dots that merge into one another. The mechanism can

also serve as a plotter, to make charts, graphs, and other such visual displays.

Kleist and his friends backed up their technological innovations with an imaginative marketing strategy. Though the professional investors they approached all advised them to go after big customers with many different printer models, Kleist and his associates, relying on their own experience and intuition, went in the opposite direction. The strategy of his newest company, Kleist said, would be "concentration, innovation, and perspiration." Printronix produced just one model, but one packed with a lot of features that appealed to many different customers. Kleist's printer, for instance, could be utilized not only in business offices but also in warehouses and food stores, where it could prepare labels and bar codes for groceries and other consumer items. "A little company," says Kleist, "can't succeed by doing many different things."

Copycats fail

Kleist's second key decision was to sell his \$5,000 machine through distributors—an unusual approach in his industry—and thus acquire at a stroke a sales force five times as large as his biggest competitor. Printronix didn't sign up its first big customers until it had 1,000 printers in the field, two years after the company was started. "We effectively created our own class of large customers by aggregating a lot of little customers under a regional distributor," says Kleist. "If you do everything like a big successful company, you'll never get to be a big successful company."

From the vantage point of success, Kleist is delighted that he was rebuffed by some eighty venture-capital outfits, ranging from wealthy individuals to bank subsidiaries. He and other managers and employees of the company put up the initial \$670,000, and they raised another \$550,000 by selling licenses abroad. Two venture capitalists chipped in \$280,000 after Printronix was in

Thinking small has worked for Haim Brill. His Aviv Corp., which has just four employees, makes a miniaturized controller that links a computer with its surrounding electromechanical devices. Israeli-born, Brill started Aviv with about \$50,000 of his own and family money and will have sales this year of \$700,000. The headquarters is in Bedford, Massachusetts, on the Hayden estate, which has served as a nursery for a number of high-technology companies, including the missile division of Raytheon.



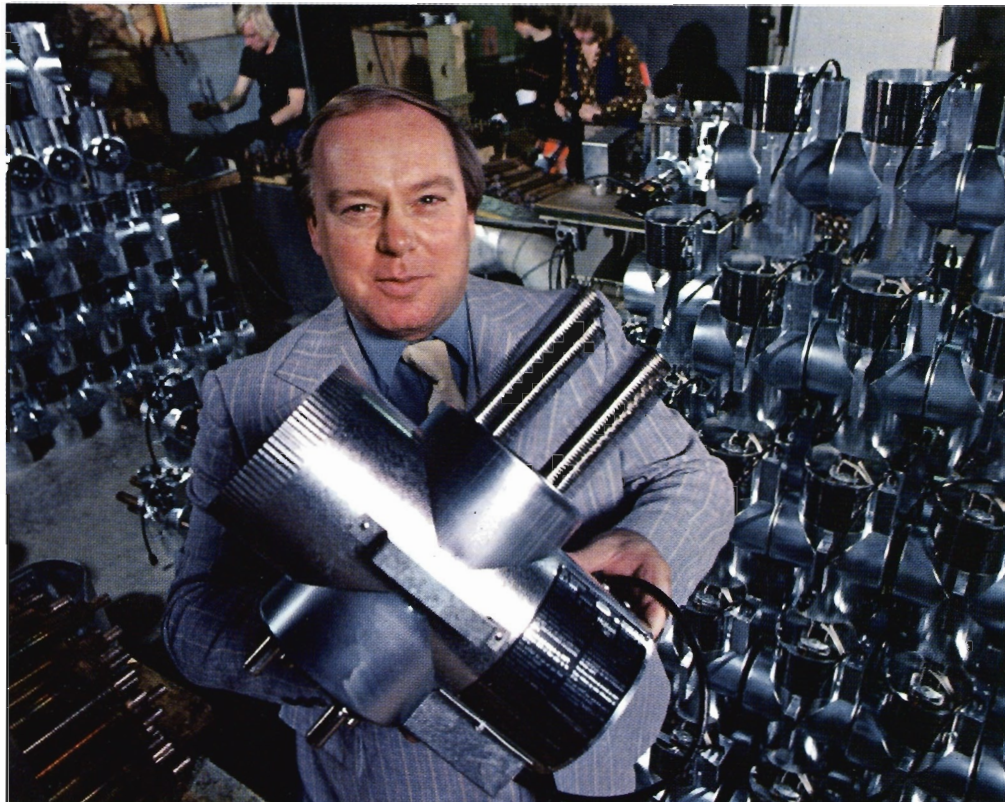
the black, but they own only 17 percent of the shares and aren't on the company's board. Kleist is selling 300 printers a month now and expects sales to reach \$30 million to \$50 million a year within three years.

Other entrepreneurs have gone to established companies for financing. Two recent emigrant engineers from the Soviet Union, Naum Staroselsky and Alexander Rutshstein, started Compressor Controls Corp. in Des Moines with the help of Ladin Industries, Inc., a small textile company. Dr. Frederico Faggin, who came from Italy in 1968 and helped design the first microcomputer, left Intel Corp. in 1974 to start his own microcomputer firm, Zilog Inc.; it has been backed handsomely by Exxon's venture-capital arm (see "Exxon Has Its Eye on More Than Oil," *FORTUNE*, April). Still other new companies have reached out for foreign funds, particularly Japanese—a trend that venture capitalists decry for fear of setting off a technology drain.

Whatever the source of their support, the new companies are succeeding—as Logical Machines and Printronix did—by exploiting gaps in the market, or by creating entirely new markets. Nowhere is their success more evident than in the rapidly growing home-computer field, which didn't even exist a few years ago. Many small companies are offering complete microcomputer systems for as little as \$300. They are being used by gadget-loving homeowners to control lights, furnaces, and appliances, to design electronic games, to help children with their homework, and to balance the family budget.

Miniaturizing electricity bills

As this boom has spread, all sorts of dead-serious customers have begun stopping by the Byte Shops and other computer stores that have sprung up around the country. Microbusinessmen—dentists, gas-station managers, owners of small retail shops—have learned how to use microcomputers as a powerful new tool. Typically, a technical consultant for the Computer Shoppe in Metairie, Louisiana, designed the program and communications system to go with a \$1,400 microcomputer that controls heat and air conditioning in the thirty-two-story International Trade Mart in New Orleans. Last year, the building had a \$600,000 electricity bill. This year, the Trade Mart's microcomputer system



An aerospace engineer, Richard Pessolano spotted commercial possibilities in the heat pipe, an efficient device used in spacecraft and nuclear reactors to conserve and transfer heat. Pessolano founded Isothermics, Inc., which quickly became profitable. It makes heat pipes for use in home furnaces and industrial installations.

will lop more than \$200,000 off that bill.

One of the small new companies fueling the microcomputer boom is Imsai Manufacturing Corp. (Imsai stands for Information Management Systems Associates, Inc.), of San Leandro, California. It was founded in 1973 by William Millard, a specialist in computer software. When its largest customers—several G.M. car dealers—asked Imsai to develop and install a computerized system to process orders and do other such office work, Imsai agreed but soon discovered that it had grossly underbid the contract. It was headed for some big losses if it bought the Digital Equipment minicomputers it had intended to use.

Forced to be inventive, Imsai developed a microcomputer system that did the same job for much less money. Then the company decided it could sell the microcomputer in kit form to hobbyists at \$399 each. It wasn't prepared for the response. In the last eighteen months, Imsai has sold over 10,000 microcomputer kits, mostly through mail order. Fascinated by this rapid growth, one of Imsai's car-dealer customers helped finance the expansion with a long-term loan.

Imsai found a lucrative market in the computer stores, which were eager to expand their line. Imsai obliged by offering complete microcomputer systems, incorporating printers, video-like displays, and so on.

Expressly for railroaders

"We've watched the stores over the months since then," says Wesley T. Dehn, Imsai's general manager. "Essentially, a new layer of business is being computerized. The traditional minicomputer companies started at the top and are now descending down the ladder to smaller companies, but they are still basically marketing toward a real corporation—a small manufacturing company, maybe a machine shop that has thirty or forty employees. The stores, however, are selling to local businessmen who may only have two or three employees. When people think of small business, these aren't the pictures that pop into their minds. These are the businesses you see when you drive around town."

Imsai is catering to this new market with a self-contained microcomputer that looks like a terminal and sells for \$5,000 to \$10,000. It is also continuing to compete in the hobby market, offering, for example, a microcomputer for model railroaders—the Imsai Express. The company is also talking to homebuilders who would like to incorporate a \$200 to \$300 microcomputer in new homes to control heating, lighting, and other such functions.

"One of the things that made us successful," says Dehn, "is our closeness to the market. Three months after spotting a trend we are shipping a product while someone in a larger company may be thinking about writing a report."

That same strategy of moving fast where bigger companies plod along has helped Haim Brill, thirty-nine, build up a rapidly growing company in the somewhat esoteric

field of magnetic-tape controllers for computers. Brill came from Israel thirteen years ago and was working for a Boston-area electronics concern when he spotted a better way of linking computers with their peripheral equipment. He struck out on his own a year ago. "Like most new companies," says Brill, "we provide a new, more economic solution to an old problem."

Brill employs the latest semiconductor and microcomputer technology in his controllers, enabling his company, Aviv Corp., to compete against larger firms. "I've done it all by myself," says Brill. "Sometimes it is very lonely, but all the arguments I have, I have with myself."

Aviv so far has just four employees, including Brill, who often works seven days a week. Sometimes he is at the office all alone, filling a rush order at midnight. "It's a hard road," he says. "But it's like an addiction, you just can't stop."

A tip from the Shah

Another enticing field for the entrepreneurs is energy-saving technology, and here, too, some interesting companies have been formed in recent years without initial help from venture capitalists. One such new en-

terprise, Enviro Development Co., Inc., of Mountain View, California, came into being because Robert J. Sherwood, a young engineer, happened to be in Iran in December, 1973, when the Shah announced the first in a series of big hikes in the price of oil. Sherwood was then European division manager for Envirotech Corp., a conglomerate that sells pollution-control and mining equipment, and he understood at once that American technology for waste-water treatment, based on an abundant energy supply, had suddenly become outmoded.

Europeans, on the other hand, had geared their water-treatment technology to Europe's higher energy costs. Sherwood saw a market back home for this equipment, which produces a form of sludge that can be used as fuel. He and a colleague at Envirotech, Matthew M. Zuckerman, a Ph.D. in environmental engineering, resigned to start a new company whose aim was to cut the power costs of water treatment in the U.S. by half and to reduce the fuel costs to zero.

They put in \$40,000 of their own money and raised another \$35,000 from friends and relatives. After a fruitless search for venture capital, they decided that Enviro

A budding capitalist from Russia, Naum Staroselsky, left, was one of the Soviet Union's top experts in control devices for compressors. He emigrated to the U.S. four years ago and started Compressor Controls Corp. in Des Moines. At right is Lawrence Ladin, president of Ladin Industries, Inc., a Des Moines textile company that financed Staroselsky's venture. Behind them is a facility of Northern Natural Gas Co. in Ventura, Iowa, where one of the new devices controls the flow of natural gas.



Development would have to pay its own way. They licensed or purchased enough equipment to get started, modified it for the American market, and began to bid on water-treatment contracts.

Industrial customers and municipalities have been so receptive to these energy-saving devices that Enviro Development will have sales this year of about \$8 million—and hopes to see them soar next year to about \$15 million to \$20 million. To allow for expansion—the company now employs eighty-five people—Enviro Development has received an infusion of \$500,000 from that San Francisco venture-capital firm, Kleiner & Perkins, which approached the company last January.

One secretary and a telephone

Another new company in the energy field has had rougher going. Isothermics, Inc., of Augusta, New Jersey, was started in 1971 by Richard L. Pessolano, a former aerospace engineer who decided to commercialize the heat pipe, an efficient thermal conductor perfected in atomic-energy research.

The heat pipe basically is an evacuated, hermetically sealed metallic cylinder, lined with a capillary wick structure made of wire screen or cloth, and filled with a working liquid. The liquid can range from water to molten silver, depending on the desired temperature range. The heat pipe has no moving parts, requires no external energy except for the heat it transmits, and is completely silent. Heat is transferred by the vaporizing and expanding liquid inside the pipe. The vapor moves to the cooler end of the pipe, where it condenses, and is returned to the hot end by the capillary action of the wick. In short, the heat pipe is a simple and reliable device that offers a compact, transistor-like way to transfer heat. Its efficiency is remarkable: a heat pipe can conduct about 1,000 times more heat than a copper rod of the same diameter, and with a very small temperature loss.

While working for a number of big aerospace concerns, which built heat pipes for spacecraft, Pessolano could see that those companies were neither equipped for nor interested in commercializing the device. So he struck out on his own. He raised \$70,000 from local investors and started Isothermics with a secretary and a telephone. He spent a week at the U.S. Patent Office in Wash-

ington, D.C., looking for ideas about ways that heat pipes could be used. Pessolano found that most heat-pipe technology wasn't covered by patents and so could be exploited by anyone.

Isothermics soon had three different consumer products on the market. The first was a cooler for motorcycle oil, a slender copper heat pipe that replaces the conventional dip stick. It transfers heat from the oil to knurled aluminum fins that project into the airstream. The second product was a cooking pin. When inserted into a roast, it reduces cooking time by almost half. The third product was a unit that reclaims heat wasted in home furnaces. It fits into the flue, where it captures heat and transfers it to an air duct outside the flue. A fan directs the stream of warm air to nearby rooms.

These smaller products caught on well, even though at the time Isothermics developed its unit for home furnaces few people were interested in saving energy. Since then, the company has also gone into the industrial market, providing energy-saving devices for such varied installations as office buildings, paint-bake ovens at automobile plants, and a military missile base.

Despite its success, Isothermics has had a difficult time raising funds needed for expansion. After Pessolano unsuccessfully approached a number of venture capitalists in New York City, he in turn was sought out by five different Japanese companies looking for energy-saving devices. Pessolano then sold 28 percent of Isothermics to Marubeni America Corp. for \$500,000. Another \$200,000 came for a license granted a Marubeni subsidiary. Marubeni has also come through with a \$500,000 loan. Isothermics has been doing so well lately that Pessolano has bought back some of the stock from the original investors, paying them three times their purchase price. He thinks that in two years his company will become a big success—barring entry of large firms into the field.

Splicing genes for profit

New companies are being formed today even in the always difficult biological area. Collagen Corp. of Palo Alto, founded by two research physicians from the Stanford Medical School, is developing novel means of treating wounds with proteinlike substances used as salves. Genentech (for Genetic Engineering Technology) of San Francisco will

splice genes to generate new products from restructured bacteria.

This company was started by Robert A. Swanson, a young organic chemist who also has an M.B.A. from the Sloan School at M.I.T. Swanson had worked for venture-capital firms but quit last year to set up Genentech. He made a list of key scientists in the field and then started talking with them. Topping his list was the name of Dr. Herbert Boyer, a University of California biochemist. Swanson founded the company with Boyer as a consultant, and venture capitalists Kleiner and Perkins came in as investors shortly thereafter.

While profits are years away, the field is full of promise. Recently, for example, Genentech financed a research program in which Boyer and other West Coast scientists programmed *E. coli* bacteria to produce a brain chemical, somatostatin, which controls the body's manufacture of insulin and growth hormone. Dr. Philip Handler, president of the National Academy of Sciences, described this breakthrough as "a scientific triumph of the first order."

Survival of the fittest

Despite recent successes, the atmosphere in which all these entrepreneurs have operated is unquestionably less encouraging than that of the 1960's when new companies proliferated. Those venture capitalists who still back start-up enterprises are apt to bet their money on proved scientific businessmen who have formed successful companies before. This, of course, limits the opportunities for untried innovators.

Once a new company gets on its feet, it may need new capital for expansion, and since few enterprises can go public, many face the choice of either stagnating or selling out to large corporations. That limits competition in new fields.

Whatever the obstacles, the most talented of the entrepreneurs will find ways to win. As the veteran San Francisco venture capitalist Arthur Rock puts it: "There will always be the Max Palevskys, the Bob Noyces, and the Gene Amdahls. If they are good people, you're just not going to stop them." Because the best of the breed is good at clearing hurdles does not, of course, mean that the hurdles—such as burdensome regulations and punitive tax schedules—are good for society.

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