

COMPUTER DECISIONS

DECEMBER 1984

THE MANAGEMENT MAGAZINE OF COMPUTING

A HAYDEN PUBLICATION

Project management

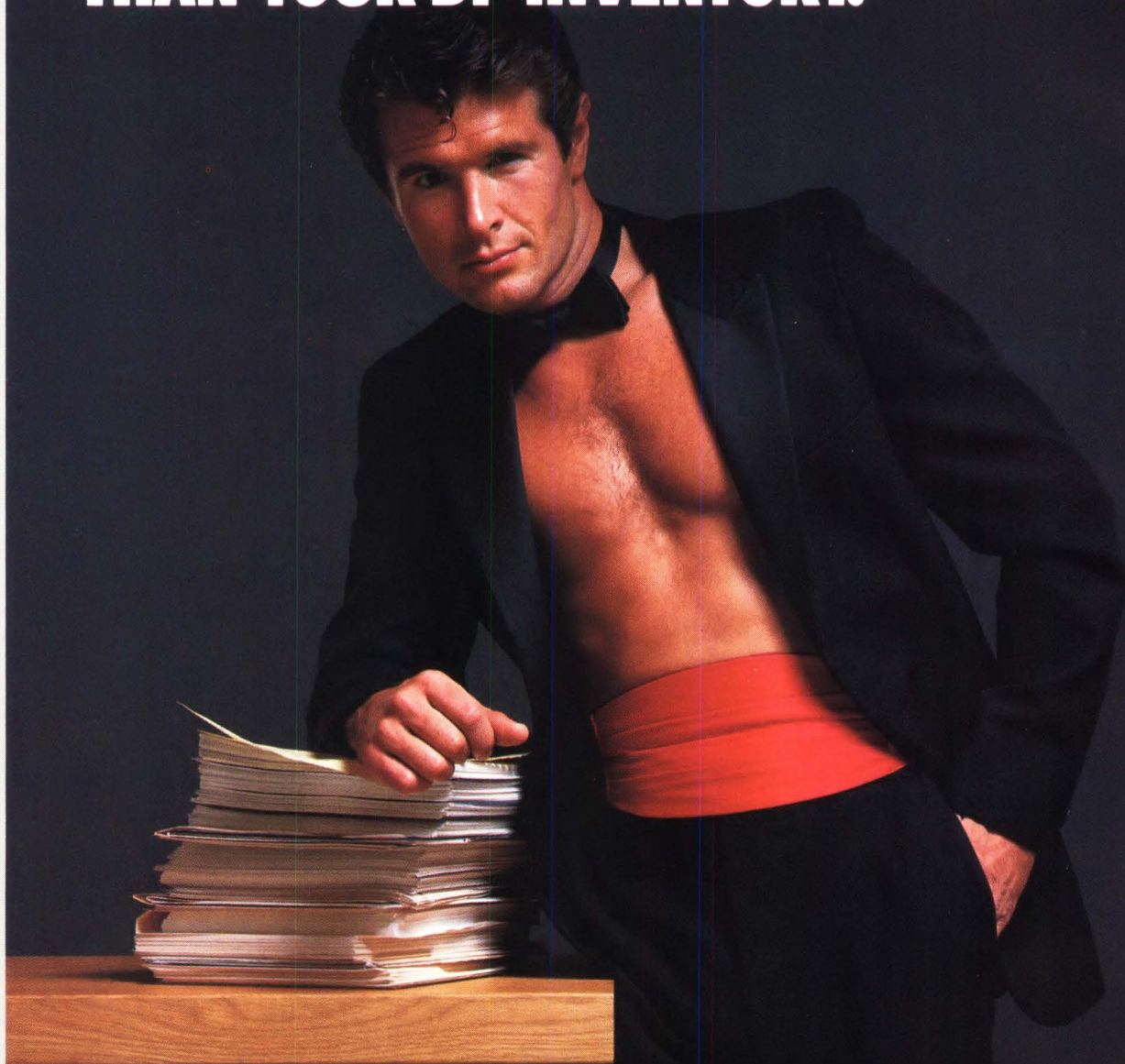
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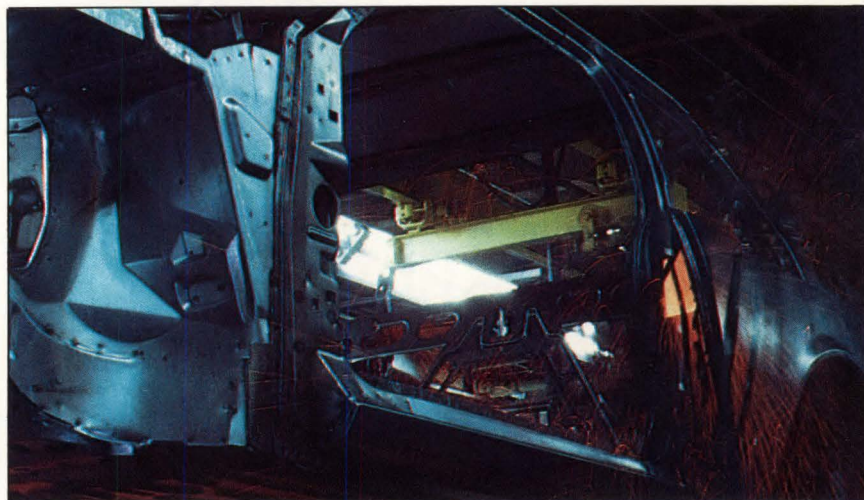
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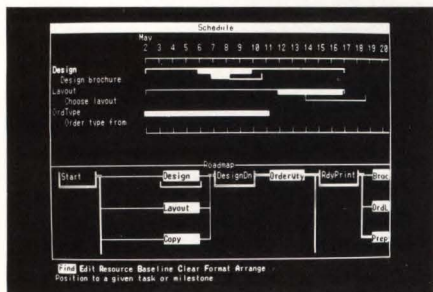
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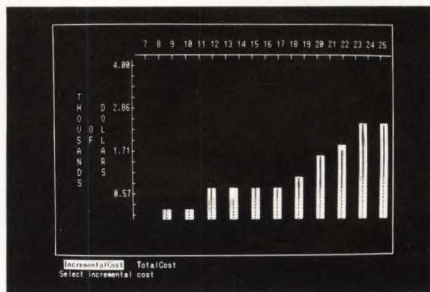
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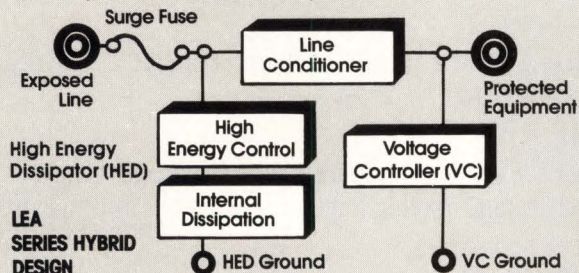
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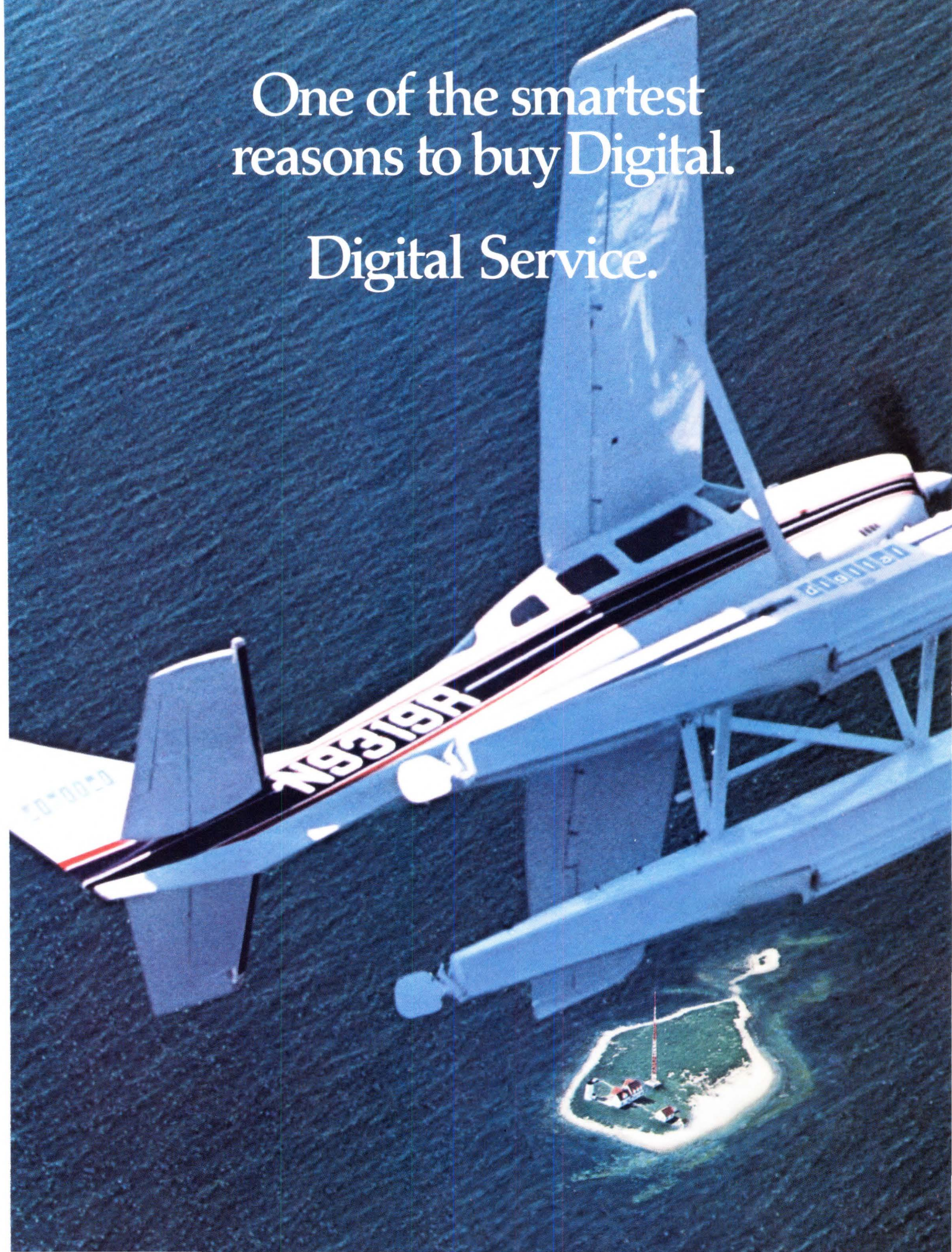
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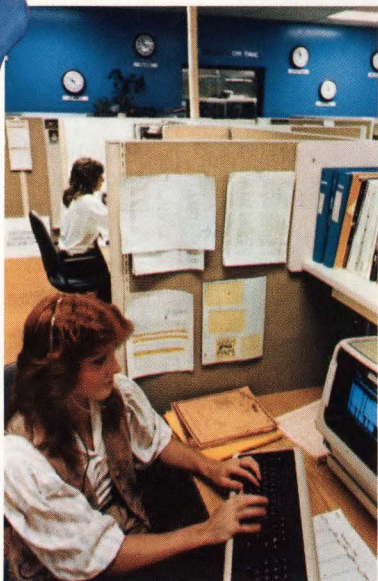




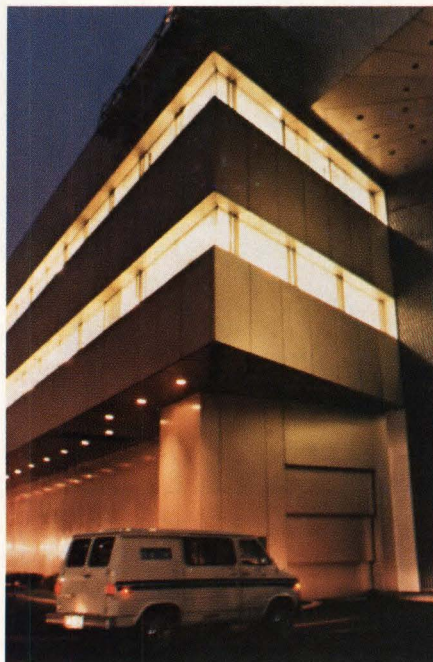
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THE TRUTH ABOUT STATISTICS

Computer crime is costing \$3 billion a year and going up fast." This was the first sentence I heard when I turned on my car radio one recent morning. This unsubstantiated statistic opened a long commercial for an insurance policy to protect against the effects of computer crime.

Throwaway numbers like the one used in the insurance commercial are as common as flies, but they are becoming annoyingly oppressive. Anyone who's got something to sell—be it a political or economic philosophy or a new insurance policy—reels out statistics to support the cause. Never mind that many of these numbers are ludicrous or best estimates. After awhile, though, all of the statistics become meaningless. It's like listening to a discussion of the federal budget on the floor of Congress. (As the late Senator Everett M. Dirksen once quipped about the budget: "A billion here, a billion there, and after awhile it starts adding up to real money.") Or the debate over the sizes of the American and Soviet nuclear arsenals. At our current level of destructive power, the warhead counts are irrelevant.

In the computer business, "statisticsmanship" is a well-exercised art and crime is getting much of the attention these days. Consider the following exchange between two experts at a recent seminar on the computer

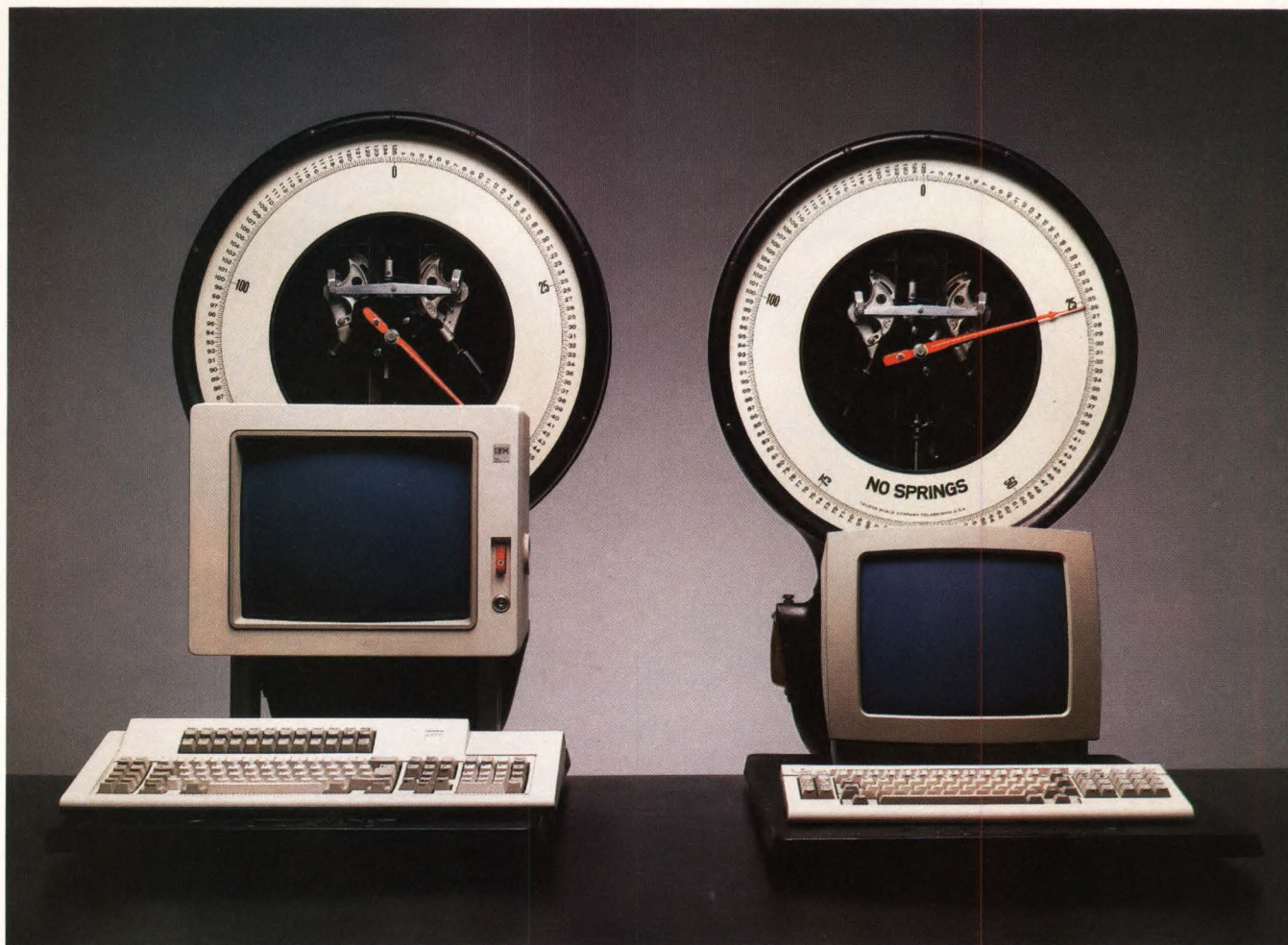


The exchange between the experts at the seminar simply confirmed the fact that nobody—not even the FBI—has a handle on the extent of computer crime or its cost. Crimes against major corporations more often than not are never reported. The only facts palpable about computer crime is the threat of it. So much for the statistics.

In this age of ready-made statistics, skepticism is the best stance for managers. Every claim and contention must be ripped apart or traced back to its source. If the source is the imagination of an expert, take the statistic for what it is, an

estimate, or worse, a guess. Perhaps the best way to gain insight into the relative flimsiness of statistics is by juxtaposing two numbers—like I did at the computer-crime seminar. At a recent press conference, a vendor's public-relations rep announced that in several years three million personal computers will be attached to some 450,000 local-area networks (LANs) in American corporations and the public sector. If you divide the number of LANs into the number of attached micros, you discover that on average about eight micros will be attached to each network. That's not many, which suggests that multi-user systems might be just as effective as LANs. That's food for thought the vendor probably didn't intend to serve.

—Mel Mandell



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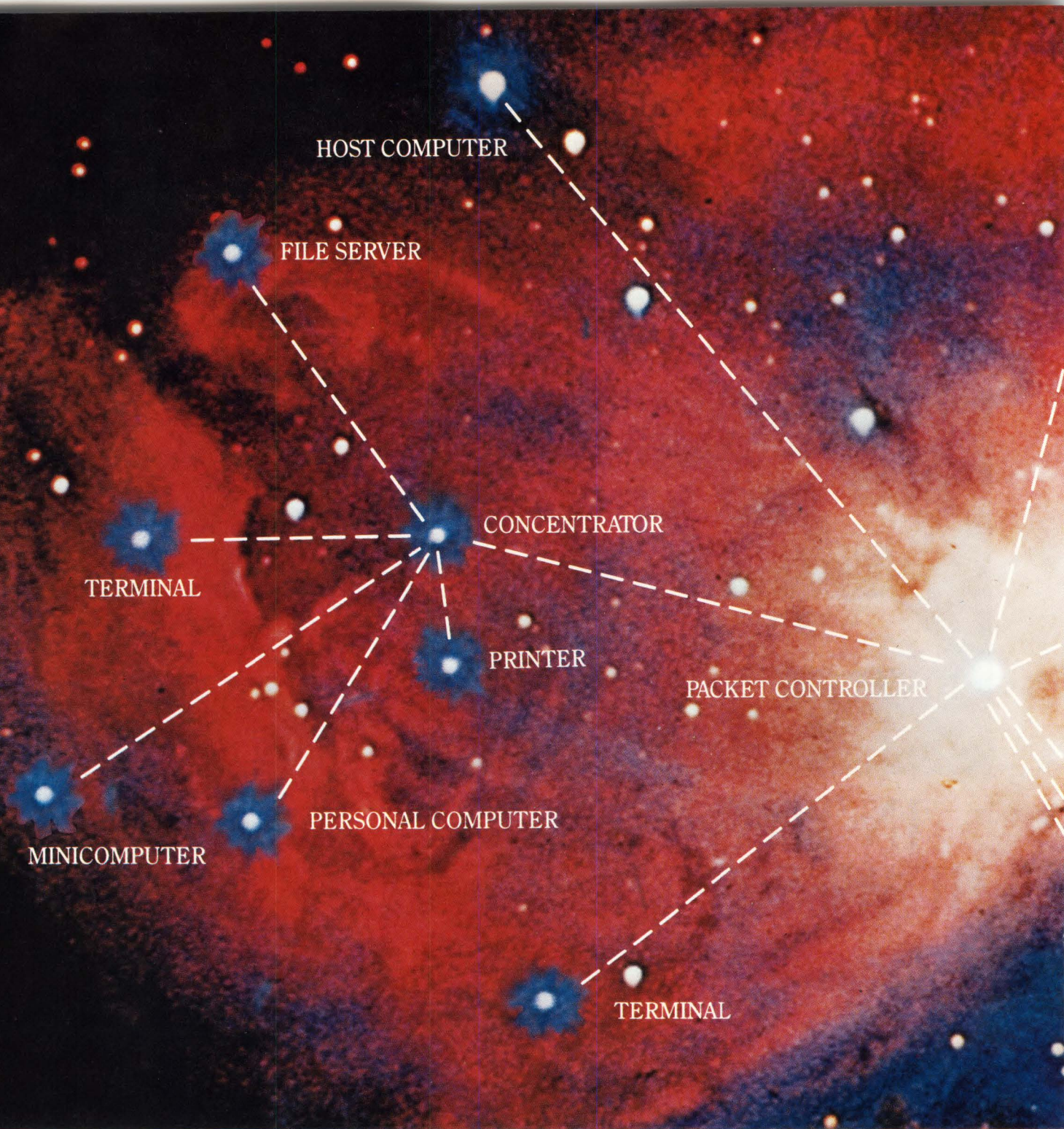
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NEWS & COMMENT

STC ILLS SHOULDN'T AFFECT USERS

Does Storage Technology Corp.'s (STC, Louisville, CO) filing for bankruptcy protection mean tragedy for users of STC's IBM-compatible data-storage devices? Not really, say several analysts who note that even if STC goes out of business, users will probably have no problem servicing STC products.

STC emphasizes that it is still in business and has filed for bankruptcy protection under Chapter 11 of the federal bankruptcy code (papers were filed on Halloween) because it plans to continue, rather than fold, its operations. However, STC says users should expect some interruptions in deliveries until STC negotiates new arrangements with companies that ship its products.

Filing under Chapter 11 will allow STC to reorganize and refinance while keeping creditors from shutting the company down. However, a statement released by STC to its sales force indicates that STC cannot guarantee it will continue to make the same products it was manufacturing in the past. "To the extent that it determines that modifying those operations will strengthen its long-term profitability, StorageTek may seek to make appropriate modifications," the statement says.

Even if STC folds, it has a large enough customer base to ensure that some organization will fill the breach and service its products, says Ken Bosomworth, president of International Resource Development Inc., a market-research outfit based in Norwalk, CT. "It would be like American Motors Corporation going out of business," he says.

Analysts say that price-cutting by IBM had a lot to do with STC's financial problems. STC could not compete with Big Blue's superior manufacturing technology and product design, analysts say. Bosomworth notes that IBM's price cuts were not temporary reductions designed to weed out the competition, but cuts that were based on reduced costs. IBM shows no signs of wanting to boost costs for its storage products in the wake of STC's ills and Control Data Corp.'s (Minneapolis) dropping of its 3380-compatible disk drive.

EXECS BLIND TO TECH

Senior management doesn't understand the profit-making potential of information technology, states John Diebold, chairman of the Diebold Group Inc., a management consulting firm headquartered in New York.

"Technology is still being managed within a limited technical context, showing that corporate officers don't really understand technology's value to corporate performance," Diebold says. "There is still a very wide gap between current applications and the



potential opportunities information technology represents," he adds.

Diebold cites the ability of technol-

ogy to accommodate employees' preferences about how and where they work best as a prime example of a potential productivity booster that is relatively unused. Employees who are allowed to use information technology to work flexible hours or in different settings (such as at home) can become more productive, Diebold says. Senior management should not be shy about altering work patterns to increase productivity, he adds. (For more on "telecommuting," which has made very little headway in industry and business, see "Telecommuting: Will It Work for You?" in the June 15, 1984 issue of *Computer Decisions*.)

Diebold highlights five areas in which computer technology is changing the way business is being conducted:

- Existing product lines are adding computer capability. Many consumer appliances and vehicles are now being marketed on the basis of how "intelligent" they are.
- Information technology can save a business money by making the organization more efficient. Savings in managing cash flow, conserving energy, and accelerating the distribution of resources justify the installation of a computer-based system.
- Information technology changes the corporate mission or objective. As a business expands, information technology challenges decision-makers to question the way they define their business.
- Information technology changes business interrelationships. Computer linkups are redefining connections between industries and suppliers, businesses and financial institutions, and manufacturers and consumers.
- Information technology creates new industries forces existing industries to become more competitive.

"The task will not be to do a first-class job at yesterday's business, but to understand how we will be doing business tomorrow," Diebold concludes. (News continued on page 18)

***DIGITAL
BRINGS VAX
TO LARGE
SCALE
COMPUTING.***



INTRODUCING THE VAX 8600 SYSTEM.

Your applications can do exactly what you want them to on Digital's new VAX™ 8600 computer system. They can expand.

User population can increase. Scientific problems can become more complex. Transaction volume can intensify. And data storage requirements can grow exponentially.

The VAX 8600 system gives you unprecedented capacity for applications growth. It's the first of a new generation of large scale VAX processors, with memory expansion to 32 million bytes and online storage up to 160 billion bytes. Yet the VAX 8600 system maintains complete architectural compatibility with every other VAX processor – including the new desktop-size

MicroVAX I™ system. Every system in the family gives you the same VMS™ operating system software, with the same set of proven development tools, communications options and data management facilities. Quite simply, there's not another computer family in the world that can match the growth path you get with Digital's VAX systems.

YOU GET UP TO 4.2 TIMES THE PERFORMANCE.

We've engineered the VAX 8600 system to deliver more than four times the processing speed and performance that the industry-standard VAX-11/780 system is known for. We've achieved this performance increase

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fetches a fourth. There's also a floating point accelerator that speeds floating point operations.

Even with all its power, the VAX 8600 system conserves floor space. The CPU fits into the same size cabinet as the VAX-11/780 CPU. Power consumption and air conditioning requirements are similar, too.

VAX 8600 SYSTEM HIGHLIGHTS

MAXIMUM MAIN MEMORY SIZE 32 Million Bytes

MAXIMUM STORAGE CAPACITY 160 Billion Bytes

MAXIMUM COMMUNICATION LINES 512 plus Local and Wide Area Networks

PROGRAM ADDRESS CAPACITY 4 Billion Bytes

BUS SUPPORT Availability includes 6 UNIBUS,™ 2 SBI, 4 DR 780, 3 CI and 4 MASSBUS™

PHYSICAL DIMENSIONS 60½" x 73½" x 30"

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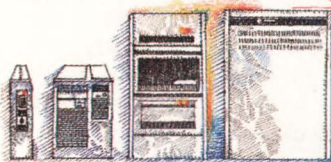
AIR CONDITIONING REQUIREMENTS 22,200 BTU/hr

ACOUSTIC LEVEL 60 dBA



VAXCLUSTERS LET YOU SHARE THE WEALTH OF VAX RESOURCES.

The large-scale storage and multi-user support you get with Digital's VAX 8600 system can be increased many times over with VAXcluster™ systems. This



multiprocessing capability, which is unique in the industry, lets you combine the resources of several VAX processors and manage them as a single system. VAXcluster systems enhance data integrity and increase system availability, with complete user transparency.

VAXcluster systems can be configured with up to 16 processors and storage servers in a variety of combinations. You can boost computing power in an existing VAXcluster configuration by adding a VAX 8600 system. Or you can build a new VAXclus-

ter using a VAX 8600 system as a compute server.

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agement utilities to work with. You have a choice of 15 programming languages. And you can combine different languages in a single application through the common calling standard.

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compliant database – VAX DBMS; and a relational database – Rdb/VMS. This software, together with the RMS hierarchical file manager which is part of the VMS operating system, can all use the DATATRIEVE™ user-friendly query language. And they all benefit from a Common Data Dictionary that eliminates data redundancy and permits record-, field- and user-specific security controls. What's more, you can automate your office with Digital's ALL-IN-1™ software.

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TECH NOT A PANACEA

Don't count on sophisticated data-communications, word-processing, and telecommunications equipment to miraculously turn a bad management situation into a good one, warns consultant M.C. Augustus Van Nievelt. If the organization is doing poorly, such equipment may actually make managers less productive. Even more serious losses may result, says Van Nievelt, because executives will be able to make more incorrect decisions faster.

Van Nievelt, of the Montvale, NJ, consultancy that bears his name, made his comments about the impact of technology on management productivity at the recent Info 84 show in New York. Other MIS/dp topics addressed during conference sessions at Info 84 included telecommunications, software maintenance, the future of modeling software, and MIS/dp's obligation to communicate with the rest of the company. Many vendors also took the opportunity to showcase new products.

Van Nievelt told conferees that although technology can't right a business that's in trouble, a business in good strategic position stands to increase management productivity with the infusion of information technology. Van Nievelt based his comments on a study of 40 businesses he is overseeing for the Strategic Planning Institute, a private organization of 3,000 businesses of all sizes that pool information on business performance into a common database.

Two consultants stressed the need for increased communication between MIS/dp and users. Alexandra J. Rand of Internal and External Communication (Santa Monica, CA) said MIS/dp executives must market their services throughout the company and get feedback from users on the types of reports they prefer. Herb Jacobsohn, president of Technology Information Products Corp. (Burlington, MA), suggested that product teams of users and MIS analysts should be formed to create business and data models that will serve as foundations for specific development projects. The teams would analyze the business and its information needs by using a series

of models with accompanying text written in common business language. Jacobsohn added that although top management should not devote too much time to the study, it should be present at crucial times. Furthermore, the teams should have as a goal only 60 percent to 70 percent completeness in planning, leaving room for changes based on actual performance and the needs of the business itself.

Upper management is losing business opportunities by failing to pay more attention to telecommunications, according to James Carlini, director of telecommunications and computer hardware for Arthur Young & Co., the Chicago-based accounting and consulting firm. Carlini said many corporations have been caught understaffed in telecommunications. As a result, long lead times for acquiring equipment and network services are delaying—and sometimes canceling—new business applications.

In another session, Richard P. Bonzagni, marketing vice president of Javelin Software Corp., a startup based in Cambridge, MA, stated that spreadsheets are outliving their usefulness as financial-modeling tools because of fundamental flaws in their design. Since spreadsheets attach no special values to numbers, users who misplace figures in the various rows and columns will not realize that the spreadsheet's answer is wrong, he said. Bonzagni added that it is difficult to describe clearly how a particular spreadsheet model is composed. As a result, top executives may have difficulty in understanding a model's validity. Furthermore, when employees who have constructed models leave their jobs, their replacements have trouble understanding how the models were constructed. (Incidentally, Bonzagni's view is not unbiased. His outfit is working on a new modeling tool that will combine the "what-if" capabilities of a spreadsheet with the visual capabilities of computer-aided design, thus allowing engineers to see relationships between different components of a problem.)

Among the new products introduced, Digital Equipment Corp.

(News continued from page 22)

DEC ADDS TO VAX LINE

Digital Equipment Corp. (DEC, Maynard, MA) has introduced the VAX 8600, the most powerful addition to DEC's popular VAX series of minicomputers. DEC claims its new mini, code named Venus, performs up to 4.2 times better than the VAX-11/780, which was first delivered in 1977. A spokesman could not compare the VAX 8600 to the VAX-11/785, which was introduced earlier this year.

The VAX 8600 runs under DEC's VMS operating system so that applications developed for other VAX minis can run on the new machine. Fully expanded, the VAX 8600 can provide 32 Mbytes of main memory and 160 gigabytes of online storage. The system can accommodate up to 512 communication lines directly, and many more through local- and wide-area networks. DEC says the VAX 8600 system can also operate in a VAXcluster with up to 16 VAX-11/750, VAX-11/780, or VAX-11/785 processors.

The increased speed of the new 8600 stems from its use of four-stage "pipelining," which overlaps the preparation and execution of instructions, and a 16-Kbyte write-back cache that allows the processor to continue at full speed without waiting for the main memory to be updated.

The entry-level system includes the VAX 8600 central-processing unit, integrated floating-point accelerator, 12 Mbytes of main memory, integrated controller and adapters for 104 asynchronous communications lines, synchronous-line and line-printer ports, licenses for the VMS operating system and DECnet, a 456-Mbyte RA81 disk drive, and a TA78 magnetic-tape transport and console terminal. Prices for the VAX 8600 range from \$576,000 to \$970,000. Volume deliveries of the system are scheduled for April 1985.

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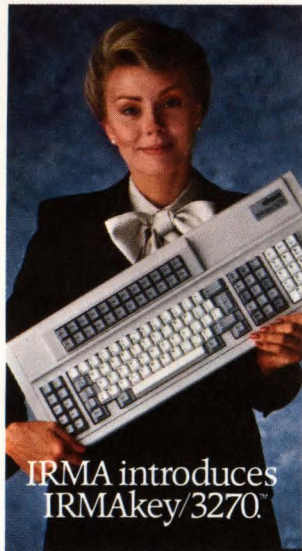


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Until now, when you operated the PC in the terminal emulation mode, keys had to be redefined.

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NEWS & COMMENT

(News continued from page 18)

(Maynard, MA) brought out the Decimate III word processor (\$2,695) and the LQPO3 letter-quality printer (\$1,074). In price, this combination is comparable to some of the fanciest electronic typewriters, yet it can act as a terminal to communicate with other DEC terminals and computers and to external databases, such as the Dow Jones News Retrieval and MCI Mail.

A two-year old startup, Filenet Corp. (Los Angeles), announced its first product, an optical-disk storage system named—aptly enough—Filenet. Priced at \$258,000, the system comprises a document-image processor that puts paper documents onto optical disks, a document-entry station, an image display station with high-resolution windowed screens, a laser printer, and software for word processing.

Lee Data Corp. (Eden Prairie, MN) introduced its Series 25 voice/data workstation, which combines telephone features with the ability to access IBM mainframes. The workstation is priced at \$1,295 to \$1,895. Call (612) 828-0300 for more information.

Microdata (Irvine, CA) announced an addition to its 9000 mini-computer series, the 9208 (\$180,000 in a basic configuration). Microdata claims that the 9208 offers double the processing speed and disk capacity as well as 50 percent more main memory than its predecessor. Call (714) 250-1000 for more information.

HONEYWELL TABS UNIX

Honeywell Information Systems Inc. (Waltham, MA) has introduced the microsystem NX, a personal computer that operates with Bell Labs' Unix operating system. The microsystem NX is a multi-tasking, single-user workstation for engineering support, administration, and applications development. The system features a window manager that can display up to six different applications at once on the NX mon-

itor. With the system, a user can print a document from a window containing a word processor, then switch windows and work on a spreadsheet at the same time. The system includes a 15-inch monitor, a detachable keyboard, 512 Kbytes of main memory, 64 Kbytes of display-screen memory, a 655-Kbyte diskette, two communications ports, and either a 12-Mbyte or 18-Mbyte hard disk. Pricing for the microsystem NX, which will be available in January, starts at \$8,895. Word-processing, graphics, and spreadsheet software is available from Honeywell at an additional cost. For more information, call Honeywell's Office Systems Marketing Department at (617) 671-6000.

NEW PROJECT MANAGER

According to Harvard Software Inc. (Littleton, MA), project-management software is virtually for every manager, not just for those who oversee complex projects such as the construction of a skyscraper or a nuclear submarine. To give micro users a little more of the power of mainframe project-management tools, Harvard Software is introducing an enhancement of its one-year-old Harvard Project Manager. Priced at \$495, the Total Project Manager performs the same functions as its predecessor, which can be upgraded for \$100. In addition, the new package tracks resource needs for tasks and spots where resource allocations conflict, the vendor claims.

Before using the Total Project Manager, a manager estimates what tasks have to be completed and what resources will be needed to complete those tasks. The tool then allows managers to make models of their scheduling estimates and indicates which tasks should be completed first. If the same resources have been allocated to the same tasks at the same time, the Total Project Manager issues a warning. The manager then comes up with a possible solu-

tion and plugs that solution into the Total Project Manager. The package determines if the scheduling conflict has been resolved.

The Total Project Manager, which is slated for release this month, runs on the IBM Personal Computer and compatible micros with 384 Kbytes of memory and either two double-sided floppy-disk drives or one double-sided floppy drive and a hard-disk drive. Call (617) 486-8431 for more information.

NO-LOSE MANUALS

How would you like to have software documentation that's easy to consult and almost impossible to lose? That's one forthcoming application for optical disks, according to David H. Davies, a project manager with 3M Co. (St. Paul, MN).

Davies made his statements during an announcement that 3M, a leading manufacturer of storage media, is purchasing a disk-mastering plant from North American Philips Corp. (New York). The plant will produce the Compact Disc Read Only Memory (CD ROM) disk, a 4.2-inch disk that can hold the equivalent of the entire *Encyclopedia Britannica*.

Because of the disks' enormous capacity, says Davies, a software vendor could place both its product and all supporting documentation on the same disk. If a user needs help with a new program, he or she simply hits the "help" button on the keyboard, and an



explanation instantly pops up on the screen of the micro or terminal in use. Although this application requires an expensive optical-disk reader for the micro or system, these readers are expected to drop in price once they are produced in mass quantities. Begin-

(News continued on page 24)



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CIRCLE 13

NEWS & COMMENT

(News continued from page 22)

ning next year, 3M will produce the disks for information suppliers, and North American Philips will supply the compact reader.

Davies, who is associated with 3M's optical recording project in Mountain View, CA, also revealed progress on optical media that, like magnetic media, can be rerecorded on easily. However, commercialization of this important advance is at least two years away. Presently, the optical disk is finding its greatest use in supplying huge databases. Widespread use of this information-distribution method could cut into demand for online information services.

MICROS OUT, PENCILS IN

According to two recently released surveys, if you've refused to trade in your pencil and paper for a personal computer up to now, you're not alone.

Only 1 percent of all executives in 1983 had personal computers or other types of automated workstations in their offices, according to a survey conducted by Advanced Resources Development (ARD), a Medfield, MA-based market-research firm. And of the 218 executives polled by Communispond Inc., a New York-based business-communications consultancy, only 1 percent used personal computers to do their business writing.

Of the 99 percent who don't use personal computers to write, 89 percent use pencil and paper and 10 percent use dictation, according to Communispond. As one respondent comments, "Writing is a manual task, plain and simple, and probably will be one for years to come."

When will office automation reach executive offices? ARD claims that 20 percent of all executives will have personal computers or automated workstations in their offices by 1988. However, ARD does not say whether executives will actually use the devices once they are installed.

EDIBLE DISKETTES



Photo: George Mattel

You can eat your words, you can eat your hat, and now—thanks to a New Jersey novelty-item vendor—you can eat your floppy diskette. Micro Goodies, a Princeton, NJ-based outfit that promises to "make hi-tech appetizing," is offering the "Milk Chocolate Eat-Only Diskette." It's an 8-ounce piece of chocolate sculptured to look like a 5¼-inch floppy. Unfortunately, buying an edible floppy is about twice as expensive as purchasing a real one to use with your micro. "Eat-Only" diskettes are available in packages of two for \$14. For more information, call (201) 874-4328.

RECOVERY CENTER

Sungard Recovery Services (Wayne, PA) has redesigned its Philadelphia disaster-recovery site and now calls it the largest facility of its kind in the country. The site offers 48,000 square feet of space for its subscribers' personnel and hardware, and it has three IBM mainframes and assorted peripheral devices and services for subscribers' use.

A spokesman for Comdisco Inc., Sungard's largest competitor, admits that the Sungard Philadelphia site is physically larger and has more central processing units (cpus) than any single Comdisco site. However, Comdisco has a two-cpu site in Carlstadt, NJ that offers comparable computer power, the spokesman says.

In addition to offering customers use of its equipment and office space, Sungard, which started the disaster-recovery business in 1978, offers telecommunications network facilities and has a 40-member technical staff to help customers run equipment. Sungard also helps customers prepare disaster plans and allows testing of its equipment by customers. Sungard will also help customers obtain additional IBM equipment for use at the disaster center.

The Philadelphia facility is divided into three data centers, each with a 7,000-square-foot computer center (called the "hot" site), a 5,000-square-foot space for the customers' own cpus (the "cold" site), and 4,000 square feet for offices and terminals. Each hot site has a different IBM computer configuration: an IBM 3033U (rated at 5.3 millions of instructions per second), a 3081G (11.4 MIPS), and a 3081KX (15 MIPS). Each site comes with supporting disk and tape drives, access to telecommunications services, and two laser printers. The sites can be tied together for a maximum of 31 MIPS to accommodate customers with greater needs.

The Sungard center—and disaster centers in general—cannot handle

(News continued on page 28)



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developed our family of networking products to support this trend.

We realized the requirement for true distribution of data, so we carefully integrated data communication capabilities with our data base software.

By listening to our users, we anticipated the growing importance of 24-hour-a-day access to data. As a result, we now offer the first nonstop data base.

Today, while others are busy putting labels on our innovations, we are quietly moving on to our next innovation. And, that's the proper plan for the world leader in advanced systems software.

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NEWS & COMMENT

(News continued from page 24)

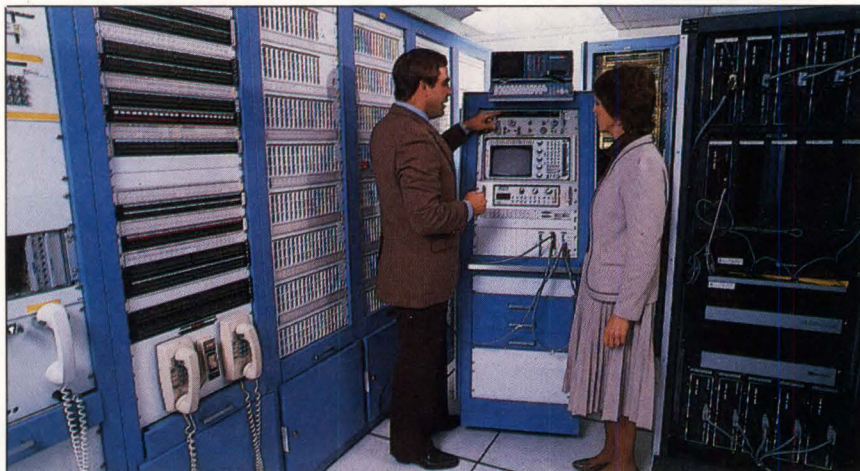
large-scale catastrophes affecting a large number of users from the same area, says John H. Ratliff, Sungard's

vice president of marketing. "If you've got a blackout of a whole city, then it's a holiday," Ratliff says. "Disaster centers are built for iso-

lated occurrences."

Sungard has about 270 customers now and says it can accept up to 440. Sungard charges its customers from \$3,000 to \$13,000 a month for its services. Each customer is guaranteed an equal right to use a center. If the main facility in Philadelphia is already being used, a customer may use Sungard's second site in Chicago. Sharing arrangements may also be worked out, Ratliff says. He adds that in six years of operation, no customer has ever been denied access to the computer power because another customer was using a site.

For more information, call (215) 341-8734.



TONGUE IN CHECK

There's nothing in language quite so thrilling as a lucid metaphor, and nothing more hilarious than a mixaphor.

A mixaphor is two metaphors in an unlikely and ludicrous partnership. Alan Kay, former chief scientist for Atari Inc., recently reeled off a classic mixaphor when he joined Apple Computer Inc.: "I guess the tree of research must from time to time be refreshed with the blood of bean counters," Kay told the press. In other, less colorful statements, Kay explained he was leaving Atari because it had cut back investments in research after suffering huge losses.

Metaphors are poetic devices designed to compress much meaning into a word or phrase. By describing your boss as a Scrooge, for example, you illuminate many facets of his or her character with a single word. Kay's mixaphor provides no such illumination. It's not only grotesque, but also contradicts his less imaginatively stated reason for leaving Atari.

Many mixaphors are much more subtle, but no less ineffective at conveying a statement's meaning. "There is a negative productivity curve involved with learning to use micros that can overwhelm first-time users—unless they're prepared for it and know what to do about getting over the hump," a consultant recently opined. The consultant's first offense was the breathtaking length of his sentence. But he also asked the reader to follow him over some pretty rough terrain. Facing a *negative curve*, users have to climb out of a hole to reach the high sierra of optimum productivity. But then there's this matter of the hump—where does it fit into the topography?

There's a place for colorful language, and good metaphors are certainly welcome additions to humdrum business communications. But be careful. First, a metaphor must snugly fit a statement to be effective. Kay, for instance, might have described how the tree of research receives less nourishment in harsh times. Second, if you endeavor to construct a metaphor, don't let your first thought lead you recklessly toward another verbal image. The result will be, at best, ridiculous, or, worse, baffling. And that's not what business communications are all about.

—John Rymer

HAMMERING AWAY AT OA

Office automation came under fire from several consultants and academics during the recent annual conference of the Society for Information Management (SIM) in Chicago.

Although OA was only one of the "islands of information technology" considered at the conference, it was the one that drew the most attention. Michael Hammer, head of the Cambridge, MA consultancy that bears his name, led the assault on OA. The former professor argued that OA can't be justified because its costs far exceed any measurable benefits.

Hammer took shots at almost all aspects of OA technology, including electronic and voice mail, portable computers, and managerial workstations. He ridiculed what he called the "wretched excesses" of OA, such as electronic calendars. He knocked teleconferencing as resulting in more meetings rather than less travel. He called videotex "a new dimension in boredom" and described local-area networks as "the data-processing equivalent of conceptual art" in that they attract a lot of attention without causing any real change.

Hammer also criticized the ways that personal computers are being used within corporations, claiming that they should be called spread-

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NEWS & COMMENT

sheet machines based on their dominant application. Hammer said personal computers are merely taking over jobs that are done by other machines already in the office.

Richard Byrne, a professor at the Annenberg School of Communications of the University of Southern California, Los Angeles, argued that the benefits of OA will not be realized until office practices and procedures are modified to accommodate automation. "What's wrong with OA is that we're automating the old office," he said.

Byrne warned that OA advocates may be placing too much faith in the power of the microcomputer. "It's lethal to think micros will ever do the mainframe's job," he said. However, Byrne added he sees micros as causing "structural" changes in corporations, such as eliminating some levels of middle management.

John Loewenberg, senior vice president of information services for Springfield-based Massachusetts

Mutual Life Insurance, also downgraded OA as "a sort of myth." Instead of implementing some grand plan for the plan's sake, Loewenberg said, managers should concentrate on making office workers more productive.

Electronic (but not voice) mail got a plug from Carl Cottrell, marketing operations manager for Hewlett-Packard, Palo Alto, CA. Electronic mail is widely used by Hewlett-Packard's 80,000 employees, with some 60,000 messages being sent each day. However, voice mail was knocked by Byrne of USC, who said the messages are too long.

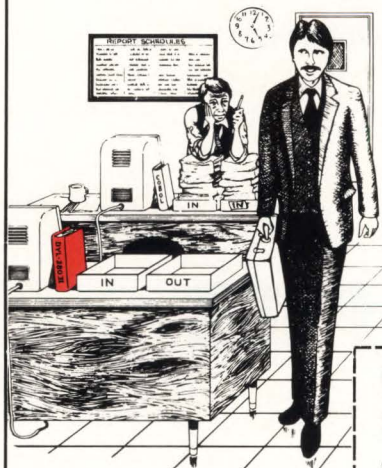
Warren McFarlan, a professor at the Harvard Business School, kicked off the conference by suggesting that many information-handling executives are "thinking too narrowly." He urged that they expend more effort on information systems that "create entry barriers to competition."

McFarlan said a properly implemented information-handling system

can give its creator enormous competitive advantages. As one example, he cited American Airlines' placement of terminals in travel agents' offices. Travel agents who use the terminals are shown American's flights first, making it likely that an agent will book an American Airlines flight if one is available. McFarlan noted that American's move is widely believed to have contributed to the bankruptcy of one of its competitors, Braniff International Corp.

Next year, the annual SIM conference will be held in Cambridge, MA. For more information, contact SIM at (312) 644-6610. SIM has also issued a call for papers for its 1985 awards competition. The best paper will be awarded \$5,000. An eligible paper must describe a management information system, an approach to developing information systems, or a technique for improving or managing MIS activity. The work described must have been implemented, and the primary author should be a manager

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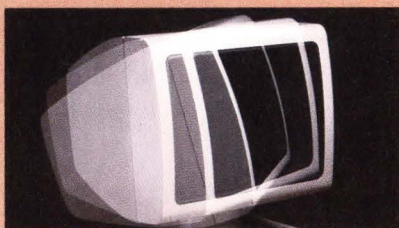
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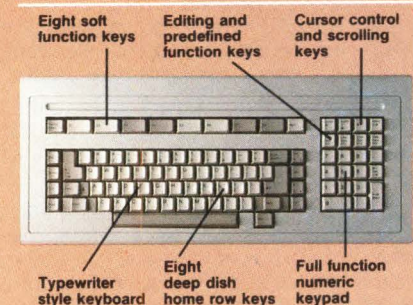
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of the institution in which the work was done. Interested authors must submit a 1,000-word abstract by Feb. 15, 1985. For more information on the papers, call E. Nancy Markle, vice president for information services, Federal National Mortgage Association, at (202) 537-7891.

IBM'S LATEST BLITZ

Big Blue has unleashed its latest wave of product announcements, a wave that includes a 4300-series mainframe with a dual

processor, an entry-level processor for the larger 308X family, enhanced versions of its 3270 Personal Computer and PC AT, and a series of programs for the office.

IBM says the new 4381 model group 3 is its most powerful 4300-series computer. Two central processors operate under a single operating system, and each has its own channels and high-speed buffer. IBM claims the new 4381 model can process workloads up to 1.7 times faster than its predecessor. Prices for the 4381 model group 3 with 8 Mbytes of main storage and 12 standard channels start at \$825,000. IBM says the new 4381 model will be available in the second quarter of 1985.

The new IBM 3083 CX processor is the smallest and lowest-priced processor in the high-end 308X series, according to IBM. The system is available with 8 or 16 channels and 8, 16, 24, or 32 Mbytes of main storage. It runs the same programs as other models in the 308X series and operates at about three-fourths the speed of the 3083 EX. The 3083 CX can use all peripheral devices designed for the 308X series. The price for a 3083 CX system with a central-processing unit, 3082 processor controller, 3087 model 1 coolant-distribution unit, 8 Mbytes of main storage, and 8 channels is \$830,000. The new model will be available in the second quarter of 1985.

IBM promises that enhanced versions of its PC AT and PC XT/370 models can act as IBM 370 CMS workstations, as IBM 3278/79 terminals attached to a host, or as standard AT or XT computers. The new PC AT/370 processes host-computer programs from 25 percent to more than 100 percent faster than the current IBM PC XT/370, according to IBM. The PC AT/370 will be available next month starting at \$9,795. The new model of the XT/370, the 5160 Model 589, has an emulation-adaptor option that enables the system to act as a 3278/3279 terminal attached to a host by a controller. The 5160 Model 589 costs \$8,395 and also will be available next month. Upgrade kits for the PC AT and PC XT cost \$3,095. (News continued on page 36)

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The HP 3000 compu

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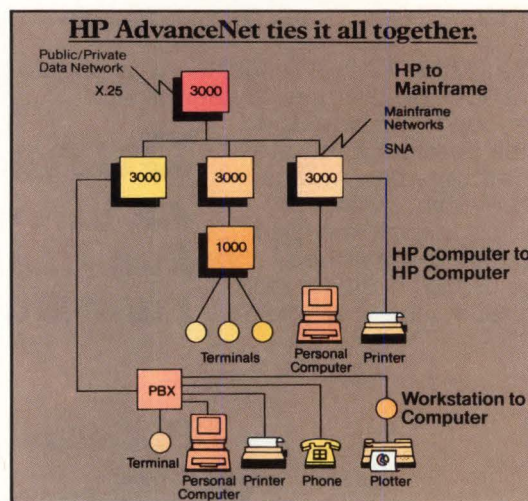
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The new HP 3000 Series 37 Office Computer, the latest member of the family, puts the power of the HP 3000 within the reach of smaller budgets.

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ter. One family fits all.

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Our communications go well beyond this office network. With HP Advance Net, they extend to links with other HP 3000s, in the same building or on the other side of the world. And to your mainframe computers, ours or IBM's.

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NEWS & COMMENT

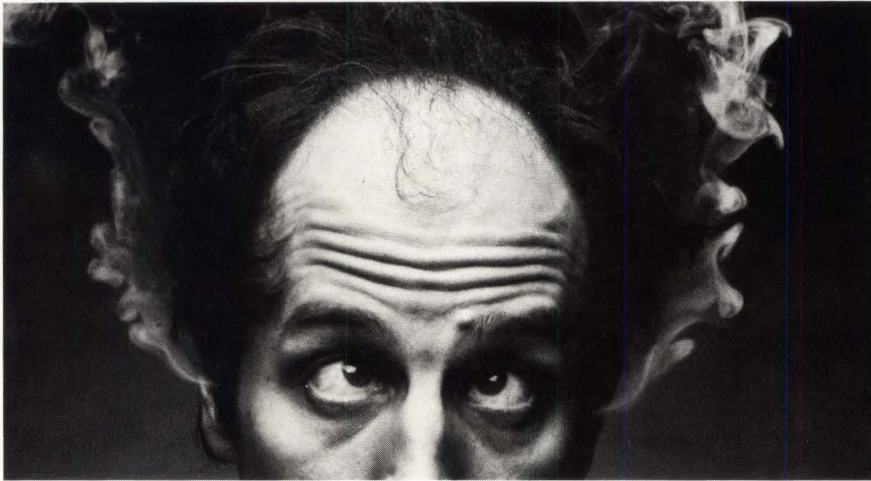
(News continued from page 32)

Among the enhancements to the IBM 3270 PC is a new application-program interface that lets users send host data directly into a spreadsheet running in a PC session without making programming changes at the host. The interface will be available in the

second quarter of 1985.

Big Blue says its new Office Systems Family includes additions to IBM's Displaywrite text-processing programs that can be used on the IBM PC and on System/36 and System/370 computers. IBM says the programs will provide full-function

text editing, library services, and electronic document distribution. The office programs will permit information exchange in networks of PC, System/36, and System/370 users, as well as with other IBM office systems, according to IBM. Two of the programs, Displaywrite 3 and Displaywrite/36, will be available for a one-time charge of \$349 and \$2,000, respectively. The programs are scheduled for release in July 1985.



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NEW IBM COMPATIBLES

Three vendors recently introduced new IBM-compatible microcomputers. For two of the vendors, the new machines are their first effort in the IBM-compatible market.

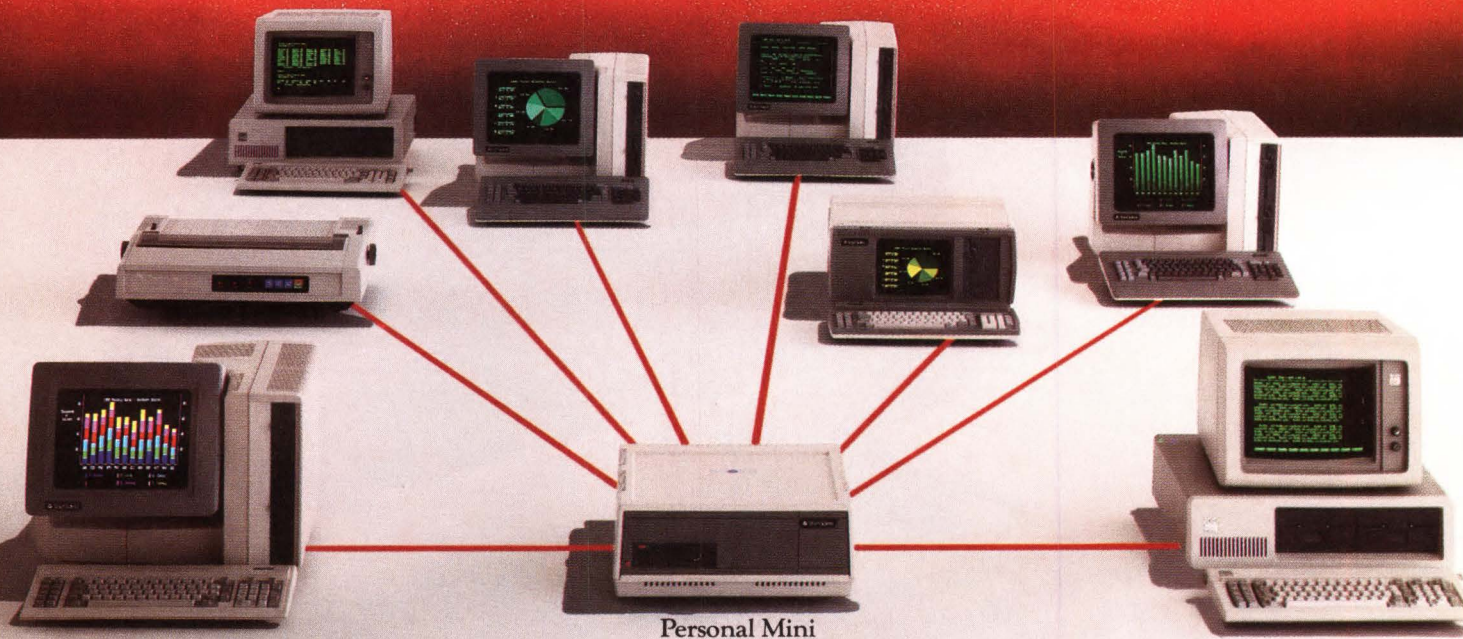
The Tandy Corp. (Fort Worth, TX) has made its first entry into the IBM-compatible market with its new 1200 HD personal computer. Tandy promises that the new 1200 does everything the IBM PC XT does for \$1,400 less. The Tandy 1200 HD sells for \$2,999 and features 256-Kbyte RAM (expandable to 640 Kbytes), a 360-Kbyte 5¼-inch floppy-disk drive, and a 10-Mbyte hard-disk drive. Tandy says the 1200 HD's 84-key detachable keyboard has the same basic layout as the PC XT's keyboard but with improved placement of shift keys. For more information, call (817) 390-3300.

NCR Corp. (Dayton, OH) has also introduced its first IBM-compatible personal computer that, according to NCR, runs all software for the IBM PC. NCR claims its Personal Computer Model 4 will distinguish itself from the competition because of such features as an online help program, a programming language that combines software support for graphics, and two self-teaching tutorial software packages. The basic configuration includes a monochrome monitor, 128 Kbytes of memory, two 320/360-Kbyte floppy-disk drives, a disk-controller board, a video-controller board, and industry-standard serial and parallel interfaces, and sells

(News continued on page 40)

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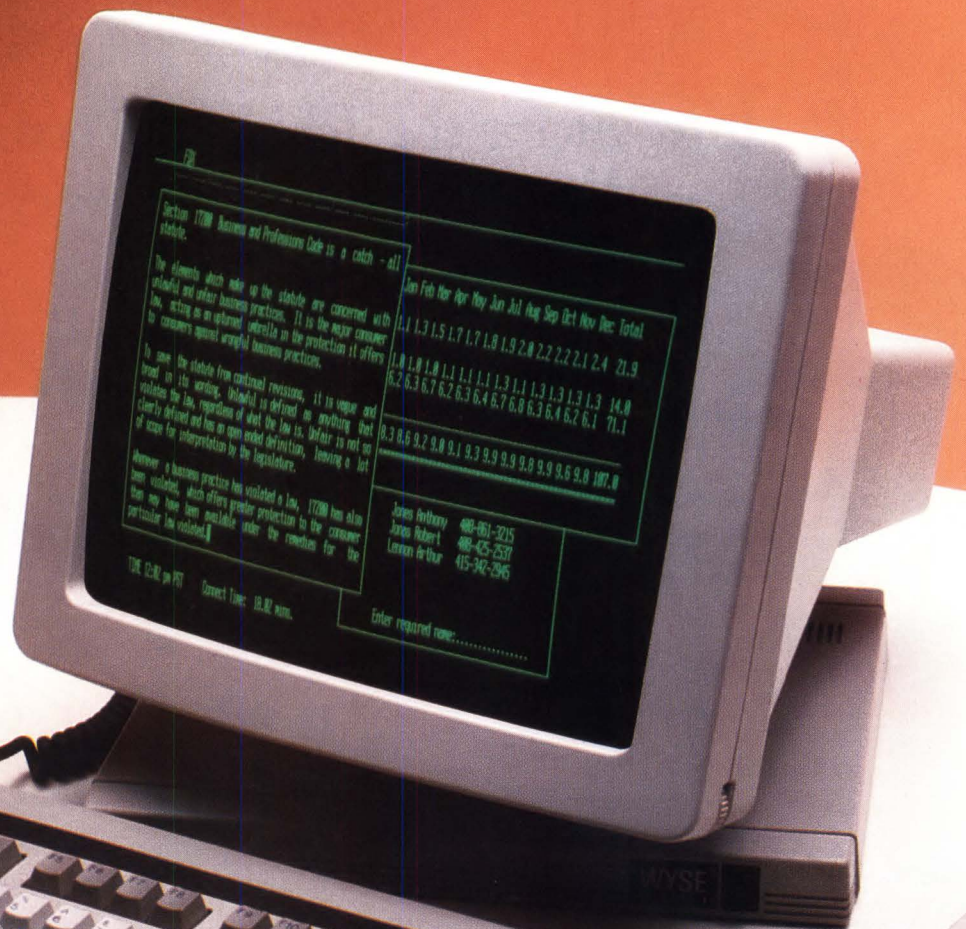
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NEWS & COMMENT

(News continued from page 36)

for \$2,825. The hard-disk version costs \$4,486. For more information, call (513) 445-6240.

Tandem Computers Inc. (Cupertino, CA), has unveiled two personal computers that can also act as terminals for its Nonstop series of mainframes. The Dynamite 6541 and the Dynamite 6546 workstations function as online terminals for Tandem's Nonstop I, Nonstop II, and Nonstop TXP systems. Each workstation can also act as a terminal for an IBM mainframe or as a stand-alone IBM-compatible personal computer. The Dynamite workstations will run most programs written for the IBM PC, including Lotus 1-2-3, according to the vendor. Model 6541, with two 360-Kbyte floppy-disk drives and 256 Kbytes of RAM, sells for \$2,995. Model 6546, with one 360-Kbyte floppy-disk drive, a 10-Mbyte hard-disk drive, and 256 Kbytes of RAM, sells for \$3,995. Memory in both models can be expanded to 640 Kbytes. For more information, call (408) 725-6000.

METERING MEETINGS

Are you and your subordinates spending too much time in meetings? Westinghouse Furniture Systems, a subsidiary of Pittsburgh-based Westinghouse Corp., is trying a new way to cut down on expensive meeting time.

To induce participants to hold shorter meetings, special meeting rooms at Westinghouse Furniture's headquarters in Grand Rapids, MI, are equipped with computerized "meters" that add up the cost of participants' salaries minute by minute. Participants enter their telephone extension numbers into the meeting meter, a digital-display device mounted in a wall next to the meeting-room door. The meter is connected to a host computer that holds the per-minute salary of each employee at the facility in its memory. During the meeting, the system automatically totals and continually displays the overall cost of

the current meeting by the minute.

Although it's too early to tell if the metering system works, a Westinghouse spokesman reports that the company has already begun to save time and money through teleconferencing. The spokesman says that Westinghouse Systems has already

saved more than \$175,000 in travel expenses since it installed teleconferencing facilities a year ago.

The Grand Rapids facility also extensively uses micros. Nearly every manager's or professional's office is equipped with either an Apple or a Hewlett-Packard 150 personal com-

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puter. Other employees are furnished with terminals. Surprisingly, there are no IBM Personal Computers in use, but the information center, where employees are trained, does have one IBM PC. The Westinghouse MIS Center is equipped only with HP 3000 minicomputers.

WORKSTATION FROM WANG

Wang Laboratories Inc. (Lowell, MA) has a new office computer for secretaries who need a workstation that is more

powerful than an electronic typewriter but not as sophisticated as a personal computer. The Wang Office Assistant can simultaneously print and do word processing. It also can process forms and do a limited number of simple graphics and spreadsheet operations. The Office Assistant sells for \$2,395 and is available with a \$1,000 letter-quality printer that works at a 20-character-per-second clip. The system consists of a 12-inch crt monitor, a keyboard, and a base unit of 256 Kbytes of RAM and a single 5¼-inch disk drive. It also comes with a Wang multi-tasking operating system and a version of Wang's WP Plus word-processing software. The Office Assistant can also act as a terminal to a Wang VS series minicomputer. For more information, call (617) 459-5000.

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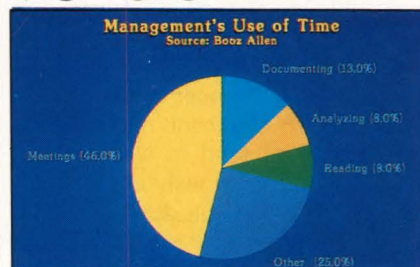
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GRAPHICS TO GO



PC Presents!, a new micro software package from Imedia Corp. (Cupertino, CA), enables Lotus 1-2-3 users to transform their 1-2-3 spreadsheet graphs into ultra-high-resolution color slides, prints, and overhead transparencies. The user creates a graph or other visual aid and transfers it to the *PC Presents!* software. This is then sent by mail or, with the aid of a modem, over telephone lines to Imedia, where it is processed and sent back to the user. *PC Presents!* operates on the IBM PC and PC XT and the Compaq portable computer, and needs 192 Kbytes of memory. The price of *PC Presents!* is \$350, but the processing cost varies, according to the vendor. A two-day processing turnaround for a visual aid costs \$15 for a slide, \$23 for an overhead transparency, and \$22 for a print. A one-day turnaround is slightly more. For more information, call (408) 255-5500.

PERSONAL COMPUTING

MINDWARE TO THE RESCUE

by Susan Foster Bryant, Microsystems Editor

The "problem child" on your staff has driven you to the wall again. No matter how hard you've tried, Mr. Fakeone simply hasn't responded. He remains a gifted pro yet to realize an iota of his true potential. As a last resort you turn to . . .

Would you believe, your personal computer? You turn on your machine and boot up a special program. It asks you some questions about the problem employee and about you. It digests your answers and gives you something like this:

"Your willingness to listen and understand Mr. Fakeone's ideas and opinions will help you to work successfully with him. He will enjoy your warm, friendly manner and cooperate with you. Mr. Fakeone makes quick decisions. You tend to worry about decisions and cautiously consider alternatives. When you deal with him, be willing to consider global issues as well as detailed matters. Be wary when he seems to speak without carefully thinking. Seriously respond only to definite statements. He may seem overpowering to you because he is so energetic and outgoing. Your ability to be friendly and considerate will draw him to you. . . ."

The report continues, giving you more information and advice on how to deal with your Mr. Fakeone.

The preceding scenario is not a glimpse into the future. It's a look at the present. "Mindware" is the latest rage in personal-computer software for managers. According to software

houses that are developing it, mindware enhances and extends mental abilities. It functions as a bridge between computer and human intelligence. It is, as one vendor proclaims, "life-enrichment software."

Mindware differs from other micro software in several ways, most notably in that (a) it is very interactive, and (b) the tasks it performs for a manager cannot be delegated. It enhances a manager's personal productivity. Most managers can assign many—if not most—computer-aided tasks to support personnel, but mindware is designed for managers themselves to use. Indeed, mindware may be the latest definition of decision-support systems. It is a wedding of the personal computer's capacity to organize and the manager's ability to think.

The report on Mr. Fakeone is an excerpt from an actual report generated by The Management Edge from Human Edge Software Corp. According to James Johnson, president and founder, the program is one of several from this vendor that "act as an advisor to the human operator during difficult moments in dealing with other people." It's an "expert" system, if you will, for managers.

The Management Edge is an easy program to run because, like many new programs, the user enters information in standard English. Johnson, a clinical psychologist and Ph.D., put together a list of observable personal traits. The software addresses these

traits by asking a series of questions. In the case of Mr. Fakeone, it asked 60 questions about the personality of the manager involved and 60 questions about Mr. Fakeone.

Based on the answers to the questions, the computer presented a 13-page report on managing Mr. Fakeone. The report was broken down into sections such as communication, performance/motivation, effective discipline, and optimal placement. The report even contained suggestions on how to fire Mr. Fakeone should his performance fail to improve. (These last suggestions are euphemistically titled "Outplacement Counseling.")

Dealing with problem employees is not the only application of mindware. Thoughtware Inc.'s Trigger is a new package designed to help a manager improve both personal productivity and company profitability by monitoring key business factors (such as sales levels, expenses, and personnel performance) and comparing that information with guidelines set forth by the manager. If the manager's criteria are not being met, Trigger alerts the manager and generates a memo that identifies the problem, its probable causes, and the action that should be taken to deal with it.

According to Johnson of Human Edge, mindware will bring managers and their micros closer. "This type of software will change the general perception of what personal computers are for. Now these computers can act as advisors, the other voice in an intelligent, solution-oriented conversation—the kind of help until now only available from high-priced consultants," says Johnson.

Another type of software that falls

(Continued on page 46)

"Mindware" is the latest rage in personal-computer software for managers.

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direct-connects to any
telephone network.

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(compressed print) add
wide format for spread-
sheets, financial data.

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a practical tool.

Exclusive program
cartridges add
custom functions
now; added
expandability
later.

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even smaller, lighter
package.

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A DP MANAGER'S GUIDE
TO DISC DRIVE
PERFORMANCE EVALUATIONS

CIRCLE 74



MEMOREX

PERSONAL COMPUTING

(Continued from page 42)

into the mindware category is the idea organizer or outline processor. Although these programs do not offer advice or suggest management strategies, by accommodating the way managers think they make it easier for users to develop their own thoughts and ideas. One such program, ThinkTank, provides an outline frame that allows users to quickly insert thoughts as they surface. It's a tool that's useful for brainstorming, conceptualizing, planning, and organizing. The program lets users create main headings, subheadings, sub-subheadings, and so on until they've run out of ideas (or memory space). Users can collapse

entire levels of the outline, move headings with all their accompanying text, and search for a misplaced item. Commands are arranged in clear menus.

Thor is another thought organizer that allows users to record, categorize, and retrieve thoughts. With Thor, users can relate thoughts to one another, change their relationships, and review a thought in summary or in detail.

Currently, mindware is in its infancy. Over the next few years, it will probably become more sophisticated. The research being done in artificial intelligence and expert systems will have a positive impact on the develop-

ment of microcomputer mindware.

But, advancements in micro software and improvements in personal productivity aside, the use of mindware—particularly mindware like The Management Edge—raises some philosophical questions managers will have to deal with. To what extent should mindware affect the human side of management? Will managers find it too easy to rely on their computers for important decisions? Will the quality of management come to depend on the quality of management-aid software used? These questions may not seem important now, but they may well become very important in the near future. □

MINDWARE FOR MANAGEMENT

Vendor	Package/Description	Equipment	Price	Circle
Fastware (201) 676-7963	Thor A thought processor that organizes and categorizes via a relational database	IBM PC and compatibles with 192K RAM	\$295	458
Human Edge Software (415) 493-1593	The Management Edge The Negotiation Edge The Sales Edge Interactive programs that enable users to analyze specific relationships	IBM PC and compatibles with 128K RAM	\$250 ea. (\$295 for The Negotiation Edge)	459
Idea Ware (212) 334-8043	The Idea Processor A word-processing and database package that allows users to store and recall data while writing	IBM PC and compatibles with 192K RAM	\$295	460
Living Videotext (415) 964-6300	ThinkTank An outline processor that features collapsible and expandable outline forms	Apple II series with 64K RAM, Apple III with two drives, Macintosh with 128K RAM, IBM PC with 256K RAM	\$150 for Apple II and III; \$145 for Macintosh; \$195 for IBM PC	461
Maxthink (415) 428-0104	Maxthink A word processor that organizes ideas in outline form	IBM PC and compatibles with 192K RAM	\$249	462
Softpath Systems (503) 342-3439	Brainstormer An idea organizer that breaks down problems into up to 10 themes and suggests up to 10 solutions to each theme	TRS-80 Models I, III, and 4, Apple II under CP/M with 80 columns, micros under CP/M and MBASIC 5.2	\$60	463
Thoughtware (305) 854-2318	Trigger An interactive program that monitors key business factors and suggests solutions to problems	IBM PC and compatibles with two drives and 128K RAM	\$495	550

STRICTLY SOFTWARE

by David J. Kull, Software Editor

LEDGER DOMAINS

Debits on the left, credits on the right. According to lore, even top financial officers struggle to remember that first rule of book-keeping. Happily, for finance departments that deal with accounting

complexities well beyond basic ledger entries, more automated help is on the way. Software packages have long processed the various kinds of transactions that comprise a corporation's income and outgo; the newer tools and

approaches *link* related information from what had been separate applications, and no longer merely balance the books, but integrate them.

Integration is helpful for both data entry and reporting. When materials

LINKED ACCOUNTING PACKAGES

Vendor	Package	Equipment	Price	Circle
Amcor Computer (502) 491-9820	Amfac GL/FM AP AR Query and Reports PR	DEC PDP 11 under VMS Same systems Same systems Same systems DEC PDP 11 under RSTS	\$3,000 to \$28,500 \$2,000 to \$9,800 \$2,000 to \$9,800 \$2,500 \$2,000 to \$9,800	551
American Software (404) 261-4381	OP, P, IN, AP, Matching	IBM mainframes,	\$20,000 to \$99,000 each	552
Argonaut Information Syst. (415) 444-5954	AP, AR, GL, IN, PO, PR	IBM mainframes, DEC VAX, HP 3000	\$10,000 to \$25,000 per package	553
Arthur Andersen (312) 580-0033	Fin-Pac/38 GL Fin-Pac/38, AP	IBM S/38 IBM S/38	\$10,000 \$5,000	520
Bristol Information Syst. (617) 679-1051	P, GL, AP, AR, IN, FA, PO	IBM PC, PC XT, MS- DOS, Micro Datapoint	Micro: \$800 \$1,500-\$4,000 (one time fee)	521
Business Model Syst. (312) 789-9160	Business Modeler	IBM S/34, /36, DPS6, HP 3000, Prime, Wang/VS, IBM PC XT	\$795 to \$20,000	522
Business Software (404) 449-3200	BSI-TAX BSI-TAX (Canada)	Most mainframes RPG III for S/38 Mainframes and minis supporting Cobol	\$1,250 to \$5,400 \$1,150 to \$2,800	523
Cincom Syst. (513) 662-2300	AR and Credit	IBM 370, 43XX, plug compatibles	\$65,000	524
Commercial Software (212) 557-0350	Cadets	IBM 360, 370, Series, DEC Digital, VAX 11/730-11/780	\$22,000 to (Depending on customer requirements)	525
Computer Assoc. Intl. (516) 333-6700	CA-GL CA-AP CA-AR	IBM 360, 370, General machines Same systems Same systems	\$15,000 to \$30,000 \$9,500 to \$30,000 \$8,000 to \$30,000	526
Computer Methods (414) 327-4471	CMI Profit	Basic 4, DEC, DEC VAX, Fortune, Micro Five, NCR, Tower, Pertec, Pixel, Seiko, Zilog	\$10,000 to \$20,000	527
Cyborg Syst. (312) 454-1865	P&P	Most medium and some minis	\$45,000 to \$115,000	529

STRICTLY SOFTWARE

arrive at a loading dock, for example, the entry usually affects several accounting functions—inventory control, purchase-order status, and accounts payable. If the affected applications are linked, or integrated, one entry updates them all.

On the reporting side, a controller can investigate an unusually large outlay appearing on the general ledger by examining related entries in budgetary-control and accounts-

payable files. Integration will allow users to tap these files using one set of commands and consolidate information from all of them in a single report.

Reports are perhaps the simpler part of integration to accomplish. Report writers, information-center databases, decision-support systems, and, most recently, micro-to-mainframe links all provide access to a variety of production files. They differ in cost, ease and efficiency of access, degree

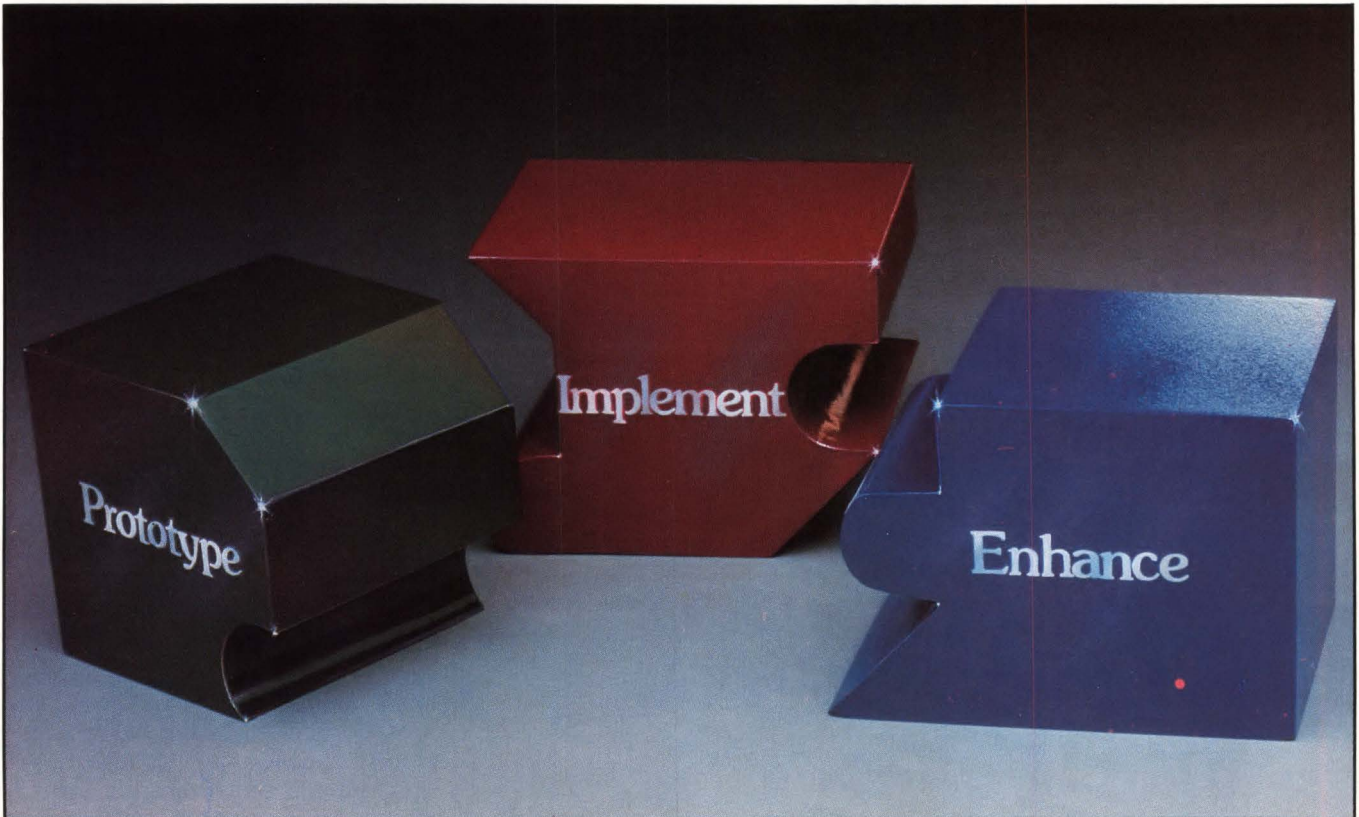
of security and control, and flexibility offered for processing, analyzing, and formatting the data once it's extracted.

The path to integration may be easier these days, but getting there depends on where an organization is in terms of systems and software. Developing interfaces for disparate programs—some built in-house, the rest bought from a variety of vendors—can be a major undertaking. Gener-

LINKED ACCOUNTING PACKAGES

Vendor	Package	Equipment	Price	Circle
Data Design Assoc. (408) 730-0100	FA	Most mainframes	From \$17,000	530
	AP and Purchasing	Most medium to large mainframes	From \$37,000	
	GL	Most medium to large mainframes	From \$63,000	
	Capital Project Management Syst.	Most medium to large mainframes	From \$15,000	
Geisco (301) 340-4000	Tabol	Timesharing on Mark 3 Network	Depends on usage	531
Global Software (919) 872-7800	GL and FP	IBM S/34, /36, 30XX, and PCMs	\$15,000 to \$100,000	532
	AP	IBM S/38, 370, 43XX, 30XX, and PCMs	\$15,000 to \$60,000	
	Integrated Cost Control	IBM S/34, /36, /38, 370, 43XX, 30XX, PCMs	\$20,000 to \$100,000	
	PO	IBM S/38, 370, 43XX, 30XX, and PCMs	\$8,000 to \$60,000	
	AR	IBM S/34, /36, /38, 370, 43XX, 30XX, and PCMs	\$8,000 to \$60,000	
	Hospital Cost Control Syst.	IBM S/34, /36, /38, 370, 43XX, 30XX, PCMs	\$50,000 to \$100,000	
Greer Sonitag (212) 661-5564	Investron	HP 3000	Under \$100,000	533
HMS Computer Syst. (918) 492-5502	GL, AP, AR, FA,	HP 3000	\$6,000 to \$8,000 per module	534
Informatics General (818) 887-9040	AR, AP, FA, PR, PC AT	IBM S/23, /34, package	\$1,000 to \$6,000 per package	535
Insight Software Syst. (914) 682-4910	FP	IBM S/34, /36, /38	\$6,000 to \$20,000	536
	FP/GL	IBM S/34, /36, /38	\$7,500 to \$24,000	
	AP	IBM S/38, /36	\$7,500 to \$10,000	
	AR	IBM S/34, /36, /38	\$4,000 to \$10,000	
International Mgt. Syst. (213) 822-2022	AR, GL, AP	IBM S/36	\$3,500 to \$5,000	537
	Fixed Assets	IBM S/38	\$3,500 to \$5,000	
International Programming Labs (401) 272-6555	AP, AR, IN, and OP	IBM S/34, /36, /38	\$5,500 to \$8,000	538
	Sales GL, P&P, and FA	IBM S/34, /36, /38	\$9,000 to \$15,000	
Lawson Assoc. (612) 379-2633	GL, AP, AR, PR,	IBM 370, 34XX,	\$21,000 to \$40,500 (IBM DOS)	539
	P&P, FA, OE	IBM S/38	\$3,750 to \$36,000	
Logical Design (313) 553-7510	AR, AP, GL, OE,	Burroughs B90	\$12,500 to \$38,000	540

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STRICTLY SOFTWARE

ally, interface tools have come from third-party vendors using a cooperative approach to an organization's existing systems. More recently, the major financial-applications vendors have begun providing more flexible reporting facilities themselves. Companies that sell financial software

know that their customers would like integration, and these vendors are trying to make it easier.

Management Sciences America (MSA), for example, recently released a report writer, Intelligent Expert (IE), that allows end-users to easily access files

from MSA's applications and create their own reports. Users can follow a menu or use IE's fourth-generation language to develop their reports. IE locates the requested information from whichever application's files contain it, allowing consolidations from several systems. MSA's budgetary-control and purchase-order applications come with the report writer, which can also hook to existing MSA applications.

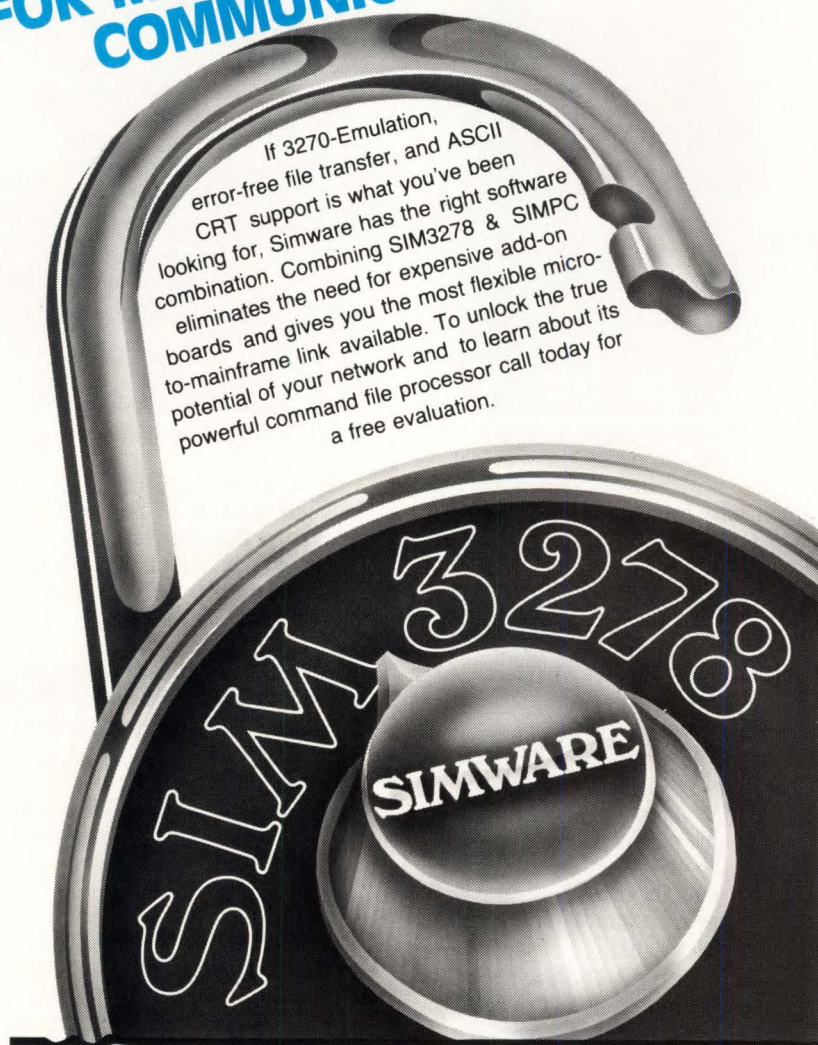
The Gateway Educational Computer Consortium in Panama City, FL, which handles data processing for school districts covering 14 counties in northwestern Florida, uses IE with its budgetary-control, accounts-payable, and general-ledger systems from MSA. According to David Smith, system consultant to the consortium, the report writer "helps take control of accounting out of data processing and gives it back to the end users. Users have to learn only one reporting system, not several. They also have more time to examine records thoroughly, since they don't have to wait for dp to produce special reports.

McCormick & Dodge, which integrates its financial-applications packages through the Millenium series, also provides easy reporting facilities. Fairchild Industries in Germantown, MD, uses the general ledger of McCormick and Dodge M&D's general ledger under Millenium to keep the books for four of its divisions, and its corporate consolidations. According to systems analyst Pat Michielli, Fairchild chose Millenium largely because of its reporting capabilities. "We wanted our accountants to be able to create reports for top management. So far, the users have done it all. MIS hasn't helped design or write any reports," Michielli says.

Other financial-applications vendors are also making it easier for customers to tap into their files. UCCEL, for example, is marketing the Imagine query and reporting system, which ties into the vendor's packages and others an organization may have. UCCEL also recently announced Perfect Link, a micro-to-mainframe link geared to its applications and able to tap VSAM files as well.

(Continued on page 52)

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STRICTLY SOFTWARE

(Continued from page 50)

Having applications share data, and respond in concert to related transactions is the other side of integration. The major financial-applications vendors generally provide good logical links among their packages. If an organization uses the same vendor for its various applications, the interfaces should be efficient. David Smith points out, for example, that the Gateway Educational Consortium's MSA system, which includes general ledger and accounts payable, works entirely through the Intelligent Expert's budgetary-control package. "The accounts-payable staff doesn't even know there's an accounts-payable package," he says. "The checks that it generates just appear on their desks."

Under the MSA system, users enter an invoice for payment into the budgetary-control package, which matches the request against the stored purchase order. If the invoice

"The accounts-payable staff doesn't know there's a package. The checks just arrive on their desks."

—Smith, Gateway Consortium

meets the purchase-order requirements, the system makes the entry in the general ledger, and passes the request to accounts payable. Accounts payable writes the check and attaches its number to the invoice. The system then completes the general-ledger entries and passes the information describing the transaction back to budgetary control. The cycle is completely automated.

Buying all applications from a sin-

gle vendor is one way to assure integration among new applications. But what about the existing—often customized—applications that must work together and with purchased systems? A database management system (DBMS) can simplify this task by relating data from diverse applications, providing development tools for building integrated applications, and offering systems-wide query/report facilities. This accounts for another trend in financial software: the merger of accounting packages and database management systems.

Some system software vendors offer financial packages that are integrated with their database management systems. Cullinet, for example, sells a range of accounting packages that integrate with the company's IDMS and IDMS/R databases. Cincom Systems provides an accounts-receivable and credit-management package for its Total

(Continued on page 56)

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power of Nucleus is incorporated within TIS™, our family of information management products for the IBM environment, and the ULTRA INTERACTIVE DATA BASE SYSTEM™, our product family for the DEC™ environment. The common, NUCLEUS-based architecture of TIS and the ULTRA INTERACTIVE DATA BASE SYSTEM assures compatibility and eliminates conversion across the IBM and DEC environments.

Application Development
The perfect complement to our relational data management technology is our industry-acclaimed, 4th Generation application development system, MANTIS™. A major breakthrough in software technology, MANTIS is the only system available that provides complete, beginning-to-end, on-line application development—all in one sitting. By using highly effective methods

logies such as prototyping, MANTIS helps you dramatically reduce and even eliminate your application backlog.

Business Control Applications
MRPS is our industry-proven manufacturing and inventory control system that's guaranteed to naturally improve your company's production and profit. CONTROL: MRPS is our outstanding new financial applications package, written in MANTIS, and completely integrated with MRPS.

Decision Support
A high priority in our needs management solutions for the business community, is the personal/local mainframe and micro environments.

To meet the needs of organizations in which end-users interact in a terminal/mainframe environment, we offer the MANAGE USER SERIES™. Using the power and the accessibility of the mainframe, the graphics, spreadsheet, text processing, and 4th Generation application development capabilities to provide PC file capability while ensuring DP control.

For the end-user in a micro environment we offer SeriesOnePlus™, our comprehensive package of integrated programs that satisfies a variety of end-user information handling

needs, including: writing reports, managing files, and compiling and analyzing data. And when combined with PC CONTACT, your SeriesOnePlus programs can incorporate both mainframe and personal data.

powerful, intelligent Query (IQ) is a facility that's based on Artificial Intelligence concepts. Easy-to-learn and use, IQ handles not only repetitive requests, but also routine, within end-user departments.

Network Management
NETMASTER™ is the foundation of our network management technology. It's a comprehensive approach to managing computer networks, distributed data, and distributed processing. NETMASTER is an advanced network management application program that lets your company realize the full potential of its multiple-terminal, multiple-application, and multiple-CPU investment.

Another primary component in our network management technology is PC CONTACT. It's our link that completes the information loop in your company.

The New Cincom: Excellence In Software Technology
The balance of this brochure provides a more detailed overview of our five integrated software technologies. Look closely at what Cincom Systems has to offer. We believe that our new product line (every product either begun or completed in the 1980's) provides the highest degree of reliability, integration, and performance in the industry.

When you see for yourself what the New Cincom Systems is all about, you'll understand why the words "Excellence In Software Technology" fit so well under our name.

reasons why we're endor you'll ever need.

technology. A complete closed-loop system, MRPS is improving the productivity and profitability of over 125 IBM and DEC VAX manufacturing environments around the world.

#4 Financial Control Software

CONTROL: Financial is our sophisticated financial accounting and control system which molds to the way you do business. Integrated directly with MRPS, **CONTROL:** Financial includes Accounts Receivable and Credit Management systems with Accounts Payable soon to follow.

#5 Advanced Network Management

NET/MASTER™ is one of the most recent additions to the New Cincom family of integrated products. Very simply, **NET/MASTER** is an advanced network management system that takes the complexity out of managing a sophisticated IBM computer network and lays the groundwork for distributed data base processing.

#6 The Interactive Mainframe—Micro Link

Further expanding the capabilities of our software information network is **PC CONTACT**, our mainframe-micro link which enables users to interactively upload/download data between the mainframe and IBM PC's. **PC CONTACT** gives the PC user the ability to access multiple file types stored in the corporate data base for Decision Support manipulation.

#7 Micro Decision Support Software

For comprehensive micro-level Decision Support we offer **SeriesOnePlus™**. **SeriesOnePlus** includes file management, spreadsheet, graphics, reporting and word processing components that are all integrated through a unique "BUS" architecture. Because the system is designed exclusively for business situations, **SeriesOnePlus** complements any mainframe-micro network strategy.

#8 Mainframe Decision Support Software

The recently introduced **MANAGE USER SERIES™** provides powerful Decision Support capabilities for the mainframe user. The **MANAGE USER SERIES** combines graphics, spreadsheet, text processing and application development tools to enhance the use and display of corporate data.

#9 Client Support

The one thing that isn't new about Cincom is our unrivaled commitment to service, support and user education. When you choose Cincom you can be assured of the highest caliber of support.

#10 Software Excellence

Why the New Cincom? Well, we like to think of ourselves as the New Cincom because every product in our software information network has been released since 1981. And, quite frankly, we

believe our new products provide the highest degree of reliability, integration, performance and value in the industry. As proof, just look at our sales. From 1982 to 1983, **TIS** sales rose 136%, **MANTIS** sales rose 50%, and **MRPS** sales rose by 45%. For even more proof we invite you to personally compare our products with what our competitors are offering. Then you'll understand why the words "Excellence In Software Technology" fit so well under our name.



CD-12

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2300 Montana Avenue
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Attention: Marketing Services Department

1-800-543-3010
In Ohio: 513-661-6000
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Excellence in software technology.

STRICTLY SOFTWARE

(Continued from page 52)

and TIS databases. And a Cincom spokesperson says more financial packages are on the way.

The financial-applications vendors are also providing links between their products and the more widely used database management systems. Recently, both MSA and McCormack & Dodge signed agreements with Applied Data Research (Princeton) that ease the integration of their products with its DBMS, Datacom/DB. A source at McCormack &

Dodge says the company is working toward links with IBM's new relational DBMS, DB2.

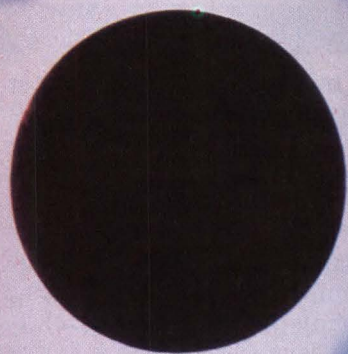
The trend toward integration reaches all data-processing levels. For example, New Generation Software Inc. (NGS), which offers a collection of financial packages—Finance/38—for the IBM System/38, recently joined forces with manufacturing-systems vendor MRM Inc. of Brookfield, WI. The combination closes the loop between MRM's manufacturing programs and NGS' accounting ap-

plications.

Armstrong-Blum, a Chicago-based machine-tool manufacturer, chose the New Generation/MRM combination when it decided to automate manufacturing control and accounting concomitantly. Says Stanley Woleben, treasurer, "We were just coming out of the green-eyeshade era. We didn't want to leave our manufacturing numbers hanging in midair, and we didn't want to put a lot of effort into writing interfaces to the accounting applications." (Cont)

LINKED ACCOUNTING PACKAGES

Vendor	Package	Equipment	Price	Circle
Logic (214) 238-1898	Clas-Ic Credit	IBM 360, 370,	\$90,000	541
	Clas-Ic Claims	Same systems	\$75,000	
Management Science America (404) 239-2000	AR, P&P, OP, AP, and P	IBM 370, 43XX, and 30XX	\$50,000 to \$120,000	542
	AP and P	IBM 370, 43XX, and 30XX; Burroughs B2700 through 7700; and Honeywell 66/600	\$32,000 to \$77,000	
	FA	Same systems	\$31,000 to \$59,000	
	GL	Same systems and Sperry 1100	\$55,000 to \$137,000	
McCormack & Dodge (617) 655-8200	GL: Millenium	IBM machines CICS, VSAM under OS, DOS,	\$94,000 to \$105,000	543
	AP: Millenium	Same systems	Same price	
	PO: Millenium	Same systems	Same price	
	FA: Millenium	Same systems	Same price	
	CP: Millenium	Same systems	Same price	
	G/L Plus	Honeywell 66, Sperry 1100, HP 3000, IBM S/34, and /38, Prime 50 and DEC VAX	\$39,000 to \$61,000	
	A/P Plus	Honeywell 66, Sperry 1100, IBM S/34 and /38, and Prime 50, DEC VAX	\$39,000 to \$61,000	
	P/O Plus	HP 3000	Same price	
	F/A Plus	Sperry 1100, DEC VAX, HP 3000, Honeywell 66	Same price	
Mini Computer Business Applications (818) 957-2900	AP, GL, PR, AR	HP 3000, Wang V/S, Texas and DEC PDP-11, VAX-11, Altos 586, Zilog System 8000, NCR Tower	\$900 to \$6,000	544
New Generation Software (916) 920-2200	Financial Reporting & Accounts Payable & Cash Management	IBM S/38	\$19,500	545
	Accounts Receivable & Credit Management	Same system	\$9,500	
PMS (803) 748-2000	FMS-GL, SMS	IBM Mainframe	Depends on usage (Machines are licensed, not sold)	546
Raxco (301) 258-2620	Rabbit-1	DEC machines RSX-11-M and RSTS/E	\$5,995 \$1,995 (RSX-11, RSTS/E)	547



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CIRCLE 35

STRICTLY SOFTWARE

(Continued from page 56)

Instead, Armstrong-Blum is opting for NGS and MRM to provide integration links. Implementation is still under way, but Woleben is impressed by what he's seen so far. He's happy with NGS' Finance/38's flexibility, and IBM's System/38's processing power, both of which he feels will accommodate the company's growing processing. "We looked at bigger machines and more expensive packages," Woleben says, "and decided they weren't the best solutions."

Integration requires foresight during development. Victor Deutsch, vice president of finance at Fishking Processors, a \$100 million food packager in Los Angeles, helped develop his own accounting system for an IBM Series/1. A single record updates the company's inventory, billing, accounts-receivable, and sales-commissions files. Deutsch is working toward further integration, concentrating now on linking microcomputers to the Series/1. "We've been building the system on a shoestring,

but with care," he says. "The key is to know where you're heading so you can integrate each step as you go along"

Now that we've discussed the movement toward integration, a caveat: It may not be necessary—or even desirable—for all applications. Next month in this space, guest columnist Peter O'Dell, director of technical services for Criton Technologies in Bellevue, WA, will describe how organizations can benefit from stand-alone systems. □

LINKED ACCOUNTING PACKAGES

Vendor	Package	Equipment	Price	Circle
Ross Syst. (415) 856-1100	Integrated Management System: GL, AP, AR, FA, Financial modeling	Entire VAX	\$20,000 to \$100,000	548
	MAPS/GL MAPS/AP	DEC VAX Same system	\$22,500 to \$30,000 \$15,000 to \$20,000	
Software Int'l. (617) 685-1400	GL and FM	IBM System/34, mainframes and PCMs; Wang/VS; HP 3000; Sperry; Data General	\$30,000 to \$90,000	554
	Project Accounting Management	Same systems	\$75,000 to \$100,000	
	AP	Same systems	\$25,000 to \$75,000	
	AR	Same systems	\$22,000 to \$50,000	
	P&P FA	Same systems Same systems	\$25,000 to \$120,000 \$25,000 to \$40,000	
Systems Mgt. (312) 698-4000	The Business Programs (BCP)	Any machine	\$27,500 (individual modules from \$2,000 up)	555
Timberline Syst. (503) 684-3660	AP	TI 300, 600, system	\$3,400	556
	AR	Same systems	\$3,900	
	GL	Same systems	\$5,500	
	PR	Same systems	\$4,400	
UCCEL (214) 353-7100	Credit & Accts.	IBM mainframes	\$73,000 to \$169,000	549
	Financial Control Syst. (GL)	Same systems	\$54,000 to \$97,000	
	Tax Planning & Compliance Syst.	Same systems	\$39,000 to \$57,000	
	Accts. Payable Syst.	Same systems	\$32,000 to \$77,000	
	Fixed Asset Syst. Imagine	Same systems Same systems	\$30,000 to \$38,000 \$15,000 to \$16,000	
Xerox Computer Svcs. (213) 306-4000	GL, AP, FA, AR, and PR	IBM 370, 43XX, and 30XX; DEC and 780. Also timesharing service	\$15,000 to \$35,000 \$8,000 to \$12,000 (Depends on usage)	557

Key to Abbreviations: AP/Accounts Payable; AR/Accounts Receivable; FA/Fixed Assets; GL/General Ledger; IN/Inventory; P/Purchasing; PO/Purchase Orders; PR/Payroll; P&P/Payroll and Personnel; OE/Order Entry; FP/Financial Planning; OP/Order Processing; SA/Sales Analysis.

THE 10 MOST IMPORTANT QUESTIONS YOU SHOULD ASK YOUR SOFTWARE VENDOR



"Many questions you would ask prospective application software vendors don't differentiate one vendor from another. The similarities between suppliers are not what's important — it's the differences that count. Here are ten questions you should ask prospective application software vendors before making your selection."

*—John C. Gable,
Vice President of
Corporate Systems and Technology
for American Software, Inc.*

	AMERICAN SOFTWARE	OTHERS
1. Can the application software you are considering be easily delivered in a variety of data processing environments (operating system, teleprocessing monitor, and data base) to permit easy migration and allow system software environmental independence?	Yes	?
2. Can the application software be delivered for VSAM and all popular data base management systems, rather than being tied to the application vendor's data base system — one which could be outmoded by new data base products developed by another vendor in this rapidly-changing high-technology industry?	Yes	?
3. Is the application software implemented using a "native" or direct approach to the operating system, teleprocessing monitor, and data base manager, without the inefficiency associated with "bridges" or the vendor dependencies of a "black box" approach?	Yes	?
4. Is the application product coded in an efficient, widely-used, and industry-standard language such as COBOL, rather than a vendor-dependent language unknown to the general data processing community?	Yes	?
5. Can the application product be "tailored" or streamlined to meet the specific functional and operational needs of a company through purchase of a basic package and selected optional features, thereby avoiding delivery of useless code?	Yes	?
6. Does the vendor retain a source version of each customer's uniquely tailored application software for emergency backup, problem determination, and client assistance?	Yes	?
7. Does the vendor have a broad, completely integrated line of application software which can be demonstrated on a single system instead of merely described?	Yes	?
8. Have all of the vendor's products been integrated by design and developed by a single organization, thus eliminating the need for inefficient interfaces and unknown "black boxes" to tie together unrelated or acquired applications?	Yes	?
9. Does the vendor clearly demonstrate a full commitment to the complex business of application software, rather than offer an incidental addition to its main product line?	Yes	?
10. Has the vendor been in the application software business a minimum of ten years with a successful track record of sustained profits and a strong financial posture?	Yes	?

If the answers to these ten questions make a difference to you, then let us explain the other important differences — the functional differences. Not all solutions are alike!

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CITY _____ STATE _____ ZIP _____

APPLICATION PRODUCT INTEREST _____

HARDWARE/SOFTWARE ENVIRONMENT _____

CIRCLE 36

DATA COMMUNICATIONS

AT&T: BUSTING THE BACKLOG

By John Seaman, Data Communications Editor

At least some of the harried corporate executives who have been trying to obtain leased lines from AT&T Communications may be singing a new tune. As reported by *Computer Decisions* at the beginning of August, AT&T Communications promised to reduce some of its backlog of unfilled circuit orders. Later that month, for the first time since AT&T's divestiture on January 1, that backlog began to drop, from 44,300 in July to 40,000. The trend continued through September, with the backlog dropping to 31,000. But will AT&T's progress continue?

Jane Laino, president of New York-based Corporate Communication Consultants Inc., doesn't believe AT&T Communications is out of the woods yet. "In early July," she says, "I began working with a local securities house that was planning to move its offices within Manhattan. The date the house had set for the move was October 13, so I immediately ordered the new intercity leased-line circuits from AT&T Communications. But by October 13, only a minimum of the lines were in place. That's a three-and-a-half-month delay." Laino counsels her clients to allow plenty of time when ordering leased lines, because they themselves may have to cope with a tangle of many carriers and vendors.

Although Laino's reservations may be well founded, AT&T's figures indicate that AT&T Communications has begun to gradually work its way out of its private-line backlog. On February 1, when the organization was barely a month old, Gus Blanchard, named vice president of the "Strike Force," was charged with

reducing the backlog. Early steps included a near doubling, to about 5,000, of the number of employees engaged in installing leased lines. AT&T Communications also doubled the number of hours its computer systems are used to process circuit orders—from eight to 16 hours per day. But these steps, helpful as they were, didn't penetrate the heart of the problem, says Jim Byrnes, staff manager for media relations at AT&T Communications, Bedminster, NJ.

At the root of the difficulty lies the working relationship between AT&T Communications and each of the 22 divested Bell operating companies, says Byrne. "A standard for ordering local access from each of the local operating companies was missing," he says. Byrnes points out that AT&T still provides the end-to-end service to the user, and bills the user for that service, but, unlike the predivestiture days, it must now arrange with each independent local operating company for local access. When ordering multi-point circuits, this can involve several local operating companies. "By the beginning of this year, it was apparent that specific access had evolved into something different for each of the local operating companies," he adds.

To overcome this problem, Blanchard invited the representatives of all the local operating companies to a meeting in Chicago in April. The operating-company executives agreed

to work with AT&T to establish a national standard for private-line installations.

"That effort started in May," reports Byrnes, "and a national standard was agreed on in July." To implement the agreement, AT&T and the operating companies had to spend millions of dollars in computer-systems changes, says Byrnes, but the cost was worth it. "We're already achieving results," he says.

Before divestiture, Byrnes explains, AT&T promised to install a leased line within 24 working days after receipt of the order. At the time of divestiture, AT&T recognized that delays were going to be inevitable, so the period was raised to 48 days. Initially, AT&T Communications had great difficulty even keeping to this schedule. In April of this year, only 20 percent of the orders were being filled within 48 working days. Since the implementation of the national standard, however, performance has improved. By August, 34 percent of AT&T's private-line orders were being filled within 48 days, and in September, the rate was up to 50 percent.

"Our goal is a nationwide service provision that is 90 percent to 95 percent on time by early next year," says Byrnes. "And we think we can do it."

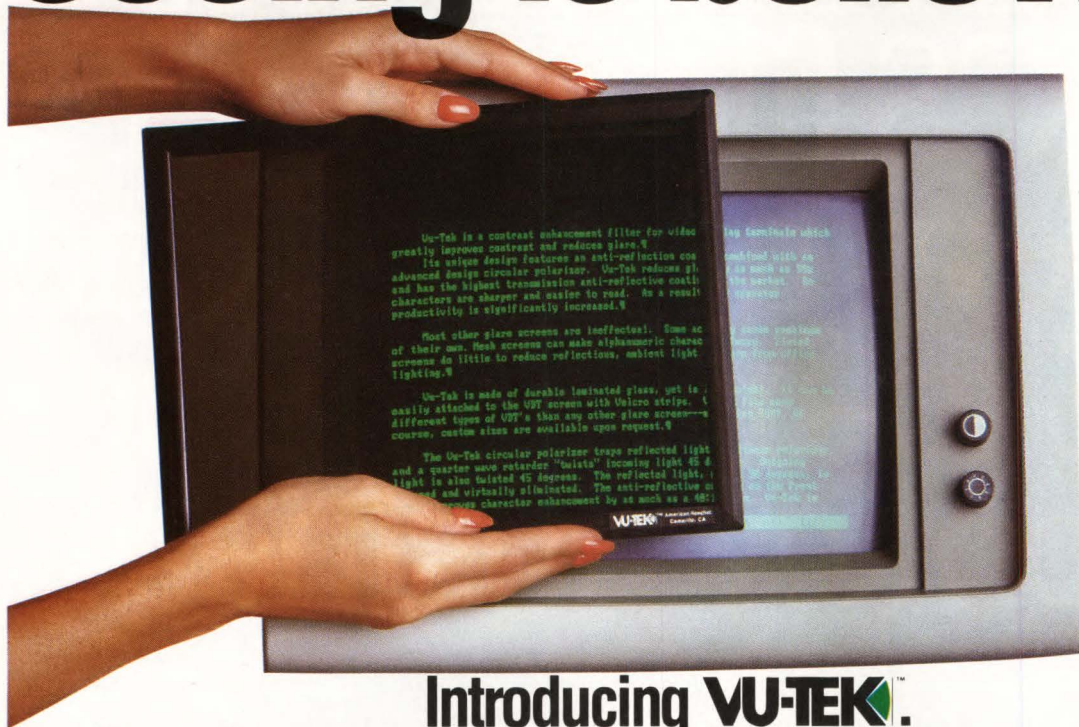
Nonetheless, as Byrnes points out, the goal is currently limited to a 48-working-day standard. "Once, we've reached that point," says Byrnes, "We'll start trying to work back to the 24-working-day standard that was maintained by AT&T Long Lines."

AT&T may be doing its best to improve service, but users must devise ways to improve their chances of getting the private lines they need when

Users must devise ways of getting private lines.

(continued on page 64)

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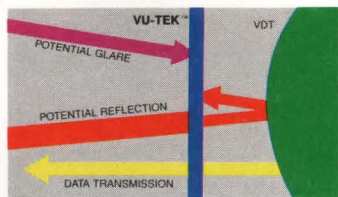
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*National Institute for Occupational Safety and Health Study, August 1981.

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CIRCLE 77

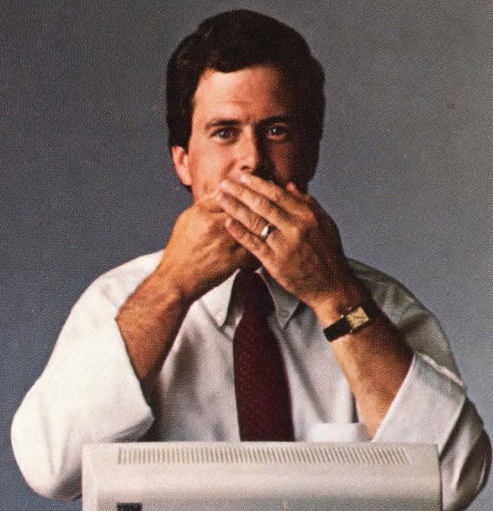
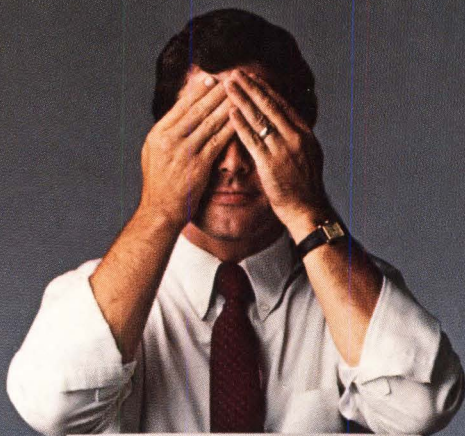
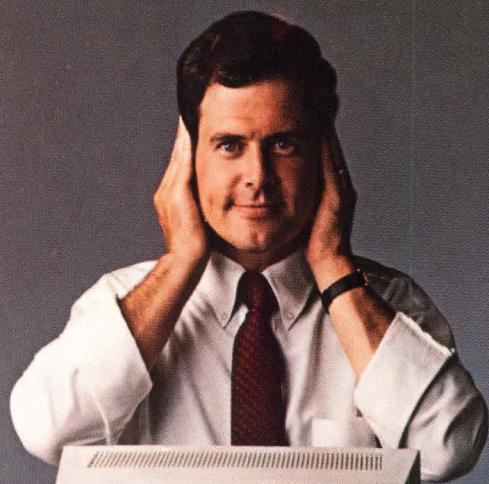
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DATA COMMUNICATIONS

(continued from page 60)

they need them. Large users will always do better than small users, suggests Gerry Mayfield, vice president of the DMW Group and head of the consultancy's Stamford, CT, office, because they do a larger volume of business with AT&T Communications and therefore have a greater knowledge of how to work with AT&T procedures.

But that's not the case for small users. Mayfield underscores that these changes will compel small users "to become more knowledgeable about AT&T's provisioning process." Echoing Laino, he adds that this will mean more work.

Such news will cause any prudent executive to halt and consider. Many larger private-line users, Mayfield notes, are saying that divestiture has increased their operating problems. "Some are resentful, and the most discouraged executives say it will be years before they see any benefits to offset their increased operational

problems," says Mayfield. "But others are already seeing some benefits, such as increased competition. Progressive companies should concentrate on building their own capabilities to take advantage of these new opportunities."

Of course, says Mayfield, there are other carriers: "MCI [Washington, DC] and GTE Sprint [Burlingame, CA] offer other options for corporations that need dedicated lines. But these carriers have not emphasized private-line services and do not offer them everywhere. They've concentrated on common-user, switched services, and are only now beginning to take advantage of the opportunities presented by the faltering of AT&T Communications. And that window is already closing."

If a user can arrange for local access, there are also the satellite carriers, says Mayfield: "Satellite Business Systems [McLean, VA] and American Satellite Corp. [Rockville, MD] are examples. If you can arrange local

access via a cable company or microwave, you can be in business. But going the satellite route is an expensive option, one that is most practical for the larger users. The smaller user's best recourse is often to be patient and wait for AT&T Communications."

If your patience is stretched to the maximum, John Dulfer, president of Telecom Planning, a consultancy in Melbourne Beach, FL, recommends complaining. "Speak first to your customer representative at AT&T Communications," he says. "If that doesn't solve the problem, talk to the account executive. The next step is to buzz the district manager. If that doesn't help, go to the vice president. The squeaky wheel gets the grease!"

Getting that dedicated line can be a little trying. You've experienced some long delays. As the statistics show, however, AT&T Communications is responding: it's starting to get its act together. By next year, you may be hearing an end to some of those post-divestiture blues. □

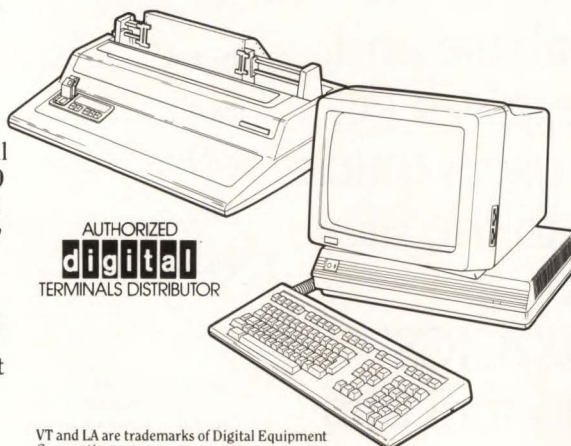
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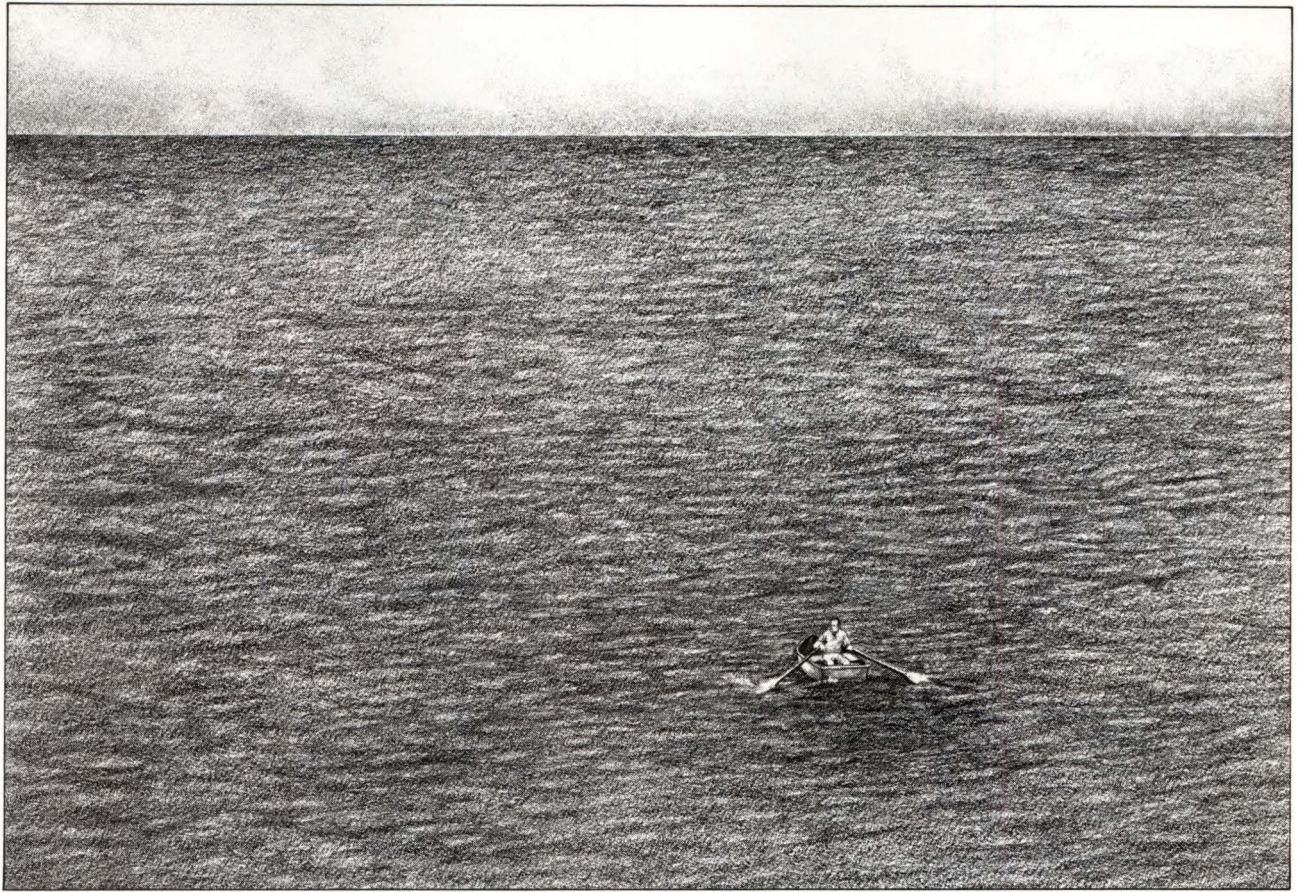


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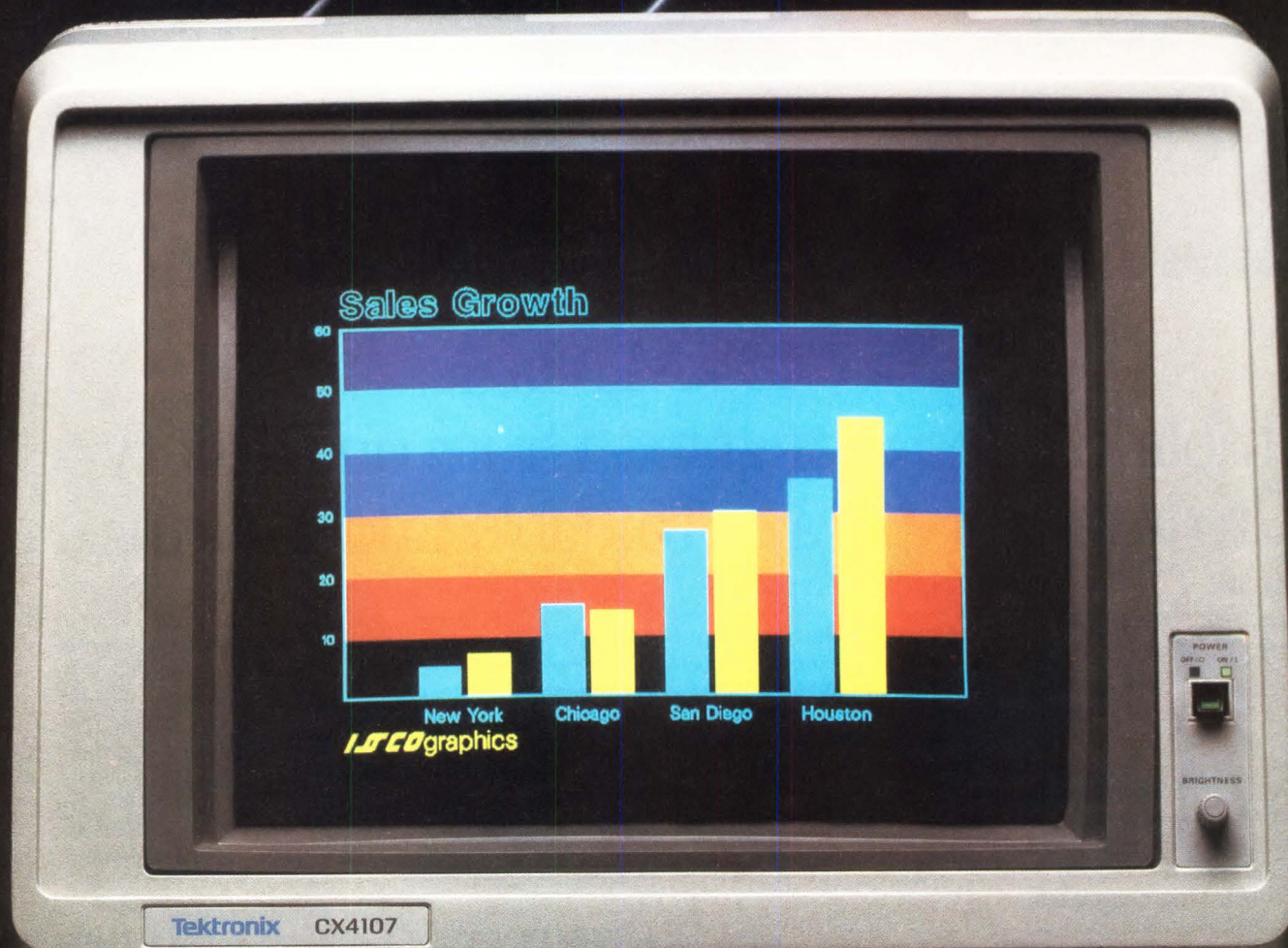
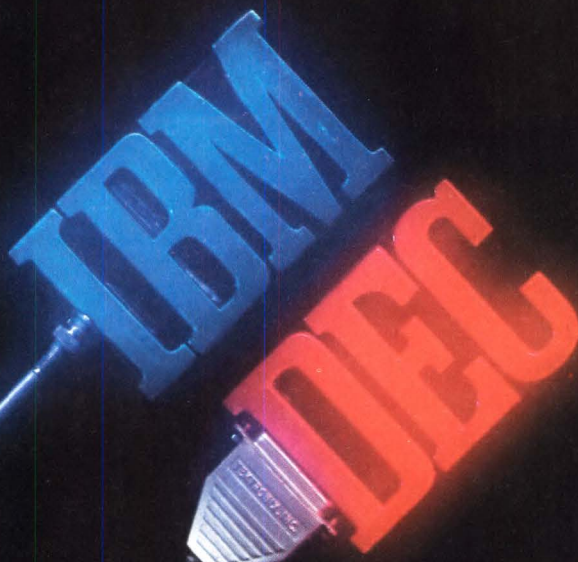
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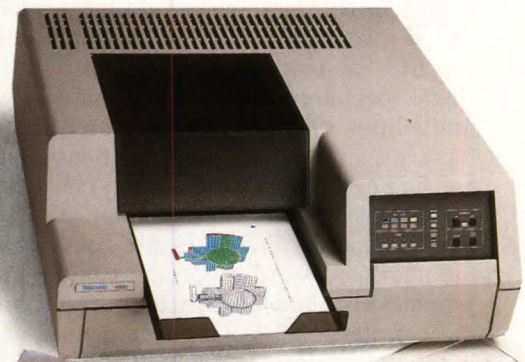
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A PUBLISHING STAR

What's faster than a speeding artist, more powerful than a word processor, and able to produce low-cost documents from a single local-area network? In-house publishing systems. Many manufacturers and service organizations are finding that advances in network technology and the introduction of microcomputers that integrate communications, word-processing, and graphics are allowing them to process more-professional-looking documents in much less time.

The organizations that have made the transition from word processing to in-house publishing are diverse, but they share one need: They must produce training manuals, engineering designs, newsletters, government bidding proposals, and other documents in large quantities and often under deadline pressure. The billion-dollar Hospital Corp. of America (HCA), headquartered in Nashville, TN, for example, uses Xerox workstations

linked through a Xerox Ethernet local-area network (LAN) to produce forms, marketing material, and manuals for users of its distributed-computing systems. In Jacksonville, FL, the city council's attorneys use a similar system to inexpensively update the city's ordinances to reflect actions taken at council meetings. Although computer-aided publishing cannot produce bound, full-color books and brochures, it has enabled these organizations to bypass several traditional document-production steps, saving time and money.

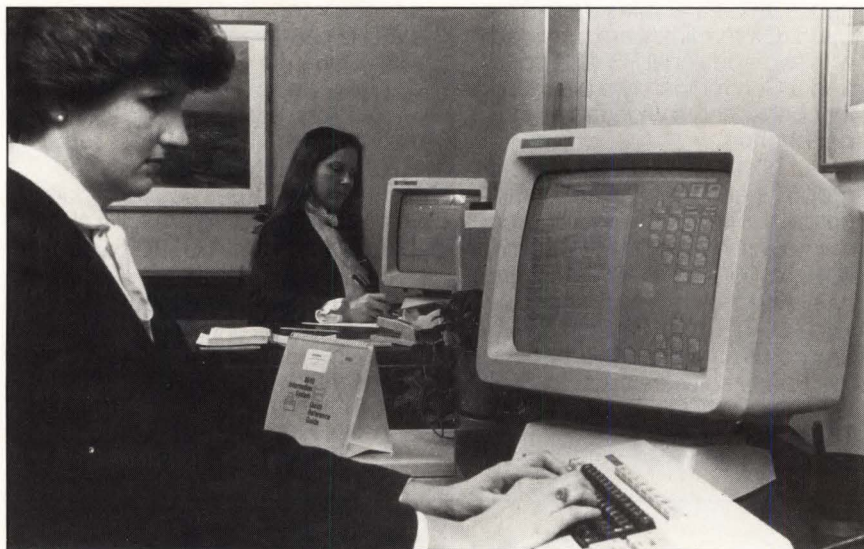
One of the more time-consuming parts of document production is the insertion of graphs, charts, and illustrations in a text. Usually, written material must be processed separately from artistic material by two people who have different jobs: a typist and an artist. HCA, however, combines these functions. According to Wanda Meador, documentation-development manager, the graphics functions

of the Xerox Star 8010 information-processing system let the corporation do without professional artists. "Staffers without artistic talent have drawn pictures of keyboards, equipment, and cabling diagrams," says Meador. "In addition, we often have to alter an illustration to make it appear as a sequence of drawings. Now we can alter the picture on the Star without having to start all over again."

The Star system offers pre-designed formats to facilitate the designing and updating of documents, but built-in Mesa software offers users a choice of type styles in sizes ranging from eight to 24 points. These, however, are only two of the system's important features. Ethernet's coaxial cable, priced at 57 cents per running foot, allows users to send information from one device to another at a speed of 500 pages—or 10 million bits—per second. The Ethernet system also enables the Star to communicate with large computers and sort and extract information locally. The Star can also swap data with IBM computers via the Systems Network Architecture (SNA) protocol and Digital Equipment Corp. computers via VT-100 emulation.

The Xerox Star 8010, which costs \$9,995, is also the linchpin in Hughes Helicopters Inc.'s in-house publishing system. A subsidiary of McDonnell Douglas Co., St. Louis, Hughes Helicopters' text-processing requirements range from the production of simplified, illustrated training manuals on helicopter repair to the processing of U.S. Department of Defense proposals that can run 20,000 pages in length. How did Hughes Helicopters build its system to accommodate its extensive publishing needs? Last year, according to Gordon F. Milse,

(Continued on page 72)

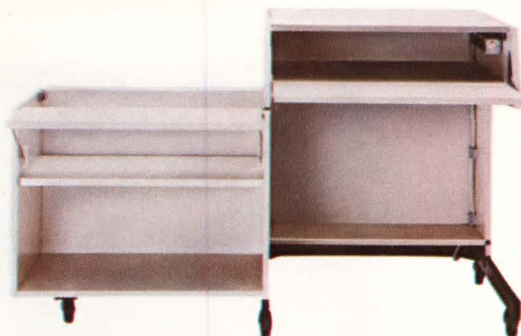


Documentation specialists from Hospital Corp. of America's systems-integration department create training manuals on Xerox Star 8010 workstations.

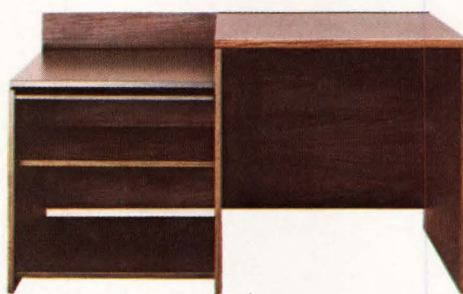
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and another



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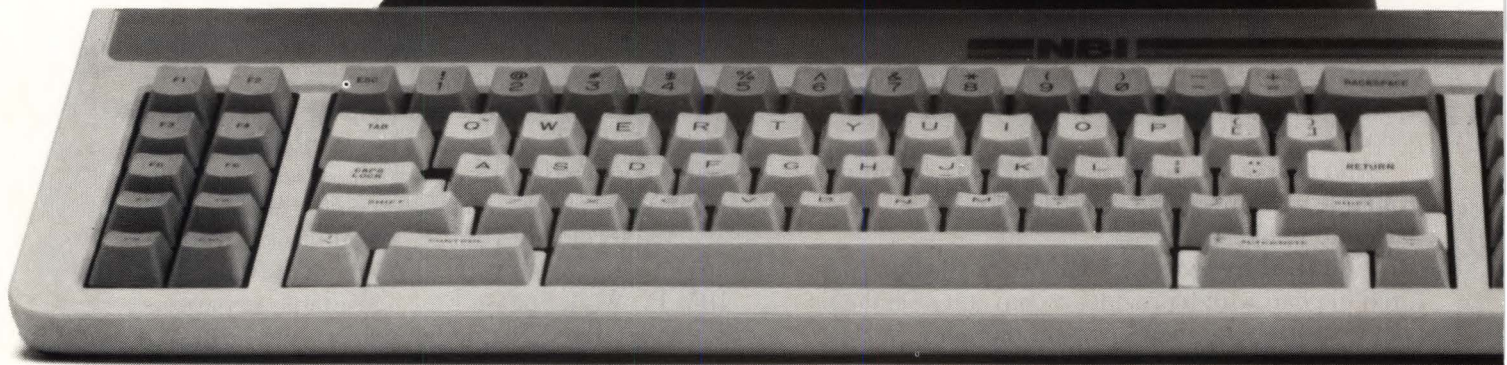
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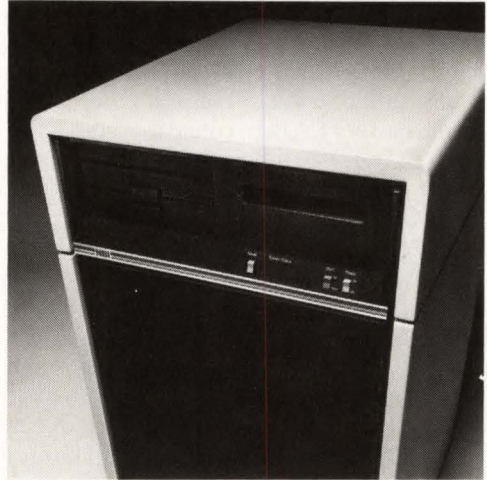
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OFFICE AUTOMATION SYSTEMS

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"The Xerox Star 8010 is the linchpin in Hughes Helicopters' publishing system."

(Continued from page 68)

manager of graphic services, Hughes installed an Ethernet LAN to connect four Xerox Star 8010 information-processing systems, a Xerox laser printer, and a file server with 300 Mbytes of storage. Since then, six more Star 8010s and two Xerox 860 information-processing systems have been added to the network. The result: His division's productivity has doubled with the same number of employees. "Under our old text-processing system, it used to take one hour to get a page into print," says Milse. "Today, we do as many as six pages an hour."

This increase in productivity can be attributed to the Star 8010's central text-processing functions. According to Milse, a report that needs typing, artwork, and a photo layout no longer has to pass through several departments before it is tacked down on pages and sent to a reproduction department. Users can construct an illustration on the workstation's two-page screen and fit it into the text

almost automatically. The completed text is transmitted to a laser printer, which produces a copy of the page just as it was composed on the screen. Users invoke specific functions by manipulating a mouse to make the cursor point to icons, or symbols, on the screen.

The ease with which users can create graphics and insert them within text is only part of the story. Not only are administrative employees able to design graphics—such as troubleshooting diagrams for technical manuals—that previously required an artist's skills, but they also can quickly update or alter documents. "We have charts and graphs that must be updated weekly for company and government progress reports," says Milse. "A few years ago, it took three to six employees to do this updating at the last moment. Now one person enters and corrects the charts and graphs in minutes."

After all the mechanics of text preparation have been taken care of, a document is ready to be printed on Hughes' top-of-the-line Xerox 5700 laser printers. Considerably faster than most impact printers but slower than offset printing presses, these printers, which cost \$65,000 each, can reproduce 40 pages per minute. Less expensive at \$12,500 but even slower (12 pages per minute) is the Xerox 8044 laser printer. Hughes uses

the printers for short runs of about 20 copies. For large runs, a single laser printout is sent to a commercial printer.

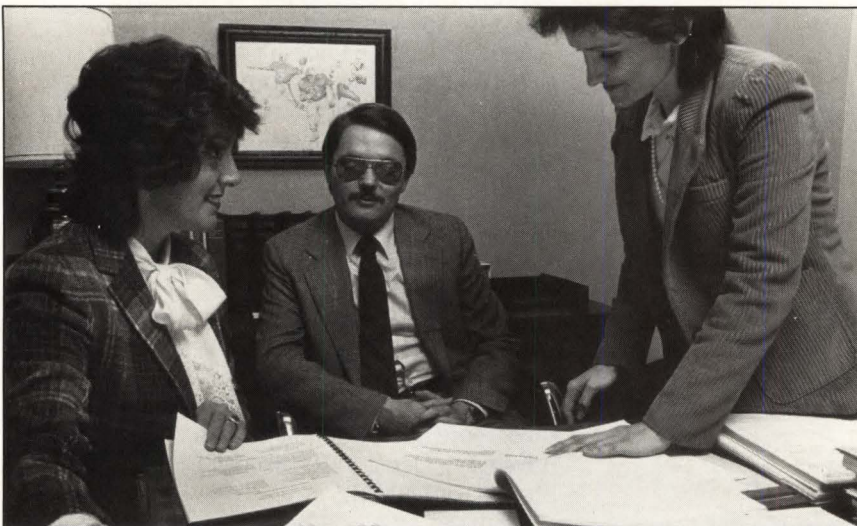
Hughes has realized considerable time and economic savings on laser-printer runs of less than 20 copies, but it is considering streamlining its operations even further. According to Milse, rather than sending customers or subcontractors printed material, the corporation may begin sending them documents on tape or disk. At present, he said, Hughes is discussing this possibility with the U.S. Army and several overseas customers.

The movement away from hard-copy documents to disk or tape documents may seem to be a radical notion given the sophisticated printing system Hughes has at its disposal. But Hughes has faced similar situations before. When the corporation installed the Star system, it had to persuade the Defense Department to accept the new form of documentation that the system produced. Eventually, says Milse, he was able to convince the Pentagon that the new method of production was more cost effective than conventional typesetting and that the savings would be passed on to the military. "The savings are considerable for a 20,000-page document," says Milse.

Not only was the Pentagon reluctant to accept Hughes' printing system but some users felt intimidated by the Star's power. As a result, it took longer than anticipated to familiarize staff with the workstation. "Moving from a regular word processor to a Star is like going straight from a station wagon to a 14-wheel truck," says Milse. "It's pretty scary."

When Hughes hooks its Amdahl and IBM 3780 and 3081 mainframe systems into the Ethernet network, Milse envisions that his department—the final checkpoint before bids and proposals go out to customers and subcontractors—will become more than a high-tech print shop; it will be the helicopter manufacturer's management-information center. □

Miriam Lacob is a free-lance writer based in New York City.



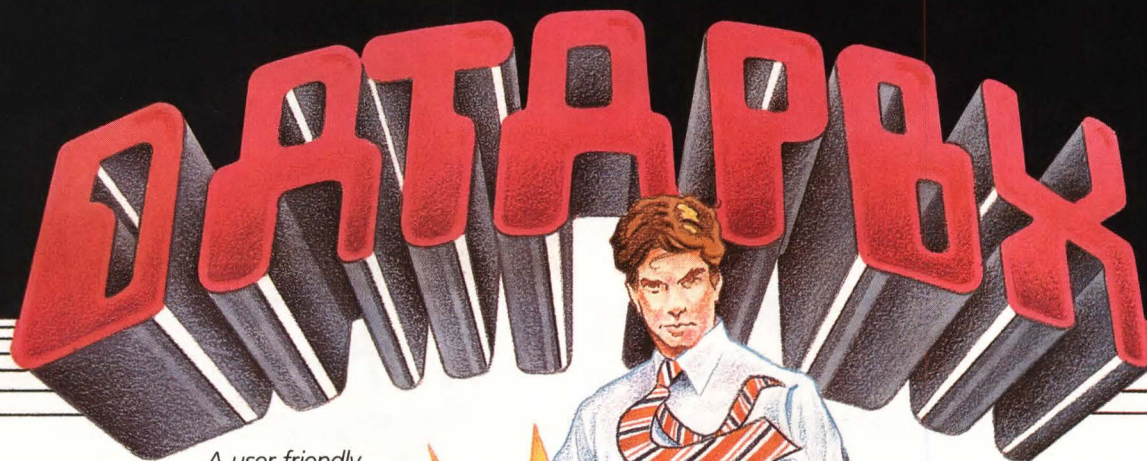
Pat Stiltz, systems-communications specialist, and Terry Armstrong, systems-evaluation and communications director at Hospital Corp. of America, review materials prepared on Xerox Star 8010 workstations with Bonnie Cox, supervisor of the systems-integration word-processing center.

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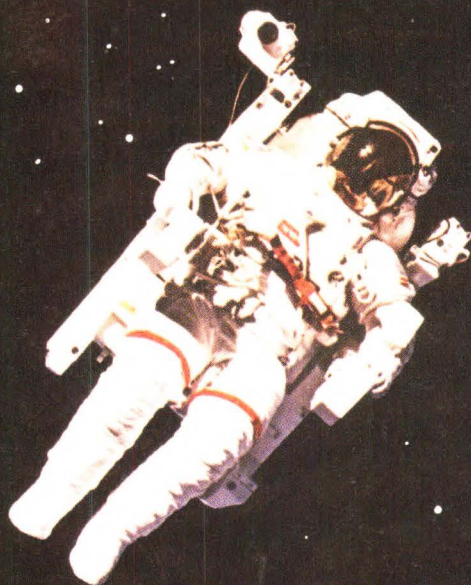
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FOLLOWING THE LEADERS

1984 REVIEW: FEW SURPRISES

There were few surprises in 1984 in the performance of the leading data-processing vendors—if certain powerful developments are kept in mind. Two of these are IBM's need to keep growing at a 20 percent annual rate and, to ensure this growth, its drive to become the industry's low-cost, high-quality producer.

That's why IBM bought the rest of Rolm Corp. (Santa Clara, CA) and why so many of those who would like to clone IBM's products—from mainframes down to micros—are faltering. Some are beyond faltering: Trilogy, Gene Amdahl's attempt to create another major mainframe supplier, is, for all purposes, dead. The \$40 million-plus investments of Digital Equipment Corp. (DEC) and Sperry in "wafer-scale integration" went down the tubes with Trilogy. Neither DEC nor Sperry suffered deep wounds from the loss, though, except perhaps to their corporate egos.

Trilogy's demise was presaged by Storage Technology Corp.'s ill-fated foray into mainframe development. Even if all the vast capital expended by both Trilogy and Storage Technology had been channeled into a single venture, it would probably have been insufficient. Only a corporate giant can now afford to develop a new generation of mainframes.

Storage Technology is also suffering from its weak entry into the manufacture of high-capacity disk drives. Again, no surprise—IBM had early problems with its 3380 disk drives,

and Control Data's attempts to clone the IBM 3380 failed. In fact, all vendors have experienced problems with the "next generation" of disk drives. Fortunately for Storage Technology, it retains a strong position in tape drives and is making a solid effort in optical disk drives, as detailed in "New options for data crunching" in this issue.

Some other manufacturers of peripherals have fared no better. A former Raytheon executive told me how that one-time major maker of terminals compatible with the widely used IBM 3270 was confronted with the results of IBM's high productivity: On a big purchase of the terminals, Raytheon found itself the high bidder. Guess who was the low bidder? It's easy to see why Raytheon sold its terminal business to Telex.

Also in deep trouble—with the notable exception of Compaq and, perhaps, Corona Data Systems—are the small shops that would like to copy IBM's Personal Computer. And who knows how well the currently successful clone-makers will perform against IBM's follow-ups to its PCs?

In contrast, Apple Computer is thriving, perhaps by avoiding a direct confrontation with IBM. But the day will come when Apple must take on Big Blue. When the market for sales of one or two machines at a time (for home use, for example) is saturated, Apple will need to sell to the Fortune 500, which until now has largely been

an IBM club.

Several of the startup manufacturers of non-IBM-compatible *portable* computers are also failing or withdrawing their offerings. This is not unexpected. How often do you see a traveling executive or professional toting a computer? How many of the executives and professionals in your organization are demanding portable computers? One reason for portables' lack of popularity is the widespread availability of desk-bound micros.

The slow progress of another office technology, local-area networks (LANs) was equally predictable. With so many competing technologies and a late endorsement of Sytek's LAN by IBM, there has been no rush to network via coaxial cabling. Before LANs become popular, they may find a powerful competitor in data-over-voice transmission on the plain old-fashioned twisted-pair wiring that's already in most office buildings.

Finally, it's not startling to me to see the wings of so many of last year's high-flying startups being clipped. As a one-time consultant to venture capitalists, I was shocked by the amount of funding for operations founded by innovators with little or no business experience.

There was one unexpected development this year: the acquisition of Electronic Data Systems by General Motors. As I suggested in my August "Insight" column, in time it may be GMC, not AT&T, that will be the only American manufacturer to challenge Big Blue. One reason is that AT&T's production costs are much higher than IBM's. But AT&T's principal disadvantage in competing with IBM is its lack of marketing moxie.

Look for the big changes—more than usual—in our "Top 100 in data processing," to be published in June. □

It's not startling to see the wings of so many of last year's high-flying startups being clipped.



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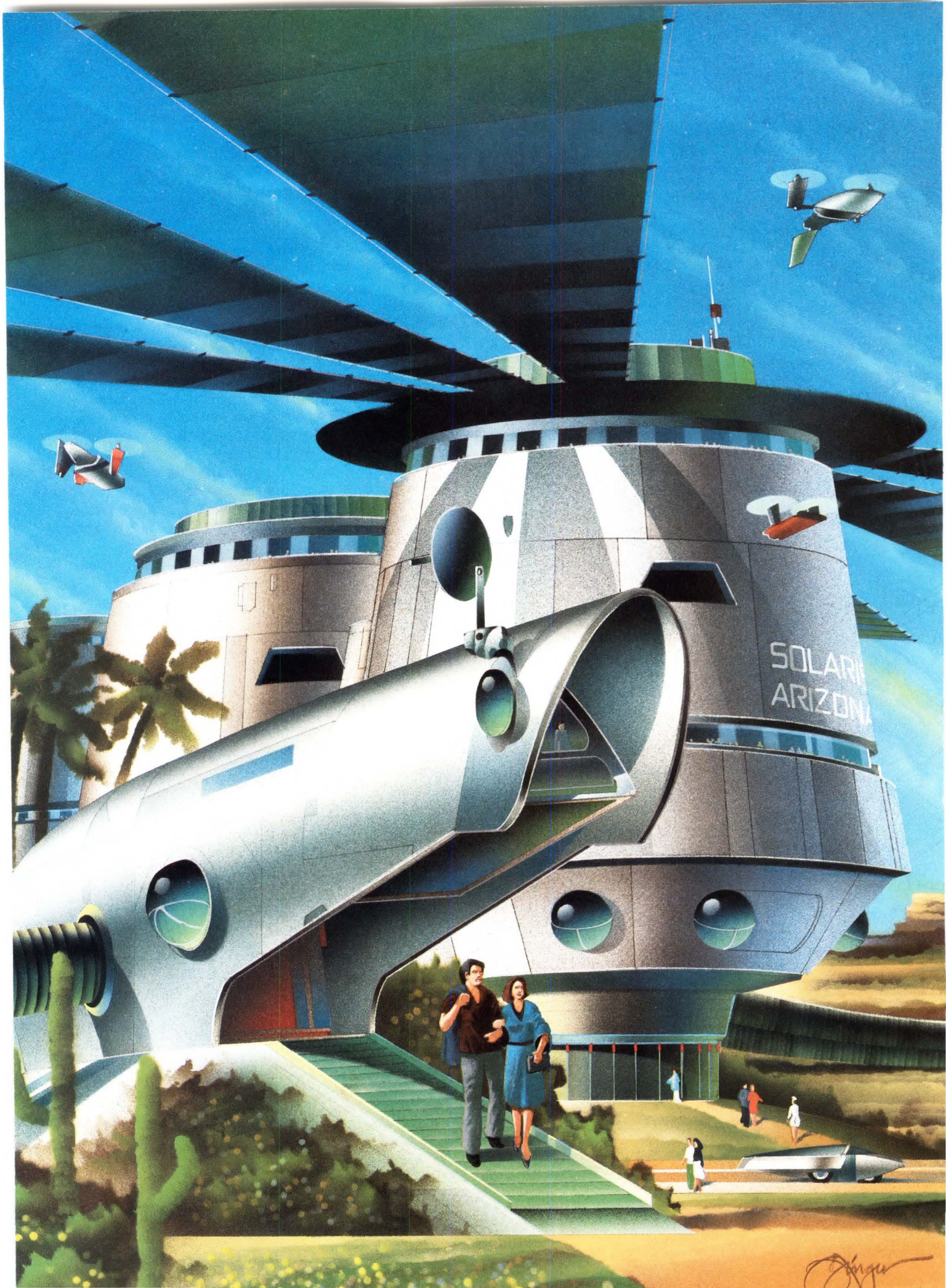
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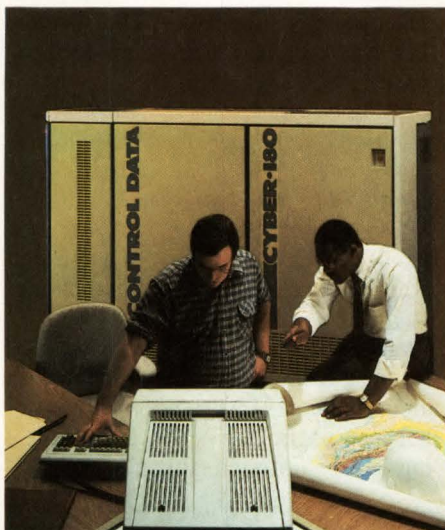
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PERSON-TO-PERSONAL TRAINING

An organization that has established successful training programs for data-processing staff ought to face few problems setting up personal-computer training programs, right? Not so. Both the training requisites and the students in each are different.

In a talk with three senior trainers from Fortune 1,300 organizations, *Computer Decisions* asked who is doing the personal-computer training, who is being trained, how—and how effectively—it is done. The answers all point to one basic fact: Trainers are still struggling to discover what methods will best teach the operation of the personal computer—a product without standard use.

The participants in the discussion were Elaine Adler, vice president and director of technology training for the corporate technical office at Citibank, New York; David Phillips, the project

manager of the pensions department's personal-computing center at Metropolitan Life Insurance Co., in New York; and William Sebrell, assistant secretary and director of data-processing staff services and personnel services at The Hartford (CT) Insurance Group. The discussion was arranged by Omicron—The Center for System Humanics, of Morris Plains, NJ.

Who is asking for personal-computer training? Is it employees acting on their own, or employees designated by their managers?

William Sebrell: Everyone you can think of. I have a backlog of end users waiting for training, and I'm training them as fast as I can.

Elaine Adler: It depends on what the personal computer is being used for. If an individual wants to use it for his or her own particular needs, then training is user-initiated. But if a specific

business unit decides that everyone is going to use a given system for a specific purpose, then the organization orders the training.

David Phillips: I'm disappointed with who the personal-computer users actually are. The press has led me to believe that the users are in management. But the reality is that clerical and professional people—not managers—are the actual users.

Management determines the need, and then sends out people who will report on how to use the software and hardware, and how to solve each application problem.

Do you identify different levels of users?

Sebrell: Those who come in for training range from the individual who has never seen a machine, all the way up to professionals I would classify as almost-programmers, because they either know Basic or C-language. They're not only manipulating data, they're fooling around in the code and putting patches in. Still, our training is as standardized as our purposes for the uses of personal computers.

Phillips: We try to identify users on the basis of their experience with microcomputers. We want to know if they're coming in completely cold.

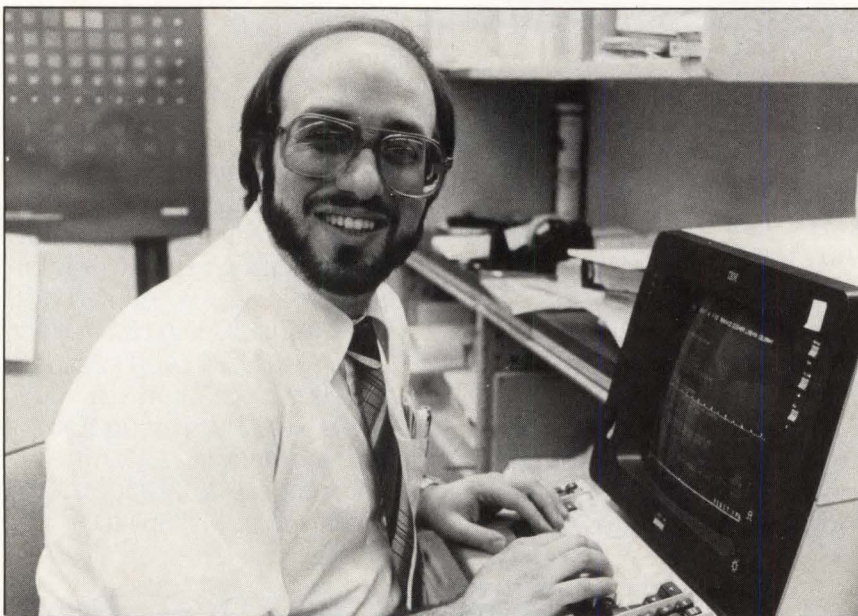
Would the fact that they own home computers make a difference?

Phillips: Well, if they have a home computer, at least they don't have to ask where the on/off button is. They know how to put in a disk, and they know the importance of the operating system. They're coming in with a few months' experience.

Adler: They're a little more sophisticated, all other factors being equal.

Sebrell: On the other hand, I've run into people who have IBM PC XT's at

(Continued on page 84)



"We're constantly chasing our tails, trying to keep up as new products come out," says David Phillips, project manager at Metropolitan Life Insurance Co.



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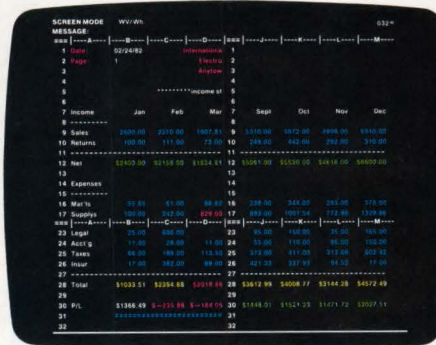
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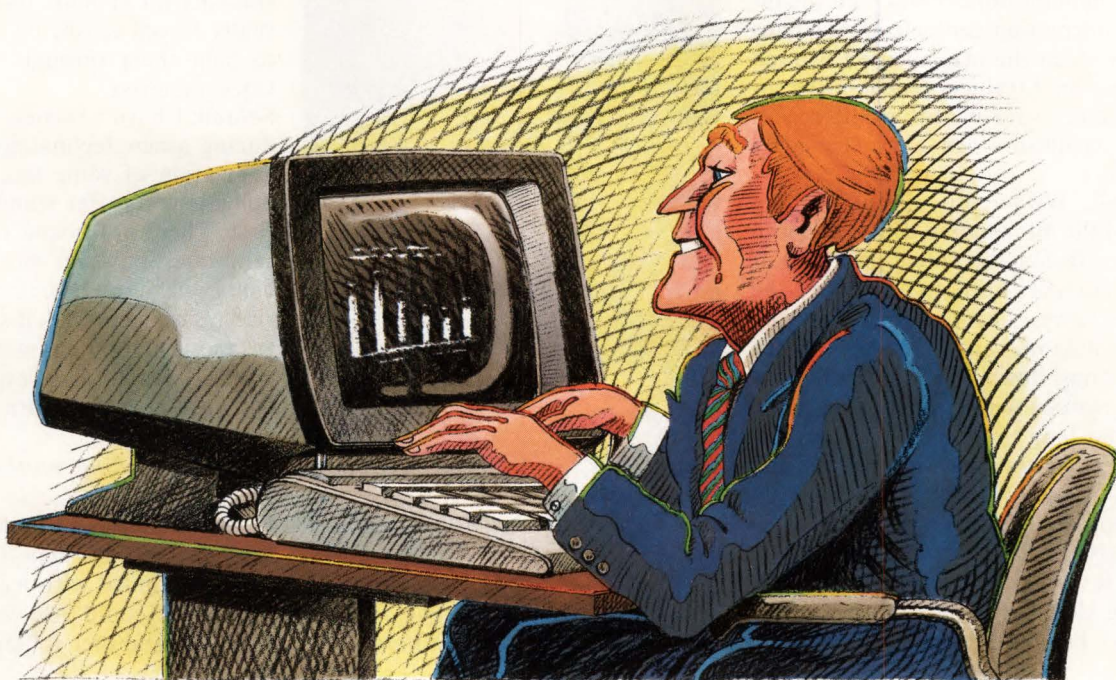
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TRAINING

(continued from page 80)

home, and they're still in the dark about using them. And what's interesting is that although a lot of the commonly-used application packages come with training software provided by the vendor, the training software is absolutely useless. It doesn't give enough information on how to use the applications packages, so everyone's seeking more training.

Is microcomputer training a corporate priority at your organization?

Adler: It's quite low on our list of corporate needs. But Citibank is highly decentralized and entrepreneurial. Each business group makes its own decisions about what problems are important; and each group is able to be responsive to its own needs. So while microcomputer training may be a high priority for some, it varies from group to group.

Phillips: If it's a corporate priority, it's not apparent at the students' level. But the training program has recently been moved from the information center to the corporate data-processing training department. Although that may raise perception of microcomputer training as a priority, students don't feel that there's any pressure on their managers to train them.

Why has training been taken from the information center?

Phillips: There was an overload demand for courses, and the information center couldn't handle it. Also the organization wanted professional trainers teaching the introductory courses. Information center consultants are not necessarily trainers.

Sebrell: We've also moved training out of the information center and into the professional training group. Half the managers I talk to have made the same move. The reason is that the information center trainers were stumbling down the same path that the professional trainers had gone down a long time ago. The information center trainers were reinventing registration, tracking, and critique systems and making the same mistakes that had been made all along the line. It wasn't that the training wasn't being done effectively, it's that it wasn't being delivered effectively.

What methods of training do you use?

Sebrell: We use a variety of techniques: stand-up lecture, interactive videodisk, non-interactive videotape, and instructional diskettes that run on the micro itself. In effect, we use every medium we can find, and employees select the one that appeals to them.

Phillips: We almost exclusively use instructor-led classroom training with hands-on labs. We have one person to a computer, and we run half-day sessions that run over two or three consecutive days.

Do you use half-day courses for students' convenience or their effectiveness?

Phillips: For their effectiveness; students have time to digest the information. The hope is that they'll spend time at their desks applying what they've learned.

Sebrell: We tried full-day sessions, but students said they were getting too much too fast, so we slowed it down a little. Half-day lectures seem to work for us because students can tinker with what they've learned before they come back and learn something else.

Adler: The sooner students put what they've learned to use, the more likely they are to remember it.



"Personal-computer users have a diversity of needs because they have thousands of products to use. And the group is not homogeneous, making training a whole different ball game," says William Sebrell, director of dp-staff services at The Hartford.

What other training methods?

Sebrell: We use videodisk, but we limit students to two hours of instruction at a time. That's about all they can stand before training becomes ineffective. We have some courses that are delivered on the micros, but I have no idea how much time students spend on them.

Phillips: Whatever method is used, the training is only the first hurdle. The real challenge is bridging the gap between what's been learned and applying it to the work to be done.

Adler: That's why it's important to know where the students are coming from, and what their expectations and needs are. That's the key to making training effective and accepted.

What methods do the trainees like best, and which seem to be the most effective?

Sebrell: There's no one answer to that; people prefer different approaches. Some method I classify as junk, a student will think is great because it worked for him or her.

Phillips: Students prefer to have an instructor. Then there's a human being there they can fall back on. Even though some students are intimidated in front of others, they at least have the opportunity to ask a question.

Adler: Most of our training is done in classrooms. I've found that self-administered training doesn't take the students far enough. They are eventually forced to rely on an instructor to help them through the sophisticated material.

Sebrell: I have a theory: When introducing a new technology into an organization of some size, it's almost obligatory to offer stand-up lectures first. There are bound to be a thousand questions that most of the students will have. Once that basic material has been covered, it's time to shift to another training medium. Then, when students still have questions, the odds are they can turn to the next person for help.

What training methods do you shift to?

Sebrell: Whatever the student learns best with maybe some form of self-study combined with lecture. Or the individual could use videodisk instruction, and then follow it up with a

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TRAINING

(Continued from page 84)
workshop.

Is microcomputer training different from other kinds of training?

Sebrell: Enormously different. Corporations have learned how to teach people technologies. We teach Cobol very well. But that's giving the student a bag of tools and saying, 'Go use it.' There's a world of as yet unknown problems that person will work on. But the personal-computer user is 180 degrees from that position, knowing exactly what will be worked on. That's the difference.

Phillips: To put it another way, you don't have to teach a programmer 12 different ways to program Cobol. You teach one set of tools with which to write code, no matter what the application is. Personal-computer users have a diversity of needs because they have thousands of products to use. It's a whole different ball game.

And the group is not as homogeneous as it is when you're doing technical training. You can have any-

one—from the clerical level up to the executive—who needs to know how to use Lotus 1-2-3. Is it best to put them all together in the same class? Maybe. There are many things we're not doing right, but that's because we're new at this. There are a number of challenges that we have to address, and we can't address them all today. But we should be aware of them.

Sebrell: Personal-computer software changes on a monthly basis, hence we adjust our training. We're just learning how to do that, and not very successfully. But we're learning.

Phillips: Every generation of software is a quantum leap ahead of the previous generation, so as new products come out we're constantly chasing our tails, trying to keep up.

Can you tell how well you're doing your job?

Sebrell: The judges of how we're doing are the end users themselves. If they're happy, the training is successful. If they're not, they can come back. No one says students can't come back.

And we're open to criticism.

Phillips: I'm skeptical. I'm afraid there are users who aren't happy with their training, but who don't come back. They're shy, or they're embarrassed that they haven't learned. We lose people that way.

How many of your students are still using their computers six months after you train them?

Sebrell: They all are. There are many aspects to the issue of effectiveness, but it says something that all who were trained are still using their computers. That's what they got them for.

Phillips: I don't know how effectively the machines are being used, either. I have no way of measuring that. But I'd say that between 85 and 90 percent of the people we've trained are using computers six months later. The others probably decided to sign up for training, perhaps being unsuited for or unable to get what they needed from training. So I wouldn't be surprised if we lose one out of every ten employees we train. □

TRAINING

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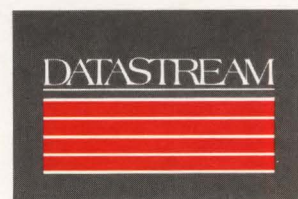
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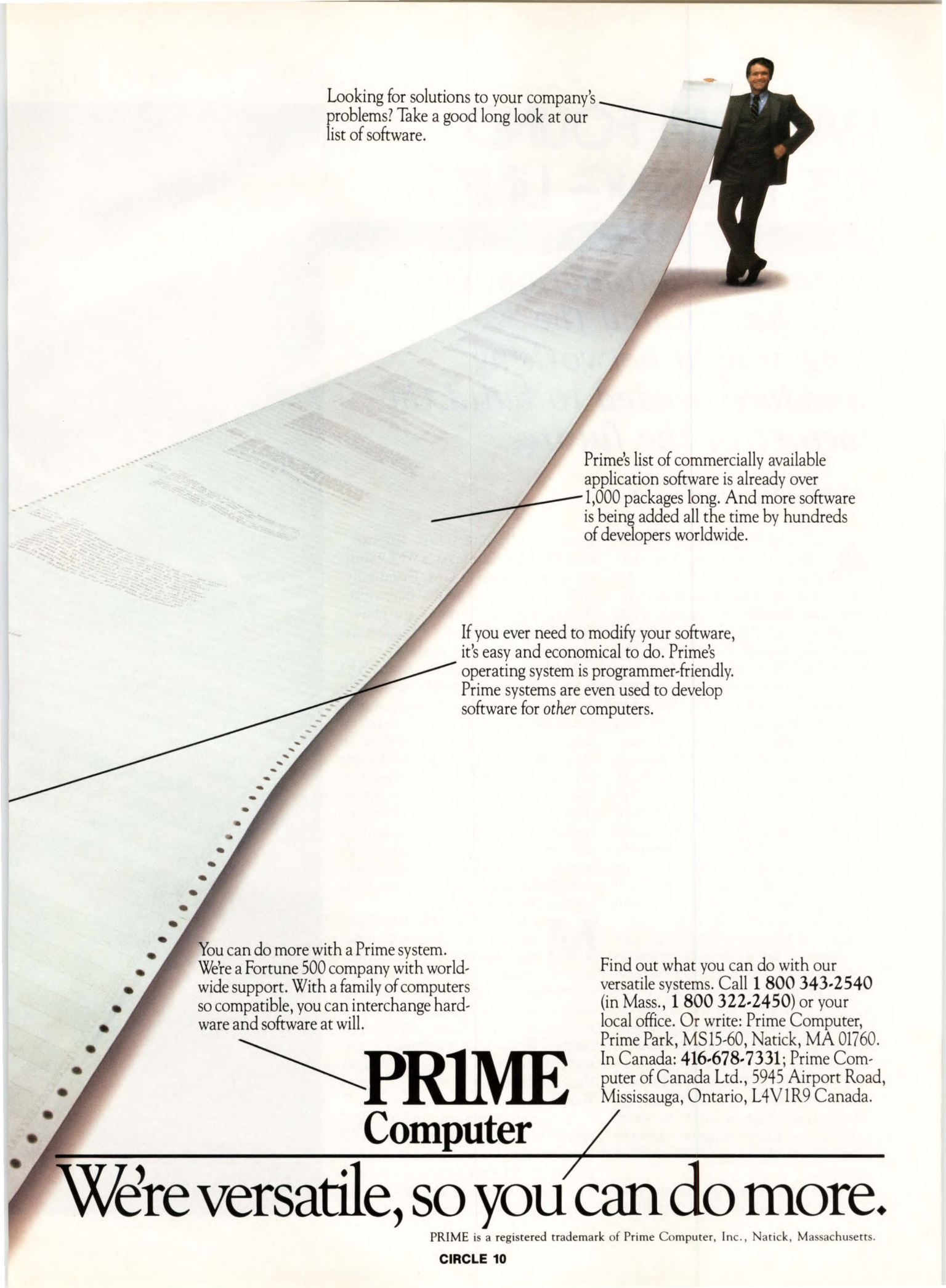


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CIRCLE 10

HAS GM FOUND THE MISSING LINK?

In factory automation, GM may have found the long-sought networking standard needed to build the factory of the future.

by Gary Stix, Associate Editor

A new era of manufacturing productivity beckons. The machine-vision systems, the robots, the automated-handling systems, the flexible machining cells are all in place. Missing, however, is the universal organizing principle, the nerve fibers that will transfer production-status information to a central mainframe or warn a manufacturing workstation that, say, a robot has decided to take a walk on the interstate highway that fronts the factory.

That missing link may be MAP, General Motors' Manufacturing Automation Protocol, a still-developing specification for information transfer on factory-level local-area networks (LANs). If General Motors has its way, MAP will become the standard protocol for all wide-bandwidth LANs in factories. But the importance of MAP goes beyond the esoteric technical discussions of protocols and networks. In the view of factory-automation proponents, MAP is the missing cantilever that will bridge the islands of automation, paving the way to the factory of the future. MAP is intended to serve as the great equalizer, making IBM talk to DEC and CAD converse with CAM, all the while giving bean counters at headquarters a little window through which to watch the entire production process.

"What we're asking is to have French-, German-, and Spanish-

speaking computers talk English," says Michael Kaminski, a MAP project team member at GM. Eventually, GM will evaluate whether all prospective factory-equipment purchases should incorporate this "English-as-a-second-language" capability.

MAP, if successful, will enable virtually all programmable devices to communicate over LANs that employ the same technology as cable-television systems. Today, according to GM, only one in seven of these devices can do this. MAP will also eliminate the tangle of point-to-point wiring that clogs factory ceilings. New assembly plants, for example, require the installation of three-foot-wide wire trays in ceiling trusses to accommodate cabling. MAP will reduce this equipment redundancy.

Most important, MAP will save money. Interdevice communication accounts for 30 percent to 50 percent of the cost of new automation. The custom programming required to make machines talk to other machines drains considerable funds. "If we want to change a network, we have to completely rewrite the application software," says Kaminski.

Although technical and market-related obstacles remain before MAP becomes the lingua franca of the factory floor, MAP's prognosis is good. The reason: GM's purchasing muscle.

Better than any single industrial





FACTORY NETWORKS

entity, GM can make MAP work because, as the truism goes, what's good for GM is good for the economy as a whole—and certainly good for machine-tool and industrial-control manufacturers. Last summer, Wall Street analysts predicted that a prolonged United Auto Workers strike against GM could bring interest rates down by relieving business-credit demands. It's no coincidence that GM, the nation's largest user of computers (excluding the federal government) and the world's largest manufacturer, is spearheading the MAP project. From 1985 through 1989, the automaker

plans to spend more than \$5 billion on machine tools for domestic operations. By 1990, the number of programmable devices at GM (currently 40,000) is expected to quintuple.

Renewal of its capital plant is the heart of GM's strategic effort to reverse the inroads foreign imports have made into the domestic market. "We are not engaged simply in a replacement of yesterday's machine tools, but in the creation of a superior manufacturing capability," Donald J. Atwood, GM executive vice president, told the National Machine Tool Builders Association in September.

GM's automation plans also became the focus of the recent UAW contract talks. During the negotiations, the UAW obtained a confidential GM study that showed that the automaker could reduce its hourly workforce by between 60,000 to 120,000 workers over the next two years by automating its facilities.

MAP began as a committee formed in the late 1970s to look at the difficulty of using broadband cabling. Broadband had proved effective for energy management, terminal communications, and closed-circuit television. However,

MAP TOPOLOGY

In simple terms, MAP is a broadband token-bus local-area network (LAN) that employs the IEEE 802.4 committee's implementation of the ISO/OSI model. That's not exactly parlor talk, but understanding what's involved in defining MAP sheds light on factory communications problems.

Although general-purpose LANs are gaining acceptance in the office, their absence is conspicuous on the factory floor, where they would have to communicate with myriad incompatible programmable devices while withstanding dirt, electrical interference, and magnetic disturbances.

Manufacturers require more predictable response times from LANs than their counterparts in the office. To ensure real-time reliability, the General Motors task force, as well as standards committees involved in the MAP effort, chose a network design different from the one employed in Ethernet-type LANs, the kind most commonly found in the office. Ethernet uses an access method known as carrier-sense multiple access/collision detection (CSMA/CD), which enables each station on the network to detect the presence of signals from other stations and to

hold back a transmission until a channel is clear, thus avoiding a collision. Under peak loads, however, Ethernet is unsuitable for real-time industrial networking because a message packet may fail to gain access to the network.

MAP attempts to overcome this drawback by circulating an "empty frame" or token—the so-called token-passing scheme. When ready to transmit, a station inserts a message with the address of a receiving station on the token. When the token arrives, the receiving device removes the message and returns an acknowledgement.

Under light transmission loads, token-passing actually provides slower network response times than Ethernet. A station on a token-passing network must wait for the token to circulate. Ethernet, however, allocates the right to transmit on a first-come, first-served basis. If no other station wants to transmit, the message can be sent instantaneously. However, the transmission time from station to station is wholly dependent on network loads and other factors, such as network length.

That's the catch. The engineering staff that integrates industrial net-

works into the factory must calculate the exact transmission time between stations. Therefore, token-passing is heavily favored.

Other characteristics of GM's plan call for a bus topology and broadband cabling. The coaxial cable is placed in, roughly, a straight line called a bus, which readily conforms to the layouts of most factories. The wide bandwidth of the broadband medium allows multi-channel voice and data transmission at a speed of 5 million to 10 million bits per second (Mbps). Broadband is easy to install, and new connections can be made with little interruption to the production process.

The biggest problem for designers is making differing operating systems and network architectures talk to one another. GM addressed this problem by adopting the International Organization for Standardization Open System Interconnection (ISO/OSI) model. The OSI model provides a framework that enables incompatible devices to communicate and uses a layered architecture. The model's layers separate network communications into seven functional groups. The lower three layers handle physical connections

linking separate broadband networks was expensive. "We'd spend \$100,000 on one broadband network, \$100,000 on another, and \$100,000 for the software to make the two communicate," recalls Sam Smith, a former GM systems analyst who's now Detroit branch manager for Sytek Inc. (Mountain View, CA), an LAN supplier.

From the original group evolved the Manufacturing Automation Protocol Specification Task Force, representing more than 15 GM divisions, from foundry operations to vehicle assembly. "We quickly realized that we'd

have to look at a standard protocol, not just the cabling itself," says Edward J. Deenihan, a task-force member.

As an interim solution to the incompatibility problem, the group first produced specifications that would have met GM's own requirements for attachment of different devices. The specs met with a lukewarm response from Digital Equipment Corp. (DEC) (Maynard, MA), Hewlett-Packard Co. (Palo Alto, CA), Gould Electronics (Rolling Meadows, IL), Allen-Bradley Co. (Milwaukee, WI), and other GM suppliers.

According to a Yankee Group study, "Data Communications in the Factory": "The almost universal feedback was that these manufacturers had no interest in implementing an interim nonstandard project but would like to see a GM standard based on IEEE [Institute of Electrical and Electronics Engineers] P-802 and NBS [National Bureau of Standards] standards."

Accordingly, GM began to develop new specs derived from standards emerging from the IEEE and the National Bureau of Standards. In fact,

(Continued on page 96)

and the flow of information between network stations or between one network and another (the physical, data-link, and internetwork protocols, respectively). Ideally, the user has to deal only with the top, or application, layer. The other layers (presentation, session, and transport) define such crucial tasks as converting transmitted data into a format understood by the applications software, establishing individual communication circuits for the application processes, and ensuring that information has been properly communicated. The data pass down the hierarchy until they reach the lower layers, which are responsible for transmitting information to other stations or networks. The modular nature of the seven layers enables the functions of one layer to be changed without affecting others.

The ISO, an amalgam of national standards organizations (the American National Standards Institute in this country) has been criticized because it failed to give specifications for the seven layers. The OSI scheme only outlines the functional attributes of each layer; it doesn't provide the cold numbers necessary to design equipment. Without stan-

dard specs for such tasks as making code conversions, communications-equipment manufacturers will inevitably develop systems that conform to the OSI model but are incompatible. Taking the ISO's work a step further, the IEEE and the National Bureau of Standards have begun to develop the specs for a token-bus network that would operate at speeds of from 1 to 10 Mbps.

The next problem is connections between LANs. Although a MAP network connects diverse programmable devices, it doesn't stand alone. Any factory-wide LAN will also connect to other networks, both larger and smaller. The Yankee Group, in its "Data Communications in the Factory" study, has classified three levels of industrial networks:

- Level 1—A corporate-wide network tying the factory to the rest of the corporation, possibly employing a centralized system architecture like IBM's Systems Network Architecture.
- Level 2—A factory-wide network, such as the MAP-type network GM is attempting to design.
- Level 3—A specialized cell network constituting a high-speed link,

such as Allen-Bradley's Data Highway, which would control a select grouping of robots or other programmable devices.

In fact, the MAP specification has grown to encompass a cell network. As plans for MAP progressed, GM realized that one central network serving every programmable device would be insufficient. The tenth-of-a-second response time furnished by the backbone network can't match the millisecond requirements of many programmable machine tools. Thus, GM decided to develop specs for a subnetwork.

The two networks will interconnect. The main network will perform such tasks as transmitting part information to the various machining cells or transferring production status information to the mainframe. The proposal calls for a single-channel, 1-Mbps baseband network that would also incorporate the token-bus design. The IEEE and the Instrument Society of America's SP.72 Proway Committee, which has been studying specs for a baseband industrial network since the late 1970s, have agreed to work together to develop the requisite cell-network protocols.

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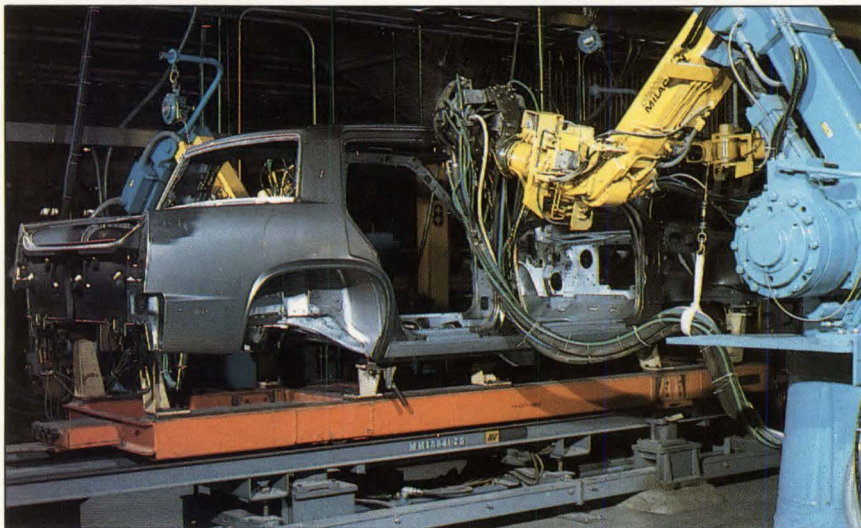
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One of the more than 150 robots at General Motors' Orion Township, MI, plant welds the body of a Cadillac DeVille. GM plans to install a MAP network at the plant that will let robots engaged in welding and painting communicate.

(Continued from page 93)

GM had a hand in influencing the standards definition. When it appeared that the IEEE favored Ethernet as a standard for the factory floor, GM, along with several programmable-control vendors, expressed its displeasure with the networking scheme. GM believes Ethernet is unsuitable for the heavy loads and the real-time considerations of the factory. (An explanation of network architectures and standards-making activities is included in "MAP topology," which accompanies this article.) As a result, the IEEE endorsed Ethernet (IEEE 802.3) as an office LAN and supported a token-bus network (IEEE 802.4) for the factory floor.

GM has since tried to enlist support for MAP from automation suppliers, large automation customers, and anyone who will listen to its missionary appeal. To this end, the Factory Floor Communications Industry Involvement Group, cosponsored by GM and McDonnell Douglas (St. Louis) was organized. "We recognized that we needed a larger market than just us," says Deenihan. Adds MAP project team member Ron Floyd: "We've

been asked why we're trying to develop a market for this product when we could probably do it faster ourselves. We're still not a computer manufacturer. We need outside vendors to support such a project through maintenance, training, documentation, and upgrading." (As of early October, Electronic Data Systems, the Dallas computer-services corporation purchased by GM in June, has yet to become involved in MAP, say GM officials. It may participate in the project sometime in the future—when a MAP network is tied to GM's corporate-wide networks by a private branch exchange (PBX).

GM's efforts to promote MAP culminated in July. At the National Computer Conference, GM demonstrated a prototype token-bus network that transferred files between equipment made by suppliers Allen-Bradley, Concord Data Systems (Waltham, MA), DEC, Gould Electronics, Hewlett-Packard, and IBM (Armonk, NY). The exhibit was the hit of the conference. A newspaper headline proclaimed: "Computer Industry's New Star: GM."

Since NCC, MAP has achieved honorary-buzzword status. Some 450

representatives of nearly 200 leading corporations attended the September MAP-users meeting at the General Motors Technical Center, Warren, MI. (The group met as, a few miles away, GM officials and representatives from the UAW negotiated a new contract, which centered on the issue of how to ease the threat of automation to union members' job security.) During the tech-center session, general statements of support for MAP came from Boeing Corp. (Seattle), DuPont (Wilmington, DE), Eastman Kodak (Rochester, NY), and others.

GM's first deployment of a MAP-standard LAN is already scheduled to be in place at a Detroit assembly plant. Prompted by signals transmitted over the network from an IBM Series/1 minicomputer through Allen-Bradley programmable devices, 15 robots will determine the color a vehicle should be painted. Early next year, similar networks are scheduled for installation at various stamping plants.

A major test for MAP will come when these specifications are made a part of corporate-purchasing policies. In this respect, an important milestone in GM's MAP schedule will come this summer: Equipment manufacturers will be called upon to make their products compatible with MAP specs for a factory-wide LAN in the automaker's Saginaw, MI, steering-drive plant, a plant billed as a factory of the future. "Fifty flexible manufacturing cells will communicate via a MAP network with the factory computer," says Michael Kaminski.

By the end of the decade, GM expects the factory-floor systems it purchases to include broadband coaxial-connector and internal MAP compatibility. Suppliers that offer those features will be given preference over equipment manufacturers that connect to the network with a "black box" or other external network interface.

The tech-center engineers spear-

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heading the MAP effort have one factor working in their favor: Acceptance of MAP by GM divisional managers is reportedly good. The center has sometimes found itself at loggerheads with the various operating divisions, in part because of a reputation for failing to support the systems it installs. With foreign competitors continuing to erode the automaker's market share, however, divisional managers have shown a greater willingness to heed tech-center advice. "This looks to be one of our most successful projects," says Edward Deenihan. "Everybody realizes that we have the hot breath of the Japanese on our necks."

In addition to having achieved internal unity, GM has received broad support for MAP from other large industrial-automation users. Opposing MAP is viewed as mildly unpatriotic, equivalent, perhaps, to opposing motherhood, or "General Mothers," as one IBM official said in a slip of the tongue at a recent conference on MAP.

Besides GM, however, other manufacturers still have to follow suit with specifics. Even McDonnell Douglas, cosponsor of the MAP user group, is

still working toward a coherent policy. A Procter & Gamble official who attended the September meeting noted that the rigors of the marketplace have a way of preempting the best-intentioned standardsmakers. While commending the MAP effort, the Yankee Group, the Boston-based market researchers, noted in a recent report that "proprietary network implementation gives the network vendor a measure of account control, which vendors are reluctant to give up."

Practical implementation of a standard that applies to segments of industry as diverse as an electrical-power producer and an automaker has the makings of a logistical nightmare. Says Bob Crowder, a DuPont executive who has participated on the Instrument Society of America's Proway Committee, a committee that's also developed factory-level communication standards: "It's difficult enough getting 10 manufacturers to work together, let alone 180." There are no guarantees for GM in its efforts to "market" MAP. After all, once other industries begin to look closely at what the MAP protocol can and can't do for them, they

Some vendors are unwilling to give their backing to GM as MAP's standard-bearer.

may demand different networking schemes.

In chemical facilities, for example, network cabling must be enclosed in sealed boxes that shield it from combustible mixtures. "This might cost 10 times what it would cost to install a network in an office building," says Crowder. "A fiber-optic network might resolve this issue. But the protocol for such a network would be different from MAP. So what you might eventually see is that MAP will grow to encompass fiber optics as well as standard coaxial cabling." Despite reservations, Crowder and DuPont are enthusiastic about MAP, as witnessed by Crowder's participation on the MAP user group's executive committee.

Although there is evidence that GM is successfully promoting MAP, a fundamental market-related question about MAP remains: Can competitors that share information usually shielded under a cloak of corporate secrecy thrive? This dilemma was illustrated somewhat comically during the MAP User's Conference. The two-day event at the GM Technical Center drew participation from a broad spectrum of manufacturers, including GM competitors, such as Ford.

During the session, factory-automation suppliers danced around the question of how they could cooperatively support MAP. Some vendors swallowed hard when asked to develop products to a specification shared by outsiders, particularly the top computer manufacturers, like IBM, that have just begun to offer factory-automation products. During a presentation, Allen-Bradley, one of the largest



A guided vehicle—one of 22—delivers manufacturing materials from a receiving dock to the trim and chassis department at GM's Orion Township plant. A planned MAP network will integrate these vehicles with other automated resources.

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U.S. suppliers of industrial-control components, talked about its Vistanet, which incorporates several of the seven layers of MAP's protocol. Although MAP is intended as an open specification to accommodate products of many vendors, Allen-Bradley talked about Vistanet as "an integrated MAP system from one vendor."

DEC, whose minicomputers dominate many factory floors, apparently finds it difficult to give MAP a rousing endorsement, despite its participation alongside GM at NCC. At the user's meeting, Stephan Koenig, DEC's corporate-account manager for GM, discussed how DEC's network architecture is adaptable to new standards. When asked about products that would support MAP, however, Koenig refused to talk about new product plans. Kaminski, of the MAP project team, said he was particularly vexed by DEC's reticence because as many as 75 percent of GM's factory computers sport the DEC label. But DEC's strategy may be just a waiting game. In fact, Kenneth Olsen, DEC's president, proclaims the number-two computer vendor's support for MAP in its just-published 1984 annual report.

In contrast to DEC's aloofness, IBM, eager to expand its role in industrial systems, has publicly given MAP much stronger endorsement, even suggesting it may use MAP devices in its own factories. Also, most market analysts believe IBM's yet-to-be-announced industrial LAN is based on MAP.

The reluctance of some vendors to endorse MAP mirrors the conventional vendor-user standoff: Users see vendors as shortcutting a path to a fast dollar, but vendors believe that users

often display scant understanding of technical and market constraints. Said Paul Accampo of Hewlett-Packard during a presentation at the September meeting: "We want to see stability if we're committed to MAP. . . . We don't want to spend several years developing something that isn't a standard and has to be changed again."

Also, some vendors are unwilling to give their backing to GM as MAP's standard-bearer. A vendor may not want to support MAP if it's also trying to sell to a GM competitor. To quell these fears, GM's imprimatur will have to be removed from MAP, probably by releasing the specification to the public domain. To that end, the Society of Manufacturing Engineers (SME), Dearborn, MI, has offered to provide start-up support for the MAP user group, giving it the option of becoming a committee of SME's Computer and Automated Systems Association.

The political obstacles to MAP's acceptance are formidable enough, but MAP also presents tough technical challenges. A more complete demonstration of the MAP protocol, scheduled for the 1985 National Computer Conference in July, has been postponed until later next year or perhaps even 1986, GM acknowledges. Still to be addressed, according to one DEC official, is the network management of a variety of incompatible peripheral devices.

Moreover, MAP-software developers face an arduous task. Substantial progress has been made in defining MAP's lower layers, which specify such tasks as how information is routed between network stations. The development of low-cost microchips

"It's difficult enough getting 10 manufacturers to work together, let alone 180."

*—Bob Crowder,
DuPont*

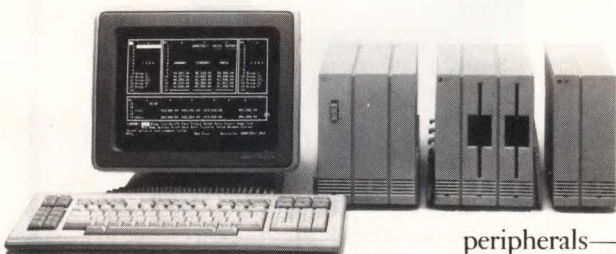
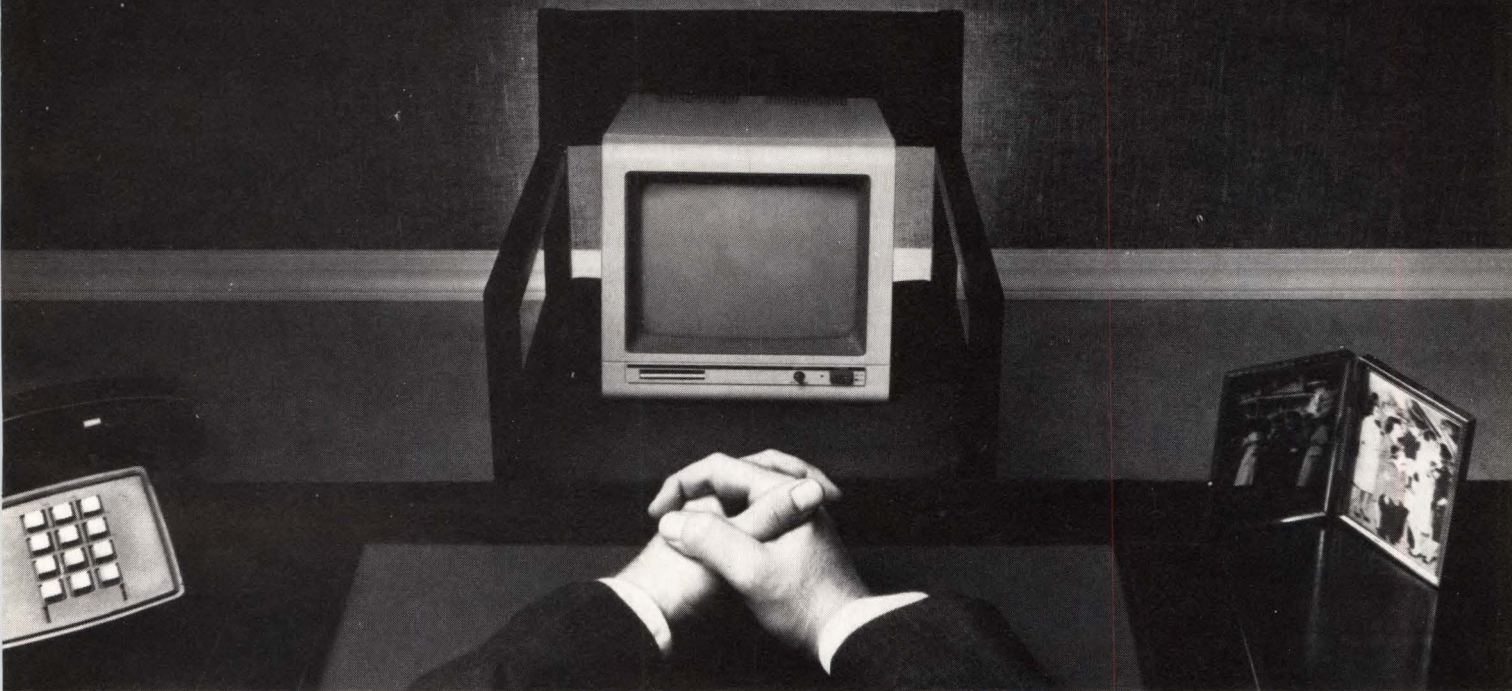
that contain the lower layers of the MAP protocol burned into silicon will greatly speed MAP implementation and reduce product-development costs. Intel and Motorola have planned MAP board-level offerings for the coming year. However, the upper layers, which enable applications software to communicate with the network, have yet to be formulated. "The session layer—the fifth of MAP's seven layers—will require a year of work just to get written," says Paul Masters, Northern Telecom's product manager for local-area networking. "Testing will take another year." In essence, what remains is the basic problem of getting incompatible programmable devices to talk to one another on a network. As one LAN vendor said at the September conference, "You still have to get Cincinnati Milacron to talk to Allen-Bradley [two major programmable-control manufacturers]."

But who will determine whether a network product conforms to the MAP standard? At least a partial answer was provided at a recent user-group meeting, where the Industrial Technology Institute (Ann Arbor), a research facility established by the State of Michigan, volunteered as a conformance-test site.

Although doubters persist, the consensus grows that MAP *must* work. Battered in the marketplace by a stampede of imports, the corporation as a whole, not just technical and research staff, is driving factory automation. Top management has begun

Some vendors are unwilling to give their backing to GM as MAP's standard-bearer.

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to see communications barriers as the fundamental obstacle to achieving automation plans. GM chairman Roger Smith, a prime mover in the MAP effort, says MAP is essential to forestall a chaos of incompatible robots and programmable devices. GM's ardor matches its investment in new technologies. MAP will become the core of the automaker's attempt to curtail incursions by foreign automakers, who hold one quarter of the U.S. market and may grab more if import quotas lapse this spring.

GM hopes to use new manufacturing technologies to match the Japanese cost advantage by the end of the decade. To obtain the necessary expertise, GM bought EDS as well as a stake in five machine-vision manufacturers and an artificial-intelligence software developer. The auto-

maker has also entered a joint venture with Japan's Fanuc Ltd., one of the world's largest robot manufacturers. (Though GM plans to market some of these technologies, GM officials say a MAP network won't be a product.)

Despite doubters, GM's public relations campaign appears to have achieved some early successes. At the September meeting, the 450 participants decided unanimously to continue the user group, selecting at the same time an executive committee.

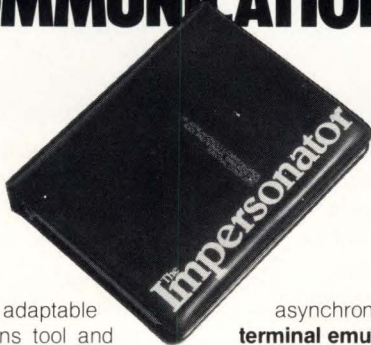
The time has arrived for the kind of cooperative venture that GM proposes. One of the more important developments that may result from the attention that's focused on MAP is the interest in factory communications generated at corporate headquarters. "A year ago, a lot of managers thought local-area networks were

MAP is intended to serve as the great equalizer, making IBM talk to DEC and CAD converse with CAM.

just some kind of real estate agency," says Wayne Hanna, the user-group chairman.

Most significant, a marked change in vendor-user relations is in order, Hanna says. Users need a means to cope with the array of incompatible hardware; vendors need to serve their markets. A standard communications protocol, while meeting the needs of users, will help bridge the vendor-user gap as well. □

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AVOIDING PITFALLS AND COSTLY DETOURS

Project-management programs drive managers toward successful implementation of plans.

by Howard Smallowitz

As many project managers have learned, managing a project is like taking a long and complicated journey. Problems lurk at every exit ramp, turn, and crossroad, and when one arises, it can immobilize you. But project managers, like travelers, don't always do the logical thing. Some panic and get confused; they swerve and turn, track and re-track, and, finally, look for guidance where they can. Signs are meant to help, but when you're lost, they can become part of the confusion itself, turning the journey into a halting and expensive one—or worse, canceling it altogether.

But like woebegone travelers, project managers can do something about their predicament. As more and more project-management software has moved from mainframes to micros, planners and managers of projects ranging from sewer design to software development have turned to project management packages to help them successfully bring projects to fruition. (See "Getting more from your key resources," in the September 15 issue.)

Of course, the planning process itself is often at the root of a project's failure. The worst doesn't just happen. Before a single turn is taken or a single commitment to code is mapped, an unexpected terminus can be waiting in a faulty plan.

In California, for example, a coffee-shop chain had a payroll project; it did not, however, have an adequate plan for implementing it. Rather than plotting a detailed course, management shied from the complexity of the problem by devising what was actually a superficial plan. It assumed that the project would take a year and that it could be completed in two phases. "It wound up requiring three years, five phases, and three times the expense—in this case \$6 million," says Alex Smariga, vice president of POC-it Management Services Inc., of Santa Monica, CA., the vendors of Microman software. By the time the company had two phases and \$2 million behind it, he says, "management couldn't afford to cancel the project."

A project-management tool can't spin gold from unrealistic expectations, too few resources, or poor workmanship, but it can help specify what will happen, who will do it, when it will get done, and how much it will cost. "Project management won't tell you what to put in your plan, but it will help you manage what you do put in," says Jerald Lauer, director of information services for Certified Grocers, a Commerce, CA, grocery wholesaler. If the plan goes awry, the system can help you steer it back on track. It will help you look at your plan, measure



AGEMENT

Photo by Bob Ward

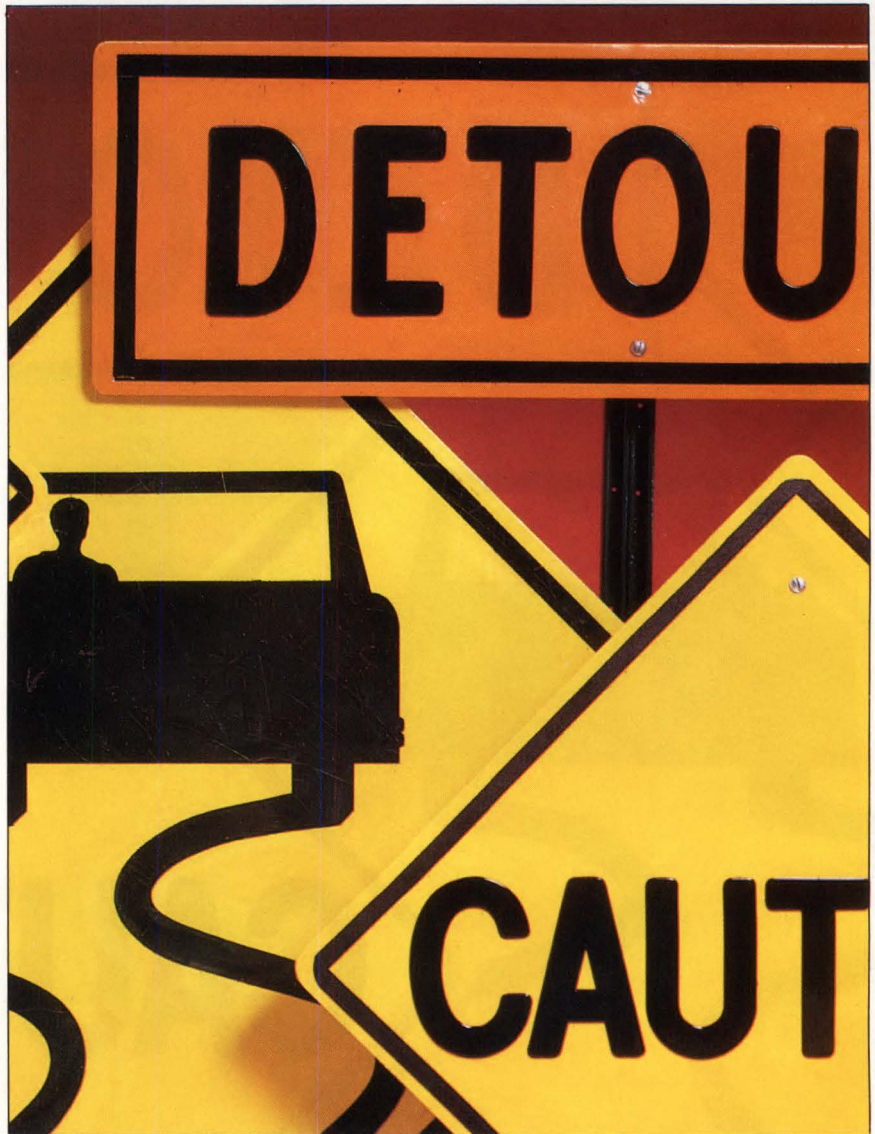


PROJECT MANAGEMENT

your resources against the plan, keep track of your progress, and bring your project to its fruition.

The first step in any project is deciding what needs to be done. At this point project-management systems can be very handy, because the first step can also be the first misstep. "Your most immediate danger is being too general in defining what you have to do," according to Don Salle, a principal with Project Control Management, a San Mateo, CA-based consultancy specializing in computerized project control. "If you get up in the morning and say, 'I'm going to write today,' that's altogether different than saying, 'I'm going to start today by doing an outline for one article. I'll do follow-up interviews for another, and I'll start to write a third,'" says Salle. (If Salle's procedure sounds easy enough, try getting up in the morning and listing the thousands of tasks required to construct a building. And yet, how many managers avoid listing the details of tasks? "Most," says Sally Jacobs, a vice president at POC-it.)

In addition, says Don Salle, "It's not enough just to say, 'I've got to do these tasks.' You have to be able to recognize when steps are inter-related." For instance, during the design of a major sewerage-treatment facility in California, "five different professionals from different design disciplines were independently deciding how the work should be done," says Salle. "When I came in, the work was going in five different directions. A major design review three months later should have uncovered the in-



consistencies and overlap this would have led to. But the participants would have had to go back and either compromise the design or redesign major parts of it, and they were already behind schedule." A project-management system, however, helped find the overlap and helped coordinate the work.

Projects also go awry because the order of individual efforts has not been planned. "When they build in the southeast, they put the roof on in the early stages of construction because it rains so much," notes John

Enyedy, eastern regional vice president of new sales at National Information Systems Inc., Cupertino, CA. "On one project, the roof was put up on one end of the building, but the posts weren't put up on the other end." A project-management tool will obviate problems of that nature; it will keep track of how critical each task is to the schedule, and which have been finished. Without a management-planning system, chances are you will tackle the easiest tasks first, not necessarily the most pressing.

"A schedule is not a schedule until you have the resources to follow it."

"If your project is in trouble and you don't know it, you obviously can't take corrective action."

Finally, some schedules are merely jerry-built; they pay very little attention to time and financial constraints. As Don Salle says, "most companies simply come up with a schedule and say, 'Voila, we've got our schedule.'"

A schedule, however, is not truly a schedule until you are sure that you have the resources to follow it. You may have a plan that is "like using a big stick to kill the little bug or you may wind up using a baseball bat to attack a killer whale," says Scott Carpenter, eastern regional manager of National Information Systems. When all of your resources are placed into a project-management system, they are measured against the tasks that have to be completed. Without a project-management system, you may discover too late that the personnel or equipment assigned to a task is insufficient or will not be available until a week after the project is due to be completed.

In addition, a project-management package can help fight unreasonable deadlines and schedules. "There are times when management gives you an unrealistic deadline," says Lauer. "You can handle that problem in one of two ways. You can say, 'I don't have the resources, and here's the proof of it.' Or, you can say, 'I will do it. But here's what it's going to take to make the project happen.'"

When Salle was allocating resources to the SWOOP project, a major sewer and sewerage-treatment plant in the San Francisco Bay area, he confronted a similar problem. By using a project-management system, he discovered when the peak demands

on labor would occur and was able to make the appropriate adjustments. "We knew then that we had to budget for a certain amount of overtime. We did that ahead of time instead of waiting for the crisis to occur," he says.

If you fail to anticipate possible problems, you pay a high cost in either extra work or in cancellation of work that has been done. If plans fall off track, says Randall Cole, senior information-systems analyst at Federal Express, the package-delivery service headquartered in Memphis, TN, "you may have to hire a contractor to come in and work 24 hours a day to get the project completed on time. Or, you can say, 'We're not going to do it. We simply cannot meet that deadline.' But you'll need management's acceptance, and you've got to be able to show why you are not going to make it. Then, it comes down to pure common sense."

One of the most useful features of most project-management systems is the ability to play "what-if" until you come up with a realistic plan. For one thing, it can be a powerful way for managers who see trouble in the offing to bring their points home to their clients or the brass. Scott Carpenter says that one customer purchased National Information Systems' Vue package because "it had a client that was having difficulty making decisions. We factored the amount of time decision-making would take into the schedule, showing the customer how much waiting for decisions would add to the cost of the project."

Troubleshooting the plan may lead to juggling resources and activities

until they fit one another. "You can plan to do more tasks at the same time," says Carpenter. "Or you can hire more employees, if you have the resources. If you're with a big company that has several projects going on at once, you may decide that you can put one off for a while and devote the resources from it to the problem at hand."

"What-if" analyses will also help you to head off unexpected expansions of the project's original scope. "Sometimes the customer asks us to do work that wasn't there originally," says Jim Kong, a mechanical engineer with General Electric Co., Fairfield, CT, who is working on a major overhaul at the Pilgrim Nuclear Power Plant in Plymouth, MA. "We can plug in the request and see what impact it will have. We can see if the change is possible, if we'll have to extend the project, and, if so, how many resources we'll have to add. Essentially, it's a forecasting tool."

"One of the horror stories in manufacturing is what I refer to as 'creeping scope,'" says William Strowbridge, vice president for management resources at Dataproducts Corp., a Woodland Hills, CA, manufacturer of printers and other peripherals. "You start out with an agreement to do something. But during the life cycle of a system's development, elements are added. It's so easy to say, 'Oh sure, don't worry, I'll take care of that,' because you want to be a nice guy."

"But every time you do that, you add a couple of hours to your project. A project-management system does not give you the opportunity to bury additional tasks. It forces somebody

"Project-control packages can help a busy manager show employees not only what is expected of them, but why."

PROJECT MANAGEMENT

to explain how many hours were spent on each task. Creeping-scope syndrome, which has burned so many project managers, is eliminated."

While implementing a general-ledger system in his own shop, Strowbridge found that the creeping-scope syndrome had affected his plan. Time and resources had been assigned to two unexpected jobs: upgrading the operating system of the computer and implementing a new general-ledger-software release. "I said, 'Wait a minute.' The operating system's upgrade is a separate subject and it requires its own cost justification, schedule, and project plan. The same is true for the new release of the vendor's general-ledger package.

"Without project management we would not have seen those two events get added to the original project, and, as a result, the project would have had an overrun. Some bosses would have said, 'Strowbridge, you said it would take \$100,000 to implement the general ledger, and you've spent \$112,000. Why?' I wouldn't have known."

A project-management system can help to forecast not just how many and how long, but, more importantly, how best. By playing "what if," project leaders can tinker with a plan until it yields the most acceptable combination of time and resources necessary to complete a project—not just by helping them to know, in detail, what must be scheduled, but by adding visibility to their claims. A schedule prepared on the back of an envelope doesn't have quite the impact of a series of automated weekly reports generated by a project-management package.

Honest estimates of how long each task will take are obviously crucial, and project-management packages can help here, too. "In analyzing what causes schedule slippage and cost overruns, the culprit is usually found in the estimating process, not in actual performance," says John Toellner, president of Spectrum International Inc., Culver City, CA, a vendor of the Lifecycle and Spectrum III project-management systems. "That's not to say that there isn't some bad performance going on out there. But when you see projects that are a year late and cost twice as much as they're supposed to, the problem generally is lousy estimating, which sometimes means that numbers have just been grabbed out of the air."

Says William Strowbridge, "You can't hide your sins when every Monday morning there's a report on your desk [and everyone else's] comparing your performance to your schedule." Under such circumstances, project managers rapidly become better estimators. As a result, plans become more trustworthy.

Carpenter admits, however, what anyone who has ever planned so much as a trip to the grocery store already knows: "In life, things never go according to plan." The proper management tool, he adds, tells project managers where they stand relative to where they should be, and it helps managers devise ways to correct deviations.

If your project is in trouble and you don't know it, you obviously can't take corrective actions. The feedback that a project-management system provides is essential to keeping a

project under control. "You're able to get answers to problems as they arise," says Salle. "You don't have to wait a week or two to find out that you made some decisions that are costly and from which you can't recover."

Projects can careen out of control frequently, says Alex Smariga of POC-it Management Services, "We have a payroll-accounting system that we're implementing right now that goes off schedule about once every two weeks," he says. "All I do is get together with the project manager, and we tweak the schedule here and there and reassign a few people, and we're back on track for the next couple of weeks."

The same features of a project-management tool that allow managers to ask "what if" in the planning stages are invaluable when the project is underway. Many of these problems have trouble hiding from the light of a project-management system. Says William Strowbridge, "A good system won't let you bury your sins forever, and you won't be able to fake your reports. It's like writing a check today and running to the bank tomorrow to put some money in to cover it. Eventually the smoke clears and what you have been doing becomes very obvious."

In fact, says POC-it's Sally Jacobs, "One manager I know was quite upset when he found that our Microman system was being installed. All of a sudden the manager saw that the project delays weren't justified, and that his mismanagement would be there for everyone else to see, too." Such managers, says Strowbridge, "are the ones you want to smoke out anyway."

Project-management software can help managers anticipate and allow for other processes that might unexpectedly knock chunks of time out of a schedule. Quality-assurance reviews, for instance, can be regularly planned. "We once did a conversion from a Honeywell to an IBM mainframe," says Alex Smariga. "We

"We didn't want to wait a year to make sure that we were successful. So we built a schedule with two-month checkpoints."
—Smariga, POC-it

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PROJECT MANAGEMENT

didn't want to take a year and wait until the end of that period to make sure that we were successful. So we built a schedule that provided absolute checkpoints at two-month intervals."

By not scheduling regular reviews, many managers lose the ability to reassess decisions. "They just keep plowing ahead," says Strowbridge. "Then, several hundred thousand or a million dollars later, they reevaluate the cost and have to abort the project. That sort of disaster causes vice presidents and directors of systems and programming to start revising their resumes."

Most management experts agree that if you know what the problems are and you know about them in time, you can usually take some kind of action. "There are little signposts along the way to alert you to critical stages," says Linda G. Worobow, vice president for marketing at Planning Control International, Tustin, CA, vendors of the Easytrak project-control package. Says John Toellner, "The key to project control is seeing the red flags." Without a project-management package, he says, the red flags unfurl on the day the project is supposed to be finished.

Such "illumination" is as crucial to keeping a project on schedule as it is in creating the schedule. Simply detailing what is expected of each employee on the project team and when it's due can keep a project on course. "I fly a lot," says Toellner, "and I always feel better knowing that the pilot sitting in the cockpit has a checklist to follow before takeoff. Even though he or she may have 25 years of experience doing the same

things over and over, it's very easy to forget a step." During planning and estimating stages of a project, a management package helps you identify, in checklist fashion, all of the tasks the project team is supposed to do, so you have a more organized effort."

Setting up a checklist, however, is only the beginning. Project managers must also publish the numbers so that employees know what has got to be done. By graphically illustrating where each assignment fits into the whole project, the reports generated by many project-control packages can help a busy manager show employees not only what is expected of them, but why. "You can give a person a targeted report with what he or she is responsible for, adding a note about which tasks are going to be affected by delays," says Massimo Grimaldi, president of Strategic Software Planning Corp., Cambridge, MA.

If an employee has never performed a task before, if the staff has not been told exactly what to do, the problems multiply. "Typically, one team member thinks he or she knows, but no one else does," says William Strowbridge. "Unclear work assignments and vague objectives can cause a great deal of confusion and milling about on a project. One of the reasons for project failure is that employees don't know what they're supposed to do."

Many of the problems that gnaw at a project's success, however, are far too insidious to be caught in a quality review or schedule revision. And they are hard to locate before a screaming phone call comes from the budget office or end user to announce it. "Many projects fail because of human error and organiza-

"Regular reviews help managers to reassess their decisions."

tional problems—not necessarily faulty planning," says William L. Harrison, an associate professor of management science at Oregon State University's College of Business (Corvallis).

These problems are usually issues of style and presentation for project managers and their bosses to consider. There is, for instance, no faster way to destroy a schedule than by making the professionals who have to live by it feel that a plan has been arbitrarily foisted on them. Most employees prefer knowing what is expected of them so they can gauge how much effort they should exert on their assigned tasks. If they perceive that a plan is too controlled or bureaucratic, resistance will build.

Take a software-development project, for example. "In an environment of unrealistic expectations, especially an arbitrary completion date, the incentive is very strong to dump all management techniques and run for the coding path," says John Toellner. "You don't go out and capture user requirements and you don't do a decent design, because you're anxious to get some programs written to get the sponsor off of your back. That process is a great destroyer of quality and credibility in the data-processing department."

If a plan puts that kind of pressure on a staff, says William Strowbridge, "employees will start to modify, causing confusion, and you get into a never-ending hole that sucks up a lot of money and resources."

Strowbridge likes to refer to an expression from his days with IBM: wild ducks flying in formation. "Systems analysts are cre-

(Continued on page 114)

"A project-management system can help to forecast not just how many and how long, but, more importantly, how best."

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(Continued from page 110)

ative by nature," he says. "They'll tolerate structure. But, when the methodology and details, forms, and paperwork slow an analyst's ability to design and write code, you've introduced something very damaging into the attitude of the organization."

Strowbridge did some consulting with a large food-service vendor in the San Francisco Bay area. The corporation had purchased three different project-control methodologies. Each met with the resistance of part of the group. "It was a standoff," says Strowbridge. "They said, 'You either

"The first step can also be the first misstep."

get something else in here, or we're going to leave.' The company must have spent \$300,000 on those methodologies, and all three were sitting on a shelf. You must create an environment that encourages the wild duck to think that it's still a free spirit."

How? Use a project-management package that is not a project in itself. "A package must be fully functional,"

says William L. Harrison, "or it will be abandoned, because it's not doing what needs to be done. But it also has to be extremely easy to use."

"A project-management system that's overly bureaucratic just won't be used. In many instances, users either didn't trust a computerized system or the system was too hard to use, so they subtly sabotaged it. They went through the motions of using it, but the real work was done on index cards or on a chart on the back of a door. If it's easier not to use a project management package, they'll say, 'To hell with it.'" (Continued on page 116)

PROJECT-MANAGEMENT SOFTWARE

Vendor	Package	Requirements	Price	Circle
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ADP Network Svcs. (313) 769-6800	Apecs/8000	Unix-based micros	\$2,000 to \$9,000/month	477
	Apecs	Supermicros under Unix	Supermicros/ \$65,000	
AGS Mgt. Syst. (215) 265-1550	Pac Micro	IBM PC and compatible	\$990	478
AHA (408) 475-8705	PMS-II	Micros under CP/M-80, CP/M-86, MP/M-80, or MS-DOS, or Wang and DEC versions of DOS operating system; IBM PC, TI PC	\$1,295	479
	RMS-II Pertmaster	Same systems IBM PC, micros under MS-DOS or CP/M	\$995 \$695 to \$895	
Alpha Software (617) 229-2924	The Executive Package	IBM PC, Compaq	\$145	480
American Computer Grp. (617) 437-1100	Quickplan	IBM PC and PC XT	\$7,727	481
A+ Software (315) 685-6918	Gantt-it	IBM PC, PC XT, and compatibles running A+'s Under-control	\$195	482
Apple Computer (408) 996-1010	Lisa Integrated Package	Apple Lisa	\$8,190/software & hardware \$1,195/software only	483
Applied Business Tech. (212) 219-8945	Project Manager Workbench	IBM PC and compatibles	\$1,150	484
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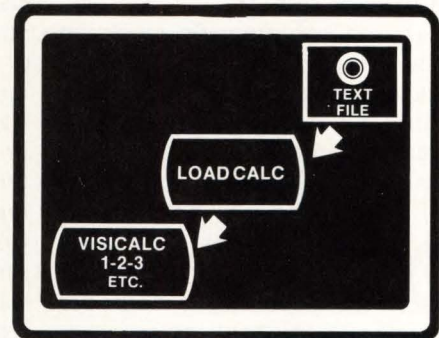
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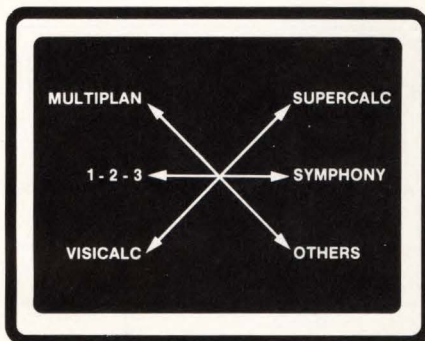
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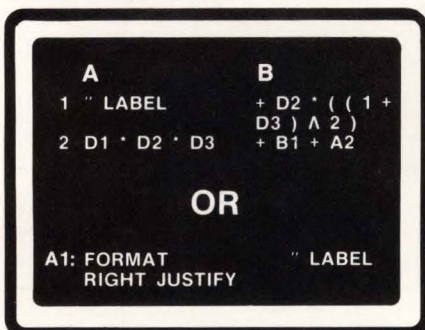
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(Continued from page 114)

Harrison recommends involving the managers who will use a project-management package in its selection. "Train them early and get them involved in selecting and using the system so they'll have a personal interest in making it work," he says.

Once the system has been picked, reports generated, and assignments and deadlines are clear and tolerable to all, project lead-

ers can use a management package as an electronic string around the finger, or a nagging conscience, as the case might be. When POC-It's Alex Smariga was planning a \$3.7 million data-processing center in Chicago, he found himself avoiding the purchasing of office furniture because the task would be unpleasant. "There were some personality issues that we didn't want to deal with," he says. "But each week the system told us, 'This is over

budget and the timing's off.' It was a constant reminder."

Of course, the ultimate human issue in project management is an insistence on quality. Managers must complete each step of the project without leaving questions unanswered and problems unsolved. In *Controlling Software Projects* (Yourdon Press, 1982) Tom DeMarco tells of his days as a design instructor: "I was presenting a seminar to a project

PROJECT-MANAGEMENT SOFTWARE

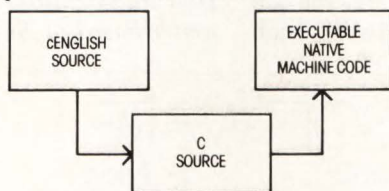
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SAMPLE cENGLISH PROGRAM

```

IDENTIFICATIONS
MODULE: Mininame
AUTHOR: bcs
DATE: 8/29/84
REMARKS: Sample cENGLISH program that adds first
names to a file
END IDENTIFICATIONS

GLOBALS
FIXED LENGTH 1 ans
FIXED LENGTH 15 Fname
END GLOBALS

MAIN PROGRAM
BEGIN
  CLEAR SCREEN
  SET ECHO OFF

  USE "NAMES"
  VIEW BY "ID_FNAME" ASCENDING

  AT 23,1 SAY "Add a record? Y or N"
  AT 23,25 ENTER ans USING "!"

  WHILE ans EQ "Y"
    CLEAR GETS
    AT 6,1 SAY "Enter first name"
    AT 6,20 GET Fname
    READ SCREEN

    INSERT
      Fname = Fname
    END INSERT

    AT 12,10 SAY "Welcome to cENGLISH," & Fname
    WAIT
    AT 14,10 SAY "HIT ANY KEY TO CONTINUE"
    STORE " " TO ans
    AT 23,1 SAY "Add another record? Y or N"
    AT 23,30 ENTER ans USING "!"
    CLEAR ROW 1 THRU 23

  END WHILE

  AT 12,10 SAY "That's all for now!"
  UNUSE "NAMES"
  SET ECHO ON

END PROGRAM
  
```

**I'd like to know more about cENGLISH.
Please send further information.**

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 Telex 516315 Phone (312) 944-4510
 In Canada: cLINE Canada, Inc. Complexe La Laurentienne,
 425 St. Amable, Suite 105, Quebec, Canada G1R5E4
 Phone (418) 524-4641

A4Q84

PROJECT MANAGEMENT

team on the West Coast. There were about 20 people in the class, including two hardware types. These two had had only a single programming experience between them—a piece of software they had designed together some years before. That program was still alive and well and had earned them

considerable renown; throughout its years of use, no one had ever found a bug in it. I asked one of them how he explained this phenomenal success, an apparently bug-free delivery on the first try. 'Well,' he said, 'we didn't know bugs were allowed.'" If you can find someone who can work such

magic—keep him or her; you may have the best system for keeping a project out of trouble. If not, a good project-management package may be the next best thing. □

Howard Smallowitz is a free-lance writer based in New York City.

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SUCCESS AT AN EARLY AGE



THE ECSTASIES (AND THE AGONIES) OF THE FAST TRACK

What's it like to be the focus of jealousy and resentment, to be regularly haunted with the sinking feeling that this time you're really in over your head? For the whiz kid, the exhilaration of the challenge is worth any sacrifice.

by Martin Lasden, Western Editor

The corporate fast-tracker seeks this kind of excitement and danger—the wonderkid who, by a combination of luck and skill, form and substance—gets swept up in a wild skyride to the executive suite. For most, this sort of life doesn't make much sense. And yet, as fast-trackers say, once you're on the track, you never want to get off.

Thirty-four-year-old Tom Buchsbaum has chosen this frantic lifestyle. After nine promotions within 10 years, he's full vice president in charge of information systems at Zenith Radio Corp., number 246 among the Fortune 500. "It's probably a chronic disorder in my personality," jokes Buchsbaum, "but I just don't feel comfortable unless I'm in over my head."

There are drawbacks to such rapid success. Mark Smith, 33, with five promotions in five years, is now vice president of strategic planning at the Chicago Board of Options Exchange. "There's no doubt about it," he says, "you do take an awful lot of shots from your peers. And if there's any blame to be had, they'll make sure you get your share of it."

Take fast-trackers like Kathleen Cook, 39, of Associated Dry Goods Corp., New York. She started as a programmer in 1973 and moved far enough and fast enough to become a

vice president of information systems within seven years. "While it's considerably damaged my personal life, I would probably do it all over again," says Cook. "If I hadn't taken risks, I wouldn't be where I am today. And I'd only have a different set of frustrations to contend with."

As Joseph Epstein notes in *Ambition: The Secret Passion* (E. P. Dutton, 1980), the word "ambition" is like a Rorschach inkblot: "... define it, and you instantly reveal a great deal about yourself." Following this line of reasoning, it would seem that those who cast aspersions upon fast-trackers reveal much about themselves. Who can claim (with a clear conscience) that they have never borne resentment toward the "cocky kids," "self-serving grandstanders," and "arrogant prima donnas" who threaten to overshadow us?

Yet, sour grapes notwithstanding, when critically studying fast-trackers and the environment that produces them, serious issues come to light. For example, fiercely ambitious people often do without a happy family life or close friends. "I don't dismiss the possibility that the reason I've dedicated so much to my career is because I'm not very good at working out personal issues," says John McNeel. At the age of 35, McNeel left data processing to become president of Plan-

SUCCESS AT AN EARLY AGE

metrics, a Chicago-based software and consulting company. He has already gone through one divorce, and, at this writing, a second is pending. "The fast track," he adds, "makes a good refuge."

Besides damaging family life, the fast track can destroy the very career it helped to build. When your pressures, responsibilities, and expectations expand at a dizzying pace, there is a temptation to flirt with disaster. John Kotter, professor of organizational behavior at Harvard University, draws a most graphic analogy: "If you have an accident when you're driving 125 mph in a high-performance car, the consequences are going to be much more serious than if you're driving the family station wagon at 40 mph."

Kotter describes the scenario for disaster: Young and ambitious, you join a company, perform reasonably well, and get promoted. With a combination of energy and intellect, your work improves, attracting wide notice from higher-ups who detect a fast-track kid on the horizon. A series of

frenetically paced promotions follows. Each time it gets a little more difficult to perform: You work a little harder only to get thrust into a new situation before you've had time to learn anything from your previous assignment.

While you're unable to do a truly outstanding job at each of these pit stops, in terms of short-term performance goals, you still manage to look good, until the day the biggest challenge of your career comes along. You don't have the experience, but the powers that be can't find anyone more competent. So they give the assignment to you, and you accept. But this time, you're in over your head, and everyone is shocked when you fail.

Not all fast-trackers end up taking such a drastic nosedive. In fact, says Professor Kotter, relatively few do. Many more are able to push on for years without confronting disaster. Still others manage to learn as fast as they zoom along, going on to become truly great executives.

However, whether an individual climber makes it or not, perhaps the

most troubling aspect of the fast track is the attendant pressures that prohibit a clearly outlined career plan. With a promotion every year, every three months, every six months—how much time is there to even consider whether you're pursuing a successful or a destructive path? On the fast track, aiming for the next rung up becomes a matter of reflex rather than reflection.

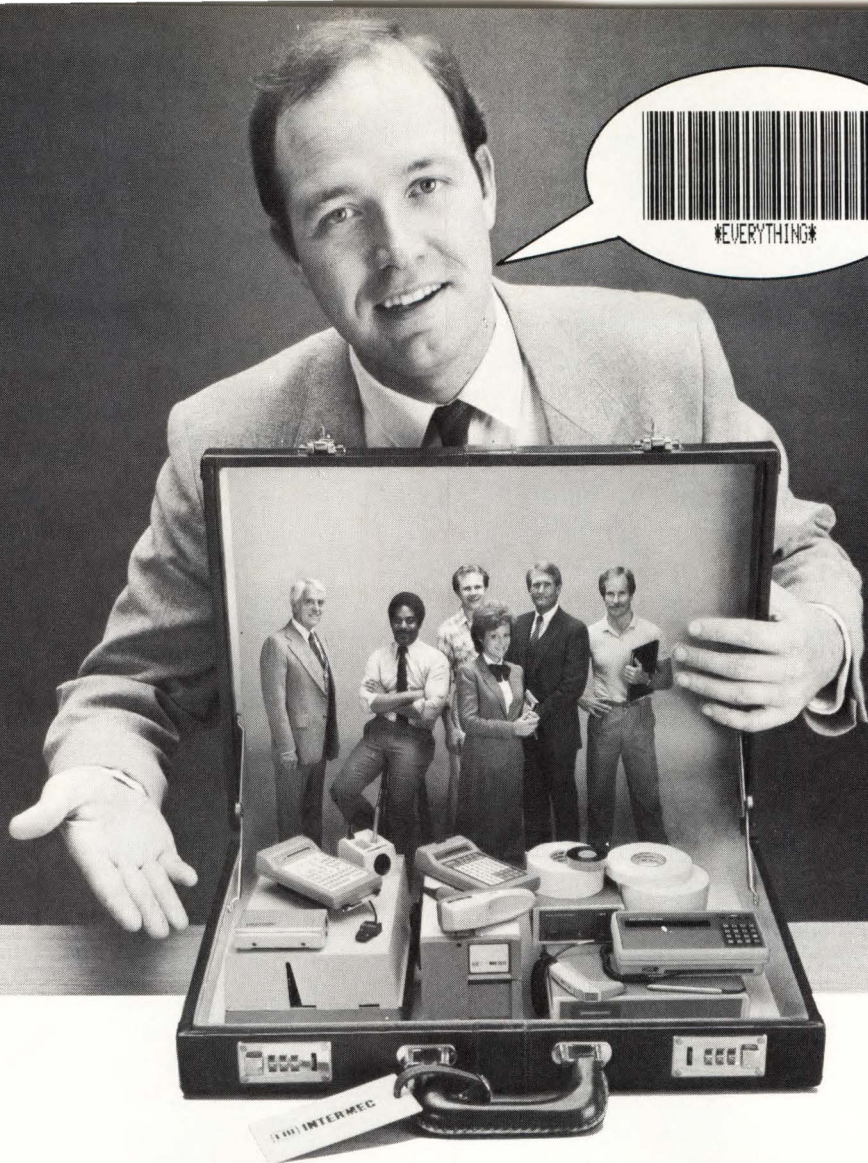
This mentality works against the ultimate interests of the individual as well as of the organization. In a provocative paper, "Warning: The fast track may be hazardous to organizational health," an organizational behaviorist, Professor Paul Thompson of Brigham Young University, with two associates, Kate Kirkham and Joan Dixon, elaborates on seven major concerns:

- **Overemphasis on short-term results:** Because fast-trackers hold a particular position for a short time, the focus is on quick payoff at the possible expense of more long-term objectives. The study cites: "If results cannot be achieved in less than 24 months, a [fast-track] manager is reluctant to start the program because he or she will not get credit for the completed work."
- **Lack of continuity:** Forever on the move, managers find it difficult to ensure continuity. First, there is little time to train successors. Second, there's a natural tendency to make your mark by starting new initiatives rather than completing old ones.
- **Managers tend to lose touch with technical work:** According to the study, by moving out of their technical disciplines too quickly, fast movers deny themselves the opportunity to establish a solid base of expertise that would serve as an important building block toward their futures.
- **Means-ends shift:** When high mobility becomes an end in itself, a vicious cycle can develop. The organization feels compelled to keep

(Continued on page 126)



Tom Lewis, 32, shown here with President Reagan, recently completed an assignment at the White House as head of automated systems.



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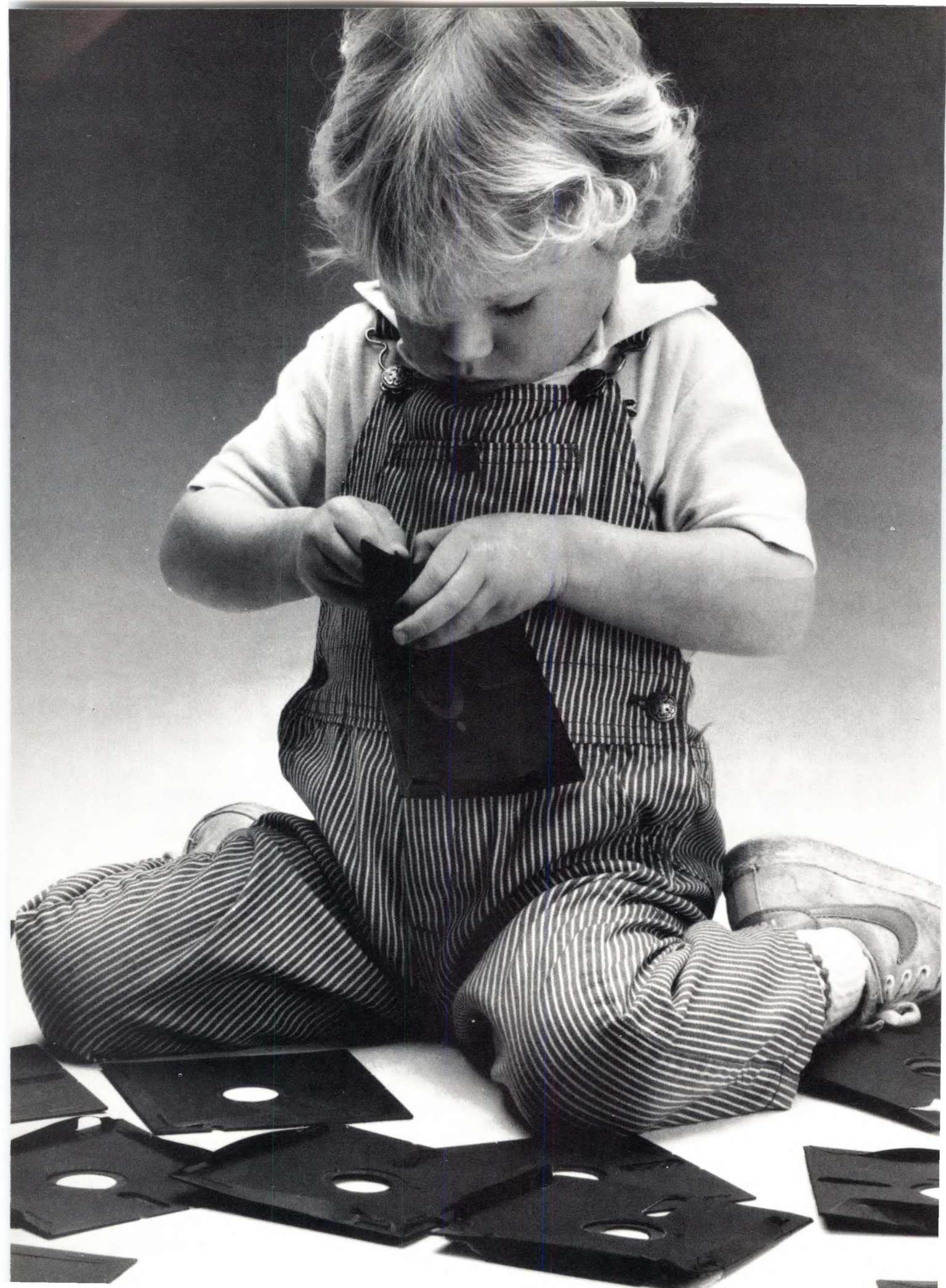


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SUCCESS AT AN EARLY AGE

(Continued from page 122)

offering promotions for fear of losing their hotshots, and the hotshots feel compelled to keep accepting for fear of losing their status.

- Ninety-five percent of the employees are neglected: The study cites, "The tendency of the fast track is to emphasize the careers of a few star performers while the majority of managers and employees are largely ignored. This approach puts a tremendous amount of pressure on fast-track managers while virtually bypassing the talents and resources of the people they manage."

- Concern for visibility: Fast-trackers must not only perform well—they must also ensure that their superiors are well aware of their latest feats.

From the organizations' perspective, however, this need for excessive attention may constitute an energy drain. "So much time is spent on obtaining visibility that it is lowering the productivity of the managers, thus reducing organizational effectiveness," according to the study.

- Burnout: Even if the fast tracker manages to keep head above water, this frenetic pace can result in a major case of burnout. Then many soul-searching questions regarding purpose and intent, long held at bay, may suddenly precipitate a major crisis of will.

Researcher Peter Graves has found further cause for concern in his book, *Work, Family and Career* (Praeger, 1980). Distinguish-

ing between what he calls successful and effective managers, Graves finds that effective managers (as evaluated by peers and subordinates), who concentrate on developing subordinates, building teams, and working toward organizational effectiveness, do not rise nearly as fast as managers who concentrate on short-term results and rely on such personal qualities as verbal skills and reasoning ability to advance themselves.

Successful fast-trackers express an overriding sense of satisfaction over where they've been, where they are, and where they think they're going. Yet, pointed questions reveal that certain conflicts, tradeoffs, and less-than-ideal resolutions are unpleasant byproducts of this type of career. Says

YOU, TOO, CAN BE A FAST-TRACKER

Those who chart the path of a fast-tracker may be filled with awe and envy at the speed with which this dynamo ascends the corporate ladder. This path to success is glamorous, with quick payoffs, but it's not for everyone. But those who enjoy family life or are not quite as aggressive can still enjoy promotions and recognition.

"I believe there are two kinds of fast-trackers," says Dr. Cheryl Lieberman, senior projects director of Goodmeasure Inc. (Cambridge, MA), a management consultancy. "Some people—a lucky few—will be successful no matter where they work or what they do," she continues, "but most of us aren't like that. We succeed where we can best exhibit our talents."

In other words, some are born fast-trackers, while others are self-made. If you fall into the second category, to acquire a position of power you'll need two building blocks: activities and alliances, says Lieberman.

The first "activity" the self-made

fast-tracker needs is *discretion*. There must be some opportunity at work to express one's creativity. Denied this freedom, an employee merely churns out work, like an automaton.

Without *visibility*, any budding talent will go to waste. Your superiors must be aware that you are successfully using your discretionary capabilities. As Lieberman says, if you're tucked away in a broom closet, no one will know what a great job you're doing. In other words, if you helped to write a first-rate report, your name should be included on it.

Last, your work must have *relevance*. If you're always handed the drudge work that gets shifted to the back of the file cabinet, your skills will go unnoticed. To achieve power, you must strive to work on projects that are vital to the organization.

Alliances are multidirectional networks (as opposed to the mentor-protege relationship), involving sponsors (superiors), peers, and

subordinates. A sponsor, says Dr. Lieberman, can supply information, counsel, endorsements (recommendations for promotion), and backup on projects. A sponsor also emits what is known as "reflective status." For example, if you're seen strolling through the office with the vice president, it can't hurt your image.

"What most people don't realize," says Lieberman, "is that one's peers are equally capable of helping you up the career ladder." Lieberman suggests new employees seek out more experienced co-workers who can offer job tips and insight into the corporate structure.

Subordinates, too, can be a vital resource. "In order to get a job done—to push through innovative ideas—it's critical for a manager to have empowered subordinates," says Lieberman. She stresses that it is possible to share knowledge without losing authority: "Good Managers groom promising employees who will be able to fill their shoes when the next promotion comes."

— Donna Jackel

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SUCCESS AT AN EARLY AGE

Tom Buchsbaum: "I feel that there's pressure on me to make every year great, and I guess there are tradeoffs with that. Every year, I feel pressure to do more for less in order to achieve short-term budget goals."

Robert Laskey of Dart & Kraft Industries (Chicago) moved from manager of internal auditing to vice president of information systems within three years. The 41-year-old shares Buchsbaum's concerns. "Sometimes when you're in a rush to get ahead, the balance shifts to the short term, and you don't pay close attention to the long-term implications," he says.

The whiz kid is often called into a project-gone-wrong to try and work some fast "magic." Laskey feels he was often put in the position of a "fire fighter"—rushing in to clean up someone else's mess. When confronted with such a situation, Laskey found himself "patching up the patient rather than trying to figure out where the patient will ultimately go."

Paradoxically, data-processing departments can avoid this path precisely because dp is not considered to be the ideal launchpad to the top. This is due to the widely recognized gap between dp management and general management. While not insuperable (as more and more executives are proving), it nevertheless acts as a decelerator.

So while the dp-er may race through the corporate hierarchy, there is a greater tendency to see his or her movements restricted within one department, and once at the top of the field, to stay there longer. For instance, one fast-tracker at a Midwest manufacturer has been rising within dp. Because of this, any negative actions he takes will most likely haunt him further down the road. While this threat may not fit the fast-track mentality, a long-term position can insure continuity, in-depth expertise, and organizational effectiveness—the very sort of accomplishments fast-trackers fail to provide.



Lynne Kershaw, 33, a vice president of the Shawmut Bank of Boston, believes a wide variety of job experiences is preferable.

With these tremendous risks and pressures, what motivates the driven fast-tracker? The most obvious answers are money and power. But there are other, more subtle, reasons. Tom Lewis, 32, had a meteoric rise in private industry. He recently completed an assignment as head of automated systems at the White House. Lewis attributes his breathless pace, at least in part, to fear. "I watched my father lose everything he had three times," he says. "We lived in a row house in Philadelphia; throughout most of my youth I was relatively poor. It was pretty tough. I was running scared."

Then there's the boredom that sets in when a fast-tracker's been in one job a little too long. Buchsbaum laughs when he says that he doesn't feel happy unless he's in over his head, but it may not be far from the truth. The exhilaration that often accompanies jumping into a sink-or-swim situation can become addictive. Dr. Cheryl Lieberman, senior project director of Goodmeasure Inc. (Cambridge, MA), a management-consultant firm, says, "The part that keeps fast-trackers going is the challenge—the limitless opportunities."

While hopping from one tough

project to another in pursuit of new challenges can be exciting, critical lessons will be neglected. Fast-trackers themselves aren't fazed by this prospect. Lynne Kershaw, for example, a 33-year-old vice president in charge of all technical systems and network services at the Shawmut Bank in Boston, strongly believes that the benefits of a wide variety of work experiences far outweigh the advantages of remaining at one job for a long time.

Having moved through a number of companies and jobs, Kershaw says, "I've seen it all. I'm the only one here that's dealt with fire, flood, smoke, terrorists, and internal and external sabotage." Kershaw adds, "In dp there are no long-term fights. So, what are you supposed to do—wait around 10 years for something to happen?"

Eight years ago Kershaw began her career as a junior programmer. Since then, she has already overshot her goal of becoming vice president by the age of 40. "I plan to be a senior vice president within three or four years," she says now.

However prestigious the position, there will come a point when the rocket ride will come to an end, and the fast-tracker will have to settle into his or her plateau. For the rising star who's driven by unceasing impatience and hooked on the adrenaline rush that comes with crises, this can be the most difficult assignment of all.

Several years ago at Dart & Kraft, Laskey met with difficulty when he got off the fast track to become the conglomerate's vice president of information systems. "The rocket ride can't last forever," he says. On the positive side, Laskey finds that he has more time to plot his future. He's also found that there's less chance of burn-out and more time for family. On the negative side, Laskey admits he misses the excitement.

So which track is preferable? "I

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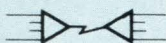
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Still, there must be a better way to get ahead than piling one promotion on another merely to fill some vacuum at the top. Professor Kotter of Har-

Kotter recommends that fast-trackers periodically sit down and reflect upon where they're going and what skills they need to get there. Then, and this is critically important,

It is evident that a discrepancy exists between what it takes to be a fast riser and what it takes to be a mature executive. But for some, fast-tracking is inevitable. Kotter notes that destined leaders, by necessity, must move at a faster clip. "In a Fortune 500 industrial, there may be 25 to 30 levels to move through," he says. "If you're satisfied with an incremental promotion every three years, you won't make it to the top until you're 350 years old!" For these superachievers, reaching the top—striving to be the best, the fastest, the youngest in their fields—comes first and foremost. As Robert Laskey says, "There's energy derived from riding on the rocket—the adrenaline creates a certain euphoria." □

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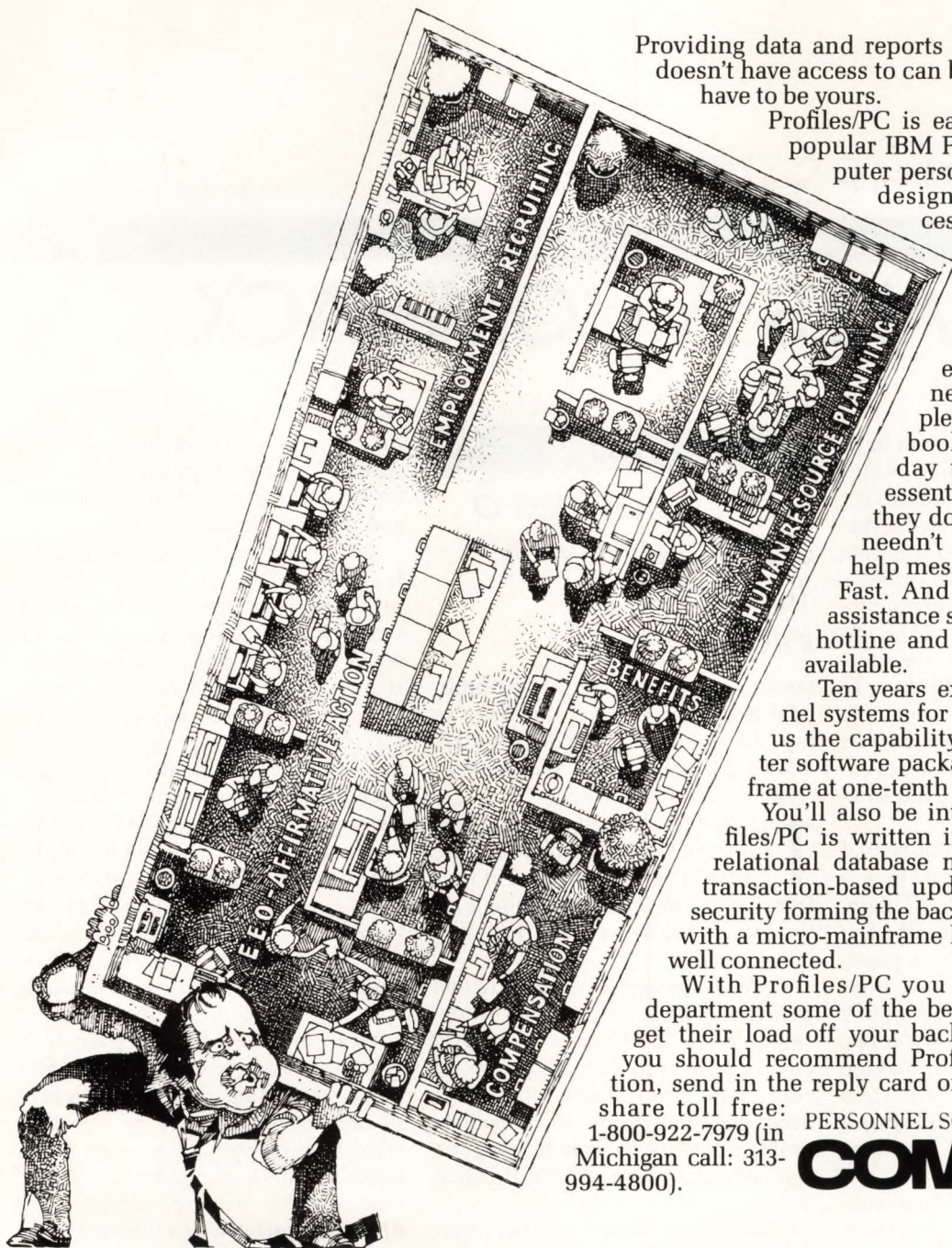
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TAPE MAKES A COMEBACK

As the use of computers in business becomes more widespread, business databases get bigger and data-storage media become more important. Information that used to be stored in file cabinets now must be housed on magnetic-storage media. To compound the importance of storage media, the user-friendly software that helped make computers more accessible not only requires more storage space than its less-friendly ancestors but also encourages users to add more information to the data bank.

An overlooked but critical aspect of maintaining an electronic database is making backup copies of all data. Electronically stored data can be lost in a variety of ways, from a power blackout to everyday disk mishandling to the malicious actions of a disgruntled or dishonest employee. Failure to protect data by making backup copies can be devastating and can mean the difference between a disruption in work and a complete work stoppage.

There are three types of magnetic-storage media used for backups: floppy disks, removable-cartridge Winchester disks, and tape. Floppies are inconvenient because they have a limited storage capacity. Removable-cartridge Winchesters have the capacity, but not the reliability. Also, most floppies and Winchesters provide full-image backup, which can cause a high number of data dropouts because their defects don't correspond to those on the original disk.

Tape drives, on the other hand, have a high capacity, are reliable, and don't have the full-image dropout that plagues floppies and Winchesters. Tape provides a convenient way to archive information not needed daily. Businesses looking for solu-

"Tape provides a convenient way to archive information."

tions to long-term data-storage problems are turning more and more to tape drives, more than a decade after disks replaced tape as the primary medium for data storage.

There are five criteria for choosing an office computer tape drive. Their weighting will vary from office to office, depending on the size of the system and how it is being used.

Cost: A budget is a budget, and cost is usually a major factor in deciding what tape-storage system to buy. Users need to examine their short-, medium-, and long-range needs. A quick fix to an immediate problem can cost more in the long run if it makes later expansion difficult or costly.

Size: Tape comes in two sizes: $\frac{1}{2}$ -inch and $\frac{1}{4}$ -inch. Half-inch tape has been around since the early days of the computer industry, while $\frac{1}{4}$ -inch is a newcomer that has only become prominent in the past few years. Because $\frac{1}{4}$ -inch tape is more compact and less expensive, it is popular in office systems, particularly smaller systems costing less than \$50,000.

Half-inch tape is available in 7-inch, $8\frac{1}{2}$ -inch, and $10\frac{1}{2}$ -inch reel and cartridge sizes. Quarter-inch tape is available in 8-inch and $5\frac{1}{4}$ -inch cartridge sizes.

Performance: The data-transfer rates for tape drives have increased markedly over the years. These improvements come from both higher

bit densities and increased tape speeds. However, tape drives that offer higher speeds are more complex and more expensive.

As in other areas of computer performance, the cost/performance ratio for tape drives has improved steadily. Streaming-tape drives, in which the tape runs continuously instead of starting and stopping file by file, are faster and less complex than start/stop drives but data access is less convenient. Tape drives that use cache technology combine the features of start/stop drives and streaming-tape drives. The high-speed memory in a cache drive emulates a start/stop drive as data are transferred from the computer to the drive's memory, and the drive transfers the data to tape at the high speeds of a streaming-tape drive.

Operator convenience: Even if a tape drive works like a dream and has a low price tag, an inconveniently placed tape-access bay or an awkward tape-threading path can make using the drive a nightmare. Those who already use a particular tape drive can offer more information.

Standardization: Because IBM put its full weight behind $\frac{1}{2}$ -inch tape in the early days of the computer industry, $\frac{1}{2}$ -inch tape is now more prevalent than $\frac{1}{4}$ -inch tape. Half-inch tape has three standard formats: 800 bits per inch (bpi), 1,600 bpi, and 6,250 bpi. Originally developed for reel-to-reel tape drives, these standard formats have been carried over to cartridge drives. In recent years, a fourth format, 3,200 bpi, has gained acceptance among $\frac{1}{2}$ -inch cartridge users.

The situation is less settled with $\frac{1}{4}$ -inch tape in regard to both tape format and the drive-computer interface. Standards are evolving, but they

(Continued on page 128H)

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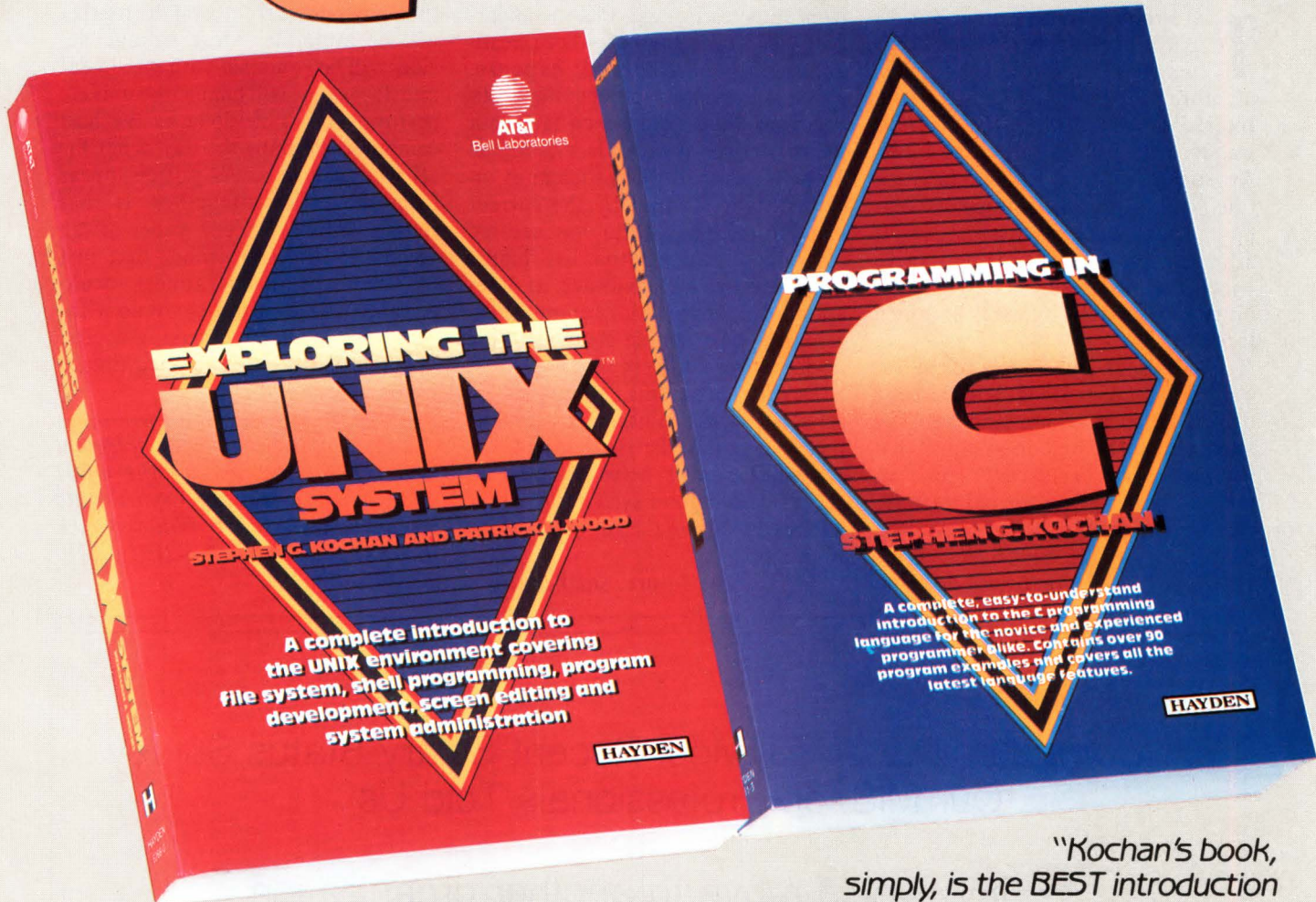
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TAPE DRIVES IN OA

(Continued from page 128D)

have not yet been universally accepted. Buyers should be aware of this because it limits equipment choices and adds to installation costs.

To eliminate tape-format incompatibility, Cipher Data Products has joined with other manufacturers to form the Quarter-inch Interface Committee (QIC). QIC's standards have been submitted to the American National Standards Institute (ANSI) and the European Computer Manufacturers Association. If adopted, the standards will give $\frac{1}{4}$ -inch-tape users the same compatibility now enjoyed by users of $\frac{1}{2}$ -inch tape.

There is an ANSI standard for computer control of $\frac{1}{4}$ -inch tape drives, the SCSI Command Set. The standard works well in systems that use tape drives exclusively. However, the standard's hardware and software are incompatible with systems that have floppy disks. Since most users that buy $\frac{1}{4}$ -inch tape drives do so to

"Data-transfer rates for tape drives have increased markedly."

upgrade their backup-storage system from floppies to tape, this incompatibility can be a source of both headaches and considerable expense. There is a similar problem in upgrading from floppies to $\frac{1}{2}$ -inch tape, but the move itself is much less common. To help eliminate the problem of incompatibility caused by the current standard, Cipher Data has created cartridge-tape drives that use floppy-disk interfacing hardware and respond to floppy-disk commands, requiring only simple changes in the device-driver software.

Despite problems, standards do serve a purpose to users. A user who purchases a tape drive adhering to accepted standards helps ensure that the office computer system can evolve as needs change and technology improves.

In the near future, smaller drives

capable of storing more information than any unit currently on the market will be available. More storage devices will be equipped with intelligent interfaces that will enable the units to perform tasks now done by the host computer. Perhaps the day is not far off when file cabinets will disappear from the office altogether. If that sounds unlikely in our paper-driven business world, remember that just 25 years ago it was almost inconceivable that an office could do without carbon paper for making copies. Where are all those smudged fingerprints today? □

Larry Hemmerich is vice president and general manager of the OEM Marketing Division of Cipher Data Products Inc., 10225 Willow Creek Rd., San Diego, CA, 92131, (619) 578-9100.



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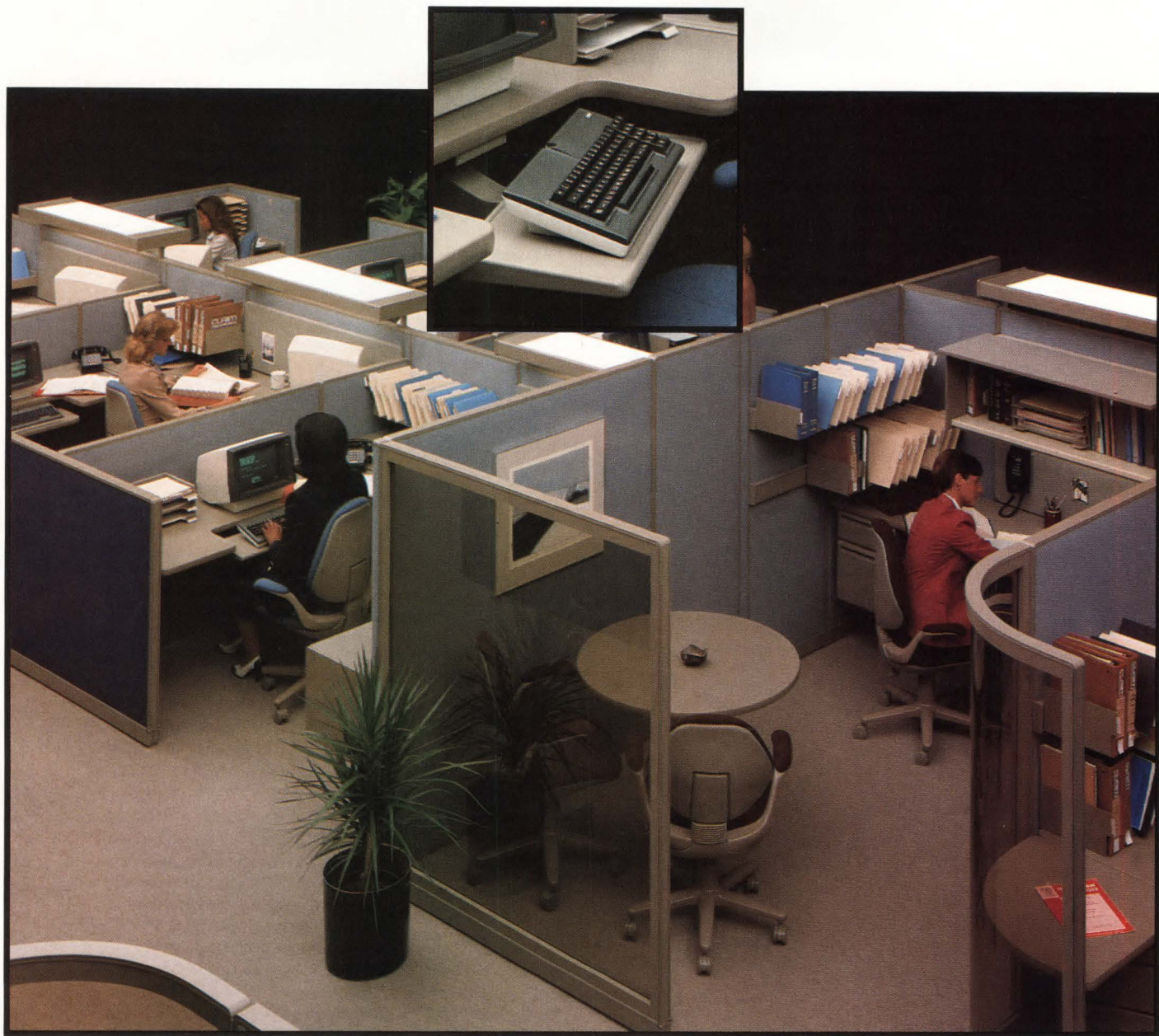
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END USERS—DP'S DILEMMA



BEND OR BE BROKEN

A boon for users—the bane of MIS/dp—end-user computing has become a force to reckon with.

by Jennifer E. Beaver, Southwestern Editor

Getting information from data processing—when it's needed—can sometimes make users feel as though they're whistling in the wind. But the hue and cry of users for more appropriate and timely feedback from strictly controlled and immovably objective dp departments has made itself heard. The result: end-user computing.

Viewed from a historical perspective, end-user computing is simply one more step in the march of technology. But despite the expedience it promises, end-user computing is not smoothly melding into the business-computing scene.

End-user computing describes the streamlining of applications for the employees who use them, and is gaining more widespread acceptance among upper management as user departments outstrip dp in suitability and speed of computer support. Requests no longer languish in dp, and users get exactly the information they need before it becomes history.

However, MIS managers and programmers look askance at the sharing of their turf. For them, applications development by nontechnical workers represents the threats of unemployment and powerlessness. The result—not altogether unreasonable—is strong resistance from MIS/dp departments that are forced to support user departments that have already made the leap to end-user computing.

“Traditional dp may not mind sharing ground with users, but it minds intensely that the ground is its own,” comments Naomi Karten, a Randolph, MA-based consultant

specializing in the management of end-user computing. “MIS loses its mystique and some of its control when users comprehend both technical jargon and development.”

Among the many concerns that fall to MIS/dp are the management and control of a diversity of equipment and the imposition of conformity on the users. A systematic approach to these issues implies interface with an information center and the efforts of a liaison who is somewhat independent of both MIS/dp and user departments—a kind of jack-of-all-trades who can analyze and control transactions.

An information center can be a neutral territory where the specter of unwarranted sacrifice doesn't haunt MIS and make it hostile and bitter. Karten, former director of the Blue Cross/Blue Shield of Massachusetts Information Center, suggests treating dp like another end user. “We hear a lot about the need to be user-friendly,” says Karten. “It's time for some “dp-friendly” actions, such as keeping MIS informed so it doesn't feel bypassed.”

Another MIS complaint centers on the quick-fix solutions offered by end-user computing. “To a CEO, it sounds like a real time-saver when a user says he or she can complete a project in three months, compared to the year it might take dp,” says Robert Frankel, a management consultant in Croton-on-Hudson, NY.

The seduction of faster development may prompt upper management to shove end-user computing down the protesting throat of MIS. It's unlikely, however, that short-term

END USERS-DP'S DILEMMA

projects will have the scope and depth of a dp-developed application. "For a competitive advantage, a business must harness a significant amount of information-processing horsepower to get a maximum return on its investment," says Frankel.

And although end-user computing does decrease report requests, it has no impact on a backlog composed of company-wide programs. In the long run, say some in MIS/dp, the cost of independence may outweigh its advantages.

Also on the underside of expedience, custodians of the central database fear a crop of unauthorized and incompatible private files will spring up under their noses. This emerges as a probability as end-user computing becomes more common; and it reinforces dp's reluctance to accept user

autonomy. Should information management be disrupted by user applications, dp will bear the blame because end users can plead ignorance.

At Warner Lambert in Morris Plains, NJ, MIS will continue database maintenance after users have taken over responsibility for the human-resources system. Using Tesseract's Personnel Management System, novice users define their own data without programming, thereby consuming fewer resources. Faster and less cumbersome than the current batch system, Tesseract allows users to download data onto their IBM PCs and manipulate it. Still, technical analyst Karen Sammond will probably be glad to see the last of the human-resources system. When the project is completed later this year, it will have taken her about

two years to convert batch data to on-line data.

Although cost- and time-efficient programming are the goals of end-user computing in Fortune 1,000 industries, the complex data elements required for programming frequently limit end-user applications, according to Robert J. Loeb, a Chicago-based consultant. Some projects simply aren't suited for less formal programming, as one of Loeb's clients found when it planned to let users operate personal computers to keep track of real estate holdings. When Loeb estimated the cost at \$20,000 to set up programs for 20-page documents, the corporation abandoned its plan.

In spite of these obstacles, industry guru James Martin and other consultants predict that users will do 50 percent of their own development, independent of MIS, by 1990. That's not as radical as it sounds; some groups have already surpassed that figure.

The sales-forecasting department at St. Louis-based Pet Foods develops 80 percent of its own projects. Using Information Builders' Focus, they have developed applications that anticipate sales demand by units per territory and units per region, and convert the data to dollar figures. "We can prepare a report on the effects of closing a specific warehouse in days, when it might have taken MIS weeks or months due to their backlog," says sales-forecasting manager Ray Martin.

Although this accelerated productivity is the exception rather than the rule, the sales-forecasting department at Pet Foods utilizes two of the three elements other forward-looking corporations might adopt as they make the transition to more end-user computing.

One is managers who combine business sense with computer savvy. At Pet Foods, Ray Martin in large part is responsible for his depart-



Managers who combine business sense with computer savvy are important members of the team that makes end-user computing a shrewd corporate investment.

ment's autonomy. He exemplifies the multi-faceted professional who can interface between non-technical users and systems personnel. In fact, MIS/dp now refers user departments to the sales-forecasting department for some database information.

Other corporations also have made inroads to progressive management. Robert C. Rush started out in Armstrong's MIS department in Lancaster, PA, and migrated to the human-services department as a temporary advisor. When he and his users developed a recordable illness-and-injury report that relieved dp of a 20 work-week project, management decided Rush was too valuable to move. Rush finds his new position challenging and gratifying. "My role is more of a project leader than ever before, but now I can take the time to learn and respond to users' needs without the fear that I'll be yanked by management to another department to act as

leader there," says Rush.

Melody Robertson, manager of user-application resources at Electro Optics, a Lexington, MA, aerospace manufacturer, seeks professionals from outside the company. Most of the staffers Robertson hires for her solution center have had some experience as teachers. She looks for people who can combine a good understanding of business processes, activities, and objectives with liaison skills. Though some computer knowledge is a bonus, Robertson says, "The other attributes take prominence; we can always teach technical skills."

Sophisticated software, another

key component for end-user computing, puts simplified, menu-driven development tools in the hands of non-computer professionals. Frequently lumped together under the heading "fourth-generation" software, these packages are often similar in name only, varying widely in their ease of use and applications suitability.

Because not all fourth-generation software is created equal, programs must be selected carefully. While an employee with a year of formal computing experience could handle the 200 or more statements required by some report gener-

(Continued on page 136)

Should information management be disrupted by user applications, dp will bear the blame.

INFORMATION CENTER SOFTWARE

Application programming

Vendor	Package	Price	Circle
Burroughs (313) 972-7000	LINC	\$35,000 to \$72,000	401

Database management

Vendor	Package	Price	Circle
Ashton-Tate (213) 204-5570	dBase II	\$700	402
Honeywell (612) 870-5200	Personal Data Query	\$210 to \$350 per month	403
IBM (914) 765-9600	APL-DI	\$240 to \$264 per month	404
Infodata Syst. (703) 578-3430	Inquire	\$55,000 to \$215,000	405
Management Decision Syst. (617) 890-1100	Express	\$50,000	406
Mathematica Products Grp. (609) 799-2600	Ramis II	\$45,000 to \$90,000	407
Tesseract (415) 543-9320	Personnel Management Benefit Plan Administration System	\$111,000 to \$150,000 \$77,000 to \$110,000	408
Texasoft (214) 369-0795	PC File	\$75	409

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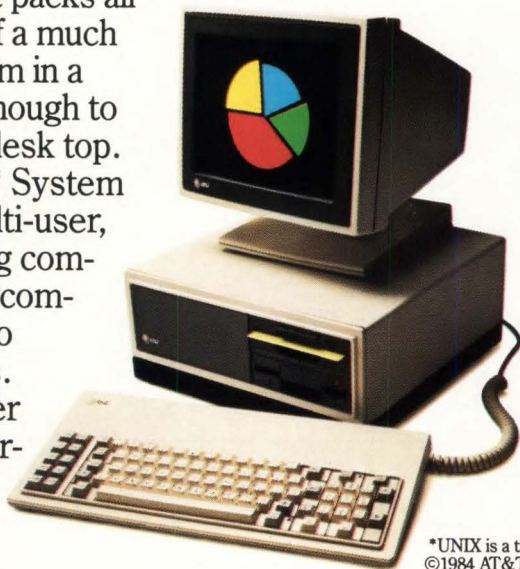
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END USERS—DP'S DILEMMA

(Continued from page 133)

ators, a novice with only four hours training would freeze. Digital Consulting Associates, based in Andover, MA, separates such software into 10 categories of differing complexities to help client companies choose appropriate packages.

Honeywell Solution Center products, which allow users to query—but not modify—the corporate database, provide an alternative. Only solution center staff—not the user—is allowed to extract and date needed information. A solution center is similar in concept to an information center, but by either name, is important for a successful transition to end-user computing.

Information centers, the third element, provide forums for information exchange among all computing groups and help mitigate the reluctance of dp departments to accept end-user computing.

It's unlikely that short-term projects will have the scope and depth of dp-developed applications.

At General Telephone of Florida, in Tampa, successful communications through the information center minimized turfguarding on the part of suspicious technical programmers, and gained the supply department dp's respect. End users in the supply department trimmed \$600,000 from their budget one year and \$1 million the next by using Mathematica's Ramis II to keep stricter control of their inventory.

The dp people also basked in the reflected glory of the supply department's achievement. "It made data processing look like the good guys for a change," comments information center director Ray Bryant.

Electro Optics' solution center be-

gan as a stopgap measure two years ago when it upgraded from a Honeywell 2000 to a DP6 Model 870. Realizing that the conversion would be so labor-intensive as to prevent development of new applications, management set up what it thought would be a temporary system to handle user requests. Two years and 200 users later, the solution center has become an integrated part of the firm's information-processing strategy.

Security Pacific Bank, in Los Angeles, is in an enviable position to enter the end-user computing age. Now running the fifth release of Ramis II—a resurrection some view as witchcraft—the bank began its version of end-user comput-

INFORMATION CENTER SOFTWARE

Distribution/analysis

Vendor	Package	Price	Circle
Ernst & Whinney (216) 861-5000	Logistek	\$5,000 to \$10,000	410

Modeling/decision support

Vendor	Package	Price	Circle
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IBM (914) 765-9600	Plancode I Plancode/S	\$764 per month \$625 per month	417
Information Builders (212) 736-4433	Focus	\$43,000	418

ing to departmental users 10 years ago, when it developed its in-house timesharing system. The result is a tremendous amount of computer knowledge dispersed throughout the bank, much of it at the middle-management level.

Running end-user programs under timesharing, rather than on the number crunchers that contain customer files, shields the bank from costly mishaps. "We allow experimentation because we know that if something goes wrong, it won't bring the Ready-teller [the bank's automated-teller system] crashing down," says Bruce G. MacCaul, senior vice-president of the financial information management department.

MacCaul has high praise for his own group, which aids him in tracking Security Pacific's accounting, tax, and management data. In a project that took six workmonths using Ramis II, the group recently designed and installed the first phase of a financial information center—an online system that delivers management information via screen instead of hard copy. Now, depending on their position in the distribution channel, managers receive the on-screen data up to 10 days sooner than they did the hard copy.

But sometimes a formalized information center can be a liability rather than an asset to some businesses. Computer professionals complain, and rightfully so, that users don't really know what they want when they make requests. Their lack of computer sophistication shows itself in a lack of specificity and results in two, too-familiar comments: "Where's my report?" and "It's not what I want."

At Security Pacific, management found that when a systems analyst sat down with an end user and went through the lengthy process of defining and documenting the user's needs, a backlog of end-user requests developed. Now end users submit

program proposals to their managers for approval before they can pursue the project.

The software that supports end-user computing brings greater relevance to applications development. Some packages, such as Ramis II, let end users search for a solution without having a clear idea of what they're looking for. "The user can build a prototype—a straw man—and then throw darts at it," explains MacCaul. The result is a custom-tailored application.

A California aerospace manufacturer called in consultant Mary Rich, president of PFS, Inc., a Los Angeles-based consult-

ancy, when slow and antiquated reports slimmed its chances of receiving government contracts—a substantial part of its business. Central dp had been trying to upgrade the price/performance ratio on the reports for five years, says Rich, but experienced little success. Rich introduced users to Focus, and in four months, the vendor was back in the good graces of the U.S. Department of Defense.

Recent industry-wide surveys have indicated that for every dollar spent on mainframes, 50 cents is spent for personal computers. Once users taste computing power, they generally demand more, and the hunger spreads.

*"Dp may not mind sharing ground with users, but it minds that the ground is its own."
—Karten, consultant*



With Honeywell Solution Center products, both end users and MIS/dp can have it their way. While end users have easy access to database information, these products prevent them from modifying that data.

END USERS-DP'S DILEMMA

Management must commit itself to a bigger hardware and software budget when it pledges itself to end-user computing. Pet Foods handled its increased demand by upgrading from three IBM 37 158s to a 3031.

A new crop of software, called fifth-generation, or artificial-intelligence products, will consume even more resources, "... about triple what anyone would have suspected in

End users in one company trimmed \$600,000 from their budget one year and \$1 million the next.

their wildest dreams," comments Mary Rich.

Implementing end-user computing involves cooperative participation within a corporation's rank and file. Until users and dp departments de-

velop comfortable working relationships, end-user computing may be a touch-and-go proposition. But end-user computing, the brainchild of necessity and intention, will ultimately come of age.

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Management Decision Syst. (617) 890-1100	Express	\$75,000 to \$200,000	420
SAS Institute (919) 467-8000	SAS	\$7,900 (license)	421
TSI Int'l. (203) 853-2884	Data Analyzer	\$14,000 to \$38,000	423
Visicorp (408) 946-9000	Visicalc	\$250	424

Graphics

Vendor	Package	Price	Circle
Graphic Communications (617) 890-8778	Graphwriter	\$395	425
Hewlett-Packard (415) 857-1501	HP Graphics (HP Draw, Easy Chart, Decision support graphics)	\$3,000 to \$10,750	426
ISSCO (619) 452-0170	Tell-a-graf	\$9,500 to \$91,000	427
SAS Institute (919) 467-8000	SAS/Graph	\$5,500 (license)	428

Information management systems

Vendor	Package	Price	Circle
Information Builders (212) 736-4433	Focus	\$43,000	429

Word processing

Vendor	Package	Price	Circle
Eagle Computer (408) 395-5005	Eaglewriter	\$495	430
Information Unltd. Software (415) 331-6700	Easy Writer I Easy Writer II	\$250 \$395	431
Multimate Int'l. (203) 522-2116	Multimate	\$495	432

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DATA CENTERS: STAYING IN THE RACE

Doing tomorrow's business today requires data centers—the machines and their masters—to be models of efficiency.

by Heidi A. Waldrop

A \$4 billion, Chicago-based conglomerate that manufactures hundreds of products—from street sweepers to golf bags—could find itself suddenly faced with the shutdown of one or more of its factories. Hundreds of employees would be sent home, and critical gaps created in distribution channels. Why? Because their data center has gone down—and consequently, costs on both ends of production will go up.

At FMC Corp., where factories are run (or *not* run) directly by its data-center network, it's not surprising that all things concerning the data center are of primary interest to top management. With the stakes so high, the brass insists that the center be a smoothly functioning model of efficiency, providing continuous, dependable service at a reasonable cost.

To reduce the risk of a production standstill or slowdown, FMC's brass encourages a closer relationship between each level of management and the data center. For whatever reason—to gain a better understanding of the overall system, promote a specific plan for directing dp resources, or participate in an MIS steering committee—general managers must be involved in some way with information-resource management (IRM). Likewise, data-center managers must consider the substantive needs of the business.

And top managers at other companies are adopting the same stance. Says Ken Quint, manager of corporate computer operations and technical services for Chrysler Corp., Detroit, "Dp has such an important role in most industries—both as a productivity tool and a way of maintaining a competitive edge—top management can't ignore it. If senior management isn't well versed in what the systems and information-processing departments can do, the overall performance of the company is compromised."

Realizing that opportunities to raise white-collar productivity were being missed and that end users needed more computing services, Chrysler developed a two-year plan to implement new technology and applications, as well as to rewrite old applications. "Senior executives have become sensitive to the role of data processing," says Quint. "MIS now has marching orders from highest level of the company."

Part of that plan includes separating the dp center's influence on production from its responsibilities for applications-software development. For example, Chrysler's online-production system controls and monitors parts flows between suppliers and assembly plants. To prevent disruptions in assembly-line production, programmers introduce new or changed programs to the production equip-



D EFFICIENCY

Photo by Focus West



SYNERGY AND EFFICIENCY

ment in a very controlled way. "We've taken the disruptive activity of software development out of the data center and put it in an isolated unit," says Quint. "It keeps our online terminals free of bad-code interference. We are just too dependent on online data processing to have some programmer knock down an online system that supports 8,000 terminals."

The link between corporate management, the data center, and users can be established in various ways. At FMC, an MIS steering committee keeps senior management apprised of computer-center operations. Atlanta-based Coca-Cola USA, a division of the Coca-Cola Co., uses liaison groups between various departments—fountain sales, bottling sales, and company-owned bottlers—and corporate management as a forum for communicating user needs.

"We're strong advocates of the liaison-group approach," says Joe Knesz, MIS/dp manager. "These groups define information requirements and discuss system priorities and development issues."

At J.C. Penney, New York, a capital-appropriations committee composed of senior executives as well as employees from various departments, approves all major systems. "Because we don't have a separate MIS steering committee," says Robert Capone, vice president and director of systems and data processing, "our capital-appropriations committee functions in its stead. We have the right level of senior-management attention—which is unusual in the retailing business—as well as active participation at departmental levels."

In some cases, management support is extended through a corporate-

wide information-systems "utility," through which management provides direction for all dp centers. At Fairfield, CT-based General Electric Co., a highly decentralized giant with over 30 data centers, having a central MIS advisory staff saves each center the effort of evaluating and recommending computer products and keeps GE-wide systems compatible.

Because they run the same operating system, programmer software, database manager, and transaction processors, GE's data centers find it easy to exchange information and programs. In addition, the corporation has gained leverage with vendors. "We establish a corporate agreement and a price with the vendor using the total company requirements, and that gives us more negotiating power," says Raymond Connor, manager of computer-services technology.

Once a year, GE holds an informal three-day conference that allows corporate management to raise specific issues and bring in industry experts, and gives regional dp managers opportunities to discuss problems and their solutions. Many other corporations are adopting this practice as they take a closer look at the link between management's understanding of data centers and overall productivity.

At FMC, according to Albert Aiello, director of corporate MIS, another approach involves "creating a participative management within the data center. When users have more input into the decisions that will affect them, we want that to parallel with a share in the responsibility."

Getting involved in dp operations or cultivating a participative atmosphere in dp management is only part of the job facing top management. It also must find new ways to cope with the special personnel problems presented by data-center managers. The dual-promotion path, for example, circumvents the possibility of a technical specialist being promoted into an unwanted managerial position.



The activities of workers in Chicago-based FMC Corp.'s data center are guided by decisions of MIS/dp managers working in a participative arrangement with senior corporate management.

"Systems pros are promoted to managerial positions because they are outstanding technicians," says Robert Capone of J.C. Penney. "However, you want to move professionals into managerial positions because they are good managers. When a person accepts a management position for the sake of being promoted, it doesn't work out well for the employee or the company. We have a dual path: A person may still be promoted, yet remain in the technical area and never supervise anyone."

J.C. Penney's policy is designed to keep staff morale high—and morale is an important component in the well-run data center. Employees are called "associates," and a concerted effort is made to not split dp and general management along traditional lines. "At many companies, data-process-

ing pros are merely tolerated, but we try to foster a feeling that the dp-center staff and the employees in the stores are partners," Capone says. "And it works. If a report is late or the system is down for some reason, dp associates care. They think, 'Hey, we're hurting the stores, and that's what counts.'"

That same attention goes into office design. "We've come up with office standards that build productivity," says Capone. Each analyst has a 10-square-foot private office with specially designed furniture and an individual printer. Capone is convinced that makes a difference. "We have the lowest turnover in the industry," he says. Capone believes the private offices are important perks that help keep top-notch personnel at J.C. Penney.

Craig Martinson, vice president and operations manager of domestic and international monies transfer at New York-based Chase Manhattan Bank, agrees that a well-treated staff is also a more productive staff: "Perks are especially required in our pressured environment," he says. "There are a lot of skilled pros around. They have to have interesting jobs—and perks—or they're going to walk out. It's too competitive a market right now not to consider extras."

Some perks are not really perks at all, but just good business, says Russ Kennedy, associate director of information facilities at General Foods Corp., White Plains, NY. He asserts that a company-owned micro for an employee's home use may be viewed as a perk or simply as a productivity tool. "We have provided several micros for the staff of the data center, and we've seen real productivity improvements," says Kennedy. "I use a micro at home for departmental budgets and other chores that wouldn't get done if I didn't have it there, or they would get done to the exclusion of other vital needs."

As top management gets involved in IRM issues, new demands have been placed on dp-center managers. In the well-run data center, the most essential managerial skills are not technical, but "people oriented."

"The characteristics of a top-notch dp manager are changing," says FMC's Aiello. "Even five years ago, there weren't as many online systems, so it didn't matter if the data center was up or down," he says. "Nobody even knew because batch jobs didn't go out until the end of the day. Now, if the data center is down, the phones ring off the wall. Someone there must be able to deal with irate users."

Dp managers can draw technical expertise from staff and vendors, but must themselves develop the political savvy to mediate interdepartmental disputes. Dp man-

(Continued on page 146)



Don Wells, systems-hardware specialist, coordinates the reloading of data into an IBM 3083E during a beta test of General Electric's disaster-recovery preparations—an essential preventive measure for an efficiently run data center.

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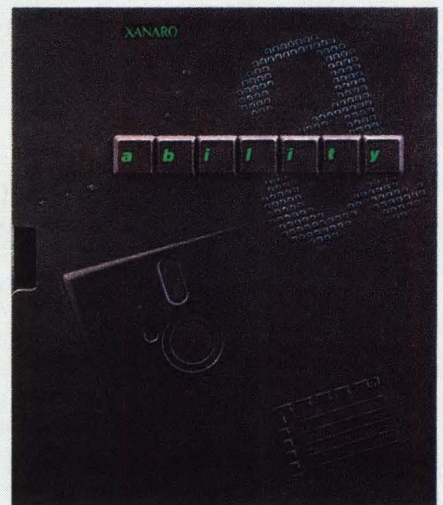
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SYNERGY AND EFFICIENCY

(Continued from page 143)

agers must maintain close contact with both those above and below them on the corporate ladder. "Without good communications skills, a manager is in trouble," says James Blessings, assistant secretary-director and manager of one of Hartford Insurance Group's (CT) three data centers. He manages a staff of about 500.

Most MIS executives measure success in their data centers by the level of satisfaction in the user departments, and rightly so. The well-run data center is interested in serving users, as a retail operation serves its customers. That means fulfilling users' needs and availing them of resources without pulling punches, even when there are problems. FMC's Robert Capone views users as his constituency. Says Capone: "When I talk to other senior managers, I use New York City Mayor Ed Koch's favorite line—'How am I doing?'"

The needs of users—not technical considerations—must be paramount in MIS/dp decision-making, asserts Capone. "It doesn't do me any good to turn out tons of reports telling employees how good we are. It's the users' confidence in our credibility that matters. If we have 200 workers tied to a mainframe with 200 terminals, they expect the system to be up and response time to be low," says Capone.

Sometimes, MIS/dp management must be the bearer of bad news—like a state legislator explaining to constituents why a pet project failed to gain approval. Often, MIS/dp managers are caught in the crossfire between user expectations and the limits of available resources, and most quickly realize that expectations are relative to users' naivete. "We never live up to users' expectations, but they usually accept reality after a while," says Russ Kennedy.

In some remote locations, General Foods has installed response-time monitors to track performance and



make results readily available to users. "These reports do away with arguments over inadequate response time and focus on the reality of what users are getting. If they have a problem, we can work on it."

User expectations and perceptions, though fickle, can nonetheless be important to data-center operations. It's easy for data-center staffers to become so insulated that they don't know whether they're operating efficiently or poorly. FMC tests user satisfaction on a monthly basis by sending out questionnaires to selected users, then posts the results on a bulletin board in the data center.

The "people skills" needed by the ideal data-center manager are important, but not to the exclusion of technical issues. Managers

must ensure that the integrity and efficiency of their operations are maintained. That means paying close attention to the operating status of automated systems, security, and capacity planning.

Statistic-generating and data-managing software tools, for example, are key methods of gathering information about data-center operations. From programmer-productivity and job-scheduling tools to project-planning packages for systems analysts, various homegrown and purchased packages are finding their places in the well-run data center.

Scheduling and data-managing software can cut production time and save money for online and batch operations. General Foods uses UCC-7 from UCCEL, Dallas, to speed batch

"General managers must be concerned with corporate computing, just as dp managers must consider the needs of the business."

processing and process reports. "We issue weekly, monthly, and quarterly recaps of performance," Russ Kennedy says. "And batch scheduling is completely controlled through UCC-7. The system contains all the jobs that are going to be run and the due dates. We automatically measure our performance against those criteria."

Another work-flow scheduling tool is ADC2 from Cambridge Systems Group, Los Altos Hills, CA. ADC2 speeds production by starting a second job as soon as the first is finished and eliminates time-consuming manual collation and review procedures. It also monitors the strain on information-processing resources.

Project-management software is also an essential in the well-run data center's toolbox. FMC's complex dp setup depends heavily on automated project management. "We have a very elaborate project-management and planning system," says Aiello. "The biggest problem facing data centers is they have projects that span several departments and must deal with conflicting views and goals. Dp must have project management for a multi-department arrangement."

One product that aids the user by tracking the amount of time operators take to insert a code and determining the impact of any delay is the project planning and control system from Nichols & Co. Inc., Hoboken, NJ. It helps a project leader develop realistic deadlines for operators.

General Foods' Kennedy has started using DMSOS, a disk-management system that cleans disks overnight. Disk manage-

ment became crucial when the corporation began increasing its disk capacity by 45 percent per year. "Nothing was coming off the system," he says. "Now we purge disks of outdated material after 90 days for production, and 30 days for test data."

Capacity management and planning also has its place in an efficiently run data center. Without managing existing processing and storage capacity and planning for increases, corporations may get caught in a never-ending spiral of spending on new equipment to meet growing needs. Having a full-time planner or team to handle capacity strategy can save millions of dollars. "You need to know who is using which resources, and you must analyze the potential growth of usage," says Ken Quint of Chrysler. "We also use our capacity-planning arm to help us identify inefficiencies and manage performance better."

Even when dp centers are running efficiently and effectively, managers must prevent security infringements and system crashes. Ken Quint's words echo the sentiments of scores of executives. "Our lifeblood is in this data flow," he says. To protect the flow of information from damaging intrusion, natural disaster, or system crash, some corporations are hiring specialists and establishing departments dedicated to security and protection. Chrysler recently hired a disaster-recovery team to develop a finely tuned plan that will keep the automaker running in the event of a catastrophe.

Chrysler has also established a security administration at each of its

data centers, headed by a security officer and the data-center manager. "They meet weekly to review security breaches and make sure the rules are followed," Quint says.

However, a big concern is the systems staffer who loves the challenge of breaking into a new system during the lunch hour or some other off-period. "It's the systems programmers with knowledge of how things work who become the biggest threats to security," says Kennedy. "They can deduce what will get them into an area they shouldn't be in."

Protection against such infringements is a managerial problem. General Foods keeps close tabs on identification-number use and reports back to staff managers. "The manager of system support receives a weekly report on unauthorized access attempts by his or her employees, if there were any," Kennedy says.

System crashes are easier to prevent. Several software tools will prevent the noncatastrophic crashes. These include V/Safe and V/Snap from VM Software, Vienna, VA, which catch errors automatically, eject data, and restore production. Another tool, Datacheck Recovery from Software Corp. of America, Herndon, VA, promises restarts in three minutes 75 percent of the time if the problem is software related.

Whether managers are dealing with the dramas of security and disaster or mundane daily tasks, the goal is to keep the data center optimally operative. A four-element checklist can help, says FMC's Aiello. It includes reliability, availability, and service (RAS), cost effectiveness, user satisfaction, and employee contentment. It's a big job, but if these criteria are met—and even if the phone is ringing off the hook—your data center will be a model of efficiency. □

Heidi A. Waldrop is a free-lance writer based in New York.

"If senior management is not well versed in what the information-processing department can do, it can hurt company performance."

—Quint, Chrysler

USERS TO MAINFRAMERS: YOU MUST DO BETTER!

by Elinor Gebremedhin

Mainframes have always been fairly immune to radical change, changing more through evolution than revolution. But there is growing evidence—evidence supplied by mainframe kingpin IBM—that change will come much more quickly to mainframes in the near future. A big reason for the anticipated step-up in change is increased demands placed on mainframes by users, and a big cause of the increased demands is the spread of personal computers.

By 1980, distributed processing had already become a buzzword. Minicomputer vendors were all for it, but IBM's position was succinctly stated in a quote attributed to James Cannavino, vice president of development at IBM's Data Systems Division: "If God had intended distributed processing, He would have put brains in our wrists."

Nevertheless, while IBM still publicly proclaimed the advantages of centralized processing using large mainframes, developments within the IBM product line, as well as within IBM, indicated Big Blue had genuine intentions of providing distributed-processing facilities for users who wanted them, even if distributed processing was not to be IBM's main marketing thrust. Systems Network Architecture (SNA) facilities were moving slowly but steadily toward being able to handle more distribution. Studies on distributed processing were initiated within IBM.

By 1981, IBM had begun to publicize the results of several internal studies suggesting that the operation of terminals at sub-second response levels resulted in productivity gains significantly greater than would be expected from simply tallying up the time saved by faster response. A 1979 study published by IBM on this subject (*IBM Systems Journal*, 18, No. 1, 143–163; 1979) speculated that workers have something like a short-term buffer memory that is easily erased; if terminal response time is too long, users have to rethink the planned action.

A second study published the same year (*IBM Systems Journal*, 20, No. 4, 407–423; 1979) confirmed the findings of the previous study with data on significant productivity improvements. Subsequent studies have strengthened the evidence that terminal response time has a significant impact on productivity; the most recent study published in the *IBM Systems Journal* was by Geoffrey





Users' needs for faster response times may cause mainframe vendors to redesign systems.

N. Lambert for IBM Information Services Limited (*IBM Systems Journal*, 23, No. 4, 36-43; 1984).

Why are these findings particularly related to a shift by IBM toward more distributed processing? Because it is impossible to achieve sub-second response times when communicating over telephone lines. To achieve the productivity benefits of sub-second response times, users have to be communicating with a local computer, which, in an organization with several branch offices, means distributed processing.

Big Blue released a second set of statistics in 1982 and 1983 about the growth rate trends of its large-systems user base. A correlation had been discovered between the predominant workload of an installation and the typical growth rate—as measured in millions of instructions per second (MIPS)—of the central processor. The original mainframe installations, which were dominated by batch processing, had grown at a rate of 15 percent to 20 percent a year until 1979, when enough of the user base had shifted to interactive processing to handle most of their workloads, yielding a typical growth rate of 35 percent to 40 percent a year.

In 1982, statements made by IBM about the typical growth rates of interactive workloads began to differentiate between workloads that were end-user driven, such as in transaction processing or microcomputer servicing, and those that were not,

MAINFRAME REPORT

"IBM has come out in support of distributed processing at all levels."

such as in online program development. When the workload was end-user driven, the growth rates for mainframes jumped to 55 percent to 60 percent a year.

These figures, which were publicized frequently in IBM product briefings in 1983, are being quoted with even more conviction this year by Big Blue. In addition, there has been a slight upward trend in the ranges of the typical growth rates being quoted. For example, batch growth rates are quoted as being 15 percent to 25 percent, non-end-user-driven interactive growth rates are described as 35 percent to 45 percent, and end-user-driven growth rates are described as 60 percent *and up*. IBM also states that it has a "considerable number" of large-systems users experiencing 80 percent growth rates and a "few handfuls" of customers with growth rates of 100 percent per year. Furthermore, IBM contends that the current upward trend in the overall growth rate of large mainframes will continue as more systems are used to connect personal computers and other end-user-oriented terminals.

If we temporarily set aside the questions of whether or not the accelerated growth in use of large mainframes is as high as IBM claims, and, if it is, whether or not IBM has correctly identified the key indicator of growth as processing mode, we come to an interesting scenario for the near future. IBM attributes a large portion of the stepped-up demand for mainframe MIPS to the connection of personal computers to mainframes for the purpose of accessing centralized files. By the end of this year,

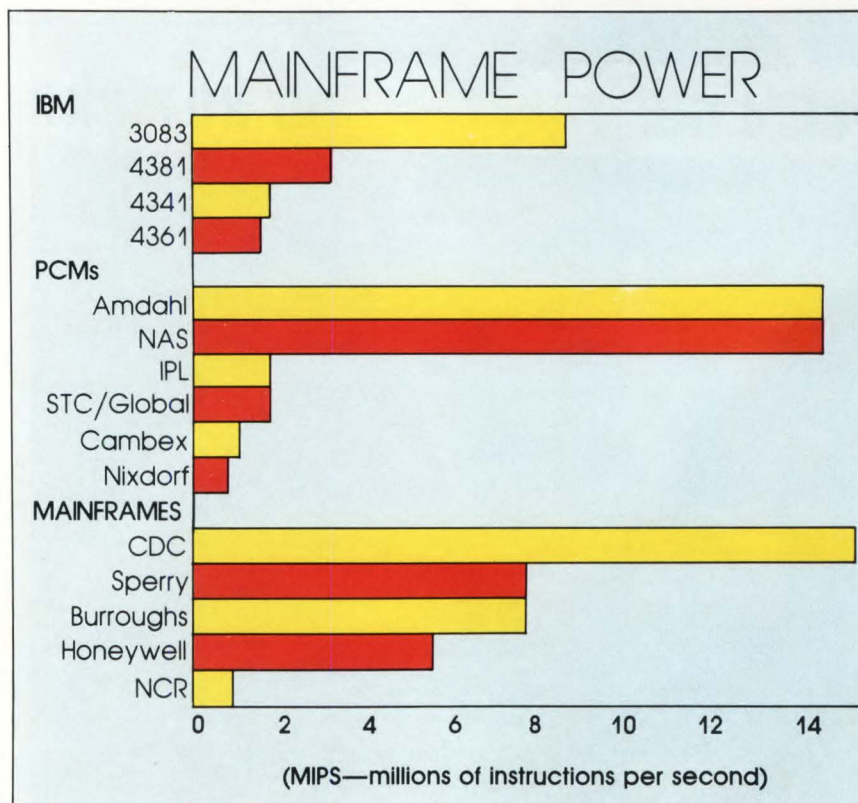
IBM will have delivered almost three million of its own Personal Computers. It's safe to assume that IBM's installed base of PCs will continue to grow.

In addition to the enormous installed base of micros in American corporations, there is a host of new specialized user-oriented terminals to consider. If these are also going to make demands on mainframe growth rates, what kind of mainframe power will be needed to support them by the end of the decade?

The question is currently unanswerable, since we do not even know the forms these workstations-to-come will take. IBM has a lot to say about what kinds of workstations it anticipates. In a June 5 product briefing in New York, IBM predicted that by the end of the decade, professional workstations would be based on 5-to-10-MIPS microprocessors, but that the additional power would be

used to implement such user-friendly features as voice response, voice recognition, complex color graphics, context editing, and compound documents that include data, voice, graphics, images (such as signatures), and supporting text.

At that session, IBM freely supplied guesstimates on the power of the micros by the end of the decade, but it did not supply equivalent estimates for the state of the mainframes that would be supporting the user-oriented workstations. Would demand still be growing at the rate of 60 percent or more per year, measured in terms of MIPS? A quick calculation reveals that in five years' time, even if we cut IBM's projected MIPS growth rate back to 50 percent per year, a 4-MIPS mainframe like the entry-level IBM 3083 would need to grow to 30 MIPS, while a 10-MIPS mainframe would need to grow to 75 MIPS. And if the



installation is one of those experiencing 100 percent growth rates, an installation currently at the 4-MIPS level of processing power would need 128 MIPS available to it within five years.

These mainframe power requirements may seem out of sight and unrealistic by today's standards. On the other hand, IBM has always supplied these kinds of projections, supporting them with detailed explanations of how to estimate the MIPS requirement of a mainframe that supports personal computers. For every MIPS of micro power attached to the mainframe, says IBM, an additional 1.4 MIPS to 4.0 MIPS has to be added to the mainframe. When asked how many micro MIPS are equal to a mainframe MIPS, answers range anywhere from 10 to 50, with a tendency to cluster around 20. If these figures are accurate, it is fortunate that all micros aren't currently being connected to mainframes, since the total accumulated power of the micro user base is estimated by most observers to be considerably greater than the total power of the entire mainframe installed base.

How do IBM's claims and projections compare with data from the field? A gradual acceleration in power requirements has been going on for some time. In the June 29, 1984 issue of *EDP Industry Reports*, International Data Corp. (IDC), the Framingham, MA-based market research firm, confirms that the growth rate for IBM large mainframes has been unusually strong because it would ordinarily be dropping off at this point in the life cycle of the 308X series. IDC's estimates show that the typical unit growth rate for the last 10 years, which is 7 percent to 10 percent, has been maintained, and that the growth in processing power has been consistent at about 35 percent to 40 percent for the last several years.

As analyst Jonathan Fram of

Paine Webber Inc., the New York brokerage house, points out in his Status Report on IBM of July 10, there are hidden power boosts (and significant revenue) in the field-installed model upgrades that do not usually appear in surveys of yearly mainframe shipments. Paine Webber estimates that revenues from these upgrades may even exceed those of the original 308X series as shipped. Although IDC has undoubtedly figured hidden power boosts into its estimations of the power of IBM's installed base, it is also true that this is a factor for which reliable indicators are hard to come by. IDC estimates this upgrade activity at about 10 percent to 15 percent of the existing base and notes that an unusual number of 3083 customers are skipping the 3081 and are upgrading directly to the 3084. But although IDC notes that "significant growth so late in the shipment cycle is without precedent," it hesitates to endorse the level of activity and the growth of mainframe MIPS rates claimed by IBM. In fact, IDC states flat out that IBM's MIPS relationships between hosts and their attached micros have not yet been supported by hard data.

Much of IBM's current and avowed future activity makes sense in terms of the projections when one more factor has been taken into account: the limitations of technology. It is getting increasingly expensive to progress to the next levels of integration in large systems. IBM frequently touts its advances in memory and processor chips, packaging, and other performance-related system components. In spite of this, it seems doubtful that IBM or any other vendor (even a Japanese vendor) is going to

be able to build single large mainframe engines that are capable of supporting the projected power requirements. This implies multiprocessing of a larger number of processors, new system relationships between multiple processors in a complex, and eventually another upgrade from 31-bit addressing to 64 bits or more.

There is also evidence that it may be worthwhile to take IBM's data at face value, or even as potential underestimates. We need to look at what impact this new relationship between micros and mainframes may do first to IBM's own marketing thrust, and then to the rest of the computer marketplace.

A clear trend that is likely to advance is the advent of special-purpose workstations, such as the rapidly developing computer-aided-design and -manufacturing (CAD/CAM) terminal. The key here is the development of chips with full 32-bit capabilities—which has already occurred—and significant increases in memory-chip density. IBM has announced a prototype memory chip with a 1-Mbyte capacity that can be manufactured with very little alteration to its production lines, implying that it will be both inexpensive and easy to achieve high production rates. Many "fifth-generation" capabilities, such as voice recognition, artificial intelligence, and mixed-mode processing, are dependent on the availability of large, cheap memories.

IBM has also begun to place a strong emphasis on improving the connectivity of its hardware. In addition to the ongoing development of

(Continued on page 154)

"The prediction that most non-IBM-compatible systems will gradually die seems to be a very sound one."

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MAINFRAME REPORT

(Continued from page 151)

SNA, IBM has been taking great pains to provide micro connections to nearly every type of IBM mainframe, small business system, and mini.

Departmental computers are another response by IBM to the growing demand for distributed processing. The system that IBM is pushing as the best choice of a local computer that will be used to take the load off the mainframe and provide better response times is System/36. In many respects, System/38 would be a better choice, because of the level of SNA implemented and its database, but System/38 is too expensive to act as a glorified PC cluster controller—which is the real role of the departmental computer.

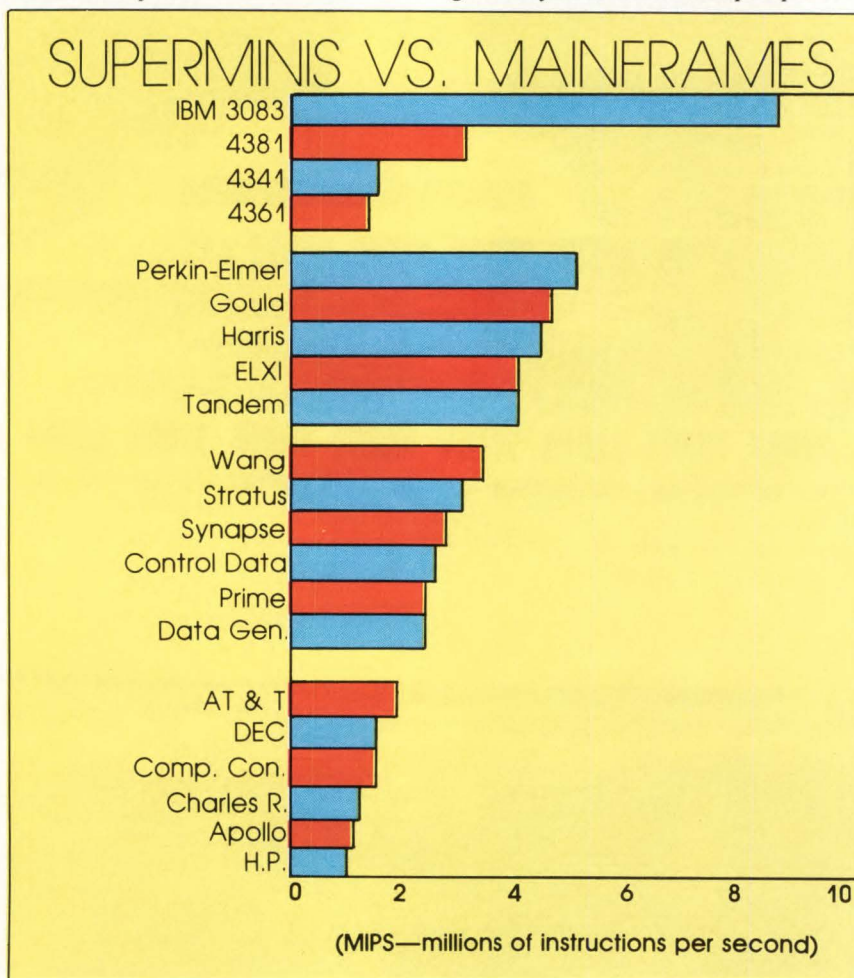
IBM's strategy recognizes reality. If mainframes will not be able to grow more powerful fast enough to keep up with the demands of user-oriented applications, then distributed processing becomes a necessity. The IBM user base has already issued its declaration of independence from IBM's 8100 distributed-processing system and insists on using compatible 4300 systems rather than the 8100 for distributed processing. The new 4361 is much better suited to this task than are the older 4321 and 4331 systems.

As soon as we turn to other traditional vendors of large mainframes, the problems of developing faster, more highly integrated systems come into perspective.

A comparison of the performance ratios that can be expected from traditional vendors, as well as their ability to fund further research, shows the suppliers falling into two groups. Mainframe vendors that have aligned themselves with Japanese manufacturers for the production of some or all of their high-end systems have the wherewithal to continue development at the high end. Plug-compatible mainframe (PCM) vendors still have respectable growth. Vendors of mainframes that are not compatible with IBM's, however, suffer from declining market share, although in absolute terms their dollar volume and number of systems shipped may still be increasing.

The Japanese computer manufacturers have been the subject of dire pronouncements from IBM for years. However, in the last few years, the worst nightmares of IBM have come true. The presence of the Japanese at the high end of the market is clear but not obvious, since they are selling their equipment through American vendors. The NAS division of National Semiconductor Corp. (Santa Clara, CA) has, for instance, ceased to manufacture its own mainframes and sells hardware manufactured only by Hitachi Ltd. that has been modified to be wholly IBM-compatible. Amdahl Corp. (Sunnyvale, CA) has been involved with Fujitsu Ltd. from Amdahl's inception, and has maintained some independent capability for the manufacture of its hardware. However, it has been clear that Fujitsu exerts great control over Amdahl ever since Fujitsu vetoed a proposed merger of Amdahl and Storage Technology Corp. Louisville, CO. In March, Fujitsu increased its share of Amdahl to 49 percent, removing any doubts about the extent of its control.

This year, a new relationship between the Japanese and American vendors has surfaced. Honeywell Inc. (Minneapolis) made an agreement



with NEC Corp. to market the NEC 1000 as the high-end upgrade to its DPS-88 mainframe in the United States and Europe. This was possible because for a long time Honeywell and NEC had a technological exchange agreement in Japan that resulted in NEC's modeling its ACOS operating system and computer systems on Honeywell architecture and GCOS-based software. Like the systems made by Fujitsu and Hitachi for Japan, the ACOS series is not completely compatible, but is so close that it is not difficult to make the alterations necessary to achieve full compatibility.

The joint agreements between the Japanese vendors and NAS, Amdahl, and Honeywell strengthen the position of the three American companies for the expansion predicted by IBM at the high end of the market. The two high-end PCM vendors, Amdahl and NAS, already have increased market share; the entire PCM market has expanded at the expense of the other traditional mainframe vendors to the point at which revenues of the PCM vendors equal those of the mainframe portion of the business of Burroughs Corp. (Detroit), Sperry Corp. (Blue Bell, PA), NCR Corp. (Dayton, OH), Control Data Corp. (Minneapolis), and Honeywell—the old “Bunch.” The major portion of all PCM revenues goes to Amdahl and NAS, which, as we have already seen, are Japanese resellers, or a reasonable facsimile thereof. It is safe to assume that Honeywell's new agreement will let it stay in the mainframe business.

An inspection of the power ratings of the high end of the market shows one reason for the spread proliferation of Japanese-related systems. The Japanese or their American/Japanese combinations are able to make single-mainframe central processing units (cpus) with a power equal to or greater than that of IBM. We have already seen how important this may

“Some users are experiencing mainframe growth rates of 60 percent or more.”

be if IBM's projections of accelerated mainframe growth do pan out.

An additional potential source of competition for IBM comes from vendors that already have an operating system that could conceivably be adapted to American needs, should full IBM compatibility be impossible to maintain in the future. Most PCM contenders in the middle of the market (with the exception of Nixdorf Computer Corp., Waltham, MA) do not have this escape route. It is interesting to note that IBM has taken steps to make this software availability less of an advantage. IBM engaged in confrontations with both Fujitsu and Hitachi; both Japanese vendors paid undisclosed settlements for the right to continue selling their own previously developed system software without fear of copyright suits by IBM. The settlement is rumored to be \$300 million in the case of Hitachi, an amount presumably agreed on because a large amount of code in the VOS 3/SP is the same or very similar to IBM's code.

The trend toward across-the-board IBM compatibility may have serious ramifications for non-IBM mainframe vendors in the long run. Non-IBM vendors should maintain profitability as they service their own software and captive large-system user bases. However, in the long run, the outlook for these vendors is bleak.

Many mainframe vendors have turned to IBM-compatible micros as their micro-level product offerings; these micros can conceivably be networked into IBM computers as well as the vendor's own mainframes. The drive toward compatibility across the

board has stepped up, as IBM has expanded SNA and added document-interchange protocols for office applications. The prediction that most systems that are not IBM-compatible will gradually die seems to be a very sound one, as we observe the increases in IBM-type interconnections and IBM-compatible micros, and the erosion of the market share of the independent American mainframe vendors. While it is true that IBM's market share is also continuing to erode slowly for the largest systems, the IBM user base has been expanding through the advent of PCM vendors.

It has been obvious for several years that the American vendors face a crisis in their plans for future expansion at the high end of the market. The cost of research and development for new chips and the cost of setting up new production lines for the next level of integration are becoming out of reach for all except the largest manufacturers. Relying on independent semiconductor houses for parts seems inevitable to a large extent, but it also leaves the mainframe vendor in a vulnerable position. The fact that Sperry, Digital Equipment Corp. (DEC, Maynard, MA) and Control Data each took the chance of investing (and losing) tens of millions of dollars in a risky new venture, Trilogy Inc., for access to a new technology shows the magnitude of the impending development problems.

Because of the stability implied in the captive mainframe base of each of these vendors, they are not likely to suffer a sudden demise. If the market as a whole accelerates its rate of growth as a result of demands by micro users, the non-IBM vendors will grow at slower rates and lose market share at the high end. However, the growing trend toward application-specific, dedicated systems may provide a market for traditional vendors that will allow them to survive as compa-

MAINFRAME REPORT

"IBM has been taking great pains to provide micro connections to nearly every type of IBM mainframe."

nies, even if their mainframe product lines eventually die. Each vendor's position has to be judged separately, especially since the vendors are also in different positions with regard to availability of high technology for power expansion at the high end.

Burroughs has greatly enhanced its internal management and is in the process of introducing a new line of mainframe computers. The A9 was delivered in the second quarter and the A3 was introduced in October. The power levels developed at the high end would seem to be adequate for the expansion of Burroughs' captive base. Its micro offering and network introductions are leaning more toward the direction of IBM compatibility. There is also evidence that Burroughs is developing a few products oriented to become specialized workstations. This may provide a window to new lines of development.

Honeywell's primary, immediately perceived weakness in the past has already been implied by its alliance with NEC to provide an upgrade for its large-mainframe user base. Honeywell's large-systems research and development facility was unable to create the processing system needed by its user base. The alliance with NEC should solve this problem, presumably for the next 10 years, but it may also invite the possibility of NEC's taking over the Honeywell GCOS user base by means of a top-downward expansion in the more distant future. NEC, which was barely profitable in its Japanese mainframe operation because its Honeywell-like architecture is not IBM-compatible, would then inherit the noncompatibility problems we have been discussing. Honeywell's low-end DPS-6 minicomputers are more affected by the trends in the minicomputer

market and should be considered separately. Because Honeywell is so diversified even in its computer business, and has sidestepped the high costs of research, it should do well financially.

Sperry, like Honeywell, has felt the full bite of the factors eroding the large-mainframe market. Its systems can't be made IBM-compatible, and, unlike Honeywell, it has no compatible Japanese vendor. Sperry did not have quite the level of difficulty that Honeywell did in developing a high-end mainframe, but it came out with the 7.5-MIPS 1100/90 about a year late. Most market analysts agree that the cost of the research for such a small user base like Sperry's is not going to allow future development in-house. Sperry has technological agreements with Mitsubishi Ltd., which supplies its personal computer. But Sperry also invested heavily in Trilogy in an attempt to provide for its next generation. Trilogy's failure to deliver earmarks Sperry as a likely candidate to abandon the large-mainframe business.

Trilogy, even though it failed to bring a product to market, has had the most profound effect on the fortunes of non-IBM-compatible mainframe vendors in the last year. Founded by Gene Amdahl to manufacture a new type of wafer chip and an associated high-performance PCM, Trilogy accumulated an estimated \$275 million from venture capitalists, stock offerings, and partnerships with the likes of Sperry, Control Data, and DEC, among others. It is easy to see what access to a technology capable of supporting mainframes competitive with IBM's would mean to large-systems vendors. Needless to say, the August announcement that Trilogy was aban-

doning its efforts to produce the chip had severe repercussions for some mainframers.

The failure of Trilogy illustrates the great sums of capital needed for future developments in the leading sectors of the industry. Figures that have emerged since the Trilogy misadventure point out that IBM spent \$1 billion in developing the thermal-conduction module used to house and cool the chips for the 308X series. The development effort took five years. To this must be added the costs of developing the chips themselves. As a point of comparison, Amdahl Corp. spent \$50 million for the development of the first 470V system in the early 1970s.

The failure of Trilogy leaves only IBM in a position of strength in in-house development of leading-edge processing technology. Other vendors either will have to rely on independent semiconductor vendors or do in-house manufacturing at a lower level of integration and speed.

Only in Japan is there a method for the research and funding needed to assure ongoing developments at the leading edge of technology. European vendors have already left the manufacture of large processors to the Japanese. In the United States, the only potential source of competition for IBM is AT&T, a giant that is just beginning to get into the competitive development and marketing of computers.

Although IBM compatibility seems to be a key to long-term survival for large-mainframe vendors, it seems that the rules of the game are reversed in the middle of the market. When we look at the smaller IBM-compatible vendors, we find that all of them are either in financial trouble, have just been in financial trouble and are now in marginal circumstances, or have recently been acquired. The one exception might be Nixdorf, which has a small user base and a financial status that

is buried in the fortunes of its large West German parent of the same name. IPL Systems Inc. (Waltham, MA), for instance, has been having financial problems for a while, although it has a system with a high-speed bus potentially capable of considerable expansion upward in power. Cambex Corp. (Waltham, MA), its lower-performance neighbor, has a very small user base. The Storage Technology subsidiary Global Ultramacc (Boulder, CO) is now selling a system acquired from Magnuson Computer Systems (San Jose, CA) and presumably has inherited Magnuson's installed base. But it is too soon to tell how this interesting combination of a vendor of PCMs and peripherals will do.

The changes that are taking place in mainframes are already having an impact on superminis. For example, when IBM introduced the 4361, which is a perfectly compatible member of the 4300 series mainframe family, it billed the 4361 as a supermini to emphasize its scientific-processing capabilities and its modularized packaging for assisting OEMs, resellers, and system houses—the traditional “stomping grounds” of mini vendors. The IBM strategy points out the blurred distinctions between what used to be separate market segments that could be recognized in terms of the power of the processor as well as the system packaging and software support. As mini vendors have matured, they have begun to provide levels of service approaching those of mainframe vendors, and their systems overlap mainframes in word size and processing power (see Figure 2). Even more interesting is the rapid speed with which supermicro vendors are approaching supermini performance levels, forcing superminis to move ahead in technological developments.

At the same time that the number of viable large-system competitors is dropping, the number of mini offerings is expanding. The state of the art



of the chip technology available to supermini vendors is such that some systems are powerful enough to encroach on the low end of the 308X series product lines, on a processor-for-processor basis. Moreover, since these vendors sell to a variety of markets, some of which are not targeted by IBM at all, they use incompatible architectures that provide more variety in multi-processing methods. Thus, while only two vendors, NAS and Amdahl, provide 308X-level PCM processors, there are five supermini vendors that provide processors as powerful as the 3083E entry-level system. Seven others have processors more powerful than the 4341 or the 4361, and hence compete with IBM's 4381 series, which is designed for use in the next part of the decade and is the basis of a new product line.

An important element of the evolution of the 32-bit marketplace is not only the growth of the supermini and supermicro sectors, but also the development of new market sectors for specialized systems that are not related directly to traditional mini or mainframe offerings or their traditional marketing approaches. This is made possible for the same reason the middle of the market is growing. The technology level has reached the point at which mid-range systems of considerable power can be offered at prices formerly available only for systems of lower power. The result of this combination is not only that previous applications can be run faster and more cheaply, but also that new applications that were infeasible are now

possible because the required performance levels are available at an affordable price and with an appropriate amount of memory.

The advent of fault-tolerant systems for transaction processing is indirectly an example of the new look in minis and small mainframes, and the scenario that IBM describes for mainframe growth requirements is likely to drive this trend even faster. The shift to specialized transaction-processing systems is justified by the very significant cost savings that can be realized by an application that is large enough in terms of both faster responses and the importance of reliability.

However, when a mainframe installation becomes overloaded because of the demand placed on it by personal computers and there are difficulties in upgrading the mainframe, one alternative is to offload an application to a specialized machine. Since IBM's suggested PC-controlling distributed systems are incompatible with IBM mainframes, the door is also open for mini vendors to step into the breach with their own brands of distributed processing.

The reason that IBM is beginning to support distributed processing is not only for the requirements of sub-second response time, but also because it may be the only solution when a mainframe runs out of power and no upgrade is technologically possible. Other mainframe vendors will have to follow suit if they are to have any chance at maintaining profitability in the future. Mainframe users will demand no less. □

MASS STORAGE



NEW OPTIONS FOR DATA CRUNCHING

If your memory device can't keep up with the workload, take heart. Several innovative storage solutions can rejuvenate and enhance it.

by Jennifer E. Beaver, Southwestern Editor

Action Industries Inc. wants your business. To get it, the Pittsburgh-based manufacturer of household plastics supplies retailers—stores like Sears and K-Mart—with advertising supplements featuring its goods for use in Sunday newspapers. In a way, Action Industries generates two commodities—plastics and pictures.

To speed Action's ad productions, Robert Carter, vice president of information systems, decided to store pictures of Action's products electronically. However, while a picture may be worth only a thousand words, it takes 6 billion characters of magnetic-disk space to store a 4-by-5-inch photo. "This project would require a room filled with magnetic-disk drives, and I don't have the luxury of expanding," Carter laments.

Until the advent of the laser-optical disk, Carter's plan might have remained a pipe dream. A relatively new medium providing high-volume, accessible, and inexpensive storage of both data and images, optical disks are being touted as the latest word in storage solutions for archival applications.

Carter is both curious and cautious about this new technology. His investigation of Storage Technology Corp.'s (STC, Louisville, CO) 14-inch optical disk, the only main-frame-related optical-storage device near commercial introduction, tells him it may be the correct vehicle for

his venture. On the other hand, he hasn't let claims of the product's speed and capacity bamboozle him into buying before he—or the product—is ready. "Optical disks are not without their problems," he explains. "They have much slower access time than magnetic disks and are still untried in the business world."

A growing number of managers like Carter are having to face the problem of finding new and better storage methods to meet their companies' expanding needs. New technologies like the optical disk can make the problem seem baffling, but managers who sift through the choices carefully are likely to find the system that's right for them. And they're likely to find it at a good price.

Though it may be tempting to stick with tried-and-true methods, deploying some of the newer products may yield dramatic results. Just considering a new storage technique—perhaps a cheaper alternative to IBM's 3380 magnetic-disk drive or an optical disk—can set creative juices flowing.

Of course, those who buy 3380-compatible machines do so at their own risk. The domination of IBM's state-of-the-art disk drive shows no sign of diminishing, despite the best efforts of traditional plug-compatible competitors Memorex Corp., Santa Clara, CA; National Advanced Systems Inc. (NAS), Mountain View, CA; Amdahl Corp.,

MASS STORAGE

Sunnyvale, CA; and STC. Control Data Corp., Minneapolis, dropped out of the race in September following a series of recalls and production problems with its 3380-compatible drive. And STC's appeal to users took a tumble on Oct. 31, when it filed for protection from creditors under Chapter 11 of the Federal Bankruptcy Act. STC's filing was prompted by mounting losses traced in large part to its failure to field a successful 3380-compatible drive.

Manufacturing difficulties experienced by Control Data and STC have plagued many of the plug-compatible makers of the 2.5-gigabyte drive from the start. The reliability of Big Blue's 3380 would make it the clear choice, except for one important consideration. Some vendors offer more capability for a lower price.

Like overnight-mail carriers, both NAS and STC promise speedier delivery. STC's drive features dual porting, which provides an alternate route around components that are "locked out"—busy reading and writing data. Users can extract data without prolonged waits. "Under normal conditions, a user will see a 10 percent to 20 percent improvement in response time

using dual porting," claims Don VerMeer, product manager. NAS' drive has a routing path similar to the one in STC's drive.

Since managers are frequently short of floor space as well as disk space, NAS pushes the compactness of its 3380-compatible drive, which is three-fourths the size of the 3380. Minh Le, director of worldwide marketing for NAS peripheral products, claims that NAS has made substantial inroads with Fortune 200 corporations. Even for predominantly IBM shops, Le says, it's important to have an alternate supplier of storage media. "If these corporations get into a competitive situation and their disk supplier cannot deliver, they could lose their market advantage," explains Le.

STC promoted its 3380-compatible drive by purchasing old storage peripherals from customers before replacing them with its own. So far, STC has bought back about 1,000 drives, according to VerMeer. This strategy, however, was not enough to overcome production problems and recalls.

Plug-compatible products are generally 10 percent to 15 percent cheaper than IBM products. Although Big

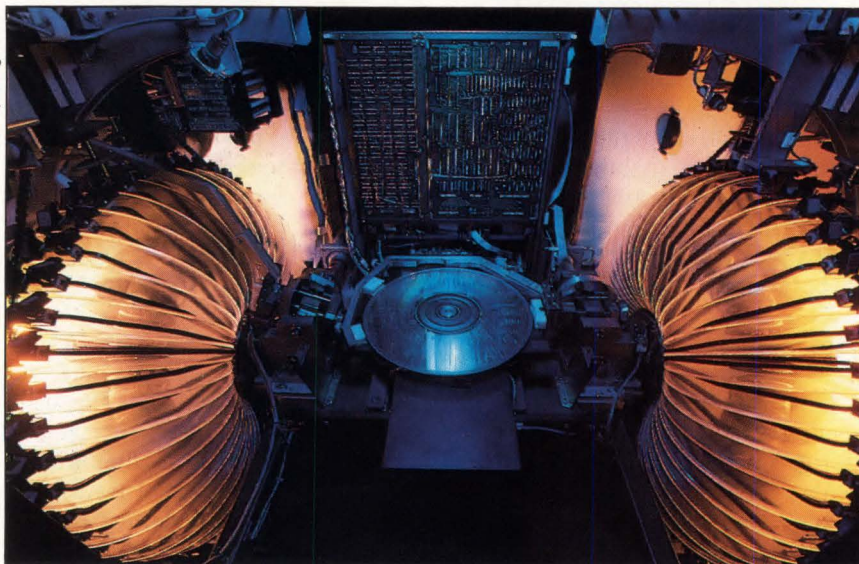
Blue recently lowered its prices, plug-compatible vendors followed suit by lowering their prices accordingly. And when IBM recently raised rental fees, the plug-compatible vendors kept theirs the same. As the world's dominant computer and peripheral supplier, IBM can afford to play a cat-and-mouse pricing game with its competitors. The same price cuts that push a wounded competitor like STC closer to the grave hardly break the skin at IBM. It's clear that IBM is pushing to become the low-cost producer in all lines.

History tells us that IBM's price fiddling may herald the introduction of a new product line. Dave Vellante, an analyst at International Data Corp., a Framingham, MA-based market-research house, outlines three theories on the significance of the price cuts. The first is that IBM will introduce a new mainframe, code named Sierra, with a 6-Mbyte-per-second disk drive totally different from the 3-Mbps 3380. The second theory is that IBM will introduce an upgrade to the 3380 that will increase its speed by 50 percent. The third theory suggests that a speed-matching buffer on a 6-Mbps drive may be in the works. "If IBM introduces an upgrade for the 3380, the plug-compatibles will have an easier time. A new system will take longer for them to duplicate," says Vellante.

STC was unprepared to compete with the IBM 3380 when it was introduced in 1981, a problem that, along with IBM's price cutting, has greatly contributed to STC's financial woes. In early October, STC announced an expected third-quarter loss of \$20 million and a layoff of about 10 percent of its nonproduction employees in an attempt to cut costs. A few weeks later, when STC announced it had filed for protection under Chapter 11, it revised its estimated third-quarter loss to \$60 million. The swiftness of STC's decline will doubtlessly hurt

(Continued on page 164)

Photo by Greg Pease



Optical-disk "jukeboxes" like the one used by The Library of Congress can store up to 1.2 million pages of printed text.

Super Stars



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**print
the report**

**and when you get to your hotel,
change everything.**

Two different plotters are also part of the HP personal computer system.

Both create full-color graphics. One with two pens, the other with six for even more detail.

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It lets a number of HP personal computers link up, talk to each other, share printers, and exchange information.

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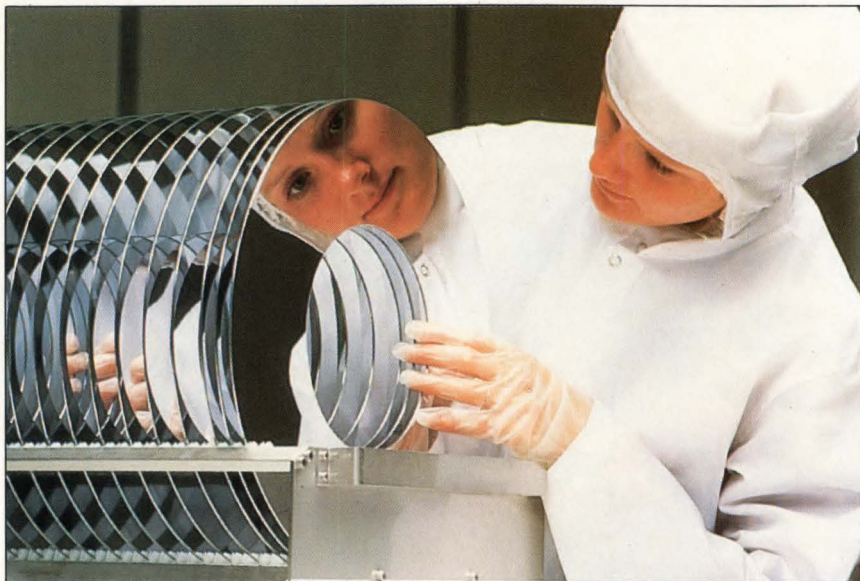
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MASS STORAGE



Storage Technology Corp.'s 14-inch optical disks hold 4 gigabytes—one and a half times more than the IBM 3380 holds.

(Continued from page 160)

the perceived reliability of plug-compatible vendors.

Managers are understandably wary of investing in non-IBM products. Big Blue's two-year head start in 3380s lends considerable weight to its election by customers. But, given the price/performance ratio of several of the plug-compatible vendors, IBM may be just starting to feel the heat of competition.

Minh Le is forthright about NAS' plans. "Next year we will introduce a 3380-compatible drive with twice as much storage as our current drive and the same footprint," Le says. The cost of the new drive will be 50 percent higher, he adds.

In a recent report to customers, Jonathan M. Fram of the New York brokerage house Paine Webber outlined the market for 3380-compatibles. Amdahl and NAS, the American agents for Japanese disk-drive makers, got the highest marks for reliability. NAS had expected to ship 3,000 drives this year and, in September, was slightly ahead of schedule. About 20 percent of Amdahl's \$900 million in 1984 revenue will be

a result of its 3380-compatible product. At Memorex, managerial problems and cost overruns have slowed production.

Fortunately for managers, magnetic-disk drives are not the only game in town. Managers like Action Industries' Carter are considering non-traditional media like optical disks for their storage plans when magnetic disks may not be cost-effective. Marty McCoy, manager of industry marketing for optical disks at STC, calls the disks "a third alternative" along with magnetic disks and tape storage. "The Fortune 1,000 are very excited about this product. It could revolutionize data processing," claims McCoy. "Businesses can save every transaction without taking up vast amounts of expensive real estate." This is because the optical disks take up less space, have faster access time than tape, and have a longer storage life than other storage media, according to McCoy.

Although the majority of stored data is frequently revised, between 25 percent and 30 percent of mainframe data remains unmodified, estimates Ted Smith, president of Filenet Corp.,

a Costa Mesa, CA, vendor of optical disks. Information rarely used can easily be placed on optical disks. Filenet targets its Document-Image Processor System at the office. The image-based technology is especially suited to applications requiring document storage, which consumes large chunks of metallic media.

For insurance carriers, the federal government, and businesses with vast amounts of permanent data, optical disks represent a tremendous opportunity to archive reference material at a low cost. The Library of Congress, for example, is the world's largest repository of printed matter. Ten new items pour in every minute of every working day. For the institution, an optical-disk system from Integrated Automation, Berkeley, CA, was a natural selection. One hundred optical platters are stored in a cabinet, aptly called a jukebox. Each platter holds between 10,000 and 12,000 pages of text.

Because erasable optical disks are not currently available, the medium is only useful for information that will not require alterations. The images and data housed in the library's jukebox will never need changing. An ancient Chinese map, for example, will never be revised even though it may be inaccurate. Although Matsushita Industrial Co., a big Japanese manufacturer, announced an erasable optical disk last year, according to Tony Jasionowski, manager of that vendor's technical center in Secaucus, NJ, the erasable disk is still under development. "We're working on making the erasable disk compatible with the existing write-once disk," says Jasionowski.

STC is the only vendor aggressively marketing a mainframe optical-storage device. Production and financial problems have reduced its production plans of the \$130,000 system this year from 400 to 100 units. Each 14-inch platter holds 4

(Continued on page 168)

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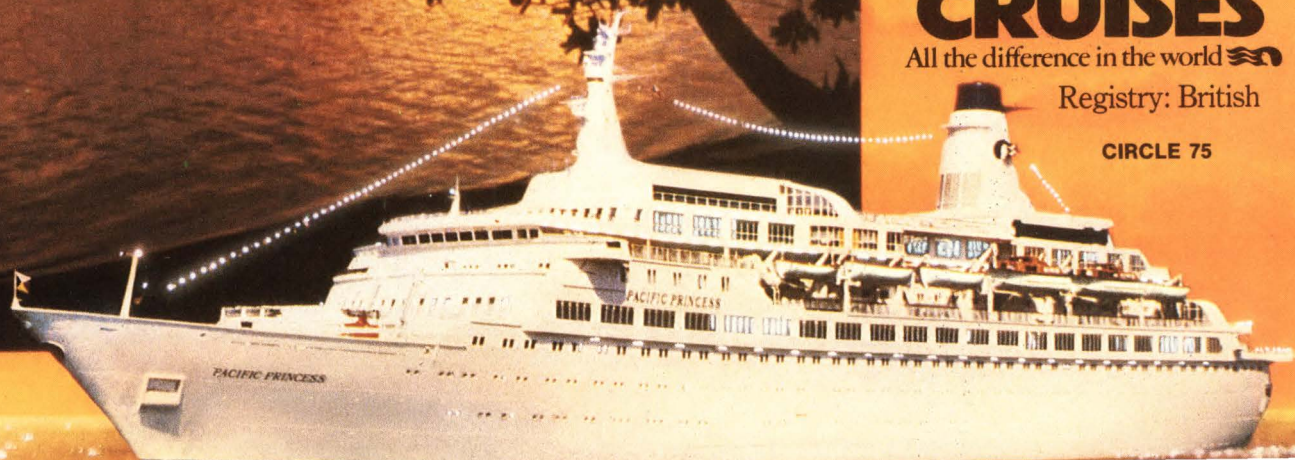
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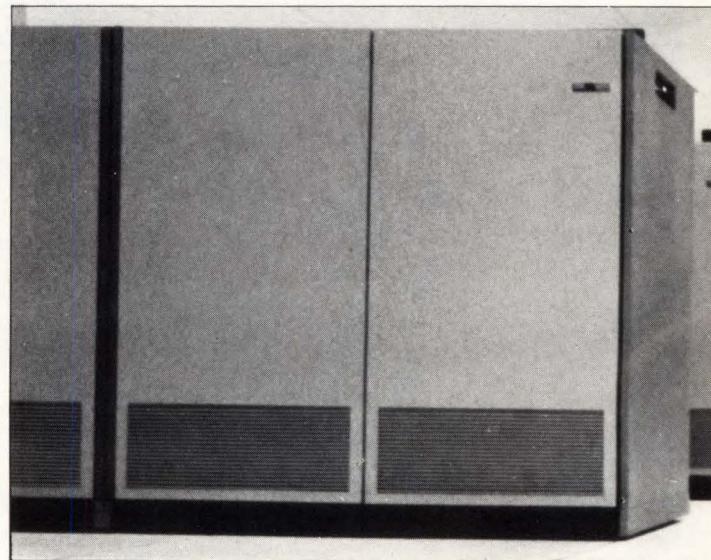


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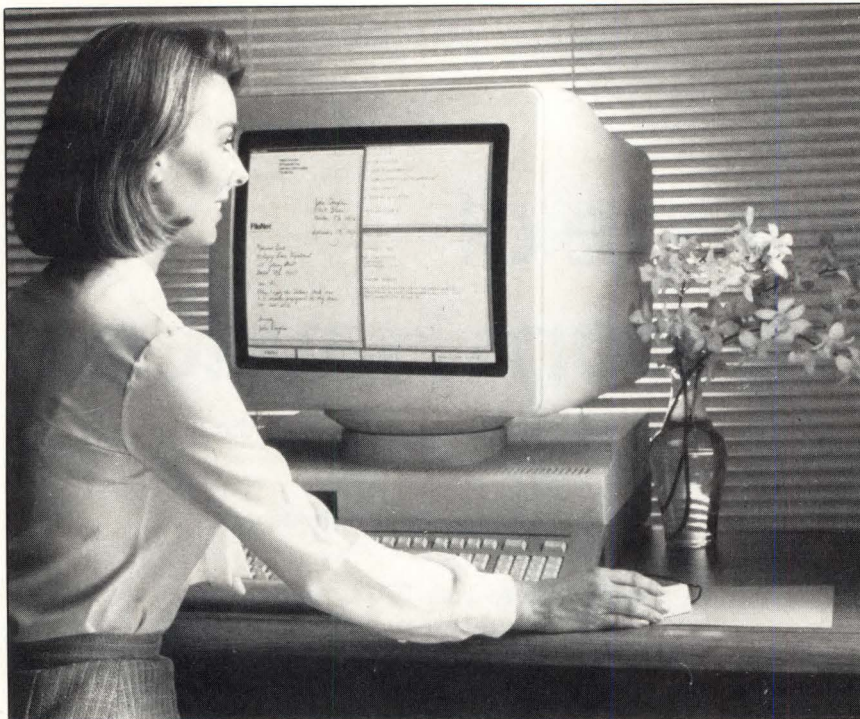
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Photo courtesy of McDonnell Douglas Corp.



The Filenet Document-Image Processor is optical-disk technology aimed at the office.

(Continued from page 164)

gigabytes—enough capacity for 2 million 8½-by-11-inch sheets of double-spaced typed documents. That's a capacity one and a half times the capacity of the IBM 3380.

A price comparison of the STC optical-disk drive and the IBM 3380 reveals why managers are attracted to optical disks. According to IDC, 1 Mbyte in a 4-gigabyte optical disk costs \$5; the same amount of storage on a 3380 costs \$40. Of course, the inability of the optical-disk drive to accommodate the changing of stored data makes the cost difference a little less significant.

STC will soon have competition from vendors of Japanese products, like NAS, which may have the edge for cultural, rather than technological, reasons. "With its pictorial alphabet, Japan has more experience with image-based systems," comments Le of NAS. "First, we computerized numbers, then alphanumeric characters, and now we're doing the same with image, voice, and patterns."

More capacity is only one of the needs facing managers. Faster access may be just as, if not more, important. According to STC, today's computers are 30 times faster than the computers of 20 years ago. In the same time period, access speed has only increased four times. This crunch

gives rise to the dreaded input/output bottleneck—a situation that results when the drive can't retrieve data as quickly as users demand.

By anticipating frequently requested data and storing it in a highly accessible place, intelligent-disk controllers like STC's Sybercache can reduce I/O bottlenecks by as much as 75 percent, according to the vendor. With Sybercache, a block of data can be located in less than 1.5 milliseconds.

Intelligent-disk controllers can also help increase the usable capacity of magnetic disks. In an effort to avoid overloads and delays, most managers use less than half their disk space. An intelligent-disk controller can help minimize that kind of waste.

When his boss told Action Industries' Carter that he had six weeks to double his data center's storage capacity, Carter realized that simply adding additional drives wouldn't do the trick. "We knew we had to upgrade to the next generation, and the idea of conversion scared us," he admits.

When he upgraded his Memorex and IBM 3340 drives to 3350s, Carter also added a Sybercache. Its turbocharged response time makes it particularly popular with Action's 70 online users who depend on their devices for order entry. In one day, three salespeople generated a million lines

STORAGE

of online orders, according to Carter.

Carter found one stumbling block to using Sybercache with the 3350s. ASAM—a type of organization file necessary for the Sybercache—can't be written to an IBM 3350 drive. But that obstacle was easily remedied by adding software: Carter added MVT/VSE, an operating-system program from Software Pursuits (San Francisco, CA) that overrides this limitation.

Alpha Data, a Chatsworth, CA-based supplier of magnetic-disk drives, uses a different method to speed information retrieval. Instead of having 10 read/write heads, as in most drives, the Alpha Data Atlas has 50. With more devices to fetch and carry, the waiting time is reduced.

At Cheshire Engineering in Pasadena, CA, I/O bottlenecks were wasting precious time. Whenever a user would begin a disk-intensive operation, which could be as simple as copying files or looking up a directory, other users sat waiting for access. The software manufacturer's 8-inch Winchester couldn't keep up while running on Digital Equipment Corp.'s (Maynard, MA) PDP-11/23. After installing the Atlas and upgrading the PDP-11/23 to a PDP-11/73, Cheshire conducted its own benchmark tests. It discovered that access time was three times faster with the Atlas in place.

The desires of users and the pressures of business place heavy demands on storage systems. A competitive corporation can't afford to let inadequate storage techniques retard its production. While realizing that any storage solution is only temporary—there will always be more information and alternate ways of storing it—a manager must anticipate and plan for these needs. There is no perfect storage medium. Each must be measured for its suitability for a particular job. With new technology and greater competition among vendors, the selection is more baffling, but the fit may be better. □

LETTERS

GRAFTALK MOVES

Thank you for including Graftalk, our business-graphics software package, in the article "Presentation graphics: Producing a hit show," in the September issue of *Computer Decisions*. David Roman's article was quite interesting and informative.

The vendor list that accompanied the piece carried our company's old address and phone number. As of October 1, we will be at:
109 Danbury Road
Ridgefield, CT 06877
(203) 421-4661

Thank you for including this update.

Jill Rago
Redding Group Inc.
Ridgefield, CT

CLEARING THE AIR

This letter is in response to a statement I made in your recent article, "Display terminals: Pick what's best for you" (September 1984). I was quoted as saying, "... the 3270-type workstation hasn't changed in 10 years and probably won't change in the next 10." This statement does not reflect my opinion or the opinion of the Harris Corporation.

There is obviously a misunderstanding regarding a concept I presented during the interview regarding 3270 terminals. The message I intended to convey was that there are now two classifications of terminals—base function and multi-function—that can be utilized on a 3270-type controller. This is a direct result of significant enhancements to and additional capabilities of the 3270 workstation.

The 10-year reference was not meant to be taken literally and referred only to the traditional base-function terminals such as the Harris 9178 or the IBM 3178. I was trying to illustrate that although various multi-function terminals are enjoying rapid growth, there is still a significant marketing need for the base-

function terminals. As a result, 3270 systems must support both the base function and the multi-function display terminals.

Both classifications of terminals, however, continue to be enhanced with ergonomic features. For example, amber displays, tilt and swivel

features, and low-profile keyboards are extremely popular.

I sincerely hope that this letter will clarify my position on the 3270 marketplace.

John J. Barry
Vice President Marketing
Harris Corporation
Dallas, TX

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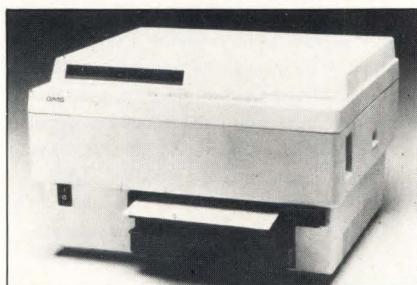
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PERIPHERALS

SMART WRITER

The QMS Smart Writer features word processing; laser printing of up to eight pages per minute; Qume, Diablo, and Epson simulation; four intermixable standard fonts; and 64-K memory. Priced at under \$5,000, it



can intermix text and graphics and accept letter- and legal-size stock as well as envelopes, postcards, and transparencies.

Quality Micro Systems Inc., P.O. Box 81250, Mobile, AL 36689.
(205) 633-4300. *Circle 207*

TWO TERMINALS

The Delta Data 8303, a 16-bit micro text-editing terminal, features multi-task windowing, 40K of scrolling memory, 127-key detachable keyboard, and 24 programmable function keys. Price: \$2,395. Model D2830-III Burroughs-compatible terminal stores 300 keystrokes, offers dual-host



communication, and is expandable with the addition of other components. Price: \$1,495. Other features include host-addressable peripheral port, multiple-processor capability, and data highlighting. **Delta Data Systems Corp.**, 2595 Metropolitan Dr., Trevose, PA 19047.
(215) 322-5400. *Circle 208*

PRINTER ENCLOSURES

Special Edition Acousticovers are foam-sound control enclosures for noisy printers. Price: \$400 to \$500.



Models are available to fit most popular dot-matrix and letter-quality printers.

Trigild Ltd., 5195 Tomken Rd., Mississauga, Ontario, L4W 1P1.
(416) 624-5037. *Circle 209*

DISPLAY TERMINAL

The DT-100 display terminal, which is software compatible with the DEC VT-100, has a 14-inch screen, VT-220-compatible editing keys, 16 programmable function keys, and built-in serial printer port with programmable baud rate. Power-up parameters can be changed by the operator and can be stored in nonvolatile memory. Price: \$795, including a

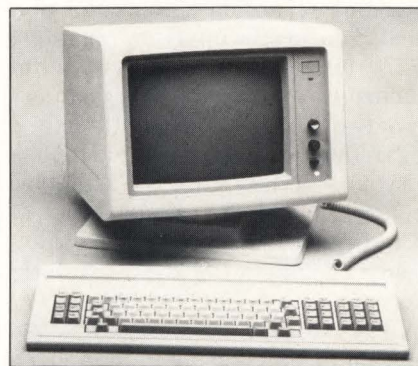


diskette for compatibility with TRS Model 16 running under TRS-Xenix. A 9,600-baud serial-to-parallel converter, which costs \$99, allows the DT-100 to be used with parallel-port printers.

Tandy Corp., 1800 One Tandy Center, Fort Worth, TX 76102.
(817) 390-3835. *Circle 210*

COMPATIBLE TERMINAL

The Term-Tronics Miracle coaxial 3178 plug-compatible display terminal has IBM 3178 features. Price: \$995. With a keystroke, Miracle can emulate IBM synchronous or DEC asynchronous systems. Optional com-

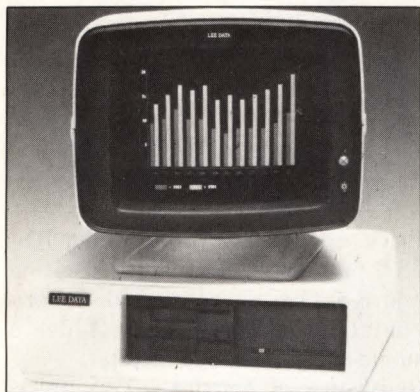


munications support for DEC, character- and block-mode ASCII emulators, and IBM 3278 Model 5 screen formats are also available.

Term-Tronics Inc., 7408 Trade St., San Diego, CA 92121.
(619) 271-1770. *Circle 211*

COLOR WORKSTATION

The Series 70 color-graphics personal workstation is compatible with the IBM 3270 PC and handles PC graphics and 3279-S3G host graphics. Users can view up to seven windows at a time and can transfer data from window to window. Price: \$5,711 for



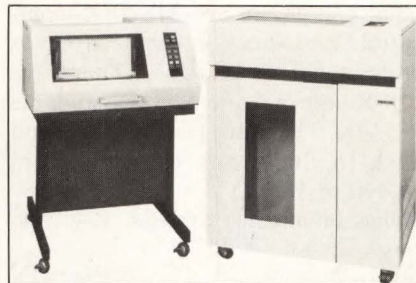
minimum configuration; \$5,646 with host-graphics support. Model 1214D All-In-One display terminal emulates four screen sizes. Price: \$1,762. Three other models in the 1214 series, which can be used with the Series 700 personal workstation, range from \$1,462 to \$2,162. Model 408 controller supports 16 display stations. Price: \$8,075. An Hewlett-Packard 2624B Emulation Option for Series 400 terminals enables displays to emulate VT-52, VT-100, and VT-132. Price: \$2,666. An adapter board allows IBM PCs to interface with any of Lee Data's system controllers. Price: \$1,150.

Lee Data Corp., 7075 Flying Cloud Dr., Minneapolis, MN 55344.
(612) 828-0300. *Circle 212*

LINE PRINTERS

The Dataprinter DP2000, a heavy-duty high-speed band printer, prints 2,000 lines per minute with a 48-character band; it also comes with 64-, 96-, and 128-character bands. Price: \$18,000. The MVP 150C ma-

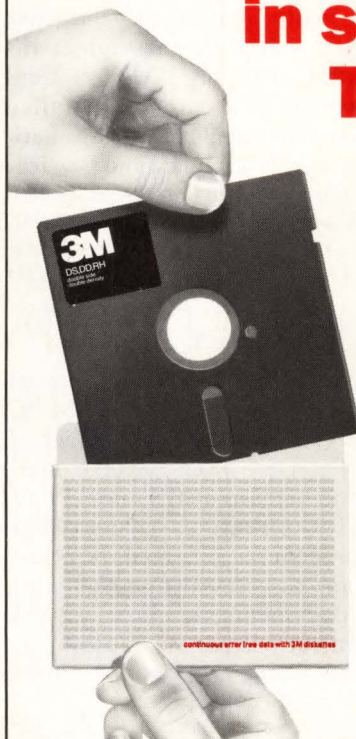
trix line printer features correspondence printing, condensed print, elite print, draft print, and bit-image graphics and is compatible with the IBM PC and most other micros. It can also be shared in workstation clusters or local-area networks. Price: \$2,995. A nonimpact printer, the NPX-20



Electronic, is compatible with most minis and mainframes and offers letter-quality printing. It can process

two pages per sheet and can compress one or two 132-column printouts on one 8½-by-11-inch page. Price: \$13,950. The P Series M Model line printers allow style and pitch of character sets to be intermixed on the same line. They print in correspondence, data processing, high-speed draft, and graphics-plot modes. Pedestal-mounted 300-line-per-minute and 600-line-per-minute models are \$5,950 and \$8,250 respectively; extra-quiet floor-cabinet versions are \$6,900 and \$9,000. The PI-3287 interface allows MVP Series or P Series printers to be attached to an IBM mainframe through an IBM 3274 or 3276 cluster controller. Price: \$995. **Printronic**, 17500 Cartwright Rd., P.O. Box 19559, Irvine, CA 92713.
(714) 863-1900. *Circle 213*

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OFFICE EQUIPMENT

HP SHEET FEEDER

A mechanical, single-bin sheet feeder, Model HP 29340S, works with the HP 2934A dual-mode printer and any Hewlett-Packard personal or technical computer with HP word-processing software. Price: \$650. It auto-



matically feeds positions and collates single sheets of 7- to 12-inch width. Odd-size sheets up to 14 inches can be manually fed through a slot without readjusting the paper bin.

Hewlett-Packard, Contact your local sales office.) *Circle 201*

PHILIPS WORKSTATIONS

Philips Model 1002 is an entry-level portable word-processing workstation. It can function as an enhanced



electronic typewriter or as a communications terminal. Price: \$1,995. Model 3005 intelligent workstation has the storage capacity of a 10-Mbyte rigid disk. It offers word- and data processing, office communications, and personal-computing functions. Price: \$8,900. Series 3100 personal computers are MS-DOS-compatible and function as executive or professional workstations. They have 128-K internal memory expandable to 512K. There are transportable and desk-top versions ranging from \$3,490 to \$6,080.

Philips Information Systems, 4040 McEwen, Dallas, TX 75234.
(214) 386-5580. *Circle 202*

EXECUTIVE STATION

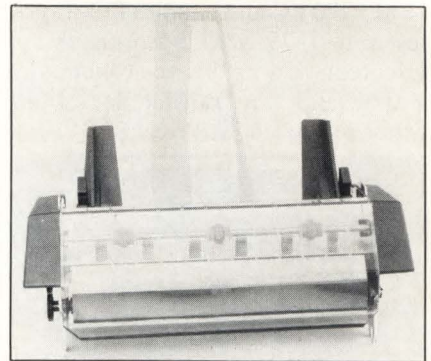
The Omni-Action office system—an integrated voice/data workstation—combines a telephone and personal computer in a single station. Price: \$6,500 per terminal. Available office applications include dictation, electronic mail, spreadsheet, database manager, and voice messaging. It's compatible with any PABX or Centrex system and can be installed with existing telephone wiring. Peripherals may be attached and new features added to prevent obsolescence. **GTE Communication Systems**, 12502 Sunrise Valley Drive, Reston, VA 22096. (703) 435-7400. *Circle 203*

MULTI-USER WP

The Sytext word-processing package for DEC computers and the IBM PC can be expanded to any number of users. For DEC users, Sytext interfaces to standard RMS files. Price: from \$1,995. Features include online help procedures, spooled printing, simultaneous access of up to four auxiliary documents, temporary work file, and various editing capabilities. **Syntacom Corp.**, 3303 Harbor Blvd., Costa Mesa, CA 92626.
(714) 996-2782. *Circle 204*

SHEET FEEDERS

A line of single-bin, clip-on sheet feeders holds up to 80 sheets of paper and allows printing on every line not restricted by the design of the printer.



Price: about \$425 each. Model RS-33.0 permits vertical paper insertion and RS-33.1 allows vertical or horizontal insertion. Each includes a single-sheet/envelope inserter.

Rutishauser of America, 10345 Brockwood Rd., Dallas, TX 75238.
(214) 343-9154. *Circle 205*

TABLETOP OCR

Typereader Model TR100 tabletop OCR recognizes typed pages and transfers data to an editing terminal, eliminating retyping at the keyboard. It recognizes up to four typetypes,



handles up to 100 stacked pages, and can transfer data to two separate computer systems. The \$11,500 price includes three typetypes.

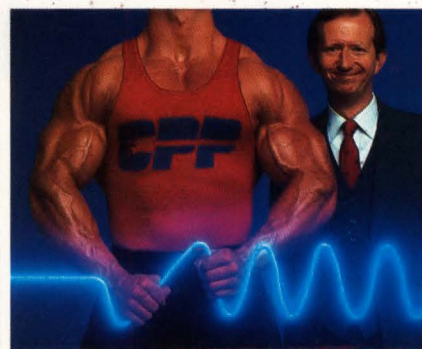
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CIRCLE 79

DECORUM: HOW DO YOU DO?

Carleton Codger sits back in his chair and waves his unlit cigar. "I don't understand what's happening in the workplace today," he says. "All the rules of behavior have changed. For instance, if I lit up this stogie, even here in my isolated office, you'd hear screams all the way to Kalamazoo. Yesterday, a young squirt of a vice president stuck his head in here and tried to pressure me into joining a noontime jogging club. Tonight I must figure out how in blazes to entertain four Japanese guys from the Tokyo subsidiary. My secretary won't make me coffee anymore—let alone pick up the phone and order my wife's anniversary roses."

Poor Carleton. When he started in the company, the rules were clear and straightforward—and they covered everything from what kind of tie to wear to how often you should get a shave and a haircut. They spelled out what you could and couldn't do. But problems began to arise in the '60s and '70s, according to Carleton. Things became so confusing you couldn't tell the mailroom clerks from the vp's, because they all wore dungarees.

Today Carleton's more confused than ever. Here he is at the peak of his career, with a large staff and a considerable amount of corporate clout, forced to cope with changing standards of business etiquette and the "new work ethic," which touts employee rights and downplays the traditional emphasis on authority, loyalty, and obedience.

And what about the new standards that must be applied to the growing number of women in executive positions? "How do you figure out what's right and wrong, what's in and what's out?" Carleton wonders. "Shouldn't codes of conduct be plain and unob-

trusive, rather than intrusive?"

Carleton's right—business "manners" are changing. For example, very few offices or restaurants would still allow him to puff on his acrid cigar. Carleton has all but given up the battle, but he still keeps one in his jacket pocket as a symbol of bygone days of privilege and pleasure.

Facts and figures from numerous health agencies coupled with public outcry, have brought these new laws and restrictions into being. Employers, too, are becoming more aware of the physical toll; the U.S. Department of Health and the Human Services' Office on Smoking and Health estimate that smoking costs businesses \$42 billion a year in medical charges and lost productivity. For each smoking employee, the corporate tab is \$1,000 to \$4,000 a year! Curbs on smoking in public places, including the office, are increasing. And in a recent survey of Seattle managers, the majority said they would give preference to nonsmoking job-seekers.

Simply banning smoking, however, isn't the answer, so some companies have come up with more creative ways to cut down the habit. Flexcon, a specialty-paper company in Spencer, MA, gives employees \$30 a month in gift certificates if they give up smoking (or do not smoke at all), and \$15 gift certificates to those who decrease their habit. Almost 300 employees are participating.

But let's get back to the shifting protocols surrounding the nicotine habit. It's not just the bosses who are raising a fuss; nonsmoking employees are also objecting to old codes of conduct. Some are content to put up signs in their offices indicating their feelings ("If you won't smoke, I won't belch"); others are more militant, pressuring their peers to take their "butts" elsewhere, or even demanding that smokers be segregated from the rest of the employees. This has given rise to many altered office arrangements and separate dining and restroom areas.

At Ocean Spray Cranberries Inc. (Plymouth, MA), people smoke whatever they want, wherever they want (within legal constraints), according to employee-relations manager Dick Brooks. "But we have an open office with an excellent air-circulation system," he says. When employees are closely clustered, this laissez-faire policy might not succeed. Visualize a staff meeting in a small, windowless room. Those thoughtless individuals who whip out cigarettes without asking if anyone objects may be subject to dirty looks—or worse.

What does a nonsmoker do in the group situation, say, at a business lunch? When a colleague hesitates before lighting a cigarette and asks: "Do you mind if I smoke?" you have several alternatives. If you do mind, you can simply say, "Yes." Or you can play on the old guilt angle by politely

"Realizing that they are professional equals with men, (women) must neither demand nor expect special treatment."
—Emily Post's Etiquette

responding, "Well, *I* don't smoke—but I suppose if you are *really* desperate. . ." Sometimes humor works best: "Go right ahead—just don't exhale!"

If you're a smoker you must be conscious of those nonsmokers around you. You must be sensitive to the fact that making friends and influencing people requires acute awareness of which of your habits meet with the approval of your colleagues, and which are likely to offend.

The key to proper business etiquette is the Golden Rule. Most professionals won't deliberately do something that makes anyone uncomfortable.

But let's return to lunchtime etiquette. In *Miss Manners' Guide to Excruciatingly Correct Behavior* (Warner Books, 1982), Judith Martin quotes a letter she received from an old-line executive: "As a businessman, how do I allow a businesswoman to pay for my lunch?" Her excruciatingly succinct answer: "With credit card or cash, as she prefers."

These new business-etiquette problems *can* be resolved the old-fashioned way. The rules really haven't changed so much. If you ask Fran Bankbutton to lunch to discuss the new microcomputer-training program, you pay. If you're traveling or dining with a business associate, the higher-level person usually pays for the meal, although it's acceptable for the lower-ranking person to pick up small tabs, such as for drinks. That's what the recently published 14th edition of Emily Post's *Etiquette* (Harper & Row, 1984) says.

There are other ways of handling a potentially awkward situation. If you're a woman arranging a business lunch and you suspect that one or more of the executives attending may

In a recent survey, the majority said they would give preference to nonsmoking job-seekers.

feel uncouth letting you pay for the meal, you can arrive at the restaurant a bit early and ask the maitre d' or table attendant to quietly give the check to you. If a Carleton Codger frantically insists that he foot the bill, be gracious and let him pay. But let him know the next time is your turn.

Remember, if you—man or woman—feel unsure about handling such social details, this insecurity will be apparent. It might cause others to wonder, "Gee, if this individual can't handle this situation gracefully, I wonder how he/she can sell a product or idea successfully."

"Realizing that they are professional equals with men, [women] must neither demand nor expect special treatment," says the Emily Post book. According to Post, business situations shouldn't be defined by sex, but by common courtesy. Courteous people are usually treated likewise.

Forms of address are another thorny aspect of contemporary business etiquette. For example, should mail to a woman executive be addressed to Ms. or Mrs.? That's an easy one—use the executive's name first. It's *inside* the envelope that the real problems surface. These days, Ms. fills the bill for businesswomen. Miss and Mrs. are considered some-

what unbusiness-like *unless* specifically requested. In fact, Emily Post says that many professional women *prefer* Ms. Moreover, if the letter writer doesn't know the other person, embarrassing or annoying errors can be avoided by the use of this designation.

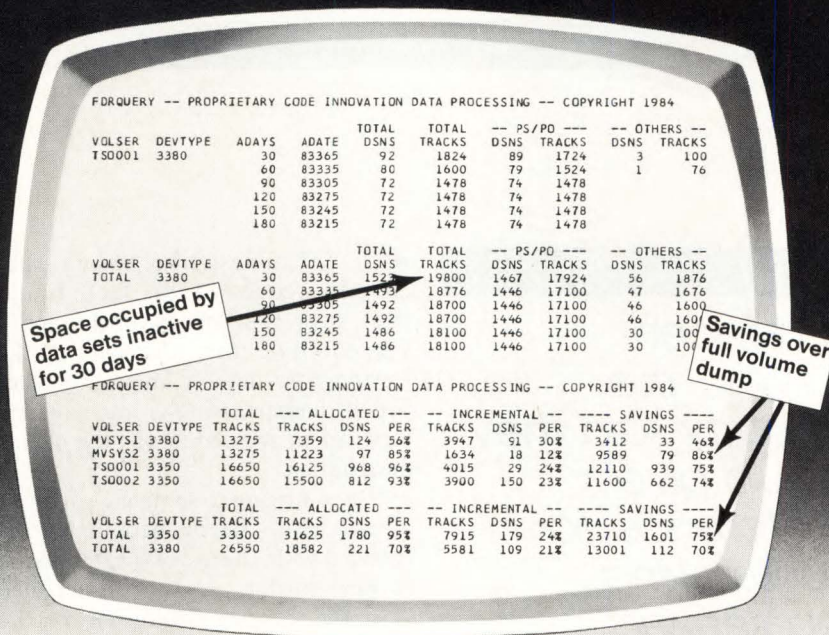
When writing to someone you have already met, telephoned, or corresponded with, the use of the first name is permissible—with restrictions. "Use the name or initials only on the envelope; inside use Mr. or Ms.," advises one executive.

If you're writing to someone and you don't know his or her gender, what should you do? Emily Post suggests the traditional "Dear Sir or Madam," although many feel this sounds too formal.

The etiquette regarding spoken names rests on the customs of the individual workplace. If your boss addresses you by your first name, that doesn't mean you can say, "Hello, Fred," when passing him in the hallway, unless everyone calls him by his first name or he himself has requested that you do so. Even then, discretion is called for; what is appropriate in one situation may be inappropriate in another.

Familiarity is discouraged in many work situations. Letitia Baldrige, once Jacqueline Kennedy Onassis' social secretary, runs a New York consultancy that teaches the social graces to up-and-comers in the business world—for a hefty fee. She advises, among other things, that clients not address secretaries by their first names. However, here again, context and consideration for others' comfort are factors. In one large office, for example, virtually everyone uses first names—except with Miss Murphy. She's been with the firm for 43 years;

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still wears gloves, a hat, and seamed stockings; slips cuff-guards over her sleeves before she begins her typing, and, in her dignified way, expects all to refer to her exactly as she was addressed when she entered the company as a proper young lady in 1941.

Forms of dress are even more complicated than forms of address. Few companies have explicit dress codes, but depending on the type of business, most expect adherence to prevailing standards. "There's never been a memo forbidding jeans and T-shirts," says one manager at an insurance office, "but people here tend to affect a more conservative dress style."

Again, creative attitudes on the part of management can enhance employees' comfort with regulations—even regarding informal rules. For instance, Ocean Spray Cranberries Inc. allows employees to wear "casual apparel" on Fridays during the summer months, says Dick Brooks, "but since the public is often in and out of the office building, even casual attire is expected to be neat, clean, and in good taste."

According to the Emily Post guide, "The way you dress tells your co-workers, your employers, and your customers or clients not only how you feel about yourself, but how you want them to feel about you." The Carleton Codgers of this world may grumble about business suits and ties on women. They may gape at noontime runners and will probably have something to say about the three tiny pearl earrings in Ms. Green's left ear. But change is inevitable and the more they accept and try to understand it, the more comfortable they'll be. Part of being a sage and successful manager is managing the relationships and interactions of the people you must work with—and for—in such a way as to quickly and efficiently attain your own personal and business goals. This involves a certain security about current business etiquette—the manners and morals, if you will, of the corporation. To achieve this, an open attitude, and a respect for the feelings and needs of others is essential. □

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