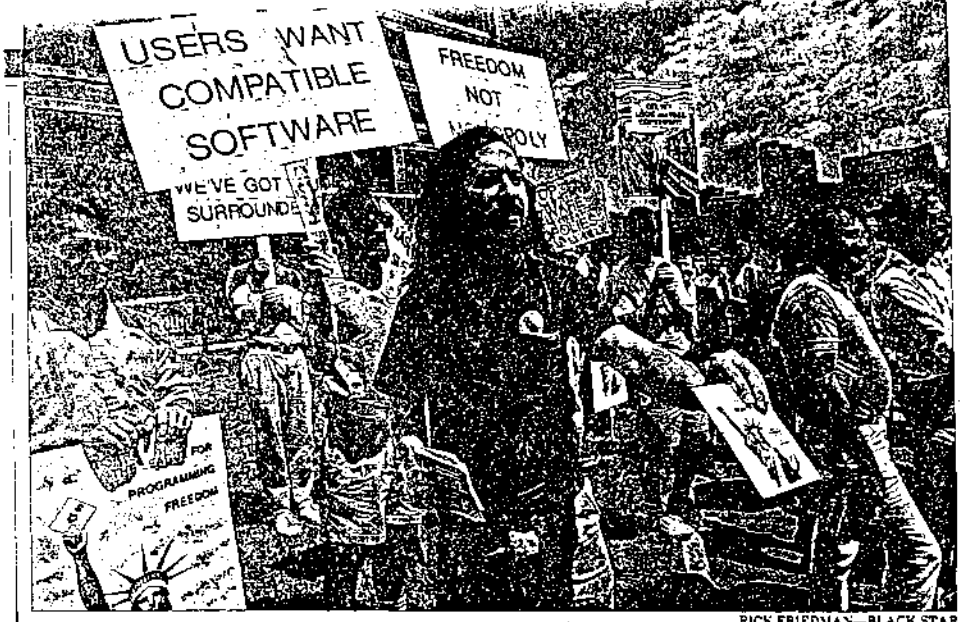
Newsweek,
August 27, 1990
p. 52



RICK FRIEDMAN—BLACK STAR

'Innovate don't litigate': *Stallman and colleagues outside Lotus headquarters*

TECHNOLOGY

Computing the Cost of Copyright

Programmers fight 'look and feel' lawsuits

The Cambridge, Mass., protest was decidedly different. These weren't the usual malcontents from Harvard or Boston University; these were computer programmers hefting picket signs. The enemy: giant Lotus Development Corp., which is trying to protect the market lead of its 1-2-3 software package by bringing "look and feel" suits against look-alike competitors. Lotus had recently won its first big victory against Paperback Software International, which has sold its VP Planner for a fifth of 1-2-3's $495 list price.

Copyright rules that worked fine for books and paintings are now straining to cover works from music videos to digital audiotapes—and, increasingly, software. Paperback and other challengers believed that the interface that a program presents to users should not have the same copyright protection as the underlying code. The imitators used their surface similarities (down to the keystroke combinations to copy or move data) as a marketing tool: users accustomed to 1-2-3 wouldn't need to learn a new program. Lotus sued. Thomas Lemberg, Lotus's general counsel, says, "We are the owners of this creation. We don't want other people copying it." Lotus has gone on to sue other spreadsheet makers. The case has broad implications for the computer industry, especially on similar look-and-feel suits from Apple Computer to protect its easy-to-use Macintosh line against Microsoft and Hewlett-Packard, which have developed software that would let IBM-compatible machines act more like Macs. Many software developers fear that the Lotus win will make it harder to bring new products to market. So when protesters marched in front of Lotus's Cambridge headquarters earlier this month, they chanted with a sly reference to the hexadecimal counting scheme that is a basic tool of their trade:

1-2-3-4 kick the lawsuits out the door
5-6-7-8 innovate don't litigate
9-A-B-C interfaces should be free
D-E-F-0 look and feel has got to go!

The group behind the protests is the League for Programming Freedom, founded by Richard Stallman, a software guru who recently got a $240,000 MacArthur grant. Stallman says the suits stifle innovation, paving the way for Japan to take over the industry. Lotus's critics say that every advance borrows from programs that went before—and that Mitch Kapor and Jonathan Sachs, 1-2-3's creators, borrowed heavily from the earlier Visicalc. Kapor, who founded Lotus and in 1986 left to found ON Technology, agrees that programmers have always borrowed ideas: "Nobody does anything from scratch."

Stallman and Co. want Congress to redefine copyright law for the 21st century. But others contend that the old rules still suffice. "There is no evidence that the sky is falling," says Harvard law professor Arthur Miller, who worked to establish software copyrights in the '70s. Perhaps not, but Stallman is convinced he's feeling more than raindrops.

JOHN SCHWARTZ *and* DEBRA ROSENBERG

The Economist, August 18, 1990 P. 59-60.

Software patents

Law of the jungle

HOPING to improve its protection of the rights of entrepreneurs, America is granting more patents than ever for computer software. This attempted kindness could wreak havoc with one of America's most successful industries.

Though paranoid about piracy, America's software entrepreneurs are shrewdly cool about the idea of patenting their creations. Many say they are applying for patents only in self-defence. Straw polls indicate that programmers prefer the much narrower protection of copyright—the usual legal tool for stopping software piracy. Some big companies, including WordPerfect, market leader in word-processing software, fear that patents will bring an innovation-crushing series of lawsuits.

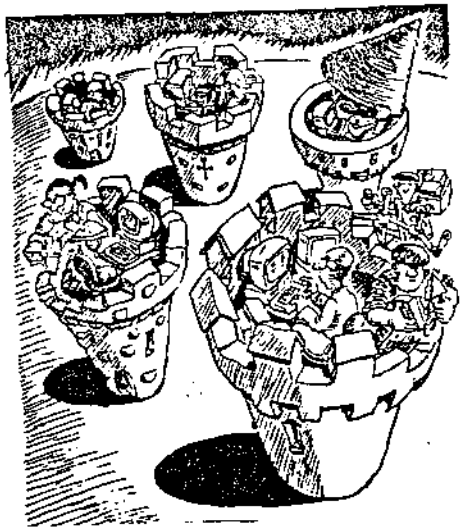
Lawyers are already busy. A New York-based company called Refac bought the rights to a basic patent on the technology of spreadsheets and has sued, among others, Lotus Development, whose 1-2-3 spreadsheet leads the market. Another tiny firm, called Cadtrak, acquired a patent with which it could threaten most programs which paint graphics on a computer screen. Both companies are accused of being more innovative in court than in developing computer software. Apple is being sued by a company which believes that the Hypercard program distributed with all Macintoshes violates its patent on techniques for combining "windows" on a computer screen.

The sorting out of conflicting claims could take a long time. With little history to guide it, the patent office will find it hard to decide who really created which software innovation. As so often when America goes to law, patent regulation could impose significantly higher costs on the whole of the software industry. The problem lies in the different assumptions underlying patent and copyright.

Patents provide ownership rights to ways of doing things. Copyright covers the expression of ideas. One might, in theory, patent the spreadsheet as a tool for manipulating numbers—indeed IBM has already filed such a patent, though it has never insisted upon its claim. In theory, nobody could duplicate the functions of a patented spreadsheet without paying royalties. Under copyright, however, a company can protect only its specific version of a spreadsheet.

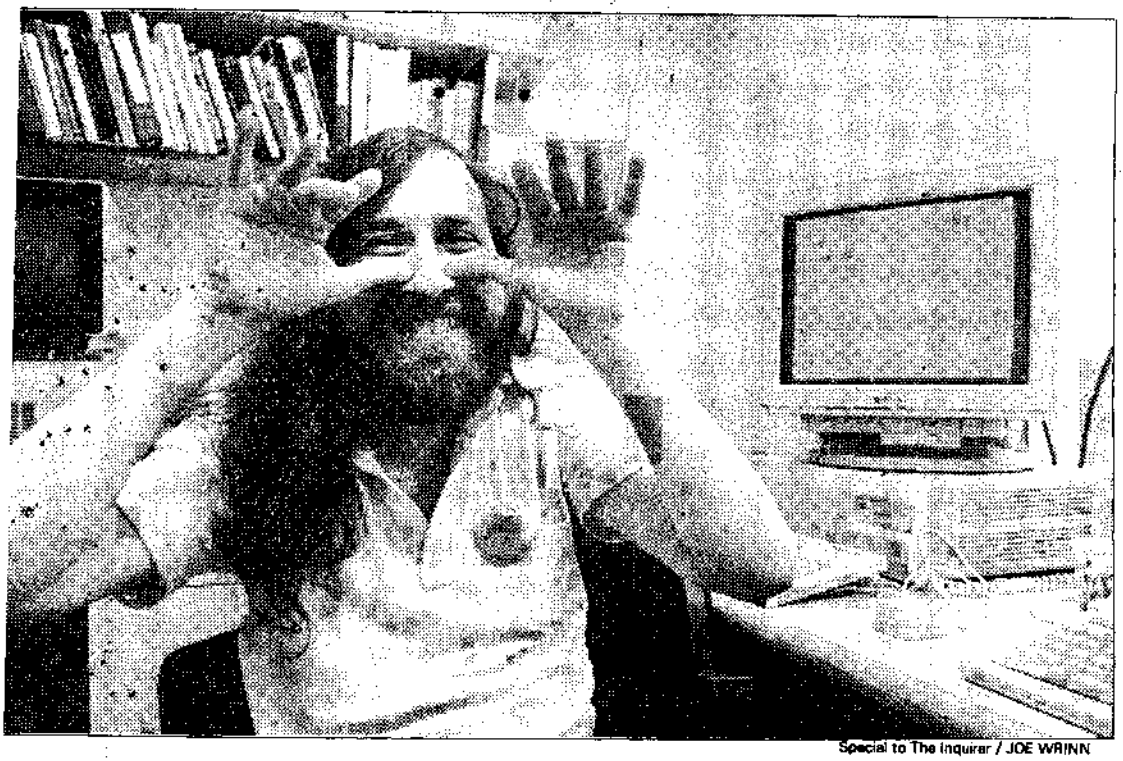
The difference could prove crucial to innovation. Copyright makes it easy to take a good idea and make it better. Patents, by contrast, require the great to pay royalties to the good. Though existing firms may be able to avoid royalties by swapping patents, the profusion of claims now being granted by the patent office will make it much harder for newcomers, especially suppliers of low-cost software, to enter the market.

Patent law could also change the structure of the software industry in an expensive way. Patents promote an industry based on sales of components. When, say, a computer-maker buys a chip for his new machine he can safely trust the chipmaker to make sure that the chip does not violate anybody else's patent. Unfortunately the technology of software makes it hard to link together components built by different authors. Though the use of software components is slowly growing, it is still cheaper and easier to build from scratch many vital (and possibly patentable) bits of code than it is to buy them.



That sort of re-invention makes the administration of patents on software a potential nightmare. Patent applications typically take two to three years, while copyright takes only a few days. Two or three years is about as long as the average software-product life cycle. So a program developer might not know to whom he owes royalties until after his product is obsolete.

To complicate things further, some legal scholars reckon that the patent office does not have the right to award patents on software in the first place. Traditionally, patents have been restricted to processes and innovations for the "transformation of matter". The extension to software rests largely on a 1981 Supreme Court case. Ms Pamela Samuelson, a professor at the University of Pittsburgh Law School and a leading authority on software law, reckons that the patent office may have been too ambitious in its interpretation of this case. It will cost the software industry dearly to find out.



Special to The Inquirer / JOE WRINN

Richard Stallman says computer users should have the right to share and alter software.

8/90

Happy hacker's crusade

Software should be free, says an eccentric who programs for the joy of it.

y Steve Stecklow
quirer Staff Writer

CAMBRIDGE, Mass. — Richard Stallman sluggishly emerges from his cramped nd cluttered office-cubicle at the assachusetts Institute of Technology. It is 11 a.m., and he is ithout shirt or shoes. His eyes re half-closed, his shoulderngth, scraggly brown hair is unombed. A blanket and pillow lie n a couch inside the door. He eets a visitor with a yawn.

Say good morning to one of the ost brilliant computer programmers in America, an eccentric and obsessive 37-year-old who has dedicated his life to writing complex and useful software that he gives away for free, and who is challenging others to do the same.

Stallman's contributions are used by thousands of programmers all over the globe, at major computer companies, universities, financial institutions and the U.S. government.

"He's a legend," says Richard Gabriel, founder of Lucid Inc., a software company in Menlo Park, Calif. "Many times when I'm at meetings in Europe or Japan, people mention his name. ... He's absolutely a genius."

Stallman, a Harvard graduate who last month won a $240,000 MacArthur Foundation "genius" fellowship, considers himself a

(See STALLMAN on 3-D)

A happy hacker who crusades for computer-software freedom

STALLMAN, from 1-D

true hacker, a designation that has nothing to do with breaking into computer networks, stealing credit-card numbers, or other mischievous and often illegal practices that the term has come to imply. Rather, he refers to the word's original meaning — a person who fiddles with a computer day and night simply for the joy of making new discoveries and sharing them with others.

Being a hacker also implies a lifestyle, and Stallman's would probably put most workaholics to shame. He literally spends nearly every waking and sleeping hour in his cubicle, whose decor consists of a file cabinet stuffed with clothes, the couch, a desk, a large computer, and piles of books and papers. Although he is interested in music and folk dancing, his social life is minimal.

Stallman's normal workday begins at noon, when he gets up and puts in his first six hours at the computer, a powerful desktop machine. He no longer actually operates the computer. Eighteen months ago, he contracted tendinitis, a result, he says, of all those years of all-night sessions at the keyboard. So now he hires typists, whom he stands over and to whom he dictates commands.

One meal a day

At 6 p.m., he breaks for his one meal of the day — a two-hour dinner, usually at a local Asian restaurant with friends.

"That's a hacker tradition," Stallman explains, as if such a practice was not out of the ordinary. "Eating once a day and eating a very large meal at a nice ethnic restaurant."

Then it's back to the computer until midnight, when he quits to spend the next four hours reading. At about 4 a.m., he usually calls it a day and conks out on the couch.

"He does look and act like he came from Central Casting: 'Find me a real MIT type of computer programmer,'" said Mitchell Kapor, another computer legend who founded Lotus Development Corp. and, unlike Stallman, went on to become rich. "But at the same time, I think the thing that is interesting about him is that he has put into practice, not just talked about, an alternative software economics."

Software freedom

Kapor is referring to Stallman's personal crusade to make software "free" — not in the sense of cost, but of freedom. Stallman believes that computer users should have the right to share, alter and improve software, and not be restricted by patent or copyright laws. Lately, several large computer companies, including Lotus and Apple, have been

He spends nearly every waking hour at his terminal, for the joy of making discoveries.

ative roots — the way it was 20 years ago, when computer technology was in its infancy. When he began working at MIT's artificial-intelligence lab in the early 1970s, he says, all software was shared, and programmers built on the improvements made by others at computer companies and other universities.

"We were really trying to advance software, rather than trying to advance software as little as possible while getting money as much as possible," says Stallman.

By the end of the '70s, universities were selling programs and Stallman saw most of his colleagues go into private industry, where software was treated as commercial property and outside programmers were no longer free to modify or copy the work.

"Everyone at first recognized the ugliness of doing that," says Stallman. "But they gave in to the pressure of doing it. Some of them were drawn by the temptation of the big bucks."

But not Stallman. "Most people who were unhappy about this were resigned to it. I decided that I was going to use all of my strength to bring back the sharing community."

In 1984, he quit his job at MIT to ensure that the university could never claim ownership of his work. But the university agreed to give him free office space to work on a special project — to single-handedly create "a large and useful body of software that people wanted to share."

Within a year, Stallman began giving away copies of a new version of EMACS, a sophisticated program editor — which is used to write new programs — that he authored. It quickly became a standard among computer programmers.

He also established the Free Software Foundation, whose purpose was to distribute EMACS and other free programs, at cost, to computer users. The programs are packaged with the original source code, instructions that programmers can use to modify the software.

Today, the foundation has about a dozen programmers working for it, most of them, like Stallman, on a voluntary basis. (To support himself financially, Stallman works several weeks each year as a $250-an-hour consultant to major companies, but only on what he considers to be free software.)

To date, the foundation has sold 20,000 instruction manuals for EMACS. It has received contributions from Hewlett-Packard, IBM, Digital and other major computer companies, and has an annual budget of about $500,000. And, according to treasurer Robert J. Chassell, it has distributed its software and programming tools to thousands of users and institutions, including Apple, AT&T, Boeing, Harvard University, Sony, Manufacturers Hanover and the U.S. Air Force Academy.

Users of the software are free to do anything they want with it — even sell it at a profit — as long as the recipients retain the right to study, share, change or improve it.

"This is an extraordinarily important social experiment," says Kapor. "The guy's a pioneer. This is very different, and it's working."

Stallman has become active lately in an organization he founded last fall, the League for Programming Freedom. On Aug. 2, he led 300 programmers, researchers and businesspeople on a mile-long march from MIT to Lotus' Cambridge headquarters, to protest the company's policy of suing developers of compatible software.

In June, Lotus won a federal lawsuit to protect the copyright on its popular 1-2-3 spreadsheet program. Under the ruling, it is illegal to develop a program that uses the same on-screen menus and commands as an existing program — a precedent that Stallman and other league members view as a threat to the entire software industry, because programmers typically borrow standardized features from other programs.

Lotus argues that the ruling only gives its products protection from imitations. But the league counters that the decision is akin to requiring all typewriter companies to come up with different layouts for the letters on their keyboards. It is not fair, league members say, to prevent them from using in their programs command sequences that people already know.

Stallman has become active in the league with his usual fervor — organizing protests, writing position papers and lobbying, while still spending five to 10 hours a day working on new free programs.

He says he doesn't expect the MacArthur Foundation fellowship he won in July — which will give him about $48,000 a year for the next five years — to change his lifestyle much. He'll use the money, he says, to go to the Soviet Union and buy an air conditioner for the office, but will probably end up saving most of it.

As for finding a real place to live, he says, that is too much of a "nuisance."

against similar-looking, competitive products.

But Stallman views this trend as a threat to the freedom of programmers, and ultimately bad for computer users. By allowing people to change software, "it makes the software more useful, and useful to more people," he says.

"It also encourages the spirit of voluntary cooperation. It's a bad thing when people make promises not to help other people in order to get things for themselves. That undermines the fabric of society."

Stallman says his thinking parallels that of Benjamin Franklin, who refused to patent the Franklin stove. While such a view may seem naive or overly idealistic in modern times, Stallman says he is only trying to return the software industry to its free-spirited, noncorporate and cre-

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Software law reduces production, competition

The production of software is paid for in roughly two ways. For direct-profit software, the return on investment is derived from sales. For indirect-profit software, the return on investment is derived from increased productivity. Institutions sometimes freely distribute such software with liberal licenses because they often receive significant improvements from outsiders. Experienced users enjoy such software because they can make it fit their needs.

A market promoting the public interests should encourage both kinds of software production, to increase the variety of available software. Unfortunaly, the producers of direct-profit software are patenting the ideas behind software and copyrighting screen layouts and command sequences. As a result, a growing proportion of the cost of producing software supports legal fees to do patent searches and litigation.

Producers of indirect-profit software are the first to pull out of the market for fear of court costs. Computer users bear the ultimate costs, including the big users, like the ones to which you pay taxes.

JOHN D. RAMSDELL
Lead scientist, The MITRE Corp.

▶ *Letters must be signed and include an address and telephone number for verification. Letters should be 200 words or less; all are subject to condensation. Not all letters may be published. Address: Business Editor, The Boston Globe, Boston, 02107.*

...an opportunity to be trade...

Computer wall raised to guard networks used by researchers

By Charles A. Radin
GLOBE STAFF

Like residents of an urban neighborhood double-locking their homes as vandals despoil the environment outdoors, the intellectuals and hackers who inhabit the world of university and research computers are bolting their electronic doors.

Some, who long have argued that the vision of free-flowing information in a worldwide computer network is a pipe dream, are enthusiastic about the ever-tighter control on access to the network.

Others, including Richard Stallman, the last of the great hackers at the Massachusetts Institute of Technology, are sad and frustrated. Long underdogs in their battle with the "sysadmins" – the system administrators who police access to the net-

GLOBE PHOTO / PAM BER

RICHARD STALLMAN
"Ashamed" of security measure

work with increasing sternness they now acknowledge defeat.

No one incident brought the b tle to an end. There was a spy he a vandal there, benign but bure cratically bothersome pranksto seemingly everywhere.

This summer, as incidents cont ued and intensified, even the Ca bridge-based Free Software Fou dation, the last bastion of absolute

COMPUTERS, Page

Boston Globe 8/6

Computer walls go up to guar

■ COMPUTERS

Continued from Page 1

open access to big-time computing, threw in the towel. Vandals who were able to enter the foundation's system anonymously were not only deleting and trashing files there, but were also entering Internet – the international network linking university and research computer systems – and doing damage in other systems as well.

To protect its own central effort – creating nonproprietary software that anyone may freely use – and in response to complaints from others that they were letting vandals into the neighborhood, the foundation for the first time began requiring users to have passwords, and other organizations drew their security ever tighter.

The trend toward more and more security is working in holding down destructive incidents, observers say, but it is making communication less free for thousands of people around the world who have grown accustomed to discussing issues and learning from people they have never met and whose identities outside the computer neighborhood are unknown.

Michael Bushnell, a programmer at the Free Software Foundation, said the changes are making systems more inconvenient to use and creating an international network that cannot be used without an operator putting himself under surveillance.

"There's not a big sharp impact because, over time, so many networks already created security barriers," Bushnell said. Extension of these restrictions to the Free Software Foundation – which, though it has created some security, is not yet fully closed – "is kind of like when the last critical-of-the-government newspaper is shut down. After it's gone a while, people notice a difference."

Because the ability to enter the worldwide network and access information in virtually every area of scholarship and research was, by its nature, not monitored, no one can say with assurance how many people now are being denied the use of such knowledge. An estimated 1,000 to 2,000 persons gained access through the foundation's computers, and staff members say they will try to preserve this somehow.

"I feel ashamed not having an open system," says Stallman, legendary computer hacker, McArthur Fellow, father and president of the foundation. "I feel ashamed having a system that treats everyone as vandals when in fact very few were.

"Thousands were using the systems, and almost all of them did nothing to bother us. Every time I think about this I want to cry."

Clifford Stoll, the San Francisco computer whiz who discovered a Soviet infiltrator in Star Wars files at the Lawrence Berkeley Lab and wrote a best-selling computer espionage thriller, "The Cuckoo's Egg," based on the experience, says it is the end of an age of innocence for even the most hopeful.

"A very small number of people, maybe three or four out of many hundreds, have exploited openness to destroy the sense of community," Stoll asserts. "Just like it's a very small number that go out and spray paint public buildings. The sad thing is it causes us to roll up the gates.

"We once opened our doors to each other in trust and naivete," Stoll said. "We believed everyone had the same goals. Now we have found out – hell no, there are actually people who really want to screw things up for others.

"You find the same people in the computer neighborhood as in real neighborhoods. Most you want to be friends with, some are uncooperative and a few are actually malicious."

The ideals of freedom and openness that now are passing were integral to the hacker ethic – the credo of the computer revolution that developed in the 1950s and 1960s and long was centered at the artificial intelligence laboratory at MIT.

Hackers sought total access

As reported by Steven Levy in his definitive book "Hackers: Heroes of the Computer Revolution," the hacker ethic dictated that access to computers should be total, information should be free, authority should be mistrusted and decentralization should be promoted.

Randall Davis, the current associate director of the artificial intelligence lab, says that there is no openness issue with regard to the content of work being done on the academic network but that the pressure for security to limit access created by even a tiny number of vandals is overwhelming.

"Anybody wants to know what we're up to here, come up here and we'll show you," Davis said. "Write us and we'll mail it to you. There's no issue about copying things. It's about destroying things.

"Imagine a library with a remarkable *property*," Davis suggests. "You can walk in and read anything you want and if you find anything you like, you can say, 'I want a copy of that,' and almost immediately you have the copy and can walk away. And it is free.

"The problem was, people were walking into the library and destroying the orginal for no reason other than the thrill any vandal gets from writing on walls or destroying basketball backboards."

While specialists differ in their willingness to embrace strong security, they generally agree in their analysis of why the vandalism has grown worse – the rise of international networks and the proliferation of inexpensive modems that allow users access to networks half a world away.

A modem – short for modulator and demodulator – converts the digital signals produced by a computer into sounds that can be transmitted over telephone lines, or converts the sounds back to digital signals understandable to a receiving computer. Around the mid-1980s, the price of modems had fallen to the $300 to

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d research networks

$500 range. By the end of the decade, the price was below $100.

Debate had early roots

The debate between advocates of security and adherents of openness goes back almost to the beginning of the computer revolution, but it was not until the modem was available to anyone with a passing interest that long-distance, anonymous exploration of the worldwide network became possible.

"From their inception, research laboratories – particularly academic research laboratories – were essentially open in their computer systems," Davis said. "Anybody who wanted to get onto the machine could. Anyone who wanted to read something that was on the system could do it.

"The key thing that made that feasible is until modems came along you had to be there – in the lab – to do it. You had to have personal contact to do that. Because people were physically co-located, there was a sense of community and an ability to enforce simple ethical rules."

"With a single modem you can reach into a place without being there physically. Suddenly, actions become depersonalized. And when actions become depersonalized, when you can destroy at a distance, there is a disconnection between the action and its consequences. You don't have to face the people for whom you have just caused trouble," Davis said. "Sadly, there is an understandable glee in being able to reach very far and knock something over – there's a certain feeling of power in that."

There is a widespread perception in academia and in the private sector that those who would roam freely – or, some say, trespass – in the computer neighborhood are young. There is great disagreement about their motives.

"Most are adolescents who want to thumb their noses at the power structure," Stoll said. "Most of these kids, fortunately, don't have enough technical expertise to wreck things, and as you become more technically expert, you usually get more a sense of community.

"I don't want our networks to need cops. I want people to trust each other. I want to go back to the age of innocence. It'll never happen. It was a bubble in the 1970s, when there were 15 or 50 people on a network. With 500,000 people, this was bound to happen."

Crackers versus sysadmins

Stallman agrees that the size of the community works against the desire for openness. But he also warns that, from the earliest days of his membership in the hacker community at MIT, undesirable side effects have been understood to arise from restrictive policing. The competition between the "sysadmins" who make the rules and the "crackers" who break them has a comic-book quality and tends to exclude the possibility for reason and conciliation.

"Computers that had security and computer administrators warp the mind of security breakers," Stallman said. "They adopt a world view – crackers versus sysadmins. They assume there are these two sides in the computer world, that sysadmins would hate crackers because the crackers didn't want to be controlled. Many accept that they are on a particular side and fight for that side without looking for a way out of the fight."

Stallman himself believes the sysadmins are on a distasteful power trip that is antithetical to what the computer world should be about, "but I don't spend most of the time breaking security because it is forbidden. That would be like the baby who eats his spinach when the parents say don't eat it.

"Adolescents often have not learned to think deeply about these things and they cast themselves in the role of the cracker."

Though Stallman went along with the other officers of his Free Software Foundation when they decided security had to be imposed there, he does not accept that an open system is an impossibility. What is impossible, he asserts, is a very large, well-known open system.

"If there's a place that's unspoiled and might get hurt if too many people know about it, it is a bad idea to publicize it," he concludes. "It is better to tell a few people you trust and who know the dangers of abusing it.

"Spelunkers have the same problem. They want to explore caves, but they know they also have to protect caves" from the environmentally insensitive. "Maybe someday it will be necessary to lock up all caves. It will be better if the information about where to find nice caves is just passed around among responsible people."

'Copyright' in Russian: Right to copy

BY WILLIAM BRANDEL
SPECIAL TO CW

In a Soviet society wrestling with free-market dynamics for the first time, *glasnost* is sometimes spelled "Copy *.*".

Duplicating copyrighted software is considered resourceful, not sleazy, in the Soviet Union, according to Soviet observers and vendors trying to sell into the emerging Eastern Bloc market. Although no precise data is available, many vendors and observers agreed that hundreds of millions of dollars worth of illegally copied U.S. software is in use in the Soviet Union and that at least half of all Soviet personal computers run some pirated software.

David Flaherty

Software piracy "is so common that many [Soviet] organizations don't even consider it criminal," said Seymour Goodman, an adviser to the U.S. Department of Defense and director of MIS and policy at the University of Arizona in Tucson.

In the Soviet Union, where intellectual property carries little financial benefit, the legal structure is not ready for a burgeoning software industry. "Our problem is that present Soviet copyright law does not include software and is not doing the trick," said David Curtis, a corporate attorney at Microsoft Corp.

"The most popular software in the government is a Soviet version of DOS," said Ilena Cavelyava, a consultant to Microsoft's Soviet distributor, Management Partnership, Inc., and a professor of foreign trade relations and intellectual property rights at Moscow State University.

Illegal copying is so widespread because Soviet information systems officials simply do not have any concept of intellectual property, Cavelyava said.

"Soviet officials take great umbrage to the charge that they are pirating software," said William McHenry, a Georgetown University professor of business administration.

Continued on page 14

'Copyright'

CONTINUED FROM PAGE 1

"They say, 'If we don't protect our own programmers, why should we protect yours?' " McHenry said.

"We estimate that for every copy of Autocad sold [into the USSR], five are copied," said Sandy Boulton, an adjunct of Autodesk, Inc.'s antipiracy group.

The Soviet government gives the activity backhanded encouragement by employing programmers to rewrite popular application interfaces for use by Russian-speaking users. At one point, Ashton-Tate Corp. discovered five different versions of its Framework integrated software making the rounds in the USSR. Instead of prosecuting, Ashton-Tate officials tracked down the authors of the best adaptation and signed them to a marketing agreement.

Ashton-Tate will support a copyright obtained by the programmers, Sasha Barilov and Mikhail Figurin of the Leningrad Institute of Information, even though the development was unauthorized, according to Ashton-Tate.

While there is widespread agreemen that piracy is epidemic in the USSR, there is little agreement about what, if anything, should be done about it.

Business Software Alliance representatives, a consortium set up by Aldus Corp., Ashton-Tate, Autodesk, Lotus Development Corp., Microsoft and Wordperfect Corp., met in San Francisco last week to discuss how to defend against international copyright infringement. Participants said the Eastern Bloc piracy issue would be among the agenda items.

Help may be on the way from the Soviets themselves. Just over a year ago, a group of programmers and IS officials from the Soviet Union as well as U.S. vendors joined to establish the Pereslavl-Zalesky agreement, a code of ethics.

The impetus is that in a loosening market, "Soviet programmers see that they have the most to lose if copyright law is not enforced," Cavelyava said.

Some vendors who are still bullish on the Soviet market would like to settle the score with more capitalist tactics. Ashton-Tate is bundling its software with PC hardware as well as offering free upgrades to legitimate Dbase customers. Autodesk is selling Autocad with hardware locks, a tactic it abandoned in the U.S. The popular sentiment from U.S. software firms is that they are willing to forgive and forget past violations and instead concentrate on establishing beachheads in a potentially enormous market.

One Man's Fight for Free Software

Continued From First Business Page

sufficient body of free software so that I will be able to get along without any software that is not free," he writes.

Perhaps Mr. Stallman's concept of free software would be easier to dismiss if he was not universally considered — even by his enemies — to be one of the nation's most outstanding programmers. And his body of software is considered distinguished by industry experts.

The computer industry is now evenly split between two giant consortiums that each claim to champion open software systems based on the Unix system. They contend that the open systems will emancipate the computer user from a single company's private standards. One has allied I.B.M., the Digital Equipment Corporation and others opposite American Telephone and Telegraph and Sun Microsystems. Mr. Stallman is somewhere in the middle and his alternative of truly free software is gaining attention — and credibility.

For example, Steve Jobs's Next computer comes bundled with Mr. Stallman's free software, and a number of other computer companies, including the Sony Corporation, Sun, the Hewlett-Packard Company, the Intel Corporation and the Data General Corporation, are now giving support to aid Mr. Stallman's development work.

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From his outpost on the M.I.T. campus, Mr. Stallman operates the Free Software Foundation, a loosely run organization of part-time staff members and volunteers that is now well on its way to creating a complete software system called GNU. The name is a Möbius strip-like acronym that stands for "GNU's not Unix."

When complete, GNU will include a computer operating system and all the tools needed by programmers to design and write the most sophisticated applications for a wide variety of computers. It will also include word processors, spreadsheets, data base managers and communication software, making it just as useful to non-programmers.

It is a Herculean undertaking, comparable to those that corporations like I.B.M., D.E.C.and A.T.&T. each devote millions of dollars and hundreds of programmers to annually.

But unlike commercial software ventures, GNU programs are distributed with source code, the original programmer's instructions. This permits any user to modify the program or improve it. While most software companies jealously guard their source code, Mr. Stallman argues that by freely sharing it he has created a software community in which each programmer contributes improvements, thereby bettering the program for all.

Mr. Stallman, who likes to be called by his initials, R.M.S., forged his values as a member of an elite group of M.I.T. computer hackers who, during the 1960's and 70's, conducted pioneering research in developing the world's first minicomputers and the first time-sharing computers. M.I.T., which is where the term hacker was born, also served as the incubator for many early computer hardware and software companies.

In that community, software was freely shared among the hackers, who would build their work on the earlier programming efforts of their friends.

While the press has come to identify the term hacker with malicious individuals who break into computers over telephone lines, the hackers themselves have an earlier and different definition. A hacker, Mr. Stallman said, is one who "acts in the spirit of creative playfulness."

But while hacking began as intellectual sport and became a way of life in the mid-1970's, many of the hackers who had participated in the tightly knit community of computer researchers left to take advantage of lucrative employment opportunities at the new companies. Only Mr. Stallman remained behind, intent on carrying on the traditions.

A pioneer creates sophisticated programs and gives them away.

The breakup of the hacker community embittered him and for several years he labored in solitude intent on the incredible task of matching the world's best programmers, writing for free the same programs they were developing on a for-profit basis at their new companies.

•

In his book "Hackers," Steven Levy describes how during 1982 and 1983 Mr. Stallman matched the work of more than a "dozen world-class hackers" at Symbolics Inc., rewriting their programs and then placing them in the public domain.

"He believes that information should be free and he interprets it in the most literal fashion," Mr. Levy said in an interview. "Most hackers make accommodations with the way the world works. Stallman doesn't want to make those concessions. He's a total idealist."

Some computer scientists believe there is a place for Mr. Stallman's free software. "There is room in the world for free stuff and commercial stuff," said Brian Harvey, a computer science lecturer at the University of California at Berkeley. "We don't have to take over the world. Its good enough that I can run his software on my computer."

The most popular GNU program is an extremely flexible editing program known as Emacs. The software package, originally written by Mr. Stallman at M.I.T. in the early 1970's, has become one of the most widely used — and imitated — programming editors. Another widely used GNU program is a compiler, a program that translates text into a form that can be executed by a computer.

For a programmer, a compiler and editor are equivalent to a carpenter's hammer and saw, the two most important tools of the craft. Emacs's popularity is due to its flexibility, programmers say. An entire computer language is embedded in the program, giving it the utility equivalent to that of a Swiss Army Knife. For tens of thousands of programmers Emacs has become virtually the only program they use because they can fashion it into a data base, word processor, appointment calendar or whatever else they need.

"You start up Emacs and you never leave it," said Russell Brand, a computer scientist at Lawrence Livermore Laboratories in Livermore, Calif.

GNU software is freely distributed, but in a different manner from public domain and "freeware" software among personal computer users. While public domain software can be freely copied, freeware authors ask users to contribute a fee if they find a program useful. In contrast, GNU programs are not placed in the public domain. Instead they are distributed with a public license that Mr. Stallman calls a "copyleft." This license insures that the software will stay freely copyable and not be incorporated into a for-profit program.

While Mr. Stallman's software is widely used at universities and research centers and by professional programmers, his zealous commitment to the idea of free software has angered others.

Several years ago the idea led to a bitter dispute when executives at Unipress Software Inc., an Edison, N.J., company that sells a commercial version of Emacs, pointed out that some of their code appeared in a version of Mr. Stallman's Emacs.

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Globe staff photo/Tom Herde

Programmer Stallman says he fears a Lotus and Apple monopoly.

MIT software developers field 'freedom' campaign

Apple, Lotus 'look-and-feel' suits targeted in ad

by Jane Fitz Simon
Globe Staff

If you oppose copyright protection for the appearance and functionality of software, do not buy Lotus 1-2-3, do not develop software for the Apple Macintosh, and do not seek employment at either firm.

That is the implied message being broadcast to hundreds of students in the Cambridge community by three highly respected computer scientists, including Marvin Minsky of Massachusetts Institute of Technology, considered the father of artificial intelligence.

Their goal? To pressure Lotus and Apple into dropping multimillion-dollar lawsuits filed against competitors they charge illegally copied the "look and feel" of Lotus' 1-2-3 spreadsheet and Apple's graphics-based Macintosh user interface.

Minsky, who built MIT's Artificial Intelligence Laboratory, edited, signed and helped pay for a half-page advertisement that appeared in the April 14 issue of "The Tech," MIT's student newspaper.

The ad blasted Lotus and Apple for "trying to create a new form of legal monopoly . . . that would cause serious problems for users and developers of computer software and systems.

"If Lotus and Apple are permitted to make law through the courts," the ad said, "the precedent will cobble the software industry."

Labeled "a paid politicial advertisement," the ad featured bold headlines: "Computer Scientists, Watch Out!" and "Keep Their Lawyers Off Our Computers."

Co-sponsors of the ad along with Minsky were legendary computer hacker Richard Stallman, who, while working for Minsky's AI Lab, developed EMACS, one of the most commonly used computer programming editors; and Gerald J. Sussman, a popular professor of electrical engineering at MIT who wrote "Structure and Interpretation of Computer Programs," a widely used textbook for beginning computer science majors.

Minsky is the most famous of the group, but the chief instigator was Stallman, whose deep belief in the sanctity of free software led him three years ago to found the Free Software Foundation Inc., a Cambridge-based nonprofit organization dedicated to eliminating restrictions on copying and redistribution of software.

Usually the FSF pursues its mandate by promoting the development and use of free software, but Stallman lately has flirted with grass-roots activism.

He is angry that Lotus and Apple are seeking to control user interfaces, a precedent that he, Minsky and Sussman agree would burden users in the same way drivers would be burdened if car manufacturers were forced to arrange pedals in different ways.

"They're trying to bluff us into giving them a monopoly that will cost the rest of us dearly," Stallman says.

Lotus disagrees. "The copyright law we believe is absolutely essential to the health of this entire industry," said Tom Lemberg, vice president and general counsel at Lotus. "It is the means for several centuries now to reward creations."

LOTUS, Page 26

Software developers in 'freedom' campaign

■ **LOTUS**

Continued from Page 25

Apple declined to comment.

If Lotus and Apple win their suits, the scientists say, competition will be stifled and the cost of software will remain artificially high. Improvements to user interfaces will be slower, because "creative imitation" will be illegal.

"Even Apple and Lotus will find it harder to make improvements if they can no longer adapt the good ideas that others introduce," the group wrote, adding a dig: "Some users suggest that this stagnation may already have started."

Perched in front of a workstation in his cramped office at the AI Lab, Stallman says his goal in taking out the ad is to help stimulate public opinion against "look and feel" copyright protection. "Perhaps it will influence which way the law goes," he says.

Stallman makes no secret of the fact that he stands to lose personally if Lotus and Apple win their suits. For months he has been working to develop GNU, a new operating system that, like EMACS, will be freely distributed.

GNU stands for "GNU's Not Unix," which Stallman describes as an improved and "not slavish" imitation of AT&T's Unix operating system. He is two-thirds finished. "You can see I'd be extremely alarmed to see anyone propose to make it illegal," he says.

So Stallman is dabbling in PR. He did not attempt to contact Lotus or Apple directly, he says, because he "didn't think that would be useful."

Stallman's initial act was to arrange for 1,000 buttons to be distributed last year at a computer show in San Francisco. The buttons featured a picture of Apple's rainbow-colored apple logo, with a serpent's fangs in the bite. "Keep your lawyers off my computer," the buttons said.

He is working with a group to file a friend-of-the-court brief against Apple in support of defendants Microsoft Corp. and Hewlett-Packard Co.

The idea of placing an ad in the 9,000-circulation Tech was a whim. "It seemed like it could be a way to do something that I hadn't tried yet," Stallman said. The three sponsors split the $130 bill "with help from a couple of friends."

Over the weekend Stallman struck again. He paid $20 to have a slide projected during film showings by the MIT movie society: "Fight 'Look and Feel' Copyright," the slide said. "Boycott Lotus and Apple."

"I don't know wh[at] next," said Stallm[an]

IDEAS

COMPUTERS

Selling Free Software

Maverick programmer opts for mega-use over megabucks with adaptable code

By Simson L. Garfinkel
Special to The Christian Science Monitor

CAMBRIDGE, MASS.

BY many accounts, he is one of the best programmers in the United States.

His going rate for consulting is $200 an hour. But these days, Richard M. Stallman spends all the time he can in a crowded, 130-square-foot office in Cambridge, Mass., writing "free" software.

To Mr. Stallman, "free software is a matter of freedom, not price." Copies of his programs sell for $150, but a person who buys one is free to do almost anything with it, including making duplicates to give away or sell. This stands in stark contrast to the rest of the software industry, where restrictive software licenses are the norm.

Most programs today are purchased "object-code only" — in a form that can be used by computers, but is virtually useless to humans who would like to take the programs apart, see how they work, and possibly make improvements. Software companies keep their "source-code" — the actual text their programmers write — closely guarded secrets, or sell it for tens of thousands of dollars.

Nobody appreciates how useful source-code can be more than computer programmer Stallman.

In the late 1970s, when he was a staff member of the Massachusetts Institute of Technology's Artificial Intelligence Laboratory, he and other programmers took the source-code for the lab's central graphics printer and added a slew of new features.

"Whenever there was a paper jam, it would send a message to everybody who had a job waiting," Stallman recalls. "When it finished [printing], it would notify you."

But when the lab upgraded its printer, the new machine was supplied with a driving program that was object-code only.

"We wanted to put those features into the [new] program, but we couldn't, and Xerox wouldn't," Stallman says. "We didn't have the source-code, so we had to suffer with paper jams that nobody knew about."

To add insult to injury, Stallman ran across a programmer at Carnegie-Mellon University who had a copy of the source-code, "but he refused to let me have it, because he had signed a nondisclosure agreement," Stallman says.

Such agreements are common in the computer industry. Stallman believes they stifle innovation by forcing programmers to constantly rewrite parts of programs that others have already written, and by preventing people from fixing problems in programs that they use. "Every such agreement is a betrayal of society for personal advantage," he says.

Five years ago Stallman, known to his associates simply by the initials RMS, decided to change things: He started Project GNU, whose herculean task it is to write a version of the popular Unix operating system for which everybody would have free and open access to the source-code. (GNU stands for GNU's Not Unix.) Three years later he set up the nonprofit Free Software Foundation, whose five directors, four paid employees, and hundreds of volunteers around the world are helping with the task.

Once the project is finished, he says, people won't have to sign license agreements that make it a crime to share programs with their friends.

The first GNU program, a text editor called Emacs, was made available in the spring of 1985. Since then it has become a de facto standard editor for high-performance computers worldwide, and is now included as standard equipment by a number of manufacturers.

In many ways, Stallman's Emacs embodies his ideals of what software should be: Emacs is powerful, yet easily modified by programmers who wish to customize it to their own tastes.

Stallman stresses that his software is not "public domain." Every line of the program is covered by a software license that has one nonnegotiable rule: No one may incorporate it into a proprietary computer program or distribute it without making the source-code available.

Today, GNU Emacs is used by hundreds of thousands of people around the world, Stallman estimates.

MELANIE STETSON FREEMAN — STAFF

RICHARD STALLMAN: *'Free' software is not a matter of price.*

But there is no way of knowing the actual number, says Len Tower Jr., one of the foundation's directors. "It's a hard question to answer because of the way we do distribution: We encourage people to pass it on."

What has attracted even more attention than the editor is Stallman's compiler, an essential part of any operating system that takes source-code and turns it into object-code. GCC, as the program is called, is considered by many to be one of the best compilers around.

"It produces code that is as good or better than any commercial compiler that I have ever used," says Donn Seeley, a senior systems programmer at the University of Utah.

Next Inc., the company started by Steve Jobs, the founder of Apple Computer, has chosen GCC for the basis of its new system. "The GNU C compiler generates very efficient and well-optimized code," says Robert Fraik, system software product manager of Next Inc.

Despite the fact that the programs are free, a lot of people are willing to pay for copies of them, which so far has been the foundation's primary source of revenues. Last year, the foundation grossed $200,000, compared with only $23,000 just two years before. Nearly all the money collected goes to hire programmers who are writing the rest of GNU.

The foundation has also increasingly been the target of corporate gifts of money, equipment, and people.

Work stations on loan from computer companies litter the main work area, part of a hallway borrowed from MIT's Artificial Intelligence Lab.

Hewlett-Packard, a major computer manufacturer, has promised the project $100,000 in money and $350,000 in equipment.

But that grant was held up for more than three months, Stallman says, because HP wanted him to sign a software license agreement promising that the programs supplied with the computers would not be copied.

"I don't think that people should ever make promises not to share with their neighbor, and I've decided to live by that myself," Stallman says.

Like the hundreds of people who have volunteered to work on GNU, Stallman has donated all his work.

He supports himself by writing programs on a free-lance basis two months each year; and he refuses to work on any project that produces proprietary programs. So far, he hasn't had any problems finding jobs.

NOT everyone is enamored of the Free Software Foundation. One company, Unipress Software, sells a program for $395 a copy that is in many ways similar to Stallman's Emacs.

"Implicitly, there have to be problems" with free software, says Unipress's vice-president, Frederick Pack, "at least with support."

But many people feel that GNU programs are actually supported better than many programs sold on the market.

"There are bugs in vendor-supplied compilers that go on unfixed for years," says Utah's Mr. Seeley. "In the case of GCC, we often fix the bugs ourselves, and if we can't, we send mail to RMS and he fixes them for us, usually within a day."

SPLIT-LEVEL COMPUTER CODES

■ A computer program has two faces.

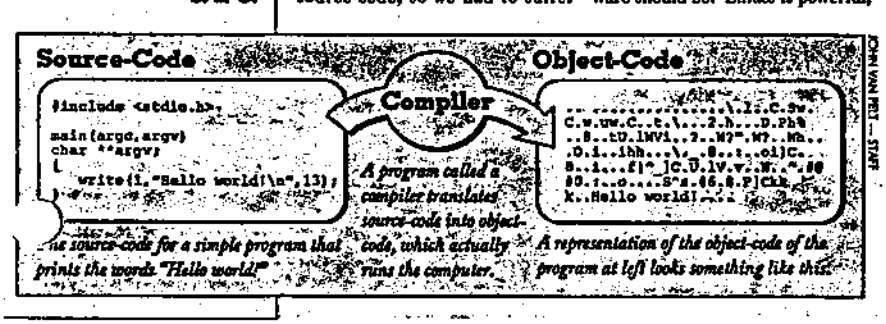
On the screen of the programmer, one face — the "source-code" — looks like a cross between recipes in a cookbook and mathematical proofs, each line containing a set of instructions for the computer to perform at a certain step in the program. Around these steps are comments, which explain how the program works.

Before the program can be run on a computer, however, it must be translated into the language the computer speaks.

The translator program takes the source-code, compacts it, and changes it into "object-code," which can be executed quickly by a computer. This face is nearly impossible for a human to read, let alone decode.

Most computer programs are sold in object-code form today; software companies generally keep their source-code a carefully guarded secret.

— S. L. G.



JOHN VAN HASSELT — STAFF

Mr. Tower amplifies the point: "GNU or free software is never going to hold you up. If you need a bug fixed, you can hire a competent programmer and have it done."

To make things easier, the Free Software Foundation distributes a list of programmers who are willing to work on GNU software on an hourly basis.

Having access to source-code is also important for security reasons, says Jeffrey I. Schiller, manager of MIT's campus network. Having source-code means that holes in security can be fixed as soon as they are detected, rather than waiting for new releases of software from vendors.

SEVERAL programs remain to be written before GNU is usable as a full-fledged computer operating system.

One is the "kernel," the program at the heart of the operating system that arbitrates between multiple programs, which want to run at the same time.

Another is the "file system," which dictates how the computer arranges information on its disks.

Tower hopes that GNU project will be able to use a kernel and a file system developed independently in the academic computer community.

Like GNU, many universities are now distributing their software on a free basis.

Stallman estimates that the operating system might be functional within two years. "One nice thing about not being a commercial organization is, we don't need to have estimates of completion time," he jokes. "I don't have to say when it will be done. I just have to do my best."

BOOKS

Lives Fixed in Flux

LOVE LIFE: STORIES
by Bobbie Ann Mason
New York: Harper & Row
241 pp., $17.95

By Catherine Foster

IN Bobbie Ann Mason's universe, all is in flux: the Kentucky farms are being replaced by subdivision "farmettes," factories from the North are moving in. Satellite dishes bristle from backyards, bringing a dizzying squawk of loud stations.

It's a universe she brought to our attention in her first book, "Shiloh and Other Stories," in 1983, which won a PEN/Hemingway Award for a first work of fiction. And it's one she continues to explore in her fourth, "Love Life," also a collection of short stories. In them, she chronicles the lives of people who are trying to keep their footing as the new era swirls in around them. Some are looking to take the next step.

The country cousins of John Updike's and Ann Beattie's well-heeled suburbanites, Mason's characters watch cable TV, have yards strewn with vehicles, and vacation at Disney World. They're inarticulate, yearning people, dissatisfied with their lives and unmoored by change.

"In the last months they lived together," thinks Beverly about her ex-husband in one story, "Memphis," "she had begun to feel that her mind was crammed with useless information, like a landfill, and there wasn't space deep down in her to move around in, to explore what was there. She felt she had strong ideas and meaningful thoughts, but often when she tried to reach for one she couldn't find it."

Mickey, a real estate broker in "Private Lies," wants to find the daughter he and his first wife gave up for adoption 18 years ago. The fragmentation of his thinking is reflected in the writing. "If Mickey had some money, he'd hire a detective. If he sold a house, he would go to Florida to search for his daughter. He would kidnap Donna [his first wife] and take her with him. He couldn't get over her bridgework. It made her smile sexy and mysterious. Nobody was thinking seriously of buying."

As one could guess from the titles, these stories have something to do with love, sometimes between parent and child, or between friends. But most often the love she's exploring is the marital, or premarital, variety. Often it has gone stale. While Mason's men think about making change, too often it's just that; thinking. Her women are the ones who most often think about doing something different and end up doing it. The exception is Cobb, a 28-year-old soil conservation worker eager to get married, in "Coyotes." He finds a sense of adventure in life through his fiancée, Lynette, who makes him

feel as if "there are different ways to look at the world."

The beauty of the pieces lies in Mason's eye for detail. "The men's shorts on Mrs. Bush's line flap in the breeze like fl... surrender." Mason is a loving scribe to a way of life ignored in an upscale world. She precisely renders small moments, and has a knack for capturing quirks.

But there is a sameness to it all; the lassitude, the small dreams and baby steps of freedom ended up affecting this reviewer like a mall where the stores all carry the same goods. One wishes that once in a while these characters, whose wings are flapping, would actually take off.

■ *Catherine Foster is on the Monitor staff.*

SCIENCE COMMENTARY

Hydrogen Fusion Hype

THE continuing news blitz over tabletop hydrogen fusion is both tantalizing and obscene.

It's tantalizing because, as of this writing, there still is no clear indication of a genuine scientific breakthrough that engineers can develop into a virtually limitless source of energy. This is so, even though hundreds of scientists around the world have been feverishly chasing the chimera loosed at a hastily called press conference March 23 by E. Stanley Pons of the University of Utah and Martin Fleischmann of Southampton (England) University.

The obscenity lies in the penchant for some of these scientists to forsake the normal channels of professional communication and announce half-baked results of slapdash experiments at press conferences. This has kept the story of what might be a major discovery befogged in confusion for over a month. It has also made some of the scientists look silly. Consider, for example, the Georgia Tech team that had to call a second press conference to report a technical flaw that invalidated its previously announced "confirmation" of the Utah experiments.

Pons and Fleischmann set the style for this confusion with their original announcement.

They had been working for half a decade with small battery-powered electrochemical cells filled with heavy water. The electric current breaks up the water molecules into deuterium (double- heavy hydrogen) and oxygen. Palladium electrodes then absorb the deuterium.

The work had reached a point where, the experimenters claim, cells produced three to four times as much energy as it took to operate them. Furthermore, there were signs that deuterium fusion was taking place inside the palladium.

Meanwhile, at nearby Brigham Young University, Steven E. Jones and associates were running different but comparable experiments that gave evidence of fusion but produced little energy.

Reportedly, the two teams agreed to submit reports of their work simultaneously to the journal Nature March 24.

But then the Utah team unexpectedly called the March 23 press conference, saying a paper would appear in Nature later.

Eventually Nature did receive the papers, gave them to scientific referees to review, and returned them to their authors for revision. The Brigham Young team answered the referees' questions and Nature accepted the paper. Pons and Fleischmann, however, withdrew their submission.

This was a graceless move. Scientists who want to confirm the Utah work have been hampered by not knowing, in detail, exactly what was done.

Indeed, partial reports of that work and of the proliferating experiments elsewhere have been circulating globally via fax transmissions and electronic mail. But crucial details always seem to be lacking. Experiments that reportedly confirm the Utah results have generally turned out to be inconclusive.

It's time for the scientists involved to cool the "gold fever" the Utah press conference ignited. Whatever wealth and glory may come of tabletop fusion lie far in the future. The important business at hand is to learn exactly what is happening in the jars — it may not even be fusion — and whether it has any bearing on energy supply. This is best done through careful research that is reported through normal means of scientific communication to ensure that the reports are adequately detailed and technically sound.

Meanwhile, the public should take all claims of fusion in a jar with skepticism. When scientists hype their work, not even the experts know who to believe.

Chronicler of Change

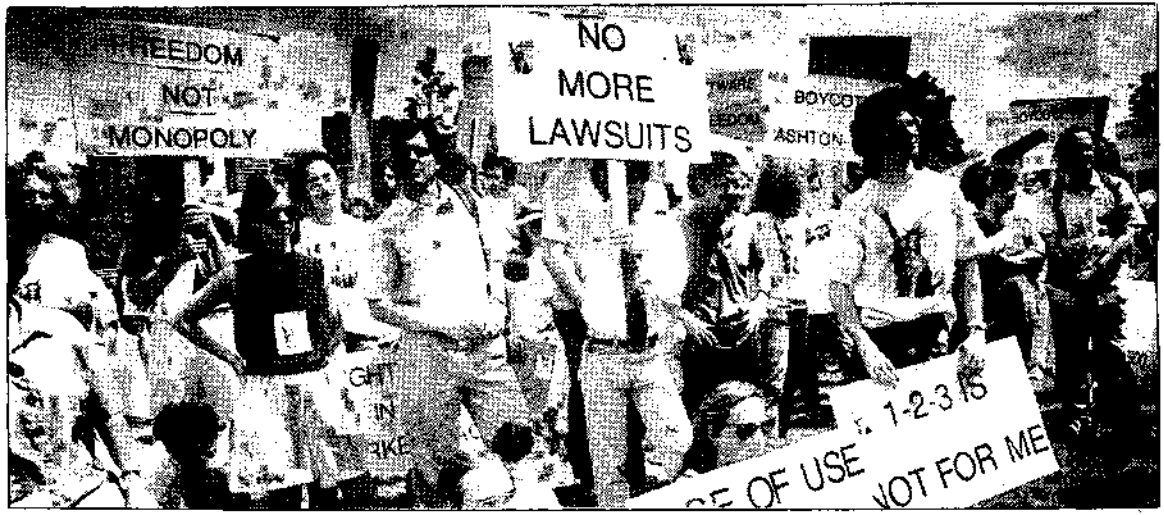
THE farm that Bobbie Ann Mason grew up on in Mayfield, Ky., is now surrounded by a subdivision, an industrial park, a railroad, a tobacco warehouse. The people she writes about are living through the tumultuous changes that happen as a new era washes over the old.

"They're my people, the people I come from," she said of her characters, in a recent interview. "I was concerned about their lives. I had witnessed the migration away from the farm and the kinds of things that happen to them.

"I think marriage is the arena where the big changes in our society are being reflected, and basically I'm always writing about change. Often it seems that the conflict in the marriage is between somebody who wants to hang on to the past and someone who wants to stride out into the future. Or somebody who is very committed to the place and someone else who wants to strike out into a new territory."

"[A] lot has been made about rootlessness, and a lot about roots has been romanticized. As the writer of these characters, I see a lot of excitement in their rootlessness, because they're being uprooted from a lot of things I find bad. It takes courage to deal with freedom ... to forge ahead."

— C. F.



GLOBE STAFF PHOTO / YUNGHI KIM

SOFTWARE PROTEST – *More than 300 software developers and computer users protest at the Cambridge headquarters of Lotus Development Corp. yesterday. They fear Lotus and other large software companies are stifling competition and creativity by intimidating rivals with copyright infringement lawsuits.*

Aug 2, 1990

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...in work rules.

The airline's negotiators, like Tom

Continued on Page D5

One Man's Fight for Free Software

By JOHN MARKOFF

Richard M. Stallman is a computer programmer obsessed with a mission. He wants to bring back the good old days when programming was a communal activity and those toiling at the craft freely shared their ideas — and their source code, the internal instructions that tell the computer what to do.

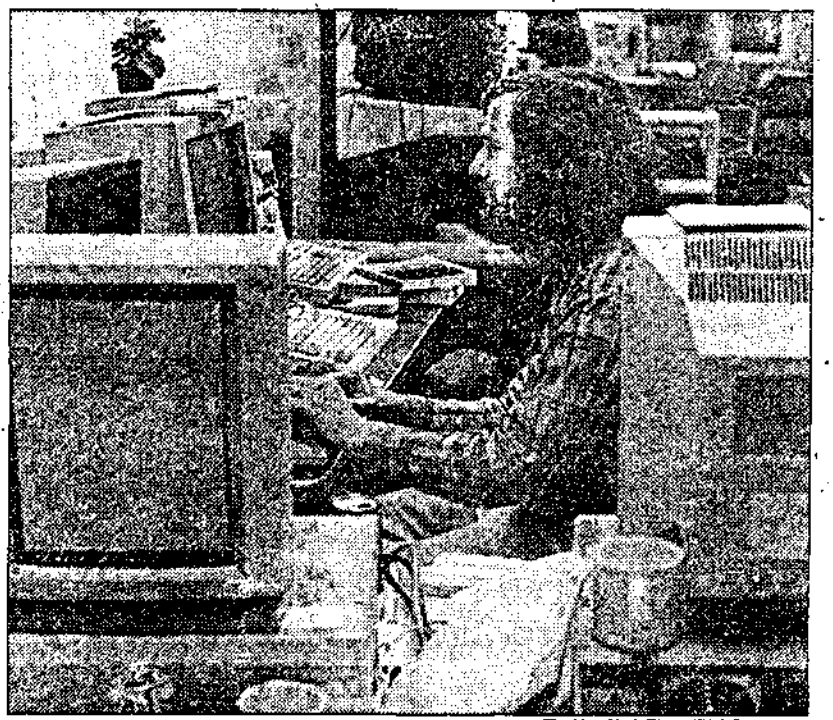
Mr. Stallman, known among his colleagues as "The Last Hacker," has spent the last decade battling a computer software industry that increasingly builds ownership walls around intellectual property. He believes that computer software should be freely shared and devotes himself to creating sophisticated programs that he gives away.

He spends his days and nights in a cramped office at the Massachusetts Institute of Technology's Artificial Intelligence Laboratory working to spread his philosophy that software is different from other physical commodities since it can be copied at virtually no cost. He believes there should be no restrictions on freely copying and distributing it.

Mr. Stallman's ideas have gained increasing importance of late because the computer industry has been moving toward "open" software that will run on many different brands of computers. Consortiums of computer companies have formed to champion their version of the open software, based on the popular Unix computer software operating system.

But Mr. Stallman carries the idea one step further. Not only should the software run on different computers, but it should also be free.

Mr. Stallman is doing nothing illegal, but his is an argument that raises bitter objections from many programmers and companies. They



The New York Times/Rick Friedman

Richard M. Stallman, who is known among his colleagues as "The Last Hacker," believes software should be freely shared and spends his time at his M.I.T. office developing sophisticated programs he gives away.

counter that protecting intellectual property is vital to encouraging innovation.

During the last two decades intellectual property protection has become the foundation of the modern software industry. However, Mr. Stallman asserts that what he calls "the use of human knowledge for personal gain" has had a negative impact because information is no longer widely shared.

"It's impossible to do anything without copying something that has come before," he said. "People talk about the bad effects of government secrecy in Russia. The U.S. is heading for the same place in terms of commercial software."

In a manifesto that outlines his philosophy, Mr. Stallman says that software sellers want to divide the users and conquer them by making each agree not to share with others.

"I have decided to put together a

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Unilever Seeks Units Of Fabergé

By DOUGLAS C. McGILL

The Unilever Group, one of the world's largest consumer products manufacturers, is negotiating to buy the cosmetics, fragrances and toiletries divisions of Fabergé Inc., Daniel J. Manella, the chairman of Fabergé, said yesterday.

Neither company would specify the price Fabergé, a personal care products and apparel company, was asking. Industry analysts, however, estimated the price to be more than $1 billion.

Mr. Manella said the company had not considered selling the divisions until it was approached recently by an investment bank that represents Unilever.

'Taken by Surprise'

"We were taken by surprise," Mr. Manella said. "This was an unsolicited offer. There may be other people interested but they haven't approached us and we have no intention of approaching anyone else."

Fabergé is part of the business empire of Meshulam Riklis, who through the Riklis Family Corporation owns diverse holdings like Culligan International, a water softening company, Pet Specialties, a pet food manufacturer, and a nationwide chain of 5-and-10-cent stores called McCrory.

In 1987, Fabergé bought Elizabeth Arden, a manufacturer of cosmetics, from Eli Lilly & Company for a reported $700 million, and took the com-

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One Man's Fight for Free Software

Continued From First Business Page

sufficient body of free software so that I will be able to get along without any software that is not free," he writes.

Perhaps Mr. Stallman's concept of free software would be easier to dismiss if he was not universally considered — even by his enemies — to be one of the nation's most outstanding programmers. And his body of software is considered distinguished by industry experts.

The computer industry is now evenly split between two giant consortiums that each claim to champion open software systems based on the Unix system. They contend that the open systems will emancipate the computer user from a single company's private standards. One has allied I.B.M., the Digital Equipment Corporation and others opposite American Telephone and Telegraph and Sun Microsystems. Mr. Stallman is somewhere in the middle and his alternative of truly free software is gaining attention — and credibility.

For example, Steve Jobs's Next computer comes bundled with Mr. Stallman's free software, and a number of other computer companies, including the Sony Corporation, Sun, the Hewlett-Packard Company, the Intel Corporation and the Data General Corporation, are now giving support to aid Mr. Stallman's development work.

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From his outpost on the M.I.T. campus, Mr. Stallman operates the Free Software Foundation, a loosely run organization of part-time staff members and volunteers that is now well on its way to creating a complete software system called GNU. The name is a Möbius strip-like acronym that stands for "GNU's not Unix."

When complete, GNU will include a computer operating system and all the tools needed by programmers to design and write the most sophisticated applications for a wide variety of computers. It will also include word processors, spreadsheets, data base managers and communication software, making it just as useful to non-programmers.

It is a Herculean undertaking, comparable to those that corporations like I.B.M., D.E.C.and A.T.&T. each devote millions of dollars and hundreds of programmers to annually.

But unlike commercial software ventures, GNU programs are distributed with source code, the original programmer's instructions. This permits any user to modify the program or improve it. While most software companies jealously guard their source code, Mr. Stallman argues that by freely sharing it he has created a software community in which each programmer contributes improvements, thereby bettering the program for all.

Mr. Stallman, who likes to be called by his initials, R.M.S., forged his values as a member of an elite group of M.I.T. computer hackers who, during the 1960's and 70's, conducted pioneering research in developing the world's first minicomputers and the first time-sharing computers. M.I.T., which is where the term hacker was born, also served as the incubator for many early computer hardware and software companies.

In that community, software was freely shared among the hackers, who would build their work on the earlier programming efforts of their friends.

While the press has come to identify the term hacker with malicious individuals who break into computers over telephone lines, the hackers themselves have an earlier and different definition. A hacker, Mr. Stallman said, is one who "acts in the spirit of creative playfulness."

But while hacking began as intellectual sport and became a way of life in the mid-1970's, many of the hackers who had participated in the tightly knit community of computer researchers left to take advantage of lucrative employment opportunities at the new companies. Only Mr. Stallman remained behind, intent on carrying on the traditions.

A pioneer creates sophisticated programs and gives them away.

The breakup of the hacker community embittered him and for several years he labored in solitude intent on the incredible task of matching the world's best programmers, writing for free the same programs they were developing on a for-profit basis at their new companies.

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In his book "Hackers," Steven Levy describes how during 1982 and 1983 Mr. Stallman matched the work of more than a "dozen world-class hackers" at Symbolics Inc., rewriting their programs and then placing them in the public domain.

"He believes that information should be free and he interprets it in the most literal fashion," Mr. Levy said in an interview. "Most hackers make accommodations with the way the world works. Stallman doesn't want to make those concessions. He's a total idealist."

Some computer scientists believe there is a place for Mr. Stallman's free software. "There is room in the world for free stuff and commercial stuff," said Brian Harvey, a computer science lecturer at the University of California at Berkeley. "We don't have to take over the world. Its good enough that I can run his software on my computer."

The most popular GNU program is an extremely flexible editing program known as Emacs. The software package, originally written by Mr. Stallman at M.I.T. in the early 1970's, has become one of the most widely used — and imitated — programming editors. Another widely used GNU program is a compiler, a program that translates text into a form that can be executed by a computer.

For a programmer, a compiler and editor are equivalent to a carpenter's hammer and saw, the two most important tools of the craft. Emacs's popularity is due to its flexibility, programmers say. An entire computer language is embedded in the program, giving it the utility equivalent to that of a Swiss Army Knife. For tens of thousands of programmers Emacs has become virtually the only program they use because they can fashion it into a data base, word processor, appointment calendar or whatever else they need.

"You start up Emacs and you never leave it," said Russell Brand, a computer scientist at Lawrence Livermore Laboratories in Livermore, Calif.

GNU software is freely distributed, but in a different manner from public domain and "freeware" software among personal computer users. While public domain software can be freely copied, freeware authors ask users to contribute a fee if they find a program useful. In contrast, GNU programs are not placed in the public domain. Instead they are distributed with a public license that Mr. Stallman calls a "copyleft." This license insures that the software will stay freely copyable and not be incorporated into a for-profit program.

While Mr. Stallman's software is widely used at universities and research centers and by professional programmers, his zealous commitment to the idea of free software has angered others.

Several years ago the idea led to a bitter dispute when executives at Unipress Software Inc., an Edison, N.J., company that sells a commercial version of Emacs, pointed out that some of their code appeared in a version of Mr. Stallman's Emacs.

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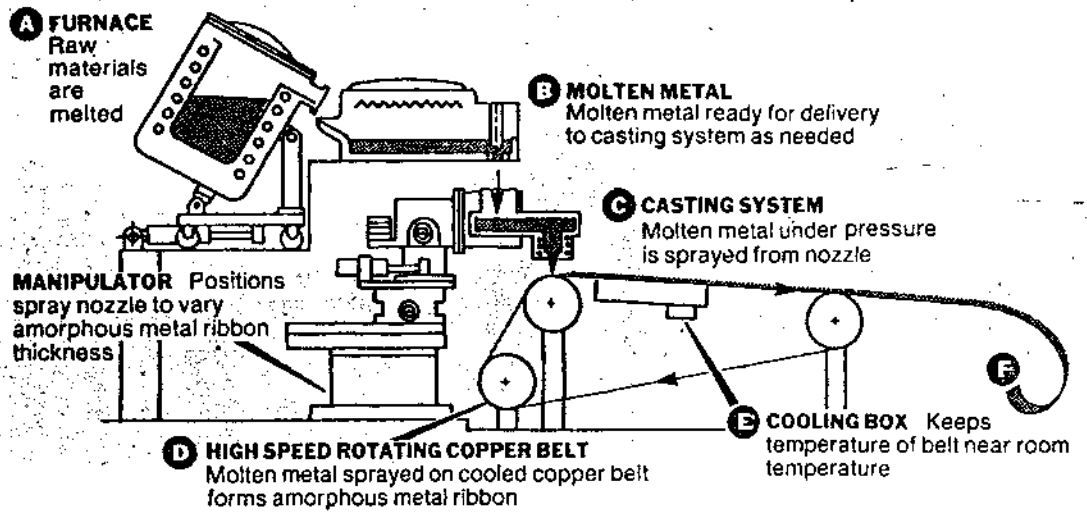

A New Way to Save Electricity

Electrical transformers, which reduce high voltages on power lines to levels useful in homes and businesses, are inefficient devices. Their metal cores must be magnetized and demagnetized dozens of times each second, which wastes electricity. But amorphous metals, in which the atoms are arrayed radomly rather than in tight rows, are much more efficient as transformer cores because they are more easily magnetized and demagnetized.

For years the barrier to developing the more efficient cores has been the lack of technology to form amorphous metal in continuous ribbons, which could then be wound into cores. Now Allied-Signal Inc. has developed a process to make the ribbons and is constructing a plant in South Carolina that will cost between $10 million and $50 million. It will go into operation this spring.

The key to making an amorphous metal is to cool the molten metal so fast that the atoms solidify into a random pattern. Such high-speed cooling means that the molten material must be taken from 1,000 degrees Fahrenheit to room temperature in one-thousandth of a second.

Allied-Signal has achieved this by spraying molten metal under pressure onto a copper belt that is turning at 60 miles an hour. The belt is kept cool enough so that when the spray hits it, a ribbon of amorphous metal instantly results. As the copper belt revolves, the ribbon is taken off and wound on spools.

Allied-Signal hopes to sell the material for about $1 a pound. The company contends that by the end of the century a $1 billion-a-year market for amorphous metal transformer cores will exist. Allied-Signal engineers have estimated that if all transformers on the United States power grid contained amorphous metal cores, 1 gigawatt of electrical energy would be saved, which is the equivalent of the total output from a large nuclear power reactor.

Allied-Signal's executives said the company had spent $100 million in developing the process. They declined to disclose certain details about the technology, including how the molten metal is kept under pressure so that it sprays from a nozzle, how fine the spray is, the temperature at which the copper belt is maintained or the method used to cool the belt.

In the process, iron, silicon and boron are melted in a furnace (A). The molten metal is kept heated in a holding furnace (B) and dispensed as needed to the casting system (C), which is under pressure. A nozzle sprays the metal onto the rotating copper belt (D), which is cooled by a special device (E). The amorphous metal ribbon is taken off the copper belt and wound on spools (F).

The problem stemmed from the ct that Mr. Stallman had decided it because the original idea of nacs was his, he could freely bor- v parts of a version written by an- ier programmer, James Gosling, o now works at Sun. While a stu- nt at Carnegie Mellon University in itsburgh, Mr. Gosling had written own version of Emacs and distrib- d it to friends before giving it to ipress to sell commercially.

Mr. Stallman said he had been told a friend of Mr. Gosling's that he could use parts of the program. Angry messages passed back and forth over computer networks before Mr. Stallman decided that the way to end the dispute was simply to rewrite the offending passages.

"We thought it was a little ironic," said Mark Krieger, president of Unipress. "He says he plans on taking on the giants and then the first company he goes after is little Unipress."

Despite the remaining bitterness over the quarrel, Mr. Krieger said he had great respect for Mr. Stallman's programming prowess. "I would give him negative credit for his ideas on free software," he said, "but give him a lot of positive credit as a brilliant design engineer and the creator of the first Emacs."

Today, although he uses an office at the M.I.T. Artificial Intelligence Laboratory, he is no longer a staff member. He resigned a number of years ago when he set out to create the GNU software system. He makes a living as a part-time software consultant.