

SPECIAL REPORT  IS COMPUTING SAFE FOR YOUR HEALTH?

MACWORLD

The Macintosh Magazine

July 1990 \$3.95

Subscription \$4.95



HEALTH HAZARD

*Could Your Computer
Be Killing You?*

SEE SPECIAL REPORT PAGE 136

GRAPHING SOFTWARE

Charts, Diagrams, and Graphics

2-D CAD

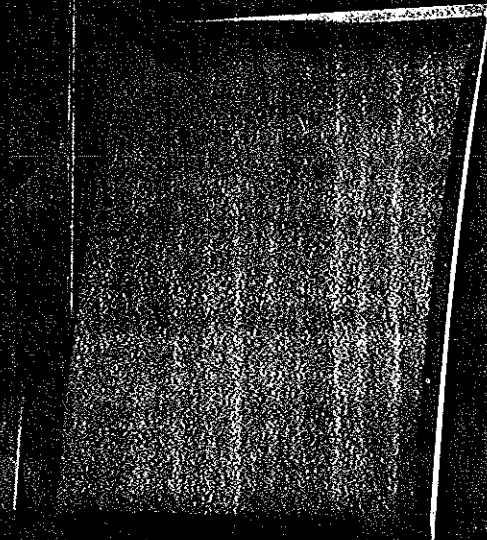
19 Products Compared

PC TO MAC AND BACK

How to Exchange Data

COLOR MONITORS

17 Products, Reviews & Lab Tests



Is Your Computer Killing You?

INDUSTRIAL-AGE PROBLEMS GIVE WAY TO INFORMATION-AGE PROBLEMS

T

BY JERRY BORRELL

his month we face the issue of whether low-frequency magnetic emissions from personal computers, especially from the monitors connected to computers, may cost you your health. One of our own designers put it most succinctly as

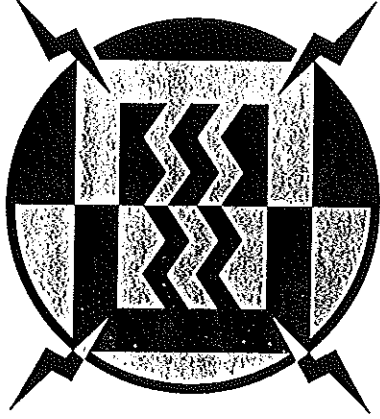
he worked on his Mac to create elements of our cover article and learned more about the article's conclusions: "You feel kind of betrayed. This tool, that you've heard about all of these years as the thing that can do so much, may be killing you."

Why Is Macworld Concerned?

Good question, since the issue is based upon a larger context, that is, the likelihood that electromagnetic fields of certain frequencies may affect human health, specifically hormonal secretions, intracellular activities, and the immunologic abilities.

Your next question may be, Why raise the issue in *Macworld*? After all, ELF (extremely-low-frequency) magnetic emissions aren't unique to Macintosh computers and their peripherals. Why Macs and their peripherals when there are over 20 million IBM PCs and clones in use? One answer—because no other computer magazine has had the temerity to question whether the industry upon which its livelihood depends may be responsible for long-term health problems. We are a computer magazine, extolling the virtues

your own or that of coworkers), the cholesterol in your bloodstream, and the peanut butter you spread on your noontime sandwich." A cavalier analogy that downplays the links between ELF emissions and several forms of cancer.



MARK FOX

of personal computing in each issue, so it is our responsibility to tell our readers if they're in danger, rather than protect the short-term interests of industry. And that (as Johns-Manville of asbestos ill fame might tell you in retrospect) could well make the industry more viable in the long run.

As recently as last December, *PC Magazine*, the largest computer magazine in the world, took the summary stance that "Even if the worst of the effects attributed to ELF prove true, it's likely that you face far greater risks from other forms of pollution (such as cigarette smoke you inhale, either

If This Were Really True the Government Would Have Warned Us

Let's play a game. A memory-recall game. I'll write several words or phrases; you read them and see if you can find any theme linking them: lead, mercury, asbestos, radium, coal dust, cotton dust, beryllium, benzene, DDT, PCB, dioxin, ethylene dibromide, ethylene oxide.

Any luck? No? OK, here are some hints. Name industrial chemicals that are capable of killing both workers who produce them and people who use them in their work. Substances that both government and industry have at one time claimed have no ill effects.

The truth of the matter is that government, regulatory bodies, and industry do not have a good track record of protecting consumers.

In Alan Derickson's chapter of *Dying for Work: Workers' Safety and Health in Twentieth-Century America* (edited by David Rosner and Gerald Markowitz; Indiana University Press, 1987) he writes about the conditions for workers during the industrial boom period of the 1890s. "Beneath its gleaming surfaces the gilded age

[1890s] was also the 'leaded age' in which an evolving disease-intensive technology posed a multitude of health risks for American workers." As I sat reading Derickson's chapter describing how miners died of black lung, how car painters died of fumes from some of the first autospraying machines, how felt-hat makers went slowly mad, how radium dial painters became palsied, I came to realize that we are, just as our grandparents before us, in the midst of the latest technological/industrial maelstrom, facing a new set of health-related issues little understood by our peers.

And as was the case at the turn of the century, it will be up to the users of technology, rather than manufacturers or industry, to identify health and technology issues.

Let the Arguments Begin! Or, Terminology and Etiology, Part I

So often over the last 90 years, in the case of each of the substances listed above, each claim of an impact on health began with a long period of denial. The period of denial is typically followed by a period when terminology obfuscates the issues, when the public does not have a clear understanding that there are problems. During this time people continue to grow ill or die while scientists and technologists argue over what the real issue is.

It goes something like this. Lots of Vietnam veterans have developed cancer. Many of them were exposed to Agent Orange, containing dioxin, perhaps the most poisonous substance in the history of the earth. So how do you prove that Agent Orange is the cause? And why should your suspicions prevent Dow Chemical from using a perfectly effective chemical in its pesticides?

Another case more to the point. You may have read a story in the *New York Times* last year—just after the release of Paul Brodeur's book, *Carcerus of Death* (Simon and Schuster)—in which IBM announced that it has taken the stance that monitor and radiation issues can be solved. Furthermore, it was the company's position that its products will incorporate IBM's own patented technology to negate the problem.

The trouble is that the issue addressed in the *New York Times* relates to VLF (very-low-frequency), and not ELF, electromagnetic fields. I am not accusing IBM of clouding another issue in the all-too-dissociated mind of the public. Nor do I fault the reporter who filed a story that seemed like a recap of an IBM corporate press release. I merely point out that much of the reading public probably thought that IBM had resolved that troublesome issue they'd been hearing about on television (Brodeur was interviewed by Ted Koppel on "Nightline").

The real problem, you see, lies not in the dangers that technology can produce, but in the people who control the instruments of business that produce the technology. For it is their tendency to try to disprove that any harm will come from new technology, rather than to seek to protect the lives of those who pay to use the new technologies. And so we spend a great deal of time during which the economic rights and well-being of the companies producing the technology are protected at the expense of the well-being of the majority (the public).

Pathology and Epidemiology

At some point in the argument, the various parties are able to agree on terminology. They may even be able to agree on certain aspects of the problem. Mining or milling companies come to recognize that many of their workers have similar respiratory diseases. The companies are forced to recognize that their mines or spinning mills are poorly ventilated. Still, they refuse to admit that the two are related, and stand dumb before thousands of suffering workers. Innocent until proven guilty, they respond.

This is the stage at which the sufferers, and whatever responsible parties may take up their cause, are asked to describe the mechanism, the actual physical process by which the conditions of their work cause the disease or medical conditions that are at the heart of the argument. It has never been a situation favorable for those raising the issue. The men in the coal mines spitting up blood found no support from mining companies by pointing to the number of similarly affected miners—instead they founded

unions, which eventually became powerful enough to instigate legislation to protect the miners—despite a lack of scientific evidence that their work conditions caused their illnesses.

Indeed the task is even harder today, for the burden of providing scientific proof falls upon those least able to afford extensive research; while industry, government, and trade associations often bring to bear all their economic strength to discredit, deny, and disprove any evidence that may be brought forward.

While there are many studies that show problems with VLF electromagnetic emissions (relating VLF emissions to birth defects among pregnant women using computers or relating VLF to the incidence of cataracts), there has been very little study among humans with regard to the long-term effects of ELF emissions. To be certain, there are over 20 research studies indicating that ELF emissions may cause problems, but to date we have no long-term studies on the effects upon human health. Some studies were begun, but researchers, once given data indicating that human health is likely to be affected, could hardly continue to use human subjects as laboratory animals.

While the impact of VLF emissions has been shown in groups over relatively short periods of time, the effects of ELF—said to be cancers of various sorts—would require longer periods of time to manifest themselves, possibly decades.

Even more troubling, the actual mechanism by which ELF may affect us (I mentioned three suspected impacts: interference with intracellular activities, disturbance of hormonal secretions, and effects upon the immunologic system) is not understood. And without conclusive evidence, it's all too easy to ignore the body of still-evolving research on the subject and say, So prove it.

I am reminded of the soldiers that the military marched into the atomic explosion areas in the 1950s by way of providing them with "psychological training" to improve their fighting prowess in an atomic war theater. Researchers and scientists were certain there would be no health impacts upon the soldiers.

The scientist or the pathologist looks at the technology and asks, How does ELF cause cancer? The epidemiologist looks at rates of incidence and says, this factor (ELF) is associated with higher incidences of cancer. It is in this interim period of describing the mechanism that we now find ourselves—and the battle lines are drawn between those people looking for the causes and those supported by a very powerful military and industrial coalition that believes that there is no problem and in whose interest it is to find no problem.

Those parties in the past who have raised the issues and won have been rewarded by being granted a name for their disease: silicosis, byssinosis, asbestosis. And slowly, in a few instances, industry has had to amend its killing ways.

What Will Government Do?

Hoping for some activity on the part of the federal government, I began making calls to the administrative branch—those organs of our government responsible for promulgating standards to protect citizens. One prominently placed individual, John Villforth, chairman of the Center for Devices and Radiological Health in the FDA, had a press flack respond with a fax that may as well have been written by James Watt to people complaining about tree harvesting on public lands, or by Anne Burford in response to questions about why the Superfund for toxic disasters had not been used to eradicate any problems. It's hard to believe that bureaucrats in Washington have so little real intent to benefit the citizenry of this nation.

On the legislative front I placed calls to the chairmen of the House and Senate Science Committees. Congressman Robert A. Roe, chairman of the House Science Committee, had someone on his staff respond that the congressman did not want to be bothered by nonissues. Only Senator Albert Gore—who held hearings on this subject as a congressman in 1981—agreed to discuss the subject. Fortunately, Senator John Glenn, chairman of the Government Affairs Committee, has decided to hold hearings in May on the subject (he was in the USSR at press time, and unavailable for

months, so was unable to comment).

The result of my dealings with Washington in support of possible immense concerns relating to ELF emissions? Hey, don't bother me. I've got real work to do (a paraphrase of Congressman Roe). *Macworld* will continue to work with the respective congressional staffs to try to bring about legislative activity.

How Do the Manufacturers Feel?

While we are fortunate to live in a different age from our grandparents, it is still fair to look at the preceding history of industry and technology so that we may benefit from its lessons.

In an effort to alert manufacturers to the findings of our articles, *Macworld's* editors met with presidents of six companies producing monitors for the Macintosh—Radius, RasterOps, E-Machines, SuperMac, Sigma Designs, and MegaGraphics—to disclose much of the information that appears in this issue (without actually giving them the articles). Apple, whose 13-inch color monitor is the worst offender of all the products tested, agreed to be present, but was unable, because of a misunderstanding, to attend.

We provided a forum, background reading, methodology for how we did our testing. We asked the manufacturers to provide us with feedback for inclusion in this issue. And we told them that the July issue of *Macworld* was part of an ongoing effort to observe how industry would respond to the concerns we are raising. Two companies, MegaGraphics and Sigma Designs, responded that they intend to modify their products so as to ameliorate VLF emissions. Another, SuperMac Technology, has decided to host a larger-scope meeting of the industry with the monitor-tube manufacturers (Sony, Mitsubishi, and others) to discuss possible ways to reduce ELF magnetic emissions. For our part, Deborah Branscum, our *Conspicuous Consumer* columnist, will report regularly on the activities that manufacturers are undertaking to reduce ELF emissions.

So What? Is It Oat Bran or Cholesterol?

Could all of this be just another one of those confusing health issues like

the question of the real value of oat bran in one's diet? The merit of which seems to vary with the particular scientist or nutritionist talking about the situation.

Could this be a health issue like cholesterol, which most scientists appear to agree can cause problems, but about which some researchers are now beginning to say that a complete absence is a problem as well?

I think not. Extremely-low-frequency magnetic emissions may prove to be one of the most troublesome issues we face with information technology over the next decade, unless standards are established by the government—something that is unlikely to happen without a congressional requirement. We believe that administrative-branch agencies are unlikely to act against powerful lobbies in Washington such as the Electrical Power Research Institute or the CBEMA (Computer Business Equipment Manufacturers Association) without public and congressional recognition that there is a problem.

What About Hair Dryers and Appliances?

One of the first things I'll receive after publishing this column are letters citing the harm caused by household appliances—toasters, hair dryers, ham radios, and so on. Please save yourself the trouble. It is true that those devices also produce the electromagnetic fields about which we are writing—the difference lies in the simple fact that almost none of you spend as much as half of your day sitting next to one of those devices. Unlike any other electrical device that may produce harmful electromagnetic fields, personal computers and their users are closely united for long periods each day. I hate to think of the 12-hour days I've spent on computers over the last several years.

In the end, if we prove to have jumped to a conclusion that's wrong—at least people won't have suffered. But if we're right, and if manufacturers take action, many of the millions of computer users may never have to fear the technology that they've come to rely upon. And manufacturers can focus on advancing technology, rather than on defending themselves from class-action suits. □