

# Sightline 1990s

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## Text timesharers: sitting ducks for hungry dogs

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*Note: the opinions expressed in this essay are those of Mr. Arnold. They do not reflect the views of Learned Information, Ltd., Ziff Communications Co., or of any other organization. Address comments to the author at the address above.*

My concern this month is with the US timesharing companies — the organizations which brought databases to life and whose principal business is the delivery of information in ASCII to customers. I cannot consider this narrow and specialized class of timesharing companies in a vacuum. It will be more useful to examine their business against the fabric of American business, and then against three interesting, but not-so-recent, PC hardware and software engineering applications.

Let me be clear: I do not want to criticize particular companies nor lament the inevitable loss of US leadership in yet another industrial arena. The head yakuza says it in the film *Black Rain* quite well: 'All you Americans are good for is making music and movies'.

I want to describe how a class of information-delivery businesses are increasingly likely to find themselves out of business in spite of their current best efforts to survive.

### Timesharing's great expectations

Timesharing continues to make sense with new twists like distributed timesharing. Why put large amounts of data and the retrieval software on a covey of computers? Put this stuff in its appropriate place and let the people who need the data dial up, let the network locate the information, and customers download only what they want.

Financially, logically, and technically, the timesharing approach makes sense. In spite of this, the text-side of the industry finds itself tangled in some thorny challenges. What few observers recognize is that timesharing companies have a

natural centripetal force, the force that pulls things into a rotating mass. Timesharing companies get big, become bureaucracies, move slowly, and in general demonstrate the delightful habits all of us know about when we try to call the American Internal Revenue Service and ask a question about taxes.

Complicating the circumstances, timesharing companies have a three-parameter problem, which makes their job a bit more difficult than the one an automobile manufacturer or an iron works faces. The three arbitrary constants are:

- (1) Keeping the physical plant, that is, the hardware, operating and up-to-date.
- (2) Making sure that the software allows the business to do business without system problems.
- (3) Selling a combination product and service — *aprovice* — which is essentially intangible.

### The timesharer's physical plant

The physical plant idea is easy enough to grasp. The timesharing company's computer center is hardware. That's the stuff bankers like to have on the balance sheet. Assistant VPs at financial institutions can value hardware and, more importantly, sell it if the company goes broke.

The aspect of the timesharing company's physical plant that seemingly only a handful of information industry managers choose to recognize is that it's out-of-date the moment it is ordered. Placing an order can precede taking delivery by months. The task for the managers of the timesharing company is to get the plant up and running as fast as possible.

Once the timesharing system is online serving customers, the next task is to manage the upgrades to the plant in a coherent way. Vendors of hardware make this basic job **difficult** with continual bug fixes and modifications which are installed automatically under service agreements. A static computer center physical plant is quite difficult to achieve. Upgrades are accepted to ensure that the service agreement remains valid. You have heard about the PC owner who buys equipment and finds that it won't operate on his system. Do you think the mainframe and minicomputer buyers get it right the first time?

These are symptoms of a larger problem in American business. The 15 August 1989, issue of *Datamation* has a brief essay by Tim Mead, the magazine's Editor. In the Opinion column Mr Mead says:

'No silver bullet exists to slay the force that so many information system executives and professionals perceive as their enemy — change. In fact, there's only one thing available to help them manage change. And it's in short supply.

This scarce resource is leadership. The individuals who can see their companies, agencies and institutions through these tumultuous times are as hard to find in the boardrooms of user organizations as they are in the data centers. And those

who do dare to lead are being swept — either away by misguided corporate management or up by aggressive service/software vendors.’

Are the hardware marketers undermining the timesharing companies’ effectiveness? Who is in charge of the data centers? Without leadership at the core of the timesharing company’s business, the enterprise courts failure.

The way economics works in the everyday US business world is that once that physical plant has been purchased, it stays. If you doubt the truth of this, take a quick drive around any Rust Belt city and count the number of new manufacturing facilities.

Can the timesharing companies work around the problem of ‘old’ computer facilities? Yes, to a certain extent. But the consequence is that timesharing companies adopt a reactive approach to equipment upgrades. Their conservatism gives the fixed assets a longer useful life. Avoiding significant change also makes the timesharing company a wasteland for innovation. Massive sums of money are spent to maintain the status quo, to keep the hardware operating. Managers cloak these expenses in the words ‘maintenance’, ‘upgrades’ and ‘modifications’. Nobody steps forth and says, ‘We are spending tons of dough to keep what we’ve got rolling. We don’t dare build a new facility. We would never make our quarterly targets.’

Computer hardware specialists can and will respond vociferously with this counter-argument: ‘Upgrades are the functional equivalent of getting the newest machines’. A kernel of truth nestles in the guts of this statement. But the issue the hardware jockeys avoid is that significant innovations in computer hardware cannot be transplanted. We are not talking African violets and geraniums here; we are talking complex, expensive computer architectures. The newest ones bear little resemblance to the hardware at the heart of the textual timesharing companies in the US today. To my knowledge, only Dow Jones News/Retrieval has brought a parallel- processing computer online. What about the others? I am fearful that they are chained to the architecture of the 1970s.

I am not making much of a mental leap when I suggest that most of the leading US timesharing companies are vulnerable to a competitor which decides to embrace a new architecture as its basic plant. Granted this new competitor will struggle — and perhaps fail — to get its plant online before innovation leaves it in the dust. But the US timesharing companies will be in the buggy whip business while the new guy is manufacturing Mazda Miata accessories.

Why do I hold to my assertion that most US timesharing companies will not build a new, state-of-the-art plant? There’s the question of US financial analysis. Is it ‘better’ to build a new plant or simply upgrade the old one? It’s probably easy for people with sufficient technical background to argue either side of this case in an informed and intelligent manner. It’s another thing entirely when technology questions are debated by people with degrees in law, finance, and film chemistry. Technical issues are easily dismissed by the

uninformed. Consequently, it is always easier to say when one is uninformed, ‘Let’s fix up what we’ve got and see how it goes.’ ‘Okay, no problem,’ the lieutenants respond. Bingo, the first step down the path of US television and DRAM industries is taken. Losing revenue, investing in an expensive, partially understood computer facility, and having to create new, expensive, and completely misunderstood software is what my colleagues in management consulting called a ‘tough sell.’

### Getting software that works

Let’s talk about software a moment. Bankers and finance types can get their arms around hardware. It has heft. It can be sold at auction. But software? Without a solid understanding of software, an outsider hasn’t the foggiest notion of what’s involved in getting a new timesharing plant online. They don’t even recognize that there are types of software, not one, big, tidy Platonic software. Furthermore, the publicity highly-visible software companies get when they miss their shipping deadlines by several years and millions of dollars doesn’t help either.

Vaporware or **fogware** has educated the inexperienced business person that software is a ‘problem.’ The missteps of Lotus Corporation with Lotus 3.0 and Ashton-Tate with dBase IV shout to the world, ‘Hardware is child’s play compared with this tar baby’. Who doesn’t know that it is hard to budget time and dollars to create it? To underline the problem in red ink, everyone knows that when you’re done, you don’t have anything tangible to sell. ‘Old’ software cannot be sold at auction. A teen with a home computer can steal it. It is the original white elephant product; the only computer product outdated more rapidly than hardware. When it finds its way to liquidators (businesses that run commercial yard sales for outmoded or failed products), bankers know that yard-sale revenues do not do much to build a banker’s year-end bonus or sense of security. As a result, budgeting for software and getting the money included in the capital request is a ‘tougher sell.’

Hardware and software blend smoothly to form the culture of the timesharing company itself. Visit a mainframe computer center, and you will discover **IBMer**s or **DEC/VAXer**s. When both exist in a single company, they occupy separate buildings if possible. The **IBMer** is more common than the **VAXer**, and IBM has traditionally been the hardware vendor least able to deliver fast, economical, and easy online solutions. So when an IBM facility finally **gets** its service working, who needs to do it again? Not the computer center manager and his staff. These people have Big Blue’s Blood in their veins, and they say openly or through their actions, ‘What IBM sells is just line, thank you. We at least have a chance of getting this stuff to work.’ As a result, the unwritten orientation of the company itself makes significant change almost impossible. This is, of course, the ‘toughest sell,’ because most American managers won’t consider a fundamental restructuring. ‘Yo, status quo,’ is the cry.

## Selling the *Provice*

I do not want to spend too much time on this topic. It is obvious that the timesharing companies flounder a bit when they try to explain what they sell. Look one way, and they market an intangible-answers to your questions. Look another, and they peddle things -software, passwords, and CD-ROMs.

The reason they are uncertain about what they sell and to whom is that they offer something quite new. I call the information output from electronic devices a *provice*, an information output which shares simultaneously the attributes of a product and a service. The words we have to describe tangible and intangibles goods and services fail us when we talk about electronically-delivered information. The attempts to concretize the output of timesharing companies' systems has done little to build a huge commercial success like VCRs or facsimile machines did.

We are in the process of developing a new vocabulary to talk about information products. The fact of the matter is that the electronic-information marketing success stories have been more a consequence of persistence than clear thinking about the attributes of information outputs. If I had a Swiss franc for each explanation of databases that I have given at board meetings, presentations, and cocktail parties, I would have the wealth of Croesus.

## Opportunities everywhere

When people are exposed to electronic information, many get quite enthusiastic. When they see the tricks they must perform to gain access to the data, they typically lose interest...fast. There is a market for information provices, but it will be largely unreachable by today's timesharing winners unless they harness innovation.

Let me highlight three interesting innovations out of the dozens that bloom in the fertile gardens of entrepreneurs around the world. These three I readily acknowledge may not be the spark that sets electronic information usage on fire, but new approaches will be the stake which a competitor will drive through the heart of the timesharing companies which dominate today. Effective harnessing of innovation is the main reason why the US will lose its preeminence in online ASCII delivery to new competitors. These competitors, not all of whom will come from publishing or computer businesses, will manage their business to avoid the pitfalls I have identified.

I want to look briefly at three technological opportunities; the three are:

- (1) Graphical user interfaces (**GUIs**, for short).
- (2) Custom-tailored and pre-packaged information outputs.
- (3) Images and visual outputs.

It has long been my contention that technical developments move rapidly in the American datasphere, creating an

undercutting effect. Visualize today's timesharing leaders sitting in their stone castles as waves of change pound the foundations of their businesses. Without prompt, significant action, the structure must collapse.

Each of these three technologies is an opportunity for information companies in general, not just timesharers. Before we examine these three developments, let me reiterate that I am not talking about a *single* timesharing company. I am referring to a class of companies which deliver ASCII data to customers who pay for (a) the right to access the data, (b) consumer services like the Summit service in California or Delphi in Boston, (c) and business services like Mead Data Central, Data-Star, or Dialcom. Officers and advocates of timesharing **need** not criticize me for incorrect analyses of their particular company. I am describing a general type of business and a class of information delivery companies. If an employee of a timesharing company sees his organization reflected in this mirror, the image he sees is his projection, not my rendering. My concern is with an industry-wide problem, broader and deeper than the concerns of a single organization.

### 1. GUIs

The 12 September 1989 issue of *PC Magazine*, the top-selling computer publication in the US, explores graphical user interfaces in depth. These **GUIs**, pronounced 'gooey,' make many computer functions more accessible to more people. When someone talks about a graphical interface, I think automatically of the Macintosh screen with its icons and drop-down menus. Microsoft's Windows/286 and /386 operates in a similar way but without the pictures. UNIX has **GUIs** too, including the **NewWave**, **NeWS**, and PM/X. I have yet to find a major American timesharing company making use of **GUIs**. One new timesharing company, owned by a non-US company, has a service in beta test which makes extensive use of a windowing environment. But the established firms offer their customers the command-based or partial-menu environment. Even CD-ROM publishers have **turned** their attention to interfaces which mimic the timesharing companies'. One wonders how they attract individuals with programming skills more appropriate to the late 1960s than the 1990s.

When one sees three-dimensional icons on the NeXT or Amiga interfaces, the paucity of imagination in the timesharing companies' interfaces becomes obvious. Even the half-cooked **Windows/286** and /386 graphic environments from Microsoft appear a centimeter or two off the cutting edge of technology when one contemplates an unwavering question mark, a dot or two, or some other cheerful invitation to search online. New users find little to encourage them to explore the systems even when they are given 'friendly' interfaces. Should the flagging growth in online surprise anyone? The proof of searching competence is mastery of commands. Why should a new customer have to pass a test of fire to obtain information electronically. We're not in the secret society business, or are we? Even super-searchers like Barbara Quint bemoan the hostility of the interfaces for first-time customers. The recent flood of software interfaces

to make searching easy are not graphical in the sense of icons, pull-down boxes, and mouse-intensive design elements.

There are a number of reasons why true GUIs will be increasingly important as we stumble toward the Nasty 90s:

- (1) We are rapidly exhausting the supply of people who come to online searching because they are fascinated with computers. True, we will still find customers who want to learn. Increasingly the customers will be late recruits to online who see the information as the goal and the utility delivering the data as an appliance which **should be** easy and intuitive. GUIs are, if well-designed, easy and intuitive by definition. In fact, once one learns a GUI, all programs taking advantage of the interface are easily pressed into duty.
- (2) GUIs and the programming toolboxes standardize some code which is difficult to write. Software developers, not constrained by traditional timesharing thinking, will use GUIs to lessen their work load when writing a new application. The printer drivers, the black boxes which allow drop down menus and help to be created easily, and the management of memory resources are three aspects of programming that the GUI makes less burdensome.
- (3) People like pictures. They have to. The US produces the largest number of illiterates of any industrialized nation-state. Decision-makers are eager to absorb data faster. Well-constructed images communicate information more rapidly than words. I believe that I am on solid ground when I assert that in the next two or three years, an entrepreneur can make a great deal of money making data available in an image format online or in an allied electronic medium. People want charts, graphs, pictures, and ideograms, sharp, in color, and ready-to-use.

I admit that I have not examined the interfaces of the more than 450 timesharing services cataloged by Cuadra Associates. If I have overlooked a GUI implemented on a major timesharing service, please let me know. I want to buy some stock.

Remember: GUIs have some history. The concept of little icons and pictures did not appear from outer space two or three months ago. A decade of development has polished the GUI concept. One wonders why in the last decade that no major timesharing company has been unwilling or unable to take advantage of this interface option. *Status quoitis*, a disease common in organizations that loves what it has so much that it resists any change.

## 2. Packaging results

XyQuest, the word processing company partially owned by the Boston *Globe*, sent me the results of its 1989 customer survey. The number one requested feature by users of the Rambo of wordprocessors, XyWrite III+ was file conversion

capability in the wordprocessing software itself. *File conversion* means changing the output of one wordprocessor into a format suitable for another wordprocessor. The XyWrite survey summary indicated that about half the users of Rambo WP used another major word processor as well. XyQuest will probably make some effort to provide XyWrite IV with a file conversion capability.

It makes some sense that timesharing companies could offer their customers a choice of file formats in which to receive online data. If one downloads ASCII from any of the commercial timesharing services, extra spaces, line feeds, carriage returns, backward arrowheads, happy faces, and other assorted weirdness appear in the file. What does this customer do? He removes this unnecessary baggage and formats the downloaded data in his wordprocessor. Is it not within the capability of the major timesharing services to offer the customer a download format? The majority of companies use one of the top three or four wordprocessing packages, and I know that I would pay extra to get the file in a format I can use immediately. Housekeeping annoys me — especially when big, fast, dumb computers like those timesharing companies have by the dozen can do these mundane chores in a few clock ticks.

Now consider the hoops one must go through to make use of a chart or table. The desktop publishing packages like columns separated by single tabs (ASCII 9). How do charts, tables, and graphs come down the wire from the commercial timesharing companies? In lots of ways but none in the way usable by Pagemaker 3.01 or Ventura 2.0. If you want some excitement, try to move a downloaded table into a spreadsheet. Let me know what technique you use, because I find I have to do a touch of twiddling to make the transfer work.

What about the results of across-file search? When records from different databases are retrieved, they are indeed all different. Can the customer select an option to have the information from multiple databases homogenized in some coherent fashion?

Each of these examples underlines the customer- insensitivity of the timesharing companies. Granted most of these suggestions would be difficult and expensive to implement correctly. I suggest that the customers would pay extra money to have the output of the timesharing company placed in a format appropriate to the customer's needs for that specific online search. At this time, the output is delivered one way: the way the timesharing companies specify. The information product, therefore, meets the needs of the seller, not the buyer. My reading of the current crop of manage-for-excellence books says that companies should flop their logic. How does this sound: 'The timesharing companies should meet the buyer's needs, not the customer meet the needs of the timesharing companies.'

One positive step in meeting customer needs has been taken by the duelling duo of Mead Data and Westlaw, the modem equivalent of the feuding Hatfields and McCoys. Both companies allow their online customers to generate an invoice online. We know that legal searches on these two

systems are billed to a client who is the lucky or unlucky participant in America's real national pastime, litigation. The Mead service has the ominous name *Payback*. Westlaw has dubbed its billing service *Quickview*, which rings in a more agreeable way in my ear. Hopefully both companies will make similar strides in allowing their customers to gain greater control of the precision and format of the data retrieved during an online search.

Two new companies are making strides in providing more sophisticated information packaging options. One company will be a timesharing service targeted at executives. The customer searches for information about a company or product and then specifies the short, medium, or long report. Each report has a fixed price and is sent to the customer's printer or hard disk in a format which is easy-to-read and shaped to meet the customer's needs. A second firm, headquartered in suburban Washington, D.C., is not a traditional timesharing company. This firm specializes in querying a number of databases, capturing data relevant to the client's needs and interests, formatting the data in a desktop publishing program, and faxing the 'personal newsletter' to the executive wherever he is in the world.

*USA Today* (affectionately dubbed **MacPaper**), GEnie and CompuServe also have fax services, but not packaged in this personal way. The big guns of the timesharing-industries' fleet remain in mothballs when it comes to packaging data according to customer needs. I hope those guns don't rust. They will be needed when a real competitor shows up and captures a chunk of their market.

### 3. Images

I mentioned images a moment ago, and I'd like to return to that subject. Rapid advances in optical technology make it feasible for companies to scan pieces of paper and put a facsimile image of the page on an optical disc. If one looks at the CD-ROM trade journals, a great deal of pride bubbles from advertising prose which tells the reader that CD-ROMs replicate the timesharing leaders' online environment. However, when one reads the techie publications *PC Week*, *Computer Reseller News*, and *InfoWorld*, a different slant becomes evident.

These technical news publications are waxing eloquent over optical drives which work like floppies. The big difference is that these floppies hold several hundred megabytes or one gigabyte plus of data. Furthermore, these products are not the plain-vanilla 4.72 CD-ROM at all.

The next generation of flopticals is in the two inch in diameter range. The bigger drives are getting cheaper, faster, and easier to use. Even a Big Blue mainframer can lash a six-pack of gigabytes onto a controller and be online in less than 30 minutes.

With small and relatively cheap storage, organizations are going to go image crazy. Kodak, IBM, and Bell Laboratories have already been bitten. The first thrust has been the somewhat unimaginative but technically challenging picture

of the page, an electronic clone of microfilm. **FileNet**, now a unit of Allied Van Lines, is one of the better known image-system integrators, marketing page pictures to insurance companies and hospitals for record management applications. The next generation of image products promises to be much broader. Optical technology is more than an incredibly expensive and inefficient microform medium. It is an enabling technology which will be able to handle words, pictures, drawings, full sound and motion video, and numbers. What the customers do with the technology is difficult to predict. Rumor has it that the next generation of optical products will give the customer a choice of having a bit map of the page or ASCII and bit map of the charts, tables, or other graphic elements. I could jump into this pond today by calling Maxtor and purchasing their Tahiti optical drive. For about \$7,000 I can crunch 500 megabytes of data on my own optical disc. The drive plugs into my PC and behaves like a 198 1-360 Kb floppy. I can hook up the trusty **Ricoh** scanner and bum images.

The question is, 'Where are the images on the commercial timesharing services?' I am delighted to point to Maxwell Online and Dialog Information Services, two timesharing companies which have worked hard to offer image products to their customers. But the real image action is on bulletin board systems, the computing world's version of the underground newspaper of the 60s. On Exec PC, one of the preeminent bulletin board systems (**BBSs**) in the US, there are thousands of pictures. For those with a more salacious interest, Rusty and Eddie's BBS stocks about a hundred megabytes of electronic pornography.

The big timesharing companies lament the amount of time it takes to transmit an image. Ironic, isn't it, that when a timesharing company charges for time it complains about the time? Oh, well. Exec PC and thousands of other **BBSs** with images get around the file size problem by providing a brief searchable index which lists pictures available and offers the customer a compressed file. When the image file is downloaded, it is zipped so it takes as few bytes as possible. At the customer's end, the file is then expanded and viewed. The BBS operators provide free or shareware software to unzip the image and allow him to view it on his PC's monitor. No one has figured out how to get these BBS pictures printed in high-resolution on a range of printers. I am not worrying about this problem, however. Thousands of PC owners are wrestling with this problem. These image databases are among the most popular services on the BBS systems according to usage statistics posted in the message section of the larger boards.

In comparison with the **BBSs'** image base, the commercial timesharing companies' are running Model-Ts. One wonders what a searcher would pay to get a chart showing the number of PCs sold, not **just** the numbers. How valuable would the data be if the customer could download the data in a form suitable for editing or manipulation in Harvard Graphics 2.12 or Freelance Plus 3.1? I don't know the answer to these questions, but I do know from many hours at the other end of

a speaker's overheads, that pictures, charts, and graphs are the staples in the decision maker's information diet. At this time, I can't get these goodies from my online supermarkets.

### **Opportunities...probably too many**

I think it is obvious that the opportunities in the timesharing business for new **provinces** are plentiful.

Established timesharing companies can innovate in the way in which they present their interface to the customer. I would like to see value-added services like specific formats for downloaded data. The timesharing companies can sell me the information **province** packaged the way I want it. Timesharing companies can offer me images online. I would be able to specify **TIFF**, **PCX**, **GIF**, or some other format so I can use the downloaded data immediately.

Software companies can develop products which enhance the timesharing companies' user interfaces. Personal Bibliographic Software in Ann Arbor, Michigan, is enjoying considerable success with its line of interfaces for Macintosh and IBM-compatible users. File conversion programs like **Hijaak** and **Pizzaz** will be more important. However, programs which flawlessly convert file formats from word processor to database package are rare. This product arena offers product development possibilities.

Companies not now in the timesharing business can build new online delivery systems. Is that why a big telephone company, a Japanese game company, a retail store, and a Canadian print publisher are dabbling in online? With careful planning and marketing, newer technology will give the Nintendos and Quantums (two companies introducing new online services) a significant strategic advantage. If a new player in the timesharing game gets the mixture right, their business could take off like a nitro-methane fueled racing car. The competition will be cruising in 1976 Plymouths. Today's timesharing Goliaths will be tomorrow's Harvard case studies.

Rapid developments in optical technology will open new doors for hybrid systems. In the **90s**, fast-responding distributed databases and automatic online updating of remote databases will be aesthetically, technically, and economically feasible. The emergence of hardware and software which makes connections between separate electronic files and different types of hardware changes the rules which today's timesharing winners observe. Pricing, marketing, applications, and databases — each of these information factors will be recast. On these changes, the timesharing business of the 1990s will be built.

### **1990 is coming fast and hard**

Will US companies keep their traditional stranglehold on online? Yes and no. One or two companies are so large and have developed such an entrenched following that knocking them off their earnings will be a difficult job. Two tough competitors are Mead Data Central in the legal market and Dialog Information Services in the special library. Both companies

are successful publishers and distributors; however, both suffer from transvenderism. This is a managerial affliction which causes each timesharing company to want to become like the other. In spite of their affliction, both successfully manage prices, database producers, and customers because each company has a market and psychological stranglehold with fingers toughened from years of squeezing **quasi-resilient** objects like information providers and customers.

The lesser companies are in danger from US and non-US competitors. On the US front, the competition will come from organizations that are not in the mainstream of the information industry, such as Allied Vans, the moving van outfit, which bought **FileNet**. Why? Allied Vans is in the information business, storage division. **FileNet** lets Allied's 'boxes' hold more paper. I think that there are more Allied Vans ready to compete than some information industry executives believe.

Non-US companies can and do learn by watching. If Nintendo's online-via-game box strategy flops, will other Japanese companies tear up their online plans? Probably not. In fact, government-sponsored or private companies can buy timesharing market share. Database producers want only to receive royalties. The days of making data for its own sake will be gone when the 90s arrive. If someone pays the royalties and gives away the product to get market share, the database producers won't squawk. They get real dollars, remember.

### **The curtain drops**

The traditional timesharing companies with their rapidly-escalating overhead, bizarre pricing schemes, and interest payments will not be able to match the new competitors' low-ball prices. Customers, always in search of more moxie for their mark, go for the name-brand data at the lowest price. Overnight, market share figures will spin like the numbers on the Illinois lottery board. The losers? US timesharing companies, and, in my opinion, they will not do anything significant to thwart the challenges. Their plant is old, their customer orientation wacky, and their ability to innovate handicapped. I will write an article in 1995 called **D-RAM II: Act Three, Scene Two**.

In conclusion, the US timesharing companies are in for a heat wave. When the weather changes, different flora and fauna will inhabit the online information datasphere. From where I sit, the companies are like the stuffed animals at the Kentucky State Fair. For a buck, the competition gets to throw three hard, fast ones at targets which can't move, hide, or adapt. Like the fish in Mammoth Cave, they cannot see the missiles coming. Adaptation to their environment has blinded them. When that environment changes, they suffer, and many die.

As long as the competition can get hardware, software, and ideas to throw, the timesharing companies are easy targets. The happy quack, quack of drifting, fat, and contented pond ducks will draw big dogs fast.