As a junior high kid, he attended the birth of the Internet; in college, he invented the optical mouse; now he's launching a company to sell 'e-commerce in a box'

steve kirsch

COMPUTER CENTERS WERE INTIMIDATING places in 1969. Machines were huge, locked in air-conditioned rooms, and fed with punched cards. Time on them did not come cheaply and was tightly rationed. And the computer room in Boelter Hall at the University of California, Los Angeles (UCLA), was no exception.

In one corner of the room sat a state-of-the-art Scientific Data Systems Sigma 7 computer. Off limits to the countless engineering students, it was reserved for a small group of researchers funded by the Defense Advanced Research Projects Agency (Darpa) and busy inventing the technology that would evolve into the Internet.

TEKLA S. PERRY
Senior Editor

PHOTOGRAPHS: BY MARTIN KLIMEK / LIAISON AGENCY

Among those researchers was Vinton Cerf, now senior vice president of Internet architecture and technology at Worldcom Inc., Ashburn, Va. One evening, he was sitting next to the Sigma 7 doing some programming when a scruffy 12-year-old with a piping voice interrupted him with a question, then asked another, and another. The kid was Steve Kirsch—or little Stevie, as he came to be known around UCLA.

"He must have grabbed the door when someone walked out of the room," Cerf said. The door was usually locked. "I didn't want to be bothered at first."

But something about Kirsch reminded Cerf of himself at that age. "A part of me said, 'Be nice to the kid, you can't buy enthusiasm'." So Cerf and his colleagues set up Kirsch with a computer account.

Kirsch was thrilled, his parents less so, since he took to sneaking out of the house at 4 a.m. to bike over to UCLA. (Computer terminals were more likely to be available in the wee hours.) Eventually the boy was handed a real job—write a program to send and receive electronic mail.

At the time, some of the mainframe computers being linked into the so-called Arpanet had internal messaging programs, a precursor to e-mail; but there was no easy way to send messages from one machine to another. A messaging standard began to evolve, but that standard had to be implemented at each local system.

"We were a small group at UCLA," recalled Charles Kline, another of the researchers there. "Additional help was great. So Stevie wrote that first e-mail program for the Sigma 7."

During his junior high and high school years, Kirsch also worked on operating systems for the group and wrote a status monitoring program, so users could tell who else was on the system.

From the UCLA computer room, Kirsch went on to invent the optical mouse, patent the method of tracking advertising impressions on the Internet by click-counting, and start and profitably sell three companies. His Mouse Systems Corp. marketed the mouse; his Frame Technology Corp. developed publishing software that could handle equations and tables; and his Infoseek Corp. developed a pioneering search engine. He is now launching his fourth venture: Propel Corp., which intends to make operating systems and provide other tools for e-commerce. Along the way, he has made several hundred million dollars and launched a charitable foundation that gives over US $5 million in grants annually.

A PROGRAMMABLE CALCULATOR

But at 12 years of age, how did he know enough about computers to get Cerf's attention? It started with a calculator.

Earlier, when Kirsch was already in sixth grade, a teacher brought in a programmable calculator and showed the students how it worked. Intrigued, Kirsch took a class on computers at a nearby museum.

"I thought it was really neat, the power one person could have using a machine," he told *IEEE Spectrum.*

Then he tried to sign up for classes at the local Computer Learning Center. Although he passed the entrance exam, he was refused admittance by the instructor out of concern that the pre-teen would discomfit the adult students in the class. Instead, he offered Kirsch some weekend computer time, and the boy began teaching himself to program an IBM 360 mainframe. A year or so later, he discovered the UCLA computer.

When not in school or in the UCLA computer lab, Kirsch was to be found at the local arcade—not pumping quarters into pinball machines, but making $30 an hour fixing them, having taught himself on an old machine his father had at home.

At Cerf's suggestion, Kirsch applied to the Massachusetts Institute of Technology (MIT), in Cambridge, staying through his master's degree. Summers, he worked for Bell Laboratories, in Murray Hill and Holmdel, N.J., where he also became involved in optics. His master's thesis was on integrated optical isolators, which pass laser light through in one direction, but not the other.

What ended up having the biggest impact, however, was a side project he pulled together at MIT in three intense weeks— and later patented, manufactured, and sold in the hundreds of thousands. That was the optical mouse.

A MAN AND A MOUSE

At MIT, Kirsch often worked with high-end computers programmed in Lisp, for which mechanical mice were one of the input devices.

"They were very unreliable," Kirsch remembered. "They'd track one way and not the other way, they would skip. And I thought this was stupid—a Lisp machine costing a hundred grand being brought down by a device made up of $30 worth of components."

Deciding he could do better, he came up with two basic designs. The first used a single optical sensor that had four quadrants, creating, in effect, a two-by-two sensor array. This mouse ran over a checkerboard pad and detected speed and direction from the pattern of changing black and white squares.

His second design used the same sensor, but instead of a checkerboard pad, this mouse ran over a grid of lines, blue ink in one direction, infrared ink in the other. Along with the sensor were a red and an infrared light-emitting diode (LED), which alternated turning on and off. Since the blue ink was transparent when the infrared light was on, and the infrared ink was transparent when the red light was on, the sensor got only one type of information—

vertical or horizontal motion—at a time. Using only one sensor saved money, but Kirsch later changed the second mouse design to incorporate two sensors, one for each direction, each with a four-by-one array. The LEDs had no need to blink and were turned on continuously. This approach was more reliable, because the position of the mouse could be determined through the use of differential signals from the detector, rather than calibrating an absolute signal threshold, as had been required in the first red-infrared approach.

"What I learned at MIT," Kirsch said, "is that when you have a really hard problem you don't know how to solve, you break it into smaller problems you can solve. Calculating motion in one direction is trivial, so, using different colors of light, I broke the hard problem into two trivial problems."

After sketching out his designs, he immediately contacted Steve Jobs at Apple Computer Inc., Cupertino, Calif., and asked to show him his invention during spring break, three weeks away. He was given an appointment, and spent those three weeks constructing a prototype, using the first version of the red-infrared mouse.

Jobs met with Kirsch, but decided against marketing the optical mouse, choosing to stick with the more established mechanical device. Kirsch applied for, and was awarded, a U.S. patent on the technology, then licensed it to Summagraphics, Danbury, Conn., and forgot about it for a while.

WHEN IN ROLM

After graduating from MIT in 1980 with simultaneous B.S. and M.S. degrees in electrical engineering and computer science, Kirsch signed on with ROLM Corp., Santa Clara, Calif. The company manufactured private branch exchanges and robust computer systems. "I liked the idea of working for a real company, after having worked at a research lab [Bell Labs]," he said. "I figured I could do real things."

He was assigned to a group doing office systems software, but quit nine months later. "I had these visions of changing the world. I thought I could come into a company and make a huge difference," he told *Spectrum.* "But I found out my impact on a large company was quite small."

For the next six months or so he went on trying to decide what to do next. Summagraphics, meanwhile, still had no plans to manufacture the optical mouse. Kirsch decided that he would commercialize it himself, using $40 000 he had saved. He incorporated Mouse Systems Corp. in 1982 and shipped prototypes in October. Some 300–400 were sold every month during the first year at $300 each; the pace of sales doubled during the second year—modest, but profitable.

Kirsch's first hire was Vickie Blakeslee as a jill-of-all-trades. She was then an adminis-

Name: Steve Kirsch

Date of birth: 24 December 1956

Birthplace: Los Angeles

Height: 180 cm   **Weight:** 77 kg

Family: wife Michelle; two children, aged 4 and 5

Education: a B.S. and M.S., both in electrical engineering and computer science, received in 1980 from the Massachusetts Institute of Technology

First job: pinball machine repairer

Patents: about half a dozen

Board memberships: Propel, Targesome, the Tech Museum of Innovation, the Community Foundation of Silicon Valley

People most respected: Bill Gates; Scott McNealy, Sun Microsystems chief executive officer (CEO); Andy Grove, Intel CEO; Colin Powell; and Lee Butler , a four-star general—

because "they are all smart, great leaders, and answer their e-mail."

Favorite Web sites: go.com, hamsterdance.com, zdnet.com

Favorite composers: Burt Bacharach, Simon and Garfunkel, Brian Wilson

Favorite food: spaghetti

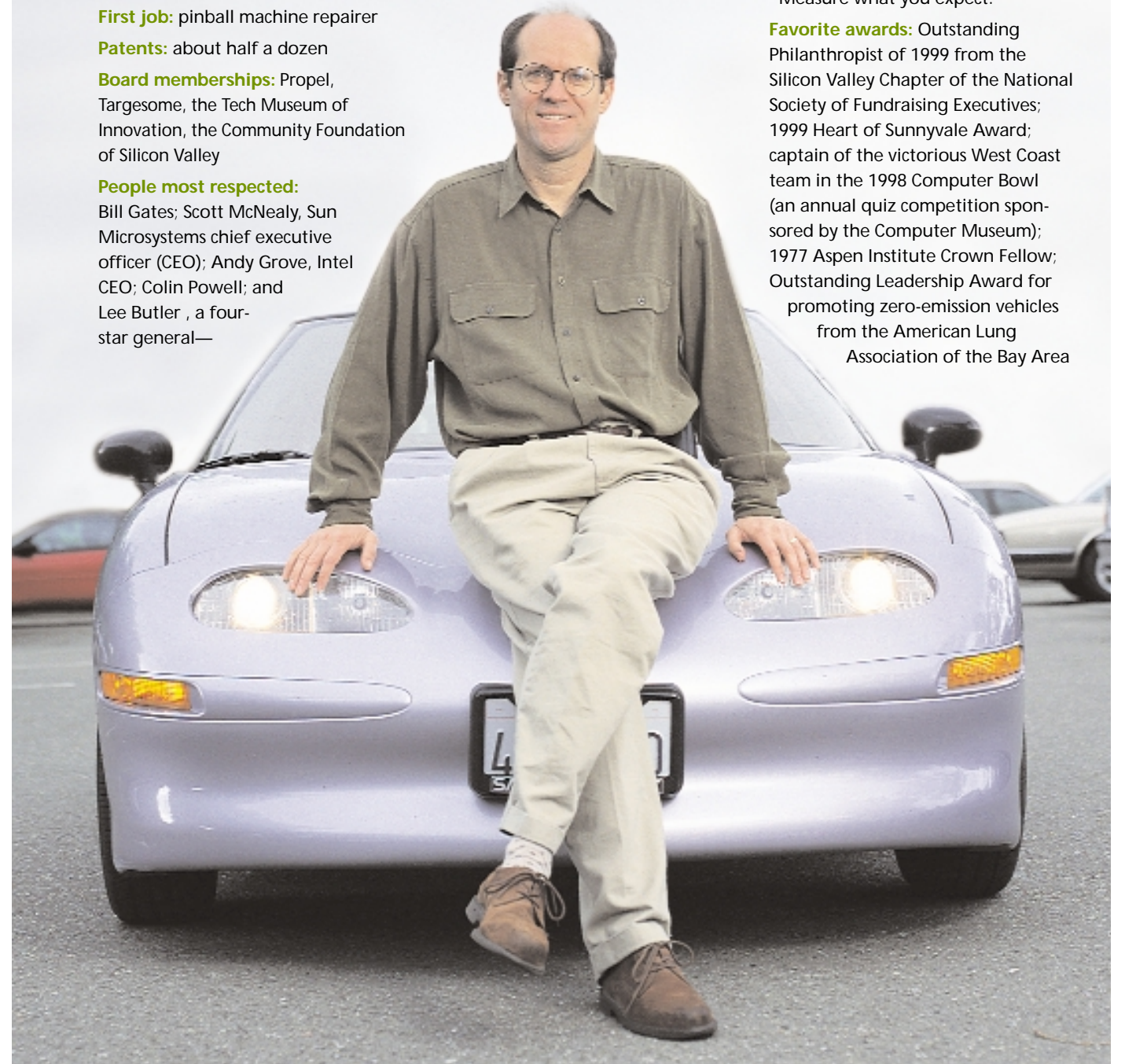**Favorite restaurant:** Fresh Choice

Favorite movies: James Bond

Leisure activities: golf, swimming, tennis, scuba diving, reading his e-mail

Car: General Motors' EV1 electric vehicle

Pet peeves: the U.S. political and educational systems; people who leave the lights on when they leave their offices; and people who put bottles and cans in the paper recycling bin

Management philosophy: "Measure what you expect."

Favorite awards: Outstanding Philanthropist of 1999 from the Silicon Valley Chapter of the National Society of Fundraising Executives; 1999 Heart of Sunnyvale Award; captain of the victorious West Coast team in the 1998 Computer Bowl (an annual quiz competition sponsored by the Computer Museum); 1977 Aspen Institute Crown Fellow; Outstanding Leadership Award for promoting zero-emission vehicles from the American Lung Association of the Bay Area

trator at the University of California at Berkeley and was to follow him to all his subsequent companies, leaving Propel only recently because of a family emergency. She took on many of the nonengineering functions, including human resources, administration, and finance.

Back then, Blakeslee reminisced, "Steve didn't have a lot of social graces. You got the impression that, while he was very bright, he hadn't been out experiencing the world much. He wanted to keep looking for new solutions to things; the human aspect wasn't important to him."

Mouse Systems became a major mouse supplier for high-end personal computers and workstations. Its product was more reliable than its electromechanical competitors.

"It wasn't as successful as it could have been because of marketing," Kirsch said. "My lesson was that it takes more than great technology. It's not the case that if you put out a better technology, people will gravitate to it."

By 1986 he had decided to do something different, and stepped out of day-to-day involvement with Mouse Systems. The company was acquired by Kye System Corp., of Taipei, Taiwan, in 1988 for approximately $12 million, about $2 million of which went to its founder.

Meanwhile, Kirsch had heard about software being created by an engineer named Charles Corfield. Its goal was to simplify desktop publishing for long, highly technical documents by for the first time making it easy to incorporate equations, complex tables, and indexes. Kirsch contacted Corfield, saw a demonstration, and was impressed. He offered the engineer a deal: Kirsch would put up the seed money and bring in a few key people to start a company, Corfield would bring in his prototype software, and the two of them would share in the equity.

Corfield agreed. (He was unavailable for comment because he was off climbing Mount Denali in Alaska.) Kirsch invested $300 000 and in early 1986 incorporated Frame Technology Corp., San Jose, Calif. With three other engineers, the two began developing the technology. Prototypes hit the market late in the year, and the company was in the black before the first production version of Corfield's software, FrameMaker 1.0, went on sale in 1987.
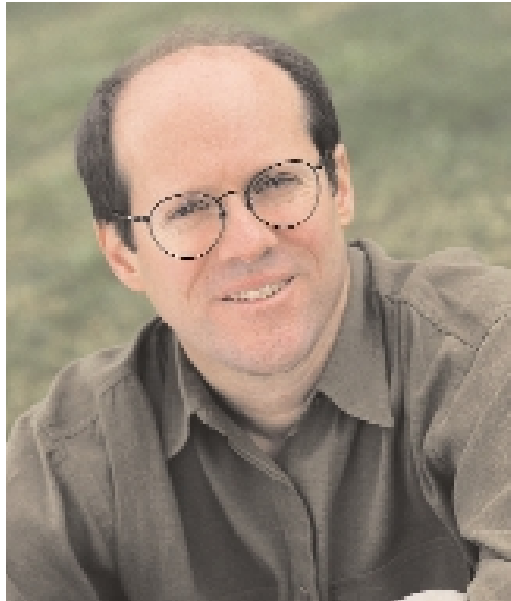
Around $3 million raised from venture capitalists in 1987 helped the company expand, and FrameMaker soon was being widely used in technical publishing. A version of FrameMaker is still being sold, but the company was bought in 1995 by Adobe Systems Inc. for $500 million, Kirsch's share being $30 million.

"Again," he said, "Frame had great technology, but we could have done a better job of marketing. I'm a technology guy, I tend to think if we get the product right, the market will take care of itself. But the market won't. I repeated the mistake."

SEEK AND GO

His departure from Frame two years before the sale to Adobe was due, not to any failure to prosper on the company's part, but to his attraction to the opportunities opened up by the Internet.

Kirsch had been using the Computer Library, a CD-ROM storing the text of a

year's worth of some 300 computer trade publications. The CD-ROM included, along with the raw text, tools for information retrieval. It occurred to Kirsch that if such an information retrieval product were developed for the Internet, it could beget a new market for information. In late 1993 he recruited a group of a dozen people, mostly engineers, and, using several million dollars of his own money, launched Infoseek. (Additional funds from Menlo Ventures and Battery Ventures came in later.)

The group began developing a search engine. Infoseek was not going to be a reviewed index, like Yahoo (which had a rudimentary Web site up, but was not fully operational at the time). Instead, it would be a comprehensive index. (A competitor is Alta Vista, which came out some years later, in 1995.)

"At the time, I was quoted as saying that our pricing model would be unique and widely imitated," Kirsch told Spectrum. "I was thinking it would cost 10 cents a query or $10 a month. It ended up being free (to users, advertising paid the bills). And the pricing model was indeed widely imitated. It's just that the numbers were slightly different."

In the early days, Kirsch had a direct hand in the development of the search engine technology. Even now, people are surprised by his ability to keep up technically in his field, while at the same time immersed in raising money and running companies.

Kirsch decided up front that Infoseek's technology would target speed and accuracy. The tradeoff was greater computing resources: the Infoseek index requires more computing power and more storage because it pre-searches and caches the results of frequently called-upon searches.

Infoseek was awarded several patents on its search engine technology, including one for a distributed searching technique and another for its method of searching large databases quickly. The company also won a patent on its method for counting clicks on Web page advertisements. When a user clicks on an ad banner displayed on an Infoseek Web page, he or she is directed, unwittingly, to a separate Infoseek Web page that counts the click and redirects the user to the site of the bannered company. In retrospect, the technique seems obvious, and it is now the way most ad clicks are counted. Infoseek has not exploited this patent.

"We created the patent for defensive purposes," Kirsch explained to Spectrum. "It's like Amazon's one-click patent. There is a question as to whether such fundamental patents should have been granted in the first place. But we knew people would patent such things, and, this way, if people wanted to harass us through their basically invalid patents, we could harass them in return."

Infoseek, like other Internet search engines, evolved into a portal, a site intended to come up when a Web user launches his browser software and that acts as a gateway to other sites. The company was sold to The Walt Disney Co. in November 1999 for the equivalent of $2.5 billion in stock and was merged with the GO on-line network; Kirsch's share was several hundred million dollars. He stayed at the merged company for four weeks, and left toward the end of 1999.

"My first company was a mouse company," Kirsch said, "so it is ironic that Infoseek was acquired by a bigger mouse."

SAVING THE WORLD

In his younger days, as his colleagues remember it, Kirsch seemed interested in technology to the exclusion of all else. As he grew older, his interpersonal skills evolved. "He now thinks ahead of time about how things will make people feel," said Blakeslee. "He never really thought about employees' feelings before."

But if Kirsch was sometimes oblivious to his co-workers' feelings, he always could get them excited. "His enthusiasm bubbles off

him," said Kline, one of the UCLA Internet pioneers, who now works for Kirsch at Propel. "That is one of his strongest assets. He is like [Apple cofounder] Steve Jobs in that way. Steve Jobs used the expression 'insanely great,' Steve Kirsch uses the expression 'way cool' whenever someone comes up with a good way to do something."

"He also," Kline continued, "gives you complete freedom to speak your mind without worrying that you will make an idiot of yourself."

In recent years, a social conscience has also evolved. Some time ago, a friend asked Kirsch to help raise funds for a local charity. Although experienced in asking venture capitalists for investment dollars, he did not see how he could convince people to just give money away. His friend told him, he said, that people who believe in certain causes are looking for charities consistent with those causes, and, by bringing such a charity to their attention, you are doing them a favor.

That got him thinking about what kinds of causes are important in his life. Five he identified for Spectrum with great seriousness are: improving air quality in California, improving education, reforming the U.S. political system, curing major diseases, and saving the world.

To target these causes, he established a charitable foundation in 1990, and so far has donated some $85 million to it. He has contributed to solar vehicle research and drives an electric vehicle himself, one made by General Motors Corp. In addition, he has funded development of programs that teach interpersonal skills to college undergraduates at MIT, helped fund the new Computer Science building complex at MIT, and financially supported the relaunch of MIT's Technology Review magazine. He has also contributed to organizations supporting campaign finance reform.

And he is trying to save the world.

"There are two ways I've discovered that I may be able to save the world," Kirsch said. "One is to reduce the threat of nuclear war. Another is to identify an asteroid that is going to hit the planet."

Asteroids, he says, are a real risk. "In 1994," he pointed out, "a large asteroid, XL1, came within 65 000 miles [105 000 km] of Earth. That's way too close for comfort. Because of a lack of funds for research, we only had 14 hours' warning—not nearly enough time to do anything about it." Again in 1997, a very near miss by a mile-wide asteroid, XF11, was predicted, but improved calculations showed it a not-so-near miss. "But the calculations could have gone the other way, and it could have been a hit," he said. "And statistically, we are going to get hit."

So he supports nuclear arms reduction efforts and he funds researchers attempting to detect near-Earth objects, including asteroids. (Once an asteroid threat is identified,

he figures, the world will mobilize against it.)

Kirsch is quite serious about this. But talk of asteroids can bring, well, odd looks.

"It's Steve," Blakeslee said, "so you expect some quirkiness. And he's paid his dues. He earned the money; it's up to him how he wants to spend it."

Kirsch has also invested in a cancer research project conducted by a company called Targesome Inc., in Palo Alto, Calif.—something no venture firm would touch. In fact, he views the outlay as more of a charitable donation than as a chance to make money. And in early 1999, he led the bailout of the United Way of Santa Clara County, donating $1 million toward an $11 million shortfall and urging his fellow entrepreneurs to contribute as well.

THE NEXT BIG THING

With Infoseek comfortably settled in the Disney empire, in 1999 Kirsch was ready to run with his latest idea. Given his track record of making money for investors, he no longer needed to create a bunch of Powerpoint slides to show to countless venture capitalists. This time he signed up nine cofounders, wrote a four-word business plan, "Amazon in a Box," and rounded up $6 million in funding in two weeks. The group of investors included Netscape's Marc Andreessen, Dell Computer's Michael Dell, EBay's Meg Whitman, and General Colin Powell. A second round of financing, for $40 million, closed in May.

The company, named Propel and located in Santa Clara, Calif., incorporated on 2 November 1999. Its focus is on creating tools and assembling services to support e-commerce, but it will differ from most such companies. Existing e-commerce software packages are not shrink wrapped, and vendors have to spend months with their customers tweaking the software to run on different combinations of hardware for different sizes of ventures. In contrast, Propel intends to provide standard e-commerce software, written in a new, Java-compatible, programming language. Along with the software, the company plans to offer e-commerce services, including Web development and hosting. It expects to have products out by year-end.

"We are taking the existing hardware technology and specifying how it is hooked together. We will provide standard software and recommend specific hardware configurations that are supported by the software," Kirsch explained.

Propel's first set of offices (soon to be outgrown) overlooks the roller coasters at Paramount's Great America amusement park, near Santa Clara—an apt reminder for a entrepreneurial company running on Internet time. Between November and April the company ramped up to some 70 employees, and shows all the signs of a rapidly growing start-up: it is housed in a tower of offices

available for short-term lease; employees' names are printed on small strips of paper and taped to their office entrances; no one has a brass nameplate; offices are sparse, furnished with scarred, secondhand desks; and unhung pictures lean against the walls. In the reception area, applicants perch on couches to fill out employment applications. (Indeed, the receptionist tried to hand this reporter an employment application when I arrived to interview Kirsch.)

Kirsch has endeavored to imbue Propel with a social conscience. One percent of the company, or one million shares, is reserved for a charitable donation. (The cash value will be determined when the company goes public.)

With a net worth in the hundreds of millions of dollars, didn't it occur to the new company's head man to take a break?

"There was no time," he said. "The opportunities are being created now, and the earlier you are, the more you have to choose from. So my choice was to take a break now and have fewer choices, or choose from a larger menu and take a break later."

Why not quit altogether? Because, Kirsch said, success is addictive: "Anything less seems like a waste of life."

The entrepreneur-millionaire also wants a big win. In his eyes, his three successful start-ups were failures. "Mouse Systems is not a household word," he said. "We didn't come up with better mouse technology than Microsoft did. Infoseek lost out to Yahoo; it had a chance to grow bigger, but it didn't. And FrameMaker is still a niche product. Yes, these were successes, but the successes could have been bigger if we had really paid attention to marketing.

"I'm not going to make the same mistake again." ◆