# No Backup

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As I write my monthly newsletter, *Access to Energy*, I continually copy the text to an external hard drive—manually, not automatically. Also, I continually make printed copies of the text.

These habits arise from the fact that computers have been central to our research work for 40 years. We have also been using research computers as word processors since the days when we had to write our own software to do this.

These days, physicians and medical facilities are being urged to go to a "paperless" record, with the entirety of the patient's medical record kept digitally. This may be either on the physician's or hospital's own computer, which is generally networked to the Internet, or even in the "cloud," that is entirely on offsite servers.

I come from a time and place when computers were far less capable and reliable than they are today. In the 1970s, keeping our computerized data collection, laboratory automation, and computation systems working properly was almost half of our personal laboratory efforts. These systems often failed without warning.

Privacy is also a major concern. When we began to have confidential human medical information in our computers in the 1970s, I made a rule that those computers stood alone with excellent physical security. They were never wired to other computer systems, regardless of convenience. Today, our Internet computer stands alone. No computer system in our laboratory that contains information that we wish to keep to ourselves—primarily unpublished data from research in progress—is ever linked to the Internet.

I am astonished by the trusting way in which people today allow everything, from their personal financial records to their personal medical records, to reside in computers connected to the Internet. Although we are assured that this information is protected by privacy software, there is a constant stream of news about failures of this software. In the medical world, there are frequent reports about laptop computers containing thousands of records being stolen, or hackers breaking into the main system.

There are also the failures of human nature. Have people entirely forgotten that privacy is an essential part of human freedom? Today there are hundreds of millions of people on "social networking" sites, spending their free time sending ill-considered personal information about themselves into the Internet. These people are voluntarily and permanently destroying one of their most precious possessions—their personal privacy.

Yet the aspect that worries me most about the computerized information revolution—a revolution that has provided great advantages to our family as it has to our entire civilization—is the unnoticed fragility that it has also brought in its wake.

As our links to knowledge among the living are destroyed through the destruction of the nuclear and extended family, so also are our links to industrial knowledge being destroyed by the increased fragility in our industrial community.

While the moneychangers who dominate the airwaves and political process seem to think that they can simply turn the essential elements of American industry on and off at will, with monetary switches, the truth is different. Human beings are the ultimate resource. It is in human brains and bodies that the essential knowledge and skills of our civilization, including medicine, reside. As our people lose their freedom; as they lose the stability that allows them to plan their futures; as they lose the hopes and dreams that motivate them; and as they lose contact with the useful work that they were once permitted to perform, they are lost to us forever.

In Ayn Rand's novel *Atlas Shrugged*, the men of the mind withdraw. They join John Galt in rebellion against the statists who seek to enslave them. In our present reality, these men are not voluntarily withdrawing. They are instead being forced to quit by means of enslaving government policies that make it impossible for them to work and prosper. The effect, however, is the same.

"Ah," but the statists say, "slaves are only slaves. There are always more where those came from. We'll have new ones read computer records about how to make the things we want, or provide the services we want, and just plug them in where the others left off."

It is, however, not that way. I have a fine collection of books on my shelves about the mining and refining of minerals, which is not my professional specialty. I read well and work hard. Yet, if the mining and refining of the minerals our civilization needs were turned over to inexperienced people like me, these industries would rapidly decline and become unproductive. Moreover, even the books are beginning to disappear. In a remarkably short span of about 20 years, storage of the knowledge base of our civilization has been transferred to electronic media. If current trends continue, virtually all records of essential knowledge will reside primarily in electronic devices—devices so sophisticated that, should a few key people and facilities be lost, we would no longer have access to them.

In addition, electronic devices are advancing so rapidly that the electronic readers themselves are becoming unavailable. In storage at our laboratory are information devices that we ourselves used 20 years ago—devices for which parts, maintenance, and information essential to their use are no longer available. Information that we did not deliberately copy forward regularly to new devices is no longer available to us. While we could, at this early date, retrieve this information with considerable cost and effort, before long the necessary equipment will reside only in museums.

Our automobiles, our machinery, our food delivery systems, and increasingly everything that keeps us alive depends upon computer chips produced in a very few factories. If those factories are lost to us for any reason, our essential activities will stop. Should this happen, we would ordinarily move back to the technology immediately preceding the present—except that the earlier technology is now discarded and would be very difficult to revive.

In medicine, we have wonderfully sophisticated imaging devices for diagnosis and advanced technology for minimally invasive surgery. Should the CT scanners and the MRI apparatus fail, are younger physicians trained in older methods? If we lose a key piece of the technology for minimally invasive surgery, do we have enough surgeons skilled in the old open procedures?

We are increasingly dependent for our very lives upon a system for which there is no backup. The brains and sinews of free men and women embedded in a vibrant web of four generations, who coexisted and worked together and who were augmented by vast knowledge stored in the printed word, have traditionally allowed mankind access to his immediate past as he oscillates forward and backward with net forward progress into the future.

Our social and political mistakes are depriving us of this human resource, and new technology is even depriving us of our books. Where is our backup if, for some reason, we stumble along the way?

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