



**SCIENCE &
TECHNOLOGY**

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By **Simson L. Garfinkel**

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FOR more than 50 years, wiretapping a telephone has been no more difficult than attaching two clips to a telephone line. Although legal wiretaps in the United States have always required the approval of a judge or magistrate, the actual wiretap has never been a technical problem. Now that is changing, thanks to the same revolution in communications that has made car phones, picture telephones, and fax machines possible.

The only thing a person tapping a digital telephone would hear is the indecipherable hiss and pop of digital bits streaming past. Cellular telephones and fiber-optic communications systems present a would-be wiretapper with an even more difficult task: There isn't any wire to tap.

Although cellular radio calls can be readily listened in on with hand-held scanners, it is nearly impossible to pick up a particular conversation — or monitor a particular telephone — without direct access to the cellular telephone "switch," which is responsible for connecting the radio telephones with the conventional telephone network.

This spring, the Federal Bureau of Investigation (FBI) unveiled legislation that would require telephone companies to include provisions in their equipment for conducting court-ordered wiretaps. But critics of the legislation, including some members of Congress, claim that the proposals would expand the FBI's wiretap authority and place an undue burden on the telecommunications industry.

Both sides agree that if provisions for monitoring communications are not made in the planning stages of new equipment, it may eventually become impossible for law enforcement personnel to conduct wiretaps.

"If the technology is not fixed in the future, I could bring an order [for a wiretap] to the telephone company, and because the technology wasn't designed with our requirement in mind, that person could not [comply with the court order]," says James K. Kalstrom, the FBI's chief of engineering.

The proposed legislation would require the Federal Communications Commission (FCC)

Legislation proposed by Justice Department would change the way telecommunications equipment is developed in the United States

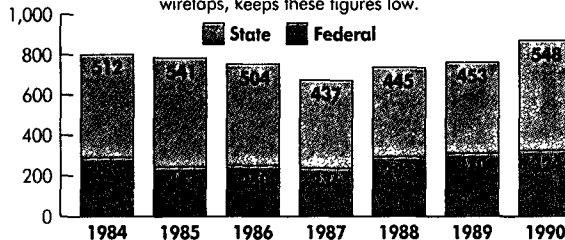
New Phones Stymie FBI Wiretaps

ILLUSTRATION BY JEFF DANZIGER/CHART BY JOHN VAN PELT — STAFF



Frequency of State and Federal Wiretaps

The number of wiretaps has remained relatively stable throughout the past seven years. The FBI maintains that the legal difficulty in obtaining wiretap permission, rather than the technical difficulty in making wiretaps, keeps these figures low.



Source: "Wiretap Report," Administrative Office of the US Courts, Washington, D.C. (1990 most recent data available)

to establish standards and features for makers of all electronic communications systems to put into their equipment, require modification of all existing equipment within 180 days, and prohibit the sale or use of any equipment in the US that did not comply. The fine for violating the law would be \$10,000 per day.

"The FBI proposal is unprecedented," says Rep. Don Edwards (D) of Calif., chairman of the House Judiciary Subcommittee on Civil and Constitutional Rights and an outspoken critic of the proposal. "It would give the government a role in the design and manufacture of all telecommunications equipment and services."

Equally unprecedented, says Congressman Edwards, is the legislation's breadth: The law would cover every form of electronic communications, including cellular telephones, fiber optics, satel-

lite, microwave, and wires. It would cover electronic mail systems, fax machines, and all networked computer systems. It would also cover all private telephone exchanges — including virtually every office telephone system in the country.

Many civil liberties advocates worry that if the ability to wiretap is specifically built into every phone system, there will be instances of its abuse by unauthorized parties.

Early this year, FBI director William Sessions and Attorney General William Barr met with Sen. Ernest F. Hollings (D) of South Carolina, chairman of the Senate Commerce Committee, and stressed the importance of the proposal for law enforcement.

Modifying the nation's communications systems won't come cheaply. Although the cost of modifying existing phone systems

could be as much as \$300 million, "We need to think of the costs if we fail to enact this legislation," said Mr. Sessions before a meeting of the Commerce, Justice, State, and Judiciary Subcommittees in April. The legislation would pass the \$300 million price-tag along to telephone subscribers, at an estimated cost of 20 cents per line.

But an ad-hoc industry coalition of electronic communications and computer companies has objected not only to the cost, but also to the substance of the FBI's proposal. In addition, they say that FCC licensing of new technology would impede its development and hinder competitiveness abroad.

Earlier this month, a group of 25 trade associations and major companies, including AT&T, GTE, and IBM, sent a letter to Senator Hollings saying that "no legislative solution is necessary." Instead, the companies expressed their willingness to cooperate with the FBI's needs.

FBI officials insist that legislation is necessary. "If we just depend on jaw-boning and waving the flag, there will be pockets, areas, certain places" where technology prevents law enforcement from making a tap, says Mr. Kalstrom, the FBI engineer. "Unless it is mandatory, people will not cooperate."

For example, Kalstrom says, today's cellular telephone systems were not built with the needs of law enforcement in mind. "Some companies have modified their equipment and we can conduct surveillance," he says. But half of the companies in the US haven't, he adds.

Jo-Anne Basile, director of federal relations for the Cellular Telecommunications Industry Association here in Washington, D.C., disagrees.

"There have been problems in some of the big cities because of [limited] capacity," Ms. Basile says. For example, in some cities, cellular operators had to comply with requests for wiretaps by using limited "ports" designed for equipment servicing. Equipment now being installed, though, has greatly expanded wiretap capacity in those areas.

"We believe that legislation is not necessary because we have cooperated in the past, and we intend on cooperating in the future," she adds.

The real danger of the FBI's proposal is that the wiretap provisions built in for use by the FBI

Rising Sea Level Linked to Natural Causes

THERE continues to be too much hype in the global-warming debate. Predictions of sea-level rise provide a case in point.

Thermal expansion of sea water and melting of land-based ice would drive the rise. The standard alarmist scenario then shows how that higher sea level would flood valuable coastal regions and drown some island nations.

The trouble with that kind of scenario is that no one can predict future sea levels reliably. They can't even know at this time how important man-made warming would be in determining the outcome.

William F. Tanner of the geology department of Florida State University at Tallahassee explained this recently in the Bulletin of the American Meteorological Society. He looked at sea-level changes for the past several thousand years as reflected by wave action on straight sandy beaches. The effects of the waves are "recorded" in the statistics of the distribution of sizes of quartz sand grains in old beach deposits.

He finds evidence for irregularly alternating high and low sea level with changes in the range of 1 to 3 meters. At least seven

such events - four rises and three drops - occurred in the past 3,000 years, Dr. Tanner says. He estimates that the average duration for a high or low sea-level position was roughly five centuries.

The so-called "Little Ice Age" of the Middle Ages shows up well in his analysis. Sea level began to fall about AD 1200, reaching its lowest point in 2,000 years around AD

ROBERT C. COWEN



1400. This drop coincided with a cold climatic period. After that, Tanner says, sea level was rising by 1750 and has continued to rise until at least 1900. The nature of his data does not allow him to say much about this century. Tanner makes several important points:

■ The steady sea-level rise since 1750 "apparently was not caused by human activity."

■ His data can't show whether or not this natural warming is over. But "if global warming could be demonstrated ... this might very well be a continuation of the [natural] trend ... and therefore cannot be shown from available data to represent an effect caused by mankind."

■ There is no such thing as an "absolute" normal sea level from which changes are measured. There are only the irregular few meter rises and falls which "appear to be in-

herent in the way the air-ocean-ice system operates at least under present conditions." It is against this background of natural fluctuations that any predictions of man-made sea-level changes have to be made.

The bottom line, Tanner says, is that one has to go back far longer than the instrumental record of the last century to build a reliable basis for projecting sea-level changes. He notes that data sets such as his "show clearly that other [than man-made] changes have been taking place." He adds that "therefore one cannot know in advance how the system will react during the interval of increased anthropomorphic influences: some other factor may be more important."

This is not an argument for or against the proposition that a man-made global warming is under way. It is not an argument for or against the possibility that such warming could bring an unnatural, perhaps dangerous, sea-level rise.

And it certainly is not an argument for or against the desirability of nations acting to curb the release of carbon dioxide and other heat-trapping gases.

But Tanner's study does make it clear that advocates of such action should not use supposedly science-based scary scenarios of drowned cities to bolster their case. Scientifically speaking, at this stage, they cannot know what they are talking about.

could be subverted and used by domestic criminals or commercial spies from foreign countries, says Jerry Berman, director of the Electronic Frontier Foundation, a computer users' protection group in Cambridge, Mass.

"Anytime there is a hearing on computer hackers, computer security, or intrusion into AT&T, there is a discussion that these companies are not doing enough for security... Now here is a whole proposal saying, 'Let's make our computers more vulnerable.' If you make it more vulnerable for the Bureau, don't you make it more vulnerable for the computer thief?"

CIVIL liberties advocates also worry that making wiretaps easier will have the effect of encouraging their use - something that the FBI vehemently denies.

"Doing a wiretap has nothing to do with the [technical] ease," says Kalstrom. "It is a long legal process that we must meet trying all other investigations before we can petition the court."

Kalstrom points out the relative ease of doing a wiretap with today's telephone system, then cites the federal "Wiretap Report," which states that there were only 872 court-approved wiretaps nationwide in 1990. "Ease is not the issue... There is a great dedication of manpower and cost," he says.

But digital wiretapping has the potential for drastically lowering the personnel requirements and costs associated with this form of electronic surveillance. Computers could listen to the phone calls, sitting a 24-hour vigil at a low cost compared with the salary of a flesh-and-blood investigator.

"Now we are seeing the development of more effective voice-recognition systems," says Edwards. "Put voice recognition together with remote-access monitoring, and the implications are bracing, to say the least."

Indeed, it seems that the only thing both sides agree on is that digital telephone systems will mean more secure communications for everybody.

"It is extremely easy today to do a wiretap: Anybody with a little bit of knowledge can climb a telephone poll today and wiretap someone's lines," says Kalstrom. "When the digital network goes end-to-end digital, that will preclude amateur night. It's a much safer network from the privacy point of view."

Needed: A Humane Hand on the Controls

By Steve Burdan

AMERICANS are a people of progress. They believe in taking a fresh look at problems and finding a better solution. If they can't fix that engine or cure that disease, just give them time and they will invent or discover an answer sooner rather than later. If it is a broken cotter pin, a broken society, or a broken heart, they can handle it with lots of hard work, money, and good-old-Yankee know-how.

Neil Postman, chair of the Department of Communications Arts at New York University and author of several best-selling books on culture, begs to differ with America's eternal can-do optimism. Technology has gotten the United States far, farther than any nation in history, he says, but at what price?

In his new book, "Technopoly," Postman warns that moral traditions that gave substance and purpose to American lives for centuries have been exchanged for a muddled view that depends on science to answer the questions of life and existence.

Postman is no cranky hermit who grouches from a mountain cabin, but a teacher who has taught students in a major city for three decades and finds that a

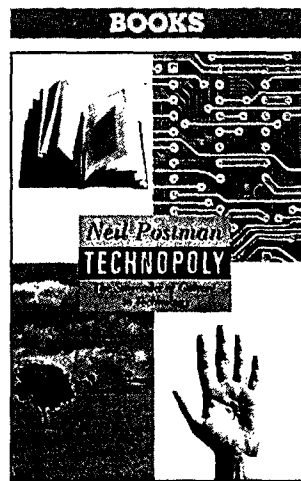
large, essential piece is missing from the way Americans picture the world today. Pointing this out is a thankless, but necessary, job.

In 11 short, compact chapters, he shows how subtly the changes have occurred, how easy it is to miss the signs. He sees no conspiracy of old men who planned hundreds of years ago to siphon off the moral coherence that held the Western world together for millennia and replace it with a manic dependence on polls, inventions, and social management techniques.

Scientists like Galileo, Copernicus, and others simply exposed areas in the traditional world view that needed revision. However, like Voltaire in the French Revolution, they were hailed by later generations as heroes who intended to dismantle the whole thing.

New thinkers and lesser scientists constructed a new world view and elected another authority that was less humane, but more measured, precise, and manageable. A human became a machine that could be fixed like a car engine or modified like a home computer. The human sciences dragged the laws of natural science to serve them, too. Unfortunately, extreme proponents of this approach built the crematoriums at Auschwitz.

The United States is the best example of a "technopoly" today,



TECHNOPOLY: THE SURRENDER OF CULTURE TO TECHNOLOGY
By Neil Postman
Alfred A. Knopf, 222 pp., \$21

says Postman. American culture seems to feed on incessant streams of information of all kinds and would overwhelm society if not for a bureaucracy of experts who control the flow. He especially singles out medical and computer technologies as representing "a loss of confidence in human judgment and subjectivity." New innovations inspire greater confidence and more reliance on the auto-pilot program to

handle things. It takes a health-care scandal or computer virus to get that human hand back on the controls, he says.

Postman gently breaks the news that we have been on the wrong road for awhile, but we can get back to the right one if enough "loving resistance fighters" point this out. "A resistance fighter understands that technology must never be accepted as part of the natural order of things ... that it always appears somewhat strange, never inevitable, never natural." Greater balance and a broad education that puts technology back into perspective in the big picture, and acknowledges the humanizing effect of religion, will go a long way to achieving this, says Postman.

Postman doesn't want to break new ground or grind up all machines as much as he wants to reclaim the old family estates where people lived in greater community and deeper understanding of life, nature, and the Creator. His style is comfortable, his exposition incisive, and his reasoning hard to ignore. While there is no imminent danger that machines will soon run our lives, Postman believes people are becoming less and less what we were meant to be: human beings.

■ Steve Burdan, who writes on media and religious issues, lives in Palatine, Ill.