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turn next week.

More than 500,000 Americans are paralyzed as a result of spinal cord injuries, costing the nation \$6 billion a year in medical care. Four out of five patients are males, commonly in the late teens. Auto accidents cause nearly half of the paralyzing spinal injuries; other causes are falls, violent acts and sports mishaps.

SOURCE: American Paralysis Association GLOBE STAFF GRAPHIC/RICHARD SANCHEZ

convey to the public that progress toward treating paralysis, while fragile, is far from anything like a cure, said Dr. Richard P. Bunge, is the scientific director of the MIT Project to Cure Paralysis, a priv

Arthur Ullian of Newton, who suffered a spinal injury in a 1991 bicycling accident, drives a specially equipped van.



GLOBE STAFF PHOTO/WENDY M.

10/11/92 Boston Globe

### ELECTRONIC ARCHIVES

# Government is struggling to save the past

Simson L. Garfinkel  
SPECIAL TO THE GLOBE

WASHINGTON - People who make their way to the nation's capital to see the Declaration of Independence often find that they can barely make out the document's faded words. But compared with some of today's computer records, the 216-year-old lambskin parchment has aged very well.

When a technician working for the National Archives and Records Administration recently tried to read a 27-year-old computer tape from the Equal Employment Opportunity Commission, the tape literally melted in the machine.

The problem? Computer tapes generally don't last more than 10 years. After that, the chemicals that make up the tape can change in unpredictable ways.

The National Archives, which is charged with preserving the permanently valuable records of the US government and making them available to the public, had other copies of the computer files, so no government records were lost. But that might not be the case next time.

In the computer age, fast-changing technology, especially ways in which data are stored, makes saving information a for-

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OF AMERICA. in General Cong.  
When in the course of human  
conduct the political bonds which have  
connected us with Great Britain have  
become dissolved, and the absolute  
necessity, independent of any  
opinion*

As the use of paper documents decreases, many say, we need a strategy for preserving potentially historic data.

# The struggle to save the past

## ■ INFORMATION

Continued from Page 29

midable challenge. For small businesses and individuals with personal computers, preserving payrolls and old love letters may not be critical. But for the federal government and its multitude of agencies, losing the records of the past could be disastrous for the future. And what concerns many experts is that the federal government has no comprehensive plan for handling archives that are not printed on paper.

"Our historical memory is the records that are created by our government," says Sheryl Walter, general counsel for the National Security Archive, a private Washington-based organization that monitors federal records. "If you can't retrieve those records, you can't retrieve your memory."

According to a 1990 report by the Congressional Committee on Government Operations, titled "Taking a Byte Out of History," 75 percent of all federal transactions — from the filing of reports to the granting of benefits — will be handled electronically by the year 2000.

Saving information, the authors of the congressional report warn, may not be enough. "Simple physical preservation of electronic records may be inadequate to meet archival needs. Electronic records must be accessible and usable in the future or they may not be worth preserving."

Fred Wood, a senior associate with the Congressional Office of Technology Assessment, says that a national information and records policy is needed, a strategy for "capturing history and recording it."

"There are people at the National Archives who are trying their best." But, Wood says, leadership from the White House is needed to formulate a policy and see that it's followed.

### Some databases are on file

With a few notable exceptions, the federal government's data preservation efforts to date have been limited to databases created by federal agencies. Databases on file at the National Archives' Center for Electronic Records include some data from the Census Bureau, economic and financial information from the Securities and Exchange Commission, military records and the re-



PHOTO / NATIONAL SPACE SCIENCE DATA CENTER

**Jim Green, head of Space Science Data Operations in Maryland, says that making information available is as important as proper storage.**

there should also be some means for individuals to do on-the-spot searches. There should be a database of databases, something that the Center for Electronic Records has already commissioned, to help people learn what information is available. And the archives should be available to everybody, not contracted to private corporations that would resell the public's records at a profit.

For the most part, preserving and storing electronic records is handled by individual agencies, which are supposed to retain records until they are no longer needed.

That de facto policy has had varying success. One of the largest electronic libraries and archives in the world is the National Aeronautics and Space Administration's National Space Flight Data Center, which keeps scientific data from the space agency's missions dating back to 1966.

It serves as a vast archive of knowledge, constantly being reexamined by scientists and researchers to "promote a better understanding of our environment and solar system," says Jim Green, head of Space Science Data Operations at the Goddard Space Flight Center in Maryland, where most of the data are kept.

The archive at Goddard is immense. It currently holds 7 terabytes, or 7 million million bytes, of information, including data from scientific satellites and planetary exploration. That's the equivalent of 5 million floppy disks, or a billion pages of

group for computer users. Electronic data, he notes, can easily be deleted accidentally or intentionally. Even more worrisome, Berman says, is the ability of computer users in the government to modify electronic documents without a trace and create fraudulent records.

That might be a big problem in the future. According to the 1990 congressional report, "widespread use of personal computers directly by federal managers, lawyers, and other professionals is creating a multitude of important records that may never be printed on paper." Without a paper trail, it might be difficult to prove which documents are originals and which are fakes.

The report also mentions something that many PC users and office workers know from their own experience: Electronic mail is a growing means of communication on government administrative and policy matters. And right now, there is no widely used system for sorting through the mountains of electronic mail generated by government — and deciding what should be saved.

The good news, experts say, is that any electronic information, including electronic mail, can be easily copied and stored out of harm's way. When the Iran-Contra scandal broke in 1986, White House aide Oliver North shredded his paper files and deleted the computerized messages on the PROFS electronic mail system that he had used to communicate with National Security adviser John Poindexter and other members

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Particularly offensive are  
the ones that say "For  
Your Files," which  
means "For Your  
Wastebasket, Not Mine."

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mission, military records and the re-  
sults of surveys conducted during  
World War II, and much more.

In all, says Kenneth Thibodeau,  
director of the Center for Electronic  
Records, more than 600 databases  
are on record. Although that's a tiny  
fraction of the 9,000 databases that  
the federal government keeps, ac-  
cording to recent study by the Na-  
tional Academy of Public Adminis-  
tration, it's the majority of the 1,000  
databases that Thibodeau says are of  
lasting historical value. Neverthe-  
less, Thibodeau's group currently  
has no provisions for storing the  
very substance of government com-  
munication: memorandums, reports  
and electronic mail.

Experts say that any national  
plan must be able to deal with differ-  
ent kinds of electronic archives -  
electronic mail, bulletin board sys-  
tems, word processing files, data-  
bases and architectural drawings and  
maps. It should capture that infor-  
mation, they say, in a format that  
is not limited to any one application  
program.

The data should be available by  
network and on compact disc, but

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ration. That's the equivalent of 5 mil-  
lion floppy disks, or a billion pages of  
paper. Most of the data are kept on  
120,000 computer tapes, although  
the archive is increasingly moving  
the data to optical disks. To prevent  
problems such as melting tapes, the  
data must be copied onto new tapes  
or disks every few years.

Storing the data is only the first  
step. Equally important is making it  
available to scientists in this country  
and throughout the world, Green  
says.

The advantage of storing data on  
optical disk is that the information  
can be accessed remotely by re-  
searchers across the country using  
the nation's high-speed computer  
networks: a graduate student work-  
ing late at night can read the spec-  
trum, or fingerprint, for a star with-  
out even having to make a phone  
call.

"You just reach right across the  
net and pull it out," Green says.

#### Computer data's disadvantages

But computerized information  
has pitfalls as well, warns Jerry Ber-  
man, director of the Electronic  
Frontier Foundation, a civil liberties

group for computer users. Electron-  
ic data, he notes, can easily be de-  
leted accidentally or intentionally.  
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tem that he had used to communi-  
cate with National Security adviser  
John Poindexter and other members  
of the Reagan administration. North  
didn't know that copies of his mes-  
sages had been preserved on the  
computer's backup tapes. Those  
tapes were key to the investigations  
by the Tower Commission and other  
congressional committees.

"We all sincerely believed that  
when we send a PROFS message to  
another party and punched the but-  
ton 'delete' that it was gone forever,"  
North testified in 1987. "Wow, were  
we wrong."

No big breakthroughs are neces-  
sary to formulate a plan for saving  
all the computer information that  
one day could be considered historic.  
What's needed, experts say, is the  
kind of high-level concern that would  
lead to a national preservation strat-  
egy.

"We can solve the technical prob-  
lems," says Wood of the Office of  
Technology Assessment. The larger  
problem, he says, is that "people  
mainly don't care about the past. In  
most organizations - government or  
private sector - people are focused  
on the here and now, and not the fu-  
ture."