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COMPUTER DECISIONS (USPS 771-040 ISSN 0010-4558) is published 16 times a year for \$35 per year by Hayden Publishing Co., Inc., 10 Mulholland Dr., Hasbrouck Hts., NJ 07604. Second-class postage paid at Hackensack, NJ 07602, and additional mailing offices. POSTMASTER: Send address changes to COMPUTER DECISIONS, P.O. Box 1417, Riverton, NJ 08077. James S. Mulholland Jr., President and Treasurer, and Philomena DiMeo, Secretary. Printed at Brown Printing Co., Inc. All rights reserved. New subscriptions: COMPUTER DECISIONS is issued free of charge to qualified executives with active professional and functional responsibility in organizations that use computers and computer-based services and among computer manufacturers. Please fill out completely the Subscriber Qualification Form in the magazine. The publisher reserves the right to reject nonqualified requests. Subscription Rates: Qualified subscribers in the U.S. and Canada Free; Nonqualified in the U.S., Canada, Mexico, and Central America \$35. Single copies \$3.00. All other countries \$45. Single copies \$4.00. Limited quota of subscriptions available for persons outside the field served. Change of address: Fill out completely the Subscriber Qualification Form in the magazine, being sure to attach old mailing label in the space provided. Send correspondence with regard to editorial matters to address listed above. Unsolicited manuscripts will not be returned or acknowledged unless submitted with self-addressed envelope bearing sufficient postage for return. Address all other correspondence to COMPUTER DECISIONS, P.O. Box 1417, Riverton NJ 08077. Copyright © 1984 Hayden Publishing Co., Inc. All rights reserved.

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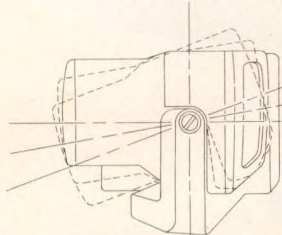
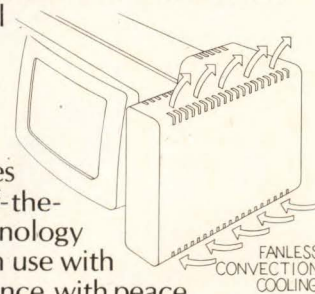
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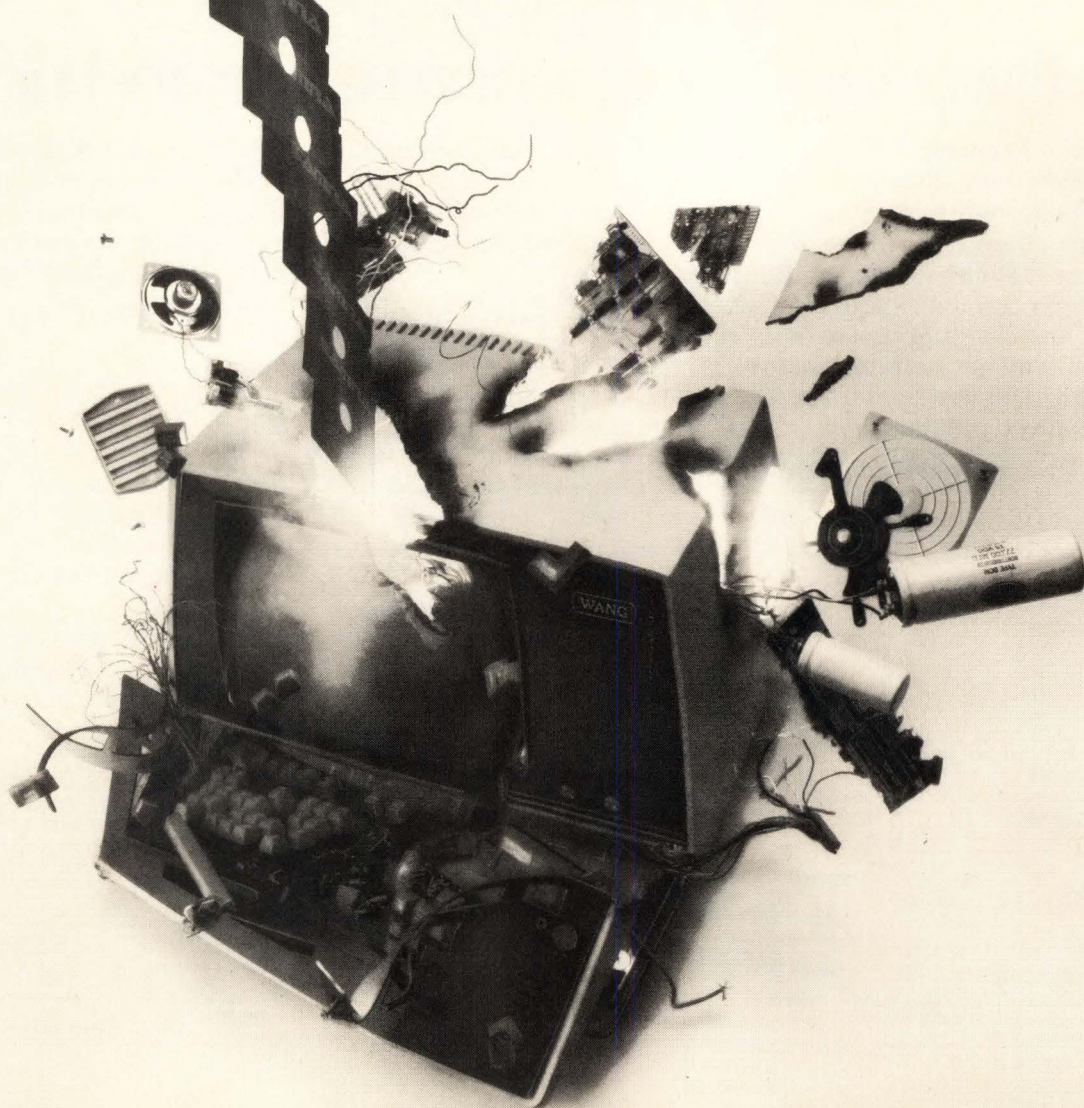
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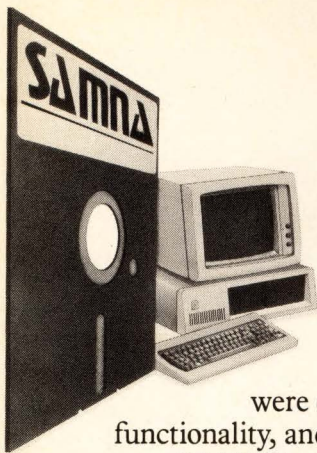
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WHEN YOU'VE GOT TO BE RIGHT.



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EDITORS' MESSAGE

"FORWARD, MARCH!"

"Office automation is a forced march, not a destination."

Getting a handle on office automation isn't easy. Here's a technically based development that has become a subset of computerization, yet its antecedents go back over 100 years to the invention of the telephone, the typewriter, and the dictation machine. (Did you know that, as soon as Edison invented the phonograph, he realized it could be used as a dictation device and dictated a message? In the process, he created what might be called a rudimentary form of electronic mail.)

Surely, there's tremendous motivation for applying OA: Most offices are drowning in paper. Many executives are not able to react to problems with the necessary speed because intra- and inter-company communications are slow or unwieldy. In spite of the continuing economic upturn, corporations are still worried about high costs. And they have good reason to be concerned: With only a few fortunate exceptions, American industry is rarely competitive overseas and generally sweating to protect markets at home from tough foreign competitors.

That's why we speak of office automation as "a forced march, not a destination." We don't mean business executives should (or can) compel their subordinates to get plugged in and start using electronic tools effectively. We mean American business has no choice but to operate more efficiently, to lower costs and raise productivity. We mean economic events and conditions demand that

American business march to office automation's cadence.

And we mean there's no end in sight. Just as surely as electronic calculators replaced 10-key adding machines and electric typewriters supplanted manual models, new and better OA tools will appear to push out the ones you choose now. Does that mean you should wait to automate until the technology's next generation? Are you still using slide rules, waiting for the absolutely last word in calculating tools?

Fortunately, there's plenty of technology available now to solve the problems and make life in offices more pleasant for executives as well as underlings. In fact, there is most likely too much technology, more than individuals and organizations can absorb.

The major obstacle to reaping the benefits of all this wonderful technology is the inability and unwillingness of people to change. So those who would play change agent must move slowly and carefully, yet inexorably, or all their efforts will founder on the shoals of human cantankerousness.

Start with executives. Even though they should benefit the most from OA, they are often the major obstacle to fruitful implementation. Just consider how few executives are willing to use that ancient warhorse of office automation, the dictation machine. And how many executives in your organization are still hung up on the anachronistic notion that using a key-

board is beneath their dignity?

Sometimes it's not the fault of those who populate offices that new technology does not make it. In spite of all the early hype, voice mail, teleconferencing, and telecommuting are not taking the business community by storm. (See "Voice mail—is anybody listening?" May, and "Telecommuting: Will it work for you?" in this issue. Teleconferencing, another underwhelming technology, will be explored in an issue later this year.)

If these three technologies are not advancing, there are nevertheless some bright stars to report. The personal computer is popping up in offices like daisies after a spring shower. Another warhorse, word processing, is still trotting ahead at a respectable pace. And with the personal computer taking on word processing—while the word processor is now able to tackle computing—we are fast approaching the universal workstation.

In spite of all the foot-dragging, quiet sabotage, and turf-protecting, OA is making it in many organizations because there are corporate heroes who recognize that there are no alternatives for a company that would stay healthy and profitable. They are willing to put their necks (and sometimes their careers) on the block to implement automation. Let us hail these often scarred warriors of interdepartmental skirmishes—and then turn the page to find out how they are making OA pay off in their organizations. —Mel Mandell

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ONE STEP AT A TIME

by Stewart Alter

Late in the 1970s, Allen Smith faced a situation that has since become increasingly common among information-systems executives. Looking at the quickening pace of developments in office automation, he began to form a vision of how his corporation would be using the technology in five years.

At that time, Smith said he saw no ideal office-automation system looming on his company's horizon. Today, more than five years later, the manager of corporate information systems at the Los Angeles-based Atlantic Richfield Co. acknowledges that he still sees "no great solution" to his systems problems.

One has to ask, "Where, then, is the value in planning so far ahead?" Indeed, in a field where the pace of new developments is so unpredictable, is it worthwhile to consider long-term plans at all? Or is working toward short-term goals the only practical way to plan for the future of OA?

Smith believes the guidance provided by his five-year vision has been beneficial. "It helped us select pilot systems and focus our efforts and energy. It also gave management an idea of where we were heading, even if we couldn't reach our destination right away," he explains.

Moreover, Smith found that just doing *something* about office automation was valuable—even without all the answers in sight—because it offered a chance to learn. "The more we learn, the quicker we can take advantage of solutions when they do arrive," he says. "We don't know what the technology will be like in the future, but we do know that it will be very different, that the opportunities it creates will be significant, and that corporations will have to make big changes to meet the challenges it presents."

Getting started with pilot projects five years ago has given Atlantic Richfield a leg up on its competitors; many of them are still sitting back cautiously, waiting for the highly touted "total solution" to link all their office systems together. Smith disapproves of this wait-and-see attitude. Even when an acceptable solution to OA is developed, he warns, "those corporations will still have to go through the trauma of educating employees, dealing with their concerns and fears, and convincing management of OA's benefits. It takes a corporation a long time to adapt to office automation; you can't tell management, 'Congratulations, office automation will arrive on Monday.'"

That's why planning has become so important to businesses involved in office automation. Until recently, American corporations have been content to let automation set its own course. John J. Connell,

PLAN FOR THE



FUTURE IN OA

Photo by Bill Oliwa

In OA planning, brilliant visions of a corporation's future become reality only if management takes realistic steps today.

executive director of the Office Technology Research Group, a Pasadena, CA-based association of managers who have senior responsibility for advanced office systems, observes that many corporations initially implemented office automation one department at a time. As employees gained experience with the equipment, it was introduced into other departments—its use spread naturally, guided, it seemed, not by the corporation's goals, but by fate.

But now senior managers are realizing the risks are too great to continue introducing advanced office systems in such a hit-or-miss way. "The capital investment in machines, software, and networks mounts up rapidly when you let OA spread department by department. And if you don't have a plan to measure results, you can't tell if you're making a nickel on your investment," Connell maintains. "Gutsy questions," he asserts, "have to be asked about what you're trying to do with office automation and how you're going to do it."

Like many others, Connell believes the key element in planning for automation is not the technology itself, but how the technology can further a corporation's objectives for growth. The value of office systems is in serving corporate goals—increasing revenue, market share, and net in-

PLAN FOR THE FUTURE IN OA

come. "Developing a vision of OA doesn't mean specifying that you will introduce this machine into that location to accomplish this particular task," he says. Rather, it's a way to avoid bringing in systems haphazardly. "You need to define your objective, decide what steps you're going to take to achieve it, and develop some way to measure results."

Planning to make technology the servant of business can be more complicated than it seems; the impact of OA can be so far-reaching, it can seem elusive. The payback doesn't come quickly, points out James Carlisle, who heads Office of the Future Inc., a consultancy in Guttenberg, NJ. "The significant payoff in office automation is the improvement in the organization's competitive position," he says. "As soon as you acknowledge that that's where the benefits are, you'll realize that serious planning for office systems is imperative. A corporation trying to operate in the 1980s without

competent OA planners is as stupid as one trying to operate without competent tax planners." And, he adds, "Office planners have as little to do with word processing as tax planners have to do with accounting."

Planning for the distant future is essential, but can an organization develop long-term plans for OA that coincide with short-term goals? In most companies, the big picture changes daily, and plans for it must be tempered by practical strategies that deal with the near future. In other words, working toward a grand future vision still means taking OA plans one step at a time.

Many experts on office automation share that viewpoint. They agree that long-term and short-term planning are not only compatible, they're synergistic. "A broad view of where you're going to be in five years is absolutely essential to the development of a one-year, short-term, plan," comments Robert Dickinson, a partner in Performance Strategies, a New York-based consultancy, and former office-systems manager for Exxon Corp. "A one-year plan is no good without the perspective provided by a long-term outlook."

In contrast, by its very nature, a long-term plan cannot be specific, continues Dickinson. There will be too many changes in the technology and within your corporation to let you stick to such a plan. But planning for 1990 can provide a forecast and assessment of how technological developments might fit into a corporation's goals. "I don't know an organization that has suffered from planning far in advance," says Dickinson. "But organizations do run into trouble when they don't figure out the consequences of how new projects fit in, either with long-term corporate strategy or office-automation strategy."

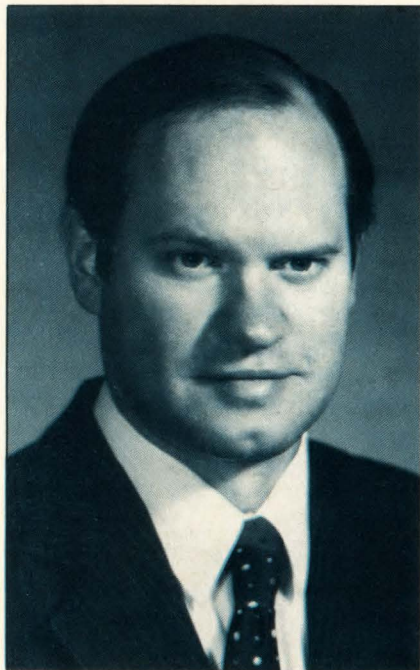
Plans have to be relevant to an organization. Dickinson notes that Exxon had developed three plans, which—allowing for differences in

the situation, profits, and locations of Exxon affiliates—range from an "aggressive, almost revolutionary introduction to office automation to a gradual, evolutionary approach. Each has its advantages and disadvantages," says Dickinson.

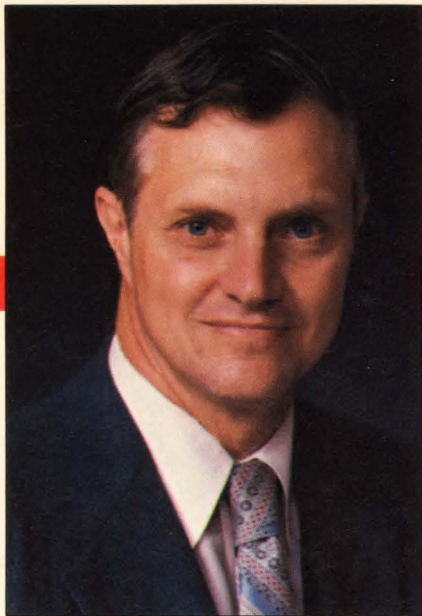
Paul A. Strassmann, vice president of systems applications at Xerox Systems Group (Stamford, CT), agrees that planning methods should be prescribed according to an organization's particular problems. He says comparing the benefits of long-term and short-term planning is like asking a doctor if he or she encourages preventive medicine or prescribes surgery for patients. "That doctor will look at you as if you're crazy, and say 'You'd better tell me more about the patient first. I may have to do artificial respiration.'" Explains Strassmann, "If a problem is highly tactical, then act with a tactical, short-term solution. If it is deeply rooted and requires a substantial overhaul, then look to the long-term."

Strassmann, who is also on the board of trustees of The Strategic Planning Institute (Cambridge, MA), explains how that not-for-profit research foundation developed a new service that assesses "the relative effectiveness of a company's information technology, determines the investment strategy that gives the biggest payoffs, and outlines the changes in management productivity that should be planned." Strassmann's service uses diagnostic tools similar to those used by strategic planners to help organizations define their goals and decide whether and where automated solutions would be appropriate.

His method is based on corporations' need to tie long-range plans into short-term strategic goals. He says the value added by technology cannot be isolated from business plans. Using the new analysis system, research conducted on 35 corporations found "businesses in poor



John Parker, director of information services, says Corning's approach "is not to look at office automation as a product, but as a process."



Having a five-year plan "helped us select pilot systems and focus our efforts and energy," says Atlantic Richfield's Allen Smith.

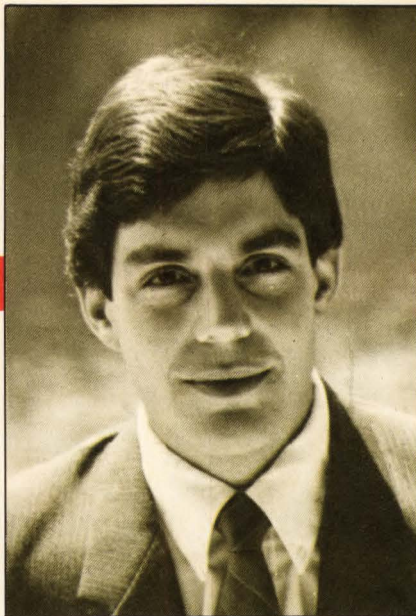
strategic positions could not gain from information technology. Businesses well-positioned strategically could show great improvements."

Striking a balance between long-term and short-term planning is also at the heart of the thinking of Dean Meyer, who heads the N. Dean Meyer consultancy in Ridgefield, CT. He calls that balance a "head in the clouds, feet on the ground" approach. "You need to develop a sense of where you're going in order to guide short-term activity," says Meyer, adding that a grand scheme should be a "living vision; a long-term target for integrating systems that changes and adapts as a program develops from year to year."

The long-term aspect of the plan, says Meyer, could include a blueprint of the technology to be used, which would give corporate management "a sense of which tools belong at which levels of the network, and of how the network will connect these pockets of technology."

Meyer believes it's possible to make some predictions about technology, in spite of its fast rate of change: "We can expect continued price reductions and increased growth in the processing power of desk-top machines." He also believes other elements can be predicted with some accuracy, including the pace of organizational change, capital requirements, and organizational support requirements.

One also knows, observes Meyer,



Consultant N. Dean Meyer plumps for a "head in the clouds, feet on the ground" approach to OA planning.

the functions of OA systems are not going to change much. "Products are announced every day and, though it may seem bewildering, they're really only old products packaged in new ways," he says. But the tools themselves, meaning the tasks they handle, have not changed greatly. "Most tools available today were available in some form in 1970."

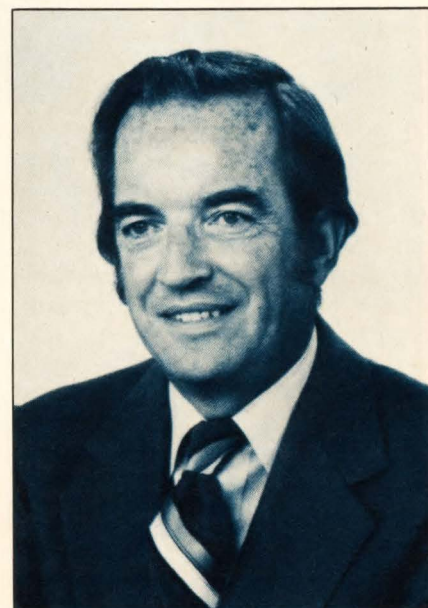
The key to planning, in Meyer's thinking, is recognizing that implementation must be tied to the jobs of users. "I caution against using a plan as an excuse for top-down implementation," says Meyer. "Some OA planners spend most of their staff time developing a plan they can attempt to implement all at once. But they're not helping users. Rather, they're creating ideal dream machines in their heads. Each local implementation should be treated uniquely because each user's mission is unique," he continues. "If you try to build an organization-wide system all at once, all you can do is address tasks everybody has in common, like administrative tasks," he says, add-

"Planning for OA five years ago has given Atlantic Richfield a leg up on competitors."

ing that such a general system could not address the real factors that account for business success.

There are no shortcuts in OA planning. The needs of every office cannot be covered adequately from the outset. "It would take five years to write a five-year plan for the entire organization, because doing it right would mean working with each user to get a sense of how the tools can help do each job," says Meyer. "No survey, interview, or observation can tell an information-systems manager what it takes to make a particular business unit effective."

Meyer concludes that long-range planning for technology is important, but it does not deserve priority over immediate plans. "The information staff exists first to serve the business and second to worry about the quality of technology," he believes. He also thinks it's better to get started delivering OA's benefits to users—even before plans are firmly in place. "I



Many corporations initially implemented office automation one department at a time, observes John J. Connell of the Office Technology Research Group. Its use spread naturally—guided, it seemed, not by the corporation's goals, but by fate.

PLAN FOR THE FUTURE IN OA



encourage OA planners first to focus on getting things moving, and to focus on integrating systems only after momentum has been built. Go out and be useful."

Tensions in planning build not only between technology and business needs, but also between an organization and the units that make it up. Marty Gruhn, director of research at the Sierra Group, a market research and consulting firm in Phoenix, AZ, divides up the planning territory to develop organizational, departmental, and personal tools.

She also divides the time components of the strategic plan into three related segments. First there's a one-year plan for solving immediate problems. Then there's a three-year plan for augmenting existing systems, and finally there's a five-years-and-beyond vision, which Gruhn calls the "Buck Rogers aspect." She warns

that such a long-range view can be hazy—no one knows, for example, whether imaging or other techniques will be used widely in the future. But she maintains it serves an important purpose: It compels information-systems executives to keep track of the latest developments. In any event, the long-range component of the plan should be as general and as non-committal about vendors as possible, Gruhn cautions. It should be reviewed yearly, so it can be modified

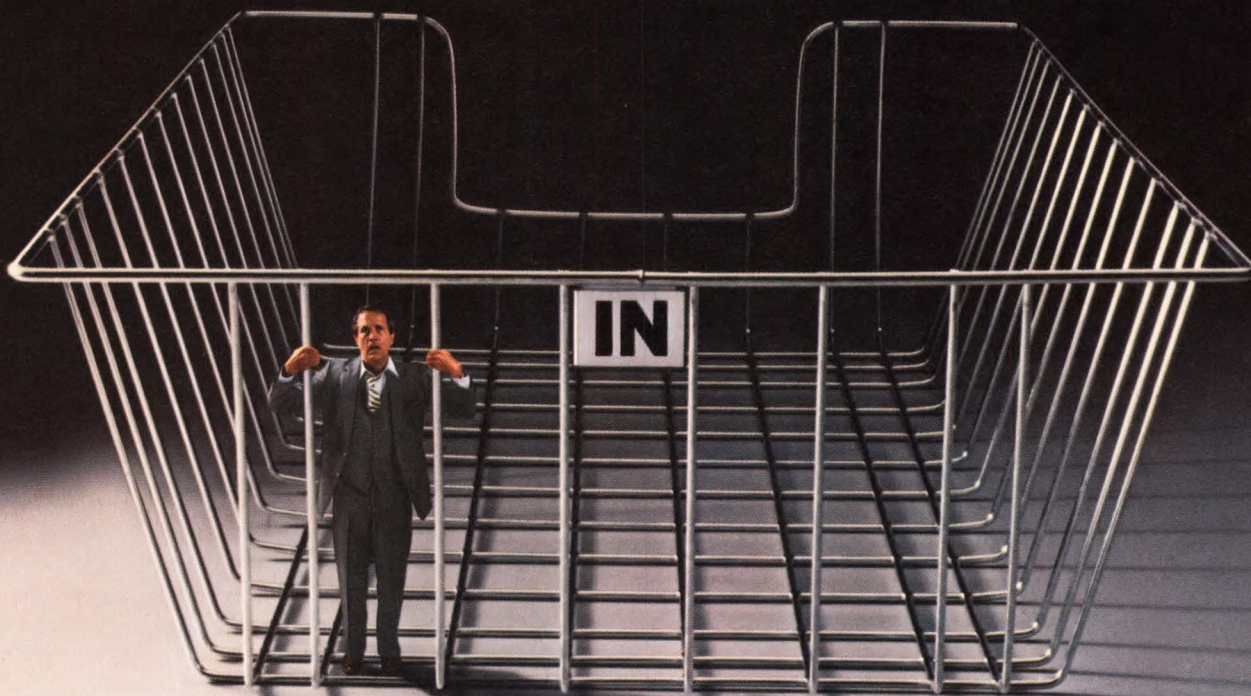
"OA managers must assume more responsibility for departmental profits."

as new products become available.

The need for planning seems obvious, but Gruhn agrees with Meyer that corporations that actually develop long-range plans are the exception rather than the rule. One reason for this is the difficulty in finding competent OA planners. She explains that the three specialties in information technology—data processing, word processing, and telephony—each demand a narrow technical expertise. "But office automation typically requires multidisciplined professionals," she explains, and such pioneers are hard to find. In addition, managers of office automation must have an almost uncanny understanding of users, a trait that is not common among other technical specialists.

Equipment obsolescence is a second reason why corporations plan for OA less than they should. Gruhn

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believes obsolescence is more an excuse not to plan than a real problem. "A lot of managers believe everything is changing so quickly, but OA is changing a lot more slowly than they think," she says. To Gruhn, the biggest danger is "not whether a product will become obsolete, but whether its vendor will." Referring to the downfall of portable-maker Osborne, she observes that manufacturer size does not guarantee long-term support. But a company can protect itself against a disaster like Osborne's. Equipment buyers can ask in advance whether they can support the products they're purchasing themselves; they can also gauge whether a vendor has gained sufficient market share to generate service revenue large enough to interest another company in taking over support, as happened with Osborne. (Xerox and Computerland are servicing Osborne portables.)

Potential product obsolescence



Implementing systems in groups of fewer than 100 people "allows us to explore the technical aspects of OA, and to get a better understanding of its advantages and limitations, of such resources as training, and of the organizational aspects," says DuPont's Raymond Cairns.



"If a problem is highly tactical, then act with a tactical, short-term solution. If it is deeply rooted and requires a substantial overhaul, then look to the long-term," advises Xerox' Paul Strassmann.

shouldn't affect an organization's plans for OA. Many consultants agree a corporation's big picture should be continually revised as both technology and business strategies change. Indeed, when planning for the distant future, it's important to be flexible and to expect the unexpected. As Robert Becker, head of the Ra-beck Inc. consultancy in Montclair, NJ, observes, "Obsolescence is a risk that's not controllable. But then, I'm not even convinced *technology* is controllable." He explains that the logic guiding new products into the marketplace is unpredictable because it reflects the marketing strategies of vendors. "Making precise long-term plans for technology is like developing a strategy around someone else's strategy. It's almost impossible to do," he explains.

Similarly, Becker believes information-systems goals have to

mesh with business goals because a corporation's future cannot be easily divined. "Something like divestiture is not necessarily a change we can anticipate," he observes. But how big a corporation will become in the future is certainly an important factor in technology planning.

The impact of technology on users can also force organizations to modify their dreams of the distant future with solid plans for today. The widespread dissemination of unsuitable information to possibly unsuitable recipients is one problem; an employee can misinterpret or misuse data available for the first time about another business unit. Consequently, Becker believes, technology planning has to include an examination of "the kind of information that is needed, the quality of information, and the ability of the accessor to interpret it."

Becker cites another problem that can bring an OA planner's dreams of grandeur down to earth. Performance, evaluated differently in different types of business units, can make introducing technology tricky. Manufacturing managers, for example, make decisions that consider intangible differences between machines and personality differences between operators. "Standard databases do not capture that aspect of manufacturing," comments Becker. "The problem with information-systems professionals is that they are largely analytical. That may suit the finance department, but when dealing with operations, people, materials, and machines, it's difficult for OA professionals to understand that the specifics don't follow an equation."

Plans for OA must be flexible if visions of the future are ever to achieve fruition. And implicit in this is the belief that the role of information systems will have to change as office automation becomes more widespread. Some argue that information-systems executives will have to assume more direct responsibility for corporate profits. OA

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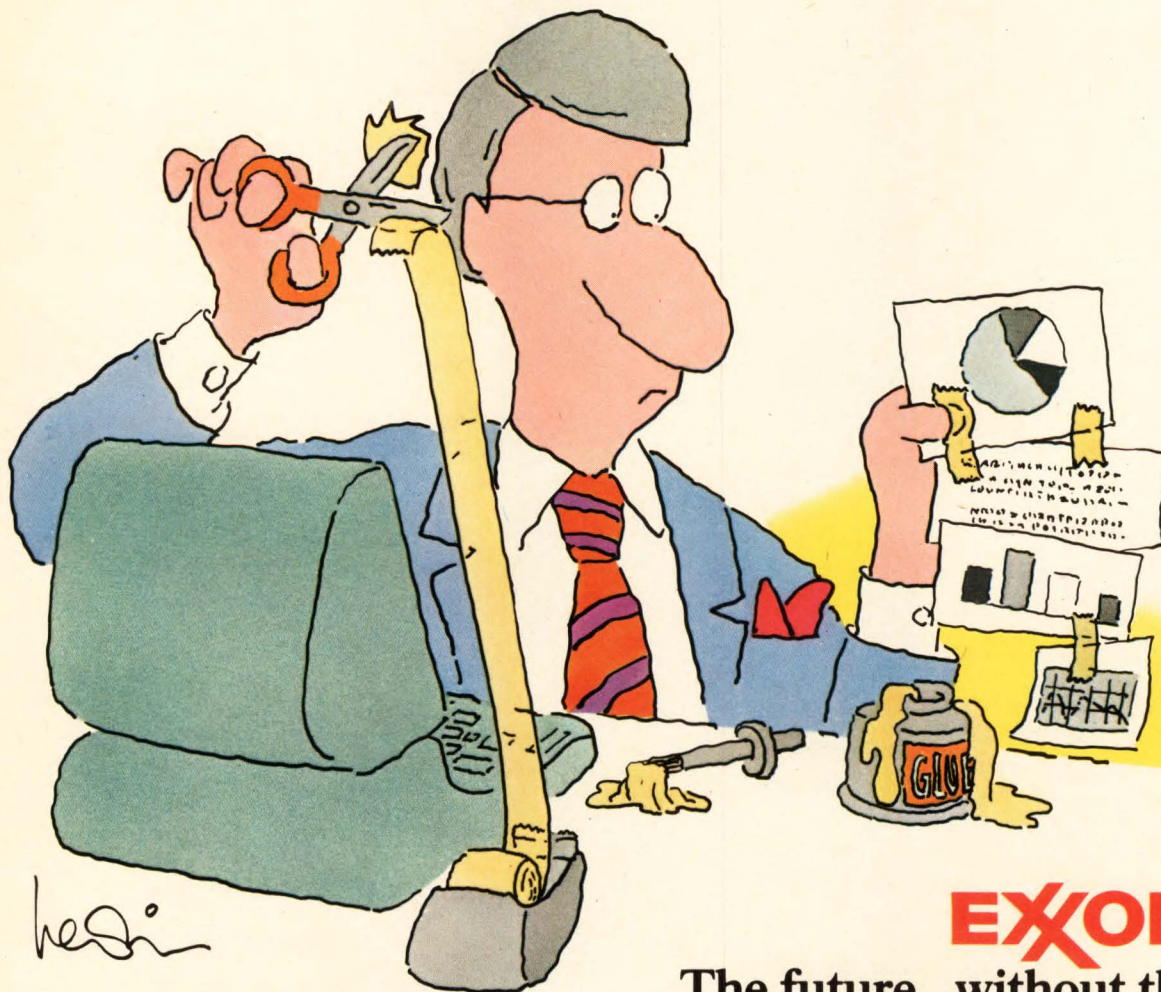
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itself will have to become a more integral part of the operation and less of a service. It will also have to be considered less as a contributor to productivity and more as a contributor to each department's profits. And, in turn, department managers will have to become more involved in OA planning.

Not all corporations need to move toward that goal—some have already reached it. Thanks to intelligent planning, companies like Corning Glass Works (Corning, NY) are able to deal with whatever changes—organizational or technological—the future may bring.

John Parker, director of information services, describes Corning's attitude toward planning. "My approach is not to look at office automation as a product, but as a process." He believes it's "not very realistic to assemble a long-term plan," certainly not if the plan specifies how many systems will be used by how many users for what tasks five years from now. "We don't attempt to install a system that requires a forced march by large groups of people," Parker says. Instead, his division works to fill specific user needs.

Except for the fact that it doesn't make or lose money, Parker's division is, in effect, a marketing organization with its own set of clients—the users. Like other marketers, it reacts to changes in its marketplace. Late last year, for example, Corning's information center, microcomputer-support team, and office-systems group were all consolidated into a single professional- and office-systems group, directed by Joseph D. Malorzo, manager of office systems and service, who reports to Parker. The move was made because the needs of various users were changing. "A client doesn't want to go to one group for statistical analysis and another for text processing," says Parker. He adds that the new consolidated entity also includes a group

of educators, behavioral scientists, and trainers, who deal with the human impact of technology.

"At Corning, information services are run as an internal business. Funding comes from end users," explains Parker. "As a result, we have to make

sure that anything we do has a demonstrable benefit. When we take on projects, we take great pains to show the hard-dollar cost recovery." As a result, Parker's division does not have difficulty persuading managers that office systems will help them do their jobs.

Corning's strict client-service approach has its drawbacks, acknowledges Parker; the individual personality and outlook of a manager become crucial. "For example, a new cast of characters that comes in halfway through a project might view its benefits differently than the former management team. If the new decision-makers don't see any hard-dollar benefits, they can terminate a program quite abruptly." He adds, however, that it's generally not difficult to justify an investment to new players.

True, Corning's approach to planning emphasizes the short-term goals of end users, but it doesn't ignore long-term goals for technology. User needs are viewed within "a context of overall long-range planning for technology architecture," says Parker. Technology planning is important because Corning needs to be able to transfer employees to different divisions without having to train them on new equipment. Corning also wants its users to be able to share all resources.

Malorzo stresses that clients' needs do not dictate Corning's OA plans. "Solutions are not based strictly on a user's perception of what should be done; they're considered within the context of our long-term plans for

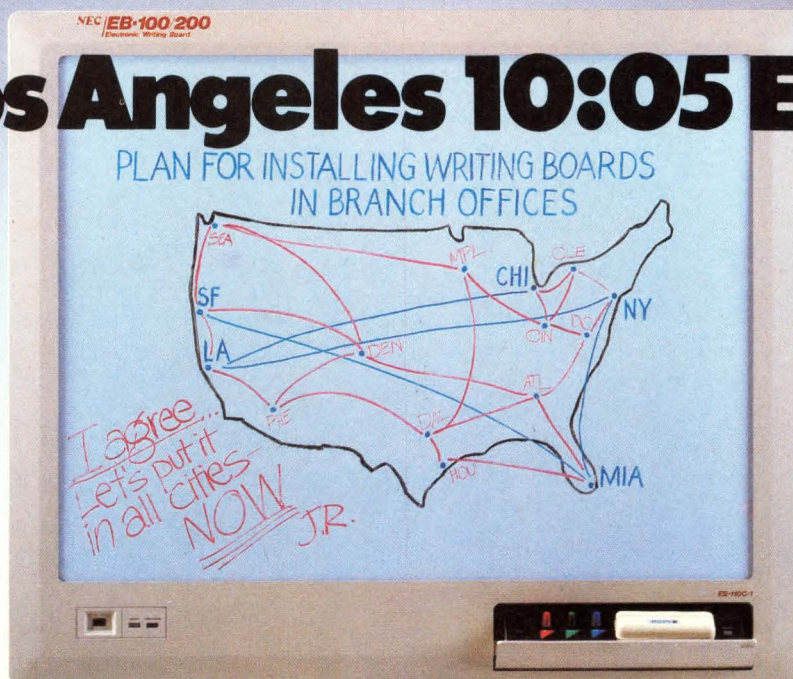


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Sierra Group's Marty Gruhn calls planning for five years and beyond the "Buck Rogers aspect."

technology." That technology primarily includes products from IBM and Digital Equipment Corp., but Parker and Malorzo will re-examine their vendor strictures if a user wants a feature that's not available from the No. 1 and No. 2 computer makers.

Corning's approach to planning allows it to take risks on products that clients may not yet know they want. For example, a few years back, Parker saw the advantages of voice mail and brought it into Corning, even though he couldn't find a user in advance. "We were not able to justify it in hard dollars, but because there were such soft-dollar benefits, we believed we could implement it on a speculative basis," he says. The move turned out to be a good bet. The "soft-dollar" benefits included such gains as reductions in corporate telephone expenses. Clients have embraced the system, and Corning now

has the largest voice-mail system of any corporation in the world, says Parker.

E.I. du Pont de Nemours & Co., based in Wilmington, DE, offers another example of how a major corporation actually goes about planning and implementing advanced office systems. Du Pont has introduced three pilot projects within the last two years. "Because the field is so new to us, we have been relatively cautious about trying to implement OA technology broadly," explains Raymond E. Cairns Jr., managing director of the information-systems department.

Du Pont has been implementing systems in groups of fewer than 100 people. "This allows us to explore the technical aspects of OA, and to get a better understanding of its advantages and limitations, of such resources as training, and of the organizational aspects," says Cairns. As a result, Du Pont's time frame for planning is relatively short. "When we gain more experience from these pilots, we'll start planning as far ahead as three years, but now we're looking toward horizons a year or 18 months away," Cairns says. He adds that, in any event, "We're not going to sit down and develop a grandiose plan for all of Du Pont. That would be counterproductive."

Like many others, Cairns believes business goals take precedence over technological considerations. "We always have to keep business uses of OA in mind," he says. This has been important in selecting, developing, and evaluating pilots.

"The value of automated office systems is in their ability to increase revenue."

Cairns believes upper-management support is essential in implementing systems. Managers must see that automating their offices can help both them and their staffs work smarter, faster, and better. Only then will they be willing to dedicate the resources necessary for OA and reap the full benefits of training. "We entered into our pilot projects understanding that if managers did not see any advantages to OA, we would take back the equipment," Cairns says. On the other hand, management would have to agree to let Cairns' staff continue to implement new technology, if a pilot were successful.

Like Corning, Du Pont has dealt with the threat of obsolescence by limiting the number of vendors it buys products from. In Du Pont's case, there are three: IBM, DEC, and Hewlett-Packard. "Our strategy is to use the major products of those three vendors," Cairns explains. "We looked at their financial capability, emphasis on research, and product quality, and decided they are all going to be around for a long time."

As the examples of Du Pont and Corning indicate, no two plans or approaches to planning look alike. Still, most planners will agree on a few points. Both Parker and Cairns, for example, claim not to address corporate strategic planning directly, but in a de facto way by tying systems planning tightly to user requirements. Both also try to prevent obsolescence by limiting their purchases to a few major vendors.

And, as many consultants emphasize, planning is necessarily an imperfect procedure. At best, it permits adaptation to change. And in a way, planning means preparing for change. Flexibility must be at the core of any plan, if corporations are to take advantage of new opportunities. □

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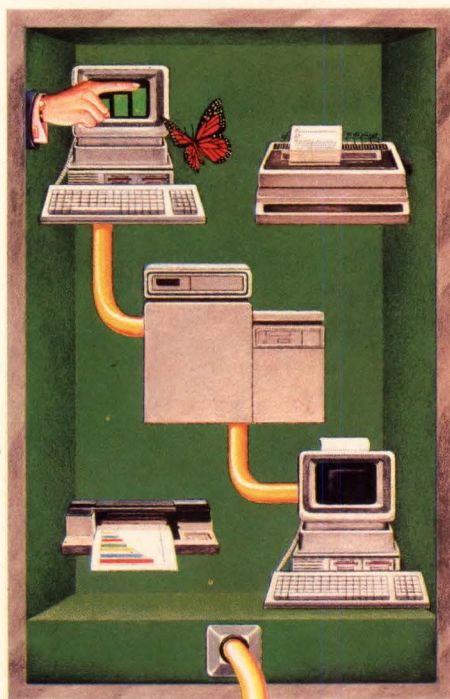
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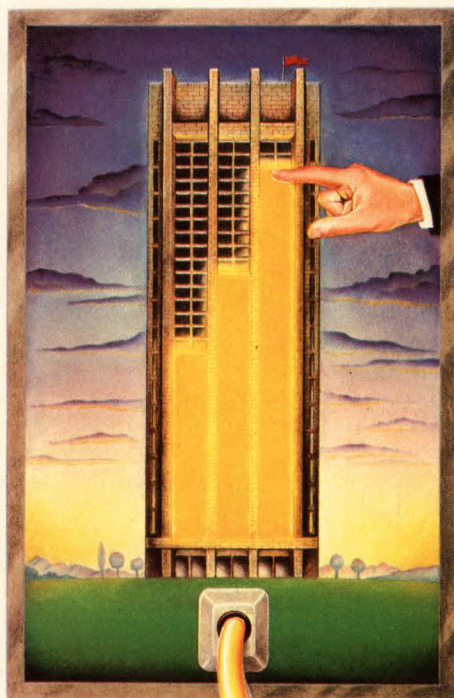
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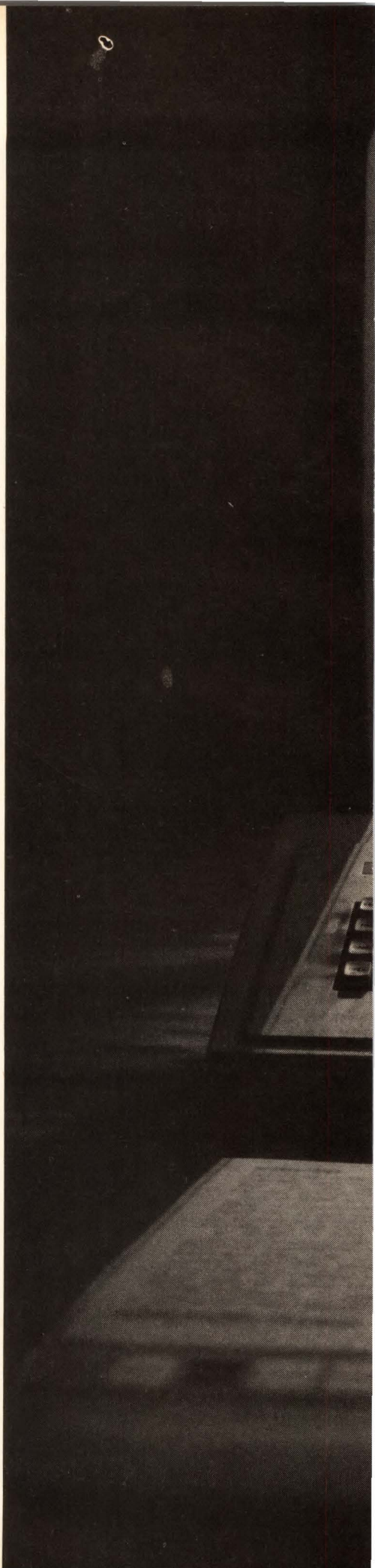
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Input/output systems

The three basic techniques used by computers to interface to the outside world are 1) interrupts, 2) programmed input and output (PIO), and 3) direct memory access (DMA). To describe these techniques, it is helpful to break down the internal organization of a computer into four functional units or blocks, i.e., the memory, I/O, arithmetic logic unit (ALU), and control unit. Figure 4 shows this functional breakdown for first, the von Neumann as well as the bus structured architectures.

As shown in both, interrupts are signals from external devices through the I/O unit to the control unit. These signals indicate the occurrence of a specific event and usually affect the program currently being run in the computer. No data is transferred by the interrupt signal; only the presence of the interrupt is established.

PIO is done by having the program explicitly transfer the data between the I/O unit and either the registers in the ALU or the memory unit. On the other hand, DMA occurs when data is transferred between the I/O unit and the memory unit without program intervention except for initialization.

Interrupts

An interrupt is a signal from outside the computer that something has taken place. The general process of servicing an interrupt is that first the interrupt arrives at the I/O unit, which in turn, informs the control unit. The program is stopped at the conclusion of the program if it

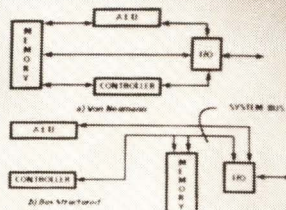
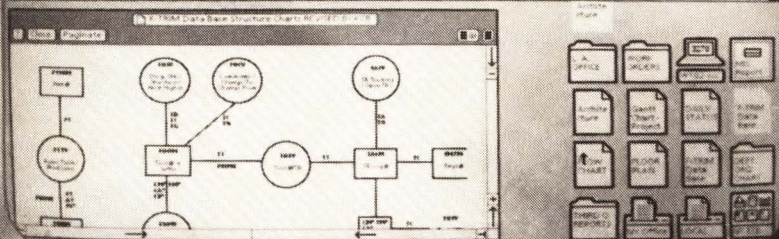


Figure 4. Computer architecture

then stopped. This unit can be interrupted by the ALU or the memory unit. The unit can be interrupted by the ALU or the memory unit. The unit can be interrupted by the ALU or the memory unit.



AFTER YOU TEST THE WATERS, BEFORE YOU TAKE THE PLUNGE

For senior managers, getting involved in OA means looking beyond the cost of equipment and return on investment. It requires total commitment—even before you blow the whistle and shout “Go!”

by Sally E. Ketchum

One office-automation vendor's radio commercial hits home with executives responsible for implementing office technology. In it, “Mr. Bixby” is asked by his boss, “Has that computer paid for itself yet?” After asking the same question several times in increasingly heated tones, the boss roars: “Mr. Bixby, if that computer doesn't pay for itself soon, *someone* will have to pay for it!”

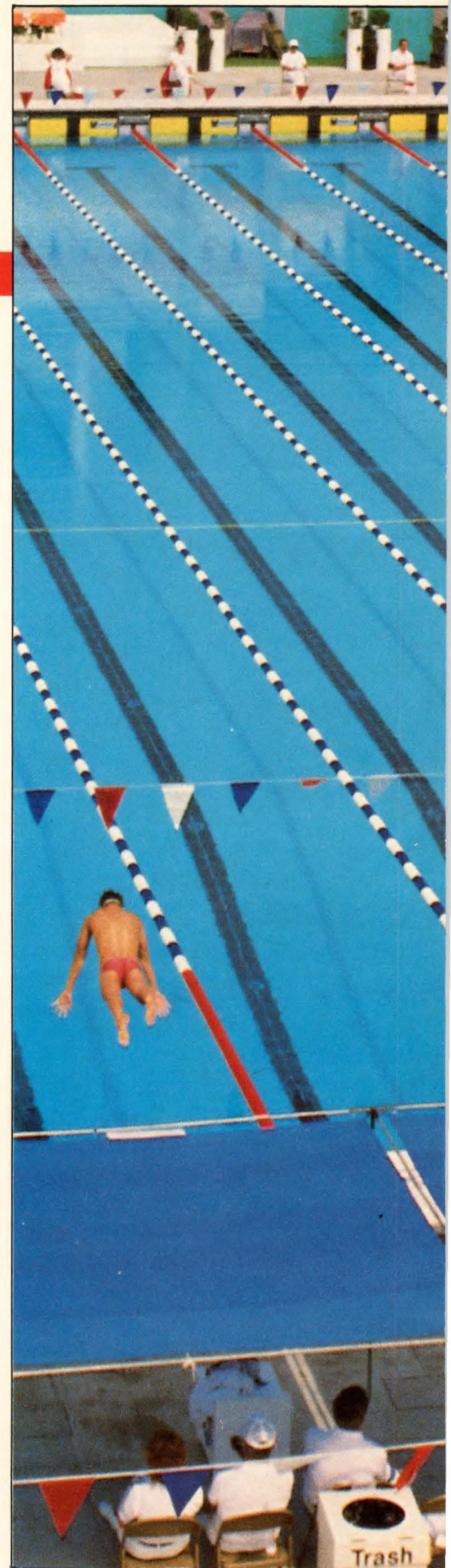
Unfortunately, there are a lot of Mr. Bixbys—and bosses like Mr. Bixby's—in today's offices. When it comes to buying computer systems for the office, the cost of the equipment—and the saving it might reap in the future—is pretty much all anyone at the top wants to hear about.

Granted, economic considerations should form the crux of any business acquisition. But a computer is not just any ordinary business tool, and price is not its most important characteristic. For instance, you don't hear anyone asking whether a calculator is user friendly or if it will pay for itself. And you certainly don't

find the data-processing manager and heads of other departments at odds over control of calculator purchases.

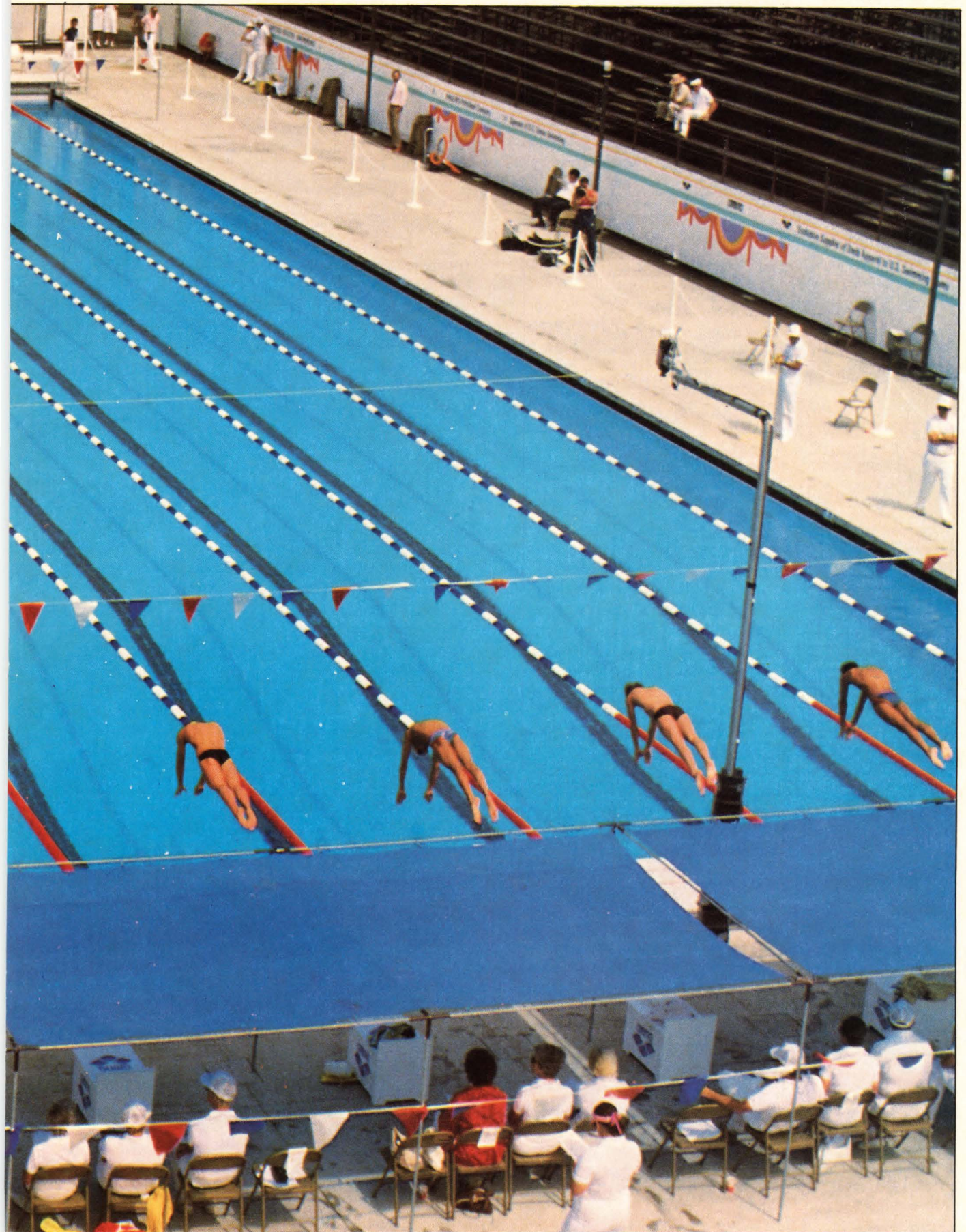
There's a lot more at stake when implementing office automation than there is when installing standard office equipment. Yet in many corporations, top management shies away from OA projects—except where the bottom line is concerned. Such misdirected emphasis promotes the fallacy that cheap equipment and speedy implementation are more important than the smooth flow of information throughout the office. And senior managers who allow systems to be implemented under such a philosophy are, in effect, handing their workers toothbrushes to scrub the floor of the Taj Mahal—and handing their automation project a death sentence.

Management at one mid-sized northeastern manufacturer did implement OA carelessly—and, not surprisingly, its project fell on its face. “Management did not clearly identify the company's needs initially,” says Alan C. Verbit, president of Ver-



A GOOD START IN OA

Photo by Tony Duffy/Sports Illustrated





"Technical people get upset with top management when it ignores office automation," says Bart Carlson, CEO of National Systems Laboratories, Schaumburg, IL.

bit & Co., general management consultants. "Neither did it commit a big enough budget to the project."

According to Verbit, whose Bala Cynwyd, PA, consultancy specializes in selection and implementation of information and OA systems, the manufacturer wound up with a system that was inadequate for the job. "We think the vendor, which had no experience in installing OA systems in manufacturing companies, intentionally supplied equipment it knew was unsuitable just to make the sale," he says. But he adds that all the blame can't be placed on the vendor. "Management did not negotiate a proper contract with the vendor; it continually changed its requirements, and it made no arrangements for user training."

Management's half-hearted attempt at getting involved in its OA project cost the manufacturer more than the price of the equipment. Today, four years later—after a lengthy court battle and the vendor's refusal to rectify the problem—the company has had to repair the damages itself. A new system has been created—with the help of Verbit & Co.—to upgrade the equipment and acquire new software. (Verbit says the old system contains "gross inefficiencies.")

But even more problematic than

A GOOD START

inadequate software was the attitude of management, Verbit believes. Had management focused on the organization's needs—instead of on the equipment's cost—the project might have succeeded the first time around. Instead, the company will end up spending more time and money putting bandages on its system than it would have spent examining its needs and purchasing the right equipment in the first place. "Once management realized its attitude was part of the problem, cooperation increased dramatically," he says.

Too often, the need to create synergy between technology and staff is lost on top management, which is used to dealing in dollars and cents, not in bits and bytes. In *Time* magazine's January 1983 "Machine of the Year" issue, one office-design consultant noted: "The biggest problem in introducing computers into an office is management itself. [The bosses] don't understand it, and they are scared to death of it."

When top management shuns all involvement with automation projects—except to approve purchases—the task of implementation often falls to the MIS/dp department—partly because "the computer department" has *always* taken care of computerization, and partly because other departments usually don't have or want the technical knowledge needed to make OA work.

This can pose some problems. For one, the real needs of users may not be understood by a technical staffer; this problem is compounded if that staffer also lacks skill in interviewing and fact-finding. For another, MIS/dp often is not qualified to provide the follow-up support and guidance needed to ensure the productive use of equipment. As a result, the company may find itself sailing on a sea of automation without a captain.

According to Bart Carlson, who was an MIS manager and a consultant before becoming president and CEO of National Systems Labora-

tories (Schaumburg, IL), MIS managers want help from the top. "Technical people get upset with top management when it ignores automation, because the payback from OA correlates with the input, planning, and emphasis top management gives it. Senior managers should set an example by using appropriate OA technologies in their own work and by asking themselves, 'How can OA help my part of the company?'"

That extra interest and involvement from the top can help MIS/dp analyze how work is done in an organization and, therefore, how technological tools can help get that work done faster, better, and cheaper. Such involvement is also a way for management to discover the less obvious advantages of computer systems. "It's not always a matter of return on investment," says Carlson. "Computers add value by allowing you to accomplish tasks you couldn't before."

Tight direction from senior management can also prevent political struggles between office-automation and data-processing staffs—which can ultimately negate any potential saving from OA. If separate departments are at odds over control of office automation, the situation can get ugly. "The data-processing staff has actually thrown switches to bring our OA system down and make us look bad," says one senior administrative executive who oversees office automation at one of the world's largest manufacturing companies.

Allen Olson, as we shall call this executive, was cast adrift in the sea of office politics three years ago when his boss—who Olson says was strong and decisive enough to keep dp at bay—left the company. "Not long before that, my department had been commissioned by the president to look for an office-automation system," he explains, "but dp heard about the project and warned us not to get involved. The dp managers

(Continued on page 37)

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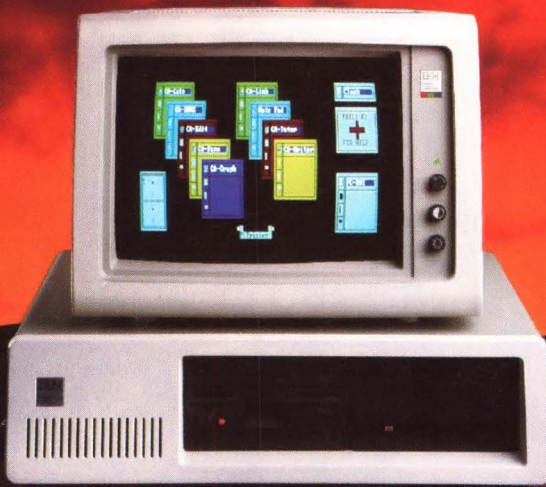


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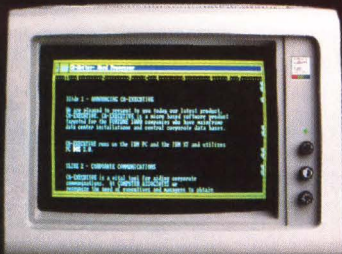
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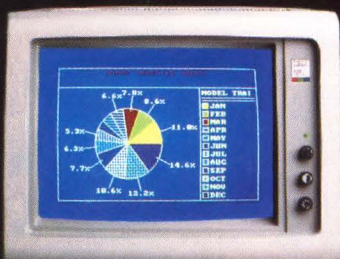


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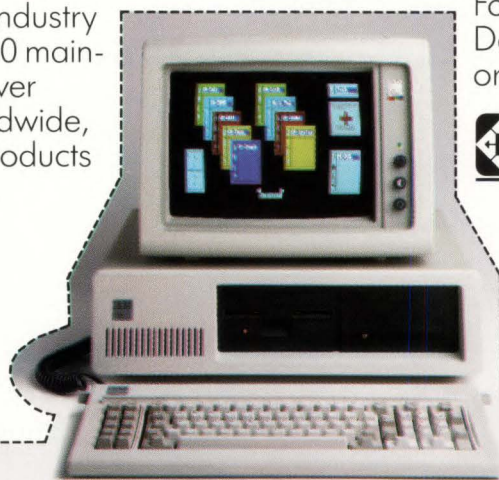
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A GOOD START

(Continued from page 32)

hated us from the start because they thought we were encroaching on their territory. And they've told us flat out that they won't cooperate with us."

In fact, says Olson, dp has done everything possible to torpedo his department's efforts. In addition to throwing switches, the dp department has decreed that any system hooking into the mainframe automatically reverts to its control. "And that includes simple storage—so dp has even taken over stand-alone applications."

Unfortunately, Olson says, his new boss has turned out to be "wishy washy," so Olson now has to fight his own battles with dp—not an easy task when dp outnumbers his group nearly 40 to one. "I've tried everything: I've been nice . . . I've gotten mad . . . I've screamed. But the dp manager can only see blue; he wants outmoded IBM-emulation terminals everywhere, and that's that. The frustrating part is that, with stand-alone terminals, we can often solve problems faster than dp—whose backlog is years long—at a substantially reduced cost."

As an example, Olson cites one company division which acquiesced to dp's authority. It is now in the midst of switching to a new terminal-emulation system. Someone from that department approached Olson and asked him to provide an interim solution, since the system will not be completed until 1986. "But dp said, 'Hands off—that's our baby.' The dp managers would rather see the department languish than have us provide an efficient interim system," he says.

What's Olson's advice to higher-ups? "The company president must get the OA and dp departments working together or, ultimately, users—and the company—will suffer."

Indeed, users themselves can be the biggest help or hindrance to office automation. And what's sometimes forgotten is that they also account for

the biggest expense. Carlson says that, 20 years ago, office equipment cost two to five times as much per year as the average employee. But that situation has changed. The office full of machines everyone's in a tizzy about doesn't amount to a hill of beans when stacked up against employees' salaries and benefits. The key, according to Carlson, is to concentrate on getting the most out of people, not machines.

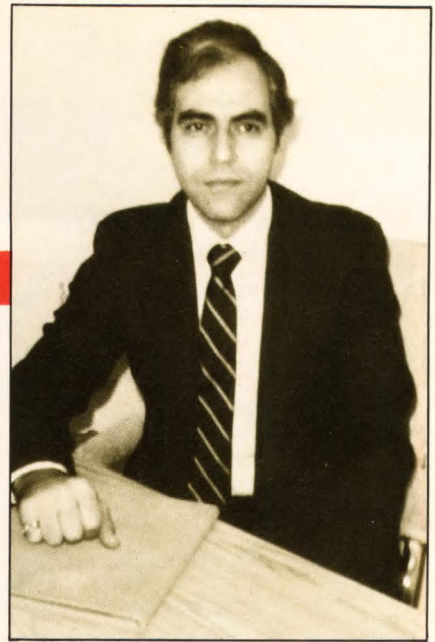
"There's too much concern about whether equipment is being used 24 hours a day, seven days a week. And there's too much concentration on how many more widgets can be sold as a result of automation. Instead, management should be concentrating on improving office productivity," he declares.

Carlson believes the biggest roadblock to successful implementation of OA—and a resulting improvement in productivity—is an inability to significantly change the attitudes of large groups of employees. "It's a matter of training people to use and appreciate computers, and to think of these tools as solutions to their problems," he says.

Carlson cites Duke Power Co. in Charlotte, NC, as an example of a corporation that has its OA head on straight. To gradually change attitudes about automation, the utility set up a demonstration center to introduce technology three to five years before it ever appears in its offices.

According to a vice president at

"The need to create synergy between technology and staff is too often lost on top management."



Alan C. Verbit, consultant, warns that poor management can cost more than inadequate OA equipment.

Duke, the demonstration center gives both the company and its employees a chance to evaluate and grow accustomed to new technology. For employees, the center serves as a showcase and training center. They can learn to use the IBM PCs, XTs, Displaywriters, and Scanmasters at their leisure, knowing it will be a long time before they must use the equipment on their jobs. For the company, it's a chance to experiment with all aspects of automation—from user training to communications—so that, when the time to automate comes, Duke will have a fully compatible, fully functional system. And employees will be enthusiastic, rather than leery, about working with the new technology.

Duke Power's foresight is unusual among companies that have taken the plunge into automation. Too many treat automation as strictly a budget item, neglecting the crucial training and support that can make or break a project. In too many corporations, managers have their eyes focused so closely on the bottom line that they can't see the big picture. A penny-wise and pound-foolish approach to office automation will not make your organization any richer. In the end, you reap what you sow. □

Sally Ketchum, former assistant managing editor of Computer Decisions, is managing editor of Medicine & Computer magazine in White Plains, NY.

WHO'S IN CHARGE OF OA?



THE SUCCESSFUL IMPLEMENTER'S MANY SIDES

A successful OA implementer can manage with equal savvy the purchase of thousands of dollars' worth of technology and the trepidation of the typist confronted with a word processor for the first time.

by Ara C. Trembly

There's "an awful lot of bullshit out there, and you need someone with a shovel and a strong back to cut through it." Executives about to implement office automation would do well to heed this warning from James Carlisle, president of Office of the Future Inc., an OA consultancy based in Guttenberg, NJ. According to Carlisle, technological know-how should be only one of a successful implementer's many facets.

What kind of person does it take to spearhead an OA project, which can involve a range of specialties, including word processing, minicomputers, microcomputers, electronic mail, and telecommunications? Should an OA honcho be a latent technocrat? A high-level executive? A human-resources specialist? A secretary who's taken a few night courses, or perhaps the building superintendent?

Outrageous as the last notion may seem, a large government agency actually did place responsibility for implementation of its OA system in the hands of its facilities manager. The result, predictably, was disaster.

According to Robert M. Dickinson, partner in Performance Strategies, a New York consultancy, the agency kept its data-processing department away from the OA project. And the facilities manager purchased equipment without first determining user requirements or providing for training or support.

A simple case of putting the wrong person in charge," Dickinson calls it. "That manager had no experience dealing with either people or technology. The agency ended up buying a lot of hardware, and just walking away from the project. Now the agency's just marking time, waiting for further directives from its parent organization and hoping for a change in top management." Had the project been planned and implemented properly, he adds, the agency would have gained an integrated nationwide OA system.

Government organizations have not cornered the market on fiascos involving poorly chosen project leaders. Dickinson cites a corporation in a major eastern city that put its

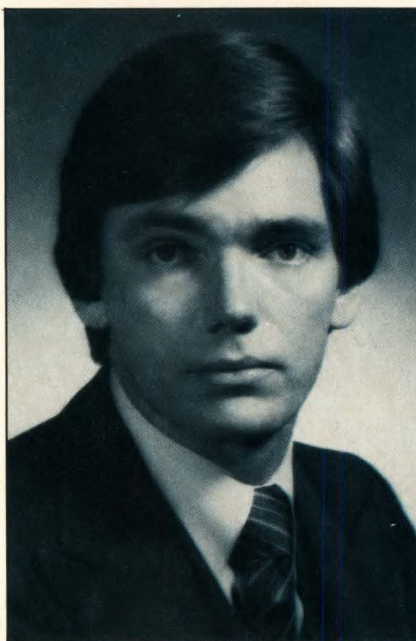
WHO'S IN CHARGE OF OA?

secretaries together to form an OA study group. The supervisor of the typing pool became the project leader. Neither the leader nor the group knew enough about the company's business needs or about equipment options to effectively automate operations.

"The group decided that office automation meant word processing, so that's the kind of system it implemented," Dickinson relates. "It brought in equipment, and the project was a total disaster. Support suffered and users were overcharged for services. The group never even considered end-user efficiency, so the system failed to address user needs; when the demand for word-processing services was high, the resources just weren't there."

After a year of difficulties, the corporation dismantled its system and returned to decentralized wp. The experience left managers with a bad taste in their mouths concerning office automation.

Clearly, the background, skills, and personality of an OA implementer are pivotal to the success of a project. But what kind of individual should you put at your project's helm? "The successful implementer must be a jack-of-all-trades," declares Paul D. Oyer, president of the Office Automation Society International, a nonprofit association in Washington, DC. "He or she has to be an innovative manager, a technologist, an economist, a cost accountant, an organization specialist, a catalyst, a doer, a planner, an edu-



"The implementer must have a rapport with managers and executives at all levels—the higher the better. Executives are the leaders and the most important beneficiaries of OA," advises consultant James Carlisle.

cator, and an ergonomics specialist. In addition, he or she must like people, and be familiar with the goals and daily operations of your offices. A leader who lacks any of these skills should hire other staff members who do have them."

An OA leader can come from a variety of backgrounds. "No particular preparations make a candidate better or worse for the job," asserts John J. Connell, executive director of the Office Technology Research Group, a Pasadena, CA-based association of managers who have senior responsibility for OA within their or-

ganizations. "Some implementers come out of MIS, some out of administration, and some have no related background at all. All can be successful. Many executives prefer an OA leader with a background in technology. But you can always buy technological expertise. The implementer must be more familiar with the human aspects of automation."

But can the ability to manage people really make up for a lack of technological knowledge? Shouldn't an implementer have some knowledge of hardware and software? Alan Purchase, director of OA programs for SRI International, Menlo Park, CA, believes so. "The implementer doesn't have to be a designer or be able to write programs, but he or she must be able to talk with vendors and in-house services." A good background in administrative systems and management is also important, along with the ability to analyze the organization's paperwork and determine what functions need to be automated.

Carlisle believes both management and technical experience is essential. "A basic computer understanding alone is not enough. Such knowledge may help someone determine what is an adequately useful system, but then again, it may not. If a vendor specifies the wrong equipment or doesn't supply enough hardware to meet a company's needs, someone with scant technological understanding may not realize it."

For Connell, the right attitude is more important than the implementer's technical skills. "The leader's most important role is that of facilitator. The implementer has to realize that the whole objective of automation is to put technology in the hands of users. His or her mission is to educate employees in the use and capabilities of the equipment. OA is no longer a simple monitoring activity; it requires one-on-one interaction between the user and

"We didn't want technology to become the driving force behind the project. When that happens, you end up with a solution in need of a problem to solve."

—Dickinson, Performance Strategies

the machine. The reaction of human to machine determines an implementer's success."

Careful attention to behavioral dynamics is what makes an OA project work, agrees SRI's Alan Purchase. "The successful implementer must be very human oriented," says Purchase, whose organization provides consulting services to vendors. "He or she has to be conscious of the rate of change users will tolerate. The leader has to determine how fast users are learning one step, and when they're ready for the next. He or she should also realize when automation pupils are in over their heads."

Purchase stresses that the implementer must be able to plan the OA project in stages, which include selecting equipment, providing support and education, and gathering data. The leader must also be able to communicate with all potential users, as well as with the internal liaison group and, perhaps most important, with upper-level management. "The OA leader has to realize that any project will probably cost more, take longer, and yield fewer benefits than expected. And he or she has to keep

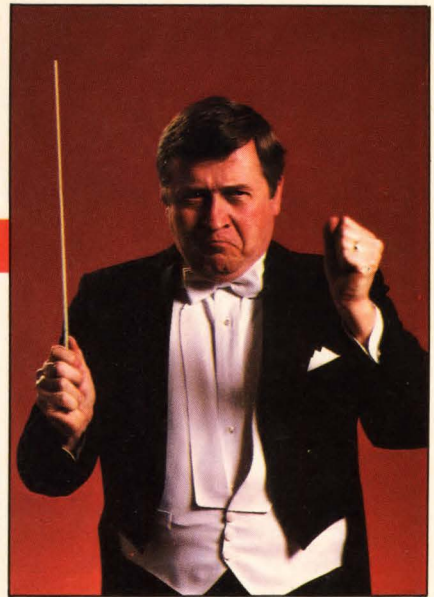
management abreast of these practical and financial aspects of implementation," he says.

Carlisle agrees, adding that a long-term commitment to managing changes in behavior, policy, and strategy is especially important in the relationship with high-level managers, who may exert tremendous pressure on the implementer to achieve significant rewards from OA right away. But major changes don't happen overnight; according to Carlisle, it may take from six months to four years for monetary returns to be realized from a project. "The implementer needs a strong rapport with managers and executives at all levels—the higher the better. They're the leaders and the most important beneficiaries of OA."

Sometimes, a lack of technical knowledge can work to a manager's advantage. "I had no background in OA when I inherited my position," declares Dino Patel, director of systems planning and advanced technology at Squibb Corp., Princeton, NJ. "I didn't know a thing about word processors or personal computers. And that gave me a fresh outlook on my job."

Patel, who has a general business background and experience in planning and operations, assumed leadership of the pharmaceutical manufacturer's automation program in June last year. By the end of December, he had implemented systems that included six IBM 5520s, 22 Displaywriters, and 28 IBM Personal Computers. "I began by looking at what was being done. There were a lot of in-house studies on OA, but nothing was being implemented," Patel recalls. "Another problem was that Squibb had purchased equipment from a variety of vendors, without thinking about how any of it would interface with its mainframes."

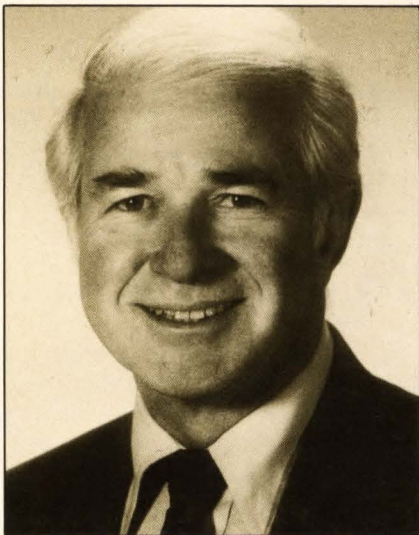
Patel and his colleagues recognized the need to create the voluminous documents processed by Squibb ac-



cording to standards set up by the federal government. They sought to integrate all aspects of the corporation's document-creation activities. After selecting a single vendor, they defined the automation procedures as they related to user needs. This enabled the team to set up standards for document processing. Patel then took the new system to high-level management for approval. The first systems were installed in senior management's offices in Princeton and New York, and the technology was later expanded for use in other departments. "We installed five systems in four months, but I had only two people to do the job, so we worked like hell," says Patel enthusiastically. "We brought 110 people online, and now we're testing advanced communications. We're doing very well."

Patel believes the OA leader must be able to assemble information quickly. "You need someone who can understand the technical complexities of OA and the terms and functions associated with its products. But an implementer doesn't have to be an expert," adds Patel, who has sent members of his implementation team to the vendor for training. He also insists that a leader should understand every employee who will be using a system—from secretaries to executives. "You need a person who can relate to all your users and make them feel comfortable. It's very important to maintain the office's status quo."

An important reason for Patel's success is his ability to get and hold



Alan Purchase, director of OA programs for SRI, says that providing information and training for users is one of the OA implementer's most important tasks.



"The successful implementer must be a jack-of-all-trades," says Paul D. Oyer, president of the Office Automation Society Int'l.

the support of top management. "I had to sell management, especially the chief financial officer, on the system," he explains. "I had to calculate productivity gains and do economic analyses. After all, you can't spend half a million dollars on word-processing gear unless it makes some kind of economic sense."

Training was also a significant aspect of Patel's project. "Our biggest problem was user education," he says. The training manuals provided with equipment are too general. Education has to fit the specific needs of users, so we provided demonstrations and in-house support."

An OA implementer has to be a doer, and that implies that he or she should be strong-willed. Sometimes, however, such a personality will get an individual the ear of top management, but not necessarily the cooperation of end users." Patel prefers a service-oriented leader, who will gain the trust and enthusiasm of users before going to top management. If an implementer's system has the approval of its users, it is more likely to be approved by senior management, as well.

Oyer says the National Oceanic and Atmospheric Administration

WHO'S IN CHARGE?

benefited from a service-oriented leader. This implementer came from a strong dp background, but he recognized the value of personal computers and was open to the users' point of view. He encouraged offices to get micros, and he set up reasonable and flexible standards. As a result, he gained the support of top management, and that made it easy to procure equipment and to get all departments to work together. This implementer provided central support, but he didn't take control.

James Young, MIS director for Wrightline Inc. of Worcester, MA, expresses similar sentiments. "OA leaders have to balance their strong-willed behavior with a user-oriented presence. A leader can be so strong-willed that he or she crams systems down users' throats at all costs—and that doesn't gain their acceptance. The OA manager must show a good balance of guidance and support, if he or she is going to be effective."

John Connell of the Office Technology Research Group also dismisses the notion that implementers must be strong-willed. "That's the dictator approach," he notes, adding that an OA-project leader should be "enthusiastic, knowledgeable, and helpful—leading the way, but not trying to take over." According to Connell, an implementer's ability to visualize the breadth of OA in terms of the interaction between people and equipment is more important than strength of will. "The best honchos are those who can maintain an overview of a project without claiming ownership," he emphasizes. "A real facilitator doesn't want to own the equipment; he or she wants to help users own it."

Sensitivity to users' attitudes and

"The ideal project leader should be an employee of the company."

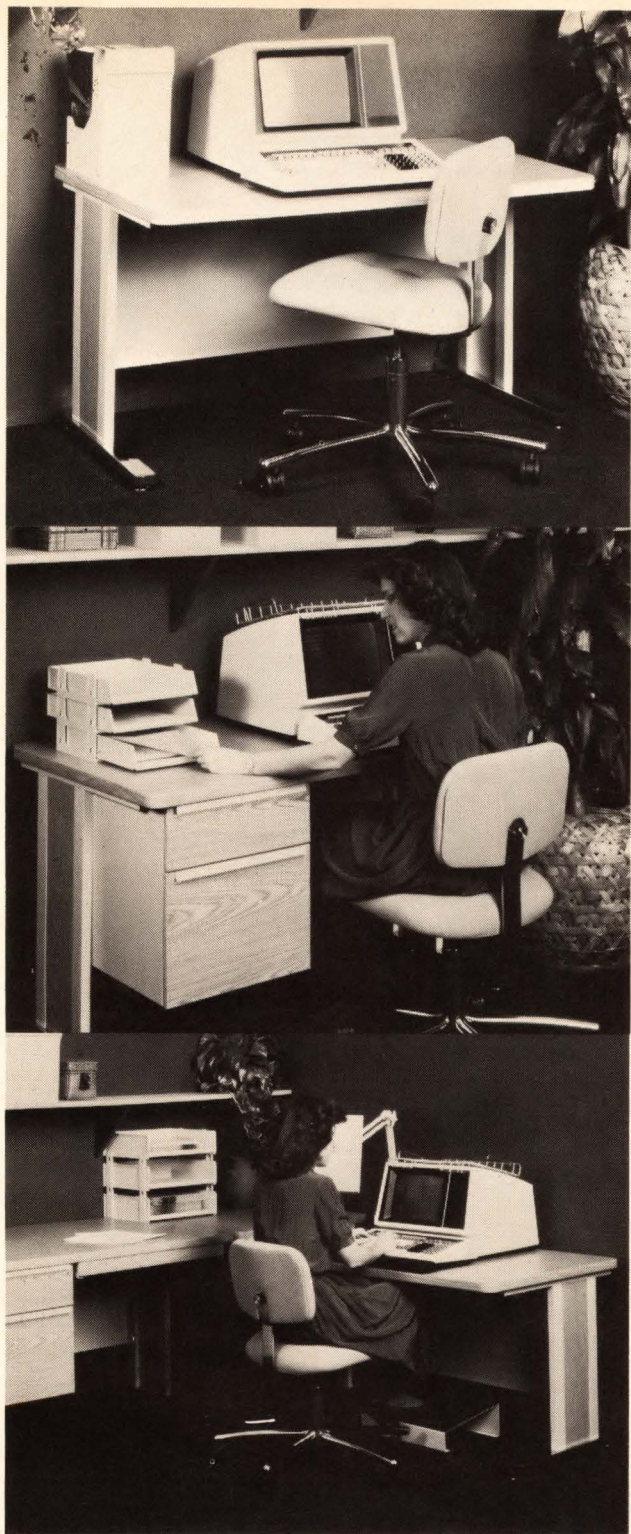
requirements is perhaps the strongest requisite for an OA implementer. Carlisle of Office of the Future tells of one successful implementer at a large eastern bank. This leader recognized the needs of all the bank's different branches, groups, and employees, and addressed those needs with his OA plan. He kept user interest piqued by publishing an OA newsletter, and he assembled training workshops for new and potential users. Of course he didn't do it all on his own. According to Carlisle, the leader built a strong OA team that had most of the skills needed to successfully complete his project. Still, it was his sensitivity that was the guiding force behind the bank's successful implementation.

"User input is extremely important at all stages of implementation," believes Carlisle. "We try to get our clients to set up a user-advisory council that will work closely with the OA leader. A successful implementer has to be service-oriented, as well as a good manager. And that demands a high degree of assertiveness. The term 'strong-willed' implies inflexibility, which spells disaster in office automation."

An OA leader is harder to find than to describe. Ideally, the project leader should be an employee of your organization—someone who knows the company thoroughly. But in organizations with limited personnel, a consultant may be the logical choice. In that case, Oyer warns, you should look for the same qualities that are required of an in-house implementer. And that means you'll have to spend time teaching the consultant about your business.

John Connell believes the honcho

"We installed five systems in four months, but I had only two people to do the job, so we worked like hell." —Patel, Squibb



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should always be an employee. "This is an assignment that involves people—human behavior, politics, and corporate culture. And an outsider can't deal with all those factors. A consultant can help provide direction and choose equipment, but an insider is needed to implement the project."

No project leader has the background needed to undertake the entire task of implementation alone. The wise leader will work *with* consultants, who can be valuable sources of practical and technical advice. "The consultant can take care of special tasks insiders don't have time for," says Purchase. "Usually a consultant has already implemented systems in other organizations."

Carlisle agrees that a leader should be an employee. "An OA honcho—whether an assistant to the president or to the controller—is critical, and shouldn't be an outsider. In all likelihood, however, that individual won't have all the qualities required of a successful implementer. That's where the consultant comes in, working with the leader to fill in the gaps."

A competent implementer also looks to vendors to provide support and to help interface new equipment with existing systems. Vendors provide information on equipment, software, and applications. They can help an implementer prepare for future expansion, and train users in new applications. Purchase believes vendors can also help the OA leader prepare the all-important project

presentation used to gain the support of senior management.

To inform users of a system's capabilities and train them on new equipment, an implementer may turn to another outsider—the professional educator. Purchase describes the problems created when a Fortune 500 manufacturer of consumer products tried to automate without proper user education and support. "The OA honcho—the head of purchasing—tried to move the system in much too quickly. The actions resulted in increased turnover of personnel, and when management realized the problem, it had to spend additional money and time to get the system running. Since then, management has provided users with the background and information they need, and the project's starting to shape up."

Outsiders can certainly provide valuable guidance, but they're no substitute for strong leadership. For example, vendors, though valuable in bringing the latest OA technology to an implementer's attention, are not recommended as implementers in and of themselves. Says Oyer: "Every

OA leader ought to use whatever information vendors have to offer, but you can't rely on a vendor for implementation. The vendor doesn't know your business."

He adds that some organizations will mistake technology for planning and leadership. He points to the case of a well-known federal agency that recently bought 600 personal computers, then had no idea of what to do with them. "The equipment was centrally procured, with minimal feedback from branches around the country," he recounts. "The agency installed the computers in its nationwide offices, and ended up with a lot of terminals sitting idle." This organization erred by relying entirely on technology, rather than leadership, to implement its OA system.

According to Carlisle, many disasters have occurred because an implementer relied too heavily on outsiders. Often an implementer who is in far over his or her head can't get the support of top management and begins hiring consultants to cover his or her tracks. The result is often the purchase of tens of millions of dollars in equipment without any integrated plan for its use.

"The OA leader has to realize that any project will probably cost more, take longer, and yield fewer benefits than expected."

—Purchase, SRI

Strong leaders are rare, but they're worth the effort it takes to find them. Dickinson of Performance Strategies demonstrates how a good implementer works. When he was manager of office systems for Exxon Corp., Florham Park, NJ, Dickinson, serving as an in-house consultant, led a team of 30 individuals, who conducted studies and formed plans for implementing OA projects. "We purposely created a real mixture of abilities on the team," recounts Dickinson. "We needed technical staff, but we didn't want technology to become the driving force behind the project. When that happens, you end up with a solution in need of a problem to solve."

Dickinson's own background includes training in business administration, finance, and personnel. He emphasizes that business skills, accounting, and financial-management acumen are important for the OA implementer, as is the ability to communicate effectively on issues, technologies, and needs. That ability, he notes, is "not always a strong suit of dp types."

Understanding the business, Dickinson reiterates, is vital for an OA leader. "At Exxon, we stressed an effective orientation for the members of the OA team. One criterion I used in selecting members was how well they understood Exxon."

Dickinson worked with a highly organized team, but he believes a strong leader is vital to any OA project. "The OA leader is the primary vehicle for delivery of information systems and services," he says. The advocate must be able to relate to end users, and to see their problems from their point of view, he continues. "And there must be as much user input as the organization allows."

A successful implementer must be able to play as many roles as the needs and structure of an organization demand. In a corporation where resources and personnel are plentiful, a facilitator/manager may do the best job. Where such resources are inadequate, a "Renaissance man or woman," who combines many skills and a diverse background, will

fit the bill. But in any organization, the human dimension must be addressed if the implementer is to succeed. Human beings come in many shapes and sizes, with a variety of personalities, needs, and responsibilities. And they are the primary ingredient in any company's activities.

Only by meeting the needs of those who work with equipment daily can any implementer establish an OA program that achieves your organization's goals. □

Ara Trembly is a free-lance writer based in Metuchen, NJ.

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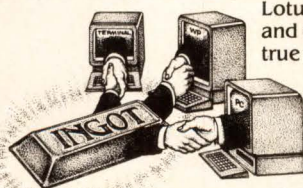
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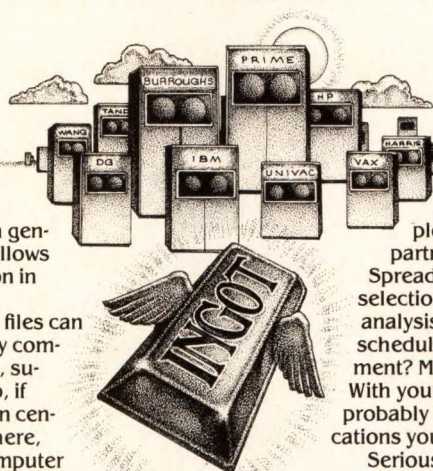
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KNOWING WHEN TO SHOUT "EUREKA!"

*The key to assaying
technology's gold is knowing
what to look for.*

by David Kull, Software Editor

Ladies and gentlemen, we have here a product that will boost your profits, cure your organizational ills, why, even correct your spelling. We're not sure exactly how you'll use it, how it will work, or how much it will help. But we know it won't cost more than a few hundred thousand dollars—to start.

Even the rawest rube would back off a few steps from that sales pitch. It's not surprising that, when the wonders of office automation are described, hard-bitten business people immediately ask to see the numbers. And often, after the requested figures have been presented, executives still are not reassured of OA's payoff. Firm evidence of that payoff is elusive, because the time saved with word processors, personal computers, electronic mail, and other white-collar tools does not lend itself to easy measurement. The technology's contribution to the bottom line is often so indirect it's indistinguishable. And its track record is so short it's inconclusive.

OA's persistent promise and management's continuing need to base decisions on facts, not faith, however, have kept open the question of defining the concept's benefits. Now, experience with the technology and new productivity-measurement techniques allow executives to predict the payoff with some confidence. Still, cost-benefit analyses require careful design. A technological nugget in one office may be fool's gold in another. Even after you've decided what you want from automation—and even if those advantages lend themselves to

quantitative analysis—toting the benefits requires digging. There are no easy formulas.

"It's a painstaking process," says Joseph McGrath, director of office information systems for Warner-Lambert in Morris Plains, NJ, speaking of data collection for the productivity study his department recently undertook. The study detailed the department's work flow, identifying 10 major products, which include reports and recommendations on other departments' proposals for OA. The researchers then pinpointed and outlined the steps that went into creating each product.

One product, a report on another department's proposal for a major office project, for example, was found to require 108 steps from receipt of the request to final document filing. Each employee who contributed to the process then timed his or her participation. This meant measuring the elapsed time for the process, not simply the individual's activity. In other words, if one step called for an executive to review and approve a document draft, the time was calculated from when it arrived at that executive's desk until it reached the next participant.

Focusing on an office's product and process, rather than on individual activities, provides information on OA's potential payoff, McGrath believes. Divorcing an individual's work from that of the department or unit under consideration makes assigning it a value or assessing its effects difficult. And, studying a process from beginning to end assures that all ele-

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ments, including time between steps, are factored in. Finally, an all-inclusive study highlights any bottlenecks or unnecessary steps in an office's work flow.

Dealing with inefficiencies in office procedure provides benefits even before any equipment is introduced. A post-implementation study found McGrath's office requiring an average 32 percent less time to produce each of its products, delivering 52 percent more products, and reducing overtime by 31 percent. But McGrath estimates that only about half the time savings came from automation; the rest came from the improved work flow.

McGrath based his study's design on one used by New York-based consultants Booz, Allen & Hamilton in Project Impact, a office-productivity study for the U.S. Air Force, and on procedures suggested by Xerox, whose Ethernet local-area network was being considered for use by Warner-Lambert. He believed it necessary to develop his own methodology, he says, because he doubted the applicability of the measurement tools available from other sources, including vendors.

Several widely used methodologies, including one developed in Multi-Client, an earlier Booz, Allen study, rely on expected time savings for individual workers. Multi-Client sought to identify the amount of time different types of employees in particular departments spend on various types of duties. Managers in finance departments, for example, were found to spend 45 percent of their time in face-to-face communications. Such activities required 51 percent of a manager's time in legal departments. The study also



Too often, an organization will focus on the local effects of new technology, and forget about what occurs up- and downstream," warns Carl Thor of the American Productivity Center.

found that professionals in marketing departments spend 12 percent of their time seeking information, and those in materials management devote 9 percent of their time to that chore. Support staffs showed a consistent division of time among activities, regardless of department. According to the study, support workers throughout an organization consistently spend a quarter of their time typing, for example, 1 percent filing, 10 percent waiting for work, and so on.

Booz, Allen also estimates percentages of time saved by automating these tasks. It believes, for example, that electronic filing and decision-support systems can halve the time employees spend seeking information. Personnel professionals, who spend 5 percent of their time gathering information would thus realize a 2.5 percent savings from the technology. Armed with these estimates, an organization can project OA savings simply by counting the number of

employees in each job classification—managerial, professional (those who work individually to provide a product or service), and support—multiplying that number by their average salaries, and reducing the product by the expected percent of time savings.

Some observers have difficulty accepting calculations like these. For one thing, they question the accuracy and projectability of the time-savings estimates. The Booz, Allen statistics detailing the way office workers spend their time came from comprehensive measurements developed in the Multi-Client study. The time-savings estimates, however, did not come from studies made after the subject offices were automated, but from earlier (unspecified) case studies.

Besides doubting the time-savings estimates critics point to a more serious drawback: the assumption that every minute saved translates directly into a reduction in personnel costs. There is no guarantee that slack time created here and there in a variety of tasks by a number of workers can accumulate into an amount that allows any of them to take on other meaningful tasks. And there's no way to be sure that all employees will fill all their newly freed moments productively.

Jerry Tellefsen, senior vice president with Booz, Allen, defends the practice of measuring individual activities instead of departmental processes. In many offices, he says, work does not follow a process, but instead is shaped by events. In those cases, there is little choice but to total the time spent on each of the tasks performed by an individual and to assess technology's effects on those amounts. But Tellefsen downplays direct translation of estimated time savings into dollar savings. Most corporations, he asserts, place more importance on the value automation adds to their employees' work than on direct cost savings.

Personal computers have demonstrated the intangible benefits of information technology.

"Typically, an organization emphasizes cost savings in its first OA pilot study," Tellefsen says. "Its subsequent studies will look for ways the technology can add value to the organization's product."

Organizations are less concerned about justifying OA through cost savings now than in the past, he believes, because the experience of companies that pioneered the technology has proved automation's efficacy. The proliferation of personal computers has also demonstrated to many top executives the intangible assets of information technology.

Polaroid Corp.'s approach to justifying OA is an example of the trend toward reduced emphasis on cost savings. Company policy requires that managers requesting word-processing equipment demonstrate its cost-effectiveness. But savings are impossible to predict, contends Joseph Sweeney, corporate OA project manager, and, he says, this procedure has largely become a ritual.

A post-implementation audit required by the Cambridge, MA, corporation's office-technology department also has a new emphasis. Aimed originally at verifying automation's projected gains, the audit has evolved into a consultation to help users identify additional advantages the equipment might provide. Department managers saw the earlier audits as intrusions on their prerogatives. "Individual managers are still the best judges of how they and their employees should spend time," Sweeney says.

An office-technology council, made up of high-level executives from a range of departments within Polaroid, looks for business problems that may be helped by automation.



Members exchange information about their experiences with OA, pointing out benefits they've realized and difficulties that might be avoided. The council is developing a strategy for applying office technology to the business.

"The way to consider OA is to address a business problem and think about ways technology can help," says Sweeney. "You shouldn't start with the technology and try to find ways of using it."

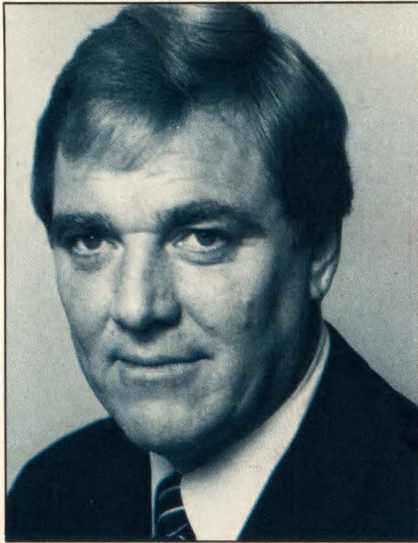
Looked at in this way, OA's payoff is apparent: Automation can offer solutions to whatever problems an organization needs to solve. Still, it's important to measure the impact of

changes brought about by OA and assess the value of investments. There are plenty of qualities to be assayed in any office, even when there are no regular processes or obvious products.

"Certain departmental actions are actually results of a department's work," says Carl G. Thor, vice president of the American Productivity Center in Houston. "A report is issued, a decision is made, a transaction occurs."

A complex collection of tasks goes into producing such results, and taking a raw count of these products is an ambiguous way to measure the impact of automation. One alternative is to total the less ambiguous milestones or activities that are a part of an overall process. This approach, however, can ignore the general effects of specific changes. The addition of a word processor may dramatically increase the output of

There's no guarantee that every minute saved by OA translates into reduced labor costs.



"Typically, an organization emphasizes cost savings in its first pilot study of OA. Its subsequent studies look for ways the technology adds value to the product," says Gerald Tellefsen, senior vice president with consultants Booz, Allen & Hamilton.

the typist assigned to it, for example. But if the increased number of documents produced by the typist merely waits in in-boxes for employees using established processes to catch up, the word processor has added nothing to the department's productivity.

"The typical department must find a balance between measuring subjective end outputs and using activity counts as a surrogate for (or at least a check on) them," Thor says. "Too often, an organization will focus on the local effects of new technology, and forget about what occurs up- and downstream."

Using various productivity measures will help an organization account for the different kinds of work that go into a department's production. And it will help highlight the tradeoffs among quality, timeliness, and efficiency that are often a part of productivity adjustments. Thor suggests a department set up standards for measuring five or six characteristics that define the quality of its work. These might include the ability to meet deadlines, acceptability of results, expenditure of resources, and even such indirect indications of efficiency as employee turnover.

One way to arrive at the selection of quality measures is to ask employees from a cross-section of the department for their suggestions. Those who do the work are more likely to come up with precise measures for it

OA PAYOFFS

than an outsider. And if employees help devise the yardsticks, they're more likely to accept their accuracy.

Management, of course, will have final say on the measures. Thor notes that managers may weight each factor according to their perceptions of its importance. If a department's collection of measures consists of five factors of equal importance, each would contribute 20 percent to the total productivity score. If timeliness were considered paramount, performance on deadlines might make up half the grade, while the remaining factors share the other half.

The organization should define its measurement standards and establish baseline scores for them before beginning a pilot study, Thor advises. Then it should take a reading at least every quarter. For the studies to have an impact, the employees involved should be given plenty of feedback about the results.

Tellefsen of Booz, Allen agrees that corporations should assess whether or not OA is providing the

benefits expected of it. Some organizations look to the technology primarily to improve the quality of work life in their offices. This can be measured through attitude surveys or by looking at turnover rates. Likewise, companies looking for a competitive edge can find a variety of ways to measure success. A sales department can determine its force's hit rate from calls on customers, for example. Then it's simple to calculate the dollar benefits of a tool that enables salespeople to increase the number of calls they make. When an office carries out a fairly regular process to create a specific product, though, a more detailed assessment such as that done in Booz, Allen's Project Impact and at Warner-Lambert is feasible.

By classifying each step in its work flow according to type of activity—typing, transcribing, copying, and the like for clericals; planning, consulting, analyzing, and so on for professionals—James McGrath's department at Warner-Lambert developed a clear picture of the work it performed. It found, for example, that after installation of Xerox' Ethernet, professionals were spending more time on research and in consultations and in reviewing and revising drafts, and less time on all other tasks. The greatest saving came in time spent obtaining approvals.

For clerical workers, the big saving was in typing, of course, but they also reduced time at the copy machine and in record-keeping. Clerical workers devoted slightly more time to communicating information after the local-area network was installed.

McGrath believes his office's pilot can serve as a guide for other Warner-Lambert departments—but not all of them. "It's not necessary to run one pilot after another," he says. "But the departments you apply the original findings to must be similar to the one studied."

One Warner-Lambert department for which McGrath's study is not ap-

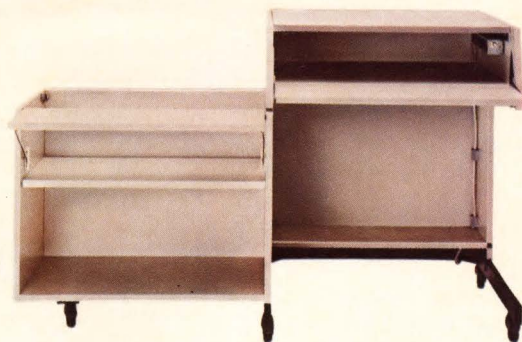


Joseph McGrath, director of information systems for Warner-Lambert, found that about half the time savings gained in his office came from correcting inefficiencies in work flow before installing equipment; the other half came from automating.

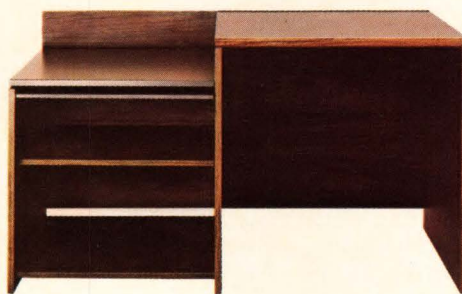
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licable is corporate communications. There, it is difficult to develop solid rules for measuring the work that is performed. The department's staff of 15 writers produces releases, speeches, and internal reports and newsletters. Although these products are tangible, the work needed to produce them requires a lot of hard-to-measure individual creativity and few concrete procedures.

Six of the department's writers and a secretary share a Xerox Star word processor. The main benefit corporate communications director Elliott Hebert hopes to receive from the device is improved quality. "Our products are seen at very high levels," he says. "Quality is very important to us."

Hebert acknowledges the difficulty of measuring quality, but feels

satisfied the equipment is helping improve it. Part of his assurance comes from his own experience with the word processor. As a writer himself, he has found the word processor's rapid editing features enhance creativity by allowing easy experimentation.

If that subjective gain were all Hebert could bring to his superiors in seeking funding for the processor, it might have been enough. Because of the department's close relationship with corporate management, it enjoys perhaps more latitude than most in justifying acquisitions. But Hebert was able to point to other, slightly more substantive, advantages. The processor allows the department to send copy over the network to its typesetting service, speeding the process, saving on messenger costs, and

eliminating at least one time the material has to be retyped. "As long as you're saving those keystrokes you're saving money," Hebert says.

The device also allows the department to produce high-quality graphic displays for executives' presentations without the help of a professional artist. The ability to store background material electronically helps make the department's releases easier to prepare and more timely, and it reduces the need for filing space and paper. And Hebert's secretary recently sent him a three page memo listing her ideas for spending the time the processor saves her. Hebert expects corporate communications will be able to harvest even more benefits in the future. "So far," he says, "we're only grabbing the low-hanging fruit." □

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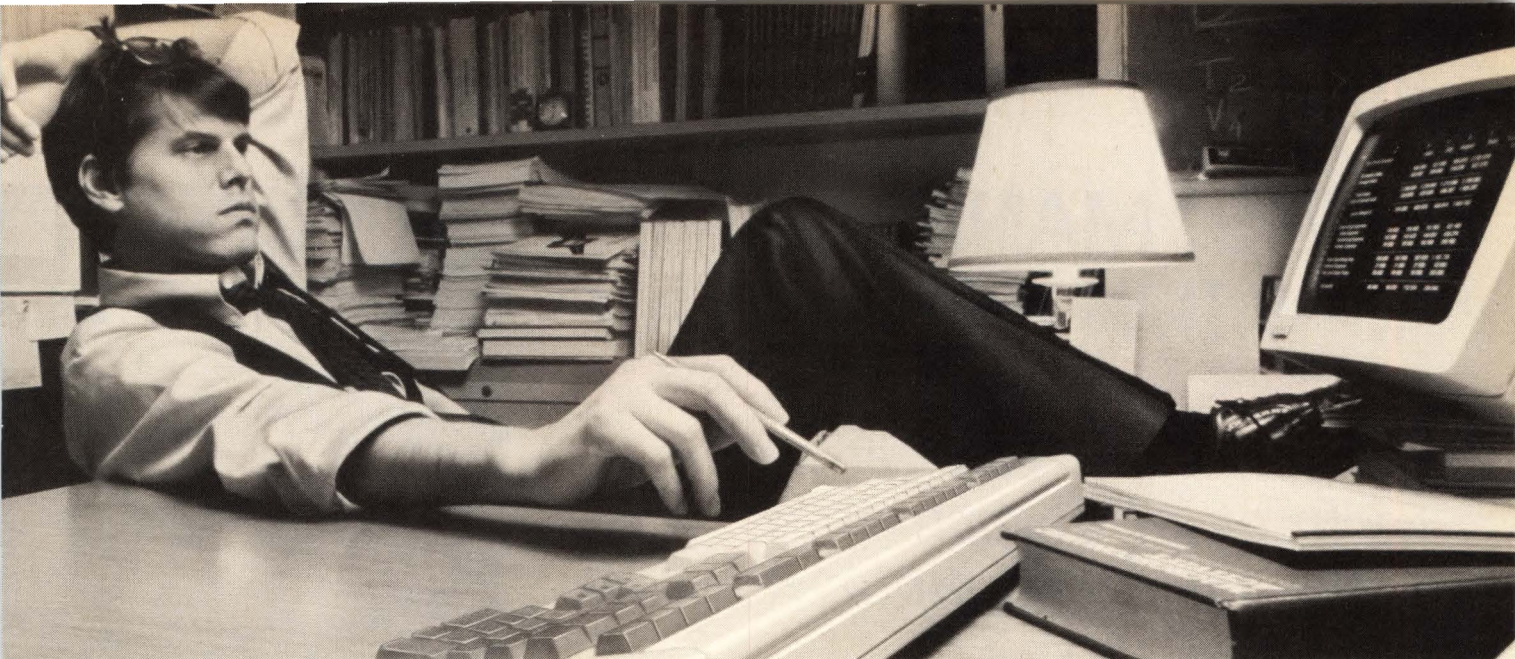
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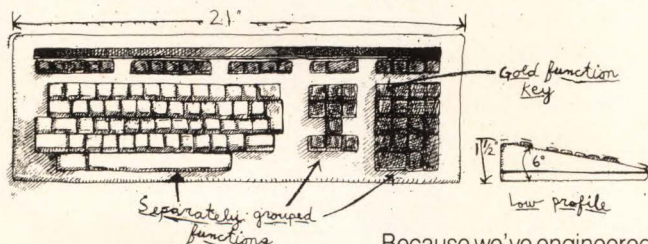
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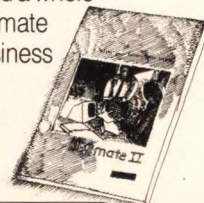
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BETTER MANAGEMENT IS WITHIN YOUR GRASP

Photo by Bill Oliwa

Micros help you get a firmer grip on office activities, and they can help employees work smarter, too.

by Fran Chesleigh

Without my micro, I'd never have done it!" exclaims the comptroller of a major motel chain. "I just finished working up the corporate budget in two weeks instead of three months!" The previous year, he explains, he spent more than a month on the road developing preliminary budget figures on legal pads with the manager of each regional office. After returning to headquarters, the comptroller fed his data into the mainframe and went through several drafts before the final budget was approved.

A Compaq portable computer has cut the annual budget grind down to size. "Now, I enter the data on my Compaq and send them to the mainframe via modem directly from each regional office," he says. "By the time I get back from my road trip, the preliminary budget is ready to go out. And to think I used to call personal computers executive toys!"

For that comptroller and other top managers like him, the personal computer has introduced new speed and efficiency to office tasks that formerly occupied months or weeks. Financial analysis—the electronic spreadsheet—is the most important time-saving personal-computer function for most executives and managers in the office. Other personal-computer applications in the office—word processing, planning, message transmission, project management, scheduling, file management, and the generation of graphics—have the same potential as spreadsheets to make short work of time-consuming tasks.

But saving time on mundane chores is just the beginning. Time saved is more time for executives to chart the future course of the organization; it is more time to figure out how office workers can perform more effectively and profitably. And armed with more immediate information about operations, managers can get a better reading on the organization's pulse—even if employees have their own microcomputer power.

"Micro spreadsheets have become so popular because they change the flow of work," says Jody Martin, president of Helix Corp., a consultancy in Westlake Village, CA. "Managers no longer have to send the numbers out and wait around until they are processed. It's all right there for them in the office."

For executives, the changes encouraged by personal computers can come in several forms. First, says Eugene Kujawa, senior vice president of Class Associates, a Wilton, CT, computer-education outfit, "executives who used to create original documents by writing them long-hand or dictating them to a machine or secretary are now using word-processing software to handle these jobs. With a personal computer, an executive can sit down and keyboard a rough draft of anything from a letter or a speech to a report or a proposal without having to take up a secretary's or steno's time during the process."

An executive who generates his or her own drafts of important documents on a personal computer contrib-



PERSONAL COMPUTERS IN OA



PERSONAL COMPUTERS IN OA

utes to improved efficiency in the office, asserts Kujawa. He rejects the notion that executives who write their own drafts are wasting valuable corporate time. "These documents are prepared as rough drafts—without the unnecessary intervention of a support staffer to make them look pretty—to be shared with the executive's peers," Kujawa says. "Ideas can now be developed, distributed, and discussed much more efficiently among teams of executives working together on a project. Nobody cares what the working documents look like, because they're not going beyond the immediate group. The result is faster decision-making."

The hands-on approach is more efficient. Says Jody Martin: "Once the secretary has the document in hand, there are fewer revisions, because the executive has gone through a self-editing process *before* turning the manuscript over for final preparation." But working with their own drafts also encourages executives to edit their *ideas* as they revise the words that express them. As a result, they may define concepts more clearly and consider the consequences of decisions more carefully.

Hannah Blank, vice president for MIS at New York-based Chase Manhattan Bank, goes so far as to assert that personal computers let executives tackle projects that would have been either impossible or prohibitively expensive to set up on larger systems. "Using an off-the-shelf package, we were able to set up

a market-analysis program for one of our product managers," says Blank. "The system runs more efficiently and more cost-effectively on a micro than on a mainframe. The same kind of application might have taken us five or more months to develop for our online end-user facility, and the product manager would have had to wait in line to use a terminal."

Kenneth Bosomworth, president of International Resource Development Inc., a market-research house in Norwalk, CT, describes a major insurance carrier that tracks claims correspondence with personal computers. The system has speeded the turnaround in the processing of adjustments, and it provides a detailed history of any claim as it is processed. "Such an application," he says, "would simply not be appropriate for most mainframes."

Handled properly, personal computers can also help organizations make better use of their executives' scarce time. "Using a personal computer's electronic-calendar function, you can set up meetings of busy managers through a master office schedule," notes James Haner, president of Dynamic Computer Services, a Palmdale, CA, consulting firm, and founder of the Microcomputer Management Association. "The computer simply picks a time when all or most of the managers are available. This eliminates all the phone calls and schedule comparisons necessary to get executives together."

Many organizations couldn't carry

out automated searches for meeting times without links between the personal computers of widely scattered executives. These links introduce new efficiency to communications between executives, says Haner, because they make a personal computer an electronic mailbox. "You don't have to play telephone tag for a week to reach someone who's difficult to get by phone," he says. "You can send your message by computer."

Better, more immediate communications may be the most important attribute personal computers bring to executives—and organizations. Fancy functions give executives extra managerial muscle, but the communications capabilities of micros allow them to bring that muscle to bear on the organization. Communications capabilities turn micros into ports in a network connecting employees in the same building or even in offices around the country.

Communications links can be opened in a variety of ways. An integrated system such as the Hero from Mohawk Data Systems, for instance, combines a powerful personal computer with a communications processor for networking and software that allows the machine to talk to IBM mainframes by emulating an IBM 3270 terminal. Hero and products like it give executives an opportunity to start small with a cluster of personal computers, and gradually expand into more comprehensive networks.

Nationwide Insurance, the nation's 11th largest carrier, is installing the MDS Hero system, upgrading an existing MDS network. With the new system, Nationwide agents will be able to process policy changes in their own offices, as well as use their personal computers as terminals connected to the carrier's data center to transmit policy applications and other information.

For many organizations, however, the words *networking* and *communi-*

SHARED MICROS

In many corporate offices, personal computers are used like copiers—they're shared by many employees. Preliminary results of a survey conducted jointly by *Computer Decisions* and Gartner Group Inc., Stamford, CT, show that many corporate offices—even large ones—have as many as 20 employees using each personal computer for several minutes to hours each day. Watch for a report on the survey, with detailed findings about the deployment of personal computers in the office, in an upcoming issue.

cations mean connections between incompatible bunches of personal computers—and even mainframes and minis. It may not make sense for these corporations to replace their personal computers with systems like MDS' Hero. Besides, many corporations won't tie themselves to a single vendor (except IBM) by acquiring a proprietary system.

E.F. Hutton, the New York-based securities brokerage, is big enough to maintain its own company-wide network to connect the incompatible. Installed in 1975, Comprehensive Processor for Advanced Security Systems (Compass) supports a network of IBM Personal Computers and Wangwriter word processors from Wang Laboratories (Lowell, MA) tied to a Data General MV Series super-minicomputer in every one of Hutton's branches around the globe.

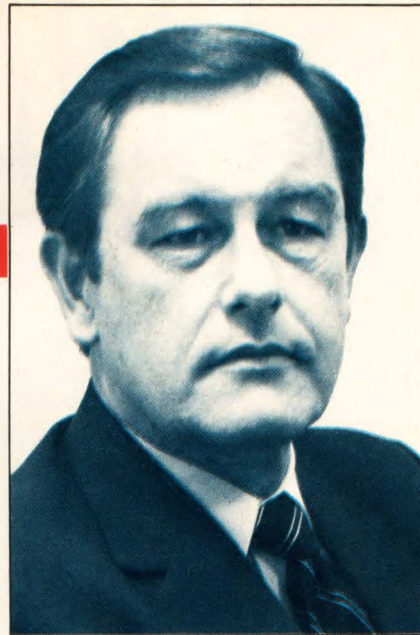
Compass is run from Hutton's Information Processing Laboratory (IPL). "Through the IPL, we establish the kind of access to our central computer each user needs—depending on specific requirements," says Vincent Pica, senior vice president of MIS. "We then devise individual database-access and computing capabilities for each user." The PCs enhance the cost-effectiveness of Compass, says Pica, because they can be used as stand-alone computers, word processors, or terminal emulators.

For other corporations, the corporate mainframe is the key to links between dissimilar systems. As an added advantage, these connections make large-scale storage and output peripherals available to personal-computer users. Links between small and large systems are being forged by many companies today. Fairbanks Morse, the Kansas City, KN-based pumping-equipment division of Colt Industries, uses a micro-to-mainframe connection to tie together incompatible personal computers in its offices.

The machines, which are located around the country, were acquired willy-nilly by employees. They never really posed a problem for the division, but a couple of years ago, top management recognized that communications between personal-computer users would raise productivity, says Martin Maney, EDP manager. Fairbanks Morse forged the links with the Hydra II protocol converter from Diversified Resources, San Rafael, CA.

The protocol converter, says Maney, channels communications between the corporation's personal computers through the central IBM mainframe. At this point, Fairbanks Morse has linked its sales representatives around the country, its five assembly plants, and Colt Industries' New York headquarters, via its mainframe and the protocol converter. The communications system works for dial-in functions, too, says Maney. "It supports such a wide variety of equipment that we didn't have to purchase new terminals or standardize on only one personal-computer brand—we let the salespeople use whatever they already owned." (See "Micro-to-mainframe links" in July.)

The micro-to-mainframe connection opens the possibility of integrating all sorts of resources in offices so they can not only communicate, but also work in harmony. For instance, Massachusetts Financial Services in Boston is introducing Digital Equipment Corp. (DEC) Rainbow personal computers into an information-processing system based on DEC VAX minicomputers. Says John W.



Using a personal computer, an executive can keyboard a rough draft of anything from a letter to a proposal without having to take up a secretary's time, notes Eugene Kujawa of Class Associates.

Davidson, assistant vice president for operations research: "These links will give more of our users access to data they'd either have to stand in line to get from the big machine or develop themselves through separate personal-computer packages." Users will also be able to transfer programs back and forth; and the VAXs will be used for disk backup.

A major goal of Massachusetts Financial's scheme is to install software that can be transported from big to small systems. Transportable software offers important advantages. First, formats and files are uniform for users of minis and micros. Thus, corporations don't have to figure out how to transfer dissimilar files and formats between machines. Second, with only one software set, the corporation will save time and effort on training. "We'll be able to teach a single command structure to all our users," says Davidson. The cor-

(Continued on page 60)

"Better, more immediate communications may be the most important asset personal computers offer to executives—and to their organizations."

SOMETIMES A PERSONAL COMPUTER JUST ISN'T



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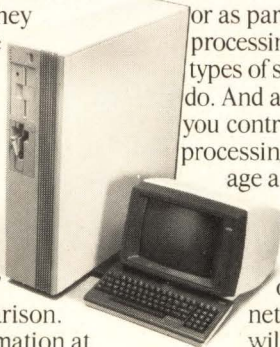
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PERSONAL COMPUTER NOT ENOUGH.



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PERSONAL COMPUTERS IN OA

(Continued from page 57)

poration is evaluating integrated software packages such as 20/20 from Access Technology of South Natick, MA.

There's a tendency among executives who've discovered the benefits of personal computers to believe they will raise productivity as automatically as they process text and numbers. But that just isn't the case; micros in the office are touted as cure-alls, but they often end up being placebos. Executives are presented with a challenge: Mastering their own personal computer is a first step, but they've also got to ensure that they *and* employees who use micros are gaining in the race for higher productivity.

How does an executive know whether productivity is on the rise? Mel Nussbaum, director of administration for business affairs of the American Lung Association, New York, measures productivity in cost savings. He recently installed IBM PCs and PC XT's (the hard-disk version) in the association's headquarters and is recommending them to its local affiliates nationwide. "Because we're a nonprofit organization, it's extremely important for us to be as cost-effective as possible in everything we do," he says. "Right now, we're using personal computers to update our local and regional contributor mailing lists. We feed these updates into a central database."

Updating mailing lists on personal computers is saving the association many thousands of dollars, says Nussbaum, and even greater savings

are expected when all offices are on the system. Meanwhile, Nussbaum has found other ways the personal computers can reduce expenses. "Our PCs also have streamlined our accounting procedures," Nussbaum says. "We now offer local lung associations customized accounting systems. Over the long term, we expect this to make our entire organization more cost effective than ever before."

Toting up expense reductions can yield powerful statements about the impact of personal computers on productivity. Other tangible benefits, like improvements in quality or reductions in the number of errors in a task, are also important standards by which to measure performance. IRD's Kenneth Bosomworth equates higher productivity with improvements in the quality of an employee's work. If a personal computer helps an employee perform better, it's worth the cost. "The middle-level financial planner who used to take two weeks or more to develop a set of projections may now take as little as two minutes to come up with the same numbers," he says. "If that professional's time is valued at \$45,000 per year, the company saves about \$2,000 every time he or she delivers a set of figures using a personal computer."

However, says Eugene Kujawa, comparing the time a job takes using a personal computer to the time it took manually often tells only part of the story. A second measure of productivity can be far more meaningful, he says. Often, the con-

tribution of a group or department is only indirectly related to the result of a task, and therefore difficult to measure by conventional means. "This might be the *added value* of an executive's ability to work more effectively within one part of the company and therefore have a more positive effect on other parts of the whole," says Kujawa.

If a personal computer helps an executive or a department head improve his or her effectiveness, how can its impact be measured? To determine the overall effect of personal computers on a corporation, says Kujawa, you've got to establish whether the business is working better than it was before micros were installed. "Evidence of such benefits must be sought throughout the entire corporation—rather than simply by looking at the individual decisions of a single executive," he says.

Others also believe the less-tangible benefits of personal computers in the office must be considered in productivity assessments. Vincent Pica of E.F. Hutton believes the secret of productivity lies in the ready availability of information to employees who need it to make important decisions. Thus, a big part of his job, he says, "is to constantly monitor the needs of users to make sure each has access to the right information at the right time." If, for example, a group of users needs database access that violates existing security provisions, Pica might modify the database-access standards to accommodate the users.

The intangibles become particularly important when judging the impact of personal computers on executive productivity, says Marty Gruhn, director of research at The Sierra Group, a Phoenix, AZ, consultancy. The standard measures of productivity—units in vs. units out—can't really be applied to executive productivity as it applies to personal computers. "The specific use an executive makes of a personal computer isn't as

"The success of a program to promote personal computers in the office can be measured by the pace at which users move from fundamental functions to innovative ones."

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PERSONAL COMPUTERS IN OA

important as the improvements of the quality of time spent performing the work," she says.

Adds Jody Martin: "If a top executive is able to make a decision faster, the corporation saves on the cost per hour of that individual's time. But if the decision is also the right one for the business—because the executive was better informed—the company not only saves money but gains on the competition."

How can executives ensure that personal computers are productively used throughout offices? As noted, efficient communications is a great way to encourage benefits achieved by single users to spread throughout offices. But before communications will begin to pay, users must have a solid understanding of computing

fundamentals and the organization's goals, and they must be supported. "Once individual users recognize the enormous potential a personal computer puts right there on the desk, they're usually eager to learn more about what these machines can do," says Kujawa. Executives must ensure that the knowledge users gain contributes to overall corporate goals.

Training is crucial, says Andrew Seybold of Seybold Publications Inc., Media, PA. "First-time users are overwhelmed—unless they're prepared to get over the hump," he says. "If no one guides these employees, they may just throw up their hands in disgust and never turn on the computer again."

Merrill Lynch, the nation's largest financial-services operation, battled initial stumbling by account execu-

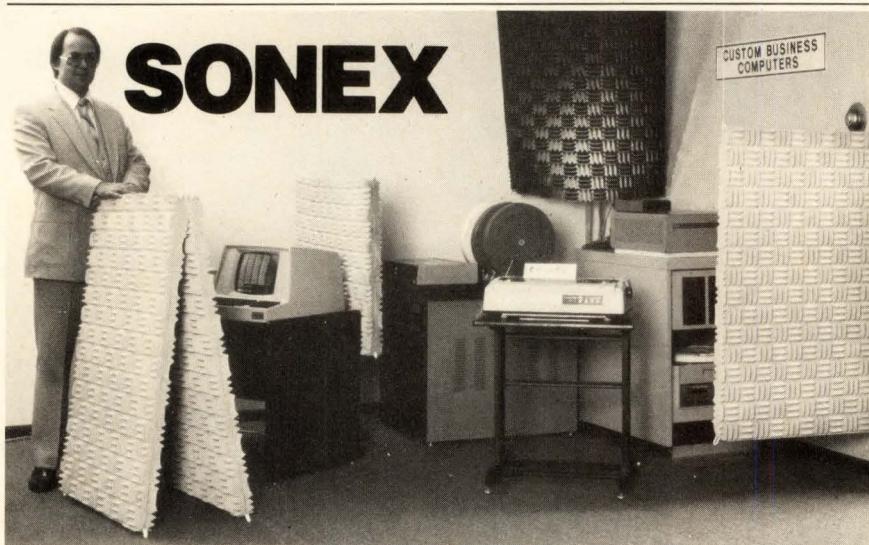
tives with a carefully considered support program, recalls Ritch Gaiti, vice president of office systems. Merrill Lynch has more than 10,000 account executives working independently all over the country, and when many of them suddenly decided to put personal computers on their desks several years ago, corporate management saw potential trouble ahead.

At first, Gaiti recalls, "the available hardware and software wasn't adequate to complete the account executives' tasks. And because many of them were poorly informed about what micros could and couldn't do, there was a high rate of failure. "We decided the best answer to the problem was education," he says. Merrill Lynch now provides account executives with a comprehensive program of training, support, and ongoing computer education. Says Gaiti: "We publish a newsletter about personal computers that nurtures the computer literacy of our account executives. We conduct national seminars and produce videotaped courses on the use of personal computers."

Finally, Merrill Lynch advises account executives on which systems they should buy. And if the recommendation alone isn't persuasive enough, the corporation has added subtle "encouragement" for its brokers to heed it: A custom software package called the Broker's Edge is offered to brokers—but it only runs on Merrill Lynch-approved personal computers.

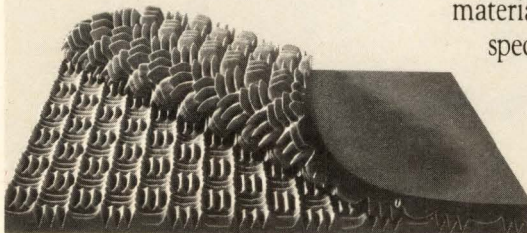
Merrill Lynch's program helped reverse the early failures of account executives. "One of the key reasons for our success is that we haven't dictated policy to our account executives," says Gaiti.

The success of a program to promote productive uses of personal computers in the office can be measured by the pace at which users move from fundamental functions like keeping an electronic calendar or phone-number directory to innovative ones. As users grow more com-



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portable with the machines, they usually become more curious and willing to take chances with personal computers.

When Manufacturers Hanover Trust Co., New York, implemented a corporate personal-computing policy in 1981 (it was spurred in part by IBM's announcement of the PC), most users wanted to do financial modeling, electronic spreadsheets, database management, and other standard applications, says Sally Huns, assistant vice president of office automation. "Now," she says, "employees are using their micros for many other tasks, including communications, programming, electronic mail, networking, cash management, budgeting, inventory, salary planning, and project scheduling."

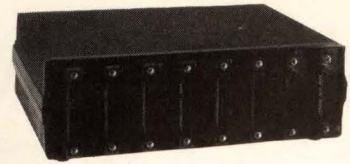
Manufacturers Hanover is satisfied that its employees' progress proves the effectiveness of its wide-open policy. "We didn't formulate any rules, regulations, or standards," says Huns. "A task force was set up to maintain a corporate-wide office-automation strategy and to ensure division-by-division financial control. The number of micros in use throughout the bank jumped from 10 or 15 to more than 400 today."

When they are carefully deployed, personal computers can change the way work gets done in corporate offices for the better. What's more, the capabilities of personal computers—and the role they play in the total dp mix—is only slowly being defined. As more and more corporate executives bring personal computers into offices and more dp managers take an active role in helping office workers make better use of personal computers as decision-support tools and delivery systems for mainframe applications, personal computers are prompting many executives to exclaim, "Without micros, we could never have done it!" □

Fran Chesleigh is a New York-based free-lance writer.

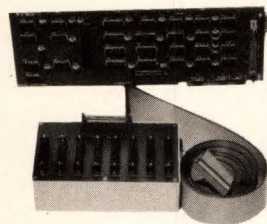
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CIRCLE 21

IBM DELAYS ITS LAN.... NOW WHAT?

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CIRCLE 42

DROWNING IN DATA? HELP IS ON THE WAY!

If the paper files in your office are mounting like a rising tide, advanced computer-assisted-retrieval and computer-output-media systems can throw you a towline.

by Melanie Mitzner

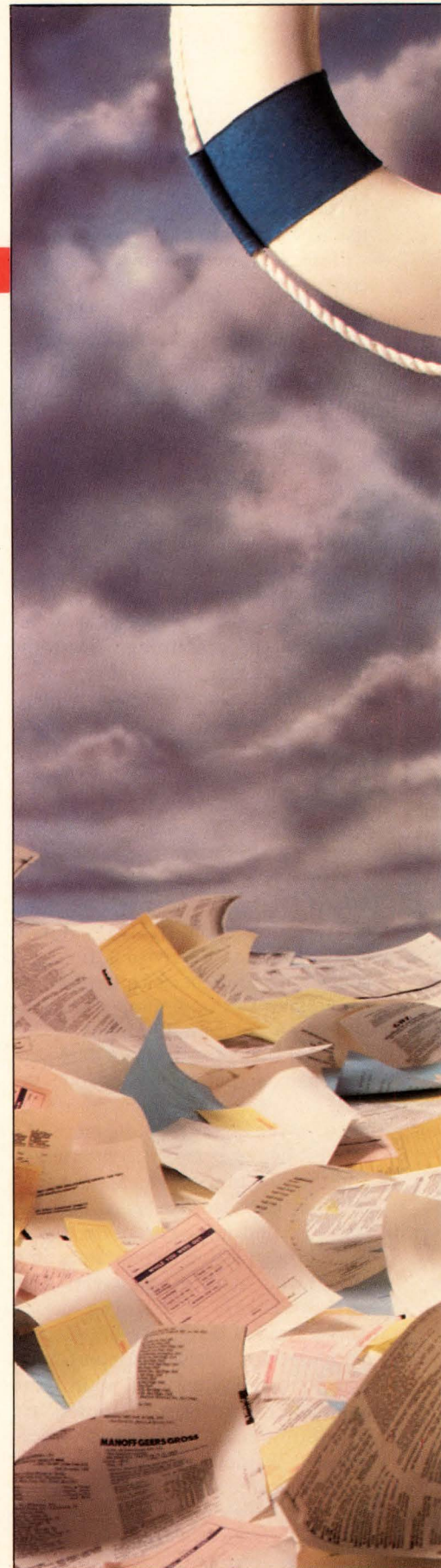
One million a minute! That's the incredible rate at which American office workers generate documents. Naturally, when so many documents are generated, too many are filed away, and staggering amounts of time and money are wasted searching for and storing them.

With 400 billion documents on file in the United States, corporations are indeed awash in data. But only 2 percent of all documents generated are vital to business. And about 45 percent of those on file in the United States could be purged right now, without legal or operational consequence, saving corporations from 1 to 5 cents per document in annual maintenance costs. That's the opinion of Robert J. Kalthoff and Leonard S. Lee, records-management experts and co-authors of *Productivity and Records Automation* (Prentice Hall, 1981). Yet businesses are reluctant to cast excess baggage overboard. Last year, Frost & Sullivan, New York-based market researchers and consultants, reported that 21 trillion pages of paper were stored in the United States.

"We're a long way from the utopian paperless office," says Robert Shiff, president of Naremcio Services Inc., the New York-based consulting arm of the National Records Management Council. "Hard copy is increasing much faster than our ability to eliminate it. We're still drowning in a sea of data."

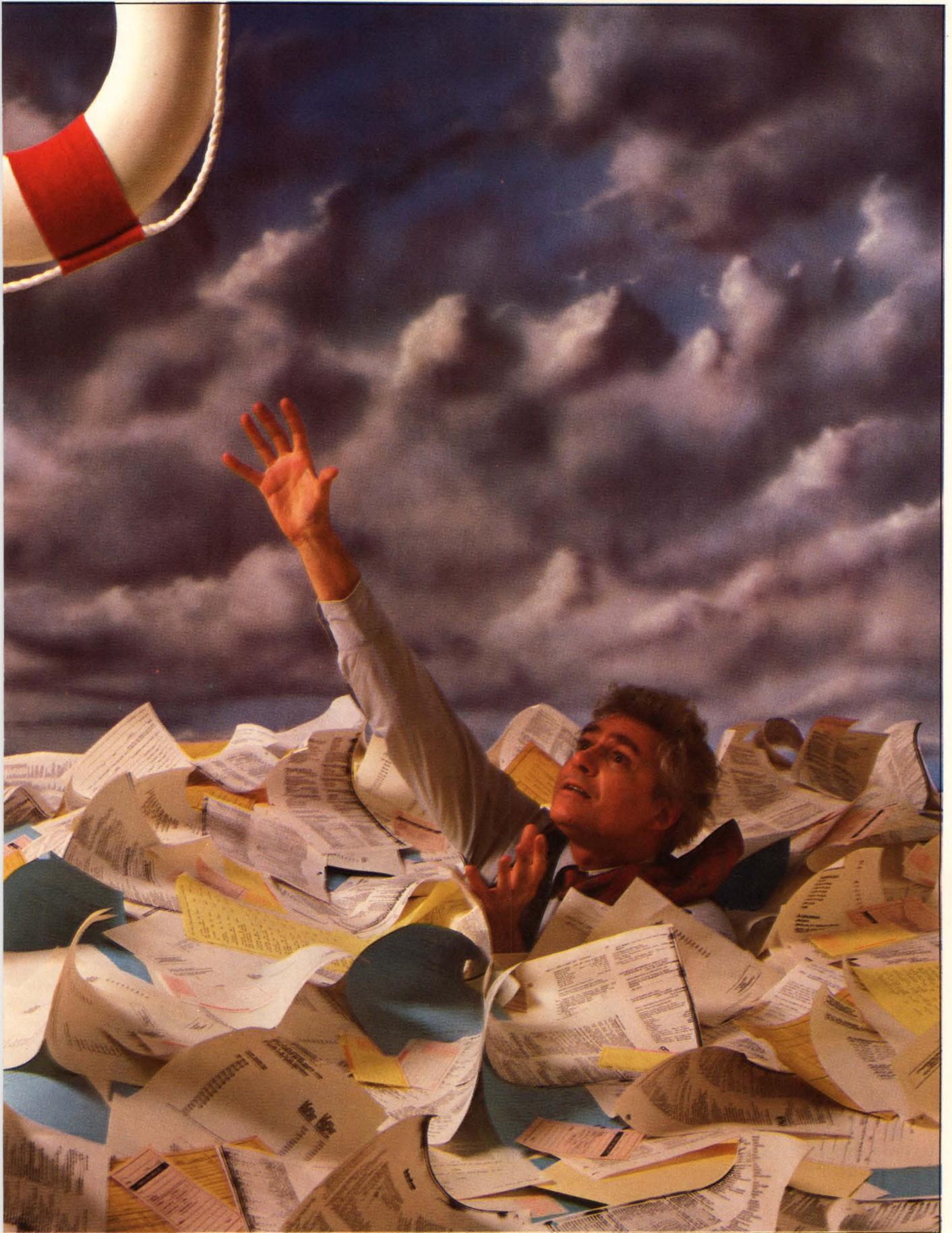
The paperless office may be years away, but the technology for reducing paper in the office has been around for a while, and is progressing rapidly. Microfilm, the most widely used paper reducer, has been around for decades, and new links to computers now make it easier than ever to generate, locate, and retrieve documents in microform. In the near future, optical storage techniques will enable organizations to file relevant data even more compactly, and retrieve them more quickly.

But technology alone cannot organize a corporation's data and keep records-management costs to a minimum. Unless top management sets a strong records-retention policy, computerized records management is inadequate to stem the tide of the information flow, according to Belden



RECORDS

Photo by Rick Barrick



MANAGING RECORDS

Menkus, a Middleville, NJ-based consultant who contributed a chapter on records management to *The Encyclopedia of Management* (Van Nostrand, Reinhold, 1982).

Many records-management problems stem not from corporations' reluctance to abandon inefficient paper systems, but from lack of cohesive records-management policies. In a 1982 Naremcu study, more than 50 percent of 112 Fortune 500 corporations surveyed did not have clearly defined, management-authorized policies on records retention. Policies that were developed did not outline records' legal, administrative, operational, and historical significance, and did not set rules for disposal.

The first step toward establishing a records-management program, according to Shiff, should be a firm commitment from top management to purge old records, starting with documents of minimal value, such as requests for annual reports. Correspondence older than two years should be removed from active files, and transactions involving these documents should be segregated and assigned retention schedules appropriate to their importance. Reference documents, such as blueprints, should be saved or disposed of according to their relevance. The importance of routine reports, Shiff continues, should be assessed to cut down on the numbers generated. Distribution should be consolidated whenever possible. And records designated for archival storage, preferably off-site at a records center, should be indexed for easy access.

With priorities thus established, a filing system should be developed to prevent duplication and ensure the availability of active records. Finally, records-retention schedules should be assigned and adhered to. All vital records, other than those that can be obtained from banks, insurance carriers, and other services, should be backed up and sent off-site as a secur-

ity measure. A 1982 study by the Safe Manufacturers' Association revealed that 43 percent of all businesses that lose records in a fire never reopen, or go under within the first six months of restarting operations.

Over the last three years, Coca-Cola revised records management at its Atlanta headquarters. After reviewing all its records and establishing a retention policy, top management called for a uniform filing system. During the first year the program was implemented, reports Coca-Cola, it saved more than \$1 million on filing equipment and freed up \$500,000 worth of office space.

But Coca-Cola wasn't satisfied—even with those impressive savings. It subsequently surveyed its reference collection to determine retrieval rates and the efficiency of indexing methods. The quality of reference data and the number of duplications were analyzed. Obsolete documents were scheduled for destruction. This process saved more than two miles, or \$600,000 worth, of shelf space—50 percent of Coca-Cola's available

space. The bottling company plans to extend its new policy to branch offices worldwide.

Data-processing departments experience a slew of records-management problems. According to Shiff, "Controlling the input from decentralized data processing is a difficult task." Nearly all users regard their data as proprietary. They seldom enter their information into the central database, so that database remains incomplete.

One obvious solution is for related departments, such as purchasing and accounts payable, or marketing and sales, to consolidate their databases, to reduce waste and document duplication. The tabular abilities of today's more flexible database-management software allow users to outline relationships between documents. That makes it easier to find and retrieve stored information from databases. Allen Andolsen, vice president of Naremcu, recommends using a data-interchange facility to set up file structures flexible enough to allow easy access to and prevent duplication of data.



Last year, Aetna Insurance (Hartford, CT) went online with Kodak's KAR 4000 system to reduce its files, which contained 1.2 million documents for 180,000 policies. Since it automated, the 4,300 square feet formerly occupied by paper-filled files have been reduced to 1,000 square feet, and Aetna anticipates the savings will be \$146,000 over the next three years.

Recent advances in automation hold much promise for document control and for the associated savings of labor, space, equipment, and supplies. But, warns Christine Zanotti, director of professional development for the American Records Management Association, technology has made automation of records a difficult task, requiring extensive study. She says policies for storing and disposing of digital information have not yet been implemented. "Magnetic media," she asserts, "are seldom placed under the same retention controls as hard copy. How do we manage records using these media, without duplicating or retaining them longer than we need to?"

To answer that question, companies must decide which records should be stored on which medium. For example, service companies, where information retrieval and updating comprises the bulk of transactions, can use online storage. But for offices that aren't constantly updating and modifying data, computer storage is costly and unnecessary, advises Andolsen. The more records stored on a central computer, the longer the queues of users waiting to get online with their terminals. In many offices, certain records can be transferred from mainframe to micro to ease access to information and lighten the mainframe load.

Offices that do not manipulate data too frequently should consider computer-integrated and computer-assisted micrographics as alternatives to online records storage. These microfilm and microfiche systems can save 30 percent of paper file-maintenance expenses, according to Kalthoff and Lee. One type of system, computer-output microfilm (COM), lets users produce computer-generated documents on microfilm or microfiche, instead of on printer paper. COM systems save storage space and costs of decollating, binding, bursting, and form separation.

The savings figures for micrographics can be startling. One COM user estimates that printing 1,000 lines of data on paper cost 65 cents, compared to 9 cents on microfilm. And printing with microimage processors is six times faster than generating hard copy on standard impact printers. According to Susan Diamond, author of *Records Management: A Practical Guide* (American Management Associations, 1983), film prices are only 20 percent those of computer paper, and film consumes only 2 percent of the filing space required for hard-copy storage.

Microfilm, microfiche, and roll film are all cost-effective computer-output media. Microfilm and microfiche are primarily used to store widely distributed short to medium-sized reports and frequently accessed documents. Roll film, on the other hand, is suitable for nonvolatile semi-permanent (one to 10 years) to permanent (10 or more years) storage, and for large central files requiring high-speed access.

According to a spokesperson for Bell & Howell, a manufacturer of micromedia, the type of film you use can affect the life of your documents. Silver halide film, says the representative, has faster throughput and gives output of higher quality than does dry silver film. Silver halide has a two-year storage life, and costs 25 percent less than dry silver film, which lasts only six to nine months.

Prices of COM systems range from \$100,000 to \$200,000.

And their levels of sophistication range from dumb systems, which rely on software and a host computer to format the records to be produced, to intelligent recorders, which take information from a computer's file tape, format it, and photograph it, without aid from the user or computer.

The way to decide whether to buy a COM system or use one of the several service bureaus that offer COM is to assess the applications for which your office accesses data, the number of documents accessed and duplicated monthly, and your projected annual growth, peak work loads, and required turnaround times. If you produce more than 2,000 microfiche masters and 10,000 duplicates a month, you can probably cost-justify a COM system. "Other variables include paper costs, types of forms used, how acquisition and billing are done, and required return-on-investment time," notes Jim McKay, director of computer imaging systems for Kodak's Business Imaging Systems Division.

Here are a few of the latest COM offerings:

- In January, NCR released the first COM system to be controlled by a personal computer. The micro in the NCR 5300 series formats and transmits data to the camera itself. The user no longer needs to use a central

SAVINGS from COM-generated microfiche over paper for a 3,600-page report

Single copy*	Paper mode	COM
Total pages	3,600	14 microfiche
Stock costs	\$25	\$2
Shipping weight	40 lbs.	2 ozs.
Coast-coast freight/mail	\$35	28 cents
Printing time	2 hours	7 minutes

*Multiple copy costs are further reduced via COM.

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MANAGING RECORDS

computer or manual techniques to produce reports on film.

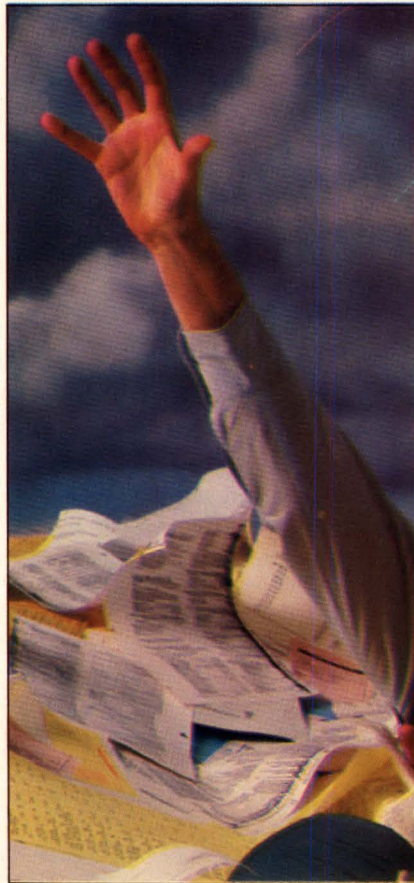
- 3M Corp.'s 720 series COM system, which can go online or stand alone, makes it easier to reproduce data on film. As Charles Dunphey, software-support manager for 3M, explains it: "The 720 allows you to format reports on a display terminal, instead having to photograph them manually through a glass slide. The reports can then be generated on hard copy for distribution."

- The A.B. Dick/Scott Graphics System 200 lets managers update master documents on 4-by-6-inch film frames that house up to 60 legal-size or 98 letter-size documents. Before putting your documents on updatable media, however, you should investigate laws concerning their validity.

- The Kodak Komstar, a minicomputer-driven imaging device, uses heat to process the dry silver film on which it writes. Coupled with Kodak's Starlink Software, the film automatically duplicates microfiche.

- Bell & Howell's Series 6000 COM simultaneously receives and buffers data to a recorder. It films a full page of data while composing another. An interface can bring the 6000 online to a mainframe.

Corporations that can't justify the expense of a COM system may have difficulty *not* justifying computer-assisted retrieval. A 1983 study by Professor Robert Calder of Northwestern University, Chicago, indicated that employees spend an average 50 minutes a day looking for misplaced files. CAR systems, which can stand alone or operate online, search for documents



via computer terminal. Their prices vary, ranging from around \$20,000 to \$90,000, depending on complexity. The simpler systems locate documents and leave retrieval to the user. More sophisticated models retrieve digitized images stored in the central computer and reproduce them on your terminal's display screen. Interfaced with COM, these systems can entirely automate data retrieval and reproduction. If your offices generate between 1,000 and 7,000 documents a day, and access 100 or more, you can make a case for a CAR system,

says Jim Hurley, director of field sales support at Kodak.

Interfirst Bank justified the purchase of computer-assisted retrieval when the volume of data generated at its Dallas-based Bank Card Division grew uncontrollable. Since the 1970s, the division automated its records management with A.B. Dick/Scott Graphics COM System 200. But, when its 108 employees began generating up to 4,000 credit applications, credit-bureau reports, and account records a day, it decided to add 3M Corp.'s Micrapoint II CAR system to save labor and storage space.

Transporting records off site was unrealistic for Interfirst. Records of ongoing accounts must be kept indefinitely for immediate access. And material used to evaluate credit applications is maintained on site for updating and future reference.

To update documents on the old microfiche systems, users had to film them, store them in a rotary file, and manually search for them. The Micrapoint II lets the user key a document's account number into a minicomputer, which retrieves the document from roll film, loads it onto a reader-printer, and displays it on a terminal.

"Savings in input/output costs have already been realized," says Oscar Reagan, vice president and manager of marketing operations for Interfirst's bank-card program. "We reduced staff by three members through attrition, and obtained a custom-designed indexing program. We estimate annual savings of approximately \$20,000 in supplies by converting to 3M's system and by using roll film rather than microfiche."

With the old system, each time Interfirst increased its number of card holders, it had to expand its filing space to make room for the new data. Micrapoint II aids compact storage and saves space. Claims Reagan: "Eventually, when the accounts already on fiche are enclosed and

"Forty-five percent of documents now on file could be purged, saving one to five cents in annual maintenance costs."
—Kalthoff and Lee, authors

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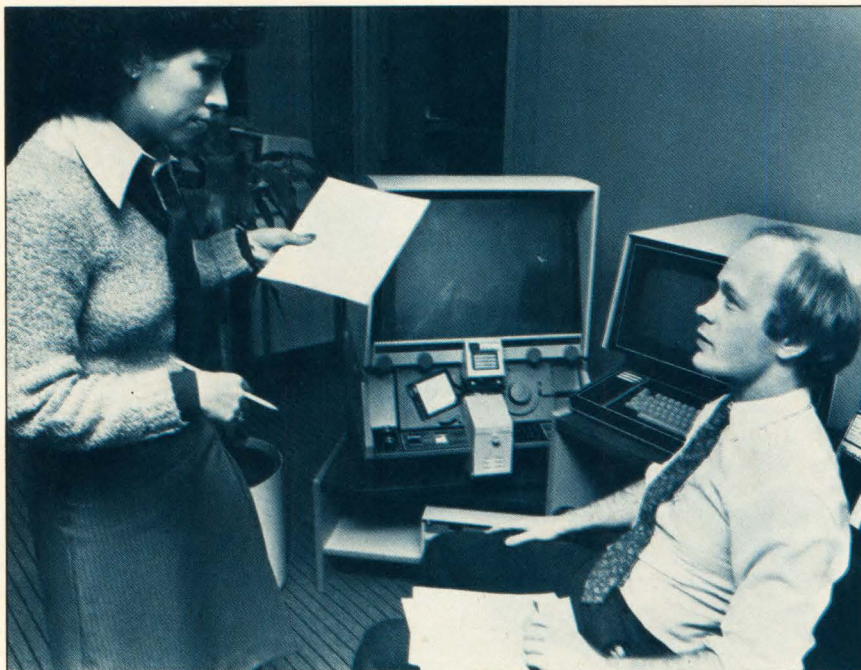


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MANAGING RECORDS



The Bank of California chose a computer-assisted retrieval (CAR) system from 3M. CAR systems, which can stand alone or operate online, search for documents via computer terminal. The most sophisticated models retrieve digitized images stored in the central computer and reproduce them on a terminal's display screen like the one at records management specialist Don Smythe's left in photo below.



archived, we'll save 1,800 square feet of filing space."

Features of Micrapoint II include delete-and-pack features that free up disk space. An archive-to-diskette transfer stores data that are removed from the upgradable hard-disk

system. Interfaces between 3M's 900 Reader-Printer and the Micrapoint II—the API (Asynchronous Protocol Interface) and BPI (Bi-Phase Interface) kits—let users access mainframes, micros, or minis through terminals any distance away.

Abbott Laboratories, a health-care products manufacturer headquartered in North Chicago, was using a manual index-card system last year, when it installed two CAR systems—a Bell & Howell Data Search 1000 and an NCR 115—and a Bell & Howell 3900 COM system. "Our paper system cost nearly \$49,500 a year to maintain, and our automated system is projected to cost \$35,500," says Mary Louise Schramm, micrographics analyst for Abbott Labs. "Most of our savings were in preparation, sorting, and filing costs. We figured that a paper retrieval system does those jobs for \$26,670 a year, and a CAR system does them for less than half that amount—\$11,570.

"We estimate a savings of \$48.95 for each microfiche we generate this year," continues Schramm. "Each fiche contains 55 lines per page and an average of 157 pages. A comparison shows enormous savings."

The CAR systems are used for order entry. Manual updates that once took an average of 6½ hours a day now take two hours a day, eliminating the need for one operator. "Productivity in work hours, savings in floor space, and an expanded database are all benefits we've realized," adds Schramm.

Abbott Labs' in-house service bureau evaluated each department's applications for document storage and retrieval, and centralized Abbott's record-keeping operations. "By centralizing, we've saved a lot of overhead, simply because we're using the systems to their full capacity. Quality control is also an assurance centralized automation affords," reports Schramm.

Mary Kramer, records analyst for Abbott, considers the system helpful. Its uniform file classification, she says, lets the company transfer clerical workers between departments without having to retrain them. But Kramer also anticipates problems. She predicts the use of personal com-



1893. Architects discover up is better than out.

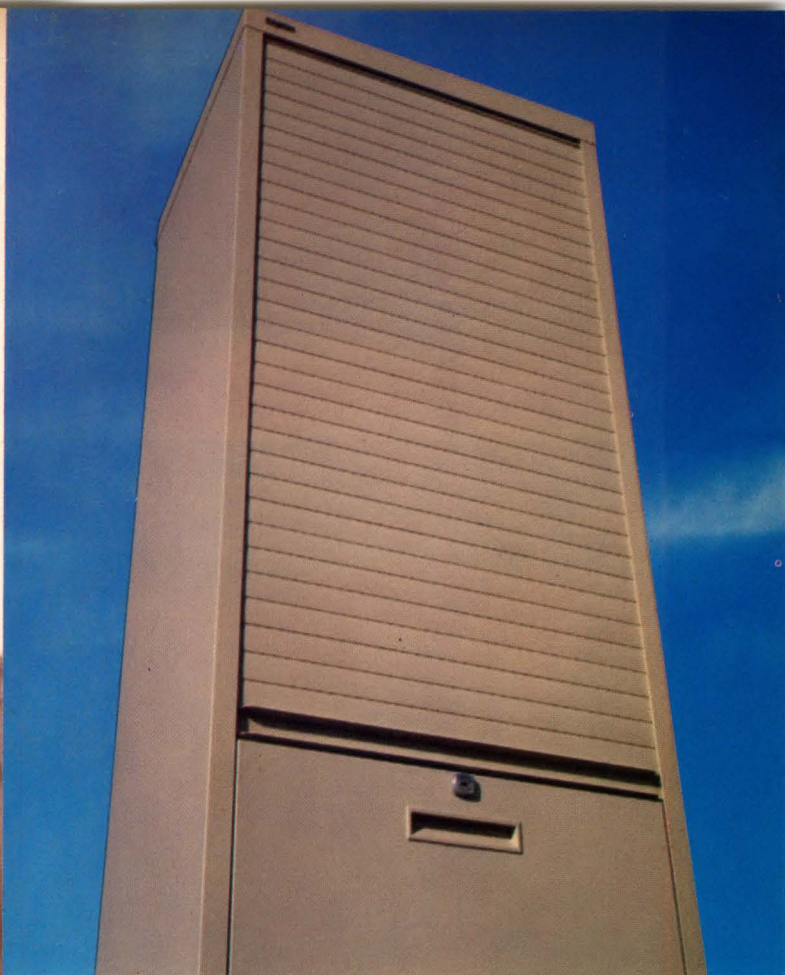
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1984. IBM PC users discover up is better than out.

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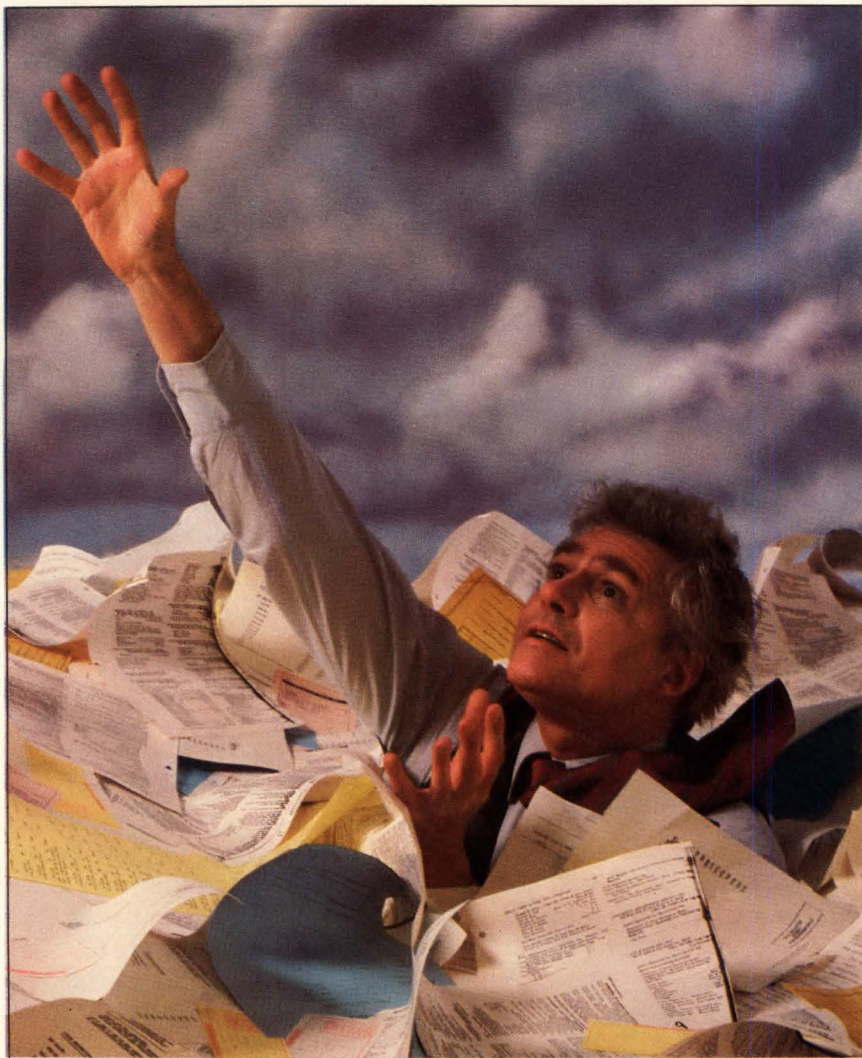
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MANAGING RECORDS



puters to generate records will encourage users not to back up files and may allow them to forget to retain information required for government audits. "Because documents generated on personal computers appear not to consume space the way paper and microfilm do, employees are less aware of their existence. We're concerned that people using the new medium aren't keeping track of records as meticulously as they had been with other systems."

The Data Search System 1000 used at Abbott is the predecessor of Bell & Howell's newer, more sophisticated System 2000, which includes expanded Winchester storage, addi-

tional tape-drive options, enhanced printers, mainframe and COM interfaces, and increased terminal support. "Operators can key an index into the computer while photographing a document," notes Paul McAllister, manager of electronic image-processing at Bell & Howell.

The price of office space was at a premium when Western Electric, now part of AT&T Technologies, began to consider automated records management. In 1979, Western Electric had moved from its large office tower into smaller headquarters in Kearny, NJ, and by 1980, it realized the need to switch from paper files to electronic record-

keeping. It purchased Ragen Precision Industries' 1010 Information System, a highly automated system that contains magnetic-disk memory for data storage and optical-disk image memory with a storage capacity of 1.2 million pages. Images are digitized via high-speed scanner and transmitted to remote terminals.

At Western Electric, the Ragen 1010, driven by a Prime computer, automates the accounts-payable division. Document volume is 1,000 a day for both source and COM documents and retrieval consumes 35 percent of the staff's time. Manual retrieval was estimated at a minimum of five to 10 minutes—if the record in question were properly filed—but retrieval with the Ragen system takes 30 seconds at most. A 90 percent reduction in space, the elimination of \$4,000 worth of filing equipment, and a staff reduction of 4½ employees were benefits cited by Parsons. Since the installation of the 1010, Western Electric has estimated total savings of \$62,000 a year in staff, labor, equipment, and space. The recovery of investment for this equipment? Fourteen months.

Last year, Aetna Insurance went online with Kodak's KAR 4000 system to reduce its files, which contained 1.2 million documents for 180,000 policies and occupied 4,300 square feet. It was already partially automated with online teleprocessing, but updating policies and searching for invoices, payments, and other information stored on paper proved too laborious.

According to Andrew Hoffman, administrator at the Hartford, CT, headquarters, 20 members of the records-management staff file 4,000 papers and retrieve an average of 650 files a day. Before automation, 17 percent of records were unavailable at any given time. Since it automated with the KAR 4000, Aetna's retrieval time has been reduced from 2½ hours to less than 2 minutes per document. The 4,300 square feet formerly oc-

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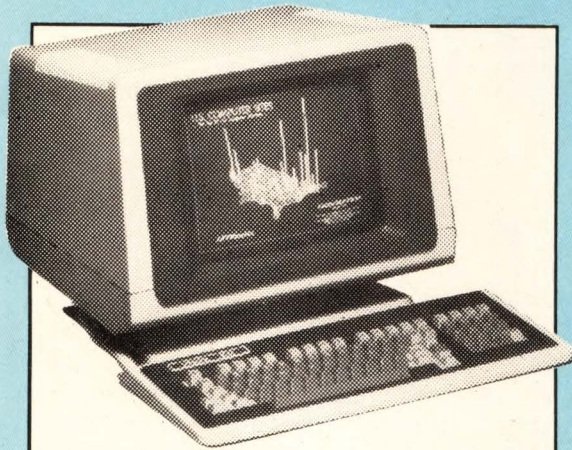
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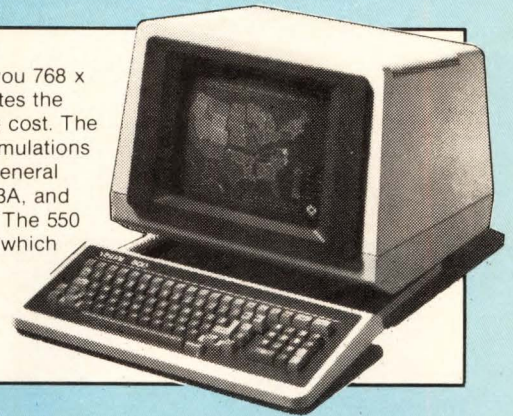


The Visual 50/55 are both code-for-code compatible with the Espirit, ADDS Viewpoint, Lear Seigler ADM-3A and DEC VT52. The Visual 55 extends the 50's performance by emulating the Hazeltine 1500/1510 and by adding 12 user programmable function keys - plus extending editing features.

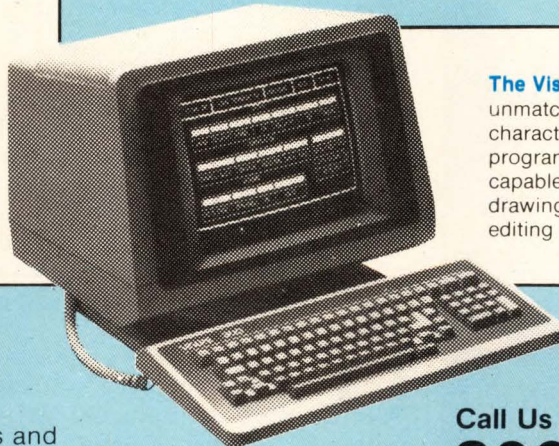


The Visual 102 is a low cost, fully DEC VT102 compatible terminal with graphics option. The graphics option card allows the Visual 102 to be used as a graphics terminal compatible with Tektronix 4010, 4014 terminals.

The Visual 500/550 give you 768 x 585 resolution and emulates the Tektronix 4010 at half the cost. The 500 provides selectable emulations of the DEC VT52, Data General D200, Lear Seigler ADM-3A, and Hazeltine 1500 terminals. The 550 is a block mode terminal which complies to the ANSI x 3.64 standard.



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MANAGING RECORDS

cupied by paper-filled files have been reduced to 1,000 square feet, and Aetna anticipates the savings will be \$146,000 over the next three years. Its staff has been reduced from 20 people working two shifts to five people working one shift, resulting in a 75 percent reduction in salary expenses. Calculating all of the benefits the KAR system afforded, and deducting the costs of acquisition, supplies, and conversion, Aetna estimates annual savings of more than half a million dollars over the next three years.

The KAR 4000 accesses both documents and online data from a central computer. It can be built up to 120-Mbyte capacity. According to



If you produce more than 2,000 microfiche masters and 10,000 duplicates a month, you can probably cost-justify a COM system. "Other variables include paper costs, types of forms used, how acquisition and billing are done, and required return-on-investment time," notes Jim McKay, director of computer imaging systems for Kodak's Business Imaging Systems Division.



"The optical disk will reduce quite significantly the use of both micrographics and magnetic tape in records management," predicts Bob Katzive, vice president of computer and office systems for Gnostic Concepts, a California market-research house.

Hurley, Kodak is also developing an optical-disk based system. "Kodak intends to expand its systems to transmit images over distance and combine information that is digitized or stored on magnetic media with imaged data on high-resolution cathode-ray tubes."

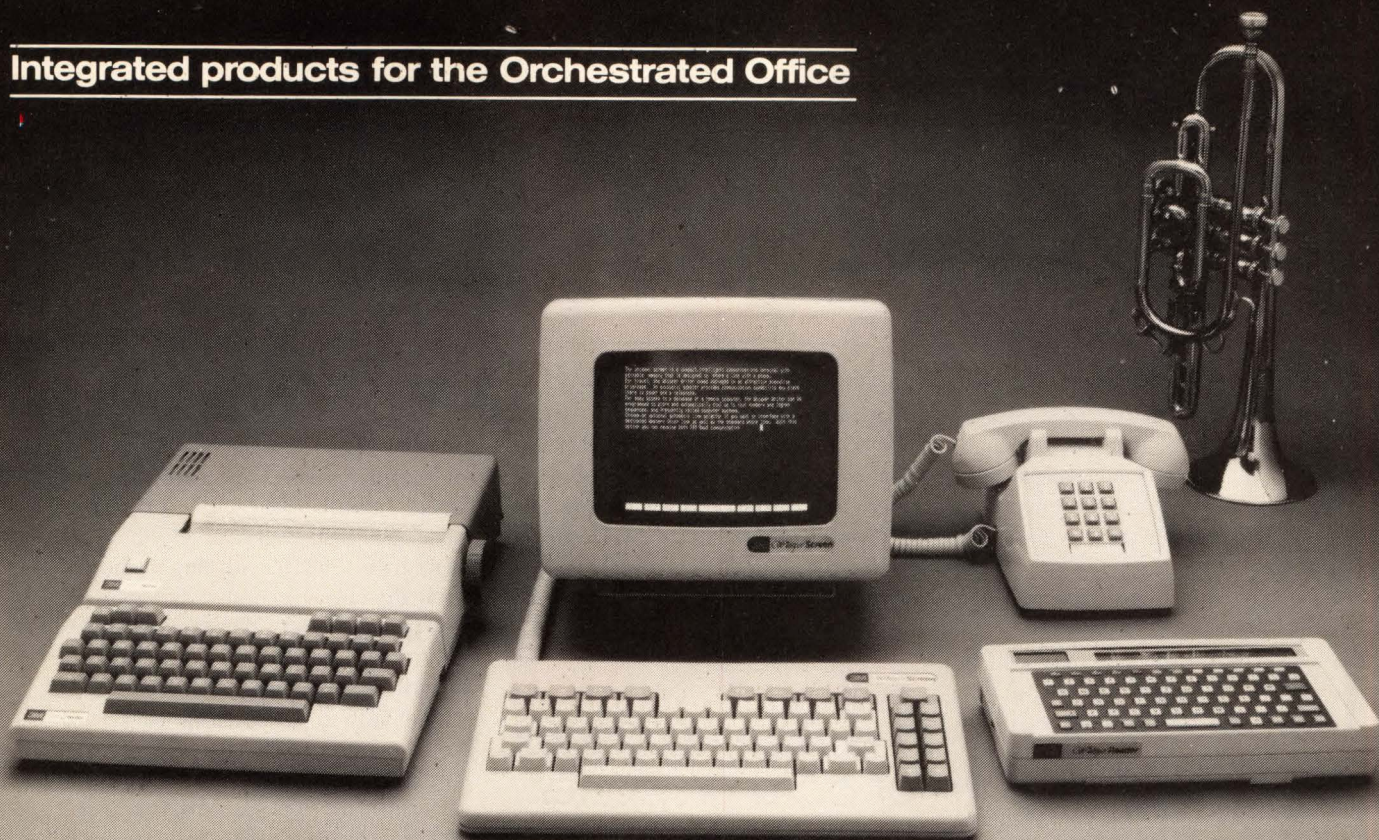
Other manufacturers are also rushing to produce systems that use the advanced data-compaction abilities of optical disk. These systems have a laser to burn on the disk's surface a digital bit pattern that alters the way the platter's coating reflects polarized light. The discontinuities created on the surface stand for the binary "1," and the unaffected parts of the surface stand for "0." The optical disk can store more than 100,000 pages of information (the equivalent of 50 magnetic tapes or 2,000 floppy disks), depending on how the data are compacted. Moreover, this medium can

be easily interfaced with or encoded by a computer.

Right now, business application of laser-disk technology is limited because data stored on optical disks can't be erased or updated. But Matsushita and other manufacturers say that a working erasable capability is imminent. Cost also prohibits its use for the present. Prices for optical disk systems range from \$6,000 to \$200,000. The disk drives can cost between \$4,000 and \$8,000, and the disk itself carries a \$200 to \$300 price tag. But prices for technology have a way of dropping as demand goes up and production costs go down; over the next five years, the cost of disks is expected to drop to \$10 or \$15.

Applications most suited to optical disk range from active-document storage and retrieval to archival storage. "Magnetic tape, the typical archival digital storage form, usually has to be rewritten every six months. And there are severe problems with handling microfilm; operators can damage and misfile records easily. An optical system bypasses operator intervention. It converts documents into a digital bit stream that can be transmitted. The optical disk will reduce quite significantly the use of both micrographics and magnetic tape in records management," predicts Bob Katzive, vice president of computer and office systems for Gnostic Concepts, a California market-research house. *(Continued)*

"Coca-Cola saved more than \$1 million on filing equipment when it revised its records-management system."



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Whisper Reader: a terminal that weighs just 2 lbs.

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Whisper Screen: a smart terminal that communicates.

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MANAGING RECORDS

(Continued from page 74)

Kenneth Bosomworth, president of the Norwalk, CT-based consultancy, International Resource Development, believes memos, correspondence, and other routine documents will in the near future be recorded on optical disk and retrieved via highly intelligent software.

The paperless office may still be only a dreamer's vision, but new storage and retrieval technologies will certainly change the way companies handle and regard records management. According to Robert Shiff of Naremcio Services, the key word for records management into the '90s will be "linkage." "One should no longer consider the various types of systems—hard copy, optical disk, film, digital data, storage and

retrieval—as separate entities," he contends. COM and CAR systems linked with micros, minis, and mainframes that can access outside databases will let employees generate, manipulate, store, and retrieve information, without expending capital to build and store a complete in-house database.

"Printing 1,000 lines of data on paper costs 65 cents, compared to 9 cents on microfilm."

Some experts, however, see danger in this ability to store and retrieve so many documents so easily. Andolsen, for example, foresees data centers' increasing in size, while programmers are dispersed throughout organizations' different departments. Such decentralization will force records managers to devise safeguards to account for and ensure the validity and utility of their databases.

The future, according to David Wolf, manager of national systems support at A.B. Dick, will bring elaborate information systems that handle enormous input of pictures, words, and voice. "Information processing, transmission, and management will involve two types of memory: New information will be maintained in an online memory

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Kenneth Bosomworth, president of International Resource Development (Norwalk, CT), believes memos, correspondence, and other routine documents will in the near future be recorded on optical disk and retrieved via highly intelligent database-management software.

system, and accessed by an interactive terminal; and old information will be kept in a nonalterable memory medium that can be progressively taken off the computer. Integrated retrieval systems will let us view old data for historical purposes," he forecasts. For such a system to become reality, he believes, both software and database-management techniques must be greatly upgraded. Wolf also adds that, despite advances in technology, the paperless office will never become more than an ideal; questions

will always be raised that can be answered by nothing but an original document.

But then, as records management is streamlined by new, more efficient systems, corporations will no longer mismanage and overduplicate their documents. And as managers' nightmares of drowning in floods of data fade, so, too, may their dreams of offices without paper. □

Melanie Mitzner is a free-lance writer based in New York.

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GETTING THE MESSAGE ACROSS

DON'T LEAVE YOUR COMMUNICATIONS TO CHANCE

There are so many communications options now that the choice has become a major task.

by Mel Mandell, Editor

Communications is the lubricant of business. And ways to improve business communications, sometimes at lower cost, have never before been available in such profusion. This broad choice is, however, a problem in itself. With so many technologies from so many vendors claiming so many advantages, the corporate executive trying to choose the best approach may suffer from information overflow.

Fortunately, certain easily set criteria help reduce the choices. First, you don't want too many communication devices on the tops of desks, the most valuable real estate owned by business.

Next, the means of connection and reconnection must be as simple and inexpensive as possible. If it takes hundreds of dollars and weeks of waiting to make a connection necessitated by an employee move, business expansion, or equipment upgrade, then user organizations will turn to the vendor who provides the fast, cheap, and—especially—simple connection. Best of all would be a plug-into-the-wall connection that the user could install without calling for a

high-priced technician.

That is why we see such interest in multi-function terminals with a single connection. And many vendors are responding with devices that can handle voice as well as data communications. The best-known of these is Northern Telecom's Displayphone. Other sources are Rolm, Sydis, and AT&T.

A newer development is the addition of phone communications to personal computers. The latest of such

add-ons is called Asher. A combination of software, a handset, and a 300-baud internal modem, Asher is available only for the IBM Personal Computer. A product of Wilcom Inc. (Roswell, GA), it costs about \$800. If personal computing is also needed, many of these devices can be enhanced in that manner, too. Then an additional element in desktop clutter, the calculator, can be eliminated.

But how are all these wonderful terminals going to be connected to other employees and the outside world? Obviously, local-area networks (LANs) are not the answer, because they can only handle data. Never-

theless, there is great interest in LANs, according to a new survey by The Omni Group, the New York-based consultancy in office automation. While only 45 percent of all Fortune 1,000 corporations had installed LANs in 1983, this minority is expected to jump to a whopping 72 percent by next year. Unfortunately, the survey did not report the extent of LAN use in terms of percentage of all employees connected. Even next year

(Continued on page 82)



Illustration by Harold Brooks



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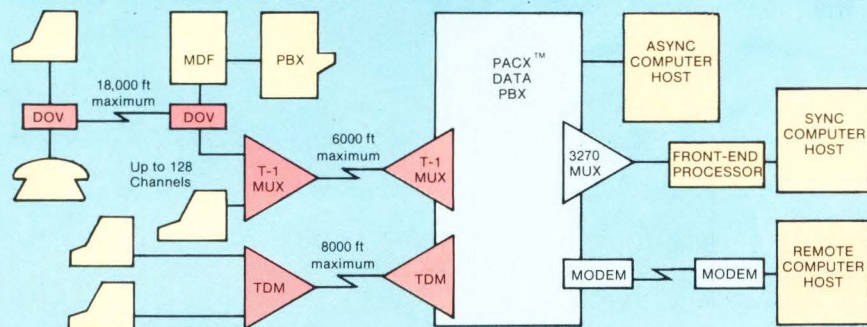
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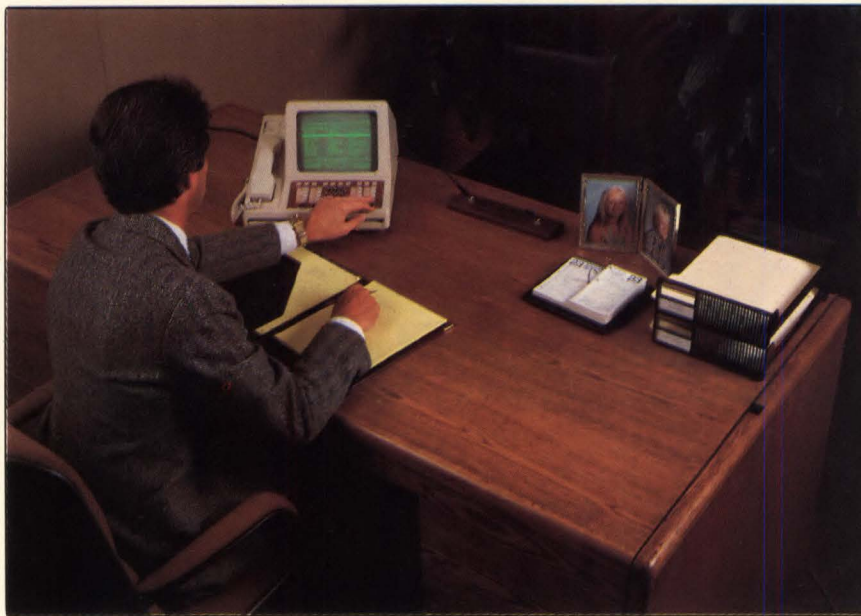
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GETTING THE MESSAGE ACROSS



One of the major appeals of the new voice-and-data terminals is that they don't take up much space on an executive's desk. This is the Cypress personal communication terminal from Rolm.

STRONG FUTURE FOR VOICE-AND-DATA TERMINALS

Of the three kinds of "executive workstations," a new study indicates the strongest future for those that handle both voice and data. (The two other kinds are data-only workstations and personal computers with integrated software. The new study was prepared by Venture Development Corp., Wellesley, MA, (617) 237-3000.

Last year data-only executive workstations were the most popular, representing 56.7 percent of those sold. However, by 1990, when far more executive workstations are expected to be installed, voice-and-data devices should dominate, with a projected 67.6 percent of units installed. One appeal of executive workstations, compared with personal computers, is the former's small footprint, a factor that should not be under-

estimated, according to the study.

VDC conducted an extensive study of present users of executive workstations, as well as those who don't use them, to determine preferences. Current users indicate that they use their machines for spreadsheets, text processing, and records management most frequently. Non-users cite spreadsheet, records management, and graphics as the most desired features. Text processing, surprisingly, was one of the least-desired features for the non-user group.

Over 90 percent of current users intend to repurchase similar devices, and over 50 percent of non-users intend to purchase executive workstations for management. The VDC report specifically noted that IBM does not yet offer what it termed an executive workstation.

(Continued from page 78)

only a small minority of employees will be on LANs, according to Warren Waldbbrand, who was in charge of the survey.

Because LANs can't handle voice, Waldbbrand expects the telephone network to be the principal means by which business communicates—for data as well as voice. That's why there is such interest in private branch exchanges (PBXs) of all sizes. And the number of suppliers of PBXs is climbing fast as the local and regional operating companies split off from AT&T go into competition with their former parent. Computer makers are also forming alliances with PBX makers. For example, IBM owns a big chunk of Rolm and Wang Laboratories has just bought part of Intecom.

However, you may have two good reasons *not* to rush into acquisition of one of the new all-digital PBXs. First, as John Seaman, data-communications editor of *Computer Decisions*, noted in his May article on the subject, there still may be a lot of life left in your present analog PBX. Dumping it now can cost in terms of lost depreciation.

Second, there's the matter of voice mail, which the newer PBXs offer as a built-in feature. However, you can add this attractive capability to your present PBX. After an early shake-out, the number of vendors of voice mail is burgeoning. They are bringing the price down sharply.

An easy way to find out if voice mail is for your business is to try one of the voice-mail service bureaus. If your fast-moving executives and professionals find the service productive, they will demand a permanent installation. And you will know if they really are using it, because the charges for the service will jump and employees without access to the service will demand it. On the other hand, if use of voice mail flags, you may do better with electronic mail, which is currently far more popular



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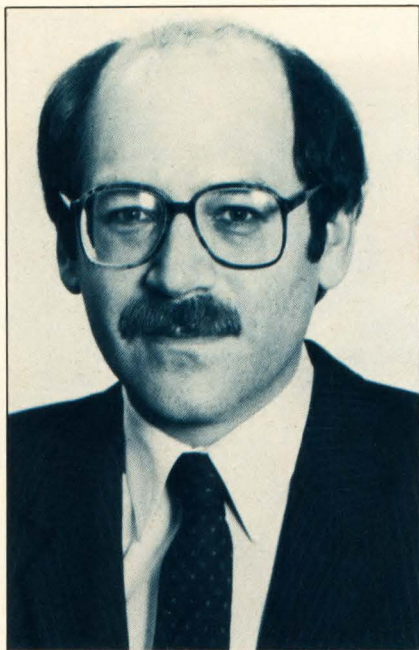
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"The telephone system is the glue that will hold office automation together," according to The Omni Group's Warren Waldbrand.

than voice messaging. (See "Voice mail: Is anybody listening?" May.)

Electronic mail may be one of the reasons for the growing popularity of briefcase-size computers. Equipped with modems, these light but power-

GET THE MESSAGE

ful machines can act as terminals to the big computers or services that support electronic mail. Some of the newest portables even have phone handsets built in. (Portable terminals will be examined in *Computer Decisions' Corporate Executives' Guide to Communications*, a special issue to be published in mid-November.)

But what is business to do with all the voice- and data-communications devices in which it has invested so many billions? They are rarely compatible with one another. Fortunately, there is a growing number of suppliers of protocol converters—black boxes that enable machines that don't speak the same languages to talk to each other. However, these handy "interpreters" must be applied with care. There are heavy-traffic circumstances when

some protocol converters can't do all they're supposed to do.

It's never been so difficult to plot the most effective approach to all the communications needs of corporations. The breakup of AT&T has opened a Pandora's box of options, not all of which are clearly understood at this time. In fact, it will most likely take AT&T and its former components years to digest the effect of Judge Harold Greene's decision.

Nevertheless, the corporation that communicates efficiently among its employees and with its vendors—and especially with its customers—is likely to see its profits grow. It is also able to react faster in the event of a serious problem or setback. In other words, in these tough, turbulent times, efficient communications contributes to survivability. □

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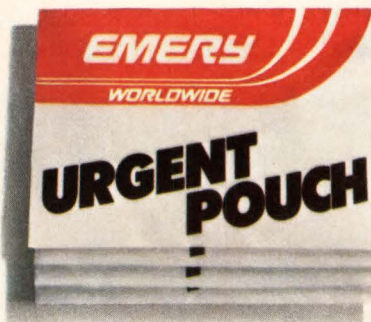
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TELECOMMUTING: WILL IT WORK FOR YOU?

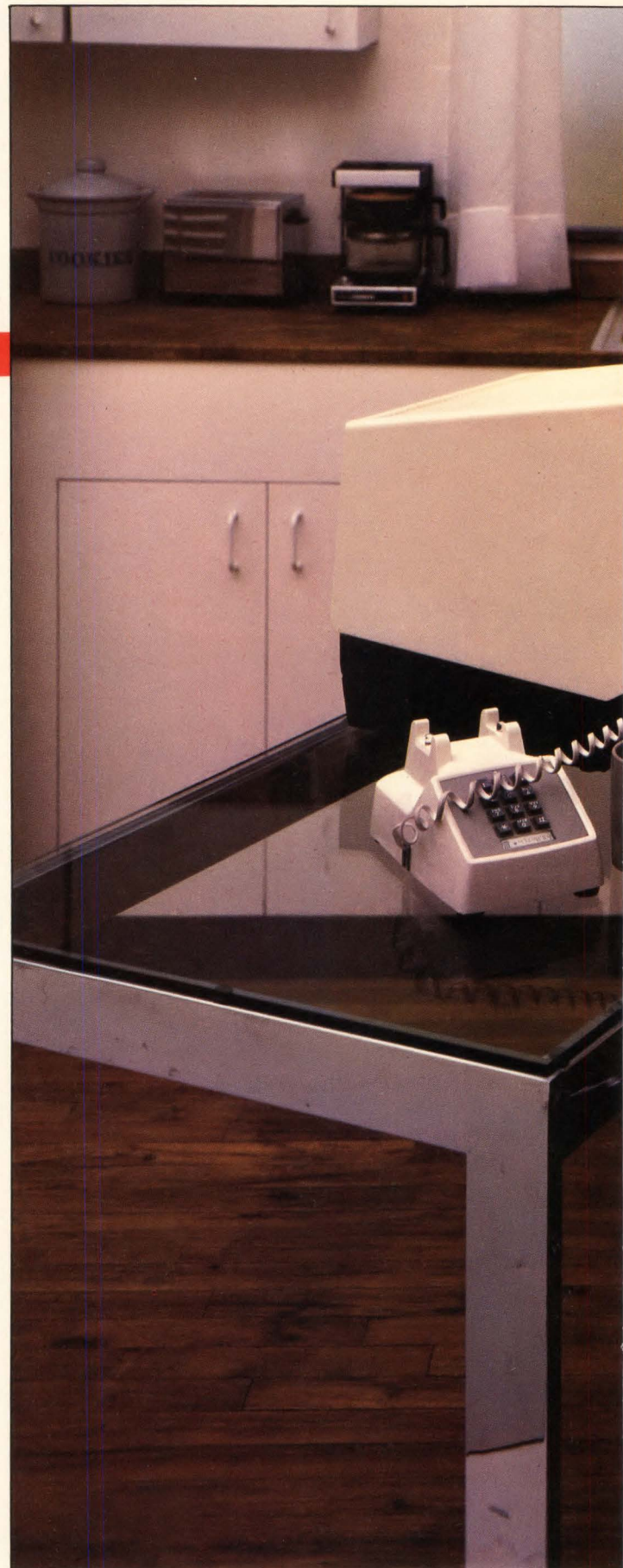
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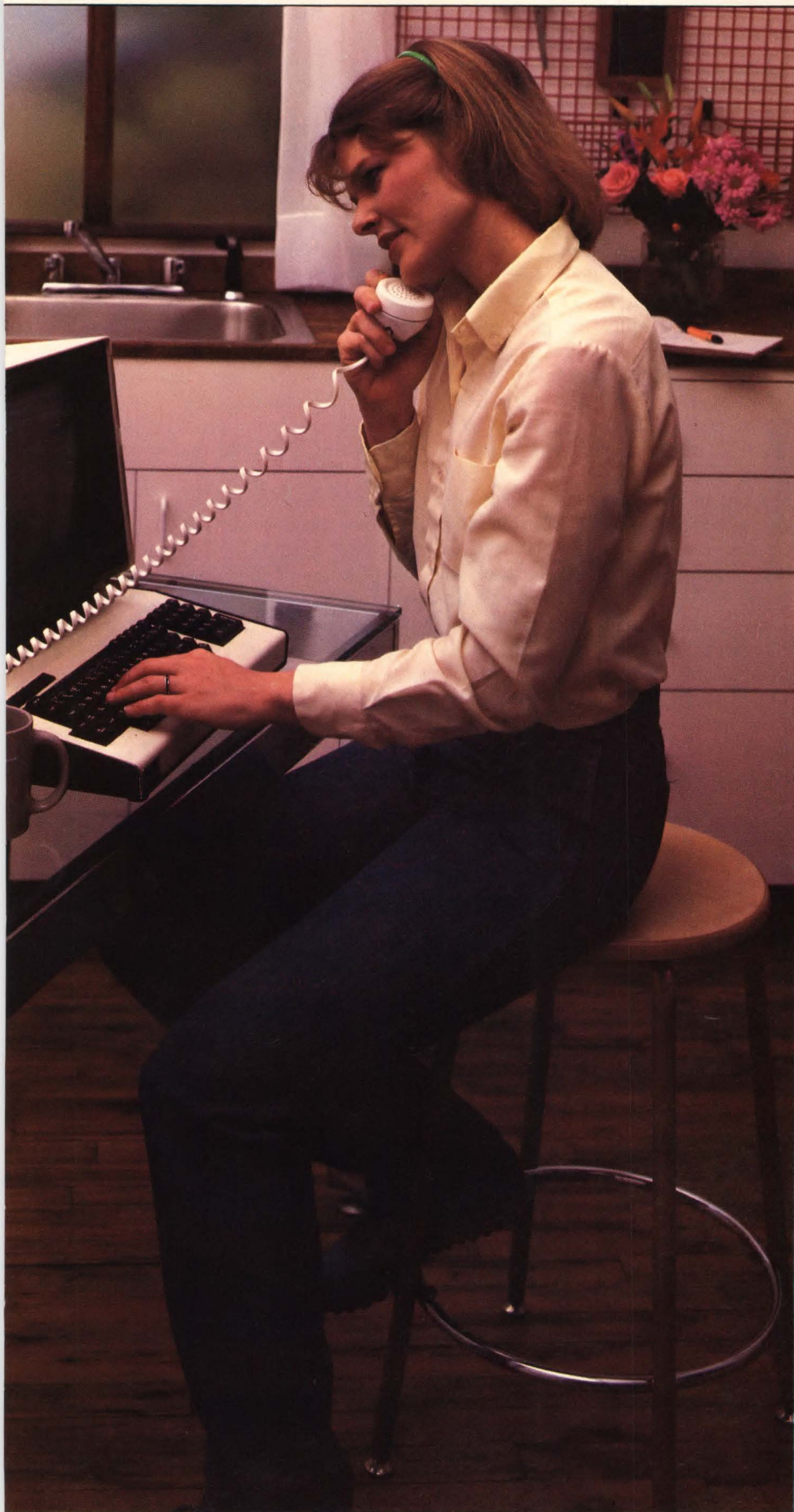
What do a computer operator who commutes three hours a day, a handicapped data-entry clerk, and a programmer on maternity leave have in common? They're among the likely candidates for your first experiments in telecommuting, in which employees work at computer terminals in their homes, communicating with the office via telephone hookup. Some companies thank telecommuting for curing dozens of corporate headaches. Others blame it for causing dozens more. But any corporation would agree that a telecommuting program should be implemented gradually and selectively.

Metropolitan Life, for example, began its telecommuting program when it hired three handicapped programmers, who would have found it difficult to travel to the insurance carrier's New York headquarters five days a week. Because they can telecommute, they travel to the office only once a week to receive assignments, pick up mail, and establish needed face-to-face contact with managers and co-workers. So far its program has worked, but Metropolitan isn't about to make telecommuting's benefits available to all employees. If the program proceeds smoothly, Metropolitan may someday expand it to include women on maternity leave.

Of course, for any corporation considering expanding or implementing a program, telecommuting must prove itself to be a two-way street, benefiting both the selected employees and the corporation. The benefits to employees are obvious. The handicapped, employees on recuperative or maternity leave, or those unable to relocate can hold jobs they otherwise could not. Also, the telecommuter saves commutation and wardrobe costs. And time that had been spent traveling to and from the office can be divided between work and leisure. As Vincent Giuliano suggests: "Instead of having to fight their way into the office and back for two hours a day, telecommuters can take an extra hour for themselves and give an extra hour to the company." Giuliano is chief scientist and vice president of Mirror Systems, Inc., a software company in Cambridge, MA, and former consultant for A.D. Little Inc., the Cambridge, MA-based consultancy.

For the corporation, work-at-home programs can raise productivity and reduce the need for office space. Businesses subject to seasonal peaks particularly benefit from such programs. Because productivity usually increases with telecommuting, such businesses often can avoid hiring additional employees and renting extra office space to handle increased workloads. Telecommuting can also re-





The word “telecommuting” conjures up visions of futuristic electronic cottages. But for now, telecommuting is just a way for a few specially selected employees to do their work a lot better.

duce the trauma of corporate relocation, enabling companies to hold on to key professionals who might not wish to move. And, in many cases, telecommuting is an effective way to lure and retain valuable employees.

Telecommuting sounds like an ideal solution for both employees and businesses, but it won't become common practice for quite some time. That's because telecommuting is not just a matter of hooking up some wires and enjoying the benefits. As with any other technology, telecommuting must be launched according to a well laid-out plan. According to Gil Gordon, a New Jersey-based consultant specializing in telecommuting, approximately 3,000 employees of 200 companies in the United States are involved in the trend. Of those companies, he estimates, no more than 40 are practicing it in a “fairly logical,

STAY-AT-HOME EMPLOYEES



To help a telecommuting programmer feel he was part of Metropolitan Life Insurance Company's team, Mary Ellen Tobin had a desk set up for him in the office. His mail and other correspondence were placed there for him to pick up during his weekly visits.

structured way."

Telecommuting will proliferate only if corporations implement it with patience, caution, and common sense. Then, after a slow start, momentum may build. Remember, telecommuting is relatively new; five years ago, participants were considered pioneers. As the years pass, entrants will have more and more examples to guide them in its use.

In the meantime, how does a corporation launch a program? First of all, Gordon advises, pick the right kind of employees as your test pilots. Data- or word-processing clerks are a good choice; they can do their jobs well without much group involvement. And consider your candidates' personalities, as well. Gordon interviews both managers and employees to see if potential telecommuters will be able to handle working at home. He checks such factors as

their work habits, their ability to manage time, and their need for socializing—a stroll down the hall to chat actually helps some workers clear their thoughts and get back to work. Also, Gordon says, "They have to be workers the manager can trust."

When Gordon looks for these traits, he draws from personal experience. When he left a corporate job to form his own consultancy, the amount of work he did at home increased tremendously. Gordon discovered that telecommuters need to set aside their own work space at home. He also learned they must have a great deal of discipline. "The distinction between day and night, weekday and weekend, gets very bleary," he says. Telecommuters enjoy the freedom to play with their children after dinner, before settling down to work, but they also must be able to handle that flexibility responsibly. And, Gordon discovered, some people simply can't stand to stay home day after day. Gordon himself, though he had always wished he were home more often, found that, "If I'm home more than three or four days at a time, I go crazy."

Once you've found the ideal telecommuter, you must decide how much time he or she should spend at home, and how much in the office. There's no rule of thumb to help you make that decision. It depends on the job, company, manager, and a dozen other factors. The experts claim, though, that no matter how well suited a job is to at-home work, a telecommuter should keep some contact with the office. Even Giuliano, a telecommuting booster,

tempers his enthusiasm. "I don't advocate employees' giving up offices and working only at home," he explains. "But I do believe it's natural for people to do some work at home and some in the office, and corporations should be more flexible about that than they are."

Giuliano is living proof that a telecommuting schedule that works for one job doesn't always work for another. Since coming to Mirror Systems, he has cut back on telecommuting. "Right now, I'm chief scientist of a new organization. Because I want to build a good rapport among colleagues, I'm keeping much more regular hours than I used to."

But Giuliano is not the typical telecommuter. He is his own boss, and he knows what has to be done to keep the office running smoothly. In contrast, most telecommuters work under a manager, and that means, in most cases, strict policies must be set up to accommodate both managers and employees.

At Metropolitan Life, management followed a logical, structured approach to telecommuting. The corporation started its program in 1981 through Lift Inc., a Chicago-based nonprofit job-placement organization for handicapped workers. Lift provided the training, but Metropolitan had to solve policy questions.

According to Steve Gilder, manager of corporate technology and systems staff, Metropolitan had trouble setting salaries for telecommuters. The insurance carrier's pay scale is based on merit and on office location. Two workers in different towns, doing the same job at the same

"Telecommuters can take an extra hour a day for themselves and give an extra hour to the company." —Giuliano, Mirror Systems



level, can earn different salaries. "The question," Gilder says, "was 'Should telecommuters be compensated based on the pay scale for their home location, or on that for the location they report to once a week?' The company decided to base their pay on reporting location."

Telecommuting raised a question that hit home for the insurance giant. "What happens if a telecommuter slips and hurts himself or herself on the stairs at home?" Gilder asks. "Will this injury be covered by the company's insurance?" Yes, the telecommuter receives the same benefits as the in-house employee. If the telecommuter becomes injured while working, he or she is covered under worker's compensation. If the at-home worker slips in the shower, the company's health-insurance program will cover medical expenses.

As the program progressed, unexpected problems arose. For example, Mary Ellen Tobin, a project manager who supervises programmers in the electronic-installation department, initially had trouble dividing her time between the two dozen in-house programmers and the one at-home programmer. She solved this problem by setting aside some extra time to discuss problems and explain tasks to

the telecommuter.

Tobin wanted the telecommuter to feel he was part of Metropolitan's team. She had a desk set up in his office, and placed his mail and other correspondence there for him to pick up during his weekly visits. The desk is a place he can call "home" when he's in the office. (Of course, by setting aside that office, Metropolitan forfeits the space-saving advantage of telecommuting.)

Communication was another of the problems solved by extra time and effort. "We started off communicating over the telephone," Tobin says. "Once the telecommuter became comfortable with the system, we switched to communicating via terminal." The programmer knows when to reach Tobin if he has questions, but generally he sets his own hours.

The telecommuting program is a big help for the handicapped programmer. Because of his disabilities, he often cannot compress all his energy into a continuous eight-hour work stint. Telecommuting lets him break up his hours as he needs. And, despite the extra effort involved, Tobin is pleased with the program, too. "He's really come a long way," she says of the telecommuter.

Control Data Corp. in Minneapolis is even more involved in telecommuting. As of last fall, the large-computer maker employed 48 telecommuters. In addition, its Homework program sells Control Data's training and expertise in telecommuting to state agencies and others concerned about the handicapped.

Control Data began investigating work-at-home programs in the late 1970s. Management saw them as a way to train in business-applications programming workers who were handicapped or in dead-end jobs. "We set up the training program because back in the late 1970s we had a screaming need for computer programmers," says Ralph McCrae, national manager of the Homework program. From that program, the company developed guidelines on the do's and don'ts of telecommuting. And from the guidelines, it developed a course for managers and employees



Questions concerning telecommuters' salaries—and insurance coverage—had to be addressed right at the start of Metropolitan Life's program, notes Steve Gilder, manager of corporate technology and systems staff.

STAY-AT-HOME EMPLOYEES

on the pitfalls of telecommuting.

Control Data learned from its program that there is a host of problems in the way in-house managers and at-home employees communicate with and regard each other. According to McCrae, managers who are to oversee telecommuters need to sharpen their skills. "You develop some bad habits when your staff is clustered about you," he explains. "You don't have to be as concise or consistent in the way you inform because workers who don't understand a task can yell across the hall: 'Hey, what's this all about?'" Telecommuters don't have that advantage."

Like Tobin of Metropolitan Life, a manager has to be willing to give telecommuters an extra dose of attention. Yet, no matter how much of an effort is made, a manager will probably treat a telecommuter differently from in-office workers. "'Out of sight, out of mind' is a very true saying. And it doesn't apply just to the mind of the person who works at home," says McCrae. It's really characteristic of human nature. To overcome this tendency, Control Data has at-home workers come to the office once or twice a week. It also invites the telecommuters to both its social events and business meetings.

If some managers balk at the notion of telecommuting, so do some employees. One of employees' most common fears is that being "out of sight, out of mind" will exclude them from promotions. Control Data's course contends that this fear is justified. For example, both systems anal-



Control Data's Ralph McCrae warns that managers who are to oversee telecommuters may need to sharpen their own skills. "You develop some bad habits when your staff is clustered about you," he explains, "because workers who don't understand a task can yell across the hall: 'Hey, what's this all about?'"

ysis and management, two positions a rung above programmer, require a lot of face-to-face contact. Does this mean that telecommuting programmers climbing the career ladder have to give up working at home? The employee and manager should iron out such questions before telecommuting begins.

As consultant Gordon noted earlier, even a telecommuter who isn't worried about career gains might not like working alone much of the time. In one case, McCrae says, a "more socially oriented telecommuter decided to return to the office. Had we insisted he continue telecommuting, he might have become a problem for us."

Sometimes, Control Data has found, it's hard to adjust to having

children or family members around while one is working. If that's the case, setting firm ground rules can solve the problem. "It's often difficult for small kids to understand that when Mom or Dad goes into a certain room, he or she is at work, and is not to be disturbed," McCrae says. "But once those issues are dealt with, kids recognize that Mom or Dad, though home, still has to go to work."

In many cases, telecommuting can help retain workers. Once, at Control Data, a valuable employee almost left to take a job in California's competitive Silicon Valley. "The opportunity to work at home was sufficient to convince the employee to stay with Control Data, rather than accept the other offer," McCrae recalls.

Another plus, Control Data found, is that its at-home workers generally perform better than in-house workers. McCrae estimates a 15 to 25 percent improvement in productivity. The criteria by which he defines productivity include on-time delivery, goals met, and goals improved upon.

Why the increased productivity? "We're not quite sure whether it's attributable to the environment, or the individuals' desire to continue working at home. Whatever it is, they're motivated to get the job done on time and even earlier," McCrae says. Part of the reason, he speculates, is that telecommuting allows workers to "complete a project without having to catch a bus or train or carpool home."

Gil Gordon offers three reasons why productivity rises with work-at-home programs. First, he says, telecommuters work more hours than office workers; second, they complete more work per hour; and third, they work at a schedule that fits them. Given these factors, a corporation can expect productivity gains from telecommuting; the size of the gain will, naturally, be affected by how well a job lends itself to telecommuting, and by how well a company handles the human-resource and technical aspects of its system. (Continued on page 96)

"Telecommuters fear that being out of sight and out of mind will exclude them from promotions."

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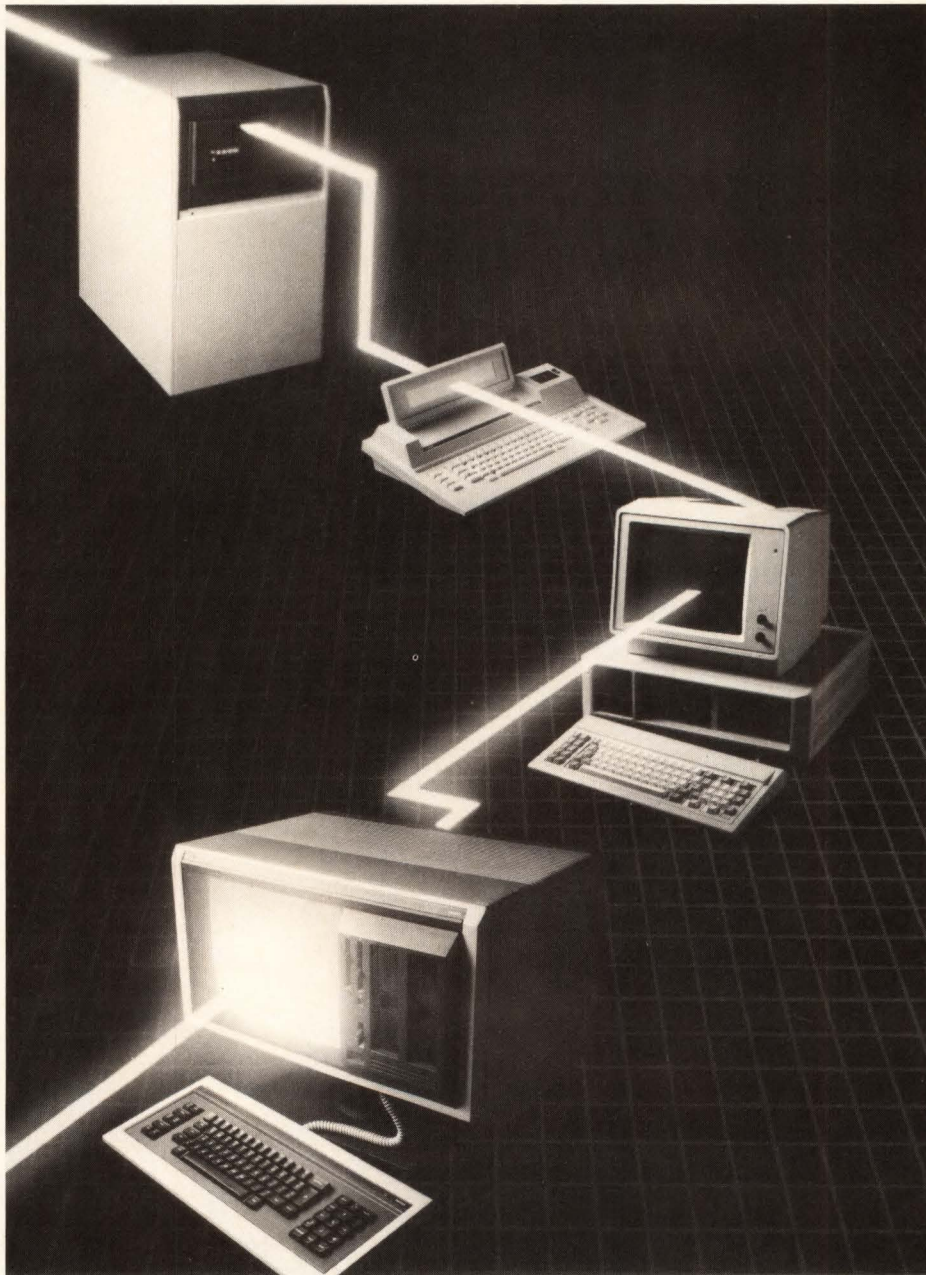
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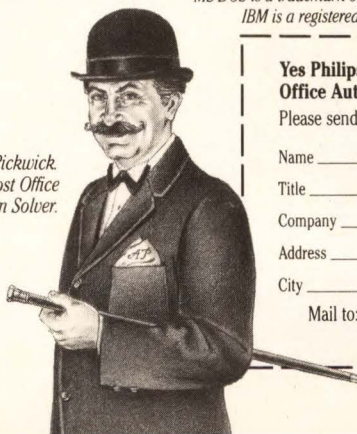
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STAY-AT-HOME EMPLOYEES



(Continued from page 92)

Technical problems forced Continental Illinois National Bank in Chicago to twice curtail its telecommuting program, despite its efficient handling of human resources. When it entered into telecommuting in September 1978, Continental Illinois hoped to gain an additional labor pool. It began a program that allowed typists to receive and process dictation at home, and transmit it back to the bank. "It's very difficult to get qualified people to come down to the [Chicago] Loop to work," explains Elizabeth M. Carlson, second vice president of personnel at the bank.

Because it was such an early entrant, Continental Illinois had no model to follow. It was forced to use a "homemade" system, in which dictation was sent to workers' homes on cassette tapes. The typists keyed the dictation into their word processors and sent it back to the office by electronic mail. "Electronic glitches," Carlson says, "added to our staff budget because we ended up adding more staff members to support the telecommuters." The bank curtailed the

program in August 1980.

But Continental Illinois immediately set to revamping its system. It eliminated the cassettes and improved the word-processing and communications equipment. It also hired four new employees for the project. There had been no problems with the first employees, Carlson says, but the bank "wanted to find out how the system would work with new hires."

The second phase of the project began in February 1981. The new employees worked fine, but the technical problems continued. About 18 months later, Continental Illinois was again forced to pull the plug on the program. Part of the problem, Carlson believes, "had to do with waiting for vendors to come out with usable equipment. Vendors have since come out with a system I think will work." Carlson refers to Dictaphone's Dictastaff system, which allows at-home typists to start and stop disks located in the office, thereby cutting down on the need for extra staff. But for now, Continental Illinois's program lies in dry dock. "The problem," Carlson explains, "is that Continental Bank

has been reducing its staff for the last year and a half. It no longer needs to."

The experiences of Continental Illinois seems to be the exception rather than the rule in telecommuting. Usually, companies have more problems with human resources than with technology. According to Giuliano of Mirror Systems, today's technology makes it as convenient to process and receive information in the home as in the office. Martin L. Ernst, vice president of advanced information technology at A.D. Little, agrees: "You can go a long way on just a spare telephone line," he says.

With all the talk about human resources, training sessions, extra work for managers, and electronic links, you might think telecommuting is an expensive way to save office space or boost productivity. But, according to those involved, it's really not that costly.

Continental Illinois, for example, did a cost analysis before beginning its program. The bank determined that salaries would be the same for at-home workers as for office workers. The bank hoped to offset the added communication costs by saving on overhead at the office. If not for the electronic glitches, the bank probably would have broken even, according to Carlson.

One factor that could affect communication costs at companies involved in telecommuting is the breakup of AT&T. The corporate world is waiting to see how the divestiture will affect rates and services at AT&T and the now-independent local operating companies. Continental Illinois is concerned because the Dictaphone system it's banking on requires an open phone line. "If the cost of telephone lines goes sky high," Carlson says, "that could become another obstacle."

To hear Ralph McCrae of Control Data talk, the breakup of Ma Bell is really no problem at all. "It took a while for us to get on top of it, but it hasn't been a major problem," he



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says. "You work with your own people to understand what the needs are, and then you talk with AT&T or another communications company to see what it can accommodate. Once you've got the right equation, it's just a matter of ordering the right equipment." And so far, telephone costs have not become prohibitive.

What are the costs of telecommuting? The first cost consideration involves the potential telecommuter's need for a home worksite. If none is available, the time and money spent renovating the home would surely eliminate any gains you'd planned to make. In that case, it might be better to forget about telecommuting for that employee.

In most cases, however, the only costs involved in telecommuting are for the terminal, or microcomputer, and the telephone line, says McCrae. These costs can be reduced if, like many Control Data workers, the new telecommuter uses the same terminal he or she used in the office. A rather inexpensive terminal can be bought for between \$1,000 and \$2,000, McCrae says.

Control Data's telecommuters pay their own electricity bills, which are slightly higher due to equipment use. McCrae says the reduced commutation and wardrobe costs are compensation for this expense. In fact, he adds, one Control Data telecommuter was able to sell his family's second car.

The only other costs Control Data has incurred are in hours lost in training sessions and in the time it takes for managers and employees to adjust to the new work situation. Is telecommuting worth the price? McCrae thinks the expenditure of time and money is well rewarded by increased productivity.

Now that you know what can go wrong, what can go right, and how much it all will cost, you can stop reading and launch your telecommuting program, right? Well, not quite. Gordon, the New Jersey-

"Telecommuting let Metropolitan Life hire three handicapped programmers."

based consultant, mentions some additional issues that could become more important as telecommuting grows.

"If a telecommuter lives and works in New Jersey, but his or her employer is in New York, will earnings be taxed in New Jersey or New York?" Gordon asks. Or, even more complex, what if the telecommuter lives and works in Windsor, Canada, but the employer is based just over the border in Detroit? Investigate such issues before telecommuting begins, Gordon advises; put it off, and both the telecommuter and your company may wind up tangled in a mess of tax and payroll problems.

Other questions will roll around at income-tax time. For example, can a telecommuter who works two days a week at home convince the Internal Revenue Service that home is a primary worksite? There really hasn't been a test case involving telecommuting yet, Gordon says, but the IRS is not likely to have a broad interpretation of what qualifies the home as a primary worksite.

Then there's the matter of workers' rights. "Some companies have attempted to set up telecommuters as subcontractors," Gordon says. In that case, to what type of worker's compensation or overtime pay is such an employee entitled? Unions are fight-

"Managers who will supervise at-home workers must sharpen their skills."

ing telecommuting, Gordon says, because they see great potential for abuse. He says the AFL-CIO has suggested the government ban telecommuting, and the Service Employees International Union prohibits its members, who include clerical workers and entry-level data processors, from telecommuting.

Knowing all this, managers are forced to ask, "What is the future of telecommuting?" *Future Shock* author Alvin Toffler paints a very rosy picture in his latest book, *The Third Wave*, published by Bantam Books in 1981. In his chapter on the electronic cottage, Toffler writes: "Today it takes an act of courage to suggest that our biggest factories and office towers may, within our lifetimes, stand half empty, reduced to use as ghostly warehouses or converted into living space. Yet this is precisely what the new mode of production makes possible: a return to the cottage industry on a higher, electronic basis, and with it a new emphasis on the home as the center of society."

Some, such as A.D. Little's Ernst, question such a view. Ernst himself has not worked much at home, but at one time he worked closely with someone who was telecommuting. Ernst decided he could no longer work with the man because he "missed the personal interaction that was a large part of what made work fun." Jobs with a need for give and take between employees will, Ernst believes, "set the limit on the form of telecommuting that lets workers stay at home."

He may be right. After all, it's difficult to believe factories or office towers will ever become ghostly warehouses. But it seems telecommuting will, at the very least, clear some space on the administrative floors. □

Patrick Honan is on the editorial staff of Personal Computing and Personal Software, two other Hayden publications.



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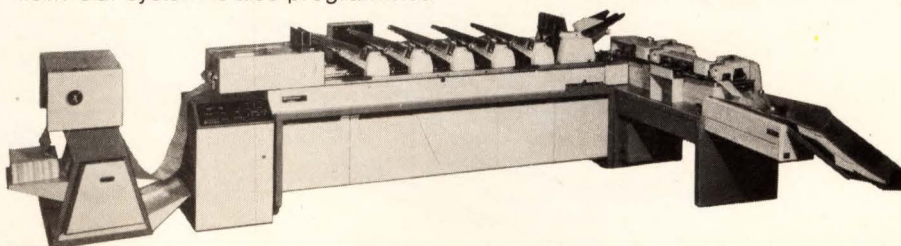
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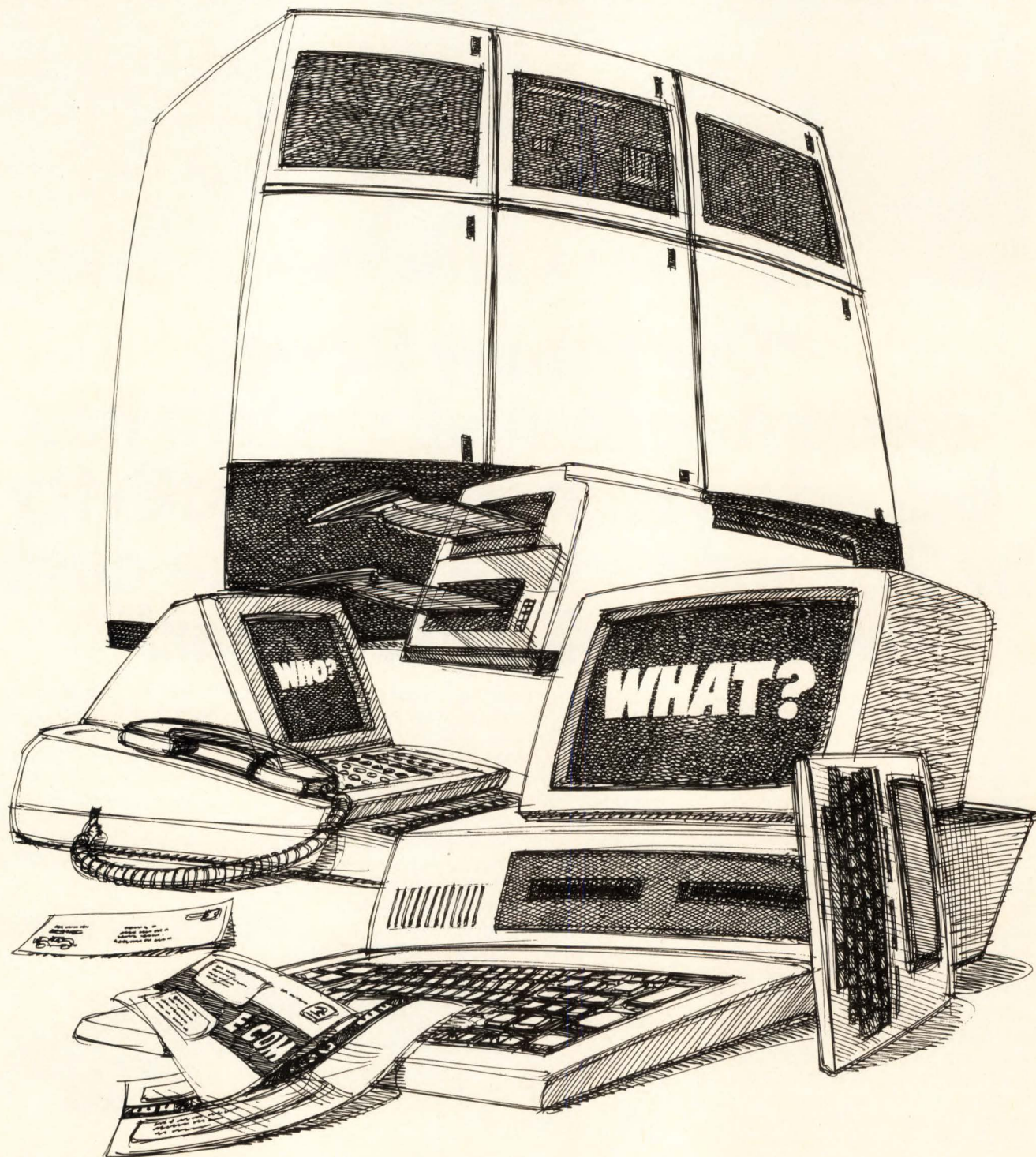
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Wheeling, IL 60090
(312) 541-9500
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Records
1000 Allview Dr.
Crozet, VA 22932
(804) 823-4351
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19050 Laytonsville
Rd.
Gaithersburg, MD
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(301) 948-5000
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(213) 882-9818
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3801 N. Rose St.
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(312) 671-6670
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Leaf Binder
3041 Locust St.
St. Louis, MO 63103
(314) 535-1414
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1243 W. 134th St.
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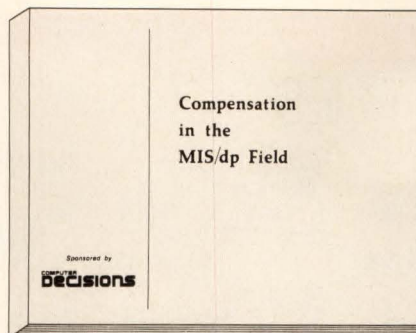
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Nashua, NH 03061
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60018
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95014
(408) 255-0900
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Boise, ID 83728
(208) 384-6161
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55440
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(800) 358-9122
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(201) 352-8800
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(201) 569-2620
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08110
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10001
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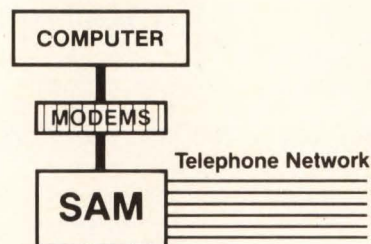
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IT'S WHEN NO ONE KNOWS THERE'S BEEN ONE.

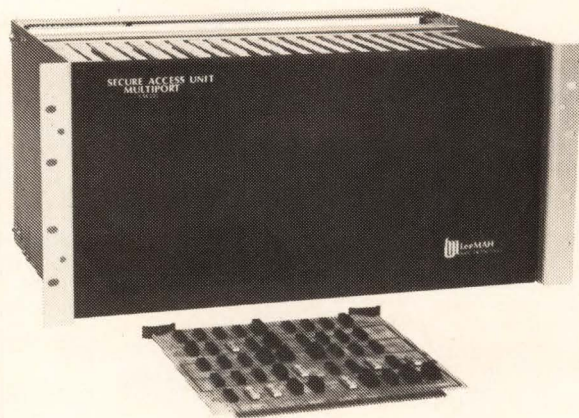
Computer crime is 10 times more profitable than robbing a bank. That's a fact. But, this statistic is only available on KNOWN computer crime...it's impossible to know how much monetary and informational theft goes undetected; some of it, perhaps, from your own system. The ability to access computers via dial-up ports is beneficial, but it creates a potential exposure akin to leaving the vault door unlocked. Disgruntled employees, strikers, malicious hackers and dishonest competitors can obtain information, vandalize the system, even misappropriate inventory...all from a push-button phone.

This high-risk threat of computer fraud has generated the urgent need for the LeeMAH Secure Access Multiport (SAM). SAM reduces your system vulnerability by allowing access to AUTHORIZED LOCATIONS ONLY via callback. SAM connects on the analog side of the modems. You can stop the perfect crime...with LeeMAH's SAM.



SAM also:

- Interfaces with any modem, any speed, any protocol.
- Provides audit trail including unauthorized access attempts.
- Has simultaneous multi-call handling capability.
- Is modular for both port and call-back directory capability.
- Masks computer from unauthorized callers.
- Up to 64 ports per system.



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MU = multiplexers
CO =
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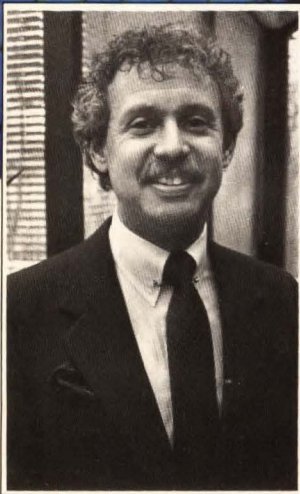
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Circle 598

Stantron
6900 Beck Ave.
No. Hollywood, CA
91605
(213) 875-0800
Circle 599

Stor-wel Syst.
3540 Valhalla Dr.
Burbank, CA 91505
(213) 846-1464
Circle 600

Systems Furniture
2727 Maricopa St.
Torrance, CA
90503
(213) 533-1212
Circle 601

Tiffany Stand
9666 Olive St. Rd.
Suite 750
St. Louis, MO 63132
(314) 991-1700
Circle 602

Trimm Inds.
11939 Sherman Rd.
No. Hollywood, CA
91605
(213) 875-2830
Circle 603

Viking Acoustical
21480 Heath Ave.
Lakeville, MN 55044
(612) 469-3405
Circle 604

Westinghouse
4300 36th St.
Kentwood, MI
49508
(616) 949-1050
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1816 Fourth St.
Berkeley, CA 94710
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Scouting For **Management Talent?**

Computer Decisions Launches A New Recruitment Advertising Section In July

If you've been looking for an exciting and responsive new market for recruiting MIS/dp managers, engineering managers, and computer-involved general and corporate managers, your search is over. Starting with the July issue, *Computer Decisions* gives you the opportunity to draw from a pool of 160,000 highly qualified executives you can't reach with any other publication. Managers who are prime prospects for the positions you have to offer.

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This prestigious group of upwardly mobile professionals is made up of managers in the nation's most active user organizations, including the Fortune 500. And they're prime prospects for recruitment. How do we know? Our latest Salary-Status Survey revealed these facts about the

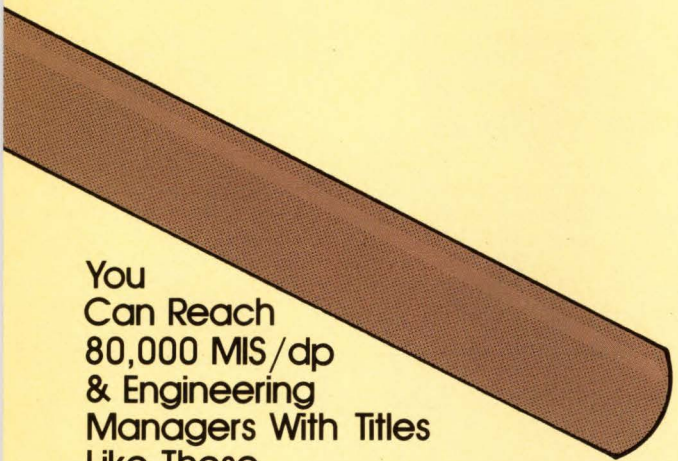
computer-involved executives in our audience . . .

- *58% would move to another organization for greater challenge.
- *46% would change jobs for more autonomy, authority, or control.
- *42% of MIS/dp managers would like to move into general management.

The Best Editorial Environment For Reaching Information Resource Management

Our management editorial guarantees high readership for your ad among the prospects you want to reach. And to enhance your readership even more, we're positioning this special section with "Your Career"—consistently one of our top-read columns.

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• General Manager • Comptroller
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Circle 607

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Park
Williamsport, MD
21795
(301) 223-8900
Circle 608

Bevis Custom
Tables
P.O. Box 2280
Florence, AL 35630
(205) 766-6497
Circle 609

Biotec Syst.
Div. of Hamilton
Sorter
3158 Production Dr.
Fairfield, OH 45014
(513) 874-9498
Circle 610

Borroughs
3002 N. Burdick St.
Kalamazoo, MI
49007
(616) 342-0161
Circle 611

Business Efficiency
Aids
8114 N. Lawndale
Skokie, IL 60076
(312) 673-0520
Circle 612

Conwed
444 Cedar St.
St. Paul, MN 55164
(612) 221-1104
Circle 613

Dennison Monarch
Syst.
P.O. Box 4081
New Windsor, NY
12550
(914) 562-3100
Circle 614

F.F. Furniture Syst.
E. Dennick Ave.
Youngstown, OH
44501
(216) 746-7271
Circle 615

Global Computer
Supplies
9135 Hemlock Dr.
Hempstead, NY
11550
(516) 292-3400
Circle 616

Group 12
201 W. Burnsville
Pky.
Burnsville, MN 55337
(612) 890-9163
Circle 617

HSP Computer
Furniture
2429 26th St. N.
P.O. Box 5545
Birmingham, AL
35207
(205) 251-0050
Circle 618

Herman Miller
8500 Byron Rd.
Zeeland, MI 49464
(616) 772-3300
Circle 619

Mead-Hatcher
752 Military Rd.
Buffalo, NY
(716) 877-1185
Circle 620

Meridian
P.O. Box 239
Spring Lake, MI
49456
(616) 842-1852
Circle 621

Pentek Products
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Wellsboro, PA
16901
(717) 724-2554
Circle 622

Royal Seating
P.O. Box 753
Cameron, TX
76520
(817) 697-6421
Circle 623

Tiffany Stand
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St. Louis, MO 63132
(314) 991-1700
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Lakeville, MN 55044
(612) 469-3405
Circle 625

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160 Gold Star Blvd.
Worcester, MA
01606
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Circle 626

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1000 Allview Dr.
Crozet, VA 22932
(804) 823-4351
Circle 627

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Grand Rapids, MI
49504
(616) 456-0600
Circle 628

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3002 N. Burdick St.
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49007
(616) 342-0161
Circle 629

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St. Paul, MN 55164
(612) 221-1104
Circle 630

F.F. Furniture Syst.
E. Dennick Ave.
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44501
(216) 746-7271
Circle 631

Haworth
One Haworth
Center
Holland, MI 49423
(616) 392-5961
Circle 632

Herman Miller
8500 Byron Rd.
Zeeland, MI 49464
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Circle 633

Metropolitan Wire
N. Washington St.
Wilkes-Barre, PA
18705
(717) 825-2741
Circle 634

Modular Furniture
Concepts
1703 W. 262 St.
Culver City, CA
90710
(213) 373-8630
Circle 635

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3001 S. Yale St.
Santa Ana, CA
92704
(714) 979-3680
Circle 636

Shaw-Walker
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Muskegon, MI
49443
(616) 722-7211
Circle 637

Steelcase
1120 36th St. S.E.
Grand Rapids, MI
49508
(616) 247-2710
Circle 638

Systems Mfg.
13 Broad St.
Binghamton, NY
13904
(617) 723-6344
Circle 639

Tab Products
1451 California
Ave.
Palo Alto, CA
94304
(415) 858-2500
Circle 640

Trimm Enclosure
Products
11939 Sherman Rd.
No. Hollywood, CA
91605
(213) 875-2830
Circle 641

Viking Acoustical
21480 Heath Ave.
Lakeville, MN 55044
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Circle 643

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Irvine, CA 92714
(714) 957-8500
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Altos Computer
2641 Orchard Pky.
San Jose, CA
95131
(408) 946-6700
Circle 645

Anderson
Jacobson
521 Charcot Ave.
San Jose, CA
95131
(408) 263-8520
Circle 646

Apple Computer
20525 Mariani Ave.
Cupertino, CA
95014
(408) 996-1010
Circle 647

Billings Computer
18600 E. 37th
Terr. S
Independence, MO
64057
(816) 373-0000
Circle 648

Burroughs
Burroughs Place
Detroit, MI 48232
(816) 972-7000
Circle 649

California
Computer Syst.
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Sunnyvale, CA
94089
(408) 734-5811
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(214) 233-3238
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02048
(617) 364-2000
Circle 652

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Columbia, MD
21045
(301) 992-3400
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Beverly Hills, CA
90211
(213) 652-2263
Circle 654

Compupro
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Court
Hayward, CA
94545
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95124
(408) 559-7000
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Circle 659

Datapoint
9725 Datapoint Dr.
San Antonio, TX
78284
(512) 699-7151
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San Leandro, CA
94577
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01754
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Montgomeryville,
PA 18936
(215) 628-4810
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Milpitas, CA 95035
(408) 263-1221
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Los Gatos, CA
95030
(408) 395-5005
Circle 667

Epson America
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Blvd.
Torrance, CA
90505
(213) 373-9511
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101 Twin Dolphin
Redwood City, CA
94065
(415) 595-8444
Circle 669

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10700 N. De Anza
Blvd.
Cupertino, CA
95014
(408) 255-0900
Circle 670

Franklin Computer
1070 Busch
Memorial Hwy.
Pennsauken, NJ
08110
(609) 488-0600
Circle 671

Fujitsu
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Santa Clara, CA
95051
(408) 727-1700
Circle 672

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Circle 673

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Information Syst.
2223 Washington
St.
Newton Lower
Falls, MA 02162
(617) 923-7500
Circle 674

IBM
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Circle 675

IMS Int'l.
2800 Lockhead
Way
Carson City, NV
89701
(702) 883-7611
Circle 676

ITT
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Phoenix, AZ 85038
(602) 894-7298
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(617) 828-8150
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Lee Data
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Dr.
Eden Prairie, MN
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(612) 828-0300
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Business Products
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Tustin, CA 92680
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4747 Irving Blvd.
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(214) 630-2562
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Circle 683

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Circle 684

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Circle 685

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07054
(201) 540-9080
Circle 686

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Computer
251 River Oaks
Pkwy.
San Jose, CA
95134
(408) 262-2122
Circle 687

Monroe Syst. for
Business
The American Rd.
Morris Plains, NJ
07950
(201) 993-2000
Circle 688

Morrow Designs
600 McCormick St.
San Leandro, CA
94577
(415) 430-1970
Circle 690

NCR
P.O. Box 606
Dayton, OH 45401
(513) 445-5000
Circle 691

NEC Information
Syst.
1414
Massachusetts
Ave.
Buxborough, MA
01719
(617) 264-8000
Circle 692

NNC Electronics
15641 Computer
Lane
Huntington Beach,
CA 92649
(714) 895-8000
Circle 693

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14440 Catalina St.
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08876
(201) 722-7000
Circle 695

Onyx
250 Crossways Park
Woodbury, NY
11797
(516) 364-2121
Circle 696

Onyx
25 E. Trimble Rd.
San Jose, CA
95131
(408) 946-6330
Circle 697

OSM
655 Clyde Ave.
Mountain View, CA
94043
(415) 961-8680
Circle 698

Perkin-Elmer
2 Crescent Place
Oceanport, NJ
07757
(201) 870-4500
Circle 699

Plessey Peripheral
17466 Daimler
Irvine, CA 92714
(714) 540-9945
Circle 700

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2230 Martin Ave.
Santa Clara, CA
95050
(408) 988-1755
Circle 701

Polymorphic Syst.
5330 Debbie Lane
Santa Barbara, CA
93111
(805) 967-0468
Circle 702

Pro-Comp
333 W. 52nd St.
New York, NY
10019
(212) 246-0074
Circle 703

Product Assoc.
465 Convention
Way
Redwood City, CA
94063
(415) 364-3121
Circle 704

QDP Computer
Syst.
10330 Brecksville
Rd.
Cleveland, OH
44141
(216) 526-0838
Circle 705

Quay
22 Meridian Rd.
P.O. 783
Eatontown, NJ
07724
(201) 542-7340
Circle 706

Sage Computer
4905 Energy Way
Reno, NV 89502
(702) 322-6868
Circle 707

Sanyo Business Syst.
51 Joseph St.
Moonachie, NJ
07074
(201) 440-9300
Circle 708

SDS
344 Main St.
Venice, CA 90291
(213) 390-8673
Circle 709

SKS Computers
3999 Pkwy. Lane
#11
Hilliard, OH 43026
(614) 876-8668
Circle 710

Smoke Signal
31336 Via Colinas
Westlake Village,
CA 91362
(213) 889-9340
Circle 711

Sony
Sony Drive
Park Ridge, NJ
07656
(201) 930-1000
Circle 712

Stearns Computer
Syst.
10901 Bren Rd. E.
Minnetonka, MN
55343
(612) 936-2000
Circle 713

Tab Products
1451 California
Ave.
Palo Alto, CA
94304
(415) 852-2500
Circle 714

Tandy/Radio Shack
One Tandy Ctr.
Fort Worth, TX
76102
(817) 390-3011
Circle 715

Tarbell Electronics
950 Dovlen Place
Carson, CA 90746
(213) 538-4251
Circle 716

Tektronix
P.O. Box 500
Beaverton, OR
97077
(503) 627-7111
Circle 717

Televideo Syst.
1170 Morse Ave.
Sunnyvale, CA
94088
(408) 745-7760
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Texas Instruments
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Dallas, TX 75240
(214) 995-2011
Circle 719

Toshiba America
2441 Michelle Dr.
Tustin, CA 92680
(714) 730-5000
Circle 720

Vector Graphic
500 N. Ventu Park
Rd.
Thousand Oaks, CA
91320
(805) 499-5831
Circle 721

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Scotts Valley, CA
95066
(408) 438-6680
Circle 722

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95133
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Circle 723

Wang Labs.
One Industrial Ave.
Lowell, MA 01851
(617) 459-5000
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Xerox
Xerox Square 006
Rochester, NY
14644
(716) 423-5078
Circle 725

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Ave.
Glenview, IL 60025
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Circle 726

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Ave.
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(312) 647-8800
Circle 727

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Walden, NY 12586
(914) 778-7511
Circle 728

Bell & Howell
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Rd.
Chicago, IL 60645
(800) 538-4000
Circle 729

Canon
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Wayne, NJ 07470
Circle 730

Datagraphix
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Eastman-Kodak
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14650
(716) 724-4401
Circle 732

Minolta
Micrographics Div.
101 Williams Dr.
Ramsey, NJ 07446
(201) 825-4000
Circle 733

NCR Micrographics
System Div.
520 Logue Ave.
Mountain View, CA
94943
(415) 965-3700
Circle 734

Ragen Information
Syst.
9 Porete Ave.
N. Arlington, NJ
07032
(201) 997-1000
Circle 735

Rochester Film
299 Cherry Hill Rd.
Parsippany, NJ
07054
(201) 263-1616
Circle 736

3M
P.O. Box 33600
St. Paul, MN 55133
(612) 733-2237
Circle 737

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Circle 738
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El Monte, CA 91731
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Burnsville, MN 55337
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- Fingermatrix
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- Honeywell Protection Svcs.
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Minnetonka, MN 55343
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425 Lively Blvd.
Elk Grove Village, IL 60007
(312) 437-2654
Circle 744
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100 N. 20th St.
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4025 Pleasantdale Rd.
Atlanta, GA 30340
(404) 448-4100
Circle 746
- Medeco Security Locks
P.O. Box 1075
Salem, VA 24153
(703) 387-0481
Circle 747
- MPPI
2200 Lehigh
Glenview, IL 60025
(312) 998-8402
Circle 748
- Palmguard
12800 S.W. Canyon Rd.
Beaverton, OR 97005
(503) 641-9525
Circle 749
- Rusco
P.O. Box 5005
Glendale, CA 91201
(818) 240-2540
Circle 750
- Schlage Electronics
3260 Scott Blvd.
Santa Clara, CA 95051
(408) 727-5170
Circle 751
- Sensormatic
1150 Broken Sound Pky. N.W.
P.O. Box 3045
Boca Raton, FL 33431
(305) 994-9700
Circle 752
- Sielox Syst.
20545 Valley Green Dr.
Cupertino, CA 95014
(408) 255-1490
Circle 753
- Simplex Security Syst.
10 Front St.
Collinsville, CT 06022
(203) 693-8391
Circle 754
- Stellar Syst.
231 Charcot Ave.
San Jose, CA 95131
(408) 946-6460
Circle 755
- Sutton Designs
Computer Security Div.
111 S. Cayuga St.
Ithaca, NY 14850
(607) 277-4301
Circle 756
- Synergistics
3 Erie Dr.
Natick, MA 01760
(617) 655-1340
Circle 757
- TEC
2727 N. Fairview
Tucson, AZ 85705
(602) 792-2230
Circle 758
- Teltech
39 Broadway
New York, NY 10006
(212) 514-5440
Circle 759

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- Datacode Syst.
5122 St. Clair Ave.
Cleveland, OH 44103
(216) 881-2120
Circle 770
- Melco Syst.
74 Gwynns Mill Ct.
Owings Mills, MD 21117
(301) 363-1600
Circle 771
- Rexham/Laminex
P.O. Box 240655
Charlotte, NC 28224
(704) 588-4700
Circle 772

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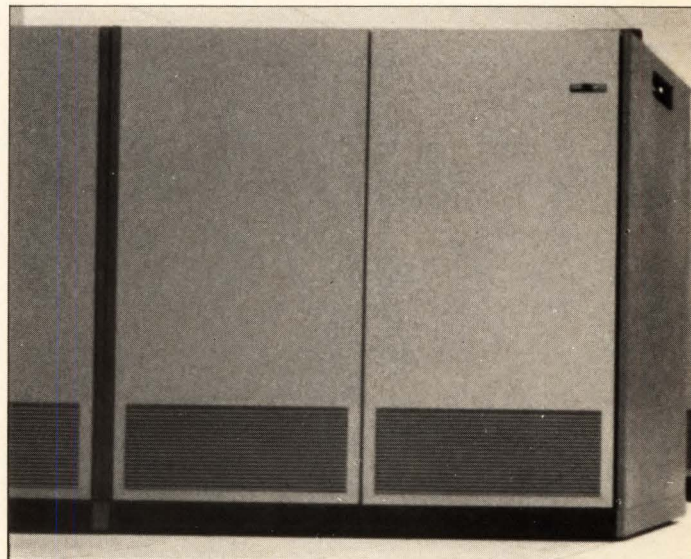
- Adax Syst.
3597 Clearview Pl.
Atlanta, GA 30340
(404) 452-7501
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1033 Washington Blvd.
Stamford, CT 06901
(203) 323-9811
Circle 789
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16931 Milliken Ave.
Irvine, CA 92714
(714) 863-3000
Circle 790
- Artsci Inc.
5547 Satsuma Ave.
No. Hollywood, CA 91601
(213) 985-5763
Circle 791
- AT&T
195 Broadway
New York, NY 10007
(212) 393-9800
Circle 792
- Berkeley Computer Corp.
703 MacArthur Blvd.
San Leandro, CA 94577
(415) 569-6422
Circle 793
- Braegen
525 Los Coaches St.
Milpitas, CA 95035
(408) 945-8150
Circle 794
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Sunnyvale, CA 94089
(408) 734-9946
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6-T Continental Blvd.
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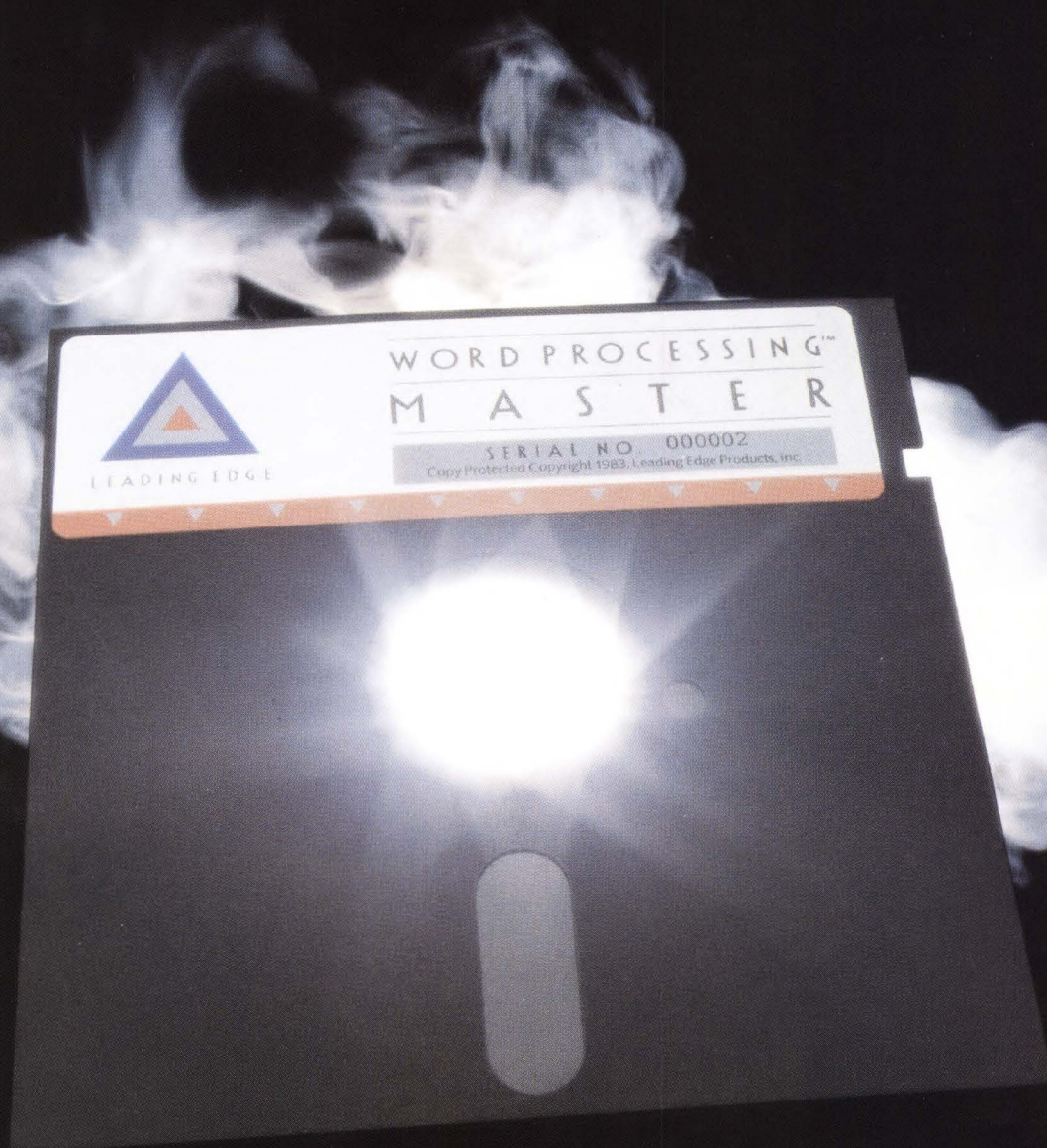
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