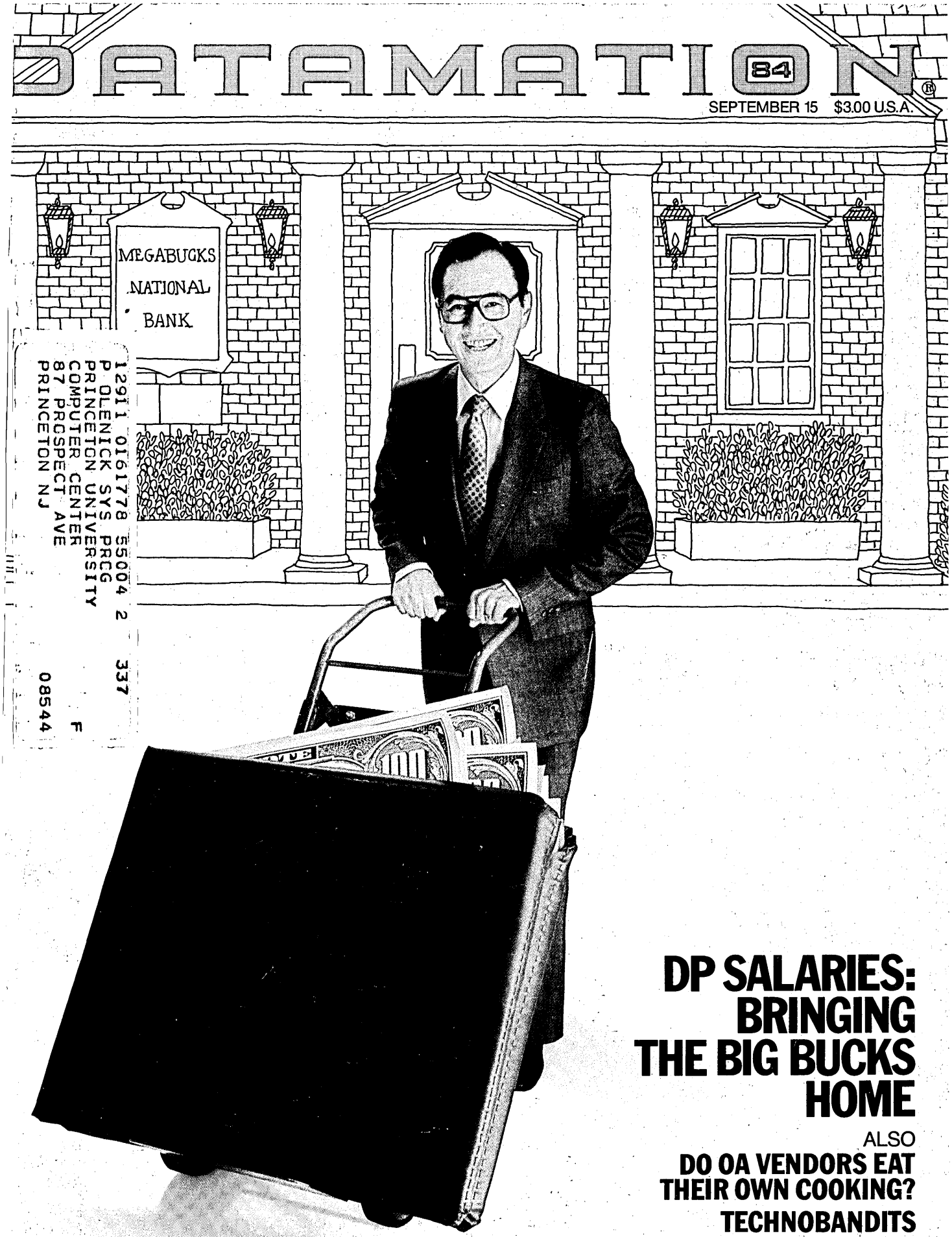
DATAMATION 84®
SEPTEMBER 15 $3.00 U.S.A.



DP SALARIES: BRINGING THE BIG BUCKS HOME

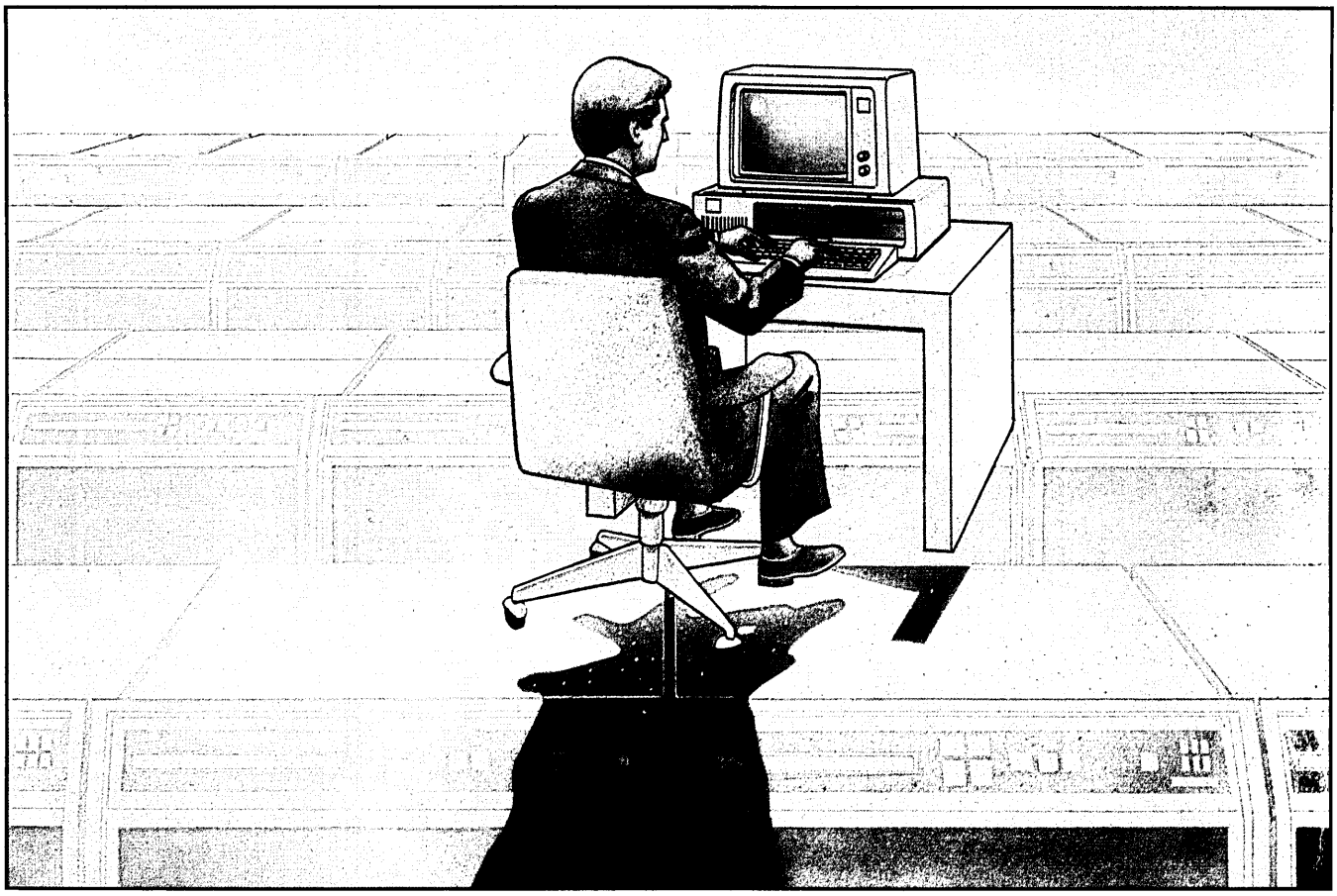
ALSO

DO OA VENDORS EAT THEIR OWN COOKING?

TECHNOBANDITS

VIDEOTEX: INTO THE CRUEL WORLD

Microcomputers contribute more when they have mainframe power.

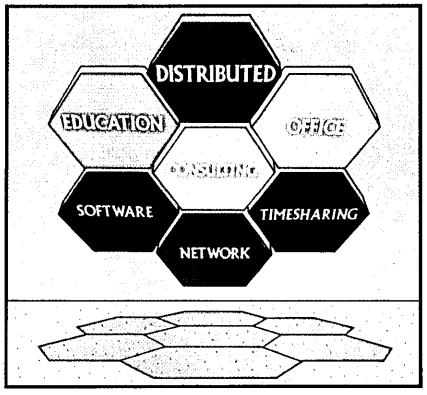


Compatibility between mainframes and micros has continually challenged experts in information services. But now Boeing makes this dynamic combination of power and convenience and everyday fact of computing life. The result: unprecedented productivity.

We call this powerful breakthrough MAINSTREAM® Distributed Services. For example, our Business Management Workstation combines the new IBM® PC XT/370 with our EIS® (Executive Information Services) Decision Support Software. You can perform functions like modeling and report generation on the PC XT/370, which simulates a System 370 mainframe. And you can switch instantly to your multi-dimensional data base via MAINSTREAM teleprocessing.

For those not requiring the full functionality of the EIS software at the desktop, we also offer the EIS Micro Workstation, which lets you download, manipulate and upload data between your IBM PC or PC XT and the MAINSTREAM service.

Because both workstations have Value-Added Dealership (VAD) agreements with IBM, Boeing is your single source for hardware, software, host processing, education and training, and support.



Our Micro/8410 brings this powerful micro-mainframe combination to structural engineering. The Micro/8410 lets engineers formulate and reformulate on the MDX 11 microcomputer. And then quickly upload to IBM, CYBER or CRAY mainframes for detailed calculations using any of the most popular design packages.

These distributed services are all part of Boeing's approach to complete, integrated information services. Enhanced remote computing services. Distributed processing and micro/mainframe links. Office information systems. Software solutions. Education and training. And a variety of professional support services. For more information or the location of the sales office nearest you, call toll-free **1-800-447-4700**. Or write BOEING COMPUTER SERVICES, M.S. CV-26-17A, 7980 Gallows Court, Vienna, Virginia 22180.

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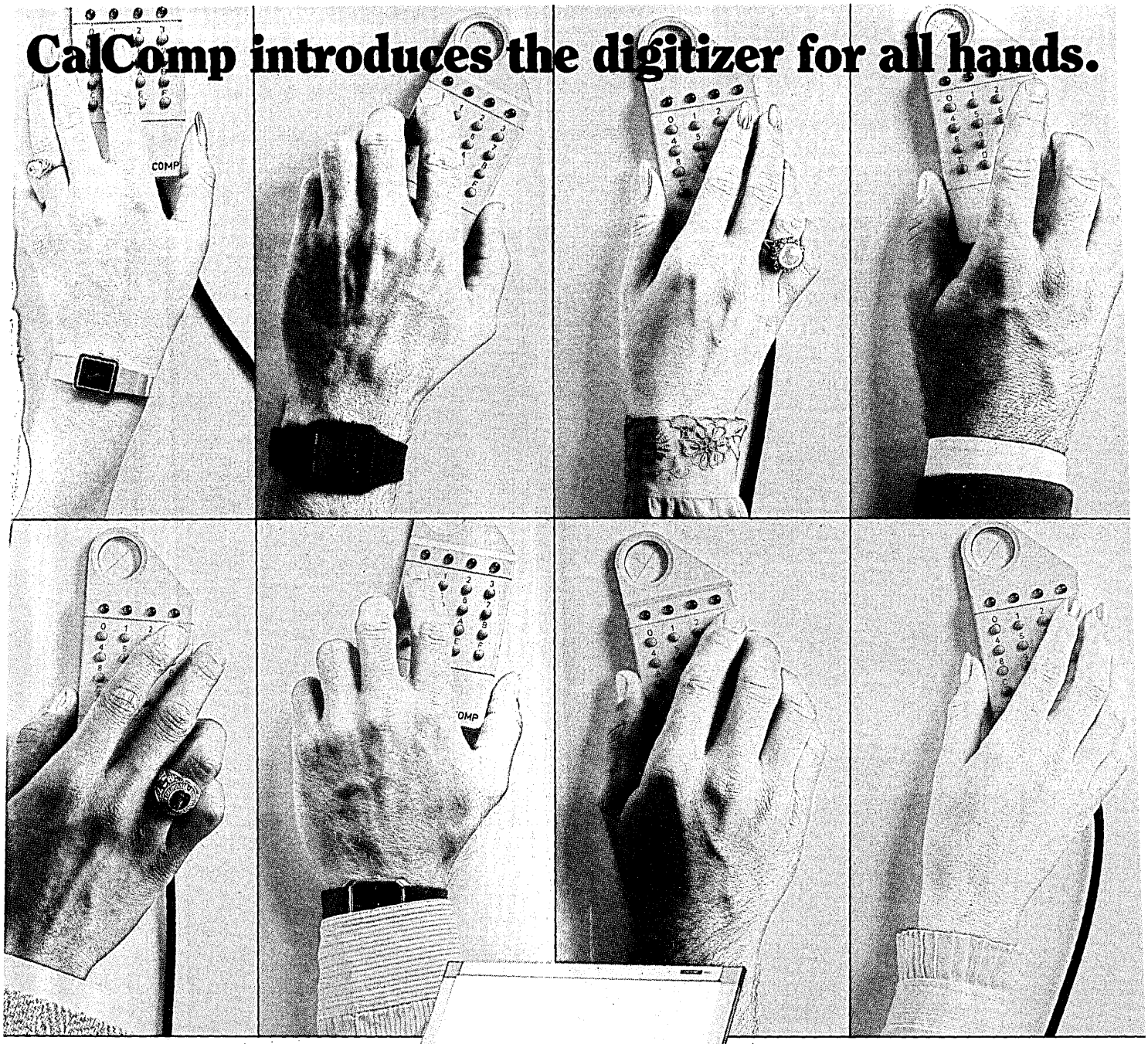
CIRCLE 1 ON READER CARD

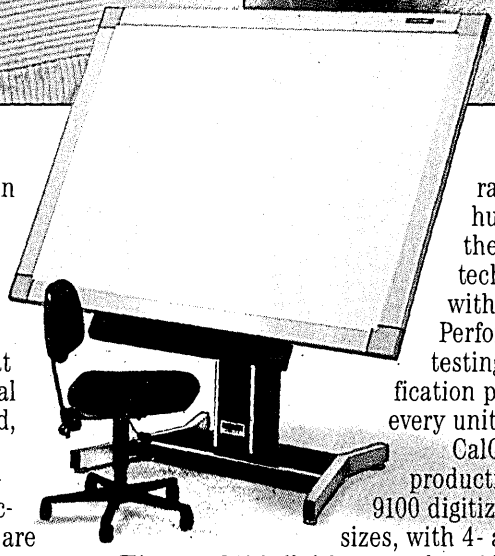
CalComp introduces the digitizer for all hands.



At CalComp, we believe a digitizer should be easy to use. For everyone. In every application.

As a result, our new 9100 features a special ergonomic design ideal for both left- and right-handed operation. The cursor's slim body promotes accurate cross hair placement, even at severe operating angles. And the signal cable exits the cursor behind your hand, away from the work area.

To keep all hands happy, we've concealed the 9100 digitizer's control electronics in the frame. And table edges are smooth so they'll never snag clothing. We've also included a handy accessory tray to keep digitizing tools in easy reach and a pen/cursor holder that can be mounted anywhere on the 9100's uniquely constructed frame.



The new 9100 digitizer.

Ergonomics even extend to accurate operation of the unit. Here, human engineering combines with the patented electromagnetic technology to deliver ±.005″ accuracy with a resolution of 1000 lines/inch. Performance is verified with automated testing, detailed in an accuracy certification printout and brochure shipped with every unit.

CalComp innovation puts new digitizing productivity in your hands. The new 9100 digitizer is available in a range of table sizes, with 4- and 16-push-button cursors, pens, and a wide choice of options. For details call toll-free 1-800-CALCOMP, ext. 156. Or write CalComp, 2411 W. La Palma Ave., P.O. Box 3250, Anaheim, CA 92803.

CALCOMP 25 1959 1984

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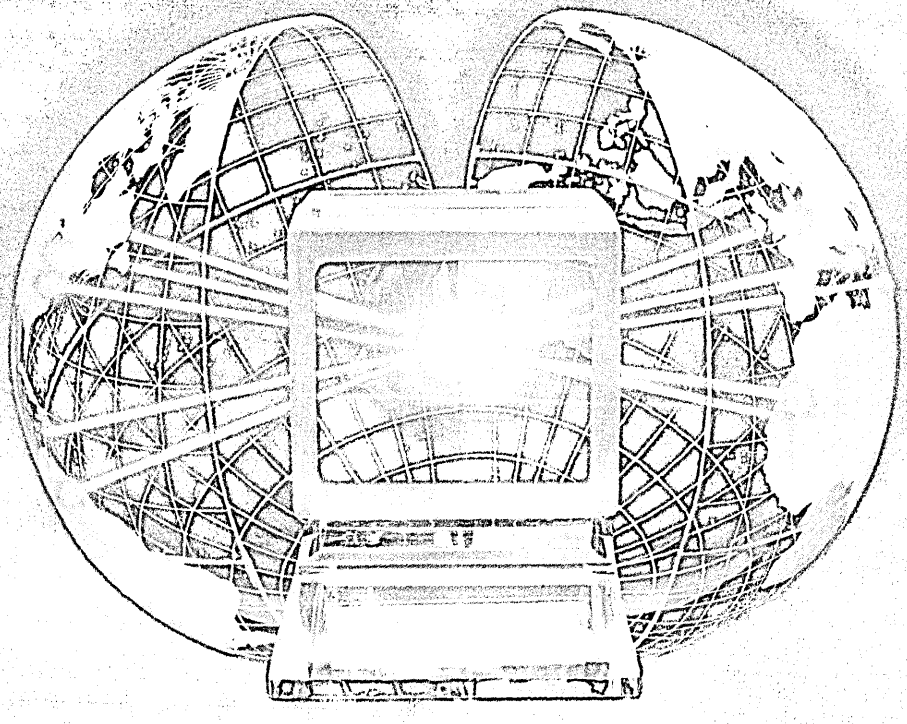
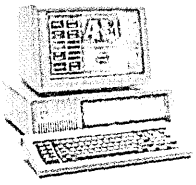
CIRCLE 20 ON READER CARD

Infotron's concept for network growth opens the world for you.

Our concept for network management puts it at your fingertips.





Centralized network management.

As your network grows—linking offices, cities or countries—you can centralize monitoring and control functions through the ANM-800 Advanced Network Manager.

A central console controls up to 32 remote nodes. User-friendly color graphics help you tell at a glance the real-time status of the entire network. Archiving of performance information enables you to fine-tune your network and plan future growth.

Working with information from Infotron's 790 and 792 Network Concentrators, the ANM-800 provides diagnostics, alarms and event reporting. All designed to help you pinpoint problems and take corrective action.

Flexibility and growth: about ANI.™

The ANM-800 is a key component of Infotron's Advanced Network Integration, a concept for networking growth that means the Infotron equipment you buy now will never be obsolete. ANI also gives you the flexibility to extend your network, expanding and reconfiguring as your needs change.

And our systems support provides the help you need—from engineering assistance to training to worldwide field service—to ensure ongoing network performance.

To find out more, send the coupon to Infotron Systems Corporation, Marketing Department, 9 North Olney Avenue, Cherry Hill, NJ 08003. Or call toll-free 1-800-345-4638.

Infotron. First in performance and reliability.

Please send me more information about all Infotron products, and the ANM-800 Advanced Network Manager in particular.

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DATAMATION

SEPTEMBER 15 1984/$3.00 U.S.A.
VOLUME 30 NUMBER 15
This issue, 183,493 copies

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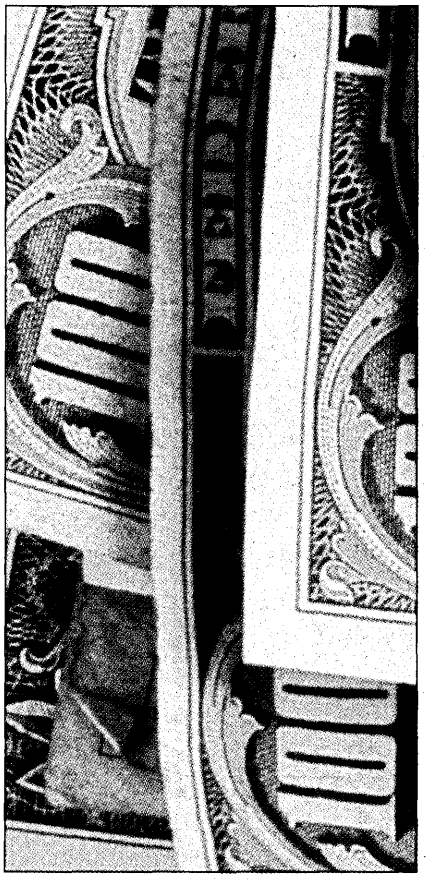

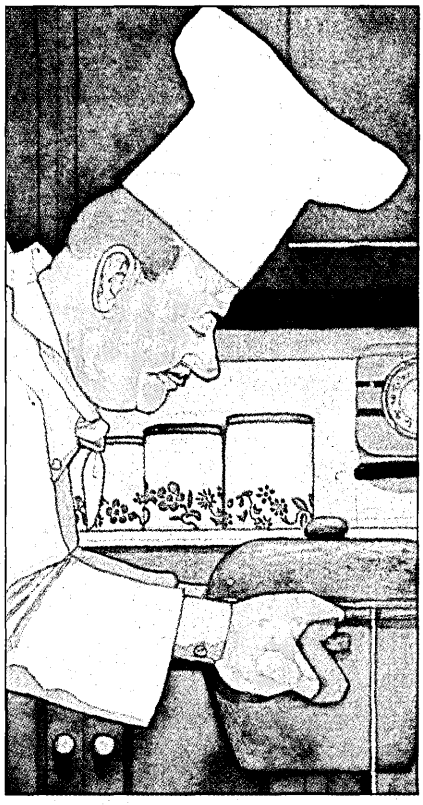

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OEM SUPPLEMENT 144-1

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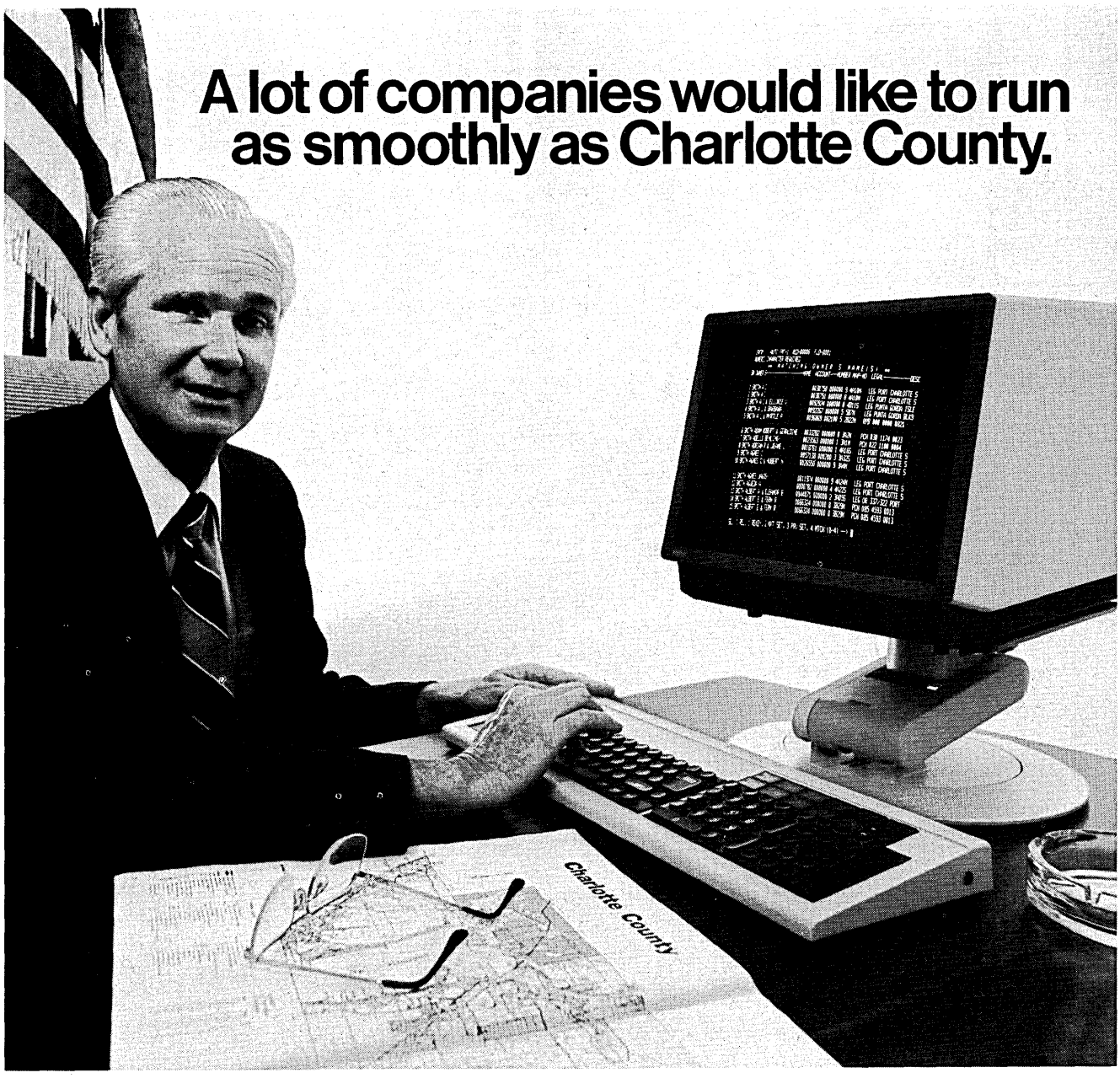
A lot of companies would like to run as smoothly as Charlotte County.



Charlotte County, Florida, is one of the fastest growing counties in America. And its government is one of the most efficient.

In fact, visitors have come from as far away as Europe to study Charlotte County's computer system. A Nixdorf computer system.

As Oliver Lowe, Charlotte County's Property Appraiser, and the driving force behind the implementation of the Nixdorf 600/55 computer system, puts it, "One of the primary obligations of any government agency, regardless of size, is the elimination of unnecessary expense and duplication of effort. With the Nixdorf system, we are able to meet the data and information processing needs of all county departments, and at the same time, make the information used by one organization available to any other department that might need it. We're comparable with private enterprise when it comes to efficient management."

The Nixdorf system handles the complete range of the county's administrative functions from property appraisal, tax collecting, license and registration renewals, payroll, and mosquito control to a number of law enforcement requirements.

Another reason for the selection of the Nixdorf system, according to Mr. Lowe, was its ease of use. The system is being run by people who had never operated a data processing system before. No computer specialists had to be hired. And that's a major factor in Charlotte County's ability to save hundreds of thousands of dollars.

For 32 years, Nixdorf has been providing solutions for the information processing needs of all kinds of businesses, as well as government agencies at the local, state and Federal level. And today, we're a successful international company with 16,000 people and over 110,000 computer systems installed around the world.

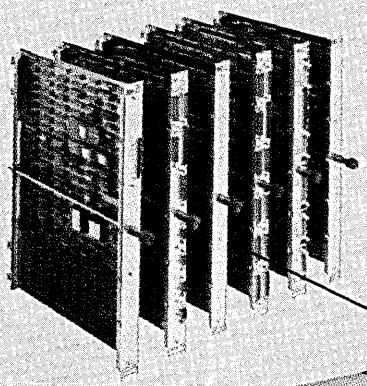
So if you want the best system of government, with all the software and support you could ask for, all you have to do is talk to Nixdorf.

Nixdorf Computer Corporation,
300 Third Avenue, Waltham, MA 02154

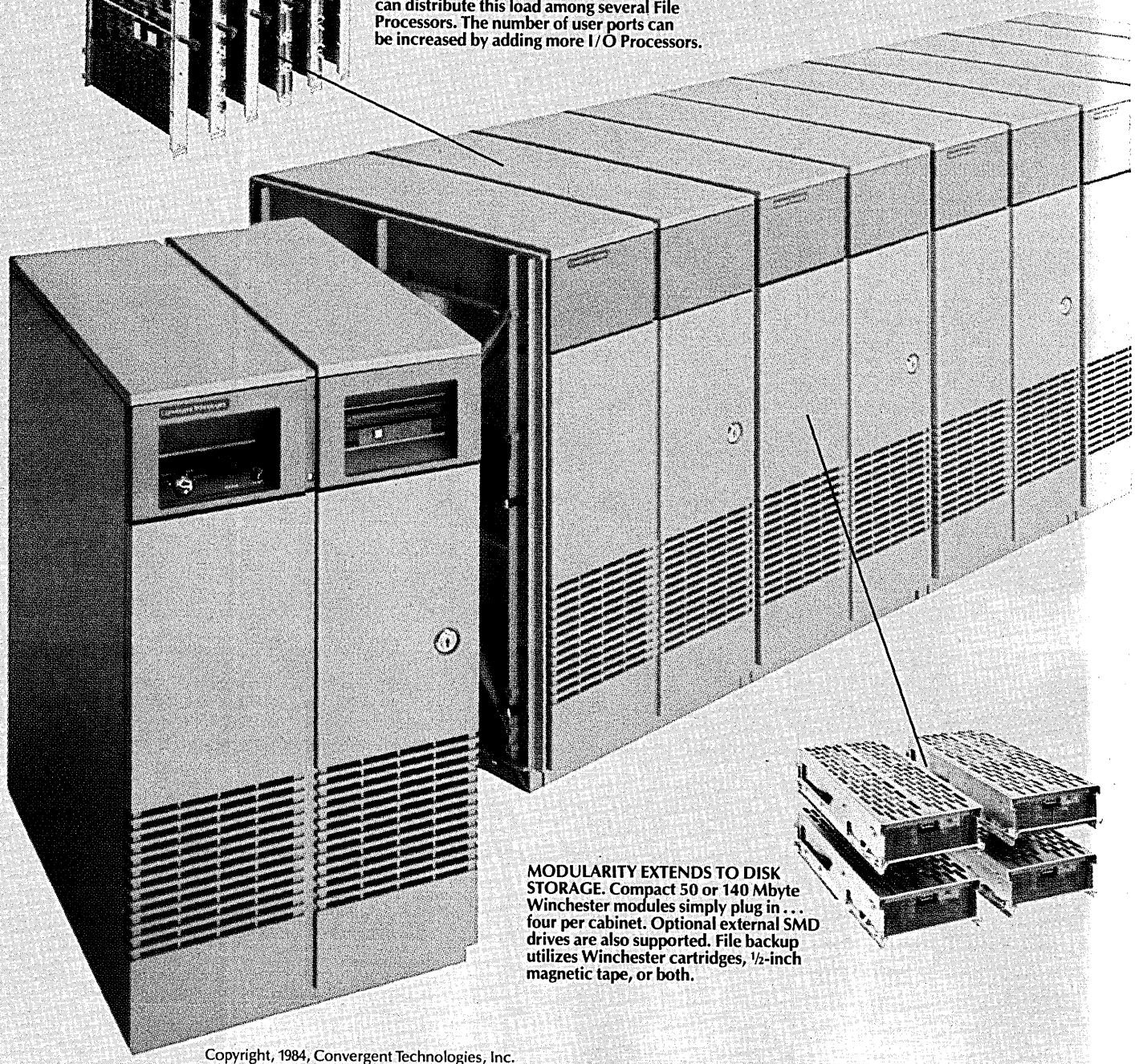
NIXDORF
COMPUTER

CIRCLE 22 ON READER CARD

IT WILL GROW ON YOU.



CONFIGURABLE ACCORDING TO USER NEEDS. As many as six processors can be installed in each enclosure. CPU-intensive jobs utilize multiple Applications Processors. Systems with heavy disk usage can distribute this load among several File Processors. The number of user ports can be increased by adding more I/O Processors.

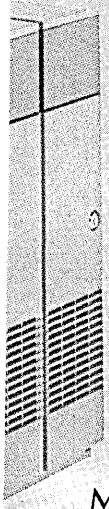


MODULARITY EXTENDS TO DISK STORAGE. Compact 50 or 140 Mbyte Winchester modules simply plug in . . . four per cabinet. Optional external SMD drives are also supported. File backup utilizes Winchester cartridges, ½-inch magnetic tape, or both.

MegaFrame™. Now OEMs can offer a high-performance UNIX™-based system that can't run out of performance.

OEMS can now deal cost-effectively with the problems encountered when user applications produce computing demands that outstrip the capabilities of conventional systems.

Convergent Technologies' MegaFrame is a revolutionary new UNIX-based super-minicomputer—so innovative in its architecture that it represents the ultimate in multiuser systems design. It grows exponentially from a system offering minicomputer-level performance to an enormously powerful engine serving as many as 128 users with 36 parallel processors, 24 megabytes of RAM and gigabytes of disk storage.



No other system can match the MegaFrame's potential for field expansion. It enables manufacturers and systems builders to keep pace with today's requirements for more and more computing services . . . but *not* at the cost of discarding hardware or performing expensive CPU upgrades.

MegaFrame's architectural breakthrough. Dependence on traditional single-CPU shared-logic architecture is the root of systems bottlenecks.

Convergent's response: a novel system utilizing *multiple* specialized processors to distribute workloads for optimum performance—even if user needs are unpredictable or subject to rapid change.

MegaFrame's virtual memory Applications Processors each have a 32-bit CPU, up to 4 Mbytes of RAM and run a demand-paged version of UNIX System V. Up to 16 of them can operate in parallel.

The File Processors effectively function as back-end machines providing DBMS, ISAM and other disk-related services. Up to six File Processors each with four disks can operate in parallel.

Terminal and Cluster Processors can also be added—the latter serving front-end communications needs. They off-load communications from the other processors by running protocols such as SNA and X25 networks.

MegaFrame's daisy-chained cabinets offer total expansion potential of up to 36 slots. OEMs configure the system needed for specific applications simply by adding the correct number/combination of processors.

Flexibility in applications development. Inclusion of one or more Applications Processors allows running UNIX System V. All standard UNIX tools are provided, along with COBOL, FORTRAN-77, BASIC interpreter and compiler, plus Pascal.

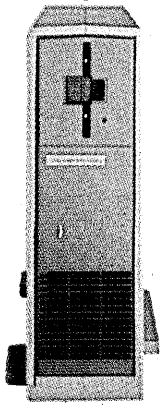
The "least-cost solution" to serving a wide range of UNIX-systems needs, MegaFrame has won acceptance from OEMs in the U.S. and abroad. The uniqueness of its modular design, its versatility in providing upgrade-path options and its price/performance advantages give it market-share potential of outstanding dimensions.

The system that will grow on you starts at a very attractive price: about $20,000 for a system that effectively supports 16 users. Send now for a comprehensive Information Package including reprints of magazine articles. It explains how MegaFrame's growth potential can impact favorably on your plans for growth in the UNIX market.

Convergent Technologies, Data Systems Division, 3055 Patrick Henry Drive, Santa Clara, CA 95050. Phone: 408/980-0850. Telex: 176-825.

MiniFrame™: the entry-level multiuser UNIX system.

Starting at under $5,000 for a single-user system, Convergent's MiniFrame offers outstanding capabilities for small to medium sized organizations running large UNIX-based applications. Utilizing an MC68010 microprocessor operating at 10Mhz, with no wait states, it provides impressive CPU speed—comparable to VAX™-11/750 running the AIM™ Benchmark. MiniFrame features virtual memory management, with demand-paged implementation of UNIX System V. It runs as many as eight terminals, with up to 50 Mbytes of integral mass storage. MiniFrame and MegaFrame are object-code compatible, allowing OEMs to offer a *complete family* of systems unrivaled in price/performance characteristics.



Convergent Technologies

Where great ideas come together

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CIRCLE 23 ON READER CARD

LOOKING BACK

BIRTH OF JAPAN INC.

September 1964: "As you can see, the Japanese computer industry is about 10 years behind the U.S. and England . . . both in computer technology and manufacturing techniques."

DATAMATION presented an overview of the fledgling Japanese computer industry in an article by Joseph C. Berton and Ken Imada. In it, the authors noted that the development of the market in Japan was also about 10 years behind the U.S. and England. This included the lack of developed computer applications for industry as well as the absence of awareness by Japanese businessmen of the important role computers could play in the operation of their businesses.

A number of characteristics of the Japanese computer industry led Berton and Imada to conclude that it was similar to Great Britain's. For instance, each country accounted for only a small portion of the world market. Domestic manufacturers were trying to corner a limited market that was already dominated by American manufacturers. Finally, government's support of the industry extended only as far as purchasing half of the computers made.

A major reason for the Japanese industry's slow start was that in the past, there had been no government support in the development of computers. In contrast, a large portion of computer development costs in the U.S. and England were paid for indirectly by the government, which funded development of computers for military use. Thus, manufacturers were able to produce commercial computers patterned after the military models with little additional development cost. The Japanese industry had to carry the entire burden of development costs on its own.

The Japanese also found themselves at a sales disadvantage in relation to American computer companies. The latter could easily afford to lease computers to users, thereby receiving tax advantages. Japanese manufacturers, meanwhile, had a hard time making such financial arrangements.

The authors noted that most Japanese companies sold 50% of their computers to the government; the rest were bought by internal organizations of the seven companies making dp machines and the two companies making process control computers. Although sales looked impressive, the authors felt that "while these sales organizations look good, the fast growth has produced a weak organization that will not be able to stand up in a free, competitive situation."

NEW ON THE SCENE

September 1974: The big news in Look Ahead was the formation of a startup called Harris Computer Systems, which would be a division of Harris Corp. (formerly called Harris Intertype). Datacraft Corp., the company Harris had recently acquired, was to be the main unit of the company, and its president, Harold N. Morris, would retain his position at the newly formed firm based in Ft. Lauderdale, Fla.

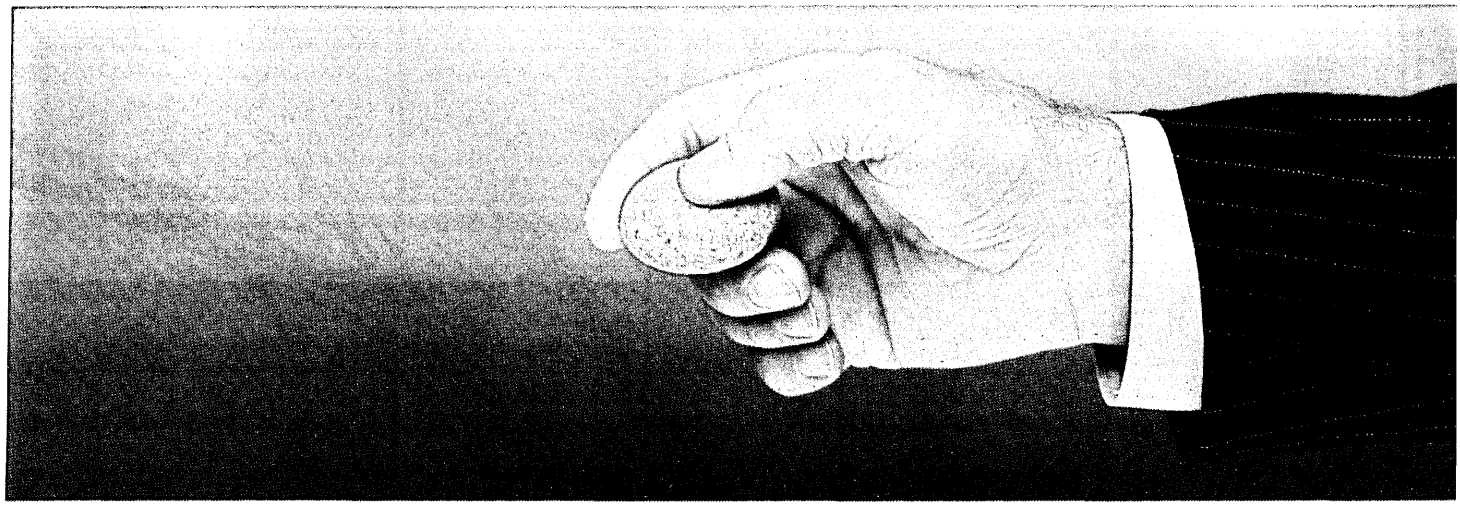
The item noted that Harris's SLASH 4 virtual memory system looked as though it might have commercial dp applications, and that the company had been beefing up its sales and field service staff, hinting at a possible assault on the commercial market.

There was no doubt that the machine would sell in Harris-Datacraft's traditional scientific and research marketplace—the first machine was being used at a missile tracking station in Hawaii—but its multitasking capabilities seemed to make it attractive to commercial users too.

Another curious bit of news about the startup was the other Florida-based Harris operations that *weren't* in the new operation, like its semiconductor facility, and a crt editing terminal manufacturing plant.

Put this together with Harris Communications Systems in Dallas, it read, and you have a big, broad computer and data communications company.

—Lauren D'Attilo



SOFTWARE AG

One perfect action creates a perfect reaction that grows and grows.

A pebble dropped into the water creates circle after circle, each growing from the one before it—and each one reaching out farther than the last.

At Software AG, each product in our integrated system grows naturally from your center of data.

- Our relational data base management system readily adapts to meet your current and future needs.
- Our data dictionary defines how that data is used throughout your organization.
- Our communications system provides a secure network to give your users precisely the data they require.
- Our fourth generation language system transforms the data into information.
- Our end-user products deliver up-to-the-minute data to support better and faster decisions.
- And tomorrow's products will meet your needs by putting information power into wider and wider circles of users.

Every Software AG product comes naturally from the one before it, and all products in our system speak the same language. That's because at Software AG, each product has been created as part of a master plan.

When we introduce a new product, we don't have to spend time struggling to make it fit with the rest of our products. We just move quietly on to prepare the next product to meet your needs.

We don't believe in surprises—we believe in anticipating the trends of the future and meeting them with new products today.

Now, it's up to you. You can take the one perfect action that will lead to perfect solutions. Call us today.

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See us at Booth #4715 at Info '84 in New York.

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SOFTWARE AG

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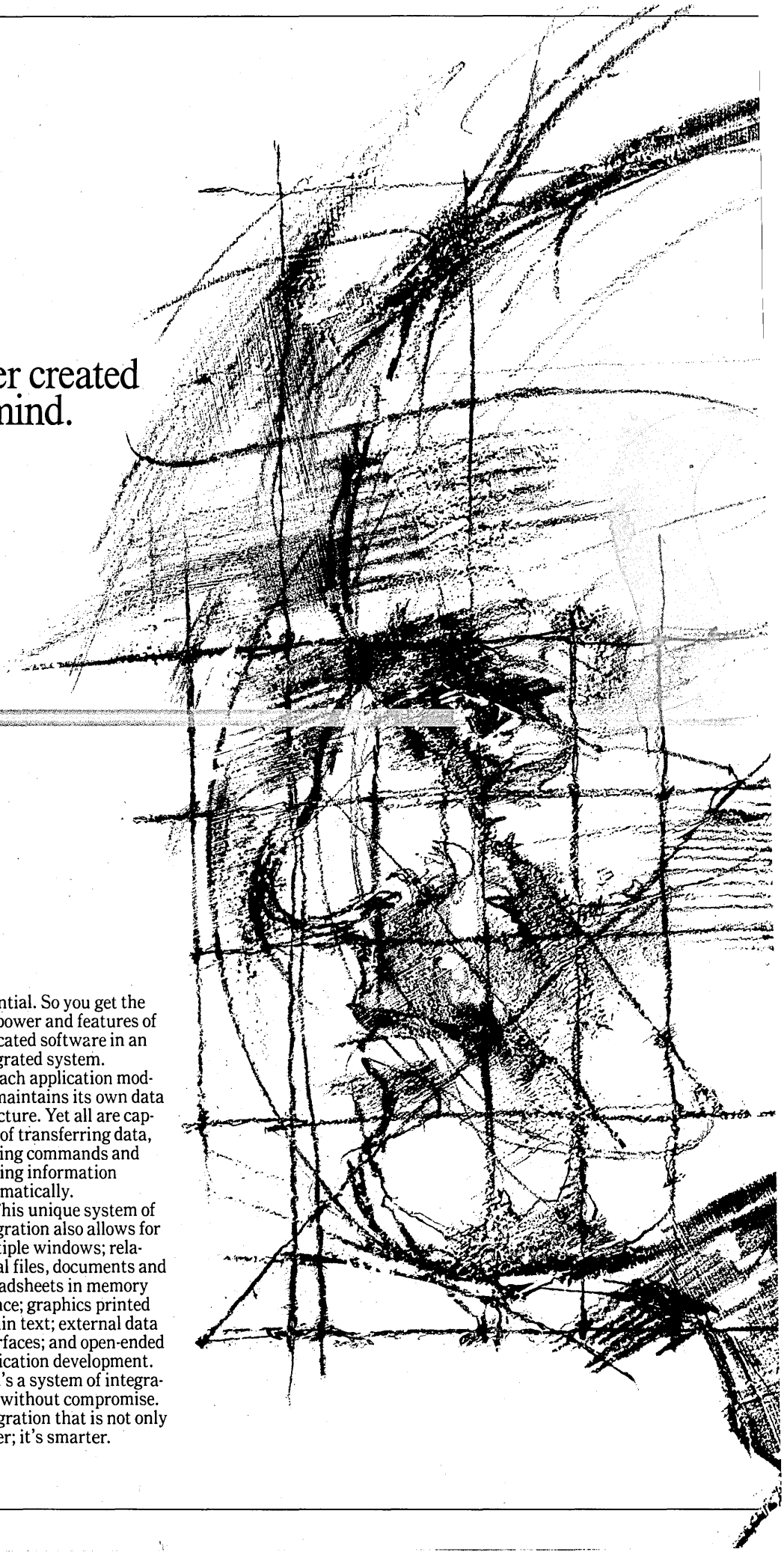
Where the future comes as no surprise.

Introducing the smartest tools ever created for the business mind.



The Smart Software System.

Smart Software, featuring The Smart Spreadsheet with Graphics, The Smart Word Processor and The Smart Data Manager, is the first software system with the unique intelligence and inherent logic to perform the way you think. Which makes applying the power of a computer to business tasks more effortless and effective than ever before.

It's awesomely powerful, yet amazingly simple. And with its greatly advanced and unprecedented capabilities, it sets new standards by which all other integrated business software will be measured.

ACHIEVING FULL INTEGRATION WITHOUT COMPROMISE

Unlike all-in-one integrated packages, Smart Software is structured on the concept of modular integration. Where each dedicated application can achieve its own maximum potential. So you get the full power and features of dedicated software in an integrated system.

Each application module maintains its own data structure. Yet all are capable of transferring data, passing commands and sharing information automatically.

This unique system of integration also allows for multiple windows; relational files, documents and spreadsheets in memory at once; graphics printed within text; external data interfaces; and open-ended application development.

It's a system of integration without compromise. Integration that is not only better; it's smarter.

SETTLING THE EASE OF USE VERSUS POWER DILEMMA

Smart Software puts to rest the ease of use versus power dilemma with an exclusive feature called "confidence levels."

At confidence level one, beginners don't face intimidating options; yet level three provides experts with all the power they want.

This feature enables Smart Software to grow in sophistication as the user's confidence increases or needs expand. Even more importantly, a variety of users in the same company, with different experience, can each work comfortably at their own level of ability with the same applications.

This one, innovative idea could revolutionize the way all business software is designed to work. And only Smart Software has it.

CREATING CUSTOM APPLICATIONS BY SIMPLE MENU SELECTION

Perhaps the most significant aspect of Smart Software is its unique "project processing" capability. It allows the user to set up customized projects, like a monthly sales report system or multi-year business plans, simply by doing them once.

There's no need to learn a complex programming language. The user merely makes simple English command selections. Smart Software then remembers to complete the project in the same way again at the touch of a button. Not by memorizing keystrokes (like a macro), but by automatically learning your custom sequence of commands and freely adjusting to changes and edits.

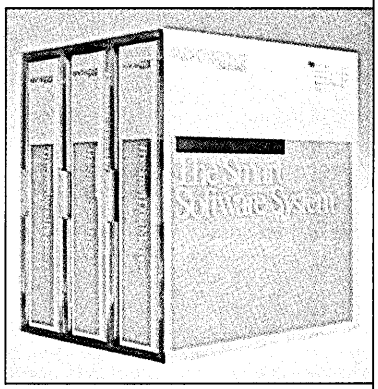
No other integrated system has a capability that even comes close to Smart Software's project processing.

HELPING PEOPLE TO WORK SMARTER, NOT HARDER

Smart Software was created to work for you, relentlessly. Structured to integrate between applications, automatically. And designed to perform multi-faceted business projects, brilliantly.

See your local computer dealer for a demonstration, and ask about the special upgrade offer currently available for Lotus 1-2-3,™ WordStar,™ or dBase II®* users who want to work smarter.

Smart Software is available for the IBM PC/XT and compatibles. For more information, or to order a smart demonstration disk,** call 800-GET-SMART.



The Smart Software System

INNOVATIVE™ Software

*Lotus 1-2-3, WordStar and dBase II are registered trademarks of Lotus Development Corporation, MicroPro International Corporation, and Ashton-Tate, respectively. In Kansas, call (913) 383-1089.

**The $10 charge for the disk is refundable with the purchase of any Smart Software.

CIRCLE 25 ON READER CARD

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Decision Data Service solves computer service problems. We provide nationwide service for large and small installations, plus depot service for special situations.

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CIRCLE 26 ON READER CARD

LOOK AHEAD

PROFS TO GO PC	IBM is showing selected customers a PC version of its PROFS office system. Designed to run under the PC/DOS operating system, the software ties into the mainframe-based PROFS, which runs under VM/370. It is unclear now if the PC version offers all PROFS functions, which include document preparation, scheduling, and calendaring, or a stripped down set of facilities. In any case, the new product, when unveiled, may make trouble for Data General, Hewlett-Packard, and Digital Equipment, who sell their own integrated office systems.
NEW CLONE FOR NEW GENES	IBM's new PC AT is certain to spawn the same kinds of imitations that the PC did, and the clones may arrive even more quickly than their 8088-based predecessors have. Phoenix Software Associates, Norwood, Mass., will soon introduce a BIOS (basic I/O system) ROM chip for the Intel 80286 microprocessor that it says will be functionally equivalent to that in the AT -- and it knows whereof it speaks. The firm currently licenses a compatible ROM BIOS for the PC that is insured against any copyright infringement suit by IBM, and expects to insure the new BIOS likewise.
IBM'S EPISTLE	Another upcoming IBM office product is Epistle, an experimental system that may be unveiled next year. Informed sources say part of Epistle is a dead ringer for the OPS-2000 office publishing system sold by Interleaf Inc., Cambridge, Mass. When introduced, Epistle is expected to be delivered on a new 32-bit processor that would accept text from IBM PCs and Displaywriters, provide powerful editing tools, and drive electronic printers to produce contracts, manuals, and reports.
HONG KONG CONNECTION	Corona Data Systems Inc. has got its foot in the Peoples Republic of China's door -- indirectly at least. The Thousand Oaks, Calif., manufacturer of IBM PC compatibles has moved its wares into that lucrative market by selling components back to a Korean subcontractor, Daewoo Ltd., which in turn sells the products to the PRC through a trading company in Hong Kong called Koolshade Ltd. Meanwhile, Corona has been in negotiations with the Chinese since 1983 trying to work out a direct trade agreement there. China is looking for joint ventures with U.S. high-tech companies to manufacture products, especially microcomputers, in its free trade zone located near Hong Kong.

LOOK AHEAD

	Carter would not comment on whether Corona would export PC products to the PRC or go into a joint manufacturing venture there.
PC NET TO BE EXTENDED	Look for a series of IBM networking product introductions this fall. The industry leader is expected to adorn its recently introduced PC network with several devices including a link into the System/36 small business system. Also in the works is a bridge to connect the PC net into the 370-based DISSOS environment, which would require EBCDIC to ASCII translation.
DBMS QUESTIONS	What do you know about DBMS products? Koch Systems, San Francisco, knew what it wanted in a DBMS to use in developing an accounting system for the Federal Home Loan Bank in San Francisco. Koch circulated a 75-item questionnaire to 50 vendors before selecting Oracle, the package sold by Oracle Corp., Menlo Park, Calif. "You'd be surprised how many vendors answered no to half the questions," says president George Koch. One vendor's salesman quit after answering nearly all the questions negatively. He asked Koch for the names of the better-scoring vendors.
SATELLITES FOR RCS	Xerox Computer Services, Los Angeles, has coined the term Skyware for a satellite-based interactive service it is offering five field test sites. Bill Fello, the unit's president, says he hopes eventually to move all the company's service offerings "away from telephone lines." New clients, he says, will be put on the satellite service beginning at year-end and the bulk of XCS's current customers will be converted in 1985. The service was put together for XCS by Telecon General of San Francisco and uses disks made by General Instruments: 4-foot KU band dishes at customer sites and 10-foot dishes at data centers. Testing is taking place over a General Telephone satellite.
RUMORS AND RAW RANDOM DATA	Could Tandon Corp., the Chatsworth, Calif., disk drive maker, be building pcs? It's been said that a $125 million contract it signed with Tandy Corp., owners of Radio Shack, includes not only disk drives but a quantity of IBM-compatible pc boards. . . .Wang Labs will unveil some products this fall, including a transportable PC-compatible machine and a combination pc-telephone product. . . . .Data General early next year is slated to introduce the 32-bit Titan cpu in its MV series of machines. It will offer 4.5 MIPS at about $70,000 per MIPS.

Make Stat Magic

Statistics, reports and plots happen magically with SPSS/PC+—the Statistical Package for IBM PC/XTs.*

SPSS/PC is the most comprehensive statistical package for performing simple or complex tasks, regardless of data size. It maintains feature and language compatibility with mainframe SPSS, while optimizing for the PC environment.

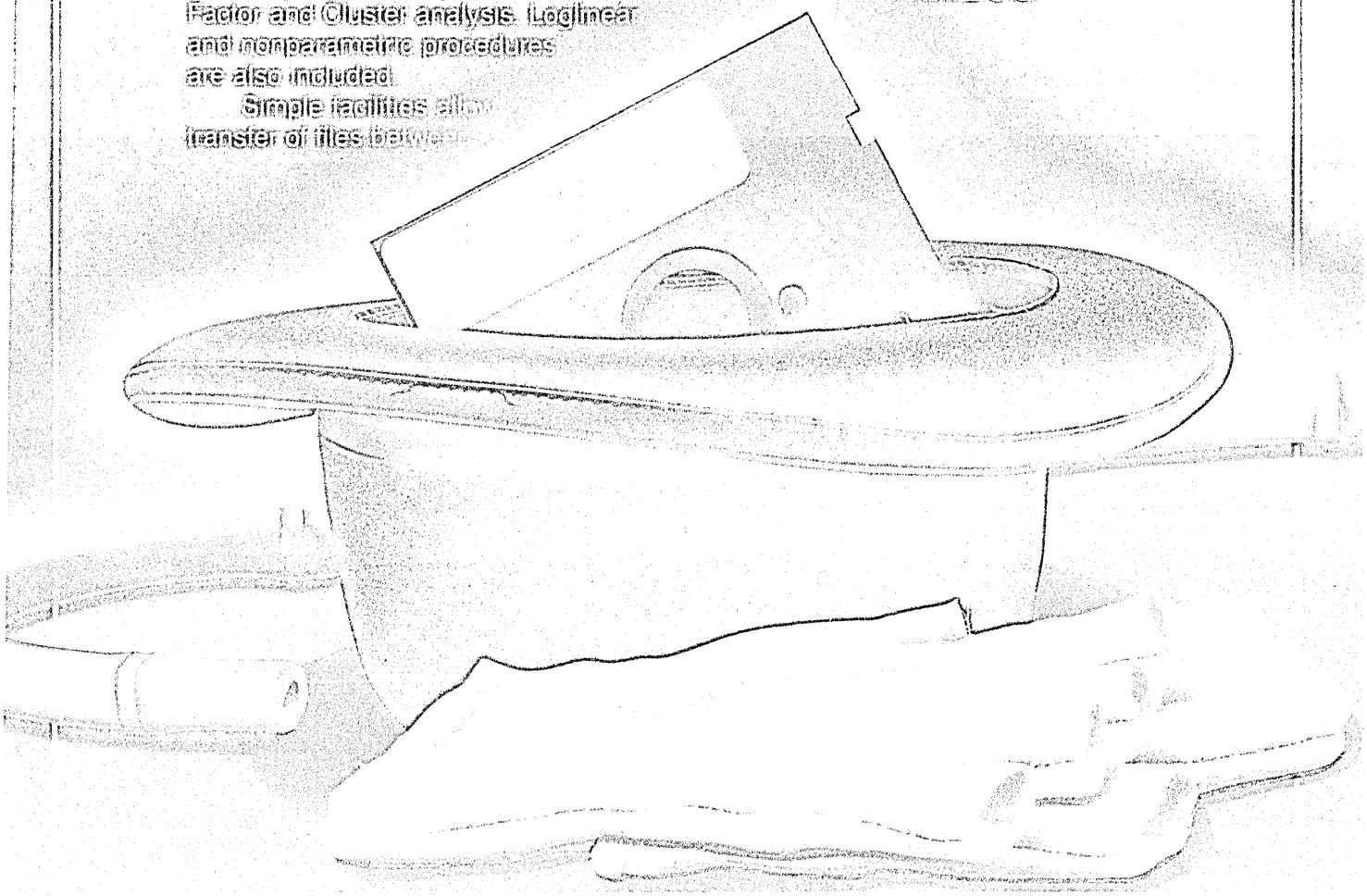
Statistics range from simple descriptive to complex multivariate, including Multiple Regression, ANOVA, Factor and Cluster analysis. Loglinear and nonparametric procedures are also included.

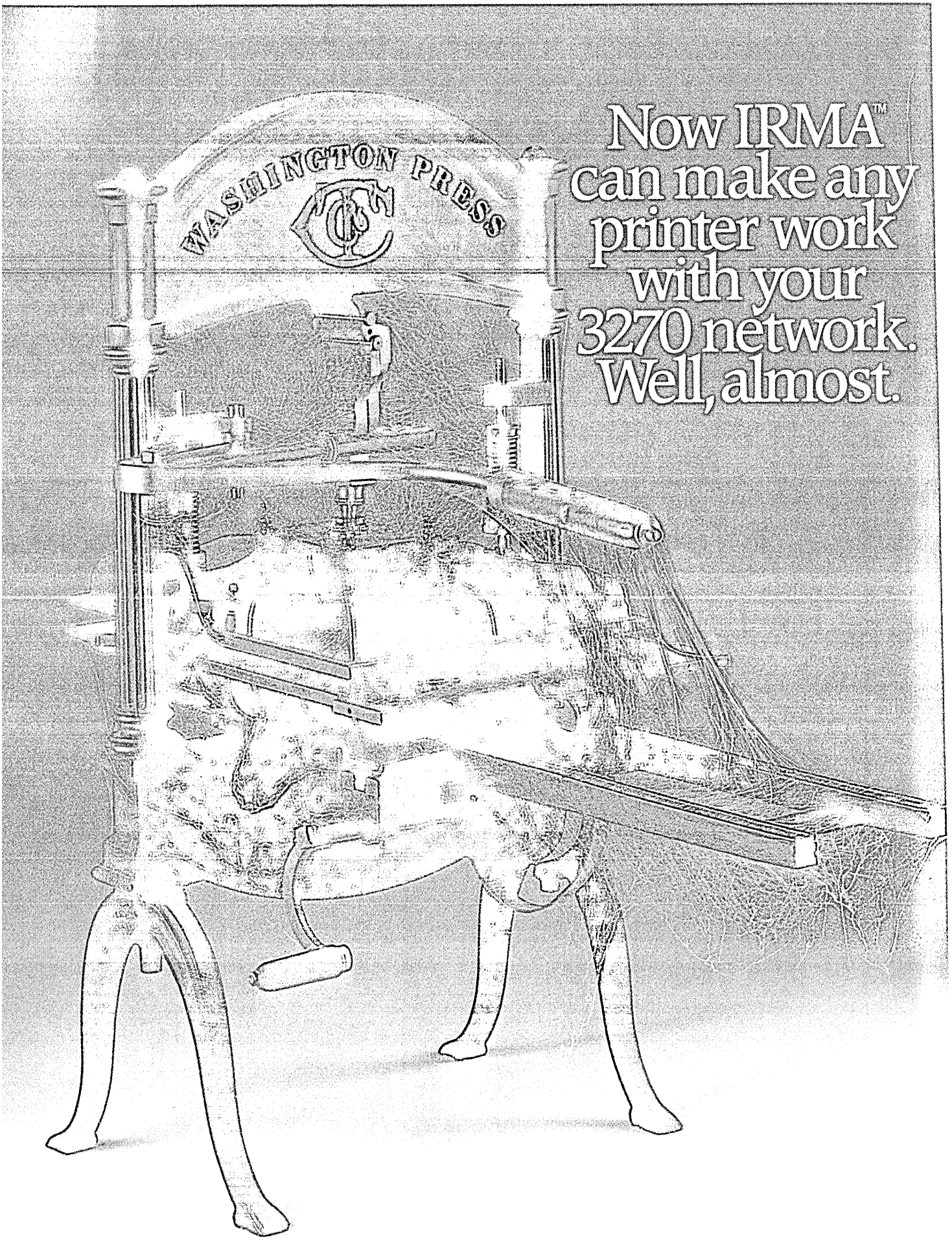
Simple facilities allow transfer of files between SPSS/PC and programs like Lotus 1-2-3, dBase II and SAS. A complete Report Writer, Plotting facilities and a Communications program for mainframes round out a fully integrated product.

For more information, contact our Marketing Department without further ado. And see what a little stat magic can do for you.

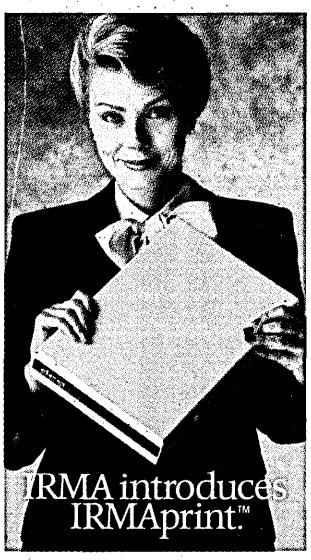
SPSS Inc., 444 N. Michigan Avenue, Chicago, IL 60611, 312/329-2400

In Europe: SPSS Benelux B.V., P.O. Box 115, 4200 AC Gorinchem, The Netherlands, Phone: + 31 1830 86711, Telex 21019





Now IRMA™ can make any printer work with your 3270 network. Well, almost.



When you set up an IBM® 3270 network, you're faced with the fact that you can't just go out and buy any printer to work with it.

Your choices are, to say the least, limited. Even IBM only makes a few that are compatible.

But with new IRMAprint from DCA, the limits are off.

IRMAprint isn't a printer. It's a printer emulator. In technical terms, it hoodwinks the IBM mainframe into thinking that whatever printer attached to it is a 3287.

So now if there's a more economical printer you want to use, use it. If you'd like to plug in a laser printer, plug it in. If you've always wanted to upgrade to a printer with better capabilities, there's never been a better time than now.

You would think that, with all that it does, installing an IRMAprint might prove to be a headache.

It's not.

IRMAprint is installed right at the controller site with a simple standard coaxial cable. And two models of IRMAprint are available for either an RS-232C or Centronics® Parallel Interface.

IRMAprint. It's new from DCA, the makers of the IRMA family of IBM-emulation products.

It lets you choose any printer that's right for the job, instead of the few that are right for the network.

For more information about IRMAprint, or any of the IRMA family of IBM-emulation products, send in the coupon below. Faster still, call 1-800-241-IRMA. Telex 261375 DCAATL.

Mail to 303 Technology Park, Norcross, GA 30092. And we'll tell you more about IRMAprint and all IRMA products.

*Name*_____

*Firm*_____ *Title*_____

*Address*_____

*City*_____ *State*_____ *Zip*_____

*Phone*_____

dca®
Digital Communications Associates, Inc.

MP-02-08

CIRCLE 28 ON READER CARD

CALENDAR

OCTOBER

INFO 84 (The 11th International Information Management Exposition & Conference).
Oct. 1-4, New York, N.Y. For information contact Info 84, Cahners Exposition Group, 999 Summer St., P.O. Box 3833, Stamford, CT 06905, (203) 964-8287, telex 649400 CAHEX WU STD.

14th International Symposium on Industrial Robots (ISIR).
Oct. 2-4, Göteborg, Sweden, contact: Svenska Massan Stiftelse, Box 5222, S-402 24 Göteborg, Sweden, tel. 46-31-20-00-00, telex 20600 MAESSAN S.

Infomatics '84 (The 16th Annual Conference and Exposition of the International Information Management Congress).
Oct. 2-4, Singapore, contact: Infomatics '84, P.O. Box 34404, Bethesda, MD 20817, (301) 983-0604, telex 904100 WSH.

ACM 1984 Annual Conference.
Oct. 8-10, San Francisco, Calif., contact: ACM, 11 W. 42nd St., New York, NY 10036, (212) 869-7440.

INTECH '84 (The Integrated Information Technology Conference and Exposition).
Oct. 8-11, Dallas, Texas, contact: Rosalind Boesch, Director of Public Relations, National Trade Productions Inc., 2111 Eisenhower Ave., Suite 400, Alexandria, VA 22314, (703) 683-8500.

LOCALNET '84.
Oct. 10-12, San Diego, Calif., contact: Online Conferences Inc., Suite 1190, 2 Penn Plaza, New York, NY 10121, (212) 279-8890, fax: (212) 279-8898.

Telcos & Videotex.
Oct. 10-12, San Diego, Calif., contact: Online Conferences Inc., Suite 1190, 2 Penn Plaza, New York, NY 10121, (212) 279-8890, fax: (212) 279-8898.

The 1984 Computer Expo & P.C. Faire.
Oct. 11-14, Sacramento, Calif., contact: The 1984 Computer Expo & P.C. Faire, P.O. Box 160288, Sacramento, CA 95816, (916) 924-9351.

TeleCon IV (The Fourth Anuual Teleconferencing Users Conference).
Oct. 15-17, Anaheim, Calif., contact: Mrs. Patty Portway, Conference Director, Applied Business Communications, 5 Crow Canyon Ct., Ste. 209, San Ramon, CA 94583, (415) 820-5563.

The West Coast Electronic Office & Expo Conference (EOE '84).
Oct. 16-18, San Jose, Calif., contact: Cartlidge & Assoc. Inc., 4030 Moorpark Ave., San Jose, CA 95117, (408) 554-6644.

COMDEX/Europe.
Oct. 29-Nov. 1, Amsterdam, The Netherlands, contact: The Interface Group, 300 First Ave., Needham, MA 02194, (617) 449-6600, or in Europe, Rivierstaete, Amsteldijk 166, 1007 MA Amsterdam, The Netherlands, 31-20-460201, telex 12358NL.

The Seventh International Conference on Computer Communication.
Oct. 30-Nov. 2, Sydney, Australia, contact: G.P.O. Box 2367, Sydney, New South Wales, 2001 Australia, telex AA 20591/OTCOM.

The 7th International Conference on Computer Communication.
Oct. 30-Nov. 2, Sydney, Australia. For more information contact Mr. C.C. Vonwiller, Chairman, Publicity & Publications Committee, ICCC-84, GPO Box 2367, Sydney, NSW, 2001, Australia, tel. 61-2-230-5210, telex AA20591.

Wescon/84.
Oct. 30-Nov. 2, Anaheim, Calif., contact: Electronic Conventions Inc., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965, telex 181350.

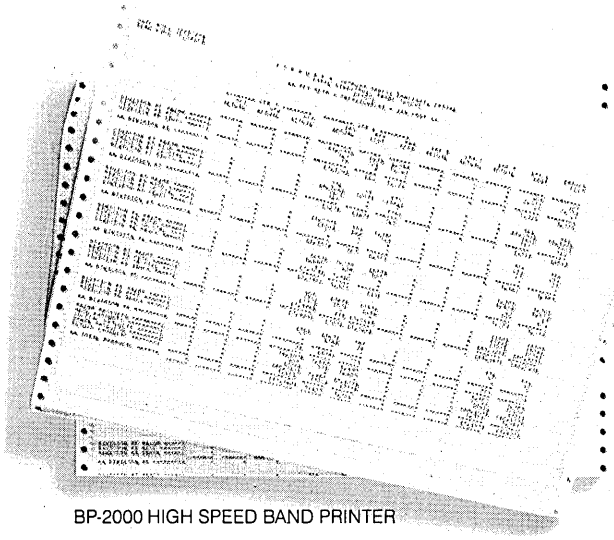
Mini/Micro West-84.
Oct. 30-Nov. 2, Anaheim, Calif., contact: Electronic Conventions Inc., 8110 Airport Blvd., Los Angeles, CA 90045, (213) 772-2965, telex 181350.

NOVEMBER

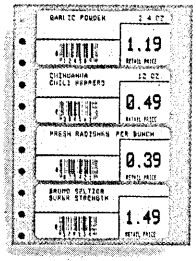
COMPEC.
Nov. 13-16, London, England, contact: Exhibitions Manager, Reed Exhibitions, Surrey House, 1 Throwley Way, Sutton, Surrey, England, tel. (44) 1-643-8040.

Electronica.
Nov. 13-17, Munich. For more information contact Kallman Associates, 5 Maple Court, Ridgewood, NJ 07450, (201) 652-7070

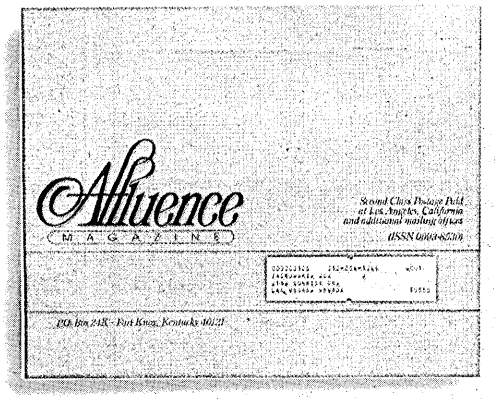
Systemotronica '84.
Nov.22-30, Moscow. For more information contact Düsseldorfer Messegesellschaft mbH-NOWEA, P.O. Box 32 02 03, D-4000 Dusseldorf 30, Fed. Rep. of Germany, tel. (0211) 4560-729, telex 8 584 853 MED D.



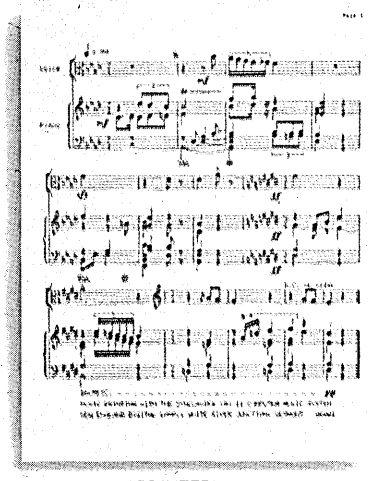
BP-2000 HIGH SPEED BAND PRINTER



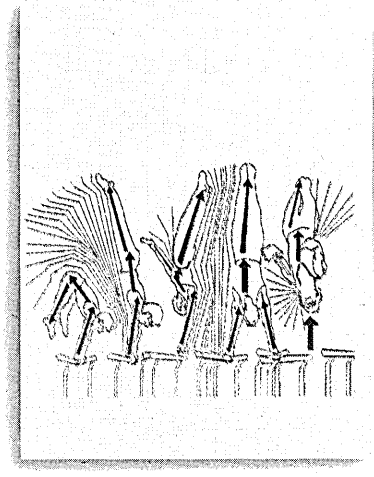
M-100L
MATRIX PRINTER



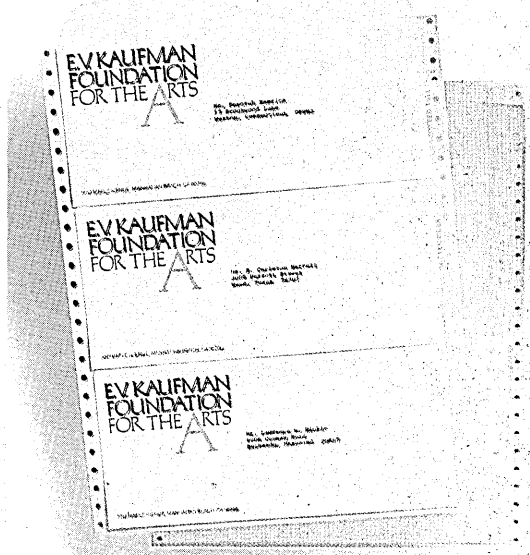
B-600 MEDIUM SPEED BAND PRINTER



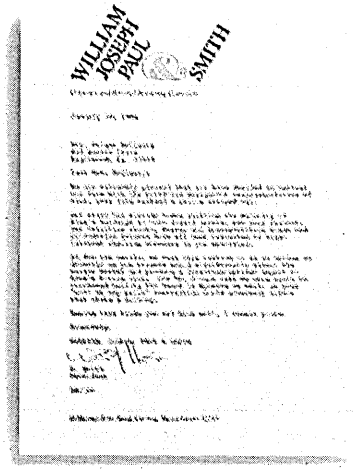
8010 MATRIX PRINTER



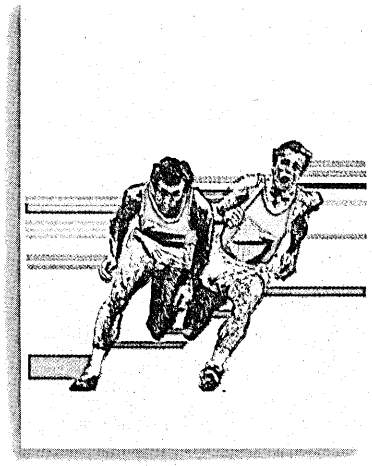
8020 MATRIX PRINTER



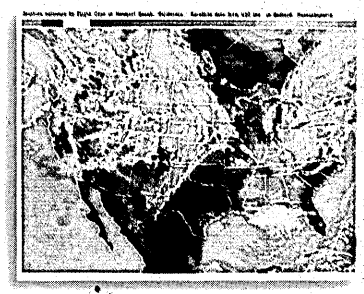
DP-55 DAISYWHEEL PRINTER



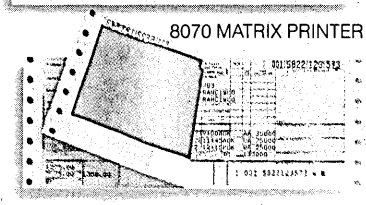
DP-35 DAISYWHEEL PRINTER



8050 MATRIX PRINTER



8070 MATRIX PRINTER



M-120 MATRIX PRINTER

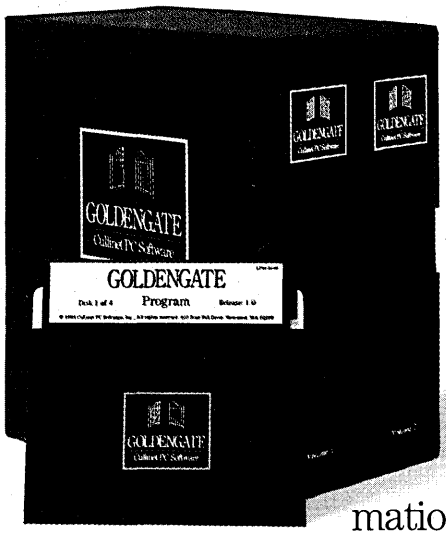
...and so on.

Dataproducts printers.
Nobody puts ideas on paper so many ways.

DATAPRODUCTS CORP., 6200 CANOGA AVE., WOODLAND HILLS, CA 91365. (818) 887-3924. IN EUROPE, 136-138 HIGH ST., EGHAM, SURREY, TW 20 9HL ENGLAND.

CIRCLE 29 ON READER CARD

The pc software to use if you have IDMS/R.



At last count, there were more than 50 integrated personal computer software packages. But for companies with IDMS/R, we'd like to suggest that only one really makes sense.

GOLDENGATE™, Cullinet's pc software package, integrates seven components: database, spreadsheet, graphics, document processing, 3270 terminal emulation, asynchronous communication and information manager. While the software is exceptional on a standalone basis (see facing page), it offers an additional benefit to pc users in an IDMS/R environment—true micro-to-mainframe integration.

Not the kind that requires a mastery of complicated command structures. Not the kind that provides a link with only a small portion of mainframe data.

Through the Information Database (IDB), the Cullinet software product that serves as the foundation for corporate information management, a GOLDENGATE user can have direct, "transparent" access to all data stored in the IDMS/R database, with no additional work required to get it. The user simply requests and manipulates IDB mainframe information in the same way information on the pc is stored and manipulated. It's that simple.

The Complete Software Solution

Decision Support Applications Database

GOLDENGATE and IDB are key components of Cullinet's complete approach to information management. You can find out about them by attending a Cullinet Seminar. To make arrangements, phone, toll-free, 1-800-225-9930. In MA, the number is 617-329-7700.

Cullinet

We understand business better than any software company in business.

The pc software to use if you don't have IDMS/R.

GOLDENGATE™ is the logical choice for IDMS/R users (see facing page). But what about in non-IDMS/R environments? How does Cullinet's integrated pc software stack up against the more than 50 competitive packages on the market today?

With all due respect to those other packages, we'd like to suggest that it stacks up *best.* You see, GOLDENGATE is fundamentally different in design than other integrated pc software packages.

Most software developers achieve integration by designating one specific function to serve as a "metaphor" for the entire program—an approach that consumes memory and inevitably creates compromises in functionality. Cullinet, on the other hand, chose to provide the *optimum* environment for each and every function in the program. When a GOLDENGATE user is doing word processing, he does it using a superior word processing tool. And so on. What's more, all tools, including new ones under development, are built around core software that integrates the tools and facilitates transfer of information among them.

Going further, we designed a command structure that makes each of these extremely powerful modules extremely easy to use, because they all share the same commands. The net result is a simple one: integrated software that works better, because each of its components works better. All without placing excessive demands on the system configuration.

To find out more, we encourage you to attend a Cullinet Seminar. To make arrangements, phone, toll-free, 1-800-225-9930. In MA, the number is 617-329-7700.

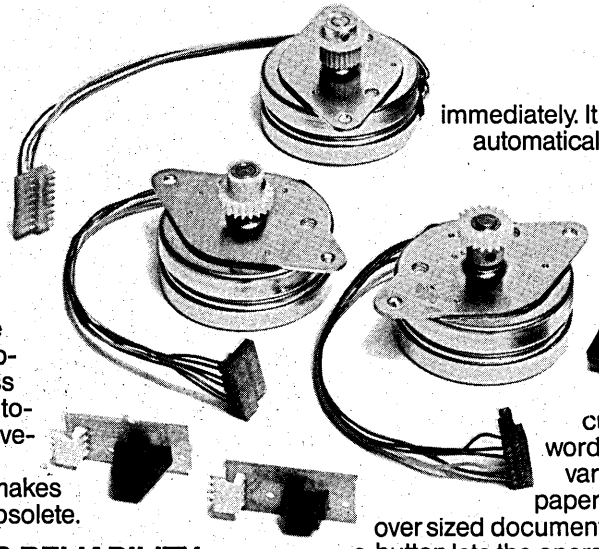
Cullinet

We understand business better than any software company in business.

CIRCLE 30 ON READER CARD

ELECTRONICS MAKES US BEST

NO OTHER CUT-SHEET FEEDER COMPARES TO THE ZIYAD® Z-300.



Compare the Ziyad® Z-300 Intelligent Paper Processor™ to all other cut- sheet feeders and the difference is obvious.

They are mechanical.

The Ziyad Z-300 is electronic.

In fact, the Z-300 is the only cut-sheet and envelope feeder that electronically captures both name and address from typed letterhead and automatically delivers a typed envelope collated with your letter.

This single feature, alone, makes mechanical sheet feeders obsolete.

ELECTRONICS MEANS RELIABILITY

Ziyad stands on proven performance. Since 1979 we have set the standard for cut-sheet feeders with quality and reliability unmatched. Over 22 of the world's leading manufacturers of word processing equipment currently sell Ziyad products under their own names. Our engineers work hand in hand with theirs determining specific product needs and applications. The result is the most sophisticated combination of technical hardware and software ever integrated into a cut-sheet feeder. And OEM tests show our sheet feeders with an MTBF of 6,000 hours. That's more than three years of continuous operation.

That's why more than 100,000 Ziyad products will be installed this year alone.

ELECTRONICS MAKES THE DIFFERENCE

Precision. Accuracy. Reliability.

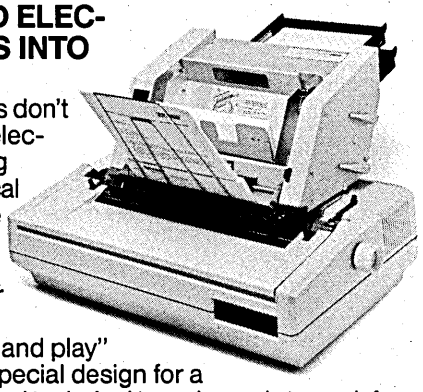
All are important in planning for increased productivity. And, the Z-300 has it all. Three electronic sensors, drive motors, and a PROM chip are integrated in the Z-300 to constantly monitor paper and envelope flow. Both paper and envelope are properly aligned and fed consistently each and every time. If the paper or envelope trays are empty, or if a misfeed should occur, the Z-300 electronically stops the printer from printing on the platen... immediately. It memorizes typing position, and can automatically alert the operator with both an audible and visual signal...whether nearby, in the next room, or on the next floor!

ENGINEERED FOR OPERATOR CONFIDENCE

The Z-300 is easy to operate. It attaches to most letter quality and matrix printers, making it the essential cut-sheet and envelope feeder option to word processing systems. The Z-300 offers various trays to accommodate a variety of paper sizes...including envelopes. When over sized documents have to be printed, a simple touch of a button lets the operator tilt the Z-300 back from you printer.

The Ziyad Z-300 is the only dual bin, cut-sheet and envelope feeder that has this capability.

INTEGRATE ZIYAD ELECTRONIC FEEDERS INTO YOUR SYSTEM



In an age of electronics don't compromise on your electronic word processing systems with mechanical sheet feeders. Add the essential electronic option—the Ziyad Z-300 Intelligent Paper Processor.™

Whether it's a "plug and play" standard feeder or a special design for a custom system, our Ziyad technical team is ready to work for you.

Integrate Ziyad electronics into your system today. Call or write Sue Turner 201/627-7600.

ZIYAD

Ziyad, Inc., 100 Ford Road, Denville, NJ 07834 USA
Telephone (201) 627-7600

CIRCLE 31 ON READER CARD

LETTERS

RE-RETHINKING PRODUCTIVITY

Regarding Bill Inmon's article, "Rethinking Productivity" (June 15, p. 185), the thesis that "fourth generation languages and applications development without programmers don't deliver the productivity gains their advocates claim," is misleading and is not supported by the data in the article.

Inmon correctly points out that data processing organizations that exhibit solid management, sound financial controls, a good understanding of the user issues, and that use the correct blend of long-term and short-term goals tend to demonstrate high productivity.

The use of fourth generation language is unrelated to these issues. Sound business skills and solid management do not depend on the use of any particular language of any particular generation.

It is inappropriate for an analysis of the production gains associated with fourth generation languages to include only gains in coding. Fourth generation languages modify the total life cycle of software development from design to testing and allow much more user interaction early in the process via prototyping.

The use of fourth generation language does allow an increase in the number of individuals with an applications bias to successfully develop programs. While the organization still needs a balance of computer science types, some production gains are accomplished by getting people with real application experience and competence closer to the development process.

MICHAEL H. BROWN
Marketing Manager
Health Care Productivity Operation
Hewlett-Packard
Andover, Massachusetts

THE BATTLEFIELD BROADENS

In his article, "The Battle for the Desktop" (July 1, p. 68), Dr. Michael Hammer has created a scenario of two "prinicipal combatants" slugging it out for the prime desktop real estate. On the one hand, he has the "mainstream minicomputer vendors" (Digital Equipment Corp., Data General, Wang, etc.) and on the other are the "standalone workstation vendors." I suggest that Dr. Hammer has failed to include a group of potentially powerful challengers, namely PBX manufacturers.

The use of the integrated voice/data digital PBX as a low-to-medium bandwidth switching vehicle (speeds up to 19.2Kbps asynchronous, 56Kbps synchronous) has gained industrywide acceptance, prompting virtually every major PBX manufacturer to view the desktop as their next logical battleground. Several of these companies already have voice/data terminals on the market. It is expected that these terminals will be enhanced to become true workstations. Examples are AT&T's Business Communications Terminals (BCTs), Northern Telecom's Displayphone, Rolm Corp.'s Cypress (in which IBM has a 30% equity interest), and GTE's Action Station (manufactured by Thompson-CSF of France). Mitel, the number four supplier of PBXs in the U.S., has, with its Kontact product, become the first PBX manufacturer to market a machine capable of processing what Dr. Hammer refers to as "personal computer applications."

As the PBX is transformed from a device dominated by its switching functions to one dominated by terminal and applications support, the major PBX manufacturers will emerge as a viable third entry in "The Battle for the Desktop."

JEFFREY A. MATROS
Director of PBX Research
Probe Research Inc.
Morristown, New Jersey

Your points are well taken as was, we hope, the article that dealt with the same subject that immediately followed Dr. Hammer's piece in the July 1 issue. Please see "The Little Engines that Might," p. 78, for the full story on PBX involvement in the desktop battle.—Ed.

THE KEY IS CONTROL

In David Robinson's article, "Synchronizing Systems with Business Values" (June 15, p. 152), he suggests that criteria other than—or in addition to—return on investment should play a more important role in selecting systems projects and in the allocation of resources to information services activities. He also suggests that the relative value of a particular system opportunity to an organization depends on whether that organization is market-oriented or control-oriented. While I strongly agree with him that multiple criteria should be invoked when evaluating system opportunities, I have difficulty accepting his notion that organizations can be meaningfully categorized into those that are market-oriented and those that are control-oriented.

I have yet to meet a senior executive who didn't feel that his was a market-oriented company. Furthermore, there is considerable evidence that in many industries organizations must be simultaneously market-oriented and control-oriented if they are to be successful. A good example is the airline industry. Ever since deregulation, airlines have been marketing furiously to increase the size of the air travel market and their share in it. At the same time, it is clear that control issues, the effective routing of aircraft and cost containment, are of paramount importance in assuring the viability of any airline. Similarly, many high-tech companies are very much market-oriented in the sense that Robinson suggests, yet at the same time they are control-oriented because product quality and reliability—control issues—are keys to their success.

A final example to make my point. In the '60s, the ITT Corp. was a darling of the stock market because of its rapid growth pattern. When Mr. Geneen, then chairman of ITT, was asked what was the

LETTERS

key to ITT's growth, he answered in one word: control.

JOSEPH C. NAPOLI
Executive Vice President
P-Cube Corp.
Brea, California

MIXED EMOTIONS

I was both pleased and saddened by reading Nicholas Zvegintzov's article, "Immortal Software" (June 15, p. 170). Pleased that the idea of rejuvenating existing software is alive and promoted by such powerful groups as Peat, Marwick, Mitchell & Co. But saddened that even though the article reads like an anthology of "restructuring," it seems to ignore any work between Jonathan Swift (circa 1726) and J. Cris Miller (circa 1978).

For instance, my article, "Better Manpower Utilization Using Automatic Restructuring" in the *National Computer Conference Proceedings, 1975,* showed how restructuring was being used to provide both better long-term software maintenance and an attractive alternative to straight software rewrite. I believe the essential concepts behind restructuring or "retrofit" as J. Cris Miller calls it, predated his own efforts. That includes perhaps the most intriguing justification for restructuring even when a redesign is scheduled. Basically, no matter how bad it may look, an operational software system, often in the form of patches, is a repository for information accumulated over years of operation. This has happened in response to obscure cases and situations that might elude a fresh designer, even one armed with today's best design and programming techniques.

And to close this chapter on credits, let me point out that the term "structuring engine" can be attributed to Michael Cashman, former products editor of DATAMATION, who suggested it to me in June 1974 before mentioning it in the "Look Ahead" column of the August 1974 issue.

Clearly, if software is too often "immortal," many articles are not.

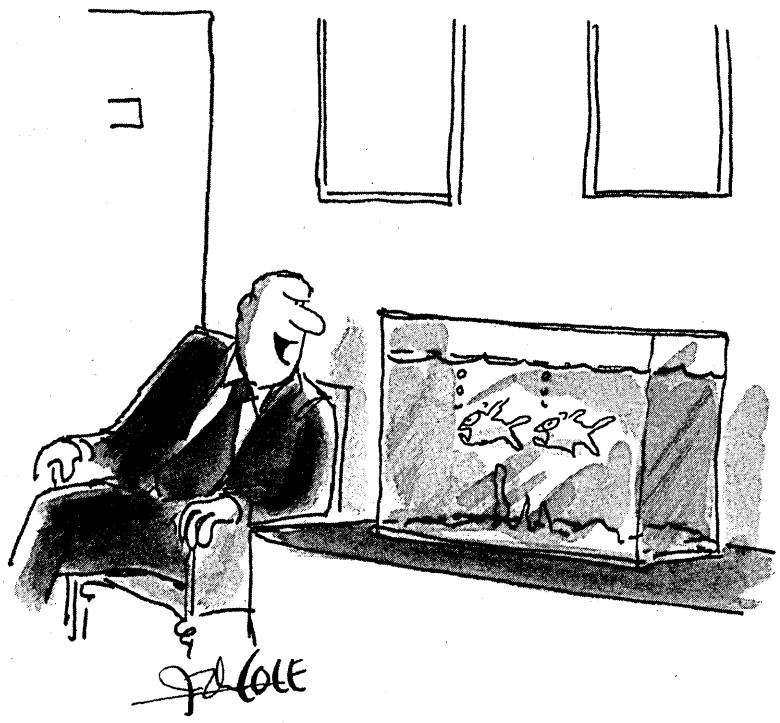
GUY DE BALBINE, PhD
Director
IDL tech
Tarzana, California

HERE COMES THE JUDGE

There may be more than comedy in M. Twohy's cartoon in the June 15th issue (p. 132), which shows a judge consulting a desktop computer and saying to the defendant, "The computer recommends you do a little time." There has been a lot of discussion about the lack of proper and uniform sentences for the same offense. This variance occurs even in cases tried in the same jurisdiction and by the same judge. Perhaps the idea of a judge entering the specifics of a case—including mitigating and extenuating circumstances—into a computer is not such a bad one after all. The computer could be programmed with past cases, mandatory sentences, higher court rulings on similar offenses, and then would provide a recommended sentence or range of options.

Surely the judge or his staff does some research to ensure that the sentence he passes is within legal bounds, so the idea isn't entirely new. But with a computerized system, the information would be readily available, thus reducing court time. By putting every judge on the same system, sentences could become almost standardized and each defendant would get more uniform treatment. Then they wouldn't get too tough a sentence from a "hangin' judge" nor too light a sentence from an overly liberal judge. This could also result in quicker resolution of appeals, thus speeding up the whole process. Of course, the judge would retain ultimate control over the sentencing process, but this system could help ensure that criminals get their "just desserts."

WILLIAM B. HERPIN JR.
Herco
Colorado Springs, Colorado



"Sushi! Sushi!"

CARTOON BY ARTEMAS COLE

MISCONSTRUED

Just for your information, the turtle in your quote from the Bible (Editorial, May 15, p. 27), refers to the turtledove, a bird, not a tortoise.

HERB FRIZZELL SR.

CREATIVE COVER

I'd be grateful if you could get Kathy Jeffers (July 1 cover) to send to me the source of the Civil War toy soldiers she used in her imaginative diorama.

One other item. Your publication is too good. It has so many informative articles that I spend too much time on most issues.

JACK MARCINEK
J-E-L Resources
West Redding, Connecticut

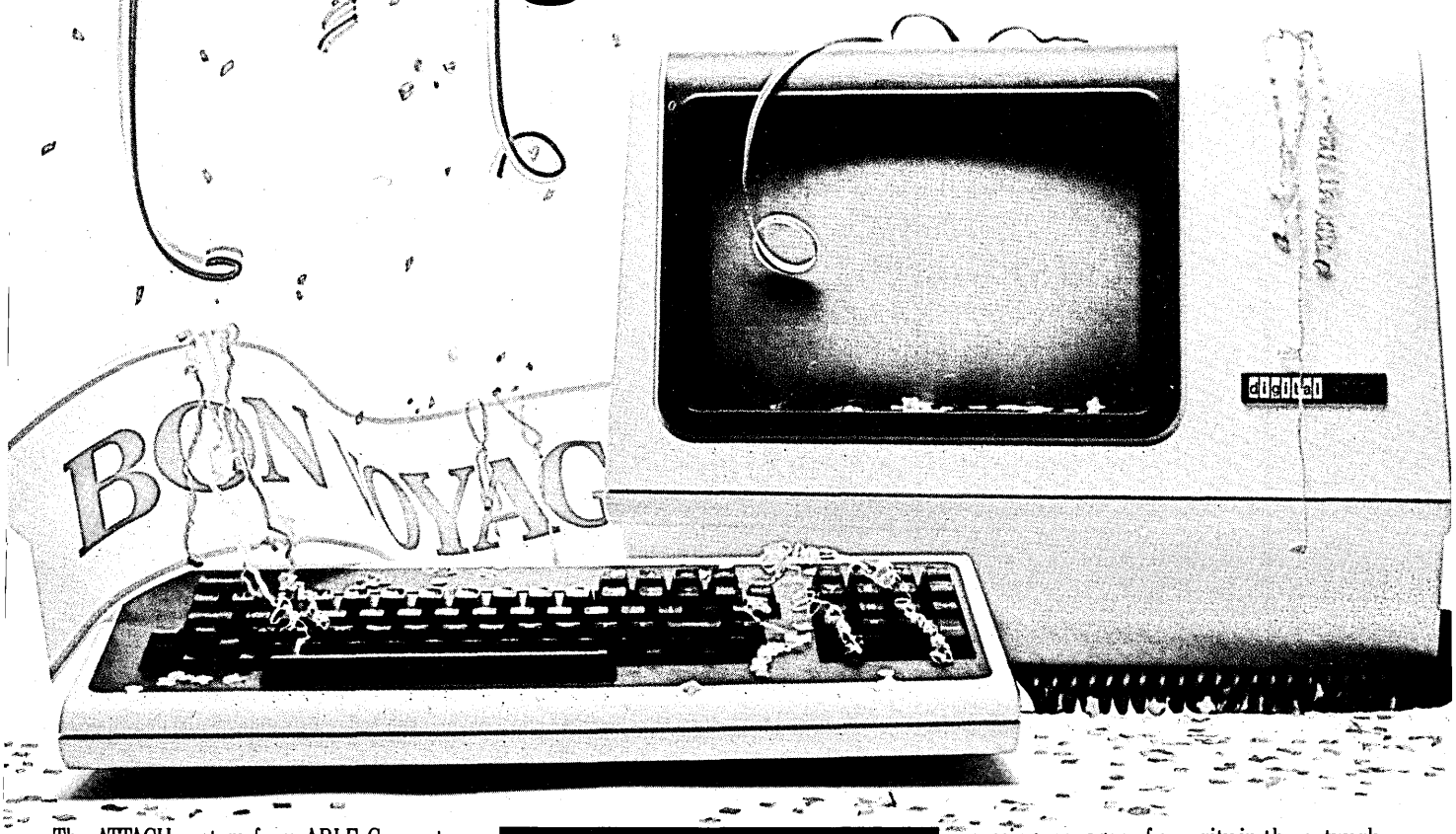
Artist Kathy Jeffers bought unpainted Civil War soldiers from The Soldier Shop, 1222 Madison Ave., New York, NY 10028, for about $8 each. She painted them herself. If you'd like them already painted, The Soldier Shop charges $30 for the foot soldiers, $37 for the drummer, and $41 for the standard-bearer.—Ed.

AN OVERSIGHT

Our company was overlooked in your list of protocol conversion vendors presented in "The Little Handshake Machines" (June 15, p. 102). KOLINAR offers 3270 terminal emulation for IBM 3101 terminals, or PCs emulating 3101s, connected remotely to a host VM system. K3101 simulates an IBM 3278 model 2 display station.

JAMES H. WEISSMAN
Director of Marketing
Kolinar Corp.
Santa Clara, California

Go from port to port without ever leaving the terminal.



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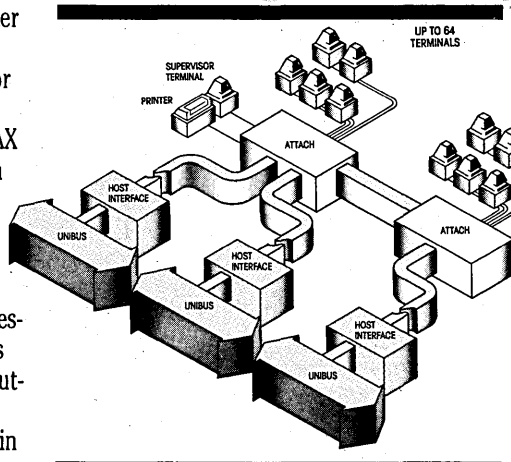
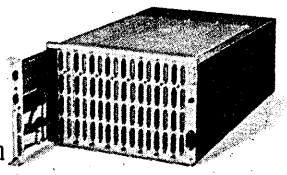


Secure A Safe Passage

The ATTACH system assures the data processing manager of security in the network. With user class definition the supervisor restricts access to any specified host computer, set of computers or subset—this safeguards critical data files. Plus, with ATTACH, the supervisor is free to allocate a particular host computer to high priority users who demand instant access and processing time.



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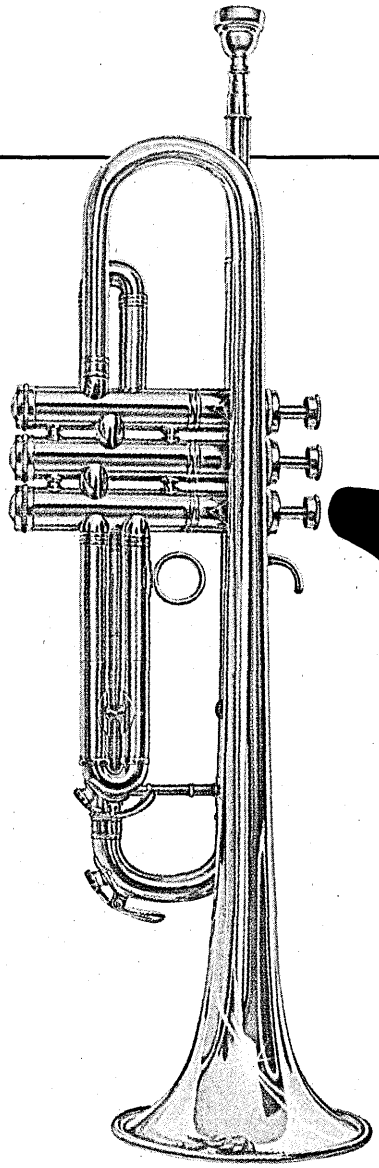
CIRCLE 32 ON READER CARD



VS

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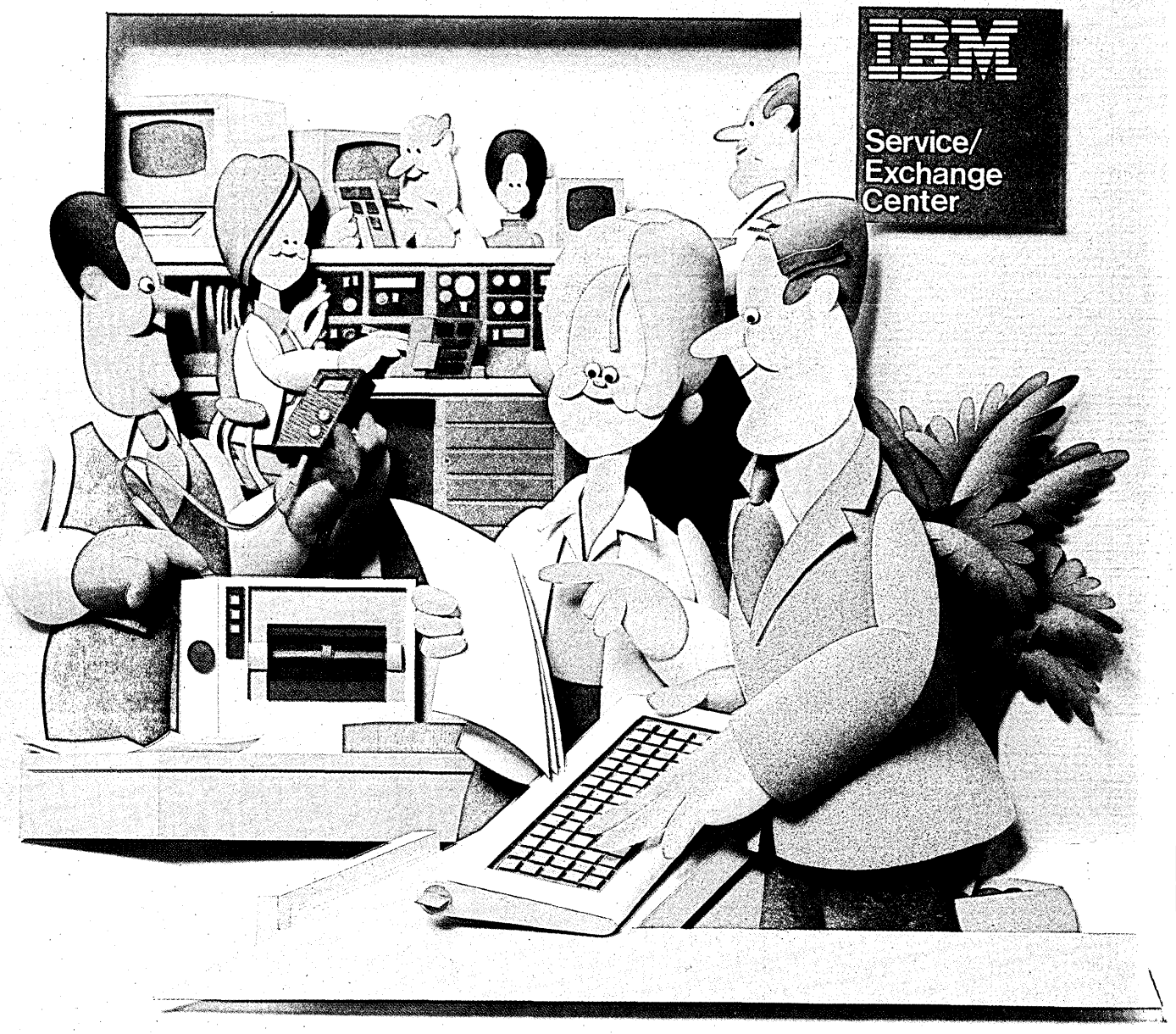

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CIRCLE 34 ON READER CARD

Rebecca S. Barna, Editor

EDITORIAL

DP SALARIES: THINGS ARE HEATING UP

ILLUSTRATION BY BACHRUN LOMELE

Salaries are always a hot topic. This year that hot topic got even hotter. Things are indeed heating up, as senior editor Larry Marion reports in his salary survey article that tracks the trends in the dp domain.

The much heralded economic recovery means better times for many corporations, which are plowing more bucks into their data processing departments. It's not an across-the-board boom yet, but the signals are clearly there. So too are the personnel shortages—a major factor inflating dp salaries in a classic supply and demand spiral.

Entwined in that spiral are the dp chiefs, one of whom warns that the big wallet era is fast approaching. "Many dp managers," he explains, "saw the leveling off of the steep climb in dp salaries and thought it meant the end of an era. That was a pause, not the beginning of a new trend."

DATAMATION's salary survey reflects this trend toward higher salaries and stepped-up turnover rates. Over 700 dp managers throughout the U.S. reported that the average salary increase for 1984 would be 7.8% over 1983—a slight jump ahead of the 7.2% average awarded in 1983.

The head count will also go up significantly, soaring up to 20% this year in larger installations. This will be accompanied by a sharp increase in demand, which will lead to a turnover rate of at least 9%. Managers at smaller shops estimate similar growth patterns, but at more modest levels.

Not all dpers are seeing their salaries soar up, up, and away. The patchy economic recovery coupled with a mild inflation rate means, as Marion points out, that a broad survey average blurs much of the day-to-day reality. That reality is reflected by the fact that some regions and industries are actually doing much better than others. Below average salary boosts, for example, are reported in areas such as Cleveland, struggling to recover from the recession. Neither are dp shops operating under Uncle Sam's thumb experiencing salary splurges. Paltry raises were doled out, for instance, in the utility, transportation, and education sectors—all posting average increases of about 6%.

Dp workers in these less lucrative areas, however, shouldn't be too depressed. They are, after all, doing better than the average American worker, who is expected to earn a mere 5.3% increase this year. Dp staffers are in fact expected to do even better than the average American executive, according to a recent survey by Sibson & Company of Princeton, N.J.

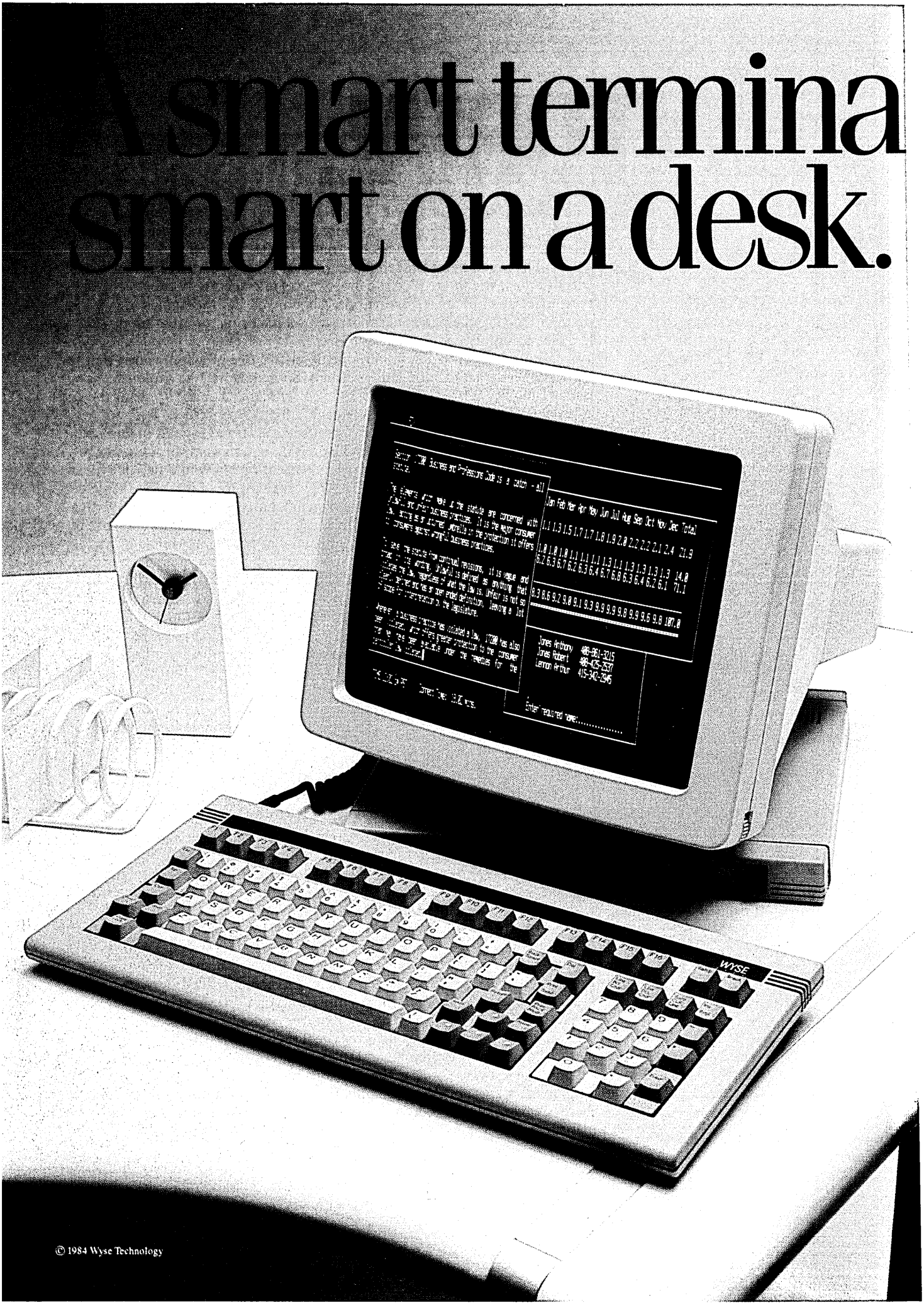
The happy days for dpers will be even happier, since their salary increases are likely to exceed that old bugaboo, inflation. Many dp managers, as a matter of fact, do indeed focus on inflation as one of the key determinants of merit increases. In Los Angeles, Bill Sumner of Bullock's told DATAMATION that he relies on local salary surveys to determine merit raises for his staff of 110 programmers, computer operators, and support staff. He also says he will boost the percentage increases to stay competitive.

Staying competitive is the name of the game in the dp world. Companies in this day and computer age simply cannot afford to shortchange their dp staff, on whom they've come to rely more and more. Independent by nature, dpers will readily migrate if they feel their salaries are not competitive. And nobody knows those salary statistics better than the dpers themselves.

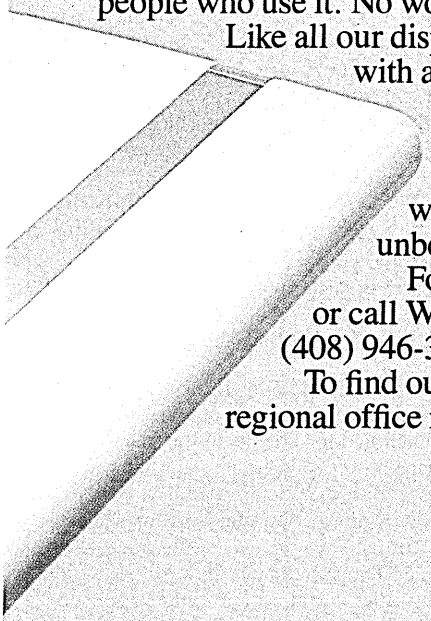
DATAMATION's salary survey, one of our most popular features, helps dp managers in their planning and budgeting. This year's survey shows that there's a growing group of savvy managers out there in computer land—managers who are using their salary budgets with a fair degree of sensitivity and creativity.

So, as the salary scene continues to heat up, one point is certain: things should never get too hot to handle for the cool dp manager, who continues to monitor the trends in this competitive and volatile industry. ◉

A smart termina
smart on a desk.



should look



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CIRCLE 35 ON READER CARD

IN FOCUS

FISH 'N' CHIPS

A TI microcomputer is at the helm of a new generation of commercial fishing boats.

by Jon Laitin

If anyone had dared stand up at a meeting of commercial fishermen two years ago to bear the tidings of computers aboard fishing vessels, he or she would have been hooted from the hall. Today, such an announcement would provoke quiet skepticism at most.

This subtle shift in attitude by the rugged individualists who dare foul weather to harvest the ocean's living resources can be traced to a new Boston-based fishing company touting innovative technology and a computer aboard every boat. Not wanting to be left behind, and already overloaded with electronic devices capable of finding the ocean's last haddock, independent boat owners are biding their time to see what the computer age will bring.

The company that will someday take credit for making "database" and "telemetry" synonymous with modern fishing technique is Seabank Industries Limited, Boston. Organized five years ago by an entrepreneur who knew more about building condominiums than fishing vessels and who was determined to supply the marketplace with higher quality fish, Seabank has so far aroused as much controversy as curiosity.

Company president Snelling Brainard, who has a bachelor's degree in economics from Harvard University, insists that the common method of harvesting groundfish in the Northeast, by dragging nets on the ocean's bottom, damages both the fish and their habitat. Long-lining, or hook and line fishing, a method popular in Norway and Japan, is the best technique for conserving fuel and landing a quality catch, he says.

While Brainard burned leather raising $1.5 million in equity from 30 investors to begin building three state-of-the-art fishing vessels, he turned the details over to the experts. He hired marine architects, boat builders, and an established fleet operator all located in Maine. His wife Caroline, the company owner and a recent Simmons Graduate School of Management graduate, investigated the seafood marketplace. He turned to his brother Millar Brainard, 59, the proprietor of a computer consulting firm in Sarasota, Fla., for the design of the computer system for the boats.

The offering was an attractive tax shelter for some investors. But the company president emphasized the potential for profits. "Billions have been made on Georges Bank," he told prospective stockholders. Seabank's fleet manager has been building a new $2 million vessel for his own company every year, he added.

Snelling Brainard predicted his three-boat fleet would land 544,000 pounds of fish the first year, compared with the Maine industry's 54.9 million pounds in 1983. The estimate is based on one boat fishing an average of 12,000 hooks per day, eventually increasing to 25,000 hooks as the crew becomes more adept at handling the automated equipment designed to bait and straighten hooks and shoot the lines over the stern.

Maine fishermen were at first up in arms over the plan, because Seabank had convinced the Maine state government that the project would aid the state's lagging economy, and obtained its backing for a guaranteed bond issue of nearly $2 million to build a fleet of three 76-foot boats. Total cost of the three boats is $3.5 million, typical of deluxe fishing boats.

But the state's ocean harvesters insisted that loan guarantees should be reserved for the small businessman, not an out-of-state syndicate whose spokesman talked like an expert but had never been to Georges Bank fishing area. They had doubts that expensive long-liners costing $1 million each could catch enough fish

Maine fishermen were up in arms over Seabank's guaranteed bond issue of nearly $2 million.

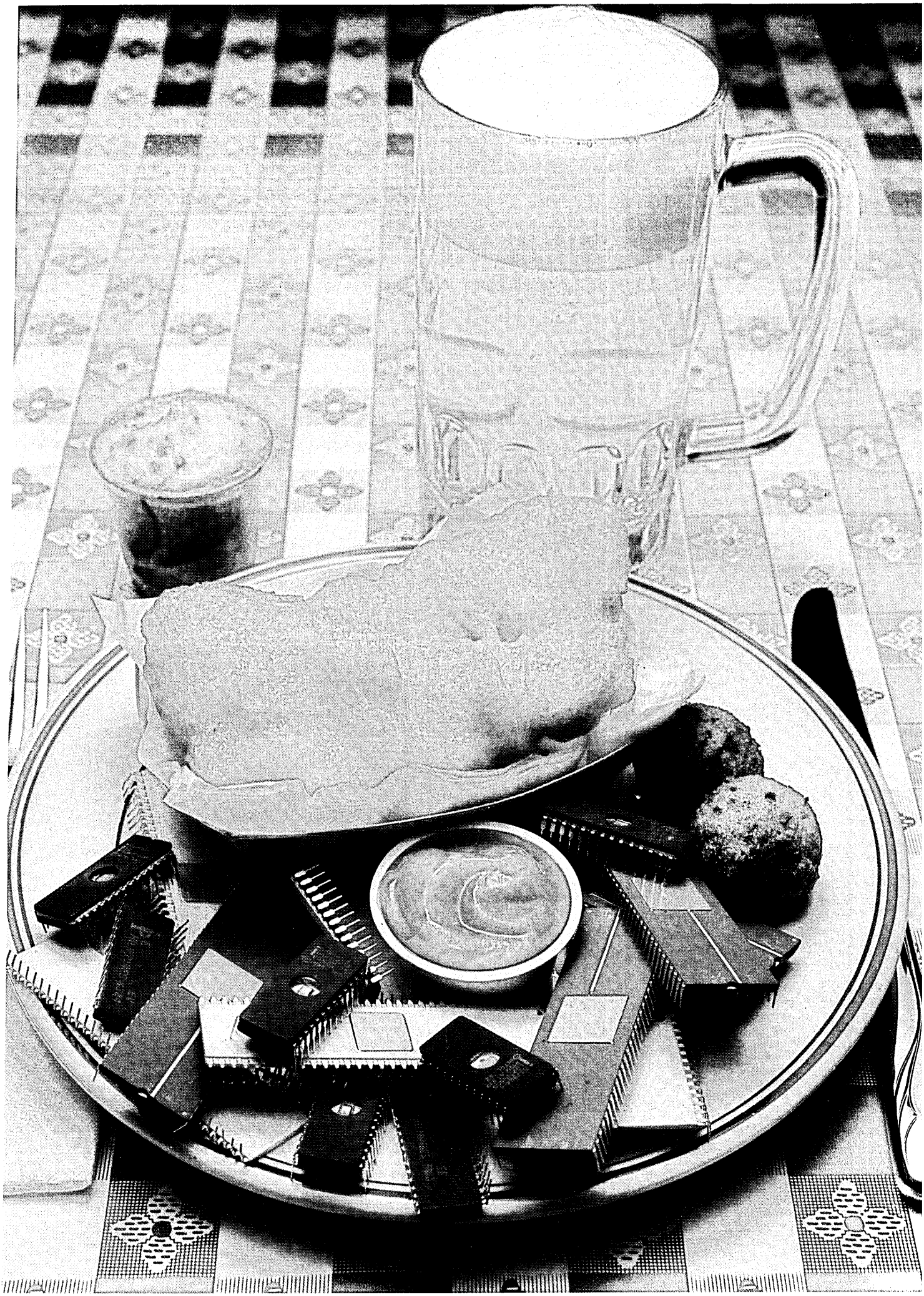
to make the operation profitable. Fishermen, not computers, catch fish, they pointed out.

Undaunted by the brouhaha, the Seabank project steams on. The first boat is scheduled to slide down the ways in October. In the pilothouse, among the radios, radar, and depth sounder, will sit a 16-bit microcomputer from Texas Instruments.

The system will link all the ship's electronics and operational sensors. Readings from the navigational aids, autopilot, depth sounder, engine and electrical system, as well as meteorological and oceanographic sensors, will be monitored, providing the captain, at several locations on the boat, with a comprehensive picture of how the vessel is functioning.

When the longlines holding thousands of baited hooks are set out and anchored in place, the exact location will be recorded on tape. The route of the boat will be entered as well as the number of

PHOTOGRAPH BY STEVE COOPER



fish caught per hook when the lines are hauled back on the sheltered deck.

After the catch is brought over the side and cut, washed, cooled, and sorted on deck, it will not be tossed into the hold as aboard traditional trawlers, but hand packed in boxes. Each box will be put on a scale, as a crew member pushes a button to indicate the species, allowing the system to record the weight and produce a label with all the necessary information about the contents.

Once the entire fleet is fully operational, by the end of next year, the company will periodically transmit all the boat's recorded information via satellite to its facility in Boston. This will allow Seabank to market its fish even before the captain calls it quits.

The captain and engineer will be fully apprised of the boat's speed, fuel usage, oil pressure, and all operational characteristics of the engine on the display terminals. The system will compare the engine's design specifications to the readings and, for example, if the temperature gets too high or the oil pressure too low, it will flash a warning on the screen and set off an alarm advising the operators to make necessary adjustments, and will automatically record the event.

While traditional indicator gauges and sensors also warn of malfunctions, the computer will react to subtle changes beyond prescribed parameters, possibly hours before the skipper would otherwise be aware of them. The ability of the ship's operators to make quick maintenance adjustments will save wear and tear on mechanical apparatus and dramatically reduce the vessel's downtime for repairs, Millar predicts.

Fishermen, not computers, catch fish, contend critics of the Brainard fishing venture.

In certain situations the system will be programmed to make adjustments on its own. If a generator became overloaded, for example, the program would turn off certain heaters until the electrical peak had passed.

As the captains become more comfortable with the vast potential of the program, they will be encouraged to key in their course and location. The electronic navigational aid called a loran would be monitored by the system, instructing the autopilot to steer the boat in the programmed pattern. This will be particularly useful in setting the longlines in any one of a multitude of configurations.

A database in another TI system at the Boston headquarters will store the information from each trip. The operating record of the main engines of the three vessels will be compared to determine fuel consumption patterns. If there are deviations from the norm, the captain of the boat in question will be advised to slow down or use some other power settings.

Most important, over a period of months and years the collected data will become a valuable tool for predicting where fishing will be best at particular times. Date, location, catch type and size, water temperature and currents, and weather conditions will all become part of the record, and the Seabank captains will eventually have an edge over other boats fishing on Georges Bank.

Millar, who majored in food processing at the University of Wisconsin and gained his computer savvy from on-the-job training at Hydrolab Corp., Austin, Texas, chose the particular hardware and software for these boats based on his experience designing systems for monitoring drinking water, waste treatment plant data, and many types of industrial process controls where reliability is critical. He selected the Texas Instruments TMS 9995 microcomputer with 512K of RAM as well as boards and modules manufactured by GW3 Inc., Springfield, Va.

One GW3 component is a 16-bit microprocessor board module with provisions for installing permanent resident ROM programs. It also has two RS232 serial I/O ports, for printers and terminals.

For this project three special boards will be included on the bus. A digital I/O board made by Millar Brainard's company has the capability of sending data to or retrieving it from a single line. It can also act as an on/off switch for the boat's operating components.

An anolog to digital (A/D) converter by Data Translation Inc., Marlboro, Mass., handles up to 32 analog data channels. This module contains a 32-channel multiplexor, sample and hold amplifier, and a 10-bit A/D converter for sampling parameters such as temperatures, pressures, and liquid levels. Shugart Corp., Sunnyvale, Calif., makes the 3½-inch disk drive, which accommodates a plastic-covered disk for program storage and can hold 320K.

The mulit-user, multitasking PDOS operating system created by Eyring Research Institute Inc., Provo, Utah, will be used. The OS was specifically designed for TI microprocessors and contains housekeeping, disk control, and tape control routines. Application programs will be written in both TI assembly language and PDOS-BASIC.

Millar chose PDOS for its memory efficiency and speed, he says. Assembly language will be used when greater speed is critical. Programs that could require immediate changes will be written in PDOS-BASIC. Once the program is debugged it may be burned into EPROM, eliminating the potentially troublesome disk drives. "We need to keep the program in a medium that we can easily change until everyone connected with the project has made up his or her mind," the designer explains.

The operating package can support up to eight terminals simultaneously and perform up to 16 separate tasks concurrently. In the pilothouse where the main computer will be located, a monitor will display all the engine information. A second screen will show fishing data. A terminal will be available to the captain for entering information or requesting a special display of information.

After a while, the collected data will become a valuable tool for predicting the best fishing.

A remote processor in the engine room will monitor the engine, generators, refrigeration equipment, bilge, fire alarms, and water temperatures; locating the cpu near the data sources reduces the wiring required. The equipment will be housed in sealed fiberglass enclosures for environment protection. During a five-year period, Millar has used the same components in a beach house within 100 feet of the ocean, and reports a trouble-free operation.

Despite the reliance on sophisticated electronics that has developed over the past 25 years, fishermen have not nibbled at the computer industry's bait. Preoccupied with declining fish stocks, increased competition, and fish prices at the dock that at times barely pay for the fuel, they have managed to keep this technology at arm's length.

One Maine cynic, who says he was in the fishing business long before the company president knew a bow from a stern, describes the industry's interloper as a hopeless romantic. "He sits in his easy chair at the window overlooking the [Boston] harbor and dreams about fishing," chortles the old-timer, who asked not to be identified.

"I am a dreamer," Snelling Brainard admits, but adds that "the independent boat owner/operator will be the industry's downfall. Each guy is working for the bank and can't afford to change." And change he must, contends Brainard, to successfully compete with foreign fleets.

"Computerization will not make any difference," contends Jim Salisbury, president of the Maine Fishermen's Cooperative Association, echoing the sentiments of his compatriots in the Northeast. "Much of the success [in fishing] is determined by the captains and crews. If Seabank gets good ones they will succeed. If they don't, computers simply

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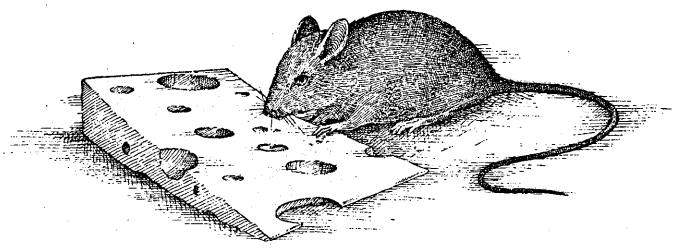

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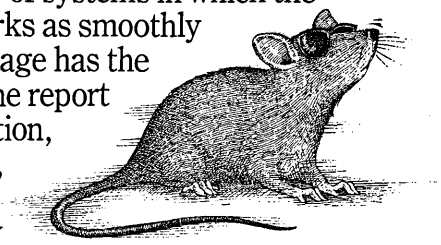

Of the big three in software, who's blind to integration and who's not? When you see how they run, you'll know the answer.

WHEN YOU THINK ABOUT TOMORROW, MILLENNIUM MAKES SENSE TODAY.

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will not help."

But Salisbury, like most fishermen, is more familiar with nets, winches, and fishery politics than the speed and efficiency of a disk drive. On the other hand, Ken Savastano, data manager for the Washington, D.C.-based National Marine Fisheries Service's SEAMAP program, predicts that computers will become as common as lorans aboard fishing vessels within the next decade.

Until now, systems for keeping track of the catches at different locations during certain times of the year were, for the most part, in the captain's head, Savastano points out. The quality of the information over the years varied, depending on the captain's memory. Now that the use of computers for commercial fishing has entered "the realm of possibilities," small operators should keep well informed, he warns, lest they be left out in the cold by the larger companies.

"The correlation of catch data and environmental parameters will lead to the best information as to where fish congregate," says Savastano. "The time will come when the National Marine Fishery Service will provide information to fishermen [via computer] on a real-time basis, similar to the weather service."

Although most fishermen may not be able to afford to go without some type of computer system in the near future, the undercapitalization of most operations inhibits change. A commercial boat is often a small mom-and-pop operation, limited in its ability to quickly adjust to the vagaries of fish population and a fickle marketplace. Declining stocks, stiff competition from Canada in the fresh fish market, and major increases in operating costs for fuel-guzzling draggers in recent years have cut deep into the independent boat owner's profits.

Still, most of these small businesses are today equipped with thousands of dollars' worth of electronics. Dreams of shorter trips, full holds, and bigger tax write-offs spurred these purchases when fishing was good.

When the U.S. declared a 200-mile limit in 1976, the harvesters of finfish, scallops, and shrimp began hanging black boxes above the helm like ornaments on a Christmas tree. With most of the foreign competition out of the picture, increased profits bought color displays for depth sounders as well as duplicates of every electronic fishing aid considered vital. It didn't pay to miss a day or two at sea because a loran was on the blink.

"Computerization will not make any difference. Much of the success in fishing is determined by the captains and crews."

Now that microcomputers are a generally recognized and affordable business tool, the fishing industry is enmeshed in a financial slump. The 200-mile limit bonanza was short-lived. Stocks were overfished. Too many boats were dragging their nets for too little haddock, cod, and redfish.

Despite hard times for U.S. fishermen and fish processors—the New England industry is estimated to be operating at less than half its capacity—Snelling Brainard is confident his boats will pay their way. He contends that higher priced, quality seafood and greater operational efficiency is the answer to the industry's doldrums. In addition to computerization, new business practices, unknown to the men who go to the sea to earn their livelihood, will help achieve these goals.

Captains and crews will be trained by Norwegians. Eventually, four complete crews will rotate on the three boats, allowing regularly scheduled time off—a luxury few fishermen enjoy today. Financial incentives will be offered to captains and crews to encourage good work habits and productivity.

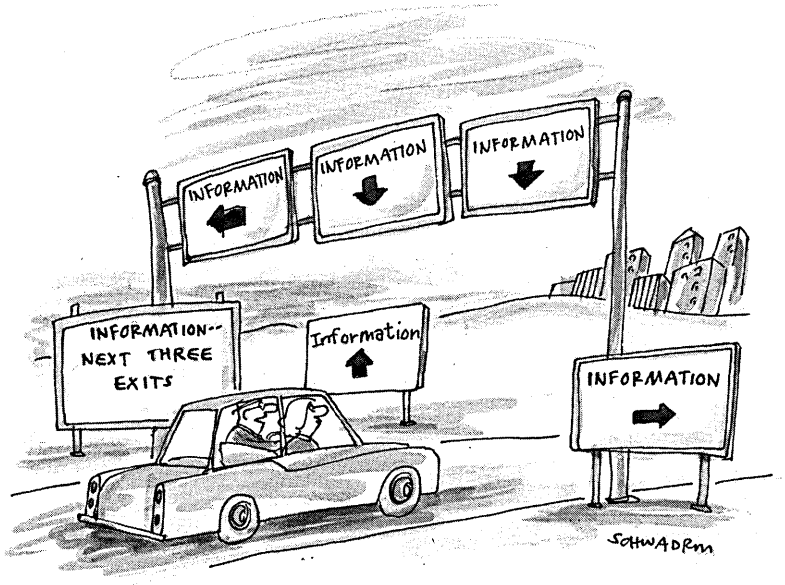
Catching fish on individual hooks and boxing the catch will lead to less damage, a longer product shelf life, and a greater demand for fresh seafood, insist company spokesmen. Computers, they say, will eliminate much of the captain's time-consuming guesswork.

If one Seabank vessel finds a highly productive fishing area, for example, the fleet operator will know about it as the first lines are hauled aboard, allowing him to alert the other company boats. The manager would not have to rely on one captain voluntarily sharing his information with colleagues, a scenario rarely acted out by tight-lipped fishermen.

Today, radio frequencies at sea are usually filled with the idle chatter of fishermen bemoaning half-empty nets and the paucity of profitable species. Seabank officials say their captains will be too busy locating fish to have time to gab on the open airwaves. And when they have something important to communicate it will be more appropriate to use computer transmission to protect proprietary information.

Future plans for this computerized operation may include attaching instruments to buoys at various locations on Georges Bank to collect data on currents and water temperature. Seabank boats traveling in the vicinity of any of these transmitters would periodically pick up and store this information. Since fish migration is influenced by these factors, the transmissions would be a valuable addition to the company's database.

While Seabank officials have no illusions about computers doing the work of fishermen, they have no doubts that the men in yellow slickers will soon be wondering how they managed before the computer age. "If the system contributes only a 2% or 3% increase in catch it will soon pay for every dollar of the hardware and software," says the company president. Millar Brainard is confident his custom designed components and programs will do much more. ◉



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Jon Laitin is a free-lance writer specializing in business reporting. He writes on a TRS-80 Model III at his log cabin in rural Thorndike, Maine.

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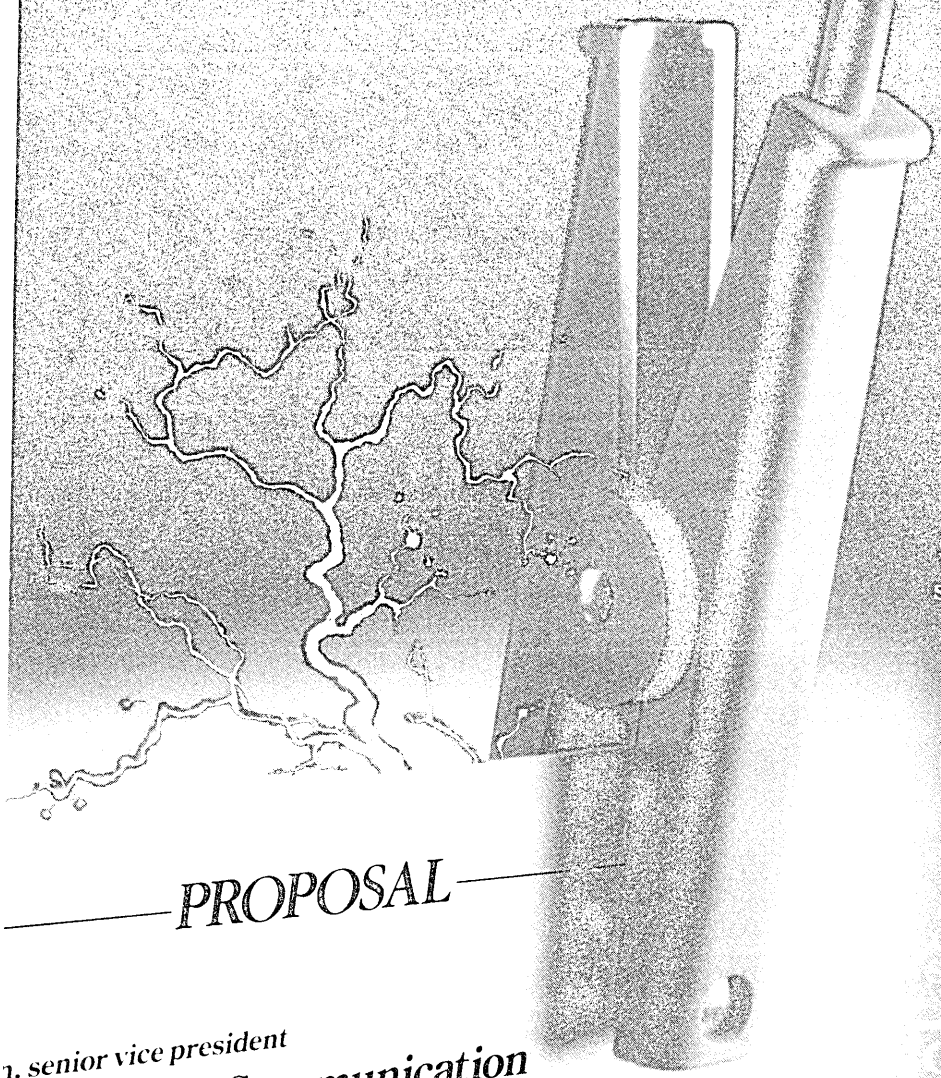

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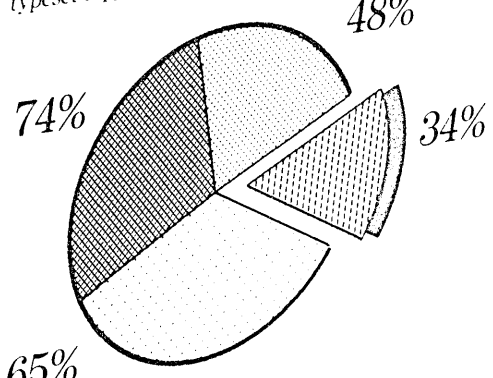

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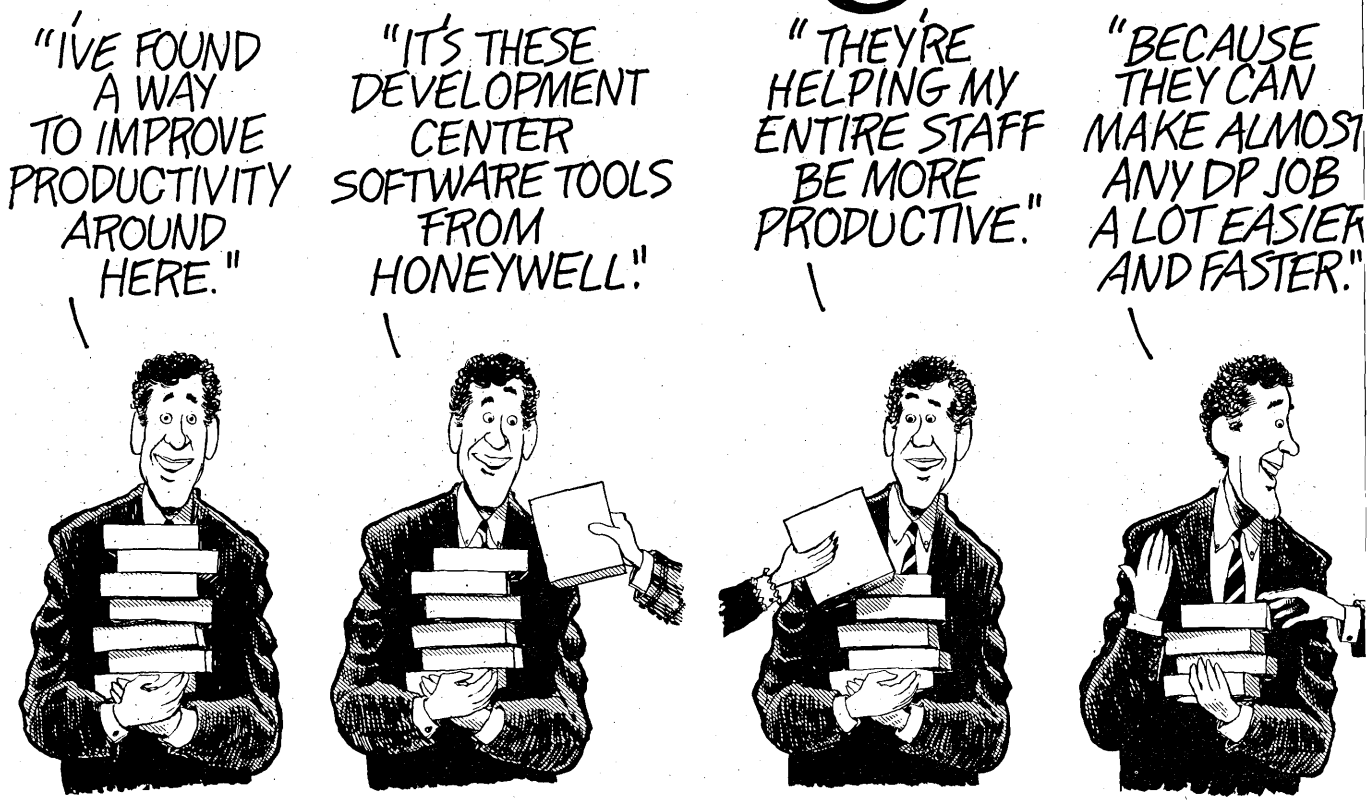

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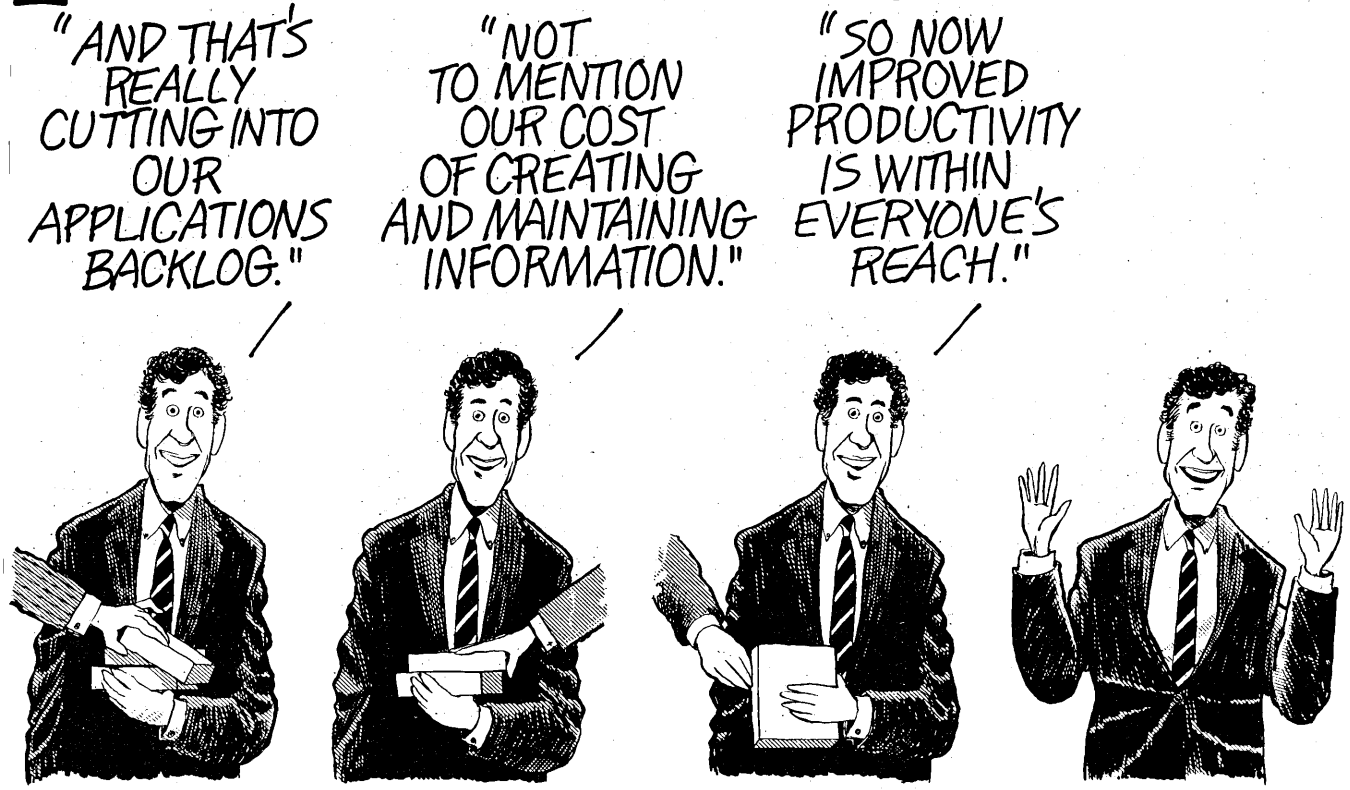

tenance of COBOL applications. Specialized tools like the Personal Computing Facility and Personal Data Query provide new development methods that allow novice programmers to do some tasks that usually require the attention of senior programmers.

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NEWS IN PERSPECTIVE

MICROCOMPUTERS

AT&T's UNIX DILEMMA

Can the telecom giant peddle its own hardware and still sell Unix as a "standard" operating system?

by R. Emmett Carlyle

"Are you hooking us now with an open Unix systems policy only to skin us later with a closed policy?" The question has dogged AT&T all year as it has shifted its promotional campaign for the operating system into high gear. Since January, the campaign has cost $50 million in advertising alone, according to sources. The answer, says Jack Scanlon, AT&T's traveling mouthpiece and president of its Computer Systems Division, is "no"—but no one seems convinced.

"The trouble is, AT&T is equally determined to be *the* hardware supplier of Unix engines in open competition with the rest of the industry" and to sell Unix by itself, says AT&T watcher Omri Serlin, head of ITOM International Co., a research and consulting firm in Los Altos, Calif. "The two just don't mix."

The problem is that most of AT&T's Unix development efforts are enshrouded within its research labs, and are moving forward for the first time on the basis of marketing instead of technical considerations. Unlike other vendors, IBM included, that have begun to provide Unix solutions on "generic" processors, such as the Motorola 68000 and Intel 8086/88 families, AT&T insists on building Unix hosts from its own proprietary chips, the Bellmac-32 micro and 256K RAM memory device. The outside community has likewise been unable to participate in setting the direction for the Unix System V software "standard." AT&T insists on developing the operating system entirely internally, where the only hardware that matters is the 3B series.

Serlin, for one, thinks this strategy could backfire on AT&T. "It was a blunder forced by internal politics and a desperate need for early revenue following its reorganization, and not by the coming confrontation with IBM and DEC," he says.

Observers note that AT&T's high-level decision makers are oriented more toward manufacturing considerations than marketing and customer support. Serlin refers to them as the old guard. He says their power is now manifested through the new Computer Systems Division, which includes the plum Bell Laboratories and the Western Electric factories. CSD makes and markets the 3B line of computers and Unix.

The competing Information Systems Group—also a part of AT&T Technologies, but formed primarily from the service and support organizations of the Bell operating companies—originally hoped to have its own design and manufacturing facilities, it is believed, but has been reduced into a marketing and support group with no product development resources. As it stands now, ISG will market the products that come out of AT&T's agreements with Olivetti and Convergent Technologies, Santa Clara, Calif. In addition, ISG will also market—in direct competition with its sister division—the 3B line and Unix. ISG clearly ended up with the leftovers following the reorganization, Serlin says.

Sources claim that ISG has a "very low opinion of the 3B series," but that by the same token the group is so grossly overstaffed compared to the volume of revenue it produces "that it is fighting to justify its existence, and must sell at all costs to generate more revenue per employee."

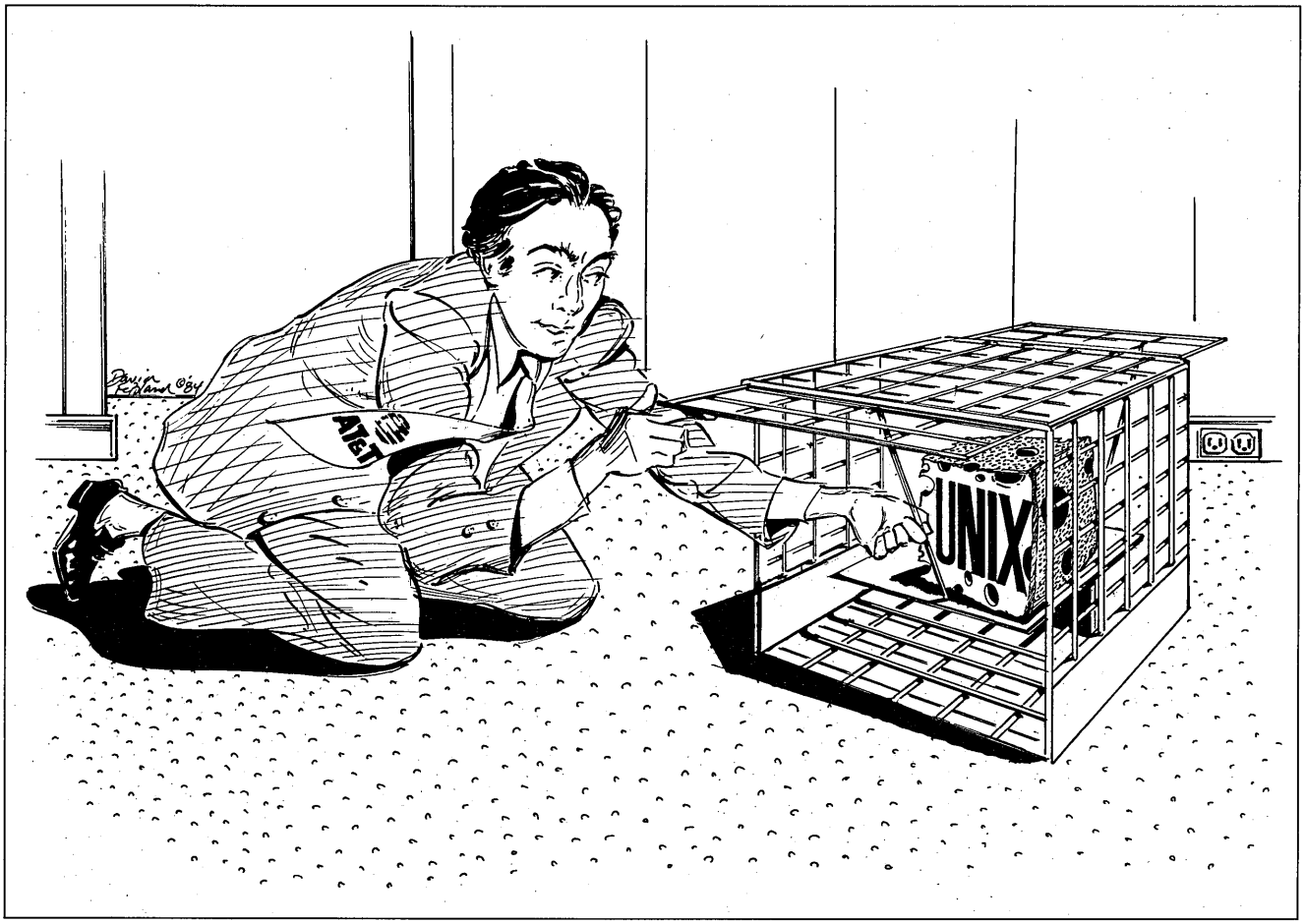
The Computer Systems Division is in favor of using only internally developed products, and has won the right to market those products. In contrast, ISG pins its hopes more on the products from outsiders than on CSD products to alleviate its revenue problems.

Reportedly, the revenue per employee at ISG is $39,000, compared with close to $200,000 per employee at IBM. The comparison is invidious, as one AT&T insider points out, because the bulk of ISG's 60,000 employees are employed in its service division, not in marketing. At IBM there is a more even balance between marketing and services.

A more enlightening comparison can be made between the powerful manufacturing arms of AT&T and IBM, according to Kenneth Bosomworth, president of market research firm International Resource Development, Norwalk, Conn. While the old guard may be the victor within AT&T, he says, it wins no prizes against IBM because it's "geared to unrealistic product life cycles."

"Typically, IBM requires 12 to 18 months from conception of a product to manufacturing. Just as typically, their products are aimed at a three-year market window, and are produced at marketing costs 15% to 20% below their competition," he says.

IRD's research shows that AT&T's Computer Systems Division requires three to five years time to market for a



product life cycle extending eight to 10 years (with 20 years not uncommon in some cases). "Manufacturing costs are about the same as 10 years ago, but with one vital difference," Bosomworth adds. "Formerly they didn't include warranty, product support, and marketing costs, which were all borne by the Bell operating companies. Today, those costs are borne by AT&T." The company, for example, brought its System/85 PBX to market expecting to amortize the product quickly in a three-year market window, and without profit, he says.

AT&T insists on developing Unix entirely internally, where the only hardware that matters is the 3B series.

"These fundamental problems don't necessarily doom them," Bosomworth suggests. "They don't have to manufacture everything they sell. They can go offshore, for example, as they've done with the ESS 1 switch that's made in Korea."

By the same token, the CSD problems don't have to strangle ISG. Its marketing and service weight can be brought to bear on timely products through other manufacturers and assemblers, Bosomworth says of the hastily arranged deals with Convergent Technologies early this year and Olivetti a year ago.

Despite the trauma that has resulted from its "house divided" status, there can be little doubt of AT&T's commitment to its Unix program if Scanlon's feverish zeal is any indication. Scanlon was in top form at NCC in Las Vegas, in his accustomed evangelical role of spreading the gospel that Unix is good for what ails you. He preached that AT&T is determined to promote Unix as an open standard reaching, as he says, from "the lap to the mainframe."

But will that commitment hold up if the 3B's unremarkable technology begins to fail, and AT&T's "mild" financial performance continues? "The 3B series has already created more problems for AT&T than it has solved," says Dale Kutnick, research director at the Boston-based Yankee Group. It has alienated IBM and the other hardware vendors, whose perception of the new AT&T is based on its role as hardware competitor and not as the benevolent creator of a generic software standard.

"Elsewhere in the industry," he continues, "there will be oem and value-added resellers who don't care who controls the Unix operating system, just so long as there is a market for their value-added solution. "But," he adds ominously, "those that do care about being locked into AT&T will resist writing to Unix System V, and will look instead for a consistent hardware interface to which their applications can be written."

He feels that many will prefer to plug their applications directly into generic processors such as the Motorola 68000 or Intel 80286 rather than into Unix System V software. Instead of taking AT&T on trust, these oems will adopt the new Concurrent PC/DOS operating system from Digital Research Inc. of Pacific Grove, Calif. Kutnick and a growing chorus of others point out that the Digital Research software gets around the existing incompatibilities between these generic processors by running on any pc built from them.

AT&T introduced its System/85 PBX expecting to amortize it in a three-year market window, and without profit.

Serlin is convinced that AT&T should pull out of the hardware business and adopt an approach similar to that of Digital Research, offering nothing but standard software to the industry. "It's

the surest road to success, and offers them the best profit margins," he adds. Not every AT&T watcher shares that view, but those who do so say it is not too late for AT&T to pull out of the hardware business; others, like IRD more harshly disposed, predict only "modest success" for Unix whether AT&T stays in the hardware game or not.

Scanlon, for one, refuses to get drawn into such speculation. "Our goal remains ever the same," he says, "and will be achieved when the bulk of the software developers change their focus from writing for a particular box (like, for example, the IBM PC) to a standard, portable operating system: Unix System V."

Despite the dangers of prediction, Scanlon claimed in Las Vegas that "Unix System V will be apparent to all during 1986." He added lightheartedly that should his words come back to haunt him we should remember that Vegas is "the kingdom of folly."

If, as one IRD wag put it, "AT&T wishes to reach out and crush someone," it will have to step up its campaign to convince IBM and its end users that its Unix System V is indeed as "open" as the telecom giant suggests.

If it fails to do that, Unix may be remembered as little more than a fad or a footnote in history. ◉

SHAKING ALL OVER

The personal computer industry is watching a Darwinian process of survival of the fattest.

by Edith Myers

It goes by many names.

It encompasses layoffs, flat or falling earnings, and filings for Chapter 11, all among microcomputer-related businesses.

What has been called a shakeup or a shakeout or a crunch by some is seen by others as a sign of health and vitality, a marketing opportunity, and good for the consumer. Is the bottle half full or half empty? The answer depends on the mindset of the beholder.

There are even some "I told you so's."

"We made a conscious decision 20 months ago not to make a personal computer," president and chairman Richard Cortese, of Alpha Micro, Irvine, Calif., said during the NCC. "When everyone said we should, I knew we shouldn't. I could have told you then that only a few people could survive."

Cortese apparently made the right decision, for under the aggressive pricing pressure of IBM and an apparent slackening of demand, the personal computer marketplace is shedding some marginal players. While some large companies continue to thrive, only those able to raise large amounts of capital or discover protected niche markets can survive for the long term.

Actually, one product Alpha Micro showed at the NCC, the AM-500 workstation, could technically be called a personal computer, since it supports MS/DOS in addition to providing multiuser terminal emulation, but Alpha Micro won't sell it as one. "We're selling multi-user systems," emphasized Cortese, who said he believes there is indeed a shakeout going on and that the ultimate survivors will be IBM and AT&T.

He plans to capitalize on that too. Alpha Micro's newest multi-user systems support Unix System V and he is eyeing the two giants as potential customers for a video broadcast software delivery technology his company has developed.

Alpha Micro has decided on a niche for its micro, a move which industry observers call a necessity for survival among so-called second-tier firms. For the most part these niches will be industry-specific.

Many give IBM and AT&T some of the credit for whatever it is that is going on in the small computer business. Some retailers are speculating that a slowdown in orders has come about because large corporate purchasers are putting off buying, waiting to see what's coming from the two giants. Others are blaming IBM's recent PC price cuts.

"When Big Blue starts cutting prices you have to be big and well-heeled to keep up," Larry Sarisky, vice president of marketing at SyQuest Technology, said at NCC. Sarisky said he believes the industry is in the middle of a shakeout but he didn't fear for his firm's removable half-height 5¼-inch and sub-5¼-inch removable Winchester disk cartridge drives. "Whoever survives will need them."

Overly optimistic forecasts by IBM made late last year for its personal computer line also are blamed for what's happening. The forecasts, say analysts, prompted many firms to increase their own sales forecasts and production plans.

IBM's overoptimism has had a more direct effect on some companies. Applied Magnetics, Santa Barbara, said in late May it expected sales of disk drive components to two key customers to drop by $3 million from earlier projections. Partial responsibility for the drop is a reduction in orders from disk drive producers Tandon Corp. and Seagate Technology, which, in turn, supply IBM.

Apple Corp.'s chairman, Steve Jobs, has given IBM credit for making his a better company by giving it a run for its money. Be that as it may, Apple's net income in the third quarter ending June 29 fell 24% to $18.3 million compared with $24.2 million a year earlier.

Apple has been spending heavily to promote Macintosh in what many have called a "bet the company" effort. Mac has so far been selling well and was probably the biggest vendor attraction at NCC.

Raising capital is key to staying in the marketing-intensive personal computer marketplace.

Apple displayed the machine along with several dozen new software packages written to take advantage of the machine's alluring graphics.

Apple appears to feel it has survived a shakeout and what is yet to come will happen among IBM-compatible pc makers. One of these, Eagle Computer Inc., is certainly on the ropes. In midsummer, the Los Gatos, Calif., firm had reduced its work force by 60% to 140 and was trying to come to terms with unsecured creditors. Eagle's problems started in mid-March, when it was sued by IBM over allegations of copyright infringement. That led to a federal judge ordering Eagle to stop marketing one computer line.

Another San Francisco area firm, Mindset, which makes an IBM-compatible pc dedicated to graphics, has put a hold on accepting components for its new pc, citing a "softness" in the market for IBM compatibles as the reason.

Along with Eagle, companies that have laid off employees during the first half of '84 include Gavilan Computer Corp., Campbell, Calif.; Fortune Systems, Redwood City, Calif.; MicroPro International, San Rafael, Calif.; Corvus Systems, Los Gatos, Calif.; Kaypro Corp., Solana Beach, Calif.; VisiCorp, San Jose; and Software Arts, Wellesley, Mass. The last two firms are involved in litigation over agreements concerning VisiCalc, the spreadsheet software developed by Software Arts and brought to market by VisiCorp., and for which sales have been drying up of late.

The biggest victims are those firms that have been forced into Chapter 11 during the past year, companies like Osborne, Victor Technologies, and Franklin Computer. Pennsauken, N.J.-based Franklin was the most recent to fall, having filed for protection from creditors last June 21. The company cited a shortage of some parts and a $2.5 million settlement

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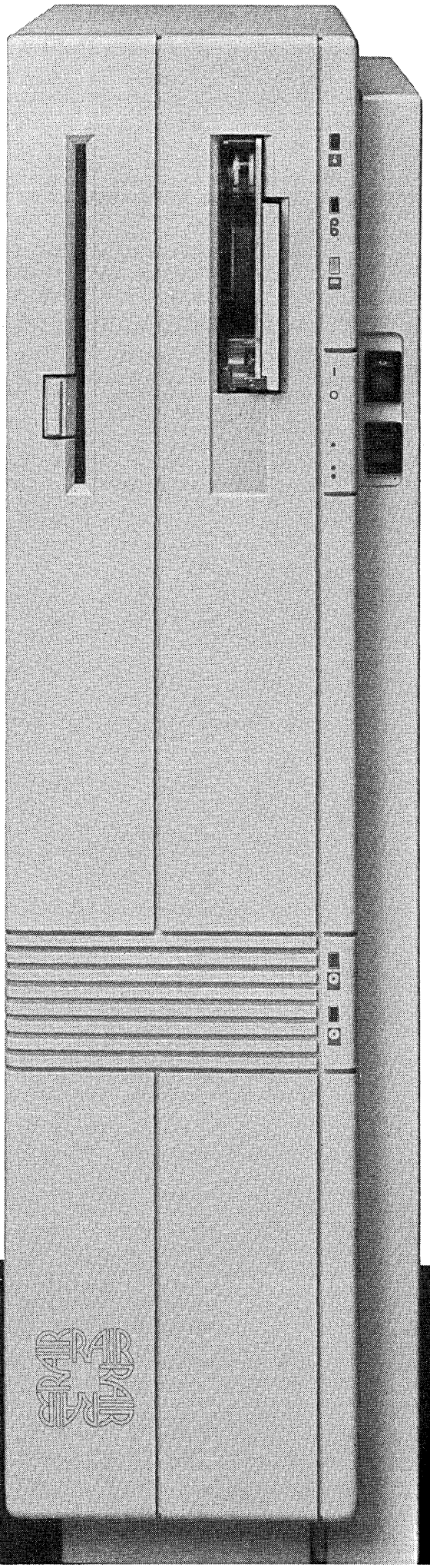

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reached with Apple to end a copyright infringement suit as reasons for seeking court protection. Franklin's computers are largely Apple compatible.

All is not totally black, however. Convergent Technologies, Santa Clara, Calif., which suspended production on its briefcase-sized Workslate computer in early July, reached an agreement in principle in the latter part of that month with Bank of America, Citibank, and Chase Manhattan for a $100 million, multiyear credit line.

Obtaining capital is a big concern among personal computer companies in these times, whatever they are called. Venture capitalists caught with risky companies in their portfolio are concentrating on helping them rather than looking for startups. "Venture capitalists won't even talk to you any more if you only want $1 million," said Cortese of Alpha Micro. "They think you don't know what you're getting into. You have to ask for at least $3 million and even then they'll think very hard."

Eric Kadison, vice president of product planning and development for Media Systems Technology Inc., Irvine, Calif., believes the shakeout on the software side will have an end result that will benefit consumers. Kadison told a software conference in San Diego in July that the industry is moving "from being totally disorganized to being a structured business hierarchy."

From the standpoint of U.S. business, said Kadison, "both personal computers and software are still quite young, but they are maturing at a phenomenal rate." He noted that smaller software firms are starting to have significant financial problems, while multinational companies like IBM and AT&T have made major commitments to software publishing.

"There will always be a place for smaller firms that continue to be creative and skillful in the development phase, but they will more than likely be affiliated with a large publishing house for marketing, sales, and distribution."

He believes this will lead to a wider selection of better developed, more meaningful software programs for the consumer.

David Russell, president of Raging Bear Productions, Corte Madera, Calif., which is planning its second annual National Software Show, to be held in Anaheim Sept. 5-7, believes "this so-called shakeout could be a marketing opportunity for savvy companies." He said the current market climate will force companies to focus on products that truly meet customer needs instead of going off on obscure development tangents.

International Data Corp. last January predicted a shakeout in personal computers this year but said it is "by no means a sign of trouble. On the contrary, it is a sign of tremendous health, vitality and growth in the industry and of the extraordinarily high degree of technological innovation finding its way into products."

Creative Strategies International, San Jose, Calif., predicts the market for microcomputers will continue "to grow at a lightning pace during the next few years." The research firm reported that 1983 shipments were 130% up from '82. CSI sees IBM controlling 50% of the market within two years and that "fewer companies will compete head-to-head with IBM in the future. Instead, many small companies will be concentrating on specific product niches within the marketplace."

Was the shakeout, or whatever it might be called, reflected at NCC? Only in the absence of some of the sufferers. Yet some of these—notably Gavilan, Fortune, and Kaypro—were there with every evidence of business as usual and full steam ahead.

Attendance at NCC was down from past shows and from the AFIPS prediction of 80,000 for this year. But this was generally attributed to 110° Las Vegas temperatures, scheduling during a traditional vacation period, and lack of plane seats.

Vendors and attendees seemed to like this. "I haven't seen anything new but it's sure easier to get around and see what is here," said one veteran NCC goer.

A post-NCC issue of *California Technology Stock Letter*, put out by Venture Capital Management Inc., San Francisco, said: "There seems to be a slower rate of growth (*not* a downturn) all across the industry as people catch their breath." ◉

ARTIFICIAL INTELLIGENCE

AI TOOLS ARRIVE IN FORCE

A growing variety of products are available to build artificially "intelligent" systems.

by John W. Verity

If there were ever any doubts about the viability of a market for so-called artificial intelligence technology, they were dispelled last month at the expansive campus of the University of Texas at Austin. It was there that AI may finally have come of age as a commercial reality.

"I think the pendulum has swung decisively," one AI veteran said as he surveyed the small but packed trade exhibit area at the annual convention of the American Association of Artificial Intelligence. "This has finally become a full-fledged trade show." He referred to the predominance of marketing people in three-piece suits and of serious-faced users who crowded around dozens of bit-mapped screens and talked business. Previous AAAI conventions, he noted, had been populated more by long-haired hackers attending arcane technical sessions.

The commercialization of AI has been accelerating for several years, but the entry last month of such giants as IBM, Texas Instruments, and Digital Equipment called attention to a market that is expected to grow from only $100 million this year to as much as $2.5 billion by 1990, according to industry observers. "There's no real way to predict how big this market will get," commented Chuck Piper, AI product marketing manager at Data General. "But it's clear that it's growing very fast."

Several trends fueling that growth were evident at the AAAI show. Besides the entry of established computer companies, attendees saw the introduction of many sophisticated AI software tools, the emergence of microprocessor-based AI systems, the establishment of a government-backed Lisp standard, and the joining of forces between hardware and software companies trying to assure users of their viability and universality.

IBM's exhibit came as a surprise to some but was viewed with pleasure by most marketers of AI goods. The company has introduced only a single AI product—a version of the Lisp language that sells for $6,500 and runs under the VM operating system—but it has certainly signaled its intentions to be a major player, according to observers. Its exhibit at the show also portrayed several projects that it designates as experimental, but which observers expect will eventually make it to market in commercialized form. Of these experiments, perhaps the most significant to mainstream dp users is YES/MVS, a real-time expert system designed to help operators of large-scale MVS computer systems.

Developed at Yorktown Heights, N.Y., where the firm's research division is headquartered, YES/MVS is designed to handle the many messages that occur in scheduling jobs, reallocating system resources, and avoiding bottlenecks in MVS machines. The program doesn't replace the human MVS operator, IBM researchers at the show emphasized, but it can assist the operator in handling many more tasks

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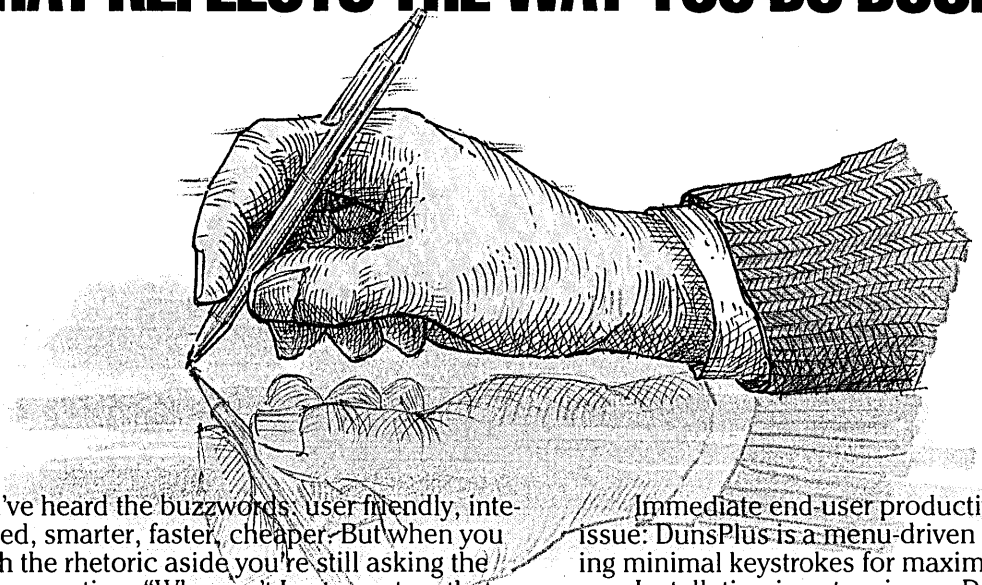

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per hour than would be possible manually. The software is written in the OPS5 language, an expert system building tool developed at Carnegie-Mellon University that is now marketed by several companies, including DEC. YES/MVS has been in use for about a month.

IBM also showed Prism, an experimental expert system "shell" designed to help users build their own systems; Scratchpad II, an interactive algebra tool said to use AI techniques; a mainframe version of Prolog, the logic programming language, developed at IBM's Paris Scientific Center; and Handy, a PC-based graphical interface the company thinks may make future AI programming easier. Handy's rather crude graphics and windowing capabilities paled in comparison with some other AI firms' bit-mapped systems, but the company was clearly trying to ensure a place on the future shopping lists of AI buyers.

TI is building a single-user Lisp machine to be introduced late this year.

A company spokesman said IBM is currently using Lisp/VM at 40 sites throughout the corporation and is actively hiring AI workers. A company source indicated, however, that the industry leader is not above buying independently produced Lisp computers for its research needs.

IBM has been criticized in the past few years for not taking up the AI flag very strongly, particularly in the face of Japan's much-publicized fifth generation project. Edward Feigenbaum, a Stanford University professor whose writings on the Japanese project have stirred much of that criticism, nonetheless commented at the show that he was "delighted" to see IBM there.

"The incoming tide floats all boats and IBM is the biggest boat," Feigenbaum said. "I think it's wonderful to see them here."

Other exhibitors spoke of IBM's entry into the AI market as "legitimizing" their efforts, but they generally scoffed at the company's offerings as "immature" and even "ancient." They were particularly critical of the IBM Lisp package, which they claimed offered few of the interactive programming tools available from such vendors of Lisp computers as Symbolics Inc., Xerox Corp., and Lisp Machine Inc. IBM's response was that its package can support many users on a single mainframe and will therefore appeal to those wanting to try their hand at Lisp without investing $100,000 or more per AI worker on a single-user workstation.

The price of Lisp programming is dropping quickly now as the language shows up on microprocessor-based machines, both standard models such as the IBM PC and specialized machines developed expressly for AI work.

Gold Hill Computers Inc. of Cambridge, Mass., showed a $495 version of CommonLisp—a form of Lisp called forth by the U.S. Department of Defense and backed by several companies—for the IBM PC. The company hopes its software will appeal to budget-minded AI workers—universities wishing to teach the language, for instance—and to those needing low-cost Lisp computers as front ends to higher-priced machines. Indeed, Gold Hill Computers, backed with an undisclosed amount of venture capital, is involved in a joint project with Symbolics, also of Cambridge, to develop "knowledge-based" financial systems for Shearson/Lehman American Express, the investment banking concern. Gold Hill also claims to be close to signing a deal

Knowledge engineering tools were introduced for everything from micros to mainframes.

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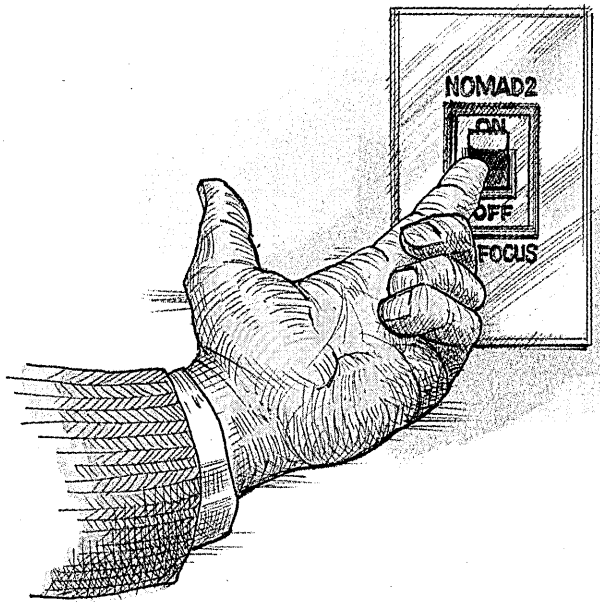

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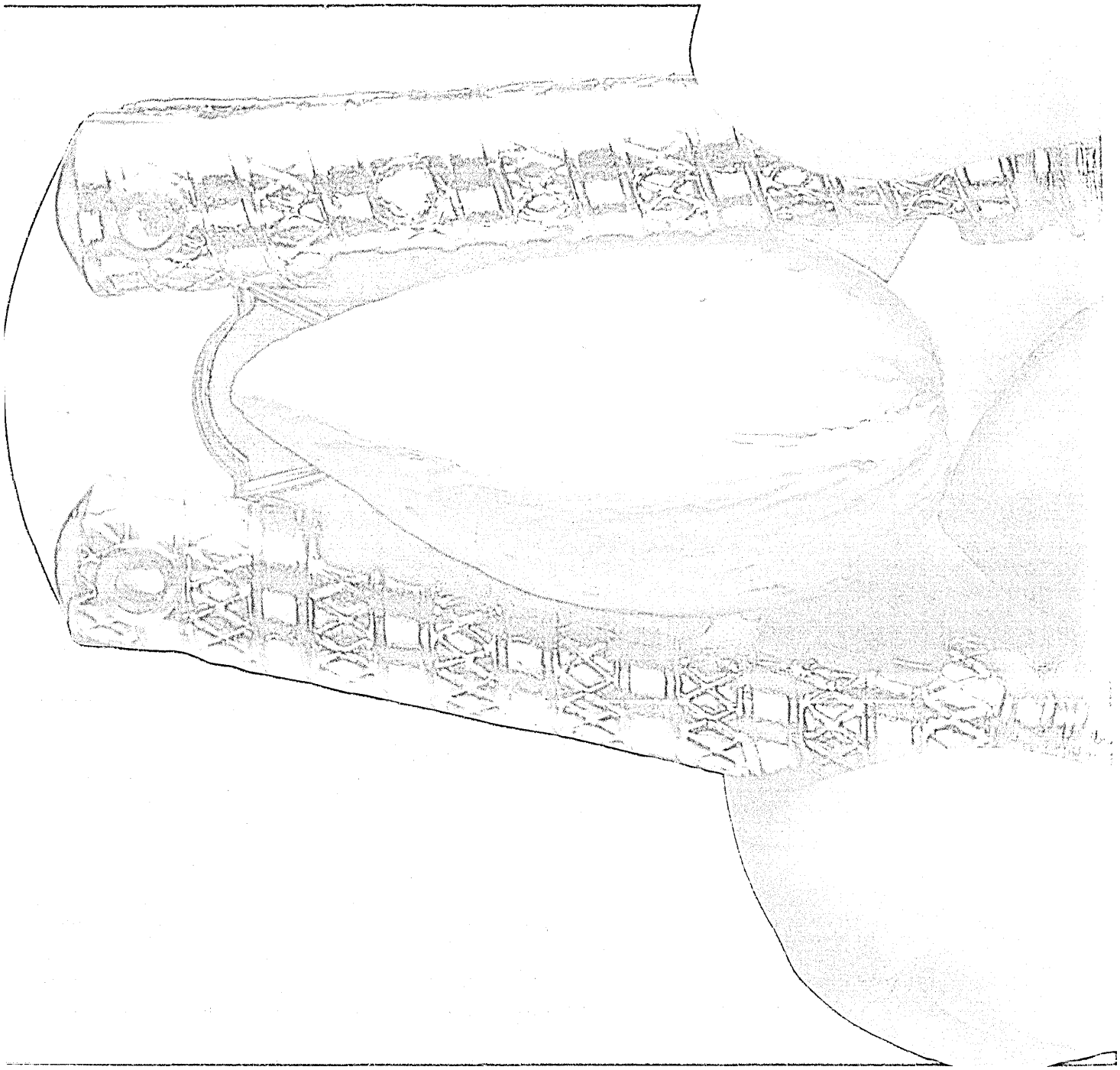

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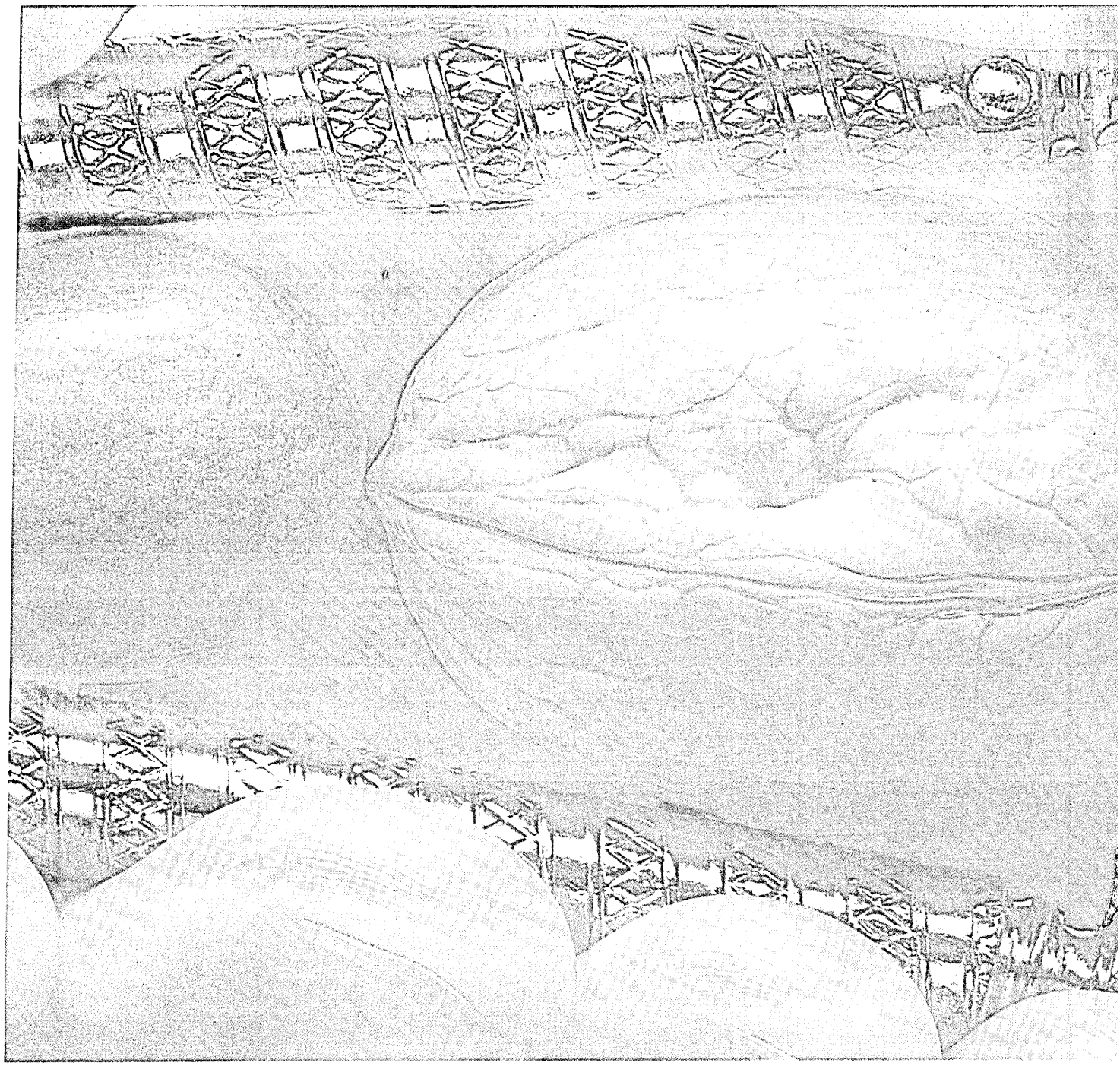

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with Wang Labs to supply that company with Lisp software to enhance Wang's office systems. Gold Hill also is supplying its Lisp package to run on the DEC Rainbow personal computer.

Texas Instruments, making its first showing at AAAI, displayed several software packages for its Professional pc, including a package called Personal Consultant, which it claims helps users build small, Lisp-based expert systems.

The company's big commitment to AI was most evident behind closed doors at a local hotel, however, where the firm privately showed a single-user Lisp computer that will be introduced formally later this year. The Chapparal machine is based largely on a design employed by Lisp Machine Inc. of Los Angeles, in which TI has an 8% equity. The TI Lisp computer will offer 2MB of real memory and a 100MB disk drive, and will run a rewritten version of LMI's ZetaLisp programming environment, according to informed sources. It is said to be built with gate array technology.

Meanwhile, TI boasted of having won a $6 million Navy contract to develop a compact Lisp computer for use in future "smart" weapons systems. The embedded computer is being developed at TI's Central Research Lab in Dallas with funding from the Defense Advanced Research Projects Agency and it is expected to be key to DARPA's Strategic Computing Initiative program (see "DARPA's Big Push in AI," February, p. 48.)

Meanwhile, Tektronix, the Beaverton, Ore., instruments and terminals maker, made a determined entry into the field with the model 4404 AI workstation. Based on the Motorola 68010 microprocessor, the desktop machine is designed specifically to run Smalltalk, Lisp, and Prolog, three popular AI-oriented lan-

Joint marketing deals abound as AI tool suppliers jockey for position.

guages. The machine is set for January availability at $14,950 with a 1MB main memory and a 20MB hard disk drive. Tektronix says it has been exploring AI for four years as a means of enhancing its traditional products, which include oscilloscopes and logic analyzers, but last year decided to enter the AI tools market head-on with the 4404 as a means of tapping into the rapid growth it foresaw in the AI market.

The firm's choice of Smalltalk, a Xerox-developed language that is described as "object oriented," was made to help system designers build highly interactive graphical interfaces for various systems, according to David C. Squire, program manager for Tek's AI Machines unit. "Smalltalk is really what we're bringing to market as unique. That and the price," he said.

Also entering the Lisp/AI market for the first time is Apollo Computer Inc. of Chelmsford, Mass., which has brought out a version of Portable Standard Lisp for its Domain series of scientific processors. The software is said to share a code generator with the Domain's other languages, which will make it easier for designers to integrate Lisp programs with those written in C and FORTRAN, according to a company spokesman. "We want to be used by people in real-world problems," he said, referring to the company's strength in CAD/CAM. Apollo does not expect to compete with the makers of high-performance Lisp computers such as Symbolics and LMI, he emphasized. Apollo's Lisp is priced at $1,850 a copy.

While new Lisp implementations abounded, much attention was given at the show to more sophisticated tools designed to help users with so-called knowledge engineering. That is the job—some say it is more an art than a science—of spoon-feeding computers information about a narrow domain in such a way that it can be processed and manipulated by inference algorithms. Somewhat analogous to database management systems, these knowledge base tools still require a substantial understanding of AI techniques to master but are claimed to lower the barrier to successful use of AI techniques.

Such tools have been introduced for a variety of machines, ranging from the IBM PC to high-performance Lisp computers. They vary in price from $2,000 to $70,000 according to their maximum capacity for "knowledge" and the means by which they store and structure that knowledge. Consequently, different tools are expected to be useful for different types of AI applications. While some vendors claim their expert systems building tools are widely adaptable, incorporating several AI techniques in a single system, others have aimed their tools at narrow types of problems.

Teknowledge Inc. of Palo Alto, Calif., for instance, says its S.1 product is useful for what it calls "structured selection" systems where one of a finite set of solutions is to be derived from a knowledge base. A typical application would be selecting from a catalog of equipment or choosing one of many diagnoses while trouble-shooting a complex piece of equipment. Priced at $51,000, which includes two weeks of training for two persons, S.1 currently runs on the Xerox

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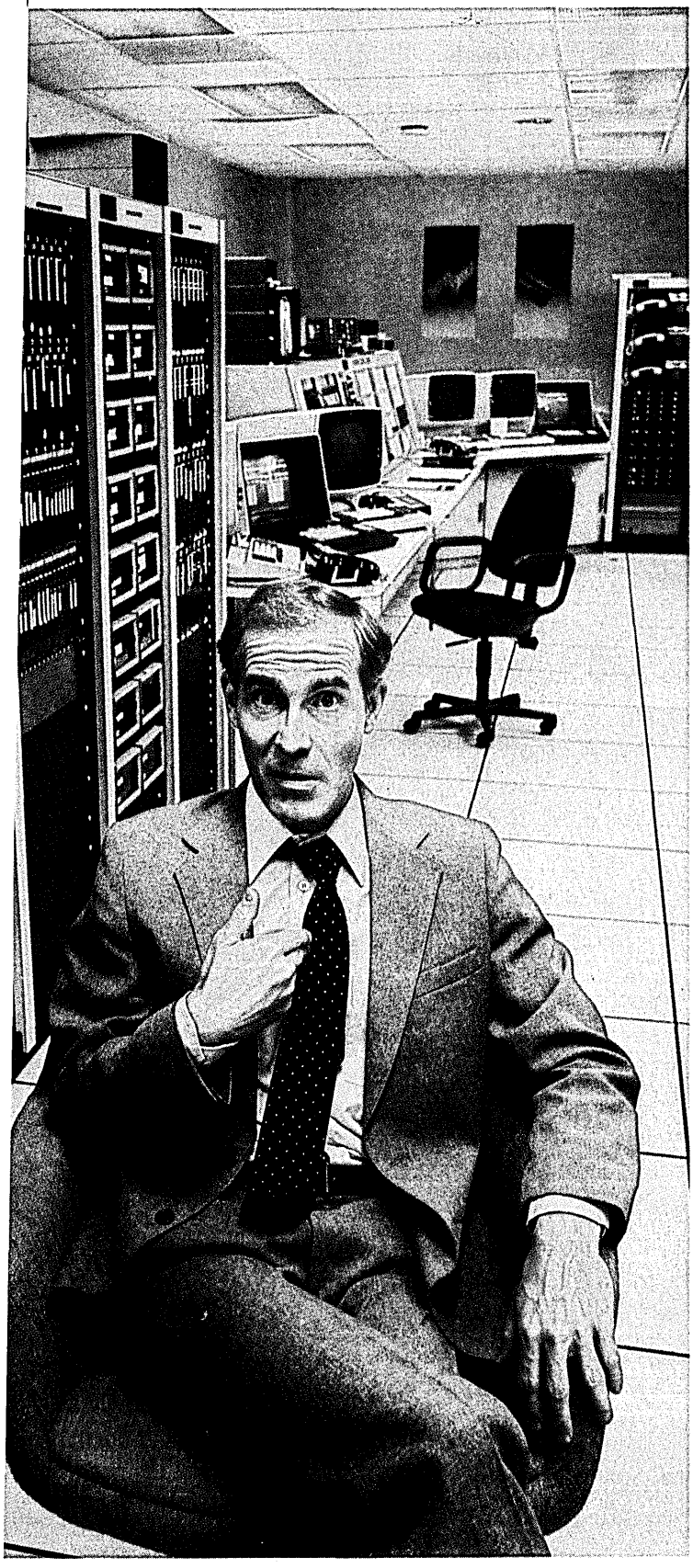

With the new Environmental Data Acquisition and Control System (EDACS) from Computer Power Systems, it was easy. Because EDACS is fully programmable, he just specified all the aspects of his computer room environment he wanted to monitor and control (like electrical power, security, life-safety, air conditioning, fire or water detection, etc.) and custom-designed his own system.

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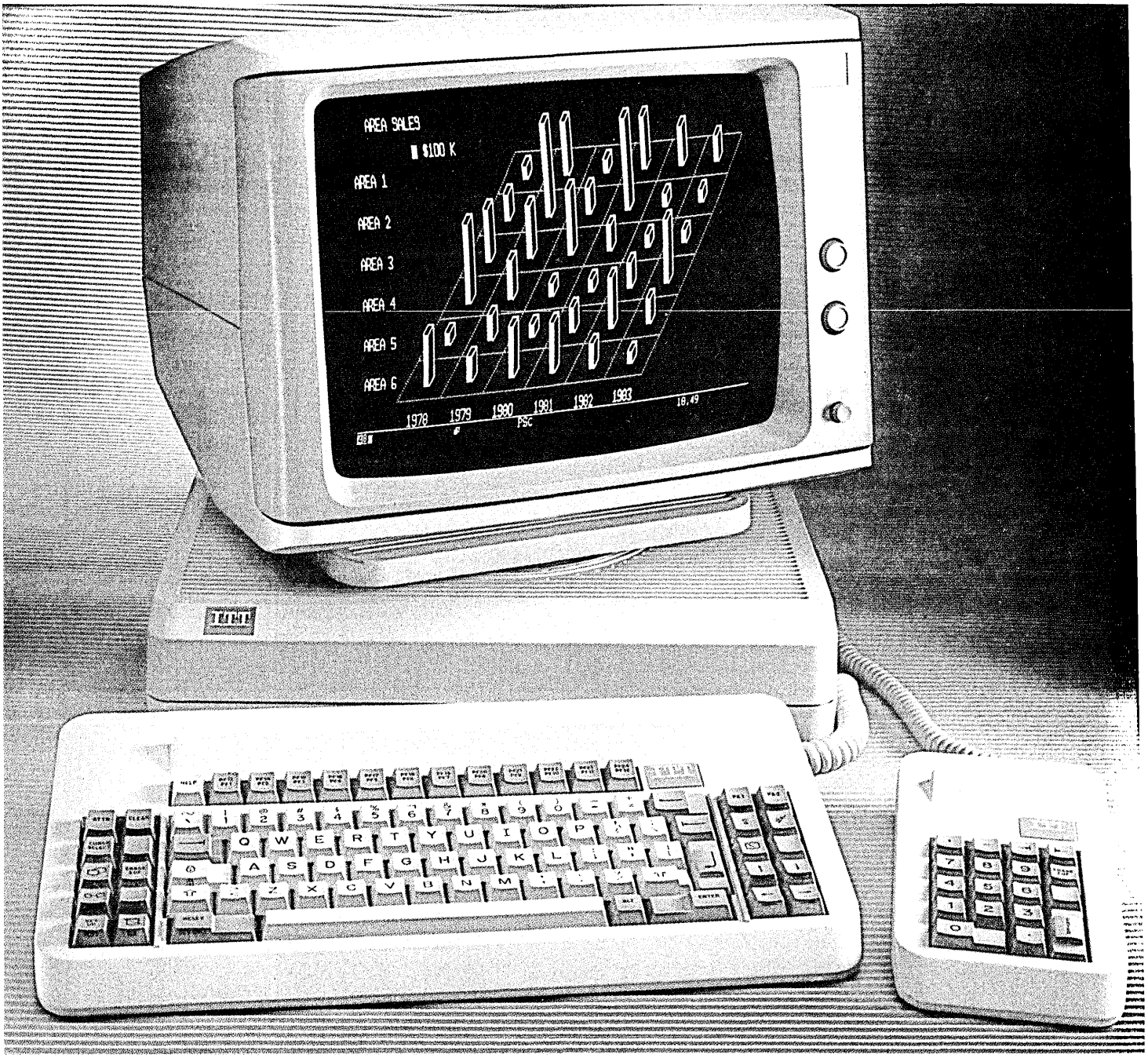

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1108 processor. It will be moved to DEC VAX and Symbolics computers in the near future, according to a company official. "We've designed this for a well-understood class of problems," he said, claiming that the firm's focus will provide additional reliability, portability, and ease of use.

On the other hand, Inference Corp. of Los Angeles, Intellicorp of Palo Alto, and Carnegie Group Inc. of Pittsburgh each claims that its respective systems incorporate a wide range of techniques that make the systems more adaptable and useful across a broader range of applications. The trade-off, of course, is between ease of use and flexibility, according to observers, who note that it may be marketing savvy as much as technical expertise that will ultimately determine the fortunes of AI tools vendors. Each of the companies is boosting its marketing efforts with additional personnel and promotional spending, and, more important, joint marketing agreements with hardware vendors.

IBM's exhibit was viewed with pleasure by most AI marketers.

Indeed, a marketing war of sorts has broken out among these three companies and others, as they try to win and lock in customers early on in their AI design efforts. There being no established leader—as there was when IBM helped define the DBMS market 15 years ago—AI software companies are scrambling to lure users into their fold. Depending upon their resources, commitment to using AI, and the size of their AI application, users find themselves faced with a broad choice of tools.

Inference Corp., backed by $2.9 million in venture capital, is offering the Automated Reasoning Tool (ART) for $60,000 a copy. The software is said to be a "superset" of other knowledge engineering packages. Among its features are "user-defined inheritance," a rule compiler that enables incremental compilation; and a "mechanism" called Viewpoint that supports the exploration of hypothetical alternatives within a knowledge base. Besides selling ART and other tools, Inference is also pursuing a joint venture in the financial services area, according to its president, Alexander Jacobson.

Intellicorp introduced a second release of its KEE product, a frame-based system designed to handle a wide variety of knowledge engineering tasks. The product costs $60,000, which includes 10 days of consulting and other support.

Carnegie Group, formed by a group of professors from Carnegie-Mellon University, has come out with SRL-Plus. Written in CommonLisp, the $70,000 package is to be delivered early next year. Carnegie Group claims SRL-Plus incorporates logic, rule-based, and object-based programming languages.

Carnegie also introduced Plume, a natural language interface product, and disclosed that two technology concerns had purchased equity interests in the firm. DEC has acquired an 11% stake, and the French Général de Service Informatique has bought a 10% share. Such investments, coming on top of traditional venture capital money, have become increasingly important to AI companies as they pursue broader geographical markets and deeper penetration of vertical markets.

DEC was one of the biggest backers of AI at the show, announcing it had also signed cooperative marketing agreements with Inference, Gold Hill Computers, USC Information Sciences Institute, and Prologia. The Maynard, Mass., minicomputer maker is also understood to have acquired an interest in Nestor, a New York City-based company that has developed a pattern recognition device.

Several pc-based knowledge programming tools have been unveiled recently, causing some vendors of higher-powered AI systems to scoff while others applaud. Products such as TI's Personal Consultant, TIMM from General Research Corp. in Santa Barbara, Calif., and Expert-Ease from Export Software International in Edinburgh, Scotland, do not offer half the power of a Lisp computer-based system, but they will do much to fuel interest in AI, educate interested users, and—best of all, according to some vendors—whet users' appetites for more costly, sophisticated systems. ◉

BUSINESS TAKES THE FIFTH

Businessmen are not so sure their "gut feelings" can be programmed into expert systems.

by Edith Myers

Is Japan's fifth generation computer systems program an immediate threat to the U.S. computer industry? Can fretting over it wait until the next century? Or is it just a marketing ploy?

The answer may be yes to all of the above. At least, each of these questions has been answered in the affirmative by persons whose vantage points differ widely.

The prolog to *The Fifth Generation: Artificial Intelligence and Japan's Computer Challenge to the World,* by Edward A. Feigenbaum and Pamela McCorduck (Addison-Wesley, Reading, Mass., 1983) ends by proclaiming: "The stakes are high. In the trade wars, this may be the crucial challenge. Will we rise to it? If not, we may consign our nation to the role of the first great postindustrial agrarian society."

Alvin Barkovsky, vice president of marketing at Silogic Inc., a Los Angeles artificial intelligence company, echos that feeling: "The country which gains the upper hand in fifth generation computers will dominate the global information processing industry and, consequently, all other industries."

Feigenbaum, professor of computer science at Stanford University and a leading investigator into applied artificial intelligence, told a seminar for chief executive officers in Carmel, Calif., this summer that artificial intelligence, knowledge engineering, and expert systems are heralding the beginning of "the second computer era, the important one."

At this conference, cosponsored by San Jose State University and the Institute for Information Management, a subsidiary of Boole & Babbage Inc. of Sunnyvale, Calif., Jack L. Hancock, senior vice president for corporate strategy and systems at Wells Fargo Bank in San Francisco, took a different view. Waving a July issue of *Business Week* carrying the cover headline "Artificial Intelligence: It's Here," Hancock said, "I prepared to come here and say it isn't here, and this is what I see."

Hancock didn't see much need for artificial intelligence in banking in the foreseeable future. He divided banking functions into three levels: operational, tactical, and strategic. On the operational level, he said, there is no need or demand for the fifth generation. On the tactical level, which involves decision-making based on combinations of structured and unstructured rules, he said decision support systems are being used, many of which "purport to have heuristic content but for the most part are accounting systems." On the strategic level, which involves long-range planning, Hancock does not see "applications of the fifth generation for several decades."

Generally, attendees at the conference tended to agree in informal discussions with this assessment with regard to their own businesses. Most felt their "gut feeling" support of decisions couldn't be cloned, though they often conceded some rules of thumb could be programmed into a heuristic decision support system.

Hancock believes that big banks and other big organizations "will fund

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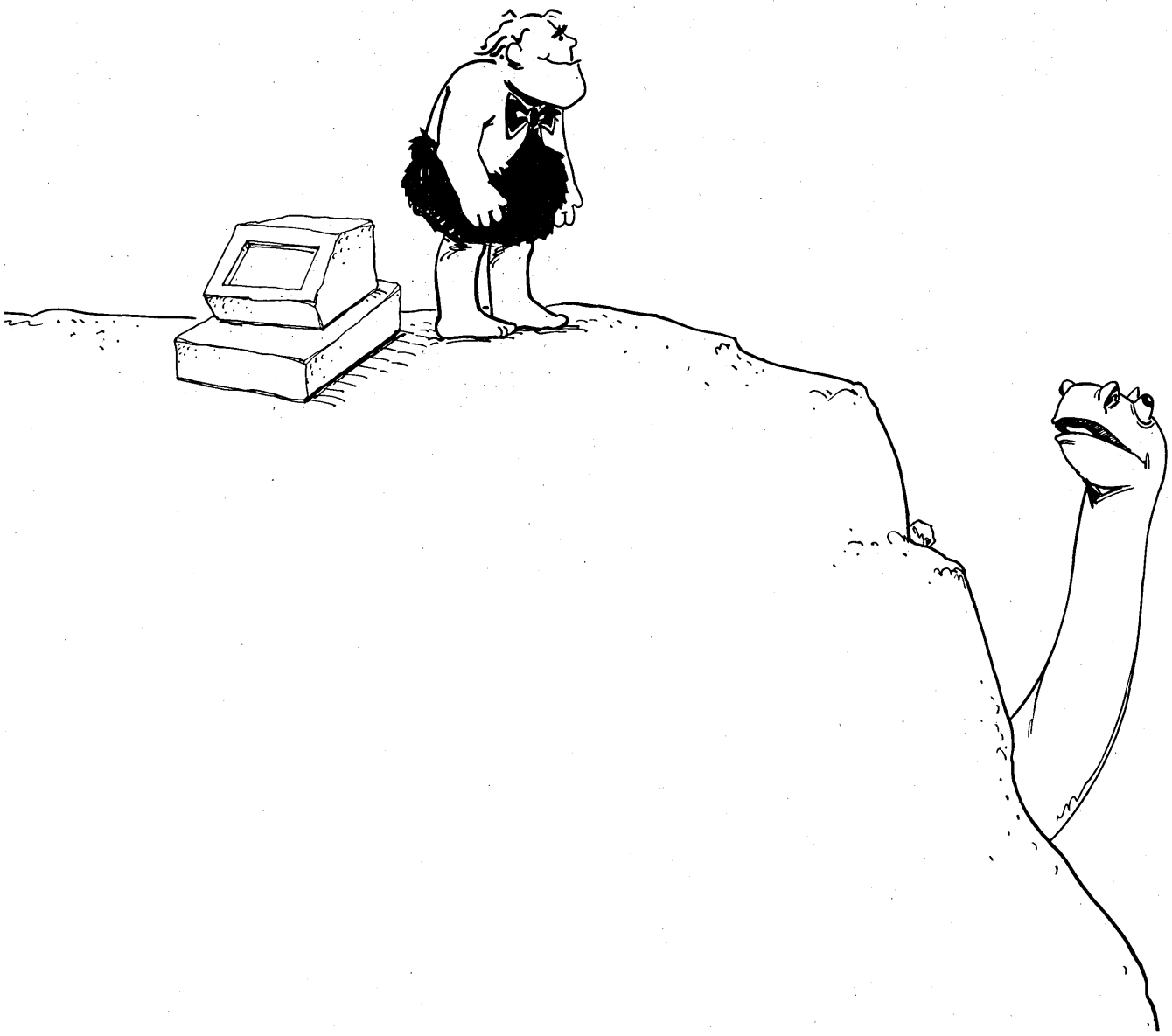

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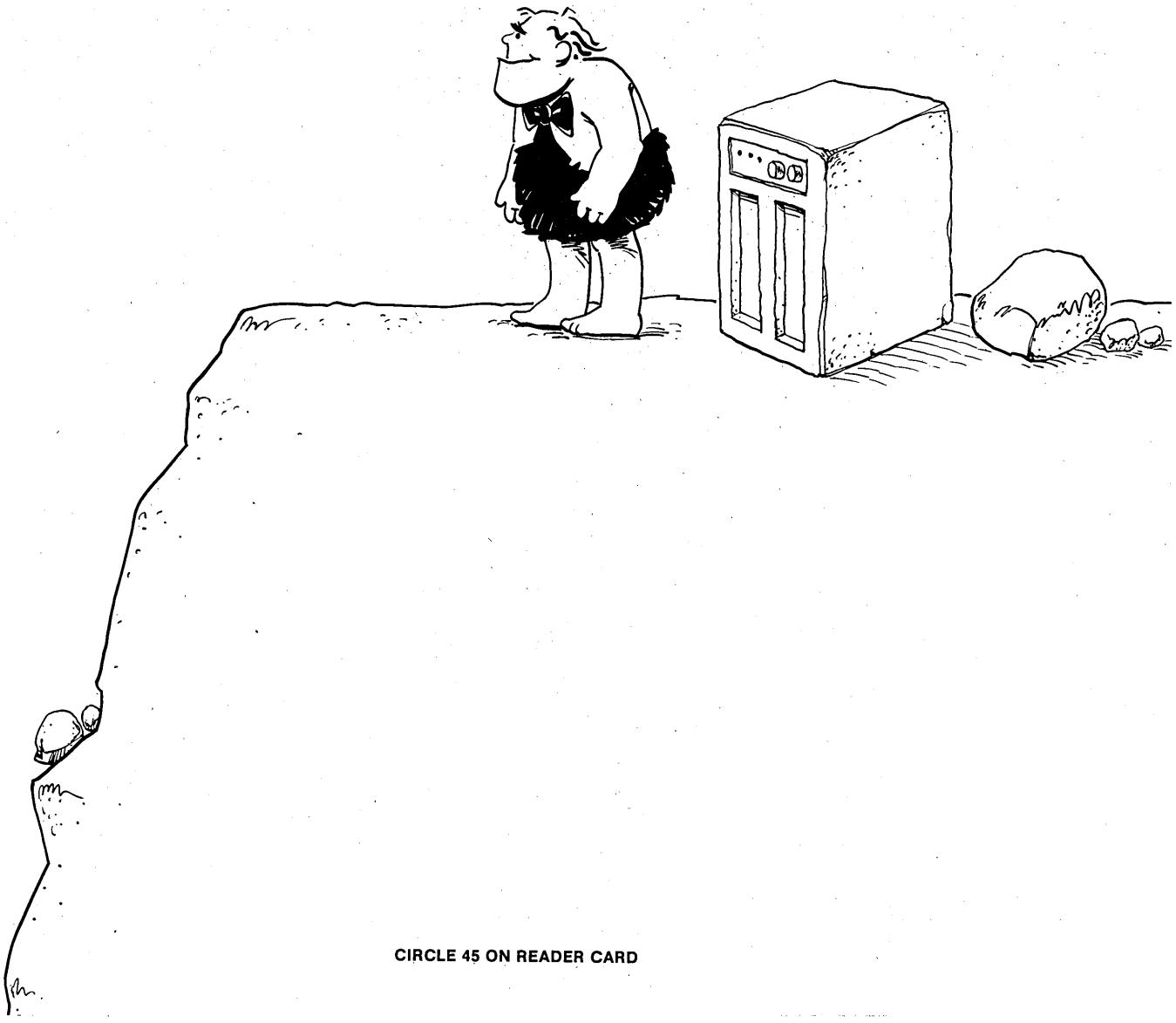

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but will not use expert systems. They'll hire the experts." Yet, he states, "the expert will not have the time or will not share his expertise, his insight, intuition, and outright gambling instincts."

Gene M. Amdahl, cofounder and chairman of Trilogy Systems Corp., the troubled Cupertino, Calif., firm hoping to make wafer scale integration a practical technology for expert systems, took a still different view of the fifth generation. "It's a marvelous marketing ploy by Japan to get us to look to other than IBM for things which will determine the nature of our future," he told attendees of the Carmel conference. "The Japanese looked at all the leading edge technology and at what people want to do and put them together pictorially."

"Our researchers," he said, "don't know exactly what they need yet in the way of expert systems." He described an expert system as "basically a database and decision tree mixed together. This can be done with a fourth generation computer."

Amdahl said an improved fourth generation computer could handle several decision trees concurrently, as if it were "kind of a multiprocessor, somewhat specialized but not that specialized." He added, "I don't know any businessman who knows exactly what he's going to do in a codified way where there is real competition around."

The Feigenbaum-McCorduck book hints that IBM is something less than serious about artificial intelligence. "Yorktown Heights, the largest of IBM's research centers, could fairly be described as censorius of, if not downright hostile to, the idea [of AI]," states a chapter titled, "IBM and AI."

At the Carmel conference Feigenbaum said a recent conversation with an IBM vice president of long-range planning had given him new insight into the rationale of this attitude. "He said that IBM's estimate of the AI market for 1990 was $5 billion in sales. IBM expects to be a $100 billion company in 1990, so that would be too small to bother with."

Just last month, IBM's Yorktown Heights lab said it had demonstrated an experimental expert system that could supervise large-scale computer systems. Moreover, the Armonk giant was in attendance at the fourth annual conference of the American Association for Artificial Intelligence in Austin, Texas, last month, indicating at least cautious interest. At the show—the first AI show at which IBM exhibited—the company demonstrated its version of the Lisp programming language and some experimental projects.

If the U.S. does not endorse AI, "we may consign our nation to be the first great postindustrial agrarian society."

Business-oriented expert systems are lagging behind other applications, however. A DATAMATION listing of eleven successful expert systems included only two related to corporate uses (see "Expert Systems In Business," November 1983, p. 240.) Both are sold by the University of Illinois. One selects procedures for an independent auditor, and the other provides estate planning recommendations.

IBM's experimental system for running computer systems could be used in business as well. Order Configuration and Entry Advisor for NCR (OCEAN), an expert system announced last month by Teknowledge Inc. of Palo Alto, Calif., will also have business applications. The package was created for NCR Corp. and will be used by the Dayton mainframer for processing orders in a way that is expected to eliminate configuration errors.

Nonetheless, the expertise, gut

feelings, intuition, and experience of human businessmen has yet to be put into an expert system. Perhaps, some suggest, that's because none of this is even understood—by the experts or by anyone. Said an attendee in the financial services business at the Carmel conference, "I don't even know what an expert in financial services is." ◉

PERIPHERALS

IBIS FLIES AGAIN

Three and a half years after its founding, Ibis Systems is finally producing high-capacity disk drives.

by Edith Myers

Three and a half years and some $48 million later, Ibis Systems Inc. is finally in full production of high-capacity 14-inch disk drives. The company expects to turn a profit this year, looking for sales of between $15 million and $20 million, a far cry from the $41 million loss last year when sales registered $1.3 million.

Ibis is producing its model 1400 drive at the rate of 20 per month, a rate it expects to increase to 50 per month in November. So far, company sources say, 250 units have been sold and 85 shipped. The drive has a 1.4GB capacity, 12MB per second data transfer rate, a track-to-track access time of 2.5 milliseconds, and an average access time of 16 milliseconds.

Ibis today bears little resemblance to the firm formed in Duarte, Calif., back in 1981. Of four founders, only vice president of engineering Dick Weir remains. Weir joined Ibis from Xerox's Electro Optical Systems. Other founders were from Memorex and Burroughs, then separate companies (see "Tiny Ibis Takes On Big Blue," July 1981, p. 49).

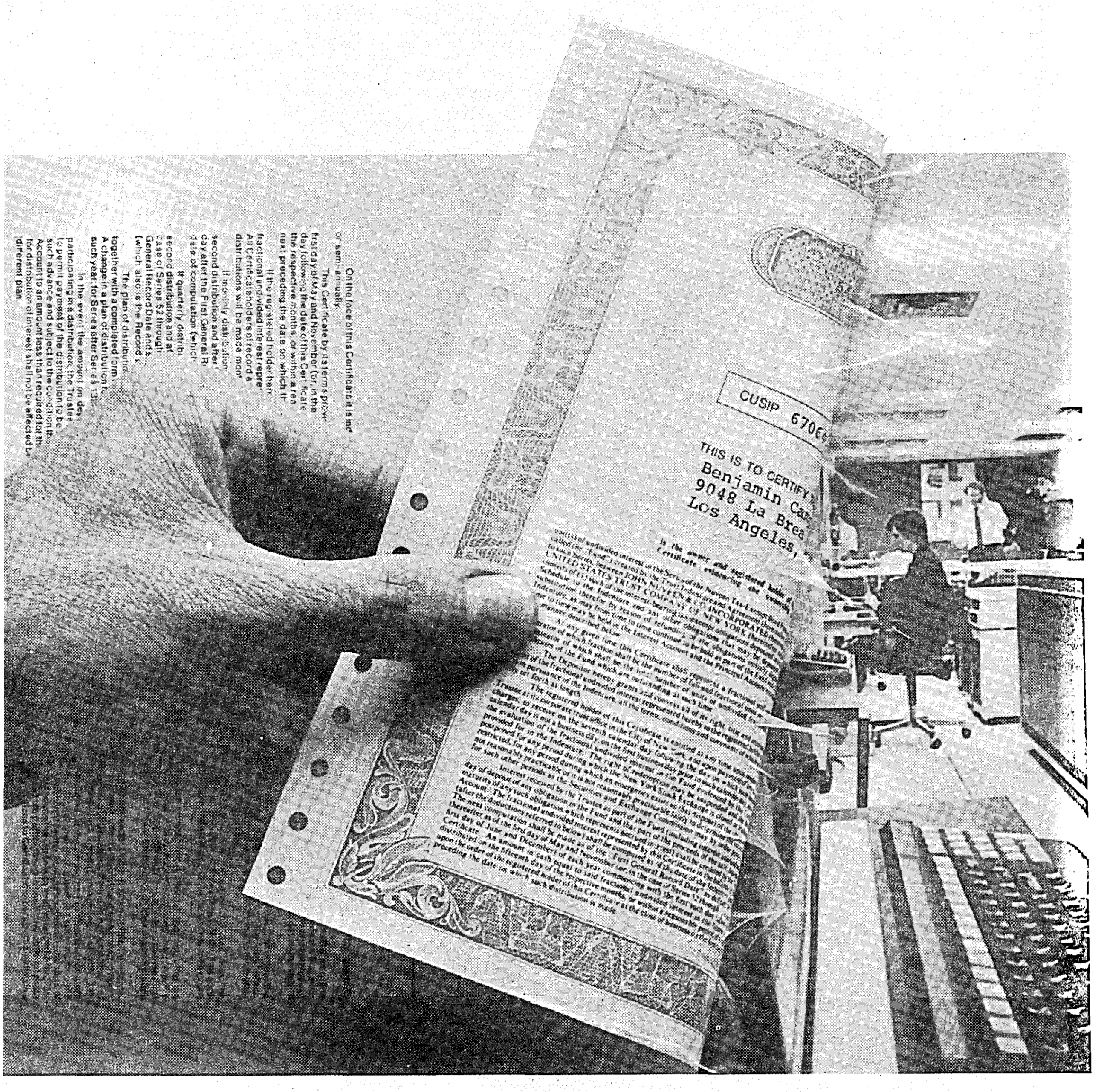
Ibis faced numerous roadblocks to market, including lawsuits, one by Storage Technology and one by Burroughs and Memorex, both alleging theft of trade secrets. Both suits were settled out of court without prejudice.

While the technology used in the 1400 is the same announced when the company was formed—a proprietary thin film media with modified ferrite read/write heads—the drive itself is less ambitious than the company had hoped. Three years ago, it announced its Model 5000, which was to have had a 5GB capacity. The 5000 was scrapped when the company closed down a Boulder, Colo., facility late last year. Ibis is still producing a smaller version of the 5000, the model 1250, which has a 1.25GB capacity.

The company is producing the drives in the same Duarte facility in which it started doing business. Administration and marketing moved to a Westlake Village, Calif., headquarters building in late 1982, and clean room operations and final inspection take place there.

Most of Ibis's current management was put in place by one of the company's major investors, General Electric Venture Capital Corp. Gevenco, along with Hillman Co. and Rothschild Inc., infused $25 million into the ailing firm early this year when Gevenco's David C. Fried replaced James MacGuire as president. MacGuire had come from Storage Technology, taking over from founder Jack Jones in 1982. Before the Gevenco investment, Hillman and Rothschild had put $23.2 million into the company.

Whereas it once boasted of attack-



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Claiborne volunteered to "beta" test the new supermini in Chicago and within six months, "We had mastered

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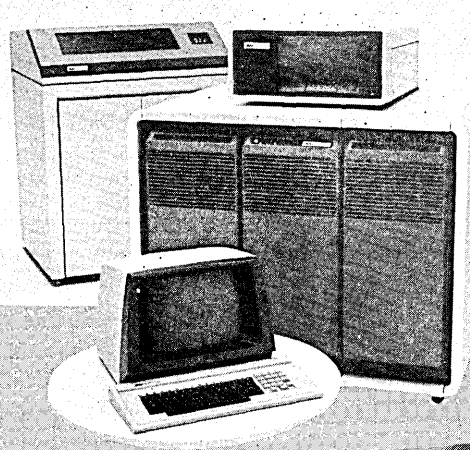

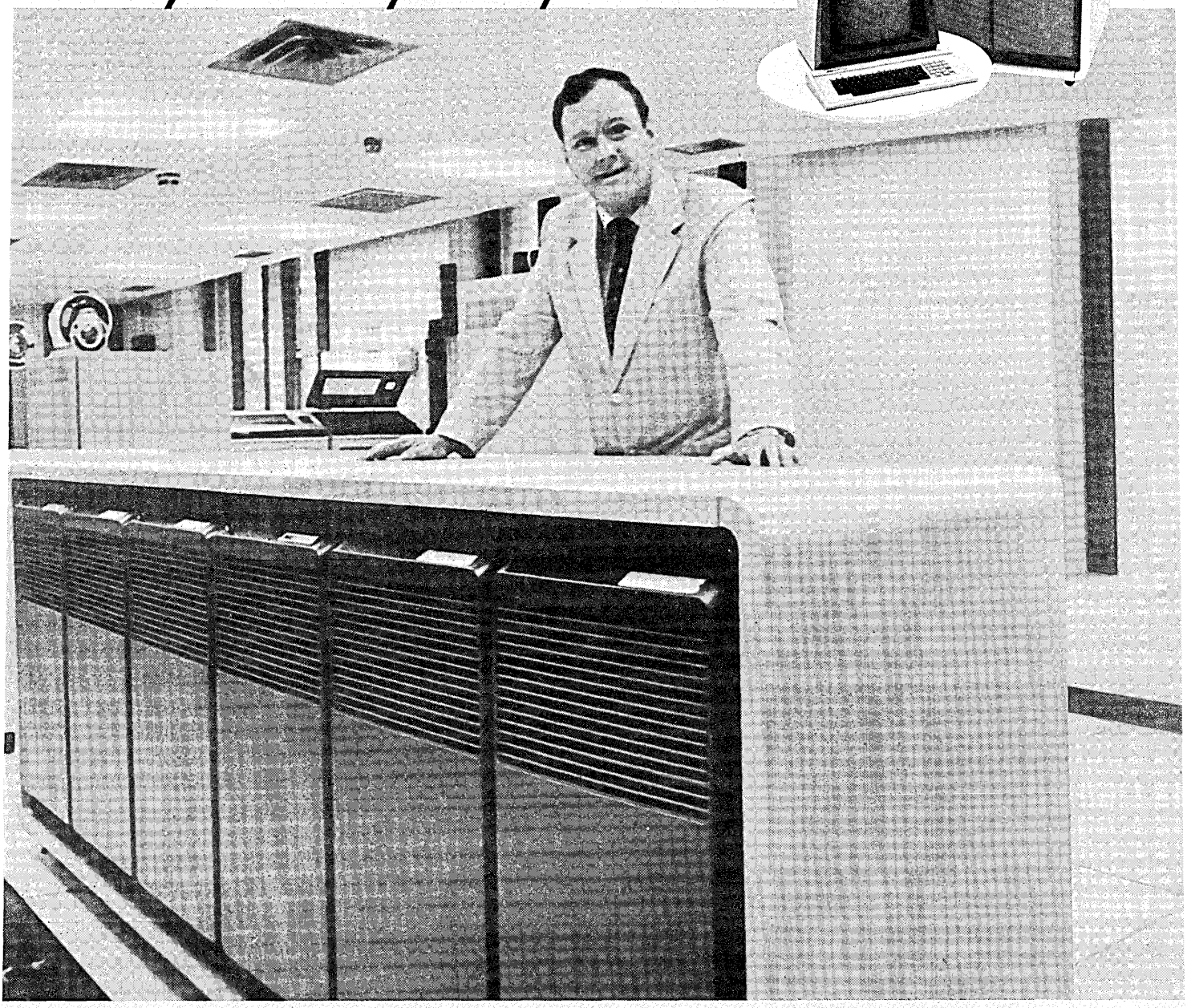

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CIRCLE 46 ON READER CARD

ing IBM head-on—sending the 5000 against IBM's 2.5GB 3380—the company now waxes vague on who its competition is. Ibis contends it is going after the high-end large system market, but, it says, not specifically after IBM. In fact, it counts IBM among its customers, along with Cray Research Inc., TRW, Lockheed, E-Systems, and Honeywell.

Yet Ibis may be heading into a diminishing market. *Disk/Trend Report,* put out by Disk/Trend Inc. of Mountain View, Calif., sees 14-inch disk drives "rapidly fading in oem markets." It still acknowledges, however, that the 14-inch drives will retain their lead in unit shipments of large fixed drives with 300MB or more capacity.

The model 1400 ranges in price from $50,000 to $69,000. The company is quoting 30-day delivery. ◉

MAKING FLOPPIES SMALLER

The microfloppy market is debating the merits of three sizes of small disks.

by Edith Myers

In no arena does a mere quarter of an inch seem to make so much difference as in the confusing market for microfloppy diskettes.

Do you want 3-, 3¼-, or 3½-inch disks, and does it really matter? Yes, say proponents of each of the three sizes, but they agree it's not so much the actual size that matters but the recording formats and other design features.

Why were the three sizes hit upon? The first microfloppies emerged in Japan and were 3 inches in diameter. "The Japanese tailored their disks to the mail system, to the kinds of envelopes that could be handled in Japan," says Dave Nelson, a product manager for Dysan Corp., Santa Clara, Calif., producer of and vocal lobbyist for 3¼-inch disks.

"Sony introduced the 3½-inch disk to the U.S. and I guess someone wanted to set an American standard, one that was not 3½ inches. To compete, you have to be different," Nelson says.

With the booming production of small systems, it's worthwhile to compete in this market, which is expected to continue for the next few years. Disk/Trend Inc., the respected disk market research company based in Mountain View, Calif., says, "Despite continued confusion over competing microfloppy standards and tough competition from half-height 5¼-inch drives, microfloppy drives are starting to reach significant production quantities, with 1984's worldwide shipments going up to 840,000 units and 1986 projected at 3.04 million drives."

Magnetic Media Information Services in Chicago says microfloppy media sales "will grow more than 26-fold, from $44.2 million in 1983 to $375 million in 1989, and in the year 1983-84, revenues for the small disks will double."

Jim Porter of Disk/Trend says the companion drive market will increase in revenues to $447 million in 1986 from $53.9 million in 1983.

ANSI is looking at all three sizes. A subcommittee approved standards for 3½-inch microfloppy media last May and approval by ANSI's X3 committee was expected this summer. The agreed-upon standards outline physical and mechanical parameters of the media, ensuring that a 3½-inch disk can be moved from disk drive to disk drive and still operate. The subcommittee is working on similar standards for 3¼-inch and 3-inch microfloppies.

For 3½-inch disks the next step is standardization of logical formats. Within the 3½-inch camp, the two current leading proponents, Hewlett-Packard and Apple Computer, have different, incompatible formats because of different drive speeds. HP's drives run at a constant 600 rpm while Apple's run at variable speeds ranging from 300 rpm to 600 rpm.

It is unlikely that either HP or Apple will modify its format to accommodate the other's. Anticipated is the emergence of a third format that could conceivably serve as a standard for the next generation of both HP and Apple equipment and could be used by other systems makers to make disks that are interchangeable.

Both HP and Apple get their disks from Sony, which makes them to specs provided by each company. Sony introduced the first sub-5¼-inch drive in its Series 35 word processor in 1980.

In any diameter, the microfloppies have much going for them. They're smaller, weigh less, consume less power, are more reliable, and hold more data than the 5¼-inch disks. The smaller disks are generally perceived to be more expensive, however, mostly because they're not being produced yet in large enough quantities to achieve true economies of scale.

Porter's *Disk/Trend Report,* however, projects the average per-unit cost of a microfloppy drive will eventually drop 25%, to $438 in 1986 from $484 in 1983. As for the disks, said one HP dealer, "If you compare the price of 3½-inch disks to the 5¼s byte for byte, they're very competitive. We sell boxes of 3½-inch disks for $69 and there are easily several 5¼-inch brands that are more expensive."

Three-inch microfloppies are supported so far only in Japan by Hitachi, Hitachi-Maxwell, and Matsushita. Some drives are made in the U.S. by such companies as Canon, Memorex, and Micro Peripherals, but only as after-market items. Little software has been written for the 3-inch format.

Apple and HP have made the 3½-inch microfloppies definite front-runners. Among a host of other companies supporting 3½-inch floppies are Shugart, BASF, Verbatim, Epson, Panasonic, and Teac.

HP, the first major oem to commit to a sub-5¼ format, said in a statement issued earlier this year explaining its choice of the 3½-inch diskette, "The only real danger of a competing standard came from IBM, which in mid-October [1983] dropped its proposed 3.9-inch disk drive. Industry observers say poor market acceptance, compatability problems, and a lack of software and a second source forced IBM to pull the product off the market. Whatever the cause, IBM's resignation has, in the opinion of most observers, cleared the path for the emergence of the 3½-inch microfloppy as the standard."

The HP statement cited advantages of 3½-inch over 3- and 3¼-inch drives. "While the 3-inch disk does have a rigid case [as does HP's slightly larger product]

In any diameter, microfloppies have much going for them compared to the now standard 5¼ drives.

and an automatic shutter, it has only half the capacity of the 3½-inch media [400K for the HP disk]. Moreover, even if the 3-inch were to achieve the capacity level of the 3½-inch disk, the increase in track density would be too great to ensure reliability. The 3¼-inch disk has no media protection. It is covered only by the traditional soft envelopes used on 5¼-inch disks."

Nelson of Dyson sees this lack as an advantage rather than a drawback. He points out that rigid covers for the HP disks do not totally encapsulate the media. "Spilled coffee could get through where the hub is exposed and through the shutter window," he notes.

Dysan, he adds, offers the user a choice. A pouch for the disk that totally encapsulates the medium is available. The rigid cover, says Nelson, "could make the difference of $4 a disk or more. We don't force the end user to pay for it."

HP has said it will introduce a

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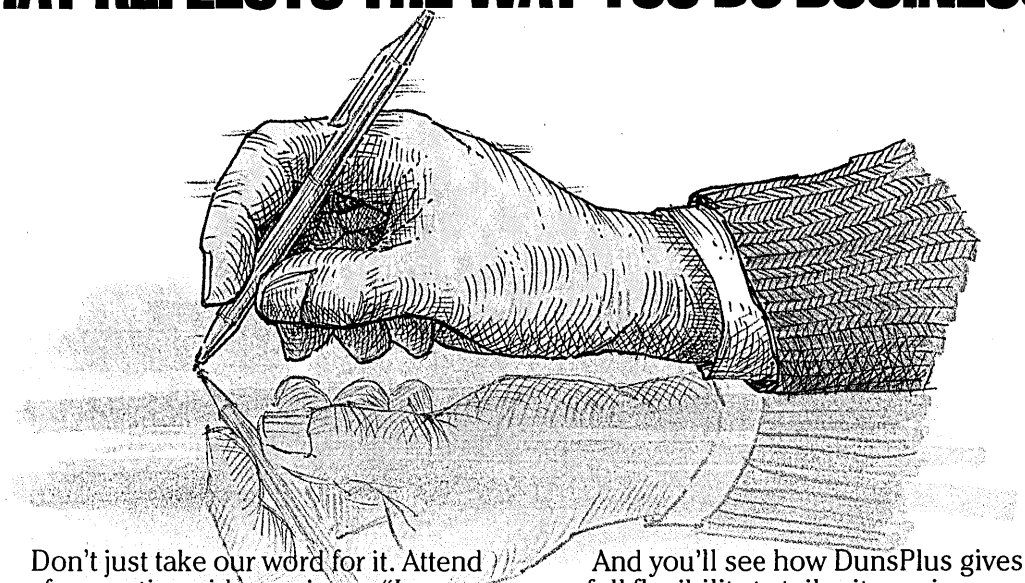

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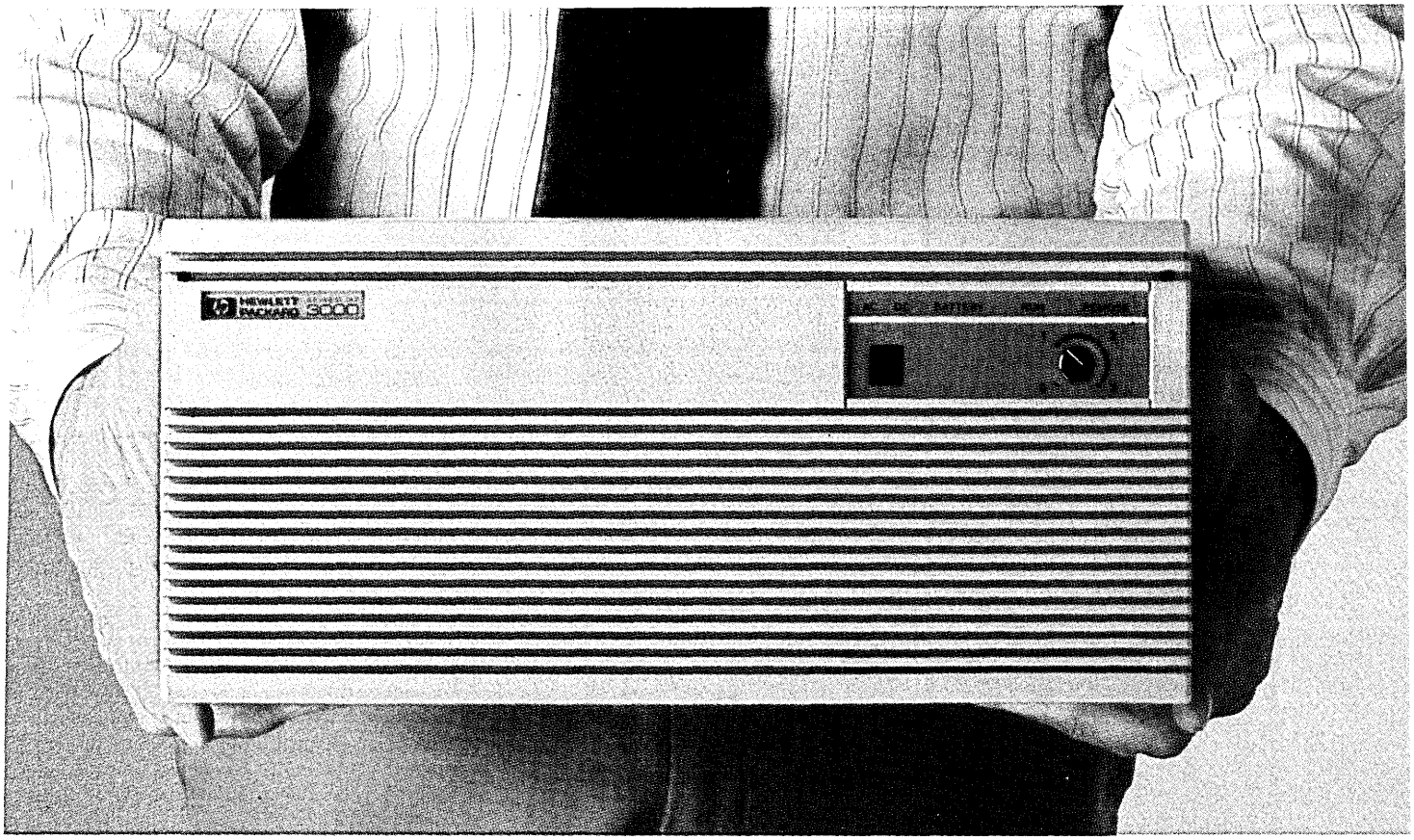

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double-sided 3½-inch product with more than 600KB of formatted capacity in late 1984 and will follow that up in 1985 with a drive storing 4.2MB of formatted data. By 1988, disk makers expect to pack 4MB to 6MB onto a microfloppy using vertical recording technology.

Such performance breakthroughs, HP explains, are achieved by using magnetic film that is thinner than that used on current 5¼-inch products, a steel center replacing the mylar hub, and a DC motor spinning at 600 rpm. This increases the data transfer rate to 18KB per second. Also, computerized head alignment ensures that each drive head is radially aligned with a resolution of 0.0004 inches and two minutes of arc for azimuth alignment to compensate for temperature and humidity variations.

HP's 3½-inch disk is twice as dense and twice as fast as its own 5¼-inch product. The 3½-inch disk contains 256 bytes per sector, 16 sectors per track, and 66 tracks per surface, representing 135 tpi.

Maximum sustained transfer rate is 17.5KB per second and the average access time is 415 milliseconds (on) and 1,415 milliseconds (off). The burst transfer rate is 500KB per second.

Even before Apple and HP gave it their blessing, the 3½-inch format had something of a lead as a U.S. standard. In 1982, an ad hoc group called the Micro Floppy Industry Committee went with the Sony format, causing the withdrawal from the group of Dysan and Tabor Corp., Westford, Mass., strong supporters of 3¼-inch drives.

Earlier, Dysan spearheaded the formation of another group, the Micro Diskette Industry Association, to promote the 3¼-inch format. Nelson of Dysan says the group functions as a "clearinghouse for information and software packages." He estimates that some 60 software packages have been sent in to Dysan's duplication facility for reformatting to 3¼-inch format. "Our goal is 200. We have a major program to get those [3¼-inch software packages] into distribution channels," states Nelson.

Drive makers in the 3¼-inch arena are Tabor and a Japanese company, Seikosha, which has U.S. headquarters in Sunnyvale. "Their drives talk to each other," says Nelson. "You can swap diskettes."

Moreover, he says, double-sided diskettes are available in that format from Seikosha along with single-sided drives and a top-loading drive that is "ideal for portables."

"We [suppliers in the 3¼-inch camp] are all set and ready to go. It's just a matter of waiting for the market to pick up and run with it."

It's unclear that microfloppies in any format will ever do to the 5¼-inch market what 5¼ did to 8-inch drives—effectively take over in most system arenas. It is clear though that the segment of the magnetic media industry adddressing the small footprint is as concerned with what their products will mean to end users as they are with the needs of large oems and systems houses. In many cases their products will be sold directly to consumers. ◉

SOFTWARE & SERVICES

C'EST L'AMOUR

French software and service companies find the U.S. a very attractive market for expansion.

by James Etheridge

French computing software companies may dominate the European software and services industry, but they are undergoing a crisis of confidence. It is a crisis that they hope they can overcome by expanding into new markets and, especially, into the U.S.

Thanks to a large home market, which represented over 20% of the $12 billion European software and services business last year, the big French service companies have a strong base from which to expand. Acquisitions are one of the favorite ways of achieving that expansion.

Most recently, GSi, the fourth largest of the French service firms, took a 10% stake in Carnegie Group Inc., an outfit specializing in artficial intelligence and expert systems set up by members of the staff of Carnegie-Mellon University, Pittsburgh.

Expansion into foreign markets is a major plank of the diversification strategy pursued by the French firms over the past few years. The changing dp environment and falling profitability have driven them to develop new services at home and to market their highly regarded know-how abroad.

The growing tendency for users to invest in in-house equipment rather than external services has meant a sharp fall-off in the relative importance of service bureau business for all service and software companies. Two of the big French firms, GSi and Cisi, in particular, have suffered, in much the same way as Tymshare, Comshare, STSC, and others in the U.S. have. According to Patrick Nollet, chairman of Cisi, number two among the French service vendors, service bureau revenues fell to 45% of European service companies' growth income in 1983, compared to 66% in 1978, while in the U.S. the proportion has fallen to 40% from 69%.

The other major development that has transformed the service companies' ball park, of course, is the microcomputer explosion. This has reinforced the trend for dp activities to be repatriated within user organizations. At the same time, though, it has engendered a major software development industry for micros and could lead remote computing service companies to offer services aimed specifically at the microcomputer end user. Cisi's Nollet, who runs a company that operates the only international telecomputing service network outside the U.S., suggests that these micro-oriented services could include providing connections to backup mainframe computer centers, giving access to common databanks and common software, and supplying information center software for applications assistance and information services to end users.

It is significant, though, that not all user organizations are opting to handle all dp operations internally. At GSi, which is especially big in payroll services with nearly 1 million employees on its books, Jacques Bentz, managing director of the international division, says that more and more companies are subcontracting payroll. "Our new customers are getting bigger and bigger. They have higher priorities for their own dp installations, such as invoicing, order processing, and stock control, which need to be on-line and up-to-the-minute."

All the major French service suppliers are now investing heavily in new activities, each one tending to specialize in particular areas. The biggest, Cap Gemini Sogeti, is moving strongly into software engineering. Cisi is developing economic and financial data services as well as focusing increasingly on CAD/CAM technology. SG2, the third largest service supplier, is concentrating on electronic payment systems and videotex, while GSi is planning to expand and improve its traditional services through the applications of emerging technologies.

This may sound like the very epitome of a dynamic industry in transition, vigorously adapting to the changing needs of its customers. In fact, however, French firms are currently undergoing a crisis and are rapidly getting a complex about their performance in the field of software development. Their paranoia on this score was all too evident at a recent conference, at which Philippe Dreyfus, vice chairman of Cap Sogeti and president of the French software and service companies' trade association Syntec, was

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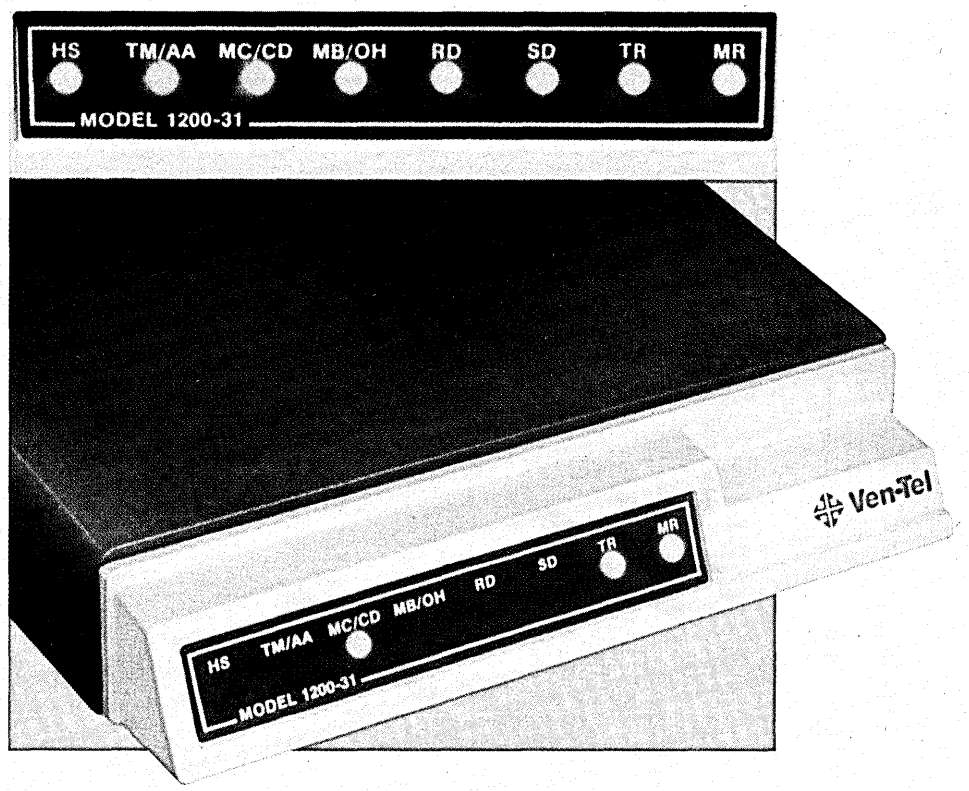

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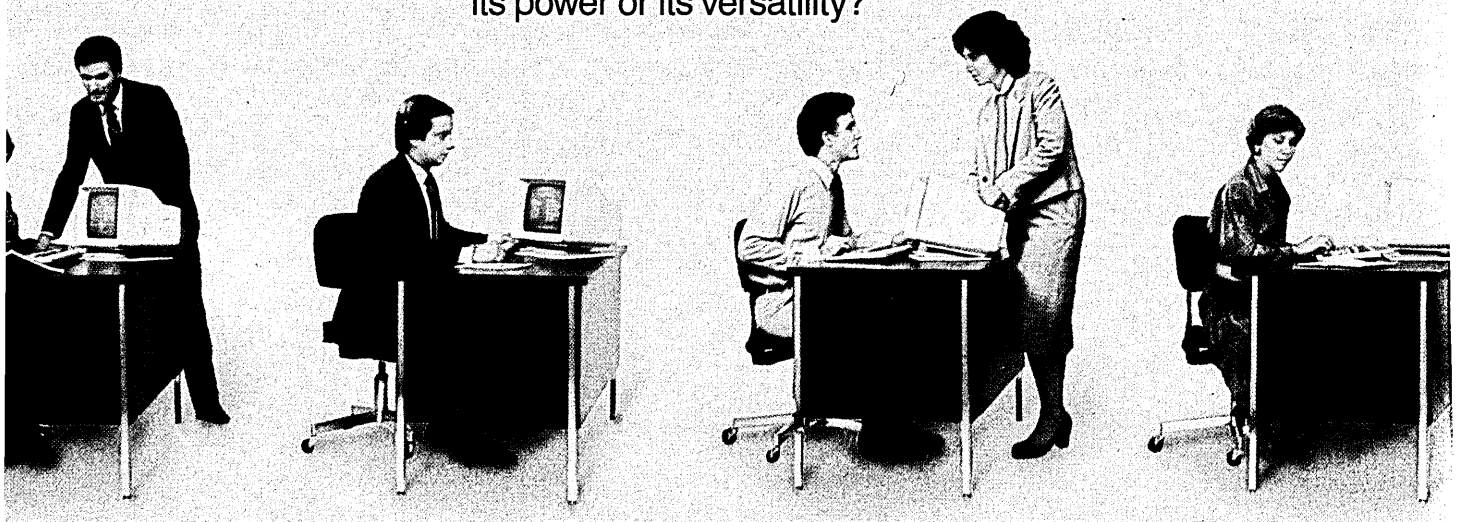

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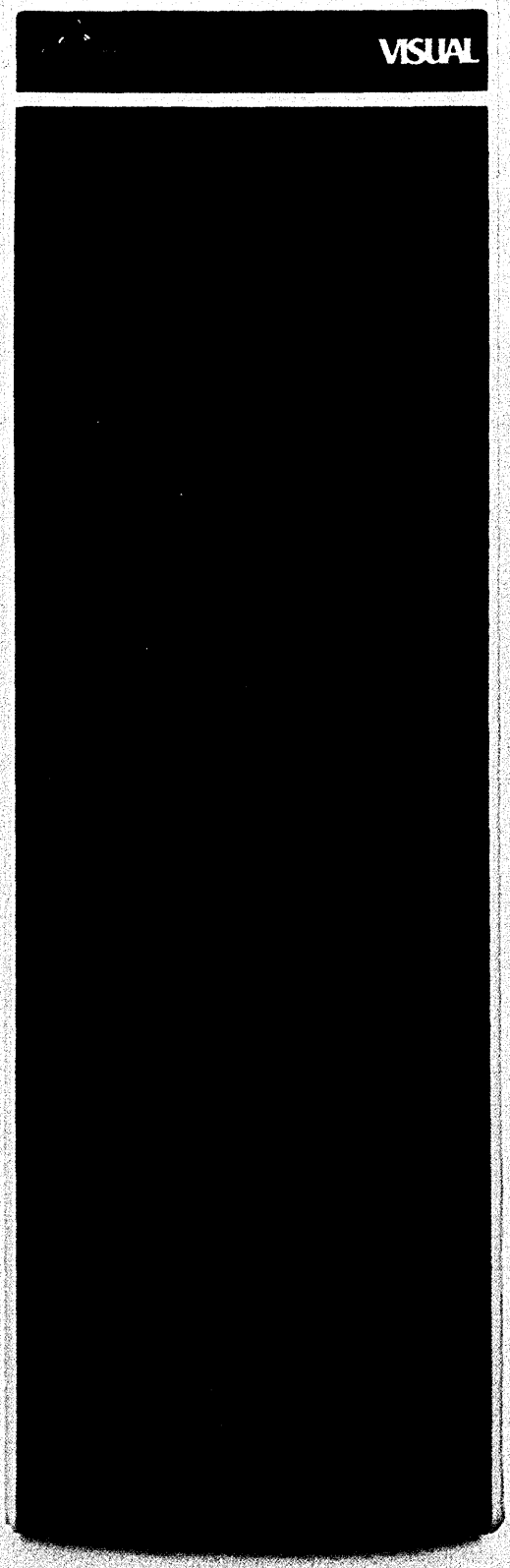

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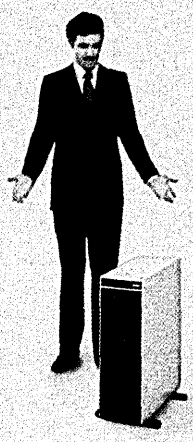

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CIRCLE 51 ON READER CARD

at pains to defend the industry's record.

The total turnover of French service firms was over $2 billion in 1983, 14% of which was in software packages. Dreyfus considered that perfectly respectable, adding that if the French companies' software development was almost exclusively centered on mini and mainframe systems, that was because micro software represented a minute fraction of the market.

Nevertheless, Jackie Saleur, managing director of Matra Robotronics, went to the heart of the matter, touching a very raw nerve. "French service companies," he says, "are in the business of knocking together so-called tailor-made systems and applications that cost tens of millions of francs when there are ready-made software packages that are much cheaper and perfectly suitable."

French service companies are diversifying and bringing their expertise to the U.S. market.

The implication behind the debate on the vendors' performance in the packaged software business is that they stand to lose out on a booming segment of the computer service market. They are unrepentant, though. Bentz of GSi-International says simply, "We are not a packaged software company. We supply global solutions to customers in specific sectors." And he points out, "American software packages are not produced by the big service companies." Nollet explains that it is partly a cultural problem. "The French," he says, "are inclined to resist ready-made solutions and to favor original, made-to-measure ones. We are not interested in manufacturing and marketing things so much as in design and development."

In fact, it is falling profitability that is really causing concern amongst the French companies, and that is not a result of market forces but a consequence of government price controls and high social security contributions in respect of their well-paid staffs in France. Even the big ones are not immune: Cisi showed losses of $10.9 million on revenues of $170 million in 1983, while SG2 could only manage a net profit of $2.1 million on a turnover of $159 million and GSi net earnings of $1.9 millon on revenues of $127 million. The profit motive may be lacking in the case of these three firms, since they are all subsidiaries of large organizations—Cisi of the Atomic Energy Commission, SG2 of the bank Société Générale, and GSi of the big electrical group Compagnie Générale d'Electricité.

Far and away the most profitable of the big four is Cap Gemini Sogeti, which happens to be a privately owned company. It reported a net profit of $8.66 million in 1983 on a turnover of $168 million, a margin of 5.1% after tax.

Cap Gemini Sogeti's revenues surged by 36% last year, partly because of a 63% rise in U.S. turnover (when converted into French francs, reflecting the appreciation of the dollar). Over half of the group's income is now derived from abroad, 27% from the U.S. and 23% from the rest of Europe.

The group's U.S. activities, now collected under the single name of Cap Gemini DASD, include conversions and software development, consulting, feasibility studies, and training. It has also established an office in Dallas to market its program development system, MultiPro, designed for use on micros or intelligent terminals.

The system is being tried out by three organizations in the U.S.—a New York insurance company, a Dallas bank, and a West Coast manufacturer—and by three European customers. They have each shelled out an average of $100,000 for a typical configuration comprising six workstations.

The latest upgraded version, MultiPro-X, was introduced to the world at Softcon in February. The system boasts powerful windowing capabilities and autonomous offloaded operation enabling all system components to be generated from a single workstation. According to Michel Berty, president of Cap Gemini DASD, there is not a comparable product available in the U.S. at the moment, a situation he intends to make the most of. "If the results of the trials are what we're expecting, we shall have to change our whole marketing strategy in the U.S. I would revolutionize our approach and multiply our technical support staff by five or 10 so as to take immediate advantage of the opportunity, while there aren't many competitors."

Cisi also has great hopes in the U.S., although its American operations were responsible for three quarters of its 1983 losses. This was largely a result of its takeover in March 1983 of Wharton Econometric Forecasting Associates; Nollet explains that "WEFA was in the red, but it is an investment and did not cost us very much." Cisi's presence in the U.S. dates from its acquisition of PCS in 1979 and Uni-Coll in 1981, which were subsequently merged into Cisinetwork Corp. Cisi also exports CAD/CAM systems through its systems engineering subsidiary Gixi, which has an offshoot in the U.S. for marketing its color graphics terminals.

Foreign markets, which had been profitable, turned sour for Cisi only in 1982, insists Nollet. Last year they contributed 35% of the company's sales.

GSi derived some 27% of its turnover in 1983 from its international operations, although the U.S. accounts for only about 2% or 3% of the total. Its expansion has been into other European countries mainly, marketing its proven expertise in payroll management and systems for auto concessionnaires. Its first move into the U.S. came in 1978 with the takeover of Pittsburgh-based Transcom Data Systems Inc., which distributes an on-line accounting system called Tolas. GSi's recent deal with Carnegie Group takes the form of a reciprocal marketing agreement providing for GSi to distribute Carnegie's products in Europe and for Carnegie to market GSi's in the U.S. Bentz explains that the productivity of its traditional services could be improved significantly through the application of expert systems and natural languages.

SG2's first foray into the U.S. was repulsed by the federal authorities, who invoked a law forbidding foreign banks or any of their subsidiaries from acquiring more than a 5% stake in an industrial or commercial enterprise. Although this legislation was hardly introduced to prevent a company like SG2 from having a subsidiary like IMI, SG2 nevertheless fell foul of its parentage.

Chairman Jean-Louis Moineau is confident they'll be back, though, he says, "We are currently negotiating with the Fed and I'm hopeful we'll find a solution." Meanwhile, SG2 has had to sell its IMI holding, with the result that its 1983 earnings were $15.7 million lower than they would otherwise have been. Altogether, its overseas operations accounted for no more than 15% of its turnover last year.

"We shall have to change our whole marketing strategy in the U.S."

As if to make up for the frustration of its American dream, SG2 has taken the plunge on the other side of the world, buying into a local firm in Taiwan and establishing a subsidiary in Singapore. The Far East has great potential for the likes of SG2, in Moineau's opinion.

"French experience is a saleable commodity," he argues, adding that "in the long term it would be dangerous for French software and service companies not to invest abroad since a very large part of future market growth will be in foreign countries." He mentions in particular the prospect of major projects in the third world. The attraction of the U.S. market is its size more than anything. "Margins are lower for service companies in the U.S.," observes Cap Gemini's Berty, "but they are not negligible and can be offset by higher volume." ◉

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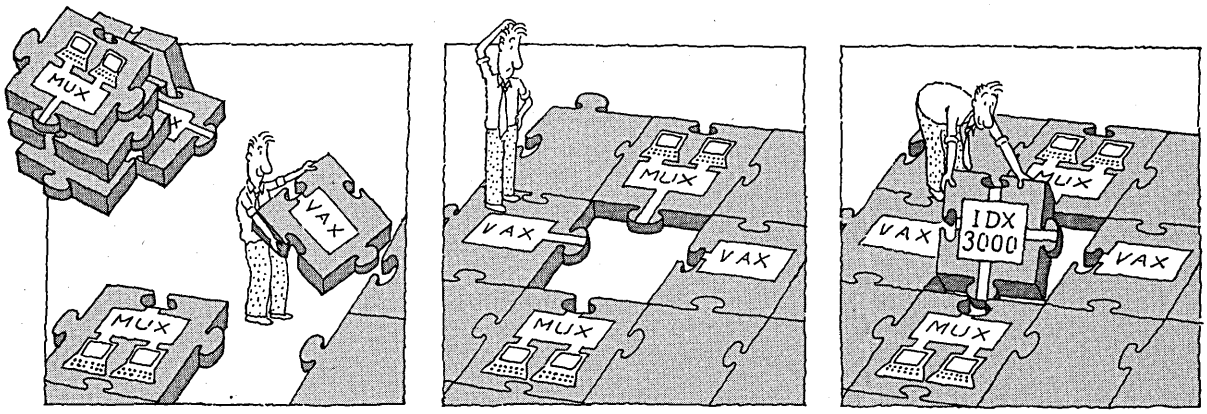

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NEC's Advanced Person Computer offers the widest range of quality graphics.

One reason the APC is better is that it lets you do more kinds of graphics than any other personal computer.

In fact, it gives you the kind of graphics you'd expect only from a much more expensive computer.

With the APC, you can produce color transparencies, color slides, or output to a variety of printers and plotters.

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Our screen is graphically better.

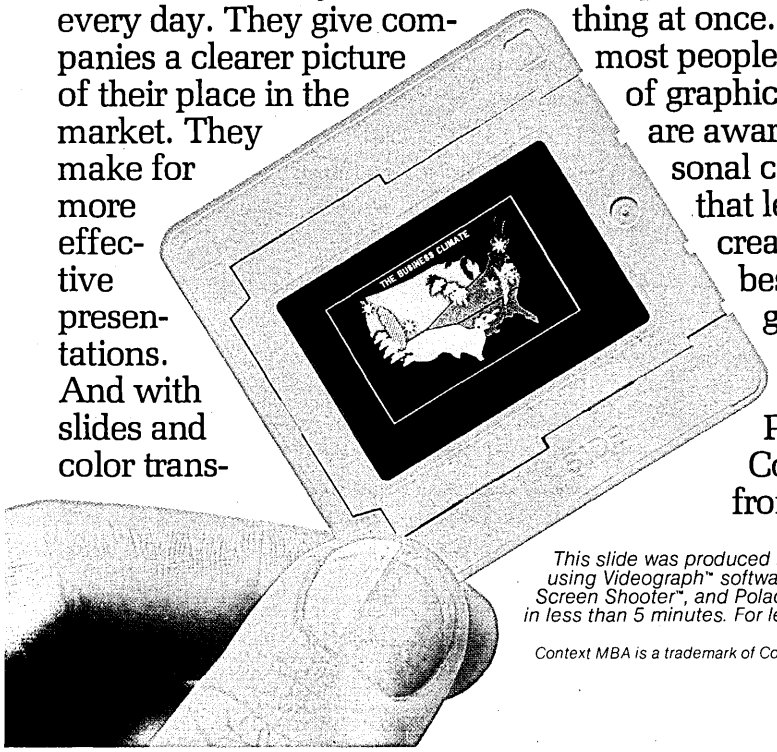
Seeing is believing. And one look at our color screen will prove it's the best.

But it's no accident. It starts with the NEC 7220 graphics processor, the most advanced graphic chip available.

Then, unlike other PC's, the

Graphics are being used more and more by businesses every day. They give companies a clearer picture of their place in the market. They make for more effective presentations. And with slides and color transparencies, they can let a room full of people see the same thing at once. Although most people see the value of graphics, very few are aware of the personal computer that lets them create the best color graphics.

It's the Advanced Personal Computer from NEC.



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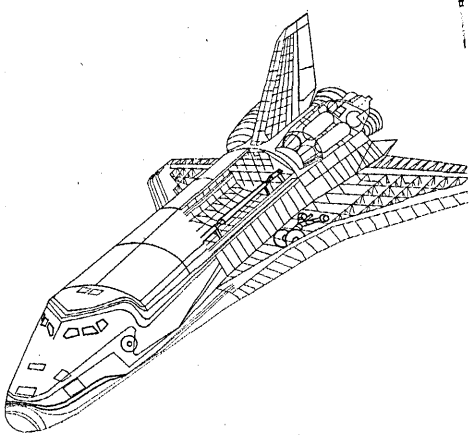
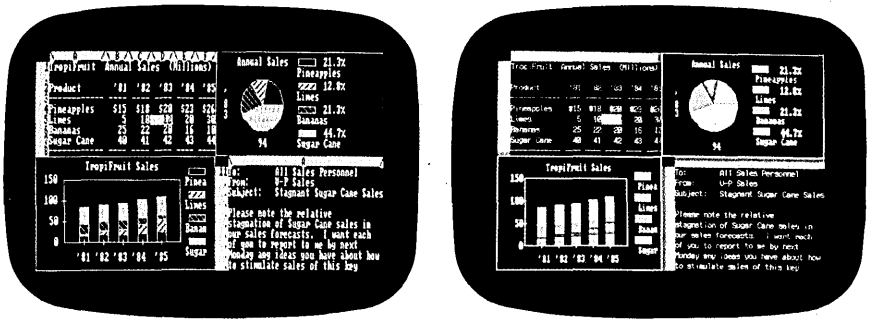


'O THE PERSONAL
BEST COLOR GRAPHICS?



Context MBA™ runs in high resolution color on the APC. But it can only run in one color on the color monitor of the leading brand.

APC graphics option has its own dedicated memory, so there's never a tradeoff between color and resolution.

Software will make you a big-time producer.

Better hardware alone isn't enough. You also need better software. And NEC provides that, too.

Take Graphplan™ for example. Graphplan can take spreadsheet format data and produce customized business graphics on paper. Instantly.

Graphwriter™ will let you produce professional color graphics in over 20 different formats. Then turn them into transparencies or hard copies using the most popular pen plotters.

Videograph™ makes creating free-form color images for slide presentations easy and inexpensive.

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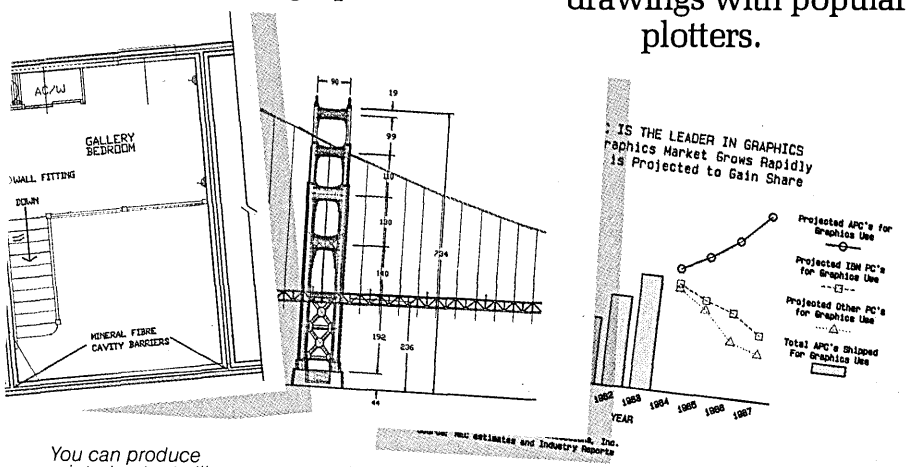
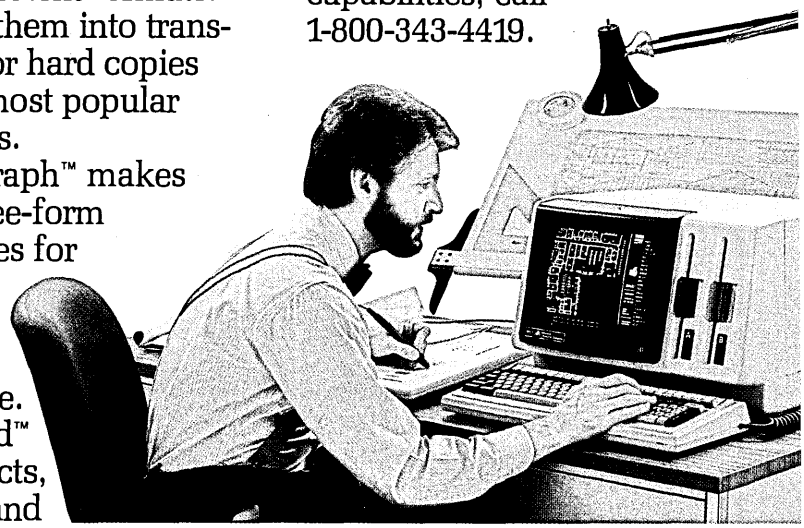


You can produce printed outputs like these with the APC.

This software combined with the APC hardware will give you the best graphics you can get on any personal computer.

For the complete picture, call NEC.

For product literature on any of NEC's APC graphics capabilities, call 1-800-343-4419.



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CIRCLE 53 ON READER CARD

NEWS IN PERSPECTIVE

BENCHMARKS

DROPS SUPERCHIP: Trilogy Ltd., in its second major retreat, canceled its development of a wafer-scale integration technology and shut down its semiconductor manufacturing facilities. The move followed the company's cancellation in June of its plans to build its own computers, and major write-downs by two of its primary investors later in the summer. In addition to scrapping its four-year-old effort to develop the so-called "superchips," Trilogy laid off about half its remaining 460 employees and announced it will take a $43 million write-down, resulting in a second quarter loss of $53.3 million. The company still has $90 million in cash to fund its development of technologies for packaging and interconnecting conventional circuits. The Cupertino, Calif., firm is also negotiating with its leading investors to modify existing technology licensing agreements. In August, Digital Equipment wrote down $20.4 million of its $26 million investment in Trilogy, and a month earlier Sperry did the same for $30 million of its $42 million investment.

ONE UP, ONE DOWN: Lotus Development Corp. reported first half revenues of $60.9 million, more than four times the revenues of the first half of 1983. Net income also soared, to $15.1 million. That represents a seven-fold increase over the same period a year ago. For the second quarter, ended June 30, sales were up 316% to $32.6 million, and earnings rose 357% to $7.6 million. The sales are entirely from the flagship 1-2-3 product, since the Cambridge, Mass., software developer's second major product, Symphony, did not begin shipping until July 1. On the hardware side, Compaq Computer Corp. suffered its first profit decline since its inception, a 73% drop in the second quarter to $892,000 from $3.3 million in the first quarter. In the second quarter of 1983, Compaq had a loss of $1.23 million as it continued to ramp up shipments of its first product. The Houston micro maker's revenues rose in the second quarter to $65.9 million, a threefold increase over the same period a year ago but only 5% better than sales in the first quarter of 1984. The stagnation, as compared to the first quarter, occurred despite a 20% increase in unit volume. Compaq blamed price wars for the standstill.

LAYOFFS: Auragen Systems Corp., one of several makers of fault tolerant computer systems to have run into financial problems, was forced to lay off a third of its work force, about 30 employees, because its second round of venture capital financing is coming up short. The Fort Lee, N.J., firm also decided to terminate its efforts at selling its systems, based on multiple Motorola 68000 microprocessors, directly to end users. Instead, Auragen will continue to focus on oems and value-added resellers. So far, the firm has oem agreements with Nixdorf, Sord, and Securities Industries Software. It has shipped about 30 systems, it said. Auragen, in a first round of venture financing, had raised $41.6 million. The second round, which Auragen president Rick Martin had originally thought would be complete by early August, may be concluded sometime this month, he said. Separately, Columbia Data Products Inc. cut its work force by 35%, affecting over 300 employees in two facilities. The IBM PC clone manufacturer is suffering from IBM's aggressive PC pricing.

SETTLEMENT: Masstor Systems Corp. and Network Systems Corp. dropped their lawsuits against one another to conclude a brawling trade secrets dispute. Network Systems of Minneapolis had sued Masstor last fall, charging theft of trade secrets in the development of Massnet, a high-speed local area network that NSC thought too closely resembled its own Hyperchannel (see Off-Line, May 1, p. 145). NSC demanded $2 million in damages. Masstor, based in Santa Clara, Calif., countersued and demanded $15 million in damages, charging that NSC was trying to tarnish its reputation. Under the terms of the settlement, no money will change hands, but Masstor will drop Massnet and instead sell Network Systems' Hyperchannel under an oem agreement.

REVIVES MAGNUSON: Storage Technology Corp., which was forced to cancel its own plug-compatible mainframe project when it ran out of money for it, may finally get a PCM after all. Global-Ultimacc Systems Inc., a Boulder, Colo., systems integrator in which StorageTek is the majority stockholder, will take over the assets of Magnuson Computer Systems Inc. under a Chapter 11 reorganization plan recently approved by a federal bankruptcy court. Global will market the San Jose firm's mainframe processors and other components through the first half of 1985, the company said, after which it plans to substitute equipment from another source, possibly in Japan or Europe. Global's Ultimacc division has marketed the Magnuson equipment for two years, and said that it was taking over the firm's assets to assure that it will continue to be able to serve its customer base. Ultimacc also will add Magnuson's 35-person field engineering staff. The systems integrator, one of Magnuson's largest customers, combines the Magnuson 4300-compatible cpus with StorageTek peripherals, ITT communication equipment, and Global software. Magnuson filed for bankruptcy in March 1983.

CRIME PAYS: U.S. businesses lost $3 billion due to computer-related crimes in 1982, according to J. David Hann, president of GTE Telenet Communications Corp. Hann, who was speaking before the National Conference of State Legislatures in Boston, noted that computer crime is still on the rise, but that it is generally not taken seriously. Hann said that the average loss per incident is far higher than for other white-collar crimes. Embezzlements, he said, typically cost a firm $19,000 to $25,000, while computer thefts cost anywhere from $100,000 to $500,000, depending on whom you believe. Hann also quoted a survey conducted by the American Bar Association that indicated that 25% of the companies responding to the survey had experienced verifiable losses due to computer crimes in the past year and that the annual losses per firm ranged from $2 million to $10 million.

BOUGHT: International Computers Ltd., the British computer maker, accepted a $561 million offer to be acquired by Standard Telephones & Cables PLC, which is 37% owned by ITT Corp. of New York. The agreement comes after an earlier $516 million offer from STC was rejected as inadequate. If the merger goes through it will create a company with annual revenues of over $2.5 billion. Under the terms of the agreement, which calls for cash and stock payments to ICL stockholders, ITT would own 26% of the combined companies. Robb Wilmot, ICL managing director, was expected to stay on, joining the board of directors, but the future role of Sir Michael Edwardes, ICL chairman, was unclear.

STARTING OVER: Osborne Computer Corp. announced plans to issue $3 million in stock and to introduce its first product since the company filed for bankruptcy a year ago. The Fremont, Calif., firm says it will emerge from Chapter 11 protection this month, and offer 3 million new shares at $1 apiece. The shares will be sold only in California and overseas so that Osborne does not have to register the offering with the Securities and Exchange Commission. Proceeds will be put in escrow so that they cannot be used to offset Osborne's $30 million debt to creditors. Osborne reserved the right to issue another 11 million shares, and said that 20% of the company would be reserved for the creditors. ◉

Robotic C
Langua

IBM

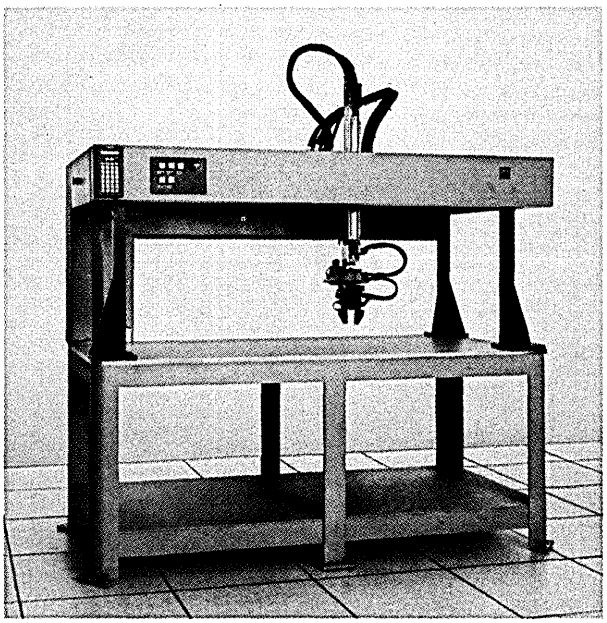
To: Jeanine
From: Bill
Subject: IBM Technology

I've been reviewing some of our past and present technological achievements, and it occurred to me that the scientific, engineering, and academic communities might like to know more about them. Will you select a topic from the following list? Thanks.

Vacuum tube digital multiplier
IBM 603/604 calculators
Selective Sequence Electronic Calculator (SSEC)
Tape drive vacuum column
Naval Ordnance Research Calculator (NORC)
Input/output channel
IBM 608 transistor calculator
FORTRAN
RAMAC and disks
First automated transistor production
Chain and train printers
Input/Output Control System (IOCS)
STRETCH computer
"Selectric" typewriter
SABRE airline reservation system
Removable disk pack
Virtual machine concept
Hypertape
System/360 compatible family
Operating System/360
Solid Logic Technology
System/360 Model 67/Time-Sharing System
One-transistor memory cell
Cache memory
Relational data base
First all-monolithic main memory
Thin-film recording head
Floppy disk
Tape group code recording
Systems Network Architecture
Federal cryptographic standard
Laser/electrophotographic printer
First 64K-bit chip mass production
First E-beam direct-write chip production
Thermal Conduction Module
288K-bit memory chip
Robotic control language

Bill—
Our robotic control language is an important factor in programmable automation. It's a terrific story—let's go with it.
Jeanine

Figure 1. *IBM's robotic control language, AML (A Manufacturing Language), is used in all robotic systems that IBM markets. Shown here is the high-end product, the IBM 7565 Manufacturing System, which represents leading-edge technology in intelligent robotics for complex assembly. This system is controlled by an IBM Series/1 computer that monitors manipulator position and sensory feedback 50 times per second, making real-time adjustments if necessary. IBM's mid-range products use AML/Entry, a simplified version of AML, enabling them to be programmed with IBM Personal Computers.*



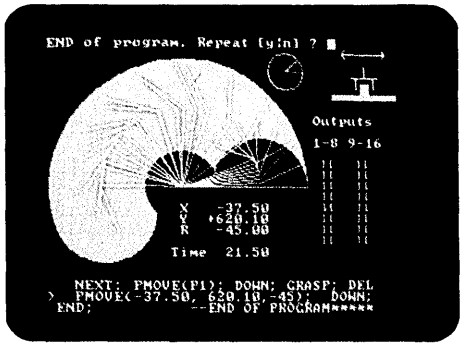


Figure 2. *This display from the AML/Entry Application Simulator is used to check the logic and efficiency of an AML/Entry program, display the robotic arm manipulation (from above), and provide timing estimates.*

Manufacturers everywhere face increasing pressure to produce products of higher quality at lower costs. Today, programmable robotic systems, with their ability to adapt to diverse manufacturing environments, are tools that help meet this challenge.

More than a decade ago, when IBM researchers began investigating flexible automation, they noted that control of manipulation was only one aspect of successful robotic applications; related tasks included terminal and storage input and output, communications, and computation. To integrate all these tasks, they designed a new general-purpose computer language and extended it with functions needed to control a robotic system.

The language that evolved, AML (A Manufacturing Language), is the most advanced robotic control language commercially available today.

In addition to robotic commands such as MOVE, SPEED, and MONITOR—which control motions through sensory feedback—AML has a wide range of communications and data processing capabilities.

AML is able to support different levels of user sophistication because of its structure: a powerful base language designed for functional enhancement through subroutines and application packages. For example, the GRASP subroutine found in many assembly applications is written in AML but is used exactly as if it were a primitive command. Experienced programmers can combine the existing base commands to construct higher-level routines.

AML is an interactive language. It provides the user with the ability to stop a program, check the logical and physical status of the system, change the program, and continue execution. This is critical for efficient development of robotic applications, which must deal with the variability of the real world.

AML has proved to be well adapted for implementing a wide variety of operator inter-

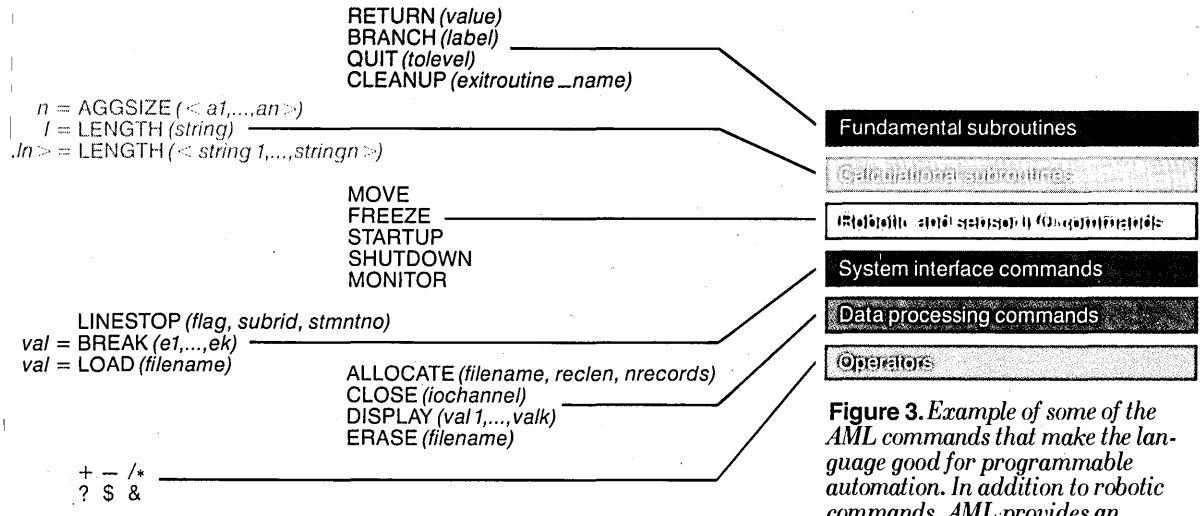


Figure 3. *Example of some of the AML commands that make the language good for programmable automation. In addition to robotic commands, AML provides an abundance of communications and data processing commands.*

ıces, including a menu-driven display screen nd the common "guiding through the motions" ıethod. In the latter, the operator moves the ıanipulator through the steps of a task by using hand-held, push-button pendant. After the perator completes the steps, the system autoıatically writes an efficient program in AML.

IBM uses its own robotic technology. For ıstance, IBM is working on computer-integrated ıanufacturing of typewriters: more than 250 'obotic units will put together most of the typewriter subassemblies in an automated plant the size of two football fields. In other sites throughout the world, IBM robotic systems are used in such applications as testing circuits, producing cables, and assembling printer type chains.

Many IBM scientists, engineers, and programmers contributed to the development of the innovative robotic control language, AML. Their contributions are only part of IBM's continuing commitment to research, development, and engineering.

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For a free technical article about IBM's robotic control language, please write: IBM Thomas J. Watson Research Center Dept. 403G/P3, P.O. Box 218 Yorktown Heights, NY 10598

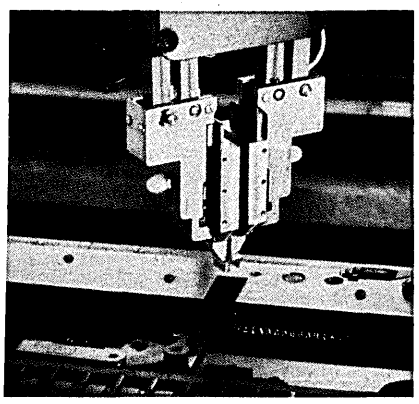


Figure 4. *In the automatic assembly of ype chains for an IBM high-speed rinter—one of the many examples of BM robotic systems at work within the ompany—an AML program is used to onsult a data base to determine the orrect sequence of type slugs. This ıpplication makes extensive use of sensng and programmed error recovery to nsure high reliability.*

```
Step_1:
 CMOVE (<feeder_app(fdr),      --Move to
         feeder_orient, .5>);    grasping
                                 position
 IF DCMOVE (<<0,0,–.75>>,
            ANY_FORCE (2*OZS),
            <.5>) THEN
   BEGIN                       --Hit something
                                 on way in
   DCMOVE (<<0,0,2>>);         --Back out
   OP_CHECK ('jammed');        --Notify
   END;                          operator
Step_2:
 cc = GRASP (0.1,              --Attempt to
             <–.04, .04>,        grasp slug
             PINCH_FORCE (1*LBS));
```

Figure 5. *This is an excerpt of AML code from the program for the application shown in Figure 4. It directs the gripper to open 0.5 inches while approaching a feeder for the next slug of type. It then moves the gripper to the grasping position and grasps the slug with a gripping force of one pound. If an unexpected force is encountered while approaching the feeder, appropriate error-recovery actions are taken.*

A tighter dp job market means even fatter paychecks are coming.

THE BIG WALLET ERA

by Larry Marion

The telephones started ringing off their hooks in April. At first the calls caught data processing managers by surprise, then they became annoying, and now they are more entertaining than anything else. After years of little demand, a legion of headhunters is making cold calls to dp shops around the country, trying to find programmers, analysts, telecommunication experts, and others.

"These people are very creative with their b.s. stories," relates William Sumner, director of management information systems for the Bullock's chain of department stores in Southern California. "It is fun listening to them."

Here's a sampler of what Sumner and his staff have heard over the past few months:

" 'Hello, I'm doing a survey on programming opportunities for women. I want to send questionnaires to all the women programmers at your organization, and I need their names and addresses.'

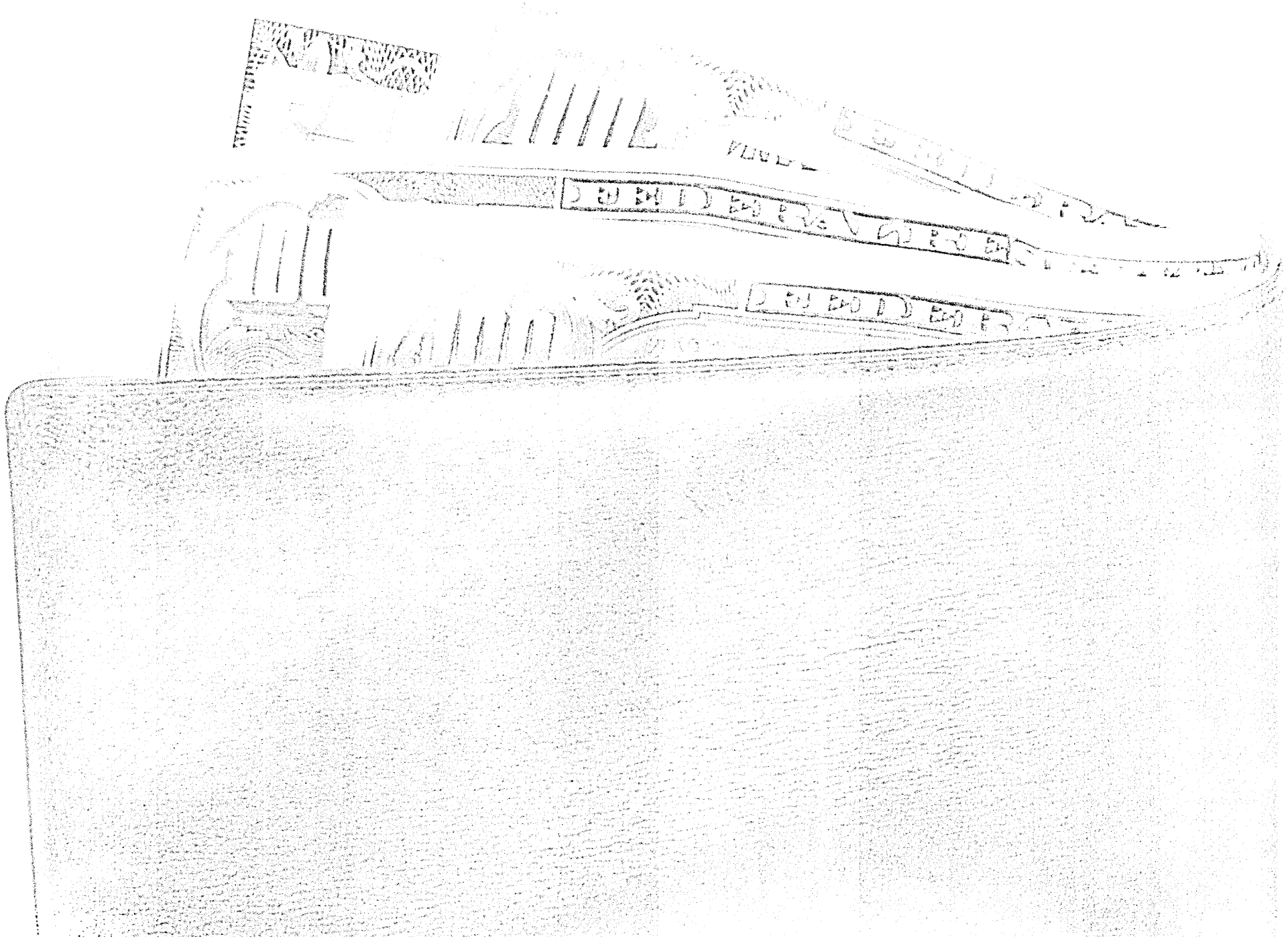
"Another time, a guy called the computer room, described himself as the editor of an IBM publication, and claimed he was in big trouble because he had lost a mailing list. He said he was in fear of his job if he didn't get a list of on-line programmers.

"God bless him, somebody here gave him the list. The next day the phones rang off the hook.

"You name it, we've heard it when it comes to cons. It's funny and it's flattering," Sumner says, and goes on to repeat other tales of brazen headhunters.

In case you haven't noticed, things are heating up. The economic recovery is bringing better times to many corporations, and their dp departments are expanding. It's not an across-the-board boom just yet, but the signals of critical skills shortages are clearly there. And just as an IF statement is followed by a THEN statement, in-

PHOTOGRAPHS BY JOEL WHITE



creased demand for experienced dp personnel inflates salaries in a classic supply and demand spiral.

The big wallet era is coming, warns the New York-based vice president of management information services for an international financial services firm. "Many dp managers saw the leveling off of the steep climb in dp salaries and thought it meant the end of an era," he says. "That was a pause, not the beginning of a new trend." Adds Daniel Roberts, manager of the management consulting department at the accounting firm of Deloitte, Haskins & Sells, Los Angeles, "Companies are trying to maintain control, not like 1977, '78, and '79, when they were adding as many as they could."

Evidence of the higher salaries, growth, and subsequent increase in turnover rates comes from the DATAMATION salary survey, which has just been completed. Earlier this year, more than 700 dp managers from across the country estimated that the average salary increase this year would be 7.8% compared to 1983, up from the 7.2% awarded in the prior year.

Managers of large shops, with annual budgets of more than $1 million, estimate that their raises will be even higher, as head counts will soar up to 20% this year and the sharp increase in demand will lead to at least a 9% turnover rate. Managers of smaller shops estimate more modest staff growth and revenue increases, but the overall trend is clear.

Double-digit raises are expected to be typical of computer centers in certain industries such as edp and financial services. Banks are also fattening the wallets of their dp employees, judging by the 9.6% raises estimated by their dp managers. The increase in consumer spending for appliances, furniture, and other household items is showing up in the 8.3% increase in dp salaries for dp personnel of the manufacturers of consumer products.

WIDE-RANGING AVERAGES

Before you run into the boss's office and demand an 8% raise, consider that these gross averages cover an especially wide range of conditions. Some industry and regional compensation, growth, and turnover rates are declining, while others are flat. Not all dp managers are stuffing pay envelopes with large quantities of extra currency these days. The uneven economic recovery—some industries and regions are doing far better than others, coupled with a mild inflation rate—means that a broad survey average blurs much of the day-to-day reality.

For example, there's bad news for

METHODOLOGY

The 1984 DATAMATION salary survey began in June with a letter sent to 5,000 dp centers in the United States, drawn at random from the magazine's list of the top official at each of the 60,000 computer sites identified from the subscription list. Enclosed with the letter was a five-page questionnaire and a small financial incentive.

Seven hundred fifteen key officials completed the questionnaires, which asked for the current annual salaries of 43 separate dp positions; most of the responses came from dp managers, though many were completed by the personnel office. In addition, the questionnaires inquired about staff growth, the average percentage salary increase, and turnover rates last year and this year.

Of the 715 respondents, most were from major population centers, including Boston, New York, Philadelphia, Detroit, Baltimore/Washington, D.C., Atlanta, Denver, Houston, Dallas, Chicago, Minneapolis/St. Paul, Cleveland, Cincinnati/Columbus, St. Louis, Seattle, Los Angeles, and San Francisco. Because of its size, the New York labor market was further divided into two segments: Manhattan and the other boroughs and suburbs.

Most of the dp shops responding to the survey had an annual dp budget of $500,000 or less, and an average head count of more than 13 individuals.

The respondents' questionnaires were also sorted by principal activity of the dp department's parent organization. The largest segment, about 30%, was made up of manufacturing organizations; followed by the miscellaneous segment, 15%; dp services, 13%; distributors, 11%; education, 7%; business services and government, 6%. Other categories included in the survey are banking, other financial services, medical/legal, and transportation and utilities.

—L.M.

JOB DESCRIPTION GUIDE

Respondents to the salary survey matched, as closely as possible, their staff categories to the following job descriptions.

Vice president: The senior executive for all corporate information systems. Responsible for long-range planning, budgeting, and operations.

Director of dp: In charge of all dp at the divisional or departmental level. Responsibilities parallel those of corporate officers, but may be at least partially guided by decisions made at corporate level.

Services coordinator/user liaison: Works for dp department and end users; represents users when operational problems occur.

For the seniority levels in each of the following categories, refer to the section on job levels below.

Systems analysis: Confers with users to define and formulate logical statements of business problems and devise procedures for solutions through use of dp systems.

Applications programming: Develops, designs, and prepares computer programs.

Systems analysis/programming: Performs the functions of both the systems analysis and applications programming positions.

Operating systems programming: Programs, maintains, and introduces modifications to systems software.

Computer operations: In charge of equipment, data entry, production control, and postprocessing, but not of systems analysis, application programming, or other development functions.

Production and I/O: Sets up and schedules jobs for processing so as to maximize and control utilization and meet turnaround requirements.

Data entry: Perform data entry and verification functions.

Office automation: Operation of word processing equipment, intelligent typewriters, terminals for text editing/word processing.

JOB LEVELS

Manager: Advanced degree and minimum five years experience or equivalent combinations. Performs personnel evaluations, budgeting, progress reporting, and project management.

Lead: Bachelor's degree or equivalent and minimum four years experience in dp with two of those years in a supervisory capacity. Performs all levels of supervision, generally as a project manager.

Senior: Bachelor's degree or equivalent and minimum three years experience including some supervision.

Intermediate: Bachelor's degree or equivalent and minimum two years experience. Requires direction on some activities.

Junior: Two to four years college and minimum six months experience or equivalent combination. Directly supervised.

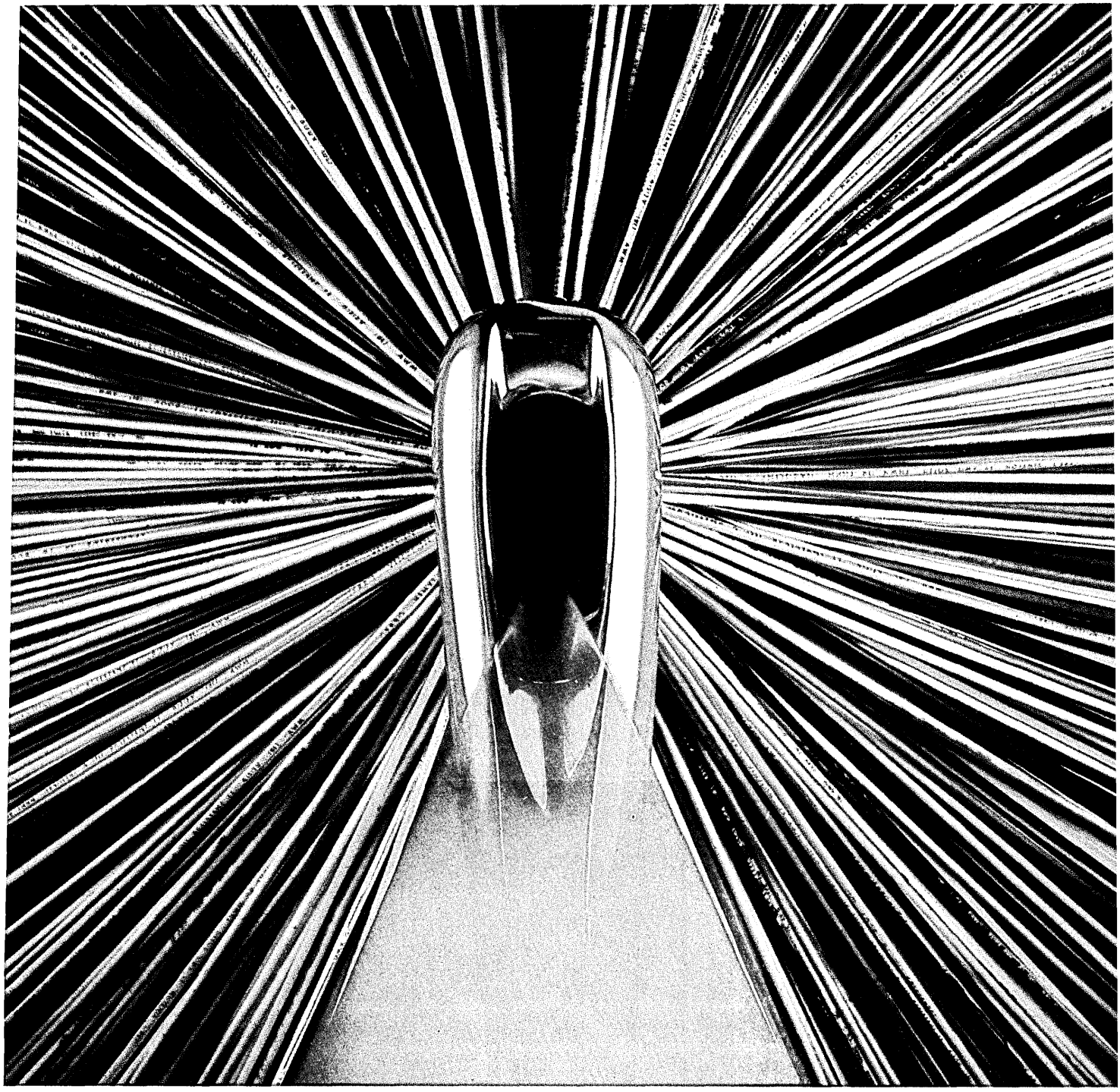


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FIG. 1

ANNUAL SALARY INCREASES AND TURNOVER RATES IN 1984, BY INDUSTRY

(IN PERCENT)

	AVER.	MFG. CONS.	MFG. IND.	BANK	FIN	EDP	OTHR SERV	DIST	GOVT	MED/ LEGL	TRAN UTIL	EDUC
Salary	7.8	8.3	6.7	9.6	10.9	11.3	8.9	6.9	6.2	7.9	5.7	5.5
Turnover	4.4	4.1	3.4	7.8	4.8	6.4	4.6	4.0	3.8	5.3	4.7	2.8

FIG. 2

ANNUAL SALARY INCREASES AND TURNOVER RATES IN 1984, BY REGION

(IN PERCENT)

	AVER.	BOSTON	MANHAT	NYC	PHILA	WASH/ BALTI	ATLNTA	DALLAS
Salary	7.8	9.7	10.4	7.3	7.1	7.0	7.9	7.0
Turnover	4.4	5.1	6.6	8.7	2.7	2.7	3.2	2.0

	CHICAGO	MINN	CLEVE	CINCIN/ COLUMB	DETROIT	SAN FRAN	LOS ANGELES
Salary	7.9	6.7	5.8	8.0	8.0	7.6	12.3
Turnover	5.5	0.8	2.4	4.1	3.8	5.5	3.7

dp shops that share one trait—oversight by the federal government. Paltry raises come from the utility, transportation, and education sectors—nuclear power woes, airline fare wars, and Reagan Administration cutbacks in funding for schools are but a few of the regulatory traumas taking their toll, with average dp salary increases of 5.7% for the utility and transportation sectors and 5.5% for education.

Below-average salary increases are not surprising in areas like Cleveland, still trying to recover from the recession's wounds and with loads of unemployed casualties to pick from. Minneapolis and Seattle are other areas where dpers won't have to go out and buy stronger wallets to hold their paychecks.

A consolation for dpers in industries and areas where below-average raises are expected: compared to American workers as a group, dp personnel are not going to do too badly this year.

The average wage rate increase for American workers in 1983 was 3.3% and is expected to rise to a mere 5.3% this year, according to economists at Wharton Econometric Research Associates, Philadelphia. Dp personnel are even expected to do better than the average American executive, according to a recent survey by Sibson & Co., Princeton, N.J.—the increase in base salary this year for executives is expected to run around 7%, although the profit sharing and other executive bonuses will increase their total compensation to the 11% range. Even in the rarefied air of the largest American corporations, there are indications that overall salary increases

FIG. 3

AVERAGE ANNUAL DP SALARIES BY INSTALLATION SIZE

JOB TITLE	ALL	OVER $1 MIL	UNDER $1 MIL
Vice President	47,562	67,650	44,772
Director of DP or MIS	36,264	49,158	35,155
Service Coordination/User Liaison	27,794	27,949	26,881
Manager of Systems Analysis	37,526	41,500	36,484
Senior Systems Analyst	35,671	35,100	35,456
System Analyst	26,420	28,278	26,265
Manager of Applications Programming	33,131	42,700	31,548
Lead Applications Programmer	29,756	38,143	27,728
Senior Applications Programmer	26,900	33,425	25,425
Applications Programmer	22,121	25,692	21,286
Junior Applications Programmer	16,907	19,530	16,536
Systems Analysis/Programming Manager	32,378	40,885	30,148
Lead Systems Analyst/Programmer	33,714	46,028	30,874
Senior Systems Analyst/Programmer	30,461	34,992	28,647
Systems Analyst/Programmer	25,123	28,478	23,842
Manager of Operating Sys. Programming	34,877	43,934	30,651
Senior Systems Programmer	33,947	35,102	32,800
Manager of Database Administration	29,850	55,000	26,706
Manager of Computer Operations	24,071	31,080	23,240
Shift Supervisor	20,237	20,864	20,241
Lead Computer Operator	17,416	19,314	17,091
Computer Operator	14,685	15,626	14,588
Control Clerk	13,867	14,518	13,595
Data Entry Supervisor	15,875	18,500	15,835
Data Entry Operator	13,012	12,740	13,054
Word Processing Supervisor	17,750	24,750	17,086
Word Processing Operator	14,435	17,537	14,230

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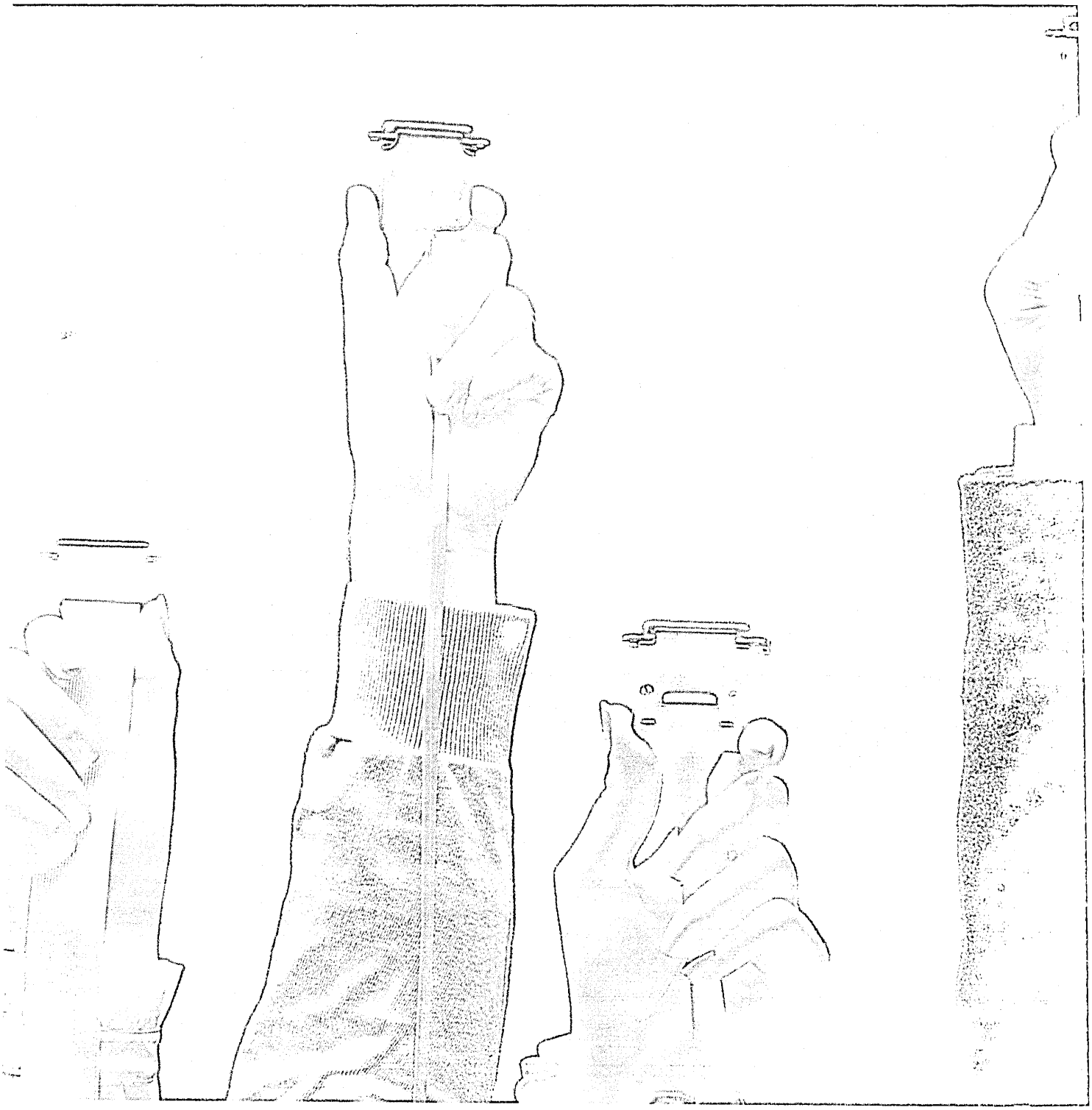

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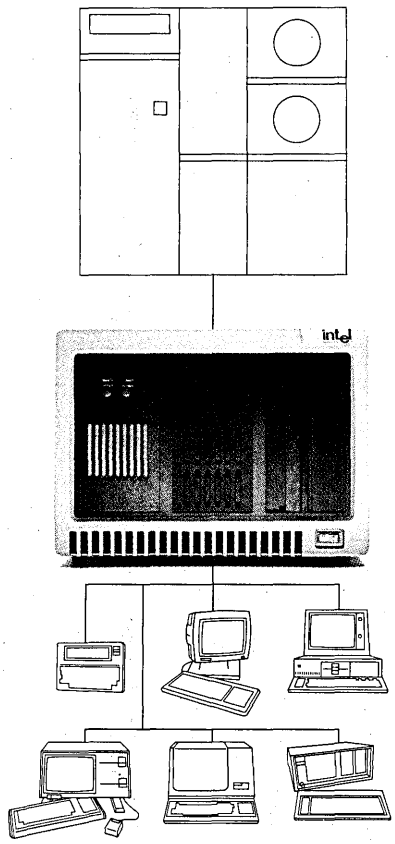

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CIRCLE 57 ON READER CARD

FIG. 4

AVERAGE SALARY BY INDUSTRY (IN $)

TITLE	MFG ALL	MFG CON	IND	BANK	FINANC	EDP
Vice President	47,562	42,512	47,500	63,500	39,075	51,015
Director of DP/MIS	36,264	35,004	35,316	47,333	39,686	51,000
Services Coordination/User Liaison	27,794	26,750	24,833	24,360	NA	34,966
Manager	37,526	35,250	33,200	52,000	46,000	40,944
Senior Systems Analyst	35,671	29,000	32,500	32,500	39,000	42,120
Systems Analyst	26,420	27,000	27,220	30,000	32,000	28,750
Manager of Applications Programming	33,131	31,167	37,500	55,000	33,333	37,950
Lead Applications Programmer	29,756	26,375	27,750	NA	26,500	35,538
Senior Applications Programmer	26,900	26,583	26,974	44,000	22,167	32,292
Applications Programmer	22,121	19,740	22,138	23,000	20,500	23,483
Junior Applications Programmer	16,907	16,236	17,111	NA	18,833	19,667
Manager of Systems Analysis/Programming	32,378	29,667	31,194	NA	29,728	38,697
Lead Systems Analyst/Programmer	33,714	28,750	29,333	NA	25,800	40,857
Senior Systems Analyst/Programmer	30,461	28,540	27,068	NA	26,658	39,133
Systems Analyst/Programmer	25,123	25,543	23,472	22,800	23,147	30,666
Manager of Operating Sys. Programming	34,877	30,667	34,552	NA	NA	42,507
Senior Systems Programmer	33,947	31,203	38,500	NA	30,000	44,022
Manager of Computer Operations	24,071	24,366	24,138	NA	24,343	24,124
Shift Supervisor	20,237	20,600	19,625	NA	NA	17,180
Lead Computer Operator	17,416	17,766	17,118	11,000	18,043	16,734
Computer Operator	14,685	15,200	14,713	10,500	15,082	15,099
Control Clerk	13,867	14,467	12,880	NA	NA	12,491
Data Entry Supervisor	15,875	15,143	18,164	32,000	13,958	14,252
Data Entry Operator	13,012	12,994	13,676	12,167	11,220	11,820
Word Processing Supervisor	17,750	NA	17,583	30,000	18,800	21,000
Word Processing Operator	14,435	14,000	14,368	22,000	20,000	12,072

AVERAGE SALARY BY REGION (IN $)

TITLE	ALL	BOSTON	MANHAT	NYC PHILA	WASH/ BALTI	ATLNTA	DALLAS
Vice President	47,562	50,357	80,000	55,240	42,111	59,278	40,667
Director of DP/MIS	36,264	41,000	58,875	43,406	40,000	40,864	32,529
Services Coordination/User Liaison	27,794	36,000	34,500	35,933	24,500	37,500	NA
Manager of Systems Analysis	37,526	38,000	51,000	45,700	36,000	36,875	NA
Senior Systems Analyst	35,671	51,000	45,500	37,640	40,100	29,800	41,000
Systems Analyst	26,420	23,000	28,000	28,000	31,667	24,000	NA
Manager of Applications Programming	33,131	27,500	34,000	45,375	43,000	35,167	25,000
Lead Applications Programmer	29,756	20,000	49,667	37,750	34,500	21,056	NA
Senior Applications Programmer	26,900	26,333	38,000	33,200	38,000	21,200	NA
Applications Programmer	22,121	22,250	25,000	26,917	20,600	22,333	18,594
Junior Applications Programmer	16,907	17,333	24,000	18,487	NA	15,200	16,498
Manager of Systems Analysis/Programming	32,378	34,833	NA	43,833	47,600	30,750	25,000
Lead Systems Analyst/Programmer	33,714	35,000	75,000	36,300	42,333	28,000	55,000
Senior Systems Analyst/Programmer	30,461	30,000	44,500	34,460	31,864	27,400	35,000
Systems Analyst/Programmer	25,123	25,500	30,667	29,062	24,667	28,500	NA
Manager of Operating Sys. Programming	34,877	41,000	NA	55,000	44,000	32,000	NA
Senior Systems Programmer	33,947	NA	50,000	45,000	35,350	35,000	NA
Manager of Computer Operations	24,071	18,500	37,500	28,417	21,800	22,033	17,500
Shift Supervisor	20,237	18,000	NA	22,800	NA	18,500	NA
Lead Computer Operator	17,416	15,873	23,000	17,540	16,416	14,375	16,983
Computer Operator	14,685	13,806	17,675	14,769	16,700	13,827	9,710
Control Clerk	13,867	NA	14,300	15,420	NA	12,000	NA
Data Entry Supervisor	15,875	14,340	18,200	20,650	15,500	14,583	17,500
Data Entry Operator	13,012	11,520	14,267	13,452	12,868	12,240	12,333
Word Processing Supervisor	17,750	10,000	35,000	24,000	15,500	20,333	NA
Word Processing Operator	14,435	15,500	19,500	17,317	14,000	13,000	NA

NA: not available

OTHER SERV	DISTRB	GOVMT	MED/ LEGAL	TRANS/ UTILS	EDUC
51,125	50,428	32,180	55,500	46,250	43,250
39,408	34,990	34,796	38,376	30,996	28,860
40,000	27,833	24,000	19,700	NA	20,500
40,700	29,333	32,460	25,000	NA	37,967
39,200	31,545	32,257	26,000	24,000	36,700
29,500	25,500	19,684	NA	NA	21,750
44,000	25,896	29,725	23,800	NA	22,500
50,000	28,250	25,685	20,000	NA	NA
22,000	21,100	25,000	30,000	NA	19,333
16,500	20,175	22,335	22,000	21,737	17,000
16,000	14,167	16,320	12,000	NA	13,200
36,750	26,287	34,254	26,625	34,000	31,460
37,500	34,650	28,100	NA	39,000	27,583
25,000	27,000	25,188	23,650	37,000	31,000
26,375	18,457	27,149	21,268	27,800	27,113
NA	NA	25,000	NA	NA	NA
NA	29,650	30,500	NA	26,000	32,700
29,750	18,700	24,225	19,537	26,800	30,919
20,000	23,750	19,000	NA	24,000	NA
NA	17,220	21,822	15,933	16,664	16,320
14,567	14,115	15,872	12,902	12,875	15,686
16,000	13,393	15,252	14,500	NA	15,001
15,833	16,360	16,344	17,500	19,133	15,100
14,020	13,159	13,619	13,209	15,082	11,565
20,500	15,333	16,010	13,333	18,000	17,100
13,219	17,300	14,193	15,000	16,000	12,860

CHICAGO	MINN	CLEVE	CINCIN/ COLUMB	DETROIT	SAN FRAN	LOS ANGELES
41,667	60,000	36,250	37,833	49,667	42,429	58,000
36,873	33,473	34,020	30,854	33,333	43,750	46,500
30,000	NA	NA	19,440	18,500	31,000	19,000
32,760	41,000	36,000	33,500	17,000	47,520	38,060
32,959	34,750	35,833	31,250	54,000	42,667	44,667
NA	29,000	NA	23,250	13,400	32,333	32,000
31,567	42,000	NA	28,025	NA	34,750	32,750
20,000	40,000	22,000	30,000	NA	29,000	27,000
26,875	37,000	30,000	24,833	NA	28,000	35,000
19,798	26,700	19,500	37,500	15,500	21,750	20,685
18,667	21,000	18,000	19,000	12,000	16,880	18,083
32,180	33,150	31,000	34,267	24,250	35,333	NA
24,300	34,500	25,000	35,000	30,000	37,250	36,000
NA	26,952	32,000	30,500	39,000	30,070	NA
25,749	22,071	30,000	26,000	25,000	26,333	29,000
32,000	60,000	23,760	35,000	NA	26,000	33,000
27,150	38,000	NA	30,000	NA	39,000	NA
26,518	21,300	25,828	26,167	12,000	23,543	30,250
17,000	23,500	20,000	NA	NA	25,000	NA
16,281	15,300	15,850	18,167	16,931	21,929	NA
15,059	17,583	15,643	12,725	13,627	15,467	19,187
13,026	18,500	NA	12,000	NA	14,000	NA
14,500	15,300	16,000	11,000	16,167	16,478	19,970
13,233	13,133	12,584	12,586	13,960	14,072	15,928
16,000	18,000	NA	20,000	12,500	18,400	18,500
15,000	14,500	14,750	16,000	11,688	16,500	14,240

will lag behind those achieved by dp personnel this year. The Conference Board recently reported that a survey of its Fortune 1,000 members showed an average increase of 6.5% this year, and another 6.5% expected in 1985, increases significantly below the level estimated by dp managers for the DATAMATION survey.

Another silver lining on dp salary increases is that they are expected to exceed the inflation rates. Wharton economists estimate that compared to last year the consumer price index inflation gauge will run about 4% this year and on into 1985. As many dp managers focus on inflation as one of the prime determinants of merit increases, shops in areas with a plentiful supply of savvy analysts are not pressured to inflate the payroll.

In Minneapolis, for example, General Mills has a hard time finding CICS programmers and telecom experts, but in general is not suffering from wholesale personnel shortages. "We made the decision, in view of the low inflation rate, for across-the-board 5% to 6% salary increases," says James Bird, director of information services. "We've had the opportunity to select from a well qualified group when we've had openings."

In Los Angeles, Bill Sumner of Bullock's relies on local salary surveys to determine the level of merit increases for his staff of 110 programmers, operators, and support staff, and he suspects that the pressure of the demand in the Los Angeles area will be reflected in the upcoming surveys. He says he will boost the percentage increases to stay competitive. He anticipates that "the first financial manifestations of a tightening job market will be seen six months from now," and speculates that "if there's a material change in survey, it will hit the dollar line in early 1985." He thinks the evidence suggests that demand will boost merit increases.

BOTH COASTS AFFECTED

The tightening job market, and its impact on salaries, is also being felt on the other coast. "During the recession, not too many local companies were growing their staffs," notes Bradford Sweet, group director of MIS at Wang Laboratories, Lowell, Mass., outside of Boston. "Now, as the economy improves, and companies speed up their operations, turnover may increase. Data General and DEC will do some hiring, and the old-line companies in the area will pick up too." Wang did its wallet fattening a few years ago, but the demand for people may be pushing the typical salary increase above the level Wang is now paying.

The uneven economic recovery means dpers in many regions and industries won't need fatter wallets.

"In 1981 we thought we were not competitive with the market in terms of salaries, so 1981-82 salary increases went up 13%, in part due to inflation," Sweet says. "In 1982-83, they went up 9% to 10%, and 1983-84, up about 8.5%." That compares to a local average increase of about 9.7% for 1984, so Wang may find itself behind the eight ball again.

The boom and bust cycles of the economy are having quite an effect on Wall Street. Banks are reeling from the cost of nonperforming loans to third world countries. Major brokerage firms are showing losses. Yet, dpers are not involved in the bulk of the financial industry layoffs. "The brokers may be shrinking people, but not in dp," contends Warren Kornfeld, currently a dp recruiter for Management Recruiters International Inc. in Woodbury, N.Y., and formerly head of dp at National Shoes in New York. "Dp project plans are one to three year projects, and they are not affected by the market's volatility. I haven't been touched by the recession in three and a half years." Adds the MIS vp for a major financial services firm, "The brokerage industry feels itself short of talented systems programming people, and if there are layoffs in that area, dp managers are only using that as an excuse to drop weaker personnel."

No matter what the region or industry, dp managers facing the perennial question of how to divide up the extra cash report serious attempts to give higher awards to their more productive personnel. "When salary budgets decline, or increases are smaller, dp managers become more selective about who gets what," explains Edward T. Redling, president of Executive Compensation Service Inc., the Fort Lee, N.J., subsidiary of the Wyatt Co., an actuarial and consulting firm. "When salary increases decline to the 5% or 6% level, the [budget increase] pie is not that big, and managers have to do some judicious selection of who gets what. They use the size of the salary increase to differentiate and reward outstanding performance."

Herbert Woods, vice president at Wall Street brokerage firm Paine Webber, says that in the past, "merit increases have ranged from 6% to 10% annually, and usually 8%, but this year they'll be around 6%," due to the doldrums in the stock market. He'll use the traditional end-of-year bonus, however, to reward higher performance personnel.

"Six percent sometimes causes unhappiness, but we can make it up in bonuses," Woods explains. "Last year two guys were disappointed with 6%, but later we gave them big bonuses. In brokerage, bonuses can run to 12% to 15% of salary, but in 1983, it was 11%. I've given as much as 20% based on performance. I can recall last year giving some guys 5% or 6% in bonuses and others getting 16%."

Adds Richard Kislowski, vice president for information services at Denny's Inc., Los Angeles, "We will focus on greater differential on outstanding performers in the future. Nobody will see an average—some will see less, others will see three, four, or five percentage points more than an average." Sumner of Bullocks adds, "While others lean toward a cost-of-living type of raise, we place a disproportionately large amount of raise on merit. We give the most to the best."

More judicious use of the available dollars has become the hallmark of dp management these days. Even in areas where potential employees are plentiful, dp managers are developing new strategies for bringing people in the door and keeping them there. "It's a difficult time to attract people, regardless of money, because it's a technology market out there," contends Bob Regazzi, vice president of management information systems at Schering Plough, the New Jersey-based pharmaceutical company. "People are interested in working with state-of-the-art equipment."

NOTHING LIKE CASH

Benefits such as reimbursement for education, company cars, and other perks continue to be popular, as noted last year ("1983 Dp Salaries—The Key Word Is Perks," September, p. 82). But there's nothing like cash to attract people. "We do not look at prior salary history," says Woods of Paine Webber. "If we need someone and find someone with the skills, we make the offer. We've paid 20% to 25% over current salary." Any possible inequities that might develop between the newly hired bonus baby and the veteran employees are corrected with the bonus, he quickly adds.

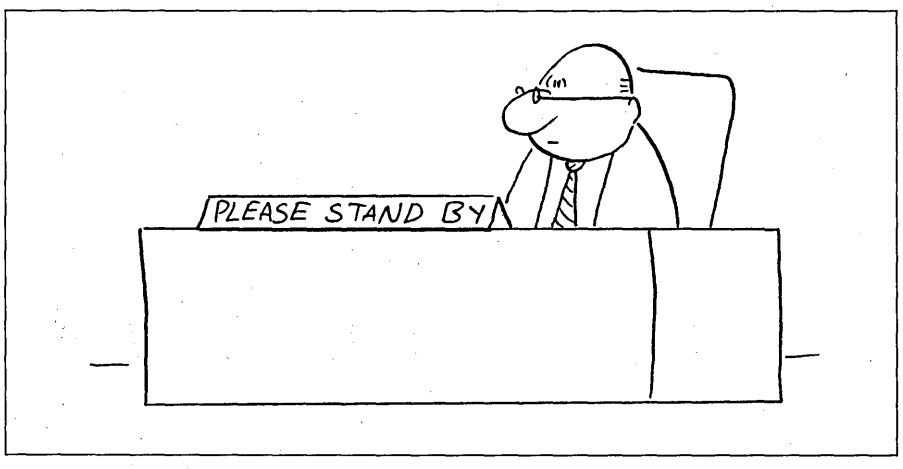
No matter how much money a dp manager has to offer, finding additional qualified systems programmers is an almost impossible chore these days. "It's hard to get systems development personnel," relates Regazzi of Schering Plough. "Nothing has happened so far to drive us to offer packages way out of line, but they're at a premium."

John Mariana, vice president for information at Anixter Bros., a Chicago-based electrical equipment supplier, sounds disgusted as he relates his experiences trying to fill, and keep filled, key dp slots. "We have been paying higher prices than we would like to, higher than we feel they should be. We don't feel the skill level justifies the salary."

A few years ago, says New York dp recruiter Max Sabrin, the primary demand was for people with COBOL programming experience, but now CICS, IMS, and other big mainframe systems are the key need. "I can get them three appointments, like *that,*" he says, snapping his fingers.

The shortage of systems programmers extends all the way up the chain of command to management. "We have worn ourselves out looking for programmers with three to five years of experience," says Sweet at Wang. "It is hard to find a true project manager who understands all facets of the process and has the necessary people skills. Many have a background in systems analysis, but they lack other background, such as people skills, the soft skills."

Another tight area where demand clearly exceeds supply is telecommunication expertise. "This is the era of telecom and databases," declares dp recruiter Kornfeld. "It had been in the fetal stage, now it is spurting." He says that a New York-based manager of telecommunication can command a salary of between $60,000 and $100,000 per year, significantly above



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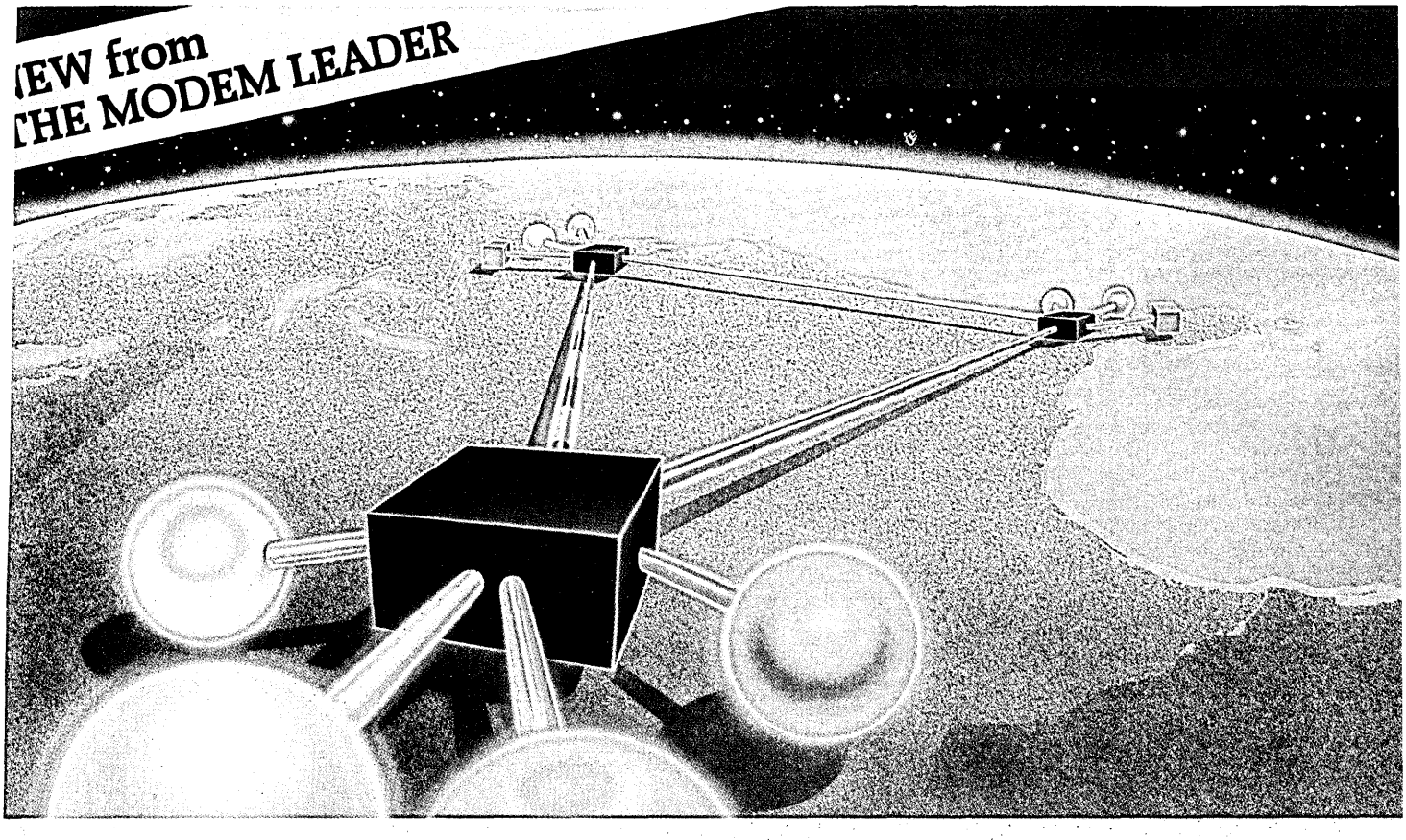

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"We have worn ourselves out looking for programmers with three to five years of experience."

the level found in the DATAMATION survey. Adds the vp of MIS at a financial services firm, "People who know both voice and data are scarcer than hen's teeth. Network designers, with voice and data experience, are essentially unobtainable."

Many dp managers, and indeed, most of corporate America, blame a lot of their telecommunication problems on the divestiture of AT&T's operating companies. "It made the mundane part of telecom effort worse," notes Kislowski of Denny's. "Before, people would just have to do some design work, and AT&T would take care of the details. Now they have to spend time patching and fixing problems that are the result of poor communications with Bell operating companies."

The West Coast MIS vp for a major DOD contractor elaborates. "The telecom environment is different than in the past," he says. "Now people are running their own telephone company within their company. These telecom managers are not used to the responsibilities. They don't have much of a management background because before it was not hard to run the function—just know the tariffs, the telephone company did all the work."

Sumner at Bullock's and Sweet at Wang both took the same approach to filling the need for telecommunication expertise—grow 'em yourself. "We had to train, develop people internally for the network control operations," relates Sweet. Sumner boasts he staffs up his operation with personnel from other departments in the stores. "A budding actress is our datacom manager right now," he says. "She came to us out of college, worked in computer operations, and had a real flair for hooking up crts. So we sent her to technical schools."

The growing popularity of database management systems has, naturally enough, led to demand for DBMS expertise. "There's a tremendous scarcity of database people,"says Kornfeld, "such as IMS programmers. Since Cullinet's IDMS is being used in large shops, and is a derivative of IDS from Honeywell, the users' needs are being met with IDS experience."

Dp managers with tight cost controls report that they are offsetting the personnel shortages by buying programmer productivity aids and other tools. Sumner has more than a dozen at Bullock's, he says. Kislowski of Denny's notes, "We are extremely happy with fourth generation packages, such as Focus. We do prototyping on it and use it extensively for reports, decision support, and databases."

Others warn that these tools are no panacea for long-term demands. "The productivity growth that dp managers are getting from improved technology will at best keep the growth rate constant," a vp for MIS contends. "Otherwise, I think we are stuck with exponential growth." ◉

The 1984 DATAMATION salary survey is now for sale in report form. It contains more than 160 pages of tables showing the average salaries for 45 different dp jobs in 18 major geographic areas and is broken down by 12 industry sectors. Single copies are $100. To order, send a check to Laurie Schnepf, director of research, DATAMATION, 875 Third Ave., New York, NY 10022.

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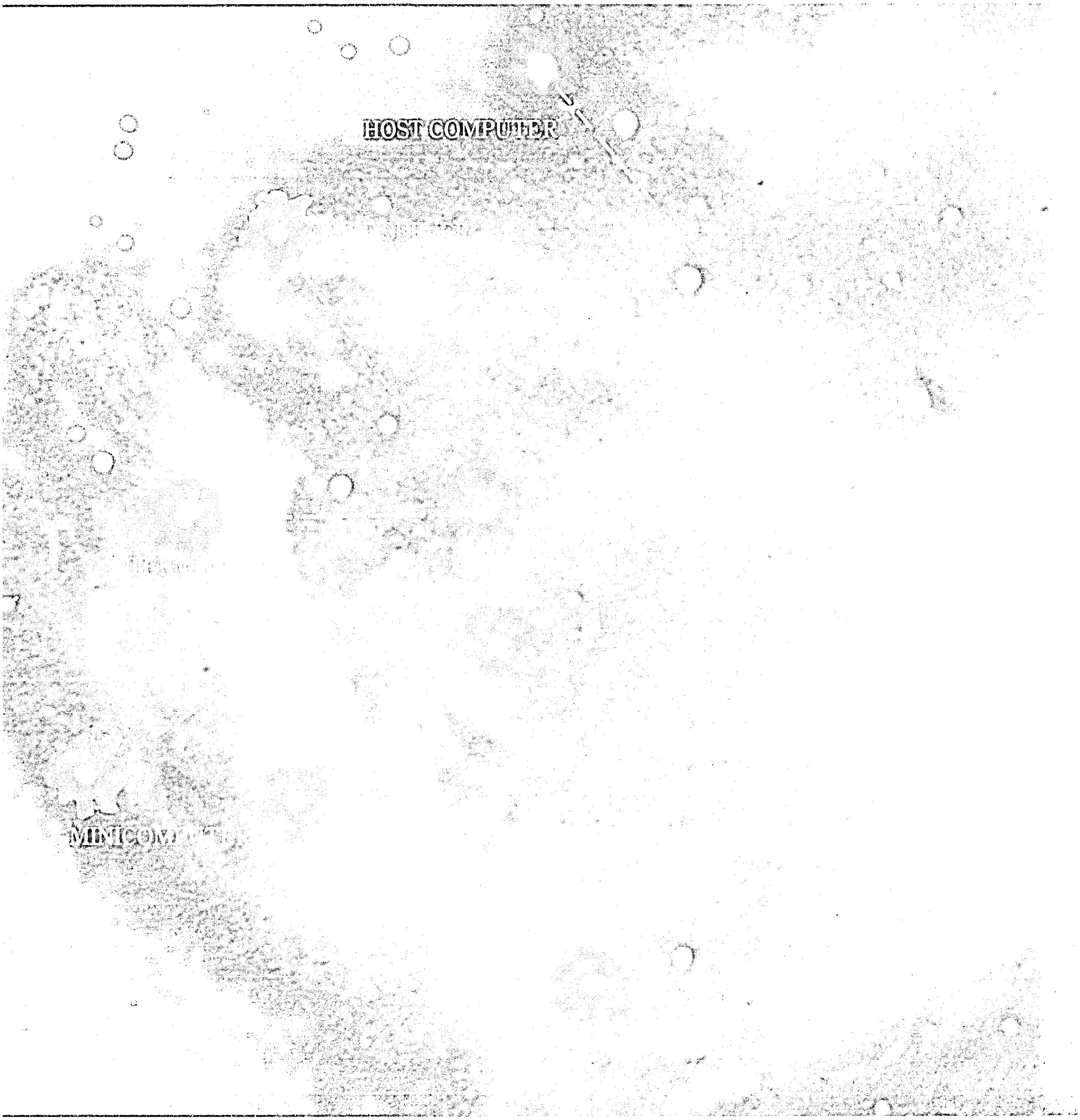

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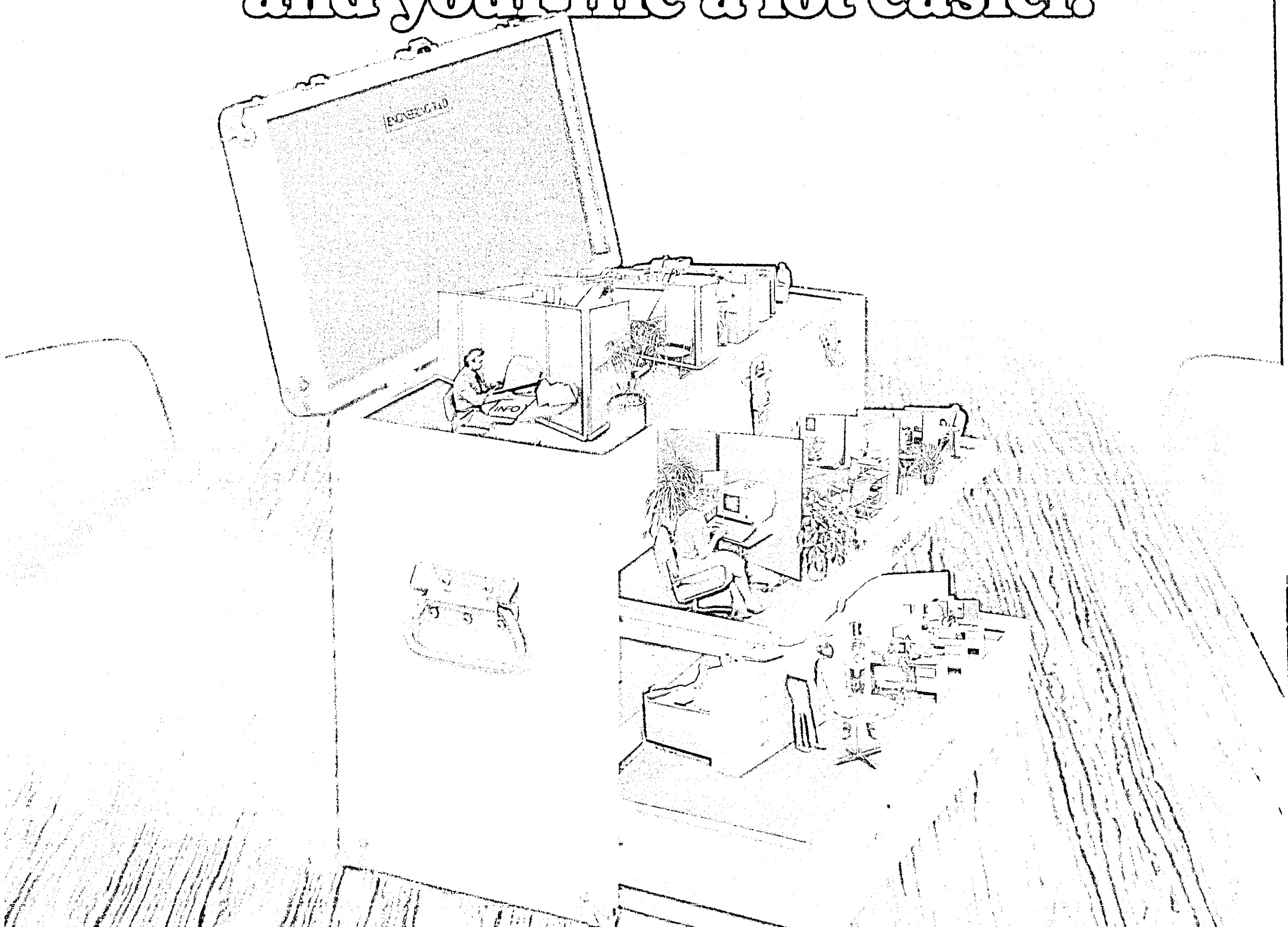


European dp managers face obstacles that might surprise their American colleagues.

THE CHALLENGE OF USERS AND UNIONS

by Andrew Friedman, Joan Greenbaum, and Michael Jacobs

Like their American counterparts, most European dp managers are eager to fully involve users in the design process and to give them what they need, rather than what they say they want. But here the similarity ends. The history and culture of European data processing departments have given rise to a different set of attitudes and methods. Firms doing business with European dp departments should be aware of some marked differences.

In the Sept. 1 issue ("Wanted: Renaissance People," p. 134), we reported the results of an in-depth survey of U.S. dp departments. Our research also includes extensive interviews with dp managers in England, Norway, and Sweden, which, when grouped together, shall be referred to as Europe (see "Methodology," p. 94). There were some very interesting findings. For example:

- European dp managers have less control over decision-making within their departments and their firms.
- A history of working with users is more common in European firms than in American firms.
- European managers prefer to try new methods and procedures rather than alter the organizational structure.
- Contrary to the American image about formal European education, European firms put less emphasis on college degrees for programming and systems staff.
- Programmers and analysts are heavily unionized in Europe, which gives these staff members more of a say in departmental policies.
- European dp salaries are more in line with average white-collar salaries and do not tend to climb as rapidly as American wages.

Large firms in Europe are highly unionized, and this applies to white collar as well as blue collar staff. Dp personnel, including professionals like programmers and analysts, are likely to be union members. While data on union membership rates are hard to come by, about 53% of all programmers and analysts in the firms we surveyed were trade union members. Only 13% of data processing staff in the American sample are union members, and virtually all of these are in the public sector. European unionization rates are lowest in service bureaus and manufacturing firms, where only about a quarter of the professional staff belong to a union. While this is low by European standards, it is in stark contrast to the absence of any union membership in this area in the U.S. (see Fig. 1).

The strong presence of unions clearly alters the options that management has in making organizational changes. European trade unions often resist quick departmental reorganizations as they may result in a deterioration of working conditions or status for some of their members. In a fairly common move, a Swedish firm recently set up a service bureau as a separate company to avoid union restrictions.

UNIONS NEGOTIATE FOR ALL

In most large European firms, salary levels, as well as certain hiring and firing procedures and even promotional opportunities are negotiated by unions for all white collar staff, including dp professionals. It is often difficult, therefore, for dp managers to act on raising salaries or promoting staff without upsetting the negotiated salary structure for the entire firm. At least 50% of those interviewed said their salary and promotion policies had to be approved outside the department. In a parallel survey, American managers had more of a free hand in this matter; only 25% reported that their staffing decisions had to be formally approved elsewhere.

One European manager even said that "data processing staff are sometimes in a worse position compared to other staff because dp is a small fraction of the union so wages are sometimes lower." Programmers and analysts in larger firms rarely see the special salary hops to which American dp staff have become accustomed.

Compared to their American counterparts, entry-level programmers and analysts in Europe are much less likely to have a college or university degree. Seventy-three percent of European managers hire programmers without a college degree, while only 30% of American managers in our survey would consider this option (though the educational systems are not, of course, precisely comparable). In general, a college degree, whether in computer science or any other field, is not necessarily expected. Since most large European firms train their own programmers, they are less interested in hiring staff with college credentials. At the programmer/analyst level, 65% of European managers accepted candidates without degrees, compared to 16% of American managers (see Fig. 2).

For almost 30 years, the market for experienced systems and programming staff has been very tight in Europe. The fact that most large firms train their own programmers makes the problem of labor turnover all the more serious. As in the United States, young programmers and analysts commonly start out in major firms. After two to four years, they move on to higher paying jobs in service bureaus. Firms in the computer service sector are those least likely to be unionized and most able to offer attractive salaries and promotional opportunities.

There is tremendous concern in Europe about service bureaus luring junior dp staff away from large firms just when these people are beginning to yield a return on their training costs. Data processing managers in user firms complain continually about this form of personnel raiding. The British call it poaching, and a 1980 study by the Central Computing Telecommunications Agency of the British government suggested limiting training of new staff and restricting less experienced staff to maintenance work to help minimize the damage caused by poaching.

An expanding European economy may bring back the demand for trained programmers and analysts.

In recent years, poaching has become less of a problem, mostly because the recession has reduced the demand for programmers. This respite could be short-lived, however, as an expanding European economy may bring back the demand for trained programmers and analysts.

Recently, European governments have been pushing educational institutions to provide more practical education in a range of computer-related subjects. The British government has made information technology a high priority for new appointments in all universities. It has also developed a wide range of short-term training programs through the Manpower Services Commission.

The Swedish and Norwegian governments have initiated a number of university departments to teach the new subject of "informatics." Informatics deals with the handling of information, communications, and systems analysis, rather than the mathematical focus of the traditional computer science degree. While the equivalent of informatics does not yet exist in the U.S., it can be conceived of as a liberal arts program featuring both humanities and technical subjects. As we pointed out in our earlier article on the American scene, dp managers here are eager to hire generalists to work with users. Indeed, the informatics degree might very well fit the bill in the U.S.

The tide of user involvement in dp functions has risen rapidly on both sides of the Atlantic. User-driven systems are becoming more common, as is computer literacy among end users. Both trends lead to more sophisticated users who demand more from dp departments and who have less patience with long delays in systems development or operational bottlenecks.

GETTING THE USERS INVOLVED

The European approach has been to fully emphasize user involvement in the system design process. In Sweden this has gone as far as pushing methodologies, like system sketches, that let users handle the design phase. The Norwegians have taken another tack. They choose to foster user involvement by encouraging computer literacy for users, and, in fact, have brought this about through a legal process known as the New Technology Agreements. These agreements, negotiated with most large Scandinavian firms, create a new category of union representative called the data shop steward, who is given time off to increase his or her technical skills and help other end users do the same (see "New Technology Agreements," p. 98).

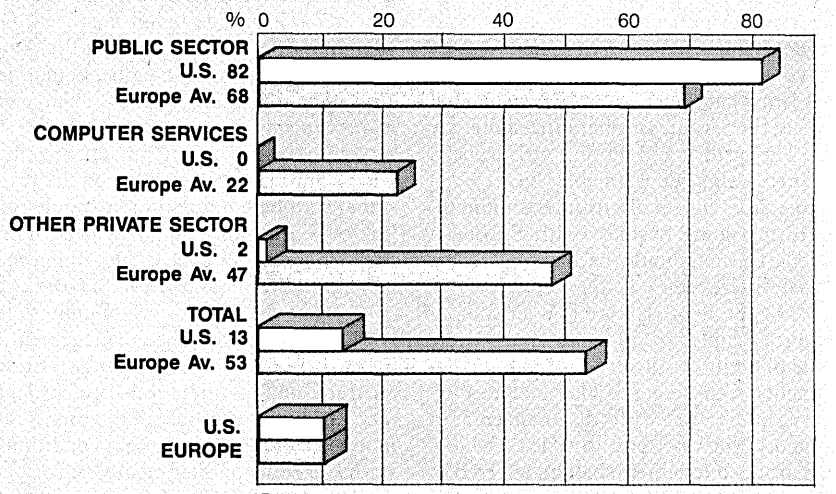
SURVEY METHODOLOGY

This international study of data processing management was funded primarily by the British Economic and Social Research Council. The findings here emerge from a sample of 199 dp managers in Great Britain, Norway, and Sweden. The results of interviews in the U.S. have been previously reported (see "Wanted: Renaissance People," Sept. 1, p. 134). Interviews are still going on in Japan.

In each country, senior level dp executives were interviewed using a standard questionnaire. The interviews, often lasting more than three hours, were conducted by nationals of each country. The research is part of a four-year study (begun in mid-1981) and is considered the only in-depth survey of dp management techniques of its kind. The researchers from the different countries have formed the International Computer Occupations Network to continue project work.

FIG. 1

TRADE UNION PARTICIPATION RATES*



*Based on sample firms included in survey
Europe equals Norway, Sweden, and England

From an American perspective, perhaps the most interesting thing about Scandinavian user interaction is the fact that this involvement includes all workers in a user department. American experience with users focuses on discussions with user management and perhaps a few members of the user department. For the Scandinavians, the term end user includes all workers who are likely to be affected by the coming system. By this definition, data entry clerks as well as secretaries need exposure to some aspects of the system design.

As American dp managers are sensitizing their staff to user needs, Scandinavians are emphasizing user education. If the American angle has been to make the dp department know more about users, the Scandinavian model has been to make users understand dp!

It is increasingly common in the Scandinavian countries for users to do their own feasibility studies. A Swedish manager explains their movement toward user power this way: "We use a special concept here called the system *owner.* This means that the users have the authority to start a project and that they are responsible for all aspects of it including reporting to senior management."

Data from our survey showed that 64% of European users are always involved in project development steering committees. The comparable figure for American firms is 45%. In Sweden and Norway, almost three quarters of all dp managers report that users are always included in such planning committees (see Fig. 3). Forty-two percent of the Europeans surveyed said that their users sometimes provide systems analysis support—quite a high number when compared to American firms where only 28% report user involvement at this level.

Since users are clearly involved in planning and carrying out development

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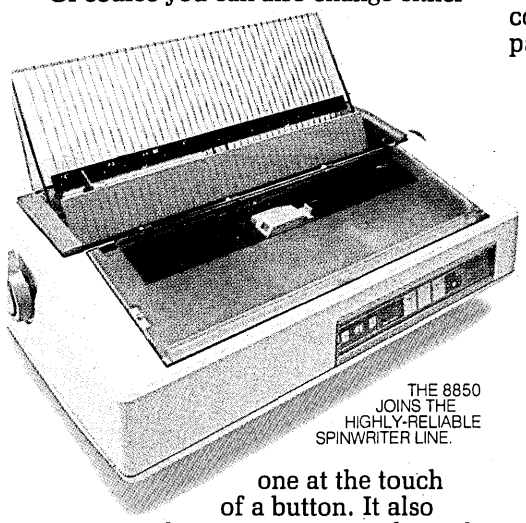

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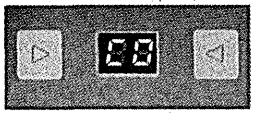

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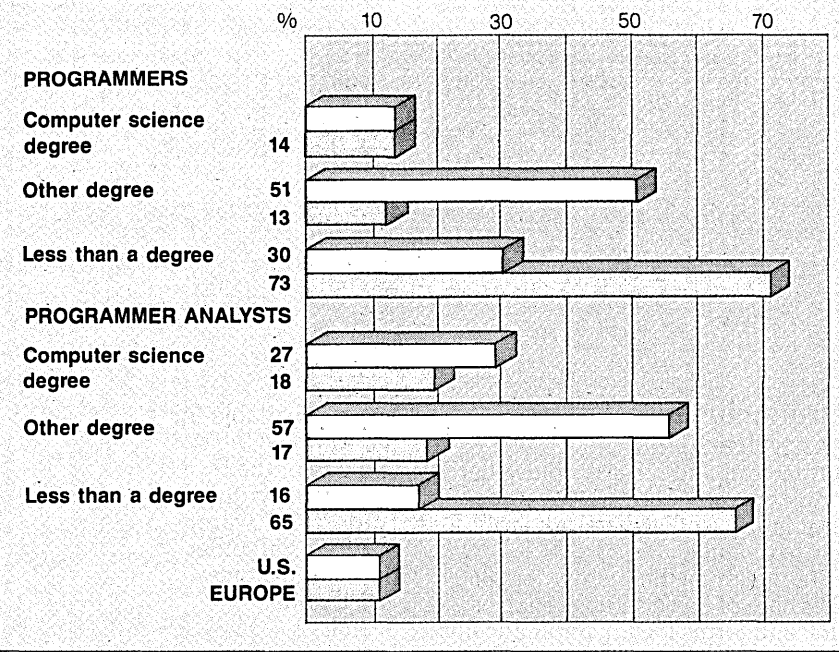
FIG. 2

EXPECTED EDUCATIONAL BACKGROUND



projects, European dp managers are moving away from a preoccupation with programmer productivity. Instead, building on a history of user integration, they are emphasizing methods for productive user behavior.

The heightened awareness of user needs in Scandinavia has been stimulated by end-user demands, often through the trade unions, for greater influence over system design. Most traditional design methodologies either bring the user in too late or require users to have too high a degree of computer literacy. Several approaches for solving this problem have emerged.

The Swedes, for example, have been focusing on the notion of prototyping, which includes building a sample system with dummy data. Prototyping allows users to get what we might call a quick and dirty working model up and running at an early stage in the project development cycle. The prototype, or facsimile of the future system, lets the users experiment with data entry procedures and visualize the screens and reports.

Many dp managers are trying out new methods such as Experimental System Development (an experimental prototyping system users can manipulate well before the actual system is near completion) and system sketches to aid them in their prototyping efforts. Just over one third of Swedish dp managers said they now use such methods or plan to try them in the near future. The dp department does system sketches, often accomplished with APL, to show the user "what it will be like" as the system is being developed. Database languages and new higher-level languages also facilitate the building of these prototype systems.

DESIGN IS THE EMPHASIS

While prototyping clearly helps users have a say in the early stages of system design, it is also useful for dp managers, because it enables them to lower costs caused by frequent requests by users for changes. The hope is that users who have a prototype system to play with will be less likely to demand design changes later on when the project is well into the expensive development phase. But system sketches are not without their own headaches. One dp manager complains, "With APL's help we could present a system sketch in half a day. This makes the user who ordered the system protest against the final development taking eight months and costing a lot of money!"

Another reason for the emphasis on design methodology is the fact that off-the-shelf application packages are much less common in Europe. With their greater need to design complete systems it is understandable that Europeans focus on methods that incorporate users in the design process.

Prior to the upsurge in prototyping, Swedish firms were using a system development monitoring model called SIS-RAS (Swedish Standards Institute Standardized Computerized Methodology). Developed by the Swedish Standards Bureau and made available in 1973, it is still being used by 46% of the managers in our Swedish sample. This method stipulated 10 developmental project milestones, although in practice managers rarely used more than five checkpoints. Several firms have abandoned the model, for as one dp manager explains, "SIS-RAS takes too long and it does not allow time to keep up with changed circumstances. Users should be involved from the beginning."

The recent boom in prototyping is still too new to say what its impact will be. In the end, however, the value of data processing will have to be measured by contribution to the productivity of user departments and not simply by its ability to deliver systems quickly and cheaply.

The overwhelming majority of surveyed firms are mainframe users where COBOL is still the dominant language. As with the American sample, 70% report separating applications and systems development into different functional units. Work within these units is organized according to project teams, where it is common for team members to be involved in more than one project at a time. Programming pools, the precursor to team structures, appear to have fallen into disrepute, particularly in Scandinavia where 85% of the work is accomplished in teams. These results follow fairly closely those found in the American sample where 72% of development work is organized using a team approach.

Program specification and coding standards appear to be as relaxed in Europe as they are in the United States. When departmental specification standards are required—and in Norway and Sweden this was less than 50% of the time—the only items that managers generally require are program descriptions, I/O formats, and file layouts. Decision tables, flowcharts, and test data requirements are requested by less than one third of the managers.

European managers, like American dp managers in the survey, are not terribly interested in demanding that their programmers avoid GO TO instructions. Less than 50% of the managers in the sample say they enforce this standard. The only standard that the majority of managers on both sides of the Atlantic seem to agree on is the need to include commentary within code. Ninety percent of the managers in the United Kingdom, 75% in Scandinavia, and 69% in the U.S. feel this standard should be enforced.

INFORMAL SIGN-OFF PROCEDURE

Formal sign-off procedures at specific project milestones are also not well enforced. As with the American sample, formal sign-offs are used most when a project is turned over to the operations department. Checking feasibility with users is required by 90% of Swedish and Norwegian managers and, as we would expect, this carries more weight than formal clearance with higher-level

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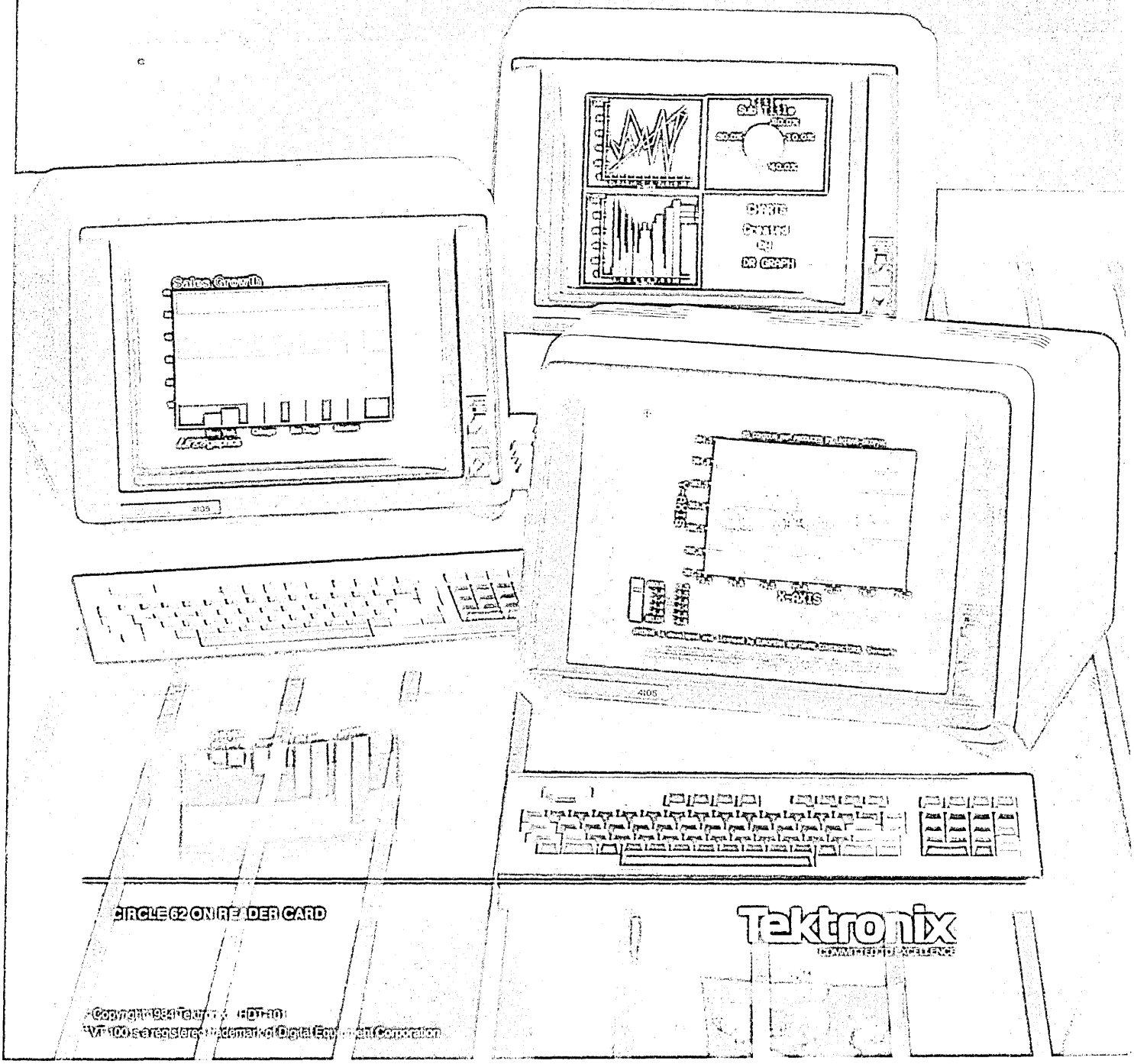


CIRCLE 62 ON READER CARD

Tektronix

European dp managers are moving away from a preoccupation with programmer productivity.

NEW TECHNOLOGY AGREEMENTS

A major difference between the American and European labor relations scenes is the substantially higher level of trade union membership in Europe's private sector, especially among white-collar employees. In addition to high union membership, most European countries have powerful coordinating organizations that represent trade unionists at a national level. The Trades Union Congress in Britain, the Norwegian Federation of Trade Unions, the Swedish Trade Union Confederation, and the Swedish White-Collar Unions Federation, for example, are all important actors on their own national stages. They negotiate general agreements with employer's associations in each country and have a more important and direct influence on government policy than American unions because of intimate links with Labour or Social Democratic parties in each nation.

During the past 10 years, the introduction of new computer-based technology has been the subject of many resolutions and documents emanating from both local unions and national confederations of unions in several European countries. These materials go beyond general resolutions, calling on employers and governments to protect existing employment. They also express the trade unions' desire to be involved in the process of introducing new technology.

This activity began in 1974 when a general agreement on computer-based systems was signed between the Norwegian Federation of Trade Unions and the Norwegian Confederation of Employers. The agreement states that employees have a right to receive all relevant information concerning new systems, in an understandable form, and sufficiently early to allow employees and unions to participate in system development. The agreement also provides for the employees to elect a special shop steward—the data shop steward—who takes an active part in system development.

Shop stewards play an important role in the labor relations processes of several European countries. Their importance varies greatly between companies, but they are usually ordinary employees elected directly by trade unionists who work at the same plant or section of a plant. Once elected, most carry out union related work in their spare time or during company time. Their role can be as limited as collecting union dues or as substantial as carrying out wage negotiations where national or companywide agreements are ineffective (for example, when wider agreements may only specify minimum pay rates). The data shop steward provided for in the Norwegian agreement was to have the right to receive "proper" training, during company time, to allow participation in system development. This was the first national New Technology Agreement in Europe.

Since then, New Technology Agreements have proliferated at local and national levels in many Western European countries. In England, over 100 New Technology Agreements were signed with individual companies between 1979 and 1982. The essential elements of all these agreements are that: 1) employee representives should participate in the project development of computer-based systems, and 2) these projects be evaluated not only from technical and economic points of view, but also from a social viewpoint—that is, considering changes in organization structures, human relations, employment, health, and safety. All the agreements stress the importance of access to information concerning new systems at an early date.

On paper, these agreements appear to severely limit management's flexibility for introducing new systems, but in practice the agreements have had much less effect. The main problem from the employee's standpoint is that it is difficult for those who are not computer specialists to digest the relevant information, even if access to it is given at an early stage in project development. An even greater problem is to develop a response to proposed projects other than opposition. The unions, particularly in Scandinavia, have been anxious not to appear opposed to new technology in general.

One way to overcome this problem is to give data shop stewards substantial education in system design. The result of such training has often been that they become more sympathetic to the original projects. Some have even vacated their positions to become systems analysts. This has left many unions with a desire to develop their own educational materials. In particular, a number of Scandinavian projects during the past seven years have tried to develop new models of system design that allow employee representatives to propose more "socially acceptable" alternatives than the proposed computer-based systems, rather than opposing those systems outright.

In Sweden, the Social Democratic Party, which has strong links with the Trade Union Confederation and the White-Col-lar Unions Federation, has been in power with only minor interruptions for the past 52 years. There, worker participation in top level decision-making was specified in a series of laws passed between 1973 and 1977. These culminated in the Law on Codetermination in 1977. Out of this law, the Center for Working Life Studies was set up to provide education materials for employees participating in decision-making processes, including the system design process for new computer-based systems.

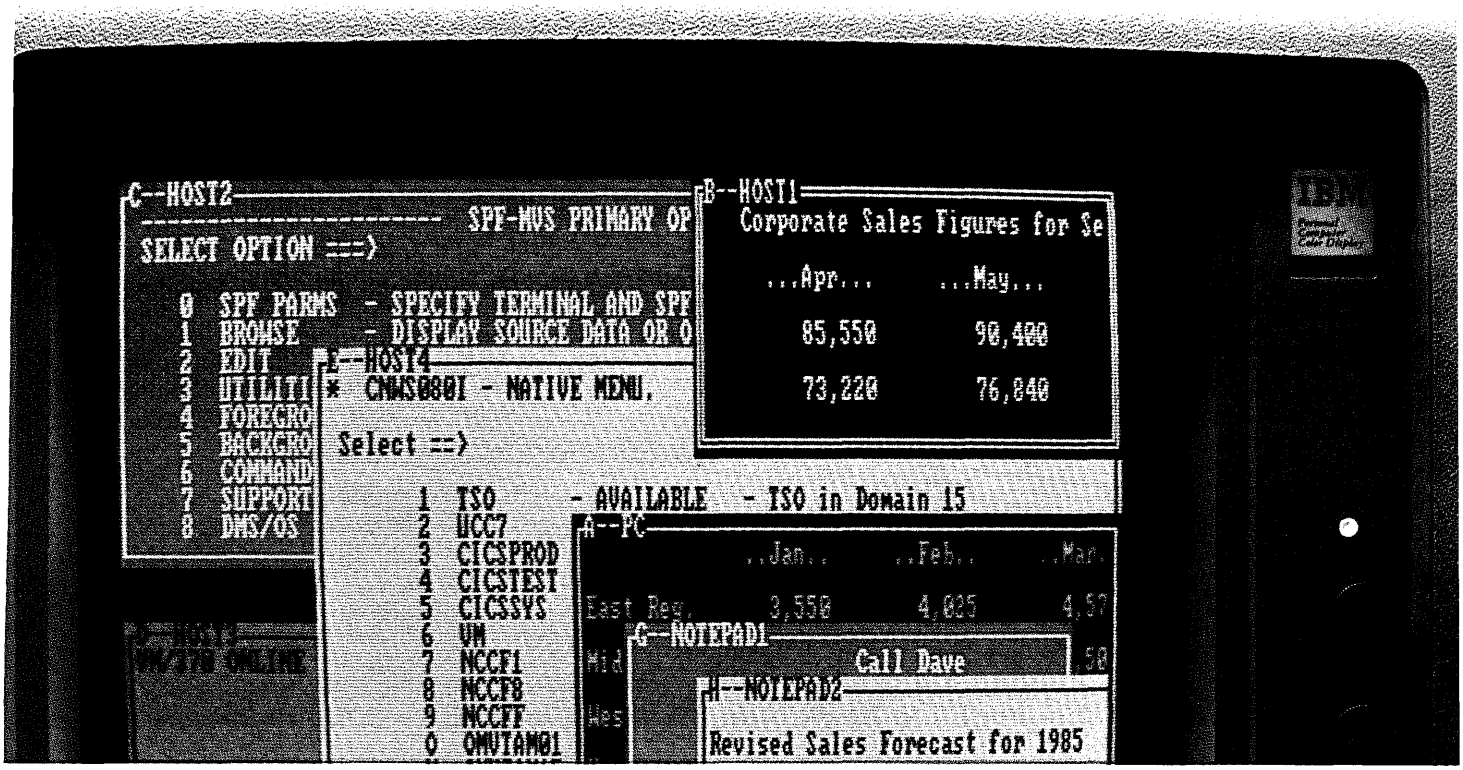
So far, it is difficult to assess the impact of New Technology Agreements on the computer-based systems that have actually been introduced. But it seems likely that the involvement of end users in more than a perfunctory role has both reduced implementation problems and encouraged end-user cooperation long after the initial system implementation.

managers within the dp department.

To American managers, the presence in Europe of strong trade unions and less managerial control over staffing decisions may seem like a glaring problem. Indeed, the European history of stronger end-user involvement and relative inflexibility in altering organizational structure are departures from American dp practice. As our earlier article pointed out, when problems arise in American firms, upper management often charges in and reorganizes the department or plays musical chairs with department heads. This is less likely to happen in Europe, for a variety of reasons. The Scandinavians, for example, are particularly interested in experimenting with system design models and less enthusiastic about shuffling the organizational chart. Their problems have pushed European managers to respond to challenges with progressive solutions.

With less need to negotiate over working arrangements, American managers tend to respond to the user challenge by shuffling the organization chart to include user representatives. The relative independence of American data processing departments allows them the luxury of time to better educate their professional staff to prepare for some form of user involvement.

European dp managers, on the other hand, have traditionally confronted union organized workers within their own shops and strong users outside their departments. These users, from clerical to profes-



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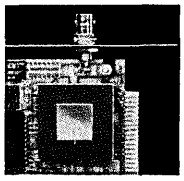

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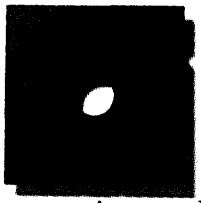

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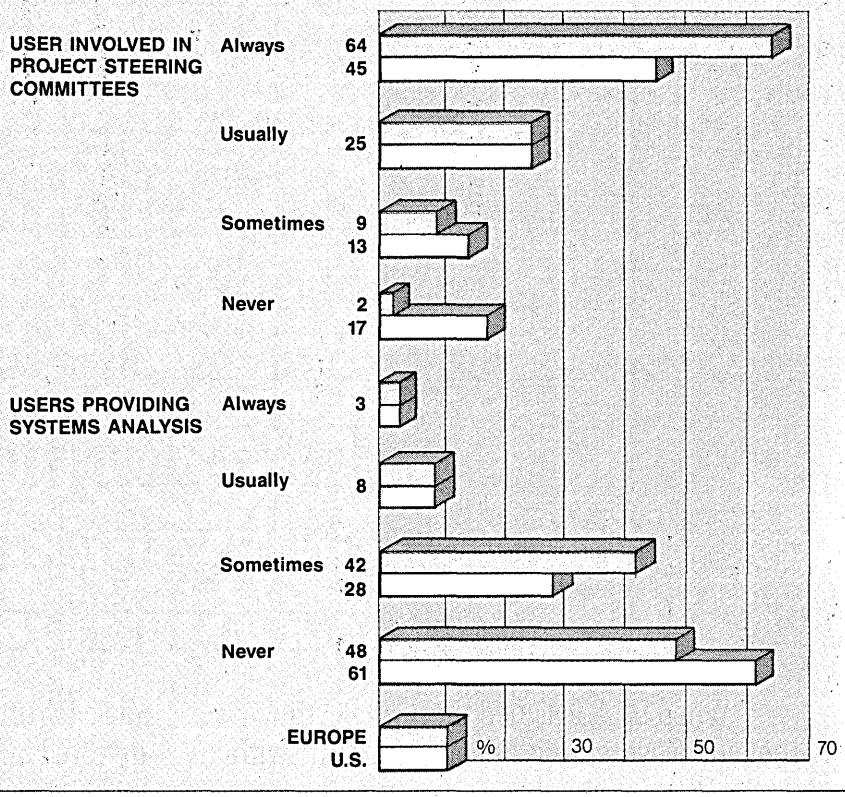
The recent boom in prototyping is still too new to say what its impact will be.

FIG. 3

USERS INVOLVEMENT IN PROJECT DEVELOPMENT



sional staff, increasingly have the backing of New Technology Agreements to help them demand participation in system development. This tradition is encouraging dp managers to focus on methods that place less emphasis on programmer productivity and more weight on the productivity of user systems.

Within the European framework, end-user clout is less significant than most trade unionists would like it to be, but is nevertheless an effective force in moving managers to try methods that integrate these workers into the system design process. Since American dp departments have more of a culture of separatism, the challenge of user integration is indeed a major one. European managers face the problem no less squarely, but have a history of user involvement on their side.

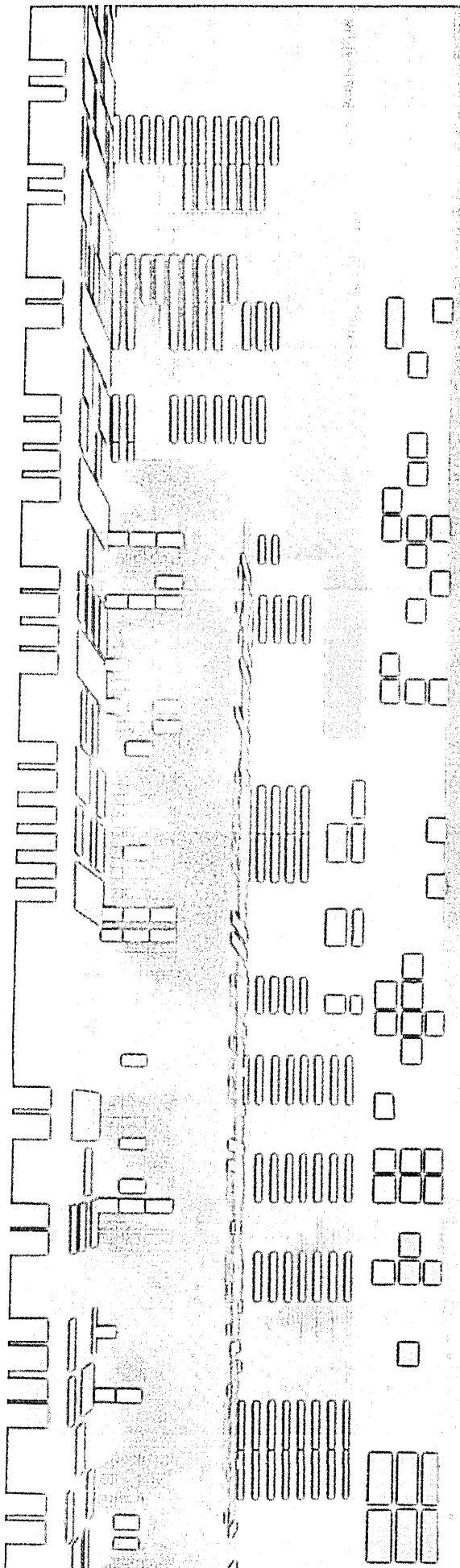
During the 1960s and '70s the independence of American data processing departments was an advantage for American companies. It allowed them to be more competitive with salaries and promotions to attract and keep specialist talent. Now American managers are facing a trade-off between their distinct status and the separate, but increasingly equal, power of sophisticated users. As the survey points out, European company culture offers some attractive alternatives. ◉

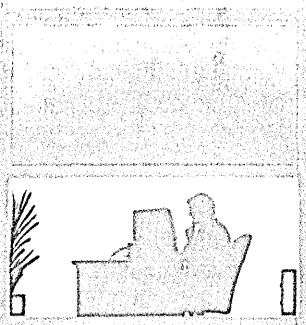
Andrew Friedman teaches economics at the University of Bristol, England. He is the principal investigator of the study reported on in this article and author of *Industry and Labour* (available in the U.S. through Humanities Press, Atlantic Highlands, N.J., 1977) as well as several articles on work organization in computing.

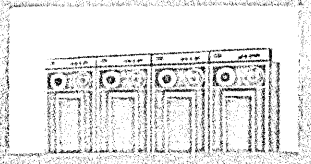
Joan Greenbaum is an assistant professor of data processing at LaGuardia Community College in New York. She is author of *In the Name of Efficiency* (Temple University Press, Philadelphia, 1979), and frequently lectures on technology and social change.

Michael Jacobs, who has worked with the Labor Institute in New York, is a student with the Graduate Faculty, New School for Social Research, New York.

We would especially like to thank Carol Bates and Dominic Cornford, our project staff in Bristol, for their contributions.







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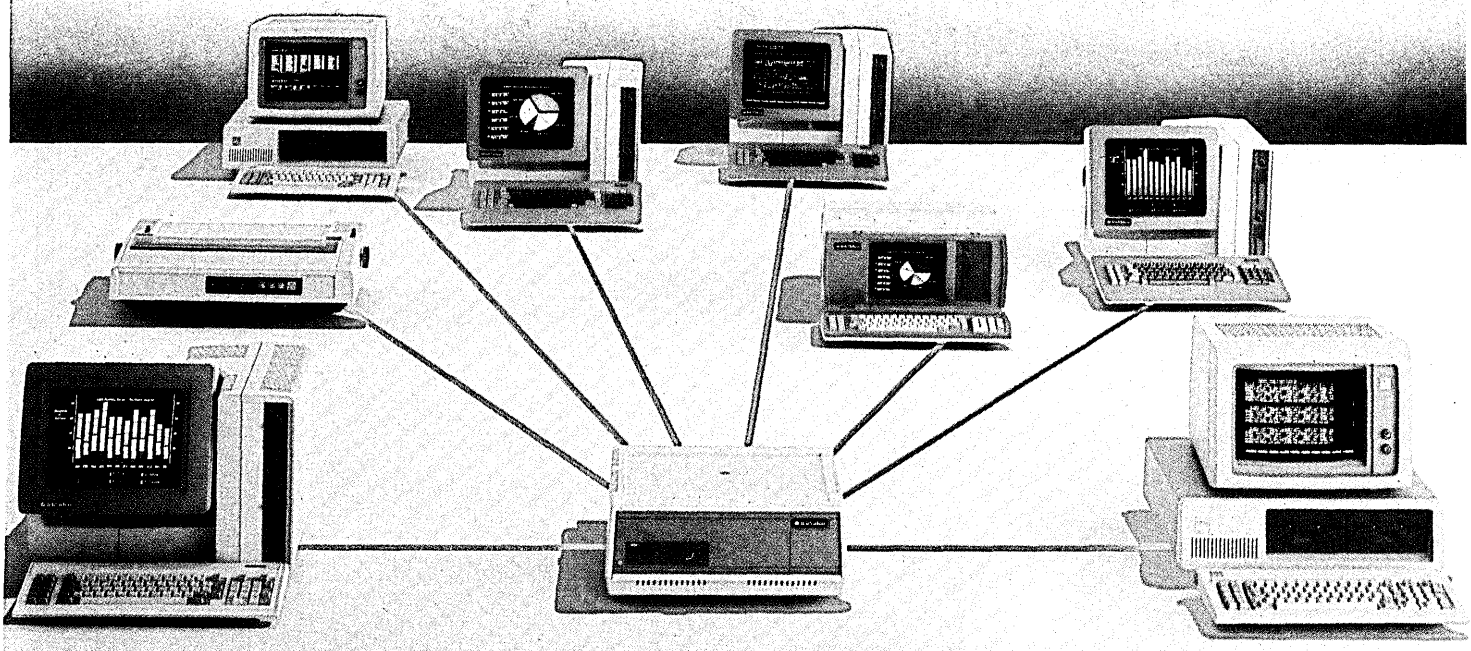

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The vendor recipe for internal office automation is trial and error.

ARE VENDORS EATING THEIR OWN COOKING?

by Lorraine King

As you listen to the office automation salesmen give you all those cost justification figures, productivity studies, and statistical analyses, do you wonder if the vendors justify their own OA systems by the same numbers game? When the salesmen encourage you to install systems on a piecemeal basis, department by department, or function by function, do you wonder whether they have ever been near their own management information system departments, or even smelled a real office support system?

Rest assured that most manufacturers of office automation equipment, according to industry consultants or by their own testimony, have been through the same hassles, the same proportion of success and

failure as their customers. If today some are further ahead, it is because they were obliged to continue experimenting no matter what the cost. Like medieval court tasters, for some vendors the staff is sometimes the first to taste the concoctions of the engineers. And they choke on a spicy meatball or two on occasion.

When it comes to internal office automation, the most successful vendors have learned that cost justification is secondary to bringing understandable information to the desk of the managers and staff. On the other hand, a few of the more rash manufacturers are now surveying an overlapping mesh of nonintegrated facilities and asking, "How did we get here?" and "Where do we go from here?"

One West Coast vendor—whose brand name can be found in most sites using microcomputers and in many where its existence is unsuspected—encouraged each of its departments to experiment with office systems without any central control. This kind of freewheeling attitude is typical, since the vendor is accustomed to making cooperative deals with several outside manufacturers selling a variety of personal computers and peripherals to end users. The company thought it could afford the OA free-for-all, because it could paper the walls with its profits. No one recognized a looming disaster when dozens of obscure and noncompatible personal computers began appearing, along with the usual supply of Apples and IBM PCs. Since none of the units was networked, no control was exercised over software labels either. Management simply said: "Do your own thing and report back on what happened."

After three years of experimentation, the company, which insisted on anonymity, realized last year that an integrated approach to its information needs should be attempted. International sales were booming and financial control was clearly slipping through a lack of fast communications. In addition, the data processing center at headquarters was based on a medium-sized minicomputer which showed signs of strain.

The integration effort began well. The company reached a cooperation agreement with a major vendor of dp and OA hardware, a sophisticated organization that also had an international communications network available to improve the custom-

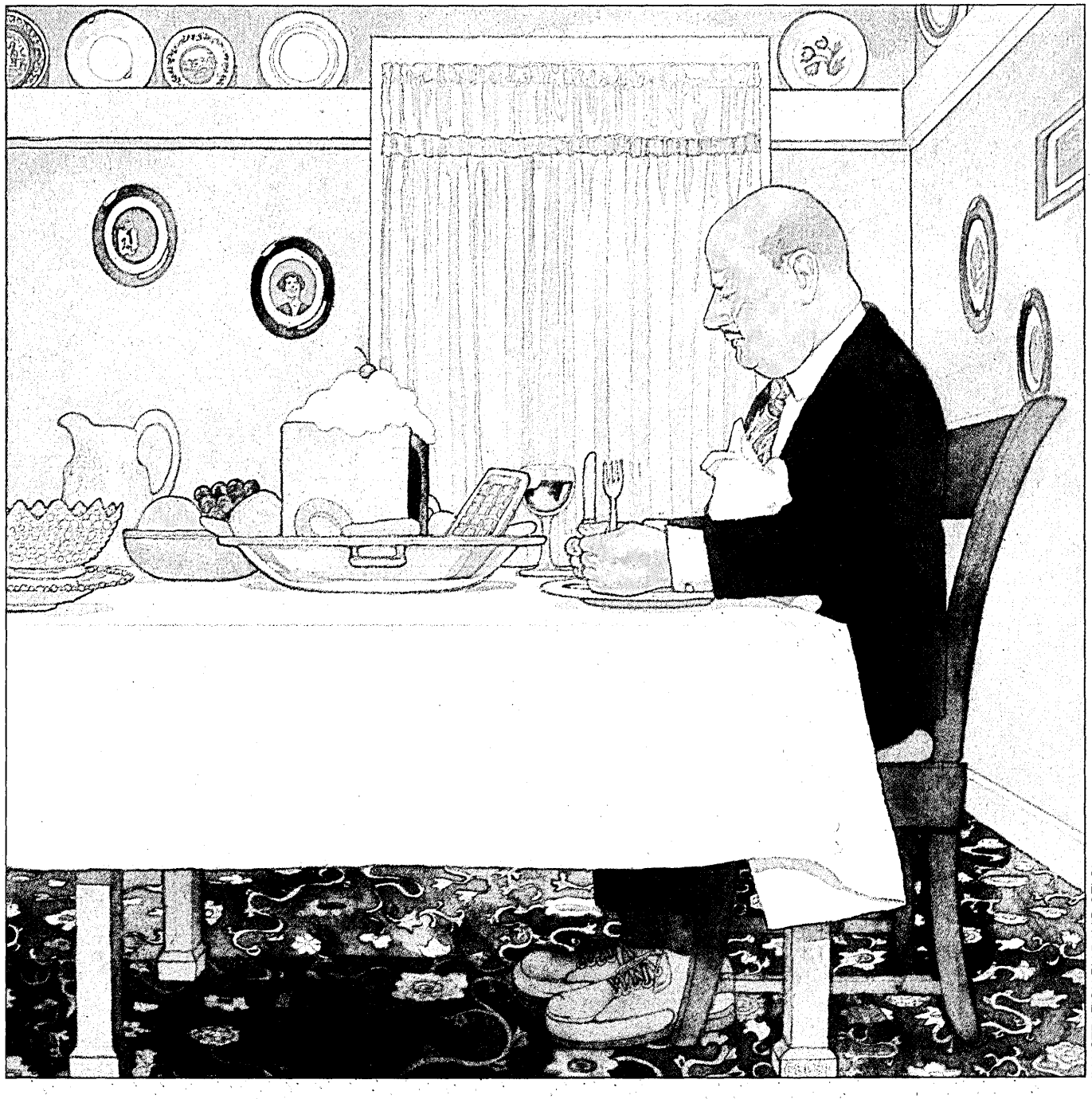


ILLUSTRATION BY DAVID CELSI

Not all Eagle staffers are as thrilled with the system as their managers believe.

er's international sales operations.. But then the company, in a touch of hubris, became ambitious and ordered an advanced PBX from a leading-edge supplier, for delivery in late 1984. Compounding the risk, the company failed to hire mature project and personnel management.

Failure was inevitable. A bunch of money has been spent, and much equipment remains in boxes or pushed into corners. Dp operations continue with the overloaded mini. Delivery of the fancy PBX is a year behind schedule, but nobody is complaining because the rest of the conversion to the integrated OA system is even more delayed. Indeed, the hardware delivery delays are a relief. Office automation integration has been postponed while the increasingly urgent need to replace the dp center takes a higher priority.

POOR OA FEATURE PLANNING

During a recent visit, it was clear that OA features such as networking, fault tolerance, and electronic mail were inadequately planned. The dp manager and vendors were struggling to convert the files so that the payroll, accounts receivable, and other vital functions would continue without serious interruption.

Now senior staff members say they are not sure what subsystem will provide critical management information today, let alone where to get that information tomorrow. Sounds like the kind of problems dp managers were having a decade ago, before the phrase office automation became popular.

The example of this vendor is extreme only because a surfeit of cash allowed every mistake to be made in parallel. Even the most controlled and carefully managed OA vendors admit they once allowed their staff to learn new office systems by just throwing them in and hoping they would not drown. "Right now we train informally," says Bryan Baehr, manager of sales support at network vendor Ungermann-Bass Inc., Santa Clara, Calif.,"but we're establishing a formal training course for users in the future. If you don't train, it costs you in terms of productivity."

Ungermann-Bass was lucky to be a vendor of communications networks when it started implementing integrated word processing in 1980. Because its network moves text and data between noncompatible terminals, the company wrote its own financial software as a corporatewide standard but left equipment and departmental software purchases to the staff. Because of the tinkerer nature of personnel in high-tech organizations, much of the required applications software was written in-house.

UB managers soon realized that the firm's accelerating growth would not permit continuation of such internal independence, and they founded an information services department early this year to manage data processing and office support on its own network. "We support the standard package concept throughout the company today," says Leo Quilici, vice president of administration. "We want to get away from writing our own software."

Lotus Development Corp.'s 1-2-3 integrated software package, VisiWord and VisiSpell from VisiCorp and Ashton-Tate's dBase II are the standard micro packages, with manufacturing software from ASK Computer Systems Inc., Los Altos, Calif., supplementing the homegrown accounting software run on two VAXs from Digital Equipment Corp. In addition to the two superminis, UB has several Onyx System 8s, a CAD system, and mass storage devices ranging from 20MB to 450MB linked in a network. Baehr estimates that the savings from sharing disk drives and printers alone is cost justification for the OA office automation network, using UB's broadband spine between buildings and floors.

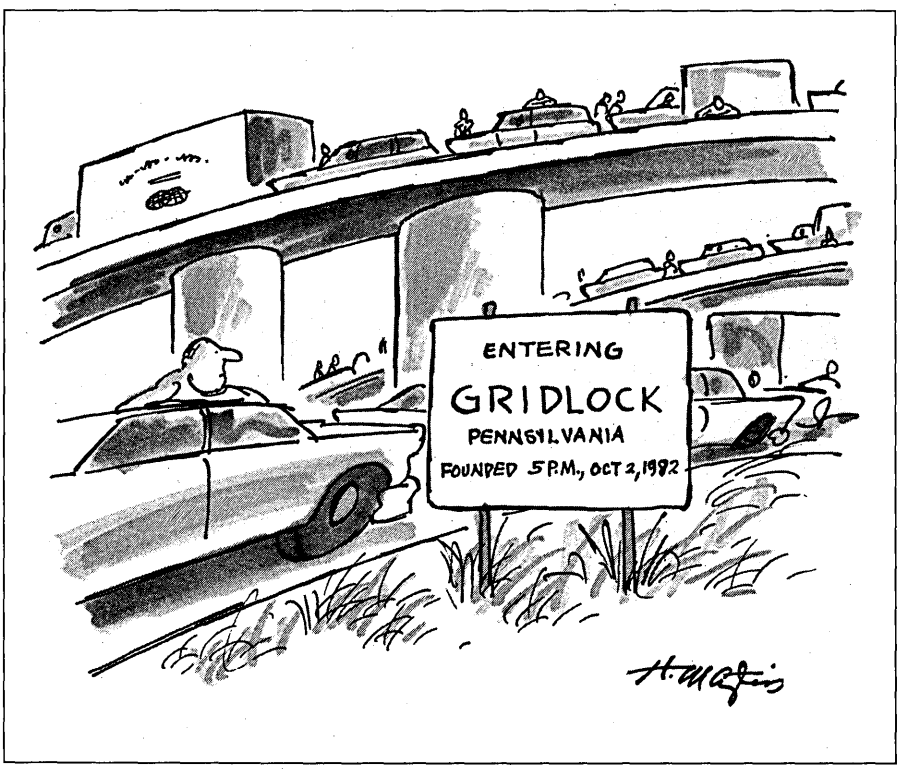
Approximately 170 terminals and personal computers from six different manufacturers are currently on the network. The predominant terminal brand is TeleVideo, but Quilici is not concerned over the lack of terminal standardization. He keeps watching the system for signs of stress, but claims that it is fine. "Peformance degradation can happen if a host is overloaded," he notes, "but it is so infrequent we can hardly catch it."

Another reason why Ungermann-Bass has been able to give its users comparative independence without serious consequences is that it has excluded messaging from its Rolm PBX and determined that all messaging will be handled by the integrated data and text service on its own network. Meanwhile, some other OA vendors are still trying to create rules for when a message should be sent via a PBX, via a terminal linked to the dp system, or via a networked office-support system.

The fundamental reason for UB's successful and controlled implementation of OA, after such a risky start, is a development rationale stressing application integration. "We decide on an application-based need, then look for solutions, then look at the quality of those solutions," says Quilici. "Our users are sufficiently sophisticated to know that the 'cost-effective' solution can be the most expensive in the long run. We divorce ourselves from the pure cost."

REAL LONG-TERM BENEFITS

Quilici adds that there are real long-term benefits in administrative efficiency, control, and more effective use of time when data processing,



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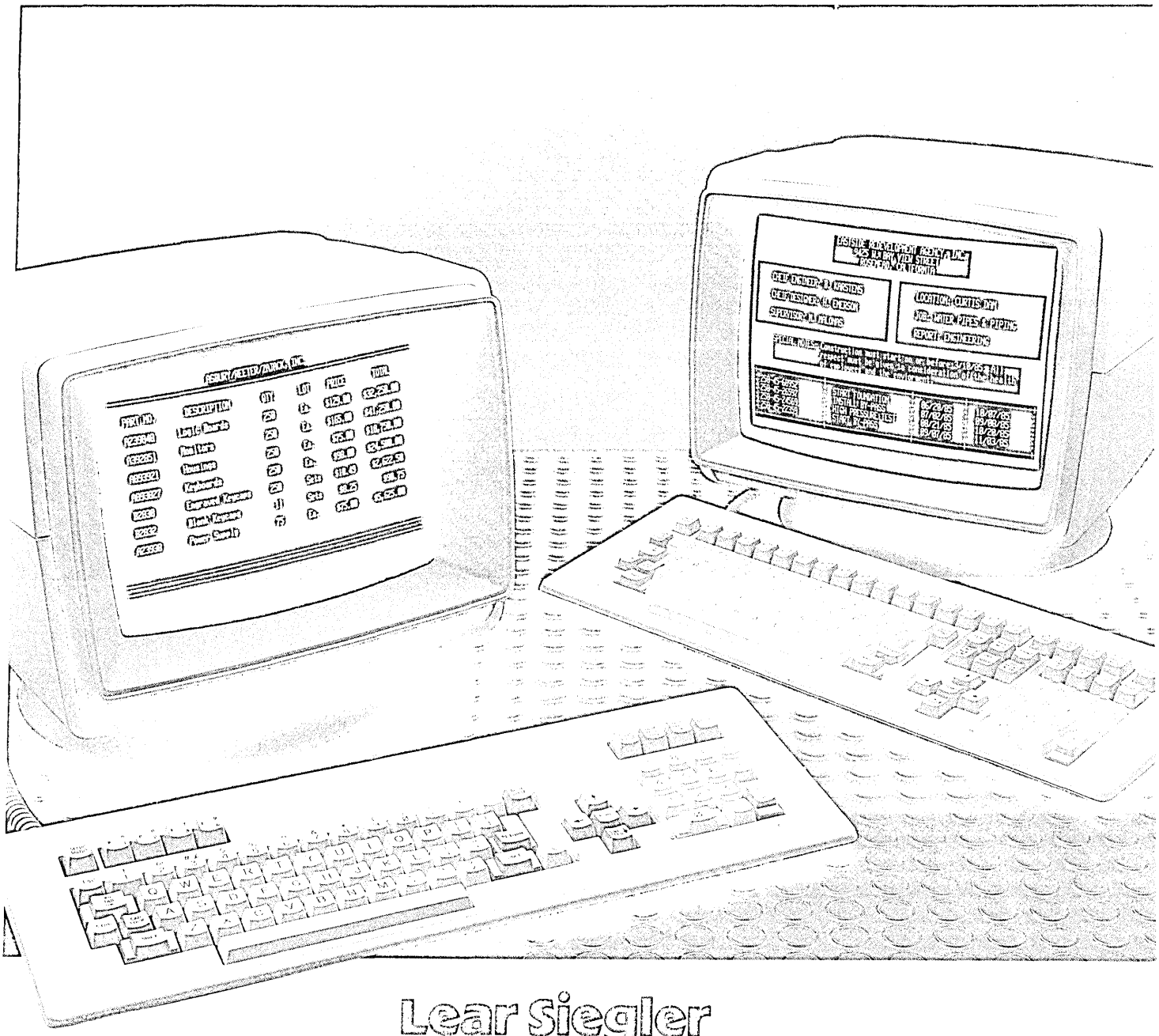

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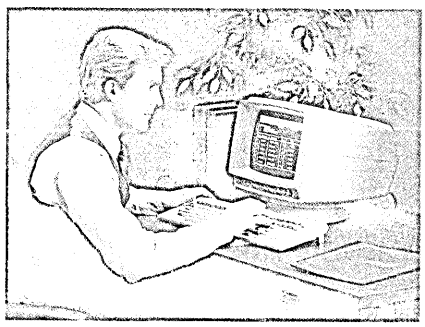

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Is the mainframers' silence due to their falling behind the mini and micro competitors in OA technology?

office automation, and communication costs are all logged without tying them to the firm's organizational divisions. "It's obvious to us," contends Quilici. "We're a young company, but we see real problems in the older corporations with managerial divisions and political problems. We have difficulties in selling to that environment."

Surprisingly, a cost-effective, well-liked office system can be implemented almost by accident, simply because the manufacturer is a communications specialist like UB or is so in love with its product that the possibility of buying noncompatible equipment from an outside vendor never arises. Love of its product and determination to prove its capabilities made Eagle Computer Inc. of Los Gatos, Calif., attempt office automation on its IBM PC clone as soon as the company was launched (see "After the Fall," October 1983, p. 30). Theoretically, the pc is the wrong end of the technological spectrum to start such a task—it is the same approach that doomed the anonymous vendor mentioned earlier. But Eagle progressed slowly in its OA implementation using pcs—never dreaming of buying any competitive equipment—and put up with the irritation of noncommunicating word processing until its own networking product was available early this year.

Today, Eagle has electronic messaging, shared mass storage and printers, communicating word processing, and integrated financial budgeting. The network and systems are available for almost everyone in the organization, from secretaries to vice presidents, from the smallest department to the board level. Canned software, like Microsoft's Word and Multiplan, and R:Base 4000 from Microrim, both of Bellevue, Wash., are the recommended packages, but privately programmed freestanding software is common.

Eagle does not install its products in-house before selling them, does not plan OA, measure its success, or monitor staff satisfaction with new facilities—and not all junior staff members are as thrilled with the system as their managers believe, according to some not-for-attribution comments made to DATAMATION during a recent visit. The ad hoc nature of the OA implementation at Eagle is total and cheerfully acknowledged by management. "We're an entrepreneurial company," says Ron McAlhaney, director of marketing support. "We just get on and do it." And they should, according to the rules, have just fallen flat on their faces. But the company is relatively small and close-knit, and it stuck loyally to its own product line. Ultimately, office automation at Eagle could turn out to be more supportive and cost-effective than at many established and wealthier firms.

As for internal OA practices within the old mainframers, calls to Sperry and Burroughs were not returned as of press time. Some observers suspect that the reason for this close-mouthed posture is that the mainframers are falling behind their mini and micro competitors when it comes to adoption of OA technology. "They're scrambling around like crazy, trying to figure out where the market's going, how they can be a part of it," contends Andrew Seybold, vice president of Seybold Publications, Torrance, Calif., a group of highly regarded OA publications and consulting services. "They've got products designed in a vacuum that they are trying to fit to a purpose they're not sure of. Salespeople are not part of the internal experimentation. Perhaps the manufacturers just can't make the salesmen keep up."

POLITICS STRANGLE OLD FIRMS

If the salesman fails to keep pace with his customers' needs it may be because his own company suffers from the same political strangulation recognized by Quilici of UB. Computer manufacturers assume a dynamic, super-tech image, but behind the sleek facade is really an aging manufacturing company with the same managerial divisions and organizational inertia as its steelmaking customers. Large manufacturers' internal OA projects were piecemeal affairs, and their salesmen may still be unable to see OA as an integrated companywide application. A management consultant working in communication anonymously observes that "it'll take another generation of managers to see integration. The problem is no different for the big manufacturers: they have the same management problems internally."

But some appear to have matured in the last two years. The vendors that have already integrated their data processing and office automation systems now talk confidently about graphics presentation, indirect usage by top management, the impossibility of precise costing, nontangible payoffs and, above all, the essential need for dedicated management. For companies like Wang and Intel Corp. of Santa Clara, Calif., the mystique has left OA and it is now just a means of dragging obscure, excessive data off the computer and delivering it to the decision maker in a format he or she will be able to use.

In early 1982, Intel recognized the danger that was posed to integrated communications by continuing to allow users to buy any brand of word processor or personal computer. The likelihood that each of Intel's 25 corporate centers would select different local networks and make information synthesis almost impossible caused Carlene Ellis, director of marketing services, to call a halt. "The first implementation strategy for long-term information integration was developed in '82," recalls Ellis. "We now use our management information database system, iDIS, for delivering marketing information to the manager's desk."

The back-end database file server and communications processor, iDIS, was developed by Intel to allow all the workstations in a department to share a common information file on a mass storage unit. "We committed to use it before it was released to our customers," says Ellis."iDIS allows data formats to be presented via a spreadsheet and from this we are moving to graphics presentation. A picture's worth a thousand words."

Originally Ellis found the concept of OA hard to sell in tangible, quantitative terms to the Intel board, but the problems of cost justification were resolved when the dp system runing the old batch marketing application had to be replaced. The hardware costs were logged to the replacement mainframe and the incremental OA software costs of $100,000 were written against the new office support elements. On paper the new OA system at Intel saves $500,000 a year in manual processing of the monthly marketing data reports, she claims.

In any volume-oriented business a handle on costs is a high priority, and Intel took the same attitude on its OA implementation. "We do not use intangible benefits in our original costings," says Ellis. "In a financially driven company people won't work for benefits unless they have to, such as to keep the head count down, reduce the cost of sales, or some other tangible."

Today, Intel still has a mixture of terminal brand names, but is moving toward standardization with IBM and IBM-compatible equipment—no surprise, since Big Blue is its largest stockholder. The company uses more than 1,000 personal computers, and with 25,000 employees worldwide it is impossible to keep track of every terminal, workstation, and pc.

DIFFICULT TO COST-JUSTIFY

Cost-justifying OA in such an environment is obviously difficult. Ellis says that a justification is simply to see the rising numbers of users and the increased activity of the hardware. She says she is pleasantly surprised at the inge-

Personal computers have become a valuable asset in business. The problem is that most personal computer systems are originally sold with "personal printers"...printers built for home use, not for heavier business work.

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Vendors are so accustomed to eating esoteric food that they cannot foresee what might choke others.

nuity displayed by many users in getting the most from their terminals, which are billed back to the departments on a usage basis. "You have to go back and audit every so often and find out that the users have gotten more and more clever at getting more out of the system," she says. "We are now getting more sensitive to intangible benefits." Improved quality and quantity of work and a greater willingness to tackle jobs for which there was previously no time are two intangibles Ellis cites as benefits of office systems.

Wang Laboratories is, like Intel, "cost-justification bound," says Robert Bozeman, vice president of corporate information services. "We set original plans and criteria and we then carry out a postimplementation audit every year. But unavoidable need can be used as justification. Cost avoidance is looked at, and quality."

Bozeman's experience as corporate manager of office strategy has also convinced him that there's an immediate payback from OA simply because it requires organized manual records. "You can't hope to automate an office successfully unless your paper records are in order," he says.

But cost justification at Wang is based on a per application basis, as with other successful users. "We record data processing costs and communications as part of OA," says Bozeman.

Wang has installed its own equipment and software throughout the company, only interfacing with other vendors' equipment for back office dp operations. Today, several departmental networks linked via one common access net provide services to more than 5,000 users at Lowell, plus more than 1,000 in other locations, including overseas. Two years ago, Wang installed a $2 million office automation system in its administrative services department, a system which it now reckons has saved about $1 million. "At the end of the third year, we should have recovered the total," figures Bozeman. "We costed the equipment at list price and worked on an expected life of five years, so the last two are gravy."

Bozeman is currently installing the latest features of Wang Office, an integrated image voice and directory distribution system, throughout his company. His greatest problem is getting hold of equipment fast enough. "We're the shoemaker's son," he laughs, reminding us of the old adage of the cobbler's children going barefoot.

But Wang is sufficently experienced in office automation to ignore the fads and stick with the shoes that fit perfectly. "We'll only automate what needs to be automated," says Bozeman. "You can get too many avenues, particularly in mail. The resolution is to make sure that the people who have the systems understand the difference and use what's best for them."

Everyone at Wang who can justify an applications need has access to the office support system, which provides international messaging, networked word processing, and extensive information retrieval services to such files as its 15-gigabyte list of 20 million businesses which are current or potential customers. The type of terminal given to each user is governed by need, not status. Top-level managers do not personally use the system, but go through administrative assistants.

To all the dp managers wondering if the vendors get away internally with the minimal level of training sometimes provided customers, the answer appears to be a resounding no. Wang uses a combination of classes, study groups, videotex, and an advanced systems laboratory. The company even has a training program for future trainers and now offers internal and external courses on integrated office automation, "which is certainly not just wp and mail," says Bozeman.

"Ra! Ra! Ra!"

CARTOON BY ARTEMAS COLE

HP STAFF WELL BRIEFED

Hewlett-Packard also puts a lot of time and effort into keeping all levels of its staff thoroughly briefed on what the company is installing and developing in office automation. HP took the unusual route of experimenting with office automation internally for three years before taking a product to market. The company learned discreetly the value of bringing together everyone involved in a new office systems implementation before development is begun, and of appointing a liaison officer to keep its future users informed, trained, and enthusiastic before the implementation date.

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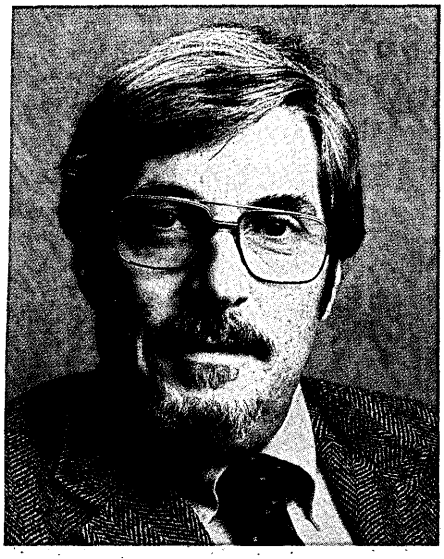

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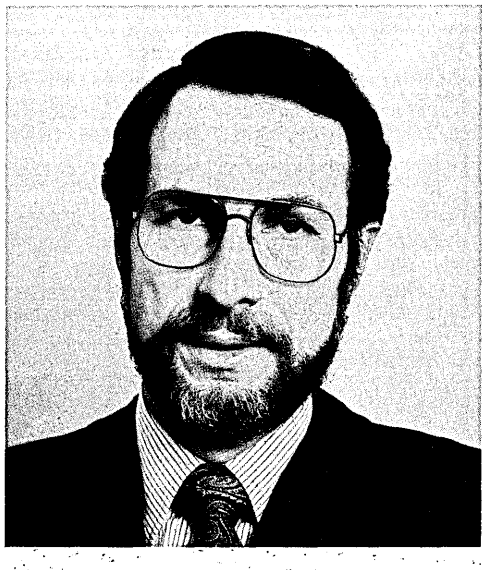

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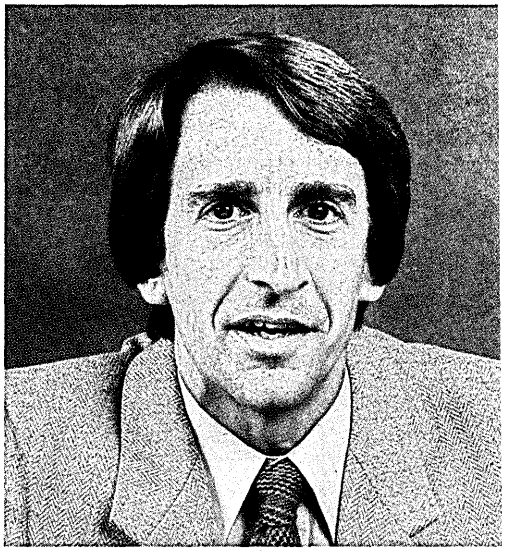

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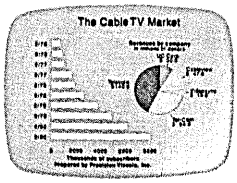

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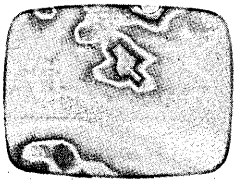

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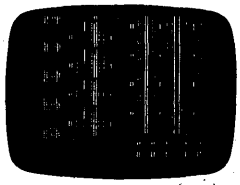

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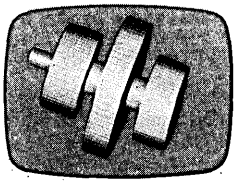

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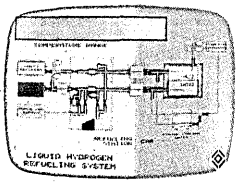

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One vendor encouraged its departments to experiment with office systems without any central control. Failure was inevitable.

interest on the part of its internal customers, and turns out to be the best method for disseminating OA information and use throughout the decentralized company. "Now people say what they want and after it is installed they are more imaginative about how to expand it," says Luis Hurtado-Sanchez, office utilities group manager at HP. "I define success as where ownership passes from the implementers to the users."

Today, 1,500 users at HP's corporate HQ have access to 1,300 of the company's terminals, personal computers, and workstations, including hundreds of HP pcs in a network linked to other brands. The domestic equipment is also linked to a worldwide communications network. Hurtado-Sanchez views his objective as both helping HP to greater administrative efficiency and providing a proving ground for its latest and experimental office products. Consequently, he doesn't have to worry too much about justification on cost benefit alone.

"Justification is one of the thorniest problems of OA," he says. "When you get to the end of an implementation, you are not comparing apples with apples, or even apples with pears. You have got something entirely different." The change is effected not simply because a successful office support system merges dp, communications, and OA into a unified application, but because the users change the function and throughput of their departments by the ways in which they use the system. Bright, enthusiastic, and productive users make the system most profitable by their determination to maximize its potential, but they also make it impossible to compare costs against preset criteria by continually moving the target.

"As soon as you get the figures, they're out of date," says Amy Mueller, manager of the messaging group at HP. "In addition, many benefits are intangible, so you can not carry out a quantitive analysis." Hurtado-Sanchez has seen his own job expand with the help of office support systems because he has more time to do tasks he previously swept aside.

Are companies based in engineering and technology pushing ahead with office automation as an act of faith? Like Quilici at Ungermann-Bass, Hurtado-Sanchez looks at the the question another way: he sees corporations in the older, more static commercial environments as being unwilling to risk any investment which is not returned as short-term profit of the most tangible kind.

Again, the evidence is that the OA vendors do not use cost justification internally, and merely include it as part of the salesman's bag of tricks. "You can justify or not justify OA," adds Andy Seybold. "Justification is smoke and mirrors. OA has to involve an act of faith because no one really knows what OA is. If you use bad criteria at the beginning, the system is bound to look a failure at the end. You have to set realistic criteria you know you can at least measure."

CANARY IN THE COAL MINE

One vendor that started off with the conservative cost-justification route to OA has abandoned the approach. Data General cooperated with Booz, Allen & Hamilton Inc., New York, in producing a "Guide to OA Benefits," which the company once used as an internal and external tool. DG no longer uses the guide internally because "we want to take advantage of the productivity opportunities," says Dave Hill, DG's director of MIS. "We're the canary in the coal mine. We have to try it out for our customers—and so that we can be prepared for journalists like you." For this manufacturer, it appears, being able to demonstrate that they eat their own cooking is justification enough.

DG began installing office automation facilities internally 14 months ago. Today, it has five data centers in the U.S., each containing a number of its MV8000 superminicomputers linked by its local area network. There are 22 MVs in its Westboro, Mass., HQ alone, with another data center in Paris and an installation coming on-line in Japan. Approximately 2,500 users use the system, ranging from clerks to senior management, and the company aims to increase the number of users to 5,000 as soon as possible.

The system is used for communicating, word processing, messaging, shared mass storage and printers, and for inquiry against corporate databases for decision support. As yet, there is no data and text integration, but the company is working in this direction and toward integrated budget consolidation packages. "We still suffer from inadequate telecommunications software to international centers for routing and store and forward," says Hill. "We're currently testing something and you can look for it in about a month." From the sound of that chirp, DG users have something to look forward to.

One of the trade-offs in installing a big OA system in a short amount of time is inadequate training, and DG pleads guilty. Hill is aware that the training program is not yet adequate, and not all users interviewed said they were thrilled with the new facilities. User representatives, called sphere managers, have recently been appointed prior to new implementations to help users learn the new office applications, but it is yet too early to judge the effectiveness of this arrangement.

Unlike the agonizing review that customers are apt to endure before buying an OA system, Data General does not carry out a requirements study for its internal operations, does not cost justify, does not project plan, and does not set success criteria. Obviously, a postimplementation audit is not a common event either. "We install it because we sell it," says Hill in a typical example of DG candor. "We want to protect our major customers."

The other side of that coin is that, without a project plan, by definition there can be no project overrun. Doubtless, there are a lot of the legendary 20-hour working days behind any OA implementation project at DG. While the company's new CEO system has already earned a lot of admirers, whether anyone in dp is ready to follow the internal DG implementation model is another story.

One of the differences between OA adoption in the marketplace versus what goes on behind the closed doors of the vendor offices—which may account for some of the troubles endured by outside users—is the reality of custom software writing. Where the employees of the company are technical and enjoy experimenting with technology, overly complex hardware and software solutions tend to proliferate. The major problem dp managers outside the computer industry face may be that the manufacturers have become so accustomed to eating esoteric food in their in-house testing that they cannot foresee what might choke less technically accomplished users.

For example, many vendors are happy to display the speed with which their technical gurus can page through menu after menu to reach the required symbol-riddled page. The average casual user in an office, however, does not regard such "challenges" as more than a waste of time and is not shamed into "trying harder" by being told that the vendor's staff learned to use the system without complaint.

Perhaps the question users of office support systems should be asking of their vendors is not "Do you eat your own cooking?" but "Do you feed your prototype systems to an impartial, nontechnical, impatient user like me?" ◉

Lorraine King is a New York City-based marketing and management consultant. She was formerly a marketing manager for ICL Ltd. in Great Britain.

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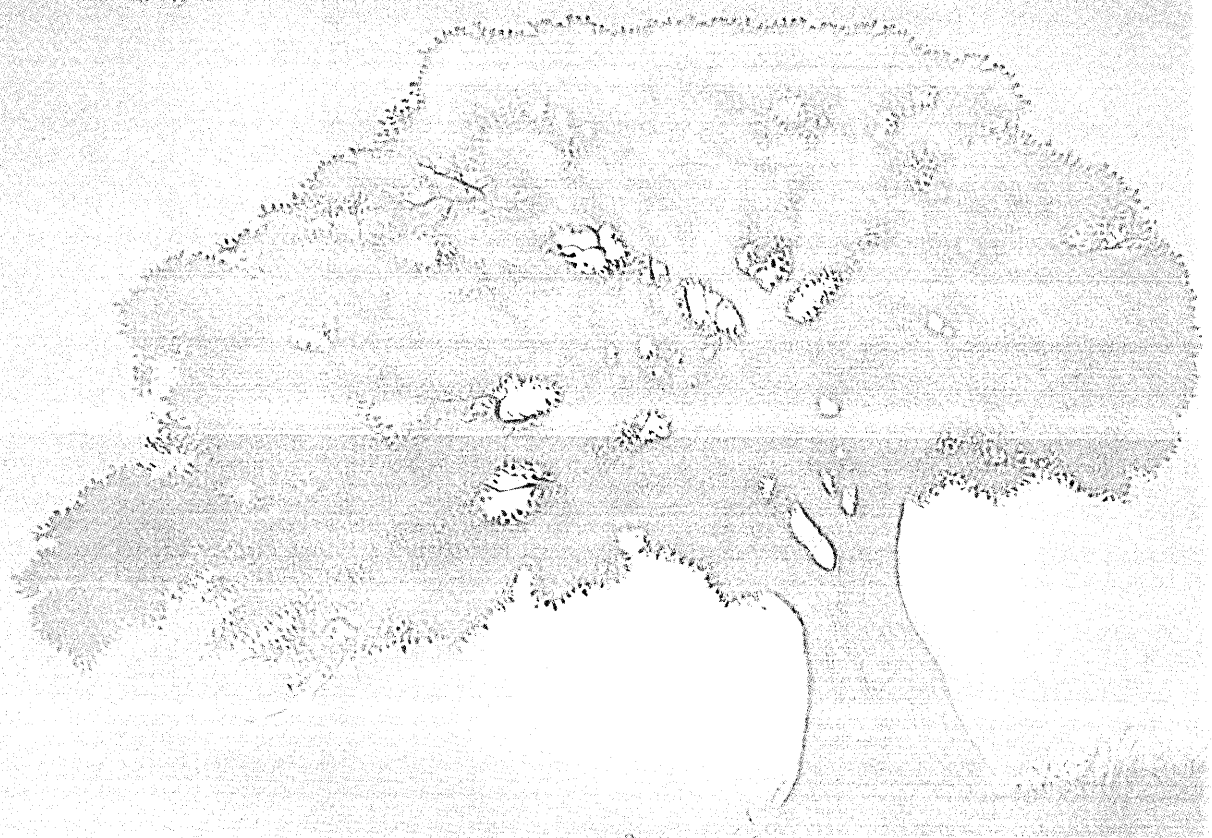

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Collective Security: An Emerging Reality

Charles P. Lecht
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It is highly *unlikely* that any of the security features offered to guard programs and data, by themselves, will prove satisfactory, although few people seem willing to confess this reality openly. Incredulous stories of database incursions made by seeming novices amplify our fears of loss and encourage users to spend more than they need to for the amount of protection they get in systems security and data privacy. Sadly, most of these funds will be spent on protecting things of little value; the interesting stuff will remain unprotected.

We must get over the idea that our data security can be best handled by rank amateurs operating on small budgets far down within our corporate hierarchies. This makes about as much sense as believing that home-devised security can protect cash under a pillow, albeit in a sock. In our new, increasingly cashless society, hard cash has metamorphosized into ideational database entries. Thus we are going to need new kinds of facilities wherein we may deposit our once-material and now-conceptual net worth. Until this concept is accepted... and the French, for example, still don't trust banks... our attempts to make data and programs secure will be ineffective.

System Penetration—Power is Everything

Most (if not all) security systems are about as effective as home alarm systems in defeating crime—they will *not* defeat the professional intruder. For every security measure incorporated by systems designers, there is a countermeasure available to those who wish to penetrate their systems. For both users and intruders, security or its breach is merely a matter of money. And since security considerations are not a sideline activity for the professional intruder, as they are for most users, the advantage is always on his side.

It is hard to imagine a system that could not be penetrated by a professional. Armed with very high speed integrated circuit (VHSIC) technology, logic, massive fast memory, and high-speed communications tools, penetration of otherwise secure systems may now be accomplished by brute-force techniques... the kind of breaking and entering methodology so common to the underworld.

The limits on the speed with which penetration may occur are basically those established by the guarded system. That is, its transaction speed for the handling of legitimate callers. But there is one caveat: if the penetration device is powerful enough, it can appear to the host as many terminals rather than one. This can accelerate the response rates (between user-messages and system) to be close to those which were anticipated by the system's designer for a single user. Anyway, there are a variety of possible scenarios: a powerful processor attempting to penetrate one that is less powerful; a small processor attempting to penetrate one with greater power, etc. But match-ups between would-be penetration systems and guarded hosts all lead to the same conclusion: power is might.

Consider This

If a VHSIC-based system can provide an intruder with brute force entry powers, it seems clear that a similar device might be used to prevent it. Let's envision a powerful penetration system trying to gain access to a database residing in a host of similar power. Processing the intruder-generated passwords at picosecond speeds received over fiber-optic communications lines, the guarded system could take evasive action. Like mythological creatures possessed of ever-changing artificial intelligence, a classic duel would ensue, complete with thrusting, parrying, and even playing dead. A stand-off between the two systems could be resolved by a breakdown in software or hardware environments. The idea of two massive computers fighting it out conjures up all the science fiction excitement we might possibly want.

Economic Chaos

But two countries preparing for war may bring this science fiction scenario into reality. Prior to World War II, both sides' preparations included plans for the penetration of their enemy's economic system, causing chaos by bombing him with counterfeit money. In a society where net worth is determined by records in electronic media, it may now be possible to deliver data missiles complete with multiple re-entry data bombs capable of wiping out data banks and wreaking many other kinds of mischief. A powerful VHSIC might be able to accomplish all this at the stroke of a key. The mind boggles when considering the multitude of opportunities for creating chaos.

Shared Protection

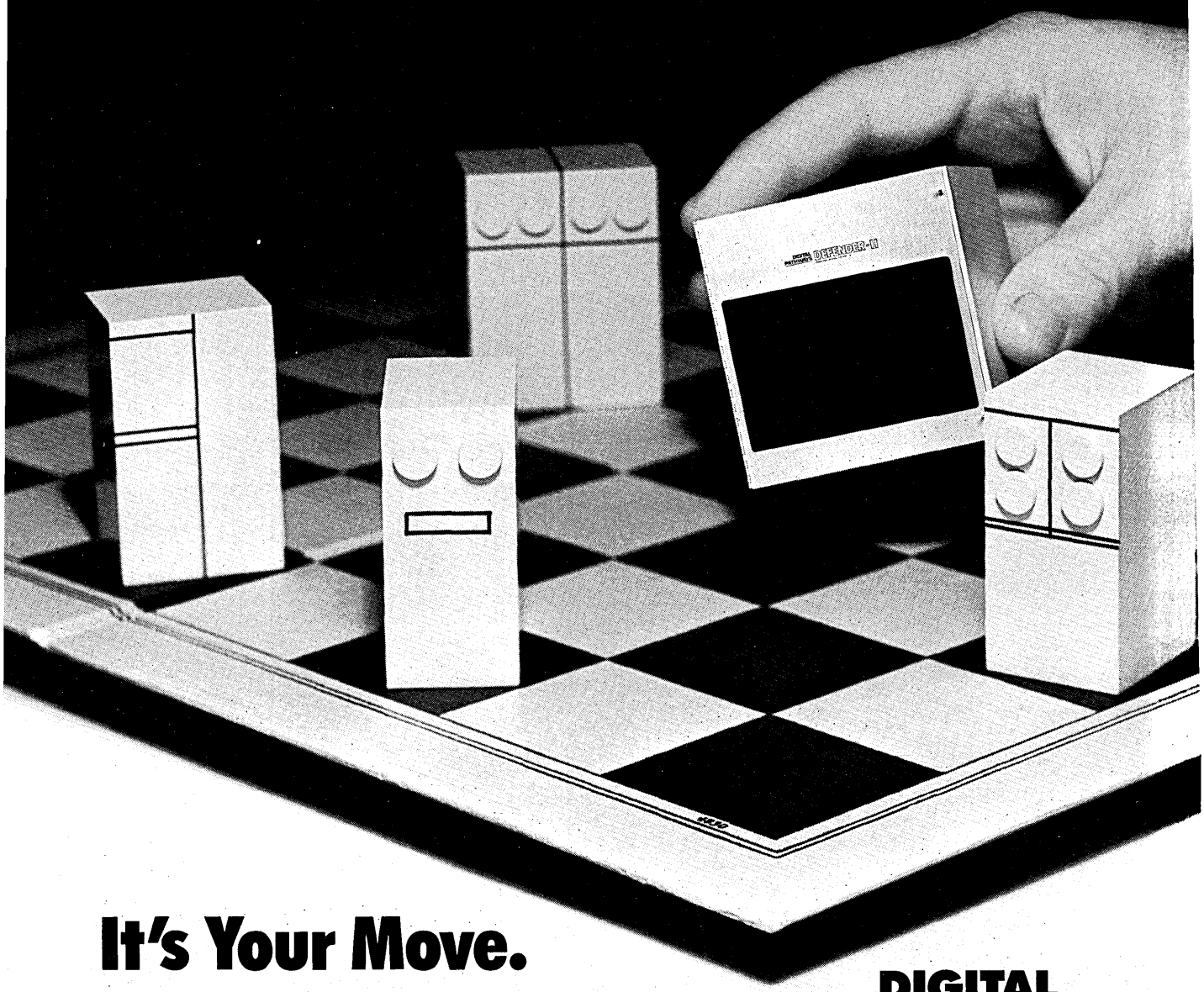
Then what, if anything, can a user do to obtain maximum security in his system, given that "maximum" does not mean "complete"? Of key importance is the acceptance of the notion that privacy of data and security of systems are going to be very expensive if they are to be effective, usually more than the user can afford and, astonishingly, probably more costly than the worth of the system and/or data. If we want the kind of security that requires intruders to pay more to break into the system than the value of what they could gain from it, then the security answer for the future lies in shared protected facilities, like banks. This will be the realistic way of bringing security costs into line.

There must have been a time when the concept of depositing our valuables in safety deposit boxes housed in banks roused a great commotion about privacy and security. Notwithstanding the occasional break-in (usually aided by persons in the bank), we overcame our insecurities about entrusting our valuables to others. It was seen that, however secure our homes could be, the economies available through collectivized security in banks compelled us to leave our valuables there... in preference, for example, to creating a similar fortress at home. Let's face it, the same kind of analysis will generate the same result for most users who wish their programs and data especially secure. This time, however, the banks will be integrated services digital network facilities especially designed to serve user security needs.

As the possibilities for computer and communications usage rush on us, we will want to explore the benefits they can bring. But with each new innovation, new problems in security and privacy inevitably arise. True, present home and office protection schemes will handle some of these, just as simple home-rigged alarms can handle the nefarious intentions of the non-professional crook. But if our fear of breaking and entering by a professional intruder is legitimate, then security in the future will mean sending our programs and data into the care of the newly emerging networks, down their cable and broadcast arteries to be tucked away for safekeeping.

In the data protection game, the best offense is a good defense.

DEFENDER II.



It's Your Move.

In chess you make your move after careful consideration of the advantages and pitfalls. The same careful consideration should be given to using telephone lines to communicate with your computer. Preventing unauthorized phone access to the information in your computers is essential. Equally important is insuring adequate control of authorized "dial-in" users. We can help. The Defender II Computer Access System allows your organization to efficiently access its information systems through the telephone network, without the worry of unauthorized usage. The Defender II works with any computer and is expandable to fit your current and future needs. To find out more about the Defender II contact your nearest Digital Pathways sales representative.

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Pitfalls of Computer Use: Crime, Mischief, & Ignorance

Joseph F. Coates
President
J.F. Coates, Inc.

What's the difference between computer crime and rape? Rape often evokes a curiously ironic response. Friends, family, the public, newspapers, and even juries erroneously impute to the victim an active role in inducing the crime. In sharp contrast, we tend to attribute computer crimes to the subtle cleverness and guile of the perpetrator. Both attitudes should be reversed. *Most computer crimes involve the latent, if not overt, cooperation of the victim.* Every businessperson, manager, or computer user must understand this unique relationship—the victim is almost always an unknowing co-conspirator with the perpetrator.

Unlimited Opportunities for Crime and Mischief. In traditional accounting crimes—misallocation of funds, juggling the books—the computer is a tool which widens the potential scope of the theft, or increases the depth to which the crime can be buried. Computers also open up new opportunities for crime and mischief, such as the destruction of records: imagine the effect on your business of wiping out six months' worth of accounts receivable! It's possible to accumulate a great deal of money by skimming the millage (the third decimal in rounding interest payments) and transferring it electronically to another bank, even overseas. The opportunity to move complex records at very high speed is one key to understanding computer crime and mischief.

Misunderstanding the Computer. What is it about computers that leaves them so open to abuse? The computer is mismanaged in at least a dozen ways that invite crime; most can be anticipated, corrected, and managed. But the management tools which have operated effectively in the traditional paper-flow operation are not always applicable, and rarely adequate, to computer systems. The computer is more than another piece of office furniture, a super file, or a different form of recordkeeping. The computer is the information analog of the robot. Its incredible power comes from speed, complexity of operation, large memory, and the ability to network. The scope, complexity, speed, and sheer volume of information-handling creates these systems' special capabilities and vulnerabilities. To leave this intellectual robot unguarded is like leaving the key to your front door under the welcome mat.

No Assignable Monetary Value to Information. Each of us knows the value of our physical assets—automobile, jewelry, house, furs—and we insure them, guard them, consider the value of vaults or safes to protect them. We know the cost of tools and machines, or an hour of a worker's time, and so we control, guard, and manage those assets. But we regard information differently. It is nearly impossible to assign meaningful value to different kinds of information, so we we tend to treat it as if it had little or no value. Yet we know information is critically important to virtually every organization, whether that information is company trade secrets, business records, procedures, strategies and plans, inventories, or customer lists.

False Confidence in Administration and Organization. American businesses have grown up as very human institutions, with authority, control, and information flow organized around face-to-face oral contact or person-to-person paper communication. The old safeguards are out of sync with an information-flow system that almost completely cuts out people, operates faster than any person or group can track, and produces results quicker and buries them deeper than any human movement could. The computer does more than augment people; it has changed the relationship between the organization and its two essential elements, information and authority. Administrative, organizational, and procedural measures for safeguarding people and physical assets are sure to be inappropriate for computer systems.

Management Ignorance. Managers tend to buy computers like any other equipment—as substitutes for or adjuncts to doing a present job...and doing it cheaper, better, faster. Oriented toward the microeconomics of the workplace, the systems buyer too often takes capabilities at face value. This naive inattention to what the system can do is the pavement on the road to regret. Your business is specific and special; the vendor's product is general-purpose—one size fits all.

To close this gap, the manager must push relentlessly on the key security questions: "What are the risks of this system? What are the vulnerabilities? What must I pay to guard against, neutralize, or minimize them? How do you know? Where is a satisfied client I can talk to?" The vendor is unlikely to volunteer information about evaluating the relative costs of vulnerabilities and safeguards. The absence of a detailed list of vulnerabilities and risks was understandable a decade ago. But organizations like Computer Security Institute, scores of highly credible security firms and individuals, plus a great bookshelf of material now make it inexcusable to neglect these risks.

Ethics and Etiquette—Weak and Undeveloped. Every new technology or system that changes our way of doing things calls for social learning. We must probe the ethics of the situation and develop new standards of behavior. Related, but distinctly different, is the etiquette of the new technology—what is it proper and improper to do? For example, many governments and corporations are cracking down on employees who use the computer for hobbies or personal interests. In my view, the ethics and the etiquette of the situation will develop in the next few years to where employees will routinely expect some free time on the computer, analogous to personal use of the office phone. The absence of that "benefit" is an incentive to steal system time, and once a person has done that and seen how easy it is, there is a great temptation to go on, not to hold back. Clearly we need to develop a *positive* ethics and etiquette of computer use by employees.

What to Do. Every businessperson, corporate manager, or employer should follow a few simple principles in buying, using, and maintaining computer systems. These call for a shift in operation and approach:

- Take nothing for granted;
- Seek out hard questions from staff, management, and others;
- Ask and demand answers to hard questions from vendors and staff;
- Look for persons who can handle the task well, but whose intellectual capabilities, dynamism, and verve are not so far above the job requirements that, in effect, they constitute an invitation to corruption.
- Get professional advice. This is like preventive medicine, which provides no immediately obvious and significant positive benefits. To the extent that security works properly, protection is invisible, unobserved, and uneventful. Professional advice is a hygienic factor like clean water. Would you really consider drinking polluted water?

You are cordially invited to attend the Eleventh Annua

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This special 2-day program is designed to meet the needs of the advanced computer security professional with at least 4 years experience. There is no extra charge for this program, but space is limited.

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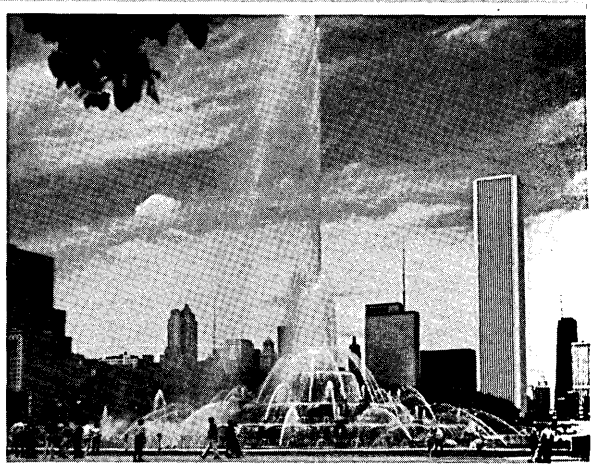
Don't miss this opportunity to attend the National Computer Security Exhibition, the only one of its kind devoted solely to computer security. You'll see the latest in security products and services.



The value of this Conference is much more than the for program; it's also an unparalleled chance to meet pro sional colleagues, to share your headaches and experien with people who really understand what you're up agai It's a once-a-year opportunity to significantly expand y network of contacts, enabling you to exchange ideas wl you return to the job. Using a variety of mechanis throughout the Conference, CSI makes this interact happen.

Here's What Attendees Said About Last Year'

FINANCIAL

"Still the premier computer security conference! An interesting and diverse program, well-organized and a great opportunity for information." David Puttock, Data Security Planner, Bank of Montreal

"The best forum for exchanging security problems and solutions—presents 'state-of-the-art' & related topics in a concise fashion!" Christine Jermyn, EDP Security Analyst, Mutual of New York

"I was concerned that the conference could become repetitive over the years. But CSI listens to its members as is evident with the Graduate Program. Another great job!!!" Frank A. Sydor, Security Analyst, First National Bank

"I've been active in arranging security educational seminars at the regional and international level and you, your staff, and all the people that participated should be congratulated for one of the finest jobs I've seen." Daniel T. Cumberledge, V.P., Lincoln First Bank,

"Overall, high quality. Useful in all aspects." David E. Farquhar, V.P., Nat'l Bank & Trust Co. of Norwich

"Excellent; it really is a good opportunity for getting up-to-date on the data security field." Naftali Fasten, Asst. V.P., Republic Nat'l Bank of N.Y.

"Very good conference. Great opportunity to exchange ideas with others in the field. Management of the conference was excellent." Dixie Alexander, Management Support Assistant, Bank of Virginia

"Excellent!! I picked up a great deal of information & ideas that will be very useful in my field (disaster contingency planning). I also liked the luncheon seating by job title, industry, & special interest." James McClelland, Computer Operations & Facilities Manager, Suburban Bank

"Overall, the conference was very good. I could see CSI had put a tremendous effort into it and CSI deserves credit." Chung Yau, EDP Auditor, Long Island Trust

"An excellent forum for frank interaction on security/control issues (past, present, & future)." E.H. Perley, Manager, Royal Insurance Canada

"Excellent program presented by professionals in a no-nonsense program schedule. Lunches were good." Joseph F. Heissler, Dir. of Operations, Country Mutual Insurance Co.

"'Job well done' CSI." John Cusick, EDP Auditor, First Nat'l Cincinnati Corp.

"Well managed, informative, & enjoyable." Joseph B. Mihalyl, Systems Analyst, New Jersey Blue Cross

"Of all the computer security conferences I have attended, this one is a must for computer security personnel." Joselyn Mascarenhas, Data Security Off., First & Merchants National Bank

MANUFACTURING

"Excellent—one of a kind—seems to have something new every year." D.R. Lamberth, Security Specialist, Gulf Oil Corporation

"Terrific—this is my third conference and, amazingly, it gets better every year." Ray Evans, Security Analyst, R.J. Reynolds Industries, Inc.

" A very excellent conference that was extremely well planned; the best I ever attended. The Graduate Program is an excellent program to view several topics with experienced security managers." John O. Tosatto, Supv., Database Security, PPG Industries

"High quality and content of sessions and workshops presented in a practical and usable manner. Thank you for another cost-effective and beneficial conference." Ezra W. Brooks, Security Coord., Burlington Industries

"An excellent forum to learn from a cross-sectio security practitioners. The exhibition was a great to expose us to many products available." Steve Cul Sr. EDP Auditor, U.S. Tobacco Co.

"The conference was invaluable in my selectio security software." Paul Frazer, Mgr, Technical Supp Kennametal Incorporated

"Best organized conference I ever have attend Donald W. Horner, V.P. Systems, Colwell Systems

"In a year of severe cost restraints, worth ev penny!" Ansgar Mantel, Manager, EDP Audit, Dom

"The conference provides a wide variety of informat for each of the professions involved in comp security: specialists, auditors, and DP personnel." J Noe, Contingency Recovery Coordinator, Armco

"Very good conference. A well organized learn experience. Well worth the trip." Michael Adams, S EDP Audit, Royal Canadian Mint

"Very educational, eye-opener. Wish that I had opportunity to attend a conference like this bef starting my duty as an EDP security officer." Nor Dang, EDP Security Officer, Texas Instruments

"Very good conference. All of the sessions I atten were very worthwhile. I'm looking forward to n year's conference in Chicago." Mary E. Kiley, M Security Services, Northern Telecom

"The conference was very enlightening & an opener. Picked up a lot of good pointers and id Liked the personal schedule." Walter R. Mazu Security Admin., Sterling Drug Inc.

"Excellent—as usual." Rolf Moulton, Sohlo

"A very well managed conference which offered the opportunity to tailor a program to my needs security concerns." John Yandrisovitz, Auditor, B lehem Steel Corp.

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is optional 1½-day series of sight-seeing tours and minars is offered to Conferees' spouses (and other mily members) at CSI's cost.

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ABOUT COMPUTER SECURITY INSTITUTE

CSI, established in 1974, is the first full-service membership organization devoted solely to helping its more than 3,000 members safeguard their EDP resources and information assets. Services include a bimonthly newsletter *Computer Security*, the forthcoming *Computer Security Quarterly*, a "Hotline" telephone referral service, and reduced rates for conferences, seminars, and publications. CSI sponsors the Annual Computer Security Conference and Exhibition (generally referred to as the "Computer Security Event of the Year") and the Annual IBM Users Computer Security Workshop. CSI publishes the semiannual *Computer Security Journal*, the 500+ page *Computer Security Handbook*, the *Computer Security Manual*, and periodic special reports. The training arm offers both standardized and customized in-house training courses as well as a full program of regional public seminars throughout the U.S. and Canada. For information, call or write:

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multitude of ideas and suggestions for both the erienced and inexperienced computer security ctitioner." James T. Spence, Sr. Staff Member, AT&T hnologies

he exhibition and personal interchange have been y valuable for learning about the latest products for dling our security needs." George W. Siegmann III, ervisor, Lockheed Missiles & Space Co.

his is the prime source of information for companies develop and benchmark their security systems. A at place to meet and converse with other security fessionals." Frank P. Behm, E.I. Dupont Co.

pportunities for an interchange of ideas are fantic. Most speakers were excellent." James S. Kinney, Sr. Systems Engineer, Brown & Williamson bacco

his was the best organized and most helpful nference I've ever attended." Bill Miller, Mgr., ndards & Professional Development, Mitchell Energy Development

OVERNMENT

onference is the best single source of information computer security on both the conceptual and chnical levels. All this expertise in one place is an ormous resource for the data security community." obert Sayre, Security Spec., Social Security Administration

uperb conference, totally pertinent subjects by the st in the business." Leo G. Miller, Computer Security fficer, U.S. Air Force

n outstanding event. The topics covered were mely, informative, and well presented. A definite ntribution to the world of ADP security." Jerry ushner, Network Security Officer, U.S. Army

This was a very good conference in all aspects, specially the Graduate Program. Many good conections were made and the Exhibitions were like eing in a candy store. Very well run as usual and quite njoyable. Just too short." Richard Brinkley, Prog. nalyst, Bureau of Public Debt

"As always, a super job. There exists no better forum for the exchange of information on computer security." Robert S. Hansel, Capt. USMC, DoD Computer Institute

"I've attended many data processing conferences. This was my first Computer Security Conference—and the best of all!" Robert P. Bell, EDP Security Officer, Naval Supply Systems Command

"Highly professional and well-managed conference. It is truly the EDP security event of the year. A wealth of information." Mary Anne Todd, Systems Analyst, Naval Supply Systems Command SSSG-N

"Of great interest. The best place to interchange about security topics." Michel Dubois, Systems Analyst, Government of Quebec

"I felt the conference was motivating and inspirational. The handouts will be quite useful in enhancing our ADP security program." Robert N. Learn, Head Applications Programmer, Naval Surface Weapons Center

"Well done—tightly run—solid subject matter." George Mayerchak, Program Analyst, Veterans Administration

"I find the annual 'plugging in' with my fellow practitioners very stimulating. Will try to bring a team next year. I'm proud to be a member of the organization." Mae C. Morris, ADP Security Officer, Navy Finance Center

"As usual you did an excellent job in putting this program together. It still is the only single source for a security administrator to get all the security tools." Horst Rahden, Corporate Security Officer, U.S. Railroad Retirement Board

SERVICE

"Absolutely the best 'meeting of methods and minds' for all concerned with security." Susan Fletcher, Coord Sys Mgt, Union Gas Limited

"Attending for the 7th straight year, I'm still impressed with the high standards and quality this conference achieves." F. Wayne Barnett, Corporate MIS Security, Sonat Inc.

"Conference was very well organized. Impressed especially with workbook, the individual schedules, and the providing of handouts at the workshops." David D. Israel, Chief Staff Auditor, Washington Gas Light

"I was extremely impressed by the caliber of general speakers and workshop speakers. Overall organization of conference is superb." William Gieske, Bell Laboratories

"The value of this conference to those attending who took full advantage of the various seminars and exhibit materials is simply unmeasurable! The conference program for the 'Graduates' was excellent in content and was most relevant to today's security issues." Gerald L. Huerta, Security Consultant, Martin Marietta Data Systems

"Well structured to provide 'something for everybody' involved in computer security." Daniel D. Cottrell, Manager-Security, AT&T Communications

"Excellent, well-managed conference—keep up the good work." C.M. Elliott, Dir., Quality Assurance & Security, Martin Marietta Data Systems

"Enjoyed the conference very much. Felt the material presented was insightful in addressing the concerns of today's security practitioner." Steve Foley, Sr. EDP Auditor, Days Inn of America

"Overall very informative for auditors, security officers, and everyone connected with EDP security." James S. Sigmon, Jr., Computer Security Analyst, Aramco

"Excellent—Best technical conference I have attended." Kenneth C. Kendrick, Dir., Internal Audit, Informatics General Corp.

"Stimulating—I accumulated 16 action items in the first two days; well worth the cost of the conference." Gerald W. Grindler, Mgr., EDP Security, Southwestern Bell

"The information I get from this conference is invaluable to me as a data security administrator. That is why I have kept coming back year after year for ten years." Melvin Swanson, Data Security Admin., Borden Incorporated

You've come a long way, Jesse James

Jesse James' 20th Century cousins are on the loose; electronic whiz kids, disgruntled employees and full-fledged criminals who are breaking codes and saying "open sesame" to dial-up data ports. They're stealing millions of dollars, confidential reports and everyone's peace of mind. They use terminals instead of guns and are not as visible as Jesse ... in fact you may not be aware of them at all.

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Information Security: Try Looking At It This Way

Harry B. DeMaio
Director of Data Security Programs
IBM Corporation

Ask today's information processing professionals to describe the changes which have most strongly influenced their current work environment, and they'll probably answer in terms of technologies, architectures, hardware, and software designs. This is hardly surprising, since intelligent workstations, personal computers, microprocessors, displays, networks, distributed processing, and distributed data implementations all seem to be dominating and reshaping the marketplace.

Security in Today's Environment

A stronger case than ever can be made for concentrating security and audit plans around the characteristics of the application systems rather than the hardware or system software. Rather than asking, "How do I protect a PC? What security do I need on a shared logic office system?" we should be asking "Describe the applications. What is the nature and value of the information? Who is involved in the process? Where does information come from and where does it go? At what points in the process can I attest to its integrity? How are we *using* the PC or shared system?"

Just a couple of years ago, simply protecting the hardware and the system software often fulfilled a major part of the security requirement. In a sense, security for applications and information came along for the ride as we protected the big central complex computers and their operating systems. But the new wave of microprocessor-based system architectures has changed all that. It has shifted the security focal point away from the hardware and its system underpinnings and directed it toward the global characteristics of the application, in all aspects of its implementation, both on and off the equipment.

Certainly, current system offerings have not become so transparent that we can ignore their individual operating characteristics in planning and implementing security. However, today's systems do offer much greater flexibility in connection and configuration, and many more choices of where, how, and by whom a specific function can be performed. So the same type of application running on the same hardware and system software may end up having a very different security, audit, and control profile from enterprise to enterprise, and from establishment to establishment, even within the same organization.

Does this mean we throw out the book and start again from scratch? No, but it does call for greater scope and flexibility in defining security procedures. We must build those procedures so that they can be readily modified and tailored to each specific environment, even to the extent of making changes in otherwise similar systems within the same company, division, or department.

Information Ownership

An alternate response to my opening question—What are the major changes in today's information processing environment?—would stress the strong reemergence of the end user. But the big news is that the functional information owner is back. What is an "information owner"? Probably the most useful definition in the security context is: *the individual who sets the rules for information usage.* Who may have access to specific information and processes, and under what circumstances? Thousands of managers in finance, manufacturing, development, traffic, personnel, and other units are now getting their information ownership rights back—rights which they earlier (and perhaps not deliberately) turned over to central DP departments. Each new personal computer and intelligent workstation under their direct management control reaffirms this transition. However, with the return of those rights have also come corresponding difficulties and a certain degree of discomfort. Sometimes, unfortunately, users and managers are not adequately prepared to take on or reassume these ownership responsibilities.

In some situations, ownership can be a very powerful managerial prerogative and the source of some conflict. But identifying and clearly establishing ownership rights and responsibilities is absolutely essential today for an effective security plan. From it comes the process of information classification and personal authorization. Both classification and authorization are more usefully expressed in terms of information and application, not in terms of specific pieces of hardware or even specific operating environments such as timesharing or batch.

What is important to the enterprise? With increasing frequency, the cost of the system is significantly less than the value of the information it is processing. Do we really know what it is we want to protect? Answering this does not necessarily require determining information value in the traditional R.O.I. sense so much as it calls for prioritization. Often this is nothing more than determining what information you can least afford to lose or reveal.

Who should be involved in this process? Certainly audit and security specialists. And the fall from power of the DP or MIS management chain has been vastly overstated; they clearly need to be a part of the process, as does telecommunications. But it doesn't stop there. Above all else, general management needs to be involved...to direct, to motivate, and to inspect. Because of the pervasive nature of this new processing power throughout the entire organization, "general management" in this case means top-level management.

The Applications Perspective

Given all those varied people, the application orientation to security now becomes even more valuable. A general manager may not be expert in computerese (although many of them are developing these skills), but almost all general managers know how their business works and how information moves through the organization. Good general managers can get a tremendous amount of mileage out of simply *asking the right questions* about controls and usage by function. And they insist on answers in the same terms. It isn't necessary to know the mechanics of encryption to understand its value. How an access control system handles profiles and passwords is not important if I know what it will do for me; if it will allow me to determine who can access data and resources, and whether that is adequate for my overall control philosophy.

The key to the security issue is a clear statement—both through direction and follow-up—that information security and audit are now more important to the organization than ever before, and that a workable, sensible information security plan needs to be developed and implemented. In today's information processing environment, this is not a single event ...it is a way of life.

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Society's Responsibility for Data Security

Steven J. Ross
Principal
The Plagman Group

We are faced, as a society, with a curious dichotomy. Most major areas of social commerce—finance, education, law, marketing, research, manufacture—are dependent on computers. And yet, we tend to glamorize those who imperil the security of those computer systems.

- The "414 Gang" penetrated on-line systems in banks and government agencies. Most frightening of all were their incursions into systems in Los Alamos Nuclear Laboratories and Sloan-Kettering Memorial Hospital. Hackers who had committed the acts were featured on the covers of national news magazines and invited to testify before Congress.
- A student from the California Institute of Technology, as a class project, rigged the computerized scoreboard at the Rose Bowl so it showed bogus scores in place of the real game score. His "achievements" were hailed on the cover of the CalTech alumni news. Although Rose Bowl officials estimated that $30,000 would be required to repair the damage, the student received an "A" for the course.
- In the movie *WarGames* and the television series *The Whiz Kids*, children with data processing skills are shown breaking into computer networks. In the movie, the hacker almost brings on nuclear disaster. Again, these children are portrayed as the heroes.

Attitudes

We are sending mixed signals about the importance of data security. We would hardly permit such tolerance of international spies, political terrorists, or even basketball point-shavers. As long as the motivation of perpetrators is not personal or political gain, but rather a desire to undermine the technology, then the crime seems to be greeted with a knowing wink. Whose fault is it, then, that "basically good kids" treat computer systems like electronic playgrounds?

Computer hacking is hardly the principal concern for either data security or child-rearing. But as American society shifts from a product-based economy to a service-oriented one, respect for the integrity of data will be as central to the success of our culture as was the primacy of property rights in the establishment of capitalism. Luddism is no more acceptable in bringing down an inventory system than it was in burning up a steam-powered loom. The issue is not the actions of misguided children; it is *society's attitude* towards those acts.

How are these attitudes formed? A subtle amalgam of the home, the church, the press, and our schools combine to create the commonly accepted wisdom. Together, these forces set the standards for the community. In the 1970s, people became aroused about data security . . . specifically about the effects of computers on personal privacy. Laws were passed around the world to guard against the improper use of personal data. But most of these privacy laws only cover data stored in government computers; if we are really interested in protecting our data, then we need to expand privacy legislation to cover all sectors of society. Moreover, the issues of privacy and security, while related, are different. My privacy is violated when data which I consider sensitive is exposed or disclosed without my knowledge and/or consent. True security will exist only when we keep other people's property—their data—as safe as our own.

Taking the Lead

Computer Users—Organizations that use computers should train their employees to be aware of the need for data security. It seems as if it would be a simple step to extend business ethics to the computer environment. However, there are many gray areas with regard to ownership, usage, and access rights. Nonetheless, the organization has a fundamental need not only to secure its own data but also that of its customers. Ethical ambiguities should not result in ethical inaction.

Computer Manufacturers—particularly those whose products are intended for home use, should include literature explaining the proper use of computers. Aside from their own direct interests based on product liability, vendors should take it on themselves to alert the public to the importance of data security. The misuse of computers on a widespread basis is certain to stimulate market and legal action that will be harmful to computer vendors.

Educators—The concepts of information security should be included in every computer course. In shop class, students are taught how to use tools safely; computer training should proceed on the same basis. Teachers do not have to be moralists, but neither should they condone impropriety, as happened at CalTech. The proper and prudent use of computers, along with respect for others' data and practices are all appropriate concepts to be included in programming classes along with syntax and structure.

Do Unto Others...

The Golden Rule has been with us far longer than computers have, but it is still being violated every day. At least we know, without having to ponder the question, that it is *wrong* to violate that principle. We must be equally aware of the wrong in doing unto others' data what we would not want done to ours. This concept of informational right and wrong must be conveyed, not only to children but to all of society. As computers increasingly penetrate our daily lives, we—as individuals and as a society—must learn how to use them in a conscientious and responsible manner. And those who have a vested interest in the security of data must take the lead in this area.

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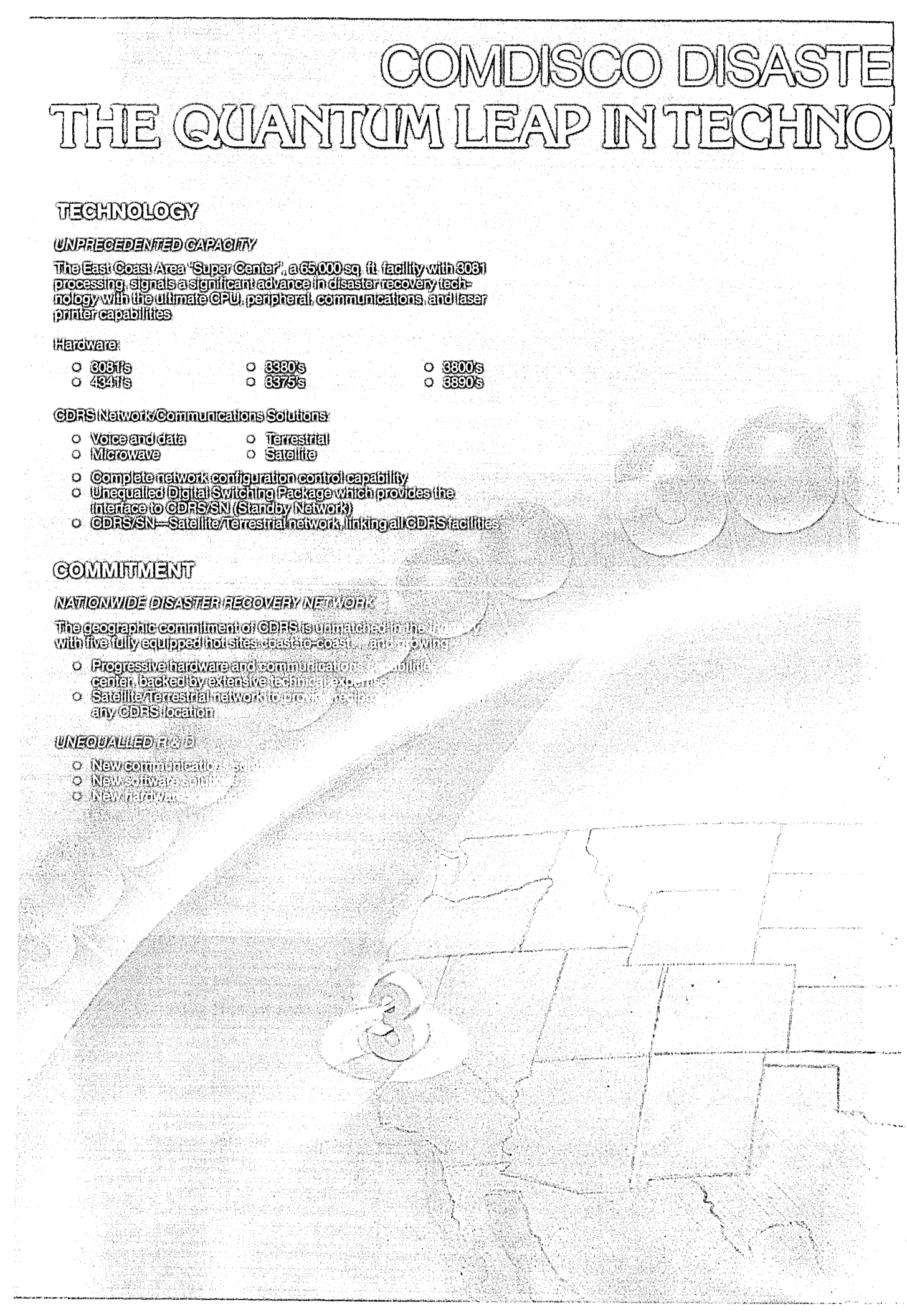

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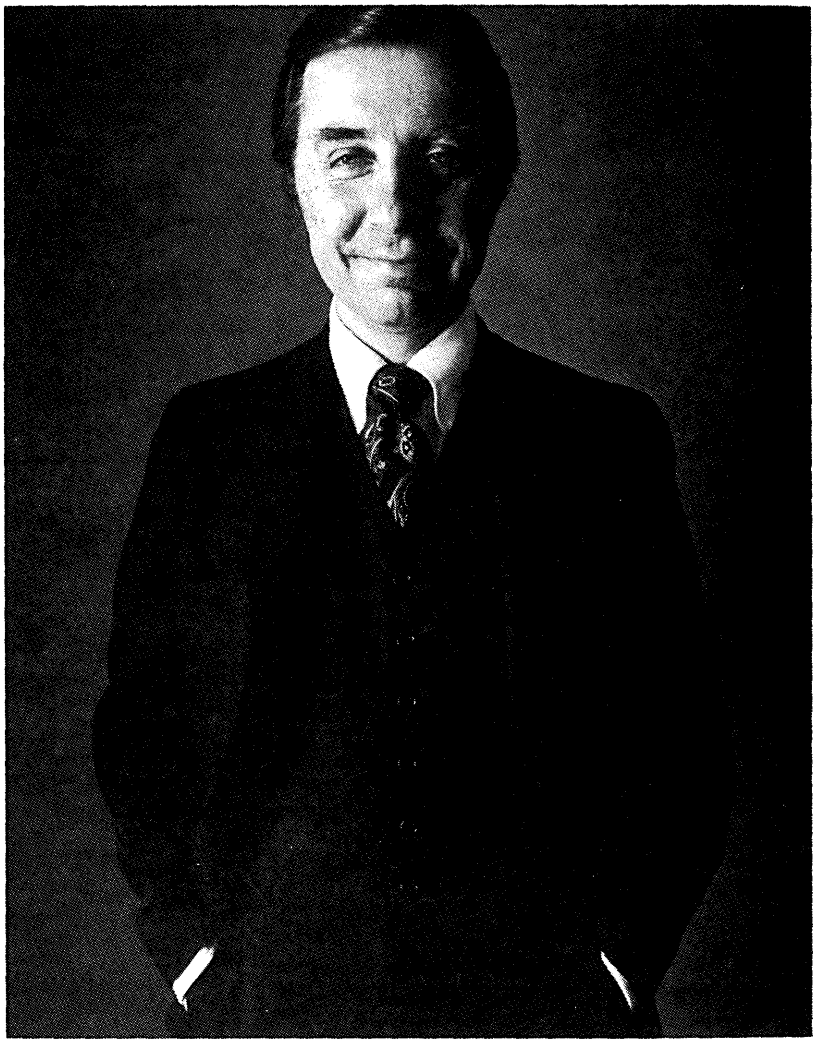

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Top Management Needs to Know about Data Security and the Law

Robert P. Bigelow
Attorney-at-Law

Any organization which fails to institute appropriate security measures can expose not only the organization but its board of directors *individually and personally* to substantial liability, which can be imposed by contract and/or by law. The board of directors of a corporation has a fiduciary responsibility to the stockholders to protect the assets of the company. Failure to establish and maintain a reasonable security program is a breach of that fiduciary duty; in case of substantial loss, the members of the board may be personally liable to stockholders whose stock has been devalued. The corporation may also be liable to others, either contractually or under the doctrines of tort law (a civil wrong for which the law imposes liability).

Protecting Software

When an organization acquires computer software, it usually receives a license from the owner of that software to use it in a *specific* manner on *specific* machines, and that use is subject to security requirements imposed by the license. Computer programs are usually protected legally by a combination of trade secrets and copyright. The protection of the trade secrets is vitally important to the software vendor, and thus its license agreement is likely to require the licensee to take a number of security precautions, including:

- disclosure only on a need-to-know basis;
- execution of confidentiality agreements by all individuals who have access to the software;
- prohibition against copying the software except as specifically permitted for backup copies.

If the licensee fails to fulfill these commitments, and by its failure causes or allows the software to be disclosed to third parties—and thereby fall into the public domain—the licensor's trade secrets may well be lost. If the license fee for the program is $50,000, the potential market value may be in the millions. The loss of its trade secret may end the licensor's proprietary rights in the software, and in some cases could even cause it to go bankrupt. In that event, a court could find that the licensee which failed to live up to its contractual security commitments was responsible for the vendor's financial disaster, and the court could require the licensee to make restitution to the shareholders of the software vendor.

Liability for Bad Data

The law of torts may also impose liability on an organization for failure to take appropriate security precautions. For example, if the organization maintains a database of information about individuals, poor security controls might allow that database to be accessed by interlopers and the information in it improperly modified. If untrue information about an individual is subsequently released, the organization could be held liable in court for having damaged the individual.

For example, a computerized credit reporting service lacked appropriate safeguards to check the validity of information about individuals in its database, and erroneous information was given to a potential credit grantor. Credit was denied, and the credit reporting organization was subsequently held liable under the Fair Credit Reporting Act. While in this particular situation the error resulted from inadequate controls for checking the information, the same result might well occur where the information was "amended" by an unauthorized person, to the detriment of the individual seeking credit.

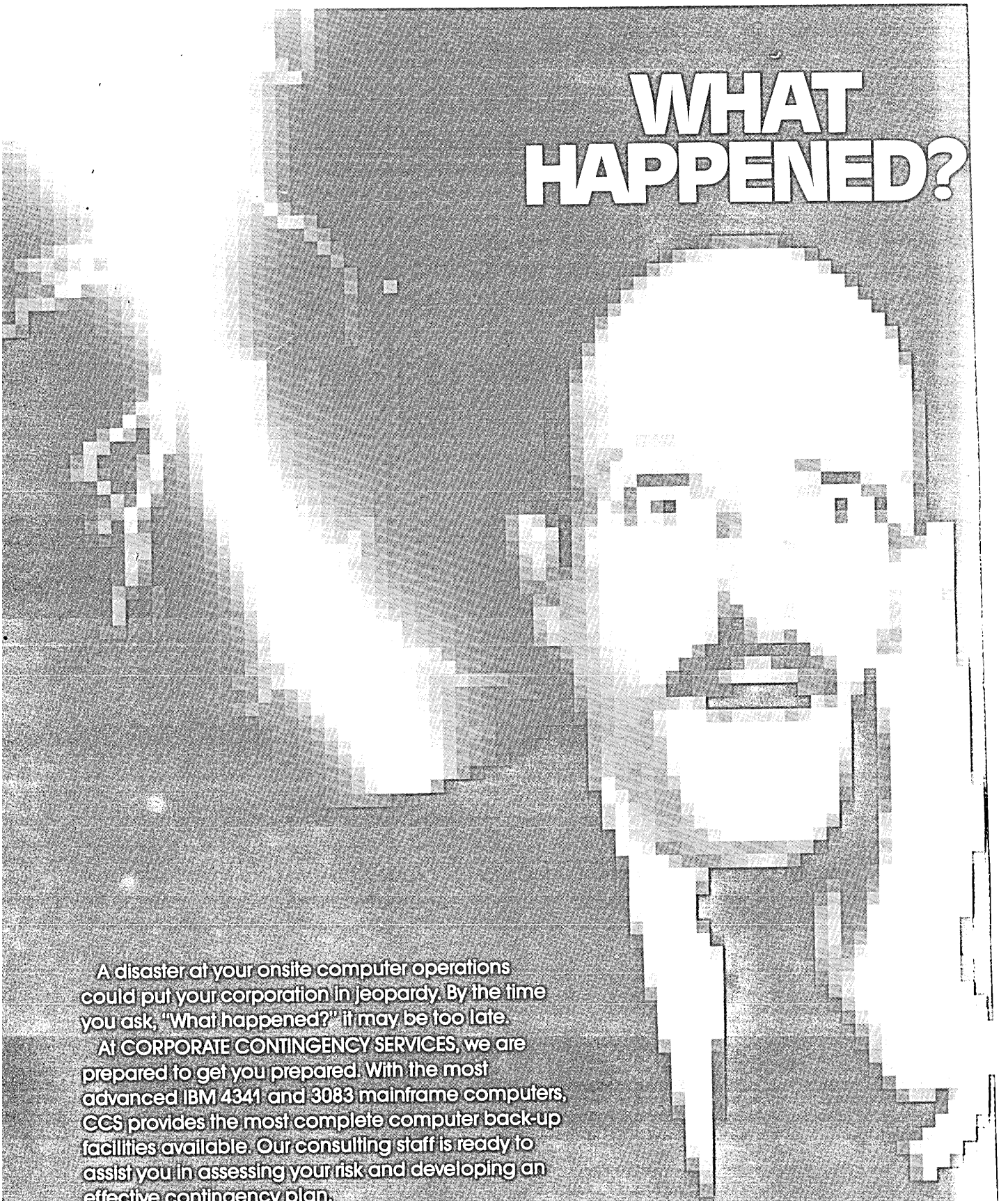
When an organization is in the business of providing computerized information about people or other factual data, its contract with customers will probably limit its liability. However, that contract cannot limit the liability to a third party injured by release of inaccurate data. For example, if an engineer relied on information in a computerized database for the strength of concrete when designing a bridge, and this information was inaccurate, the data provider might be liable to persons injured when the bridge collapsed because the concrete was too weak. The organization's contract with the engineering firm might well protect it against claims by that firm, but it would be little defense against any persons injured in the bridge collapse. A court could well hold that the database company should have been aware that its information would be used in building bridges, and the collapse of the bridge due to faulty data was foreseeable.

Complying with Regulatory Agencies

Particular industries often have specific requirements for data security imposed by regulation. For example, banks are subject to audit by federal and state authorities. In the spring of 1983, the Chief National Bank Examiner issued a circular requiring national banks to institute contingency plans for their EDP systems, including provisions for off-site backup of critical data files, software, and hardware, alternate means of processing transactions, and periodic testing of the system. Additional regulatory requirements can be expected in the future.

Management's Responsibility

Management, whether it realizes it or not, is responsible for the security of the organization's information system. Sometimes this responsibility is contractual, sometimes it is created by law, and sometimes it will be imposed by the courts. If top management does not act to establish and maintain adequate data security procedures, the organization could be liable for substantial damages...and those damages may be collectible from the managers personally!



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Disaster Recovery: A Significant Business Issue

Robert P. Campbell
President
Advanced Information Management, Inc.

Disaster recovery planning is a fundamental responsibility of senior management. This is no longer merely good sense. Last year a legal precedent was established when a bank was found liable for dishonored checks—not because it was unable to process them but because it had not diligently attempted to provide alternate processing capability.

That was dramatically clarified when, shortly afterwards, the Office of the Comptroller of the Currency issued Banking Circular OCC-177, "Contingency Planning for Electronic Data Processing Support." This requires the boards of directors and presidents of each national bank to evaluate their contingency plans annually and to formally note the adequacy and status of those plans. This action was considered necessary because of the dramatic increase in dependence on critical computer-based banking systems and the general failure of bank management to recognize this dependence and act accordingly to protect vital functions.

These events spotlight the need for effective disaster recovery planning. As with banking, the highest levels of management must be aware of and given the opportunity to deal with these concerns.

What Are the Real Issues?

The emerging long-term issue is survivability. While disaster recovery planning tends to concentrate on individual processing centers and systems, the key long-term issue will be the survivability of organizations operating in complex networked environments. Disaster recovery planning must focus upon strategic survivability issues, exposing flaws in present and planned systems, networks, and vital business functions.

Information technology is in a vulnerable period of transition. In the move from batch to on-line systems, and then to distributed databases and processing, we are creating large centralized systems which are inordinately vulnerable to disruption. It will be many years before the shift to distributed operations will be complete. In the meantime, the loss of processing capability will have a major impact on vital business or operational functions, and our dependence on real-time access to these systems will intensify.

Internal dependence on information for vital business functions is increasing. Unquestionably, reliance upon and sharing of the information resource within organizations is increasing rapidly. This information, flowing over local area networks from word processors, large mainframes, dedicated minicomputer, personal computers, and scanning devices to user department terminals, is becoming the lifeblood of an increasing number of business functions. Disrupting the flow of this information would have severe effects on critical business operations.

Liability aspects of critical system dependence are changing dramatically. Computerized information systems are being used, not only for internal business and operational functions, but increasingly to support consumers and outside organizations, to provide goods or services to outsiders for income and profit. The loss of systems therefore affects not only the information or service provider but also those outside the organization. The potential impact of failure to perform has implications not only on market position but also on liability.

Tolerance for system outages is rapidly decreasing. As dependence increases, we are less able to sustain loss. Public acceptance of near real-time services, especially for funds transfer, ATM support, and instantaneous "debit card" deductions for bank accounts, is sharply reducing tolerance for system outages. The demand for greater reliability will intensify as both dependence and general computer literacy increases.

Demonstrating Commitment

How well an organization understands these issues will determine the adequacy of its recovery planning activities. There are three distinct levels of disaster recovery planning.

1. *Backing up the computer system* focuses on technical backup of the processing facility functions. This level is characterized by data processing backup of data and files, including an agreement with a backup site for processing support. Technical system compatibility will probably have been demonstrated, with limited "batch" systems testing likely.

2. *Protection of major business functions* attempts to provide effective backup for major business or operational activities. This level requires deep involvement of functional users and business units to prepare and test this capability. If achieved, this level of backup will often have tested only the organization's batch systems, without addressing more complex, communications-dependent, on-line systems.

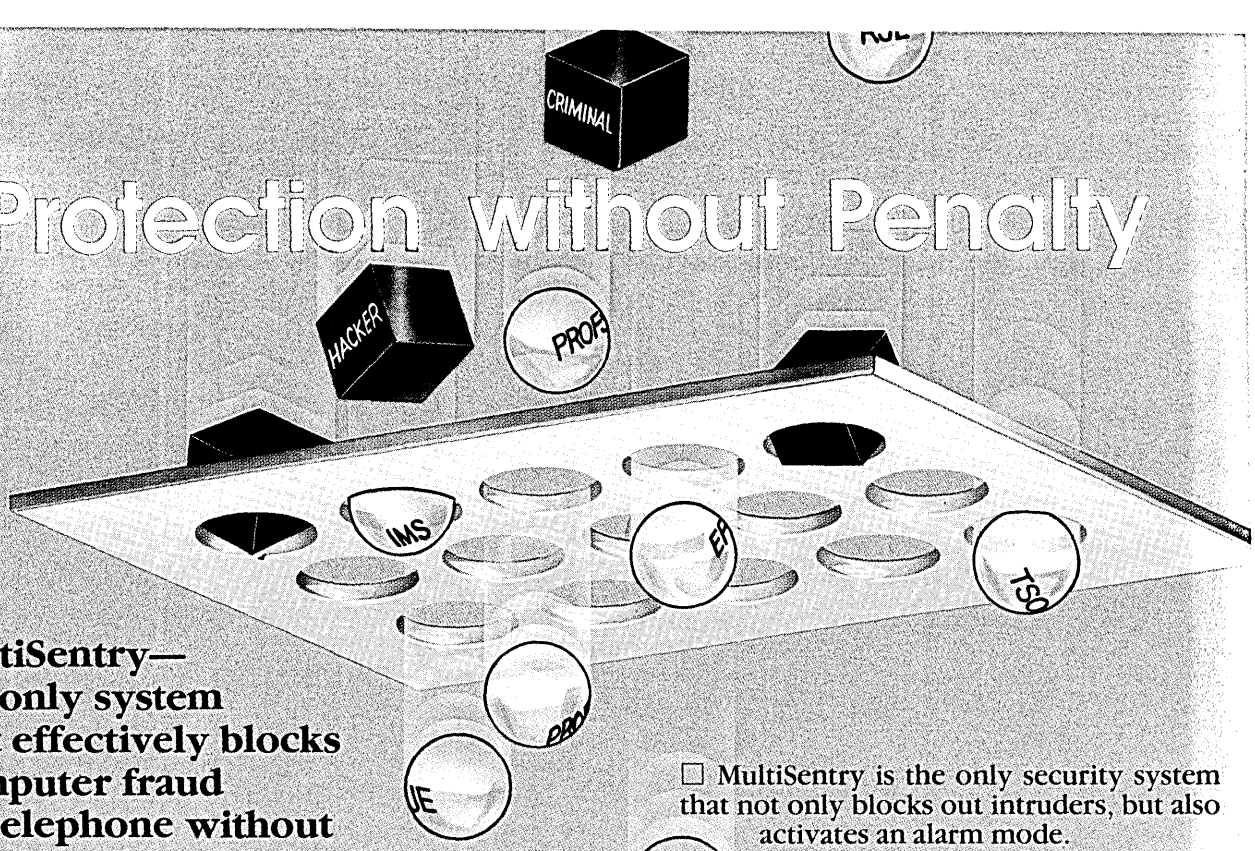
3. *Business survival planning* encompasses all major aspects of the business, automated or manual, including the survivability of major networks supporting critical business activities. As processing is increasingly distributed, the ability of a network to survive and take up the slack resulting from the loss of one or more nodes will become crucial to business survival planning.

Management Problems, Solution, Commitment

Senior managers of many large corporations in lower Manhattan were horrified last year in the wake of the week-long power outage in the garment district. Their organizations had not taken the basic precaution of ensuring that backup power was available. The emotional reaction to this potentially disastrous threat could have been avoided if management had been made aware of and given the opportunity to deal with these issues in advance.

Many organizations that claim to have a backup capability are, unfortunately, only at the first level. The extent of movement to levels two and three will be directly related to the degree of involvement and level of awareness of senior management regarding these issues. Organizations depend on the flow of critical information and need to appraise realistically the level of backup they have achieved...and then develop a strategy for attaining business survival planning. At this point, disaster recovery planning will become a significant business issue (and less of a data processing problem) deserving senior management's attention and concern.

Protection without Penalty



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You'll find that some systems offer protection that considerably restricts the convenience of authorized users. Not so with MultiSentry. Not only does it give you positive protection, its technology actually enhances convenience of access for authorized callers.

These are some of the unique and patented features that set MultiSentry apart from other computer protection systems.

☐ Each call will be responded to in less than a second. Up to 128 authorized callers can each get a line simultaneously. Your personnel will be spared the annoyance and inconvenience of waiting in a queue.

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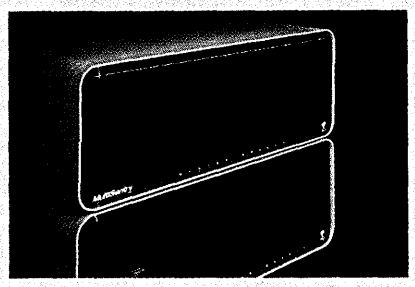

☐ MultiSentry is the only security system that not only blocks out intruders, but also activates an alarm mode.

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☐ For the convenience of your personnel, MultiSentry gives you a choice of three access capabilities: one is direct connect and two are call back modes.

☐ MultiSentry's ingeniously simple database management assures that your security is reviewed and updated regularly.

☐ MultiSentry is so sophisticated that its technology is protected by no fewer than eight exclusive patents.

Don't run the risk of substantial loss through invasion by computer criminals. And when you buy protection, don't buy any system that imposes a penalty of restricted convenience and ease of use. Look into MultiSentry.

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Policy, Organization, and Planning for Security

ames A. Schweitzer
ystems Security Technology Manager
erox Corporation

n this "information age," the essential, critical resource for ny organization is, purely and simply, information. Senior anagers must view information as a resource which must be anaged and protected. Given today's rapidly changing usiness environment, a competitive edge must come from echnological advantages and clever business strategies. And hese in turn are founded on costly information bases which, long with other, more commonly considered business esources (plant, personnel, materials), must be managed stutely.

Information Resource Policy

Establishing an information resource policy is an important first step in deciding management's risk-acceptance posture relative to each information asset. Perhaps the most important function of such a policy is to provide guidance for assigning the proper values to the organization's information resource —a common practice for traditional business assets such as land and materials, but until now unusual for an intangible. But today these critical resources must be valued so that appropriate security measures can be developed and applied in a cost-effective manner. Knowing the value of a resource is a prerequisite to protecting it.

Information is stored and processed in various forms: written, mental, and electronic; each must be managed with a degree of attention appropriate to its value. Once a basic information resource management policy has been adopted, an organizational structure must be provided which can effectively implement the policy directives. Figure 1 shows such a structure in a large organization. Security must be considered an essential component of information resource management, necessary to ensure information reliability (i.e., always there when needed) and integrity (intact and free from improper changes or deletions).

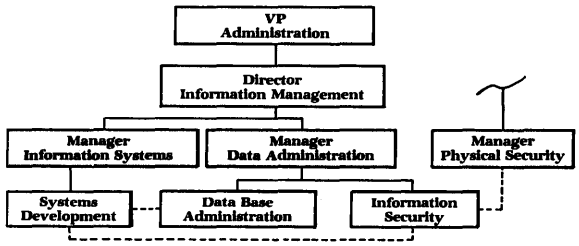


Figure 1. An IRM Organization Structure

The Role of Security

Within the policy-directed information management organization, the security function must address all forms of information (not just electronic) and must interact with general administrative groups and information systems/database organizations. The information security function works closely with information managers (e.g., VP Administration, Database Manager, Data Administrator) to ensure proper valuation and protection for each information element. Also, the information security function should have close working relationships with the physical security department.

Security measures are planned and implemented with a focus on the information elements themselves as the valuable resource. After information is valued or "classified," and in accordance with management's risk acceptance posture (as set forth in the policy), security elements must be designed and put into practice for the marking, handling, and control of information in all forms. Figure 2 illustrates one way of looking at information security. Security measures should be related to the information resource management activity through the identification and ordering of information elements across the entire business. Such information management activities are illustrated by data dictionaries, identification of unique data elements, and the appointment of responsible resource managers.

Information security, covering the information resource in all its forms, must become an accepted responsibility at all organizational levels and in all business functions. Management cannot afford a parochial "computer security" responsibility within the information systems department. With personal workstations distributing computer power and information to all, at work and at home, a major responsibility of management is to provide control and security for the information resource.

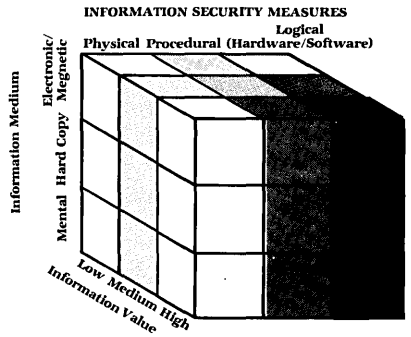


Figure 2. IRM Security Matrix

And accomplishing this information management task is not a trivial matter. If senior management gives it only cursory attention, the result will be piecemeal attacks on the problem. The resulting security measures will be placebos rather than solutions. For real information security—which is also the only cost-effective solution—a senior executive must be assigned responsibility. Usually this will be a vice president or director level job, with the title "information management" or similar. And note carefully that this is *not* an information systems reponsibility; it is much broader. Its responsibilities include:

- Publishing an information resources policy
- Structuring the organization for information management (Figure 1)
- Taking inventory of the business's unique information elements
- Establishing a data dictionary and the appropriate control and authorization-to-use functions
- Valuing or classifying each information element
- Establishing suitable security functions and security element applications
- Designing application interfaces for accessing the controlled information base with suitable security

These steps are listed in priority order. Of course, the structure and current status of a particular organization will often require variations. But the important criteria for successful information resource management are the *delegation of authority* to establish responsibility for and control over the information resource base, and the *assignment of knowledgeable people* to the significant tasks involved. An organization's information resource can be secured only if management approaches the issue with a clear picture of the value and utility of its information assets.

The only way to lock in data, and lock out intruders, is to interlock hardware and software.

Hardware alone has never solved the problem of data insecurity. Neither has software alone.

Yet year in, year out, there's always a new solution based on one of the two. Few claim to be the ultimate solution. Each claims to be different. It's a seller's market. Let the buyer beware.

Security paranoia

Let's face it: Anything important enough to put in a computer for fast analysis and retrieval is important enough to protect. Dishonest insiders — or worse, incompetent ones — will create chaos if you don't protect it. As will knowledgeable outsiders up to no good. When everybody is out to get you, paranoia is just good thinking.

And there are a variety of ways they can get you, too. There's scanning. Weaving through networks. Sending Trojan horse programs within electronic mail. Data diddling. And of course, trap doors, back doors and open doors.

Once in, there's all sorts of ways an ill-intentioned soul can cause havoc. Like browsing through records that are highly confidential. Data diddling with these records. Stealing them. Or just plain destroying them.

Old guard not working

As previously stated, there are many hardware and software solutions. Each gives some degree of protection. Each has drawbacks. Dial-back systems are costly and inconvenient. Password schemes tend to be too easy to defeat. By the same token, a dedicated file server is of no help when the elite passwords are discovered. Then there's encryption. Costly encryption. Confusing encryption.

Carrying any of these old-guard "solutions" to extremes can cause user rebellion — or even lock you out of the system.

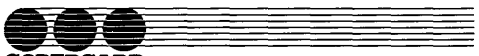
The cavalry has arrived

It's not software. It's not hardware. But the synergism of both. Codercard™ has developed a device slightly larger than a credit card that contains a self-powered microprocessor, 128 bytes of RAM and 2K of ROM. Each card contains a unique ID, and a complex series of algorithms that are key to the authorization process.

Application is simple. The user just inserts the card into a base unit that connects to his terminal. The host computer then checks for ID validity. If the card is valid, the host starts the algorithm process. Both card and host must arrive at the same answer.

Since there are over 400 billion non-linear combinations possible, accidental discovery of the correct answer is quite a long shot. A 400-billion-to-1 long shot. And any attempt to compromise Codercard electronically, or by physically disassembling it, will render the card useless. Which quickly foils dedicated attempts by computer experts to discover the correct answer to the authorization process.

As you can see, Codercard has gone to great lengths to hack out the hacker. Key to this accomplishment is the successful interlocking of both hardware and software. Anything less is truly less. And anything less just isn't enough.



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Is Your Software Secure?

John P. Imlay, Jr.
Chairman
Management Science America, Inc.

Security of corporate information is a back-office problem that deserves front office attention. Perhaps the incomprehensible "black box" has frustrated corporate managers, but far too many of them have shirked the responsibility of securing the information in their computers. However, the business world is rapidly learning that information must be managed and secured just like any other corporate asset. And there are three distinct security issues that upper management must address—software, hardware, and people.

Sooner or later, someone will market a computer system so "user friendly" that anyone who can flip the on-off switch on the machine will be coached by the software in how to gain access to the information they want. While that scenario may frighten some managers, it really raises the central security question: who shall have access, and how much shall they have?

Software Security

As the software "gold rush" to increasingly friendlier systems continues, the difficult problem of keeping sensitive business information confidential is compounded. Most software security is multi-level security that allows a manager to determine—at as many as eight different levels—how information will be distributed.

Terminal codes, operator IDs, and passwords have always been the first line of defense for computer software systems. Certain terminals may be authorized to enter the company's personnel system, while others may not. The same goes for operator IDs. No ID, no entry. In addition to an operator ID, a user must supply the right password, which may be changed regularly.

With integrated software systems, each individual system has its own security. Thus, an individual authorized to work on the general ledger may not be able to enter into the payroll system. Also, a user may be restricted to a certain division, rather than the entire company's files.

Some employees may be allowed only to look at screens. Some may be permitted to enter data onto those screens. Still others may be allowed to generate reports. And finally, a manager may want to allow an individual in the personnel office access to information about a certain field—such as education, training, and skills—but not salary.

Audit trails are another critical part of any software system's security functions, although they are after-the-fact. They allow a manager to review precisely which employee entered or looked at a specific piece of information. The trail typically identifies the employee, the terminal that was used, the date, time of day, and finally the screen that employee was using.

As you can see, the layering of security features makes it possible for a manager to maintain detailed control over access to the information stored within his computer system. Such software features are not infallible, but they go a long way toward keeping business information in the right hands.

Hardware Security

The phone lines, hardwired terminals, and microcomputers used to gain access to software systems can be viewed as the "hard" or physical aspects of security. A call-in phone system may include automatic dial-back programs that make certain a user calling into the mainframe is at an authorized telephone. Other systems may terminate a call if a user is unable to give the proper password within a certain period of time.

More and more companies are using special devices and programs to encrypt information sent over the telephone so it is unintelligible without a decrypting device. And voice recognition devices make it possible for the computer to positively identify the user before he enters the system.

The fact that certain terminals, such as those authorized to get into a company's payroll records, can be physically isolated makes keeping watch over who is using those terminals easier for managers. Some terminals require a key to turn them on. And microcomputers have both "hard and soft" security features and problems.

Everyone has heard the stories about former employees walking off with a company's books that were copied onto a diskette, or hackers using a microcomputer to break into a bank's computer system. And while fears over this sort of thievery are valid, they are somewhat overstated. First of all, someone using a microcomputer to enter a company's mainframe system must go through several layers of security simply to logon to the mainframe. A phone disconnect system may thwart them. If they do gain access to the mainframe, they must then go through the same internal security controls as someone using an online terminal.

The missing diskette is perhaps a manager's greatest fear about micros, and that brings us to the "people" part of the discussion.

People Security

People build computers, and some people will always be able to find a way to break into them if they try hard enough. But often it is human nature—being too casual or too friendly—that compromises computer security. For example, the weakness of IDs and passwords is that people often share them with co-workers, paste them to terminals, or post them on bulletin boards. This is a critical personnel problem for managers, who must recognize that a successful security program depends to a large extent on the individual user protecting his ID.

The question of missing diskettes is another critical personnel issue. Managers must recognize that people who work with information during the day may be able to take some of it home at night on a diskette. But can you rely on that individual? Managers must make this personnel judgment.

Over the past two decades, the focus of computer security has moved from protecting data to identifying the user. Software systems used to require an individual to supply a special password each time they wished to get certain information. Now, once a user has been identified to the system, he may request any information within a particular field.

This change places a heavy burden on management—one which it hasn't fully recognized yet—to develop better security consciousness among its personnel. Managers must assume this corporate responsibility for security.

The Goal News

For CICS Security

ALERT BEATS DISASTER (or SAFE Beats SORRY)

ALERT/CICS™ Protects CICS Facilities

Users have found the security facilities built into CICS to be only partially effective. ALERT/CICS is the answer for complete security. Without changing user programs, one can secure transactions, programs, files and maps. ALERT/CICS will secure fields from being displayed or, if display is authorized, from being changed by an operator.

Other facilities in ALERT/CICS, rarely found in other on-line security software include:

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- Complete security for DL/1 databases.
- System, terminal, and operator security.
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- Automatic clearing and sign-off of unattended terminals after a specific amount of time.
- Complete audit trail logging facilities which may be displayed through both batch and on-line reports.

Expanding On-line Usage Causes New Concerns For Integrity of Computerized Information

In 1981, a study by Hubbard Research revealed that "overall confidence in security provided by CICS is minimal... and that CICS users feel the system's security provisions are inadequate for an expanding on-line usage." Since that time, software advances have brought thousands of additional end-users and hundreds of new remote locations into the on-line environment.

In addition, with more companies merging today than ever before, the consolidation of computer facilities has created different kinds of on-line security concerns from those experienced in the past.

The solution to modern CICS security needs is a system which can handle the entire on-line environment:

- System resource security to control transactions and inquiry/update of files.
- Terminal resource security to decrease exposure to unauthorized usage.
- Operator resource security to positively identify who is using the system, control that usage, and record any unauthorized activity.
- Specific information security, whereby information may be "profiled," and, if retrieved by an unauthorized person, will appear encrypted.
- Advanced security facilities that provide user exits to allow the system to be absolutely custom-tailored to the installation with special needs.

ALERT/CICS from Goal Systems International contains all of the above facilities. In addition, it is easy for security administrators to use. It is totally flexible, in that various modules of the system may be adapted to various parts of the on-line environment. It is an excellent auditors' tool, as it records any and all attempted violations of security procedures; eight reports are available to monitor all ongoing activity. And, ALERT/CICS is simple to install.

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"We are known as a responsive company, one with technically sound products backed up by reliable support. We are excited to be able to put our resources solidly behind the CICS user base."

ALERT/CICS is good news for any CICS installation concerned about on-line information security. It is one of the Extended Productivity Systems from Goal Systems International and is available for a free trial. For more information, call Goal Systems toll-free today at

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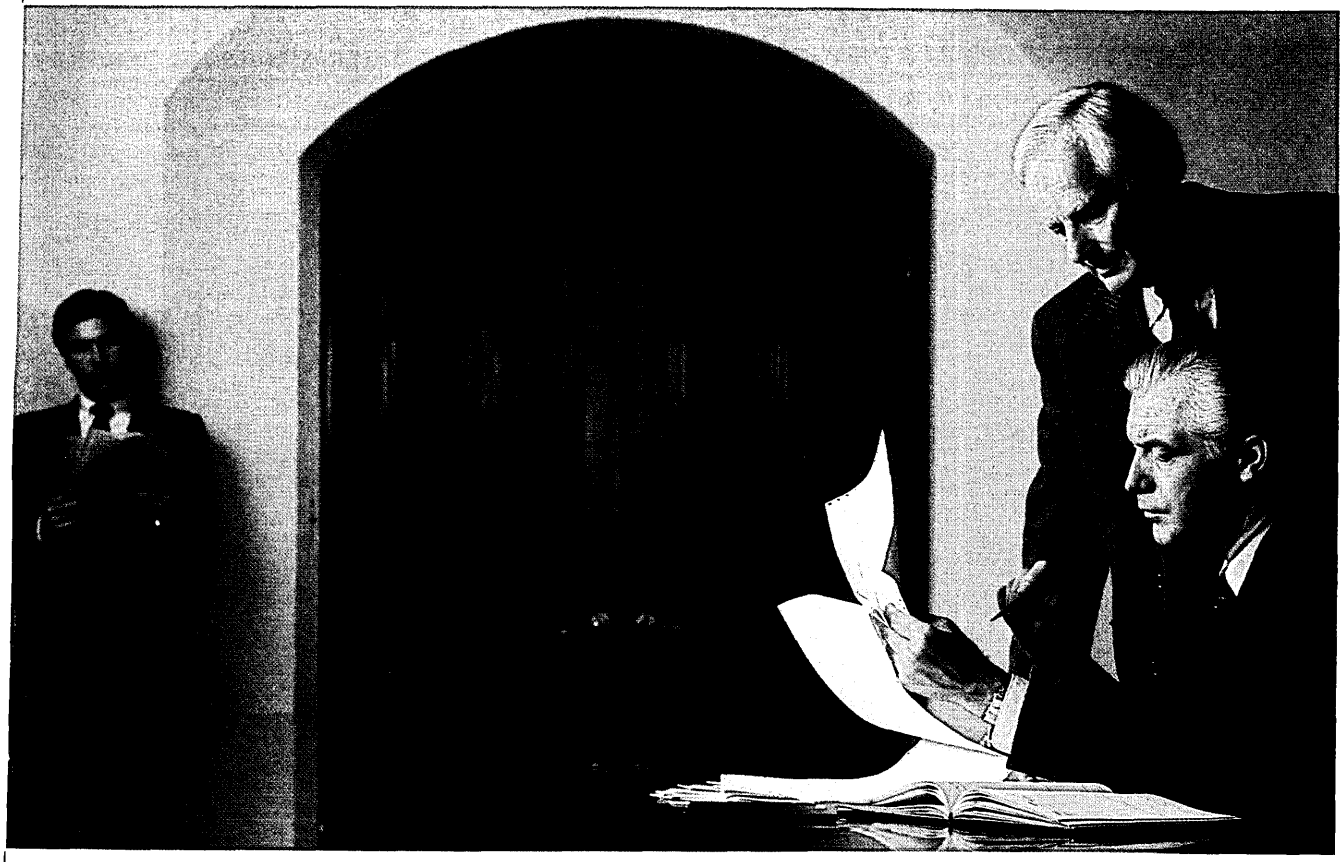

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~

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~

Next Year... Computer Security Institute will sponsor another "Advertorial." If you have something important to say about information security, we invite you to respond to our "Call for Articles." We're looking for short pieces (1,100 words) that deliver insightful, practical information that can be put to immediate use. If you're interested, write to our Russell Kay for details at Computer Security Institute, "Advertorial," 43 Boston Post Road, Northborough, MA 01532, or use the card.

About Our Contributors

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About Computer Security Institute

CSI, established in 1974, is the fi membership organization total dedicated to helping organizatio safeguard their EDP resources.

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For their $85 yearly membership du ($115 overseas), members receive a l monthly newsletter, *Computer Securit* which provides news on security topi and developments, checklists, guideline case histories detailing real-world e: periences, and other information useful t the computer security practitioner.

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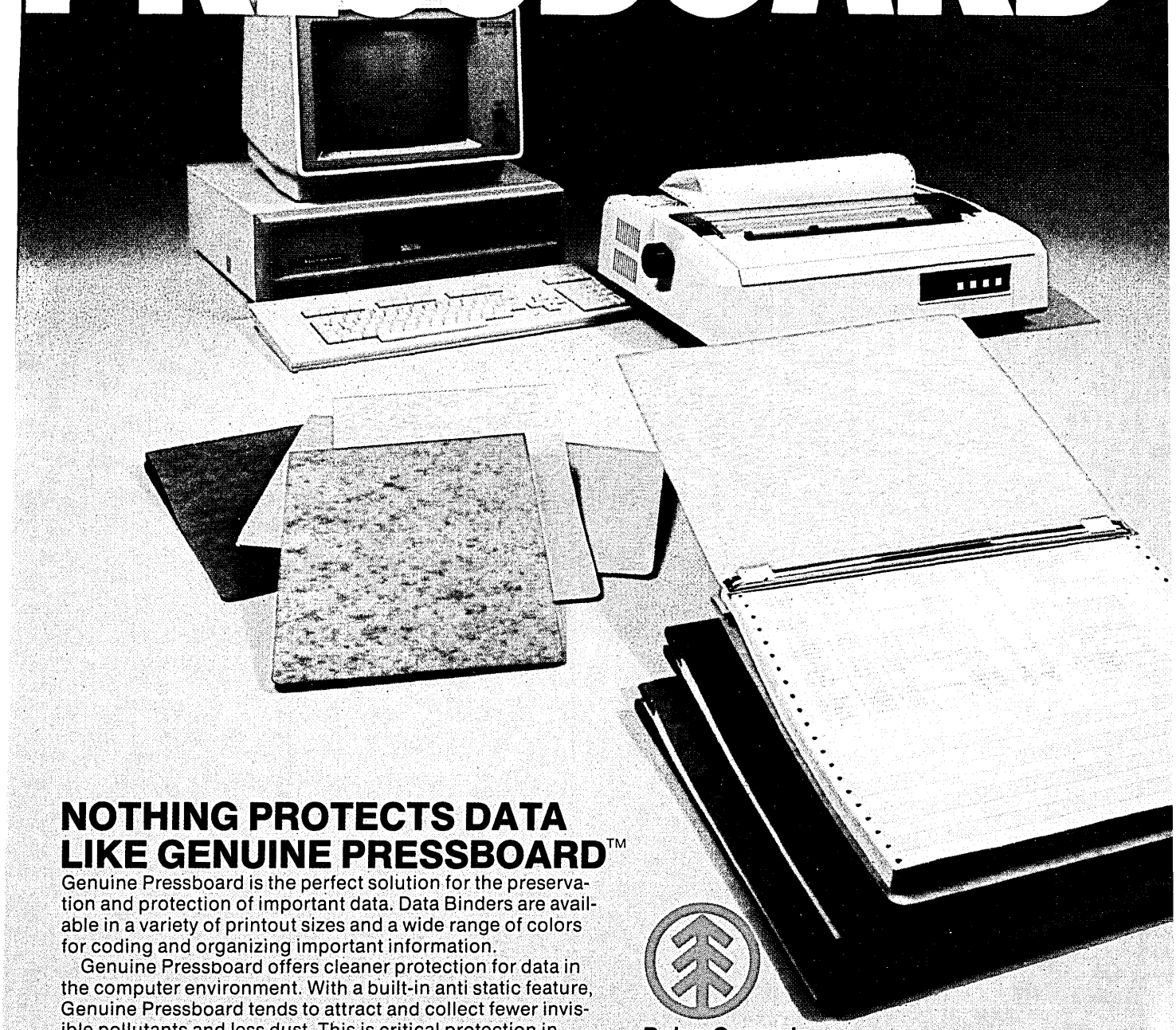

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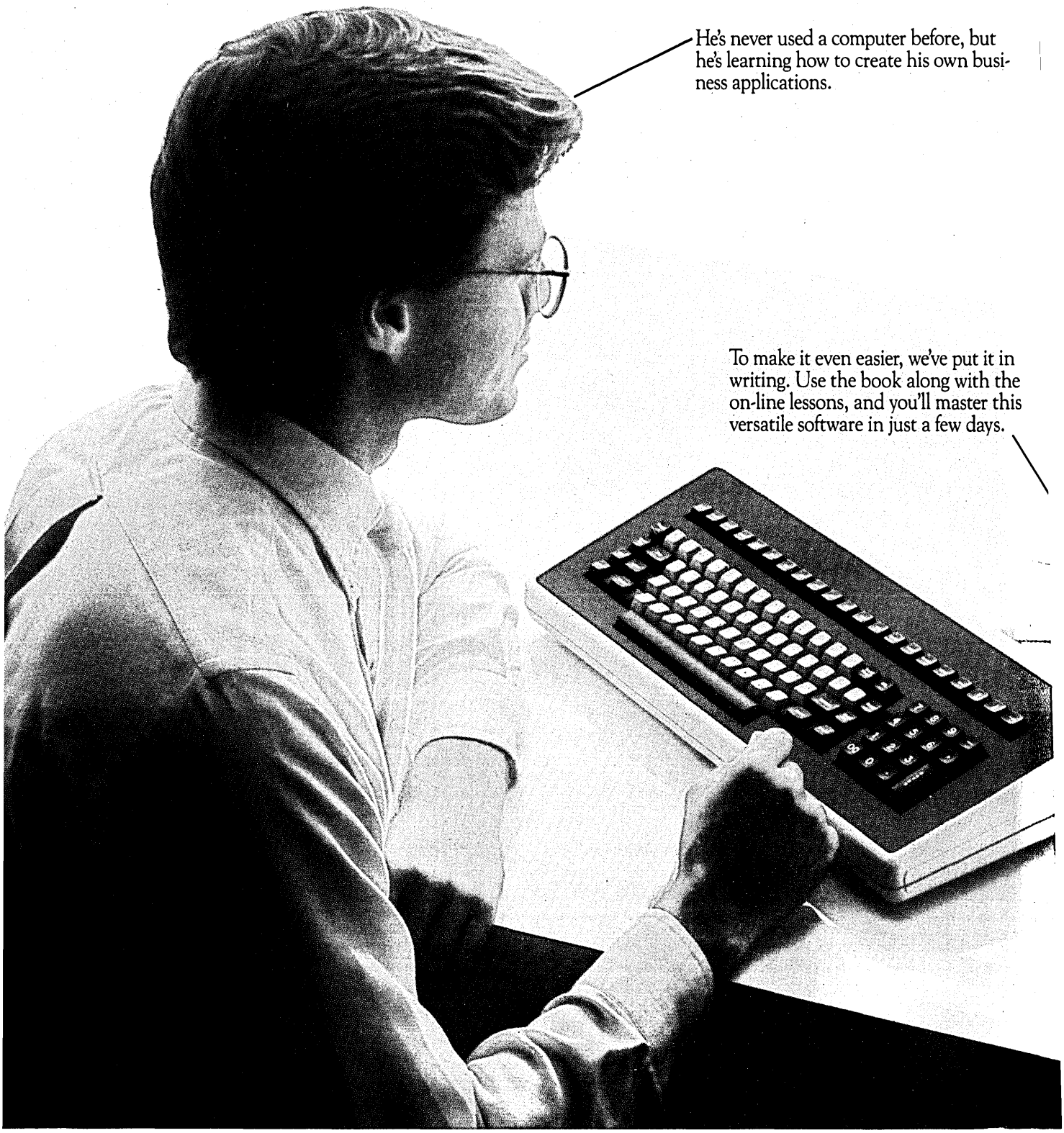

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CIRCLE 70 ON READER CARD

An excerpt from a new book reveals how the Soviets have organized to buy high technology from the West that they haven't been able to develop themselves.

TECHNO-BANDITS

by Linda Melvern, Nick Anning, and David Hebditch

The turning point was 1975. The USSR was just beginning to learn how far behind the West it was in two critical areas—the manufacture of integrated circuits and the construction of advanced computer systems. The related deficiencies in these areas would affect both the military and the civilian economic sectors. The solution was obvious: they would have to take a shortcut through the lengthy and expensive process of research and development by buying technology and products from the West. Information technology was advancing so rapidly that unless drastic measures were taken, the USSR might never catch up. The 1972 trade agreement between the United States and the Soviet Union would be the vehicle through which they could buy complete semiconductor manufacturing plants from companies like Fairchild; computers from IBM, CDC, and Honeywell; and other components from Texas Instruments and General Electric.

After all, Prime Minister A.N. Kosygin had paved the way in his keynote address to the 23rd Party Congress in 1966, when he had stressed the need to import technology from abroad, not simply to improve performance in industry and agriculture but also to save millions of rubles in research and development costs. It was significant that Kosygin's son-in-law, Dzherman Gvishiani, continued to be an outspoken supporter of such views from his top-ranking position as deputy director responsible for foreign technical imports at the State Committee on Science and Technology. Equally useful were the precedents. In the same year as Kosygin's speech, 1966, the first steps were taken to improve Soviet production of private cars. The deal involved Italy's Fiat car company in a $363 million contract to construct an entirely new production plant at the specially built town of Togliattigrad on the River Volga. The Zhiguli compact sedan, a Soviet version of the Fiat 124, went into production in 1972. A similar deal with the French firm Renault soon followed; a complete turnkey factory was commissioned. Even later came the Kana River truck plant. The automotive industry had paved the way.

But there were problems. Senator Henry (Scoop) Jackson of Washington State, influenced by a young aide, Richard Perle, proposed that the United States put pressure on the USSR through his amendment to the 1972 trade agreement: benefits to the Soviets would be in proportion to the number of exit visas awarded its citizens. The USSR responded to the pressure by canceling the agreement. This happened in 1975 and firmly closed the door on any prospect of repeating the Fiat and Renault deals in the area of information technology. The Soviets had to find another way.

Appointed by the Supreme Soviet, the Council of Ministers supervises the day-to-day activities of the 66 ministries that form the administrative heart of the Soviet government. Immediately below the council are the various state committees and commissions that oversee specific areas. The most interesting of these groups are the all-pervasive Committee of State Security (KGB), the State Committee on Science and Technology (GKNT), the State Planning Committee (GOSPLAN, responsible for the implementation of the Five-Year Plans), and the Military-Industrial Commission (VPK, charged with, among other things, imposing on the ministries the requirements of the military oligarchy).

At a lower level, but still under the direct control of the Council of Ministers, are the various ministries and other bodies of a similar rank. These include the Ministry of Defense, which is the home of the GRU. The GRU—the Intelligence Division of the General Staff—participates officially in the GKNT and has agents in the foreign trade organizations (FTOs) to ensure that the interests of the military are represented in technology acquisition exercises. The USSR Academy of Sciences is the prestigious assembly of the country's most honored and distinguished scientists. The ultimate accolade for the Soviet scientist is to be elected an academician, but the influence of the body is not limited to the power of its individual membership. From the custom-built city-sized think tank at Akademgorodok, outside Novosibirsk in Siberia, to the special training schools for gifted children in various locations throughout the USSR, the power of the Academy of Sciences makes itself felt in all walks of Soviet life.

THREE AGENCIES ESSENTIAL

There are three ministries that have been essential to the growing electronics and computer industries. The Radio Ministry is responsible for complete systems, such as IS and SM ranges of computers. The Electronics Ministry handles the manufacture of integrated circuits and other components. Finally, there is the Ministry of Instrument Building, which produces electrical and electronic instruments and process control systems. Essentially, these three are among the main customers of the foreign trade organizations. The VPK is, in turn, the main customer for goods and systems that are destined for use by what are nicknamed the eight sisters—the major defense-related ministries that service the Soviet military machine.

The Ministries of Foreign Trade oversee the activities of the foreign trade organizations. These play leading roles in the story of the techno-bandits. Although there are more than 60, only four will feature prominently: Technopromimport, Mashpriborintorg, Techmashimport, and Elektronorgtekhnika (or Elorg, as it is more commonly known). Technopromimport imports equipment for Soviet industrial concerns, a wide range of capital goods from medical equipment to combine harvesters. Mashpriborintorg specializes in machine tools for industry. Techmashimport is concerned with all other machines of a technical nature. It deals with the chemical and rubber industries, alcohol, soap, pharmaceuticals, synthetic fibers, in-

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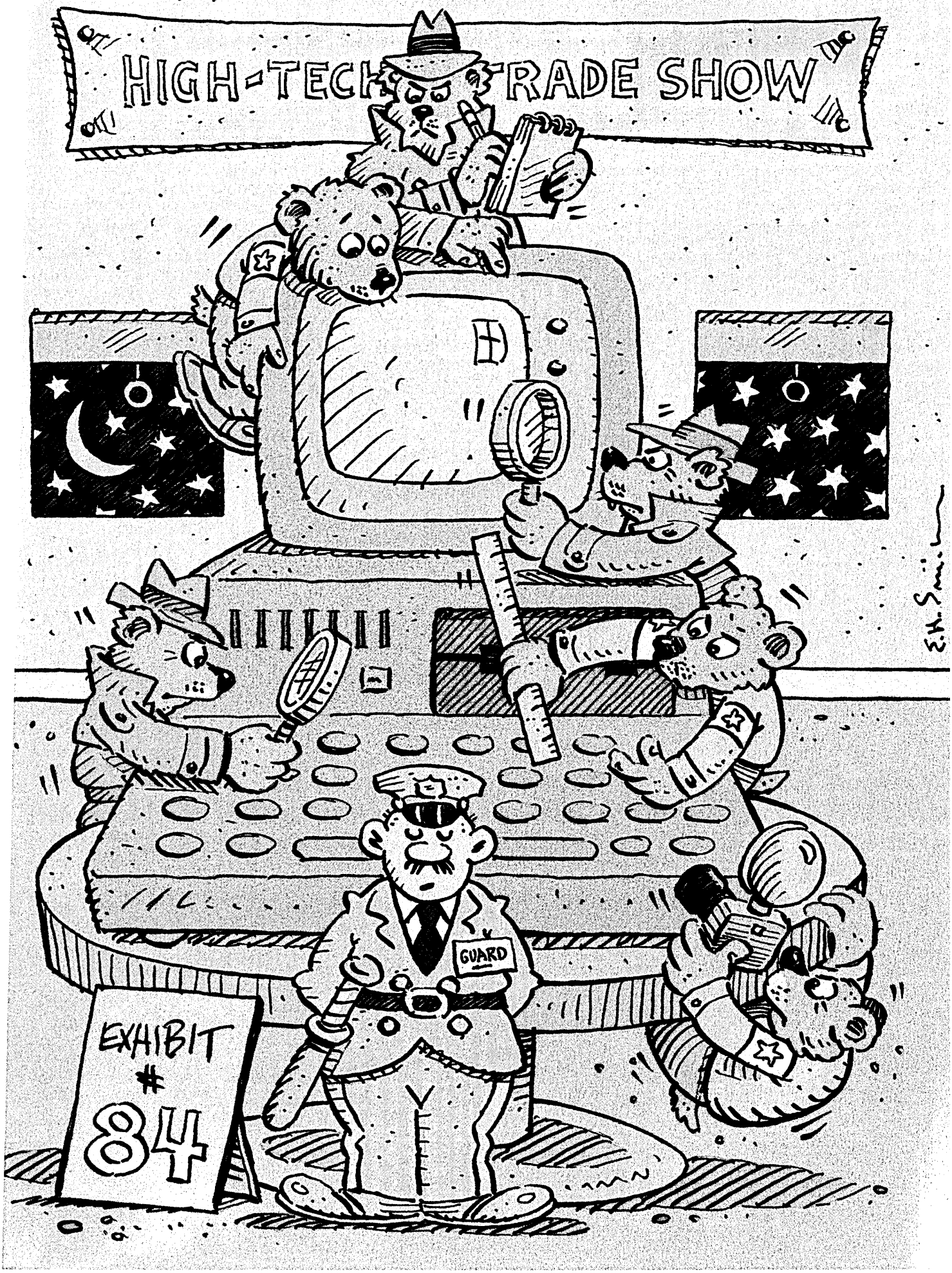
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84

If you know what a party member's position is, you cannot say what he does; if you know what he does, you cannot say what his position is.

dustrial and commercial refrigeration plants, and optical systems and products including lasers. Elorg is responsible for international trade in electronics and computers. It also runs a network of sales outlets in Finland, Sweden, Holland, Belgium, and other European countries.

What does not appear on the organization chart for the upper echelons of the Soviet government is the influence of the Communist Party. The very ways in which the party works make it difficult to place this power structure. There are a number of factors that relate to the paramount influence of the party, whose membership comprises 18 million citizens.

By adapting Heisenberg's Principle of Indeterminacy, one could say that even if you know what a party member's position is, you cannot automatically say what he does; if you know what he does, you cannot automatically say what his position is. It is safe to assume that all senior members of the ministries and the foreign trade organizations are members of the party. If the Central Committee issues an edict, the administration will be bound to act on it. The party structure will, by its very nature, ensure that policy directives originating in the Central Committee and the Politburo will be expedited. Also, there are channels of communication within the party quite separate from those imposed by the administration.

The Russians have a word for it. "Nomenklatura" refers to the system of patronage whereby senior party members try to ensure that supporters are placed in key positions below them in the hierarchy. Of course, this happens in Western organizations, but probably not in so refined a way. The ponderous Soviet system is further lubricated by a network of fixers, or "tolkachi." The Russian people are used to dealing with tolkachi, who are well placed to make things happen—as long as the rubles are there. A tolkach can arrange for that new apartment, see that there are spare parts for your car, and make available a pair of Western jeans, foreign currency, and so forth. FTO officials, therefore, view the techno-bandits as the tolkachi of foreign trade, the fellows who can get you anything from an illicit Digital VAX superminicomputer to a complete semiconductor plant.

BRITISH REPORT PREPARED

A British Intelligence report, prepared in 1976, stated: "It is . . . contrary to Soviet policy to rely on foreign sources of supply; this applies particularly to the electronics industry, which is very much geared to the production of military equipment. There are no signs of change in this overriding policy, and the Soviet Union's need for Western technology in the electronics field will therefore be limited to the following fields:

- Electronic equipment filling gaps in the civilian sector, which otherwise involves the diversion of resources from military production.
- One-of [a kind] items of electronic equipment required for technical exploitation and the associated acquisition of technical know-how.
- Some sophisticated production machinery and associated know-how especially for the manufacture of advanced semiconductor devices and automation equipment."

At the time that it was written, it was a reasonable assessment of the Soviet position. Ever since the rule of Stalin, the USSR had been determined to become as self-sufficient as possible in its electronics industry.

But the portent was not good; although it produced some $22 billion worth of goods per annum, by the mid-1970s the industry was still inefficient by Western standards and was able to make the more advanced high-quality components only in limited quantities for its military customers. Key projects in Zelenograd, Moscow, Minsk, and Leningrad were behind schedule, forcing the technology gap to widen even further.

The British report makes no reference to the fact that contacts had already been made with the techno-bandits who were to help in the critical task of equipping the silicon chip manufacturing plants. Indeed, only months earlier, U.S. federal agents had successfully smashed one of the earliest smuggling rings that shipped the critical hardware to Moscow.

By 1978 it was clear to the Soviet leadership that since the end of détente in 1975, the techno-bandits had become their main source of supply from the United States. The foreign trade organizations were geared to the legal acquisition of technology within a framework of the good relations and trade treaties that no longer existed. The FTOs were not geared to the new environment and had to be changed; the KGB and GRU military intelligence people would play a more direct and formal role in the matter of technology imports.

At the May 1978 meeting of the Central Committee of the Communist Party of the Soviet Union, the subject of the FTOs was second only to the perennial problem of agricultural production. A decree was signed on May 31 by Prime Minister Alexey Kosygin and Minister of Administration Mikhail S. Smirtyukov. It called for the reorganization of the FTOs during 1978 and 1979. In a memorandum from the British embassy to the Foreign Office in Whitehall, the most important changes were listed:

"Emphasis is placed . . . on a more thorough use of market research into goods on the world market . . . [and] the importance of a thorough study of available Western technology and equipment . . . [It] sets out the need for the ministries and administrations to be involved in discussions on major contracts and also lays down that the State Committee on Science and Technology should be consulted on questions relating to technology . . . [and] permits the formation of 'specialized firms and other organizations' within the framework of the reorganized FTO."

CHANGES MADE PUBLIC

By April of 1979 the nature of the changes initiated by the edict became public: there was a radical restructuring, and many new faces appeared in the more senior positions. In the January issue of the Soviet magazine *Foreign Trade*, the new constitution of Elorg was published. Beneath a central board of directors were nine specialist firms, which the Soviet magazine described:

"Elorg-ES, the subject of whose activities shall be the export of multipurpose Unified System computers and peripherals thereto." Director Vladimir Plakhov was appointed in April 1979.

"Elorg-SM, the subject of whose activities shall be the export and import of minicomputers and SM peripheral divices." Also appointed that April was Yevgeny Gorlenko, a 48-year-old graduate of the Bauman Technical School and a probable KGB agent.

The purpose of Elorg-ES was straightforward enough: the sale of Soviet-built Ryads to the Eastern Bloc. The brief for Elorg-SM did not include just the sale of the PDP-11-compatible Sistema Mikro (SM) series, but also the import of other minicomputers, PDP-11 peripherals, and actual PDP-11 systems from the West. In this way, the deficiencies in the SM range were to be corrected.

The division of responsibility among the other firms was less clear-cut. The *Foreign Trade* article continued to describe their various roles:

"Elorgsistema, the subject of whose activities shall be the import of multipurpose computers, accessories thereto, and storage devices." Appointed director was one of Elorg's younger men, Vladimir Usanov. Previously director of Elorg's Technical Center in Budapest, he did not

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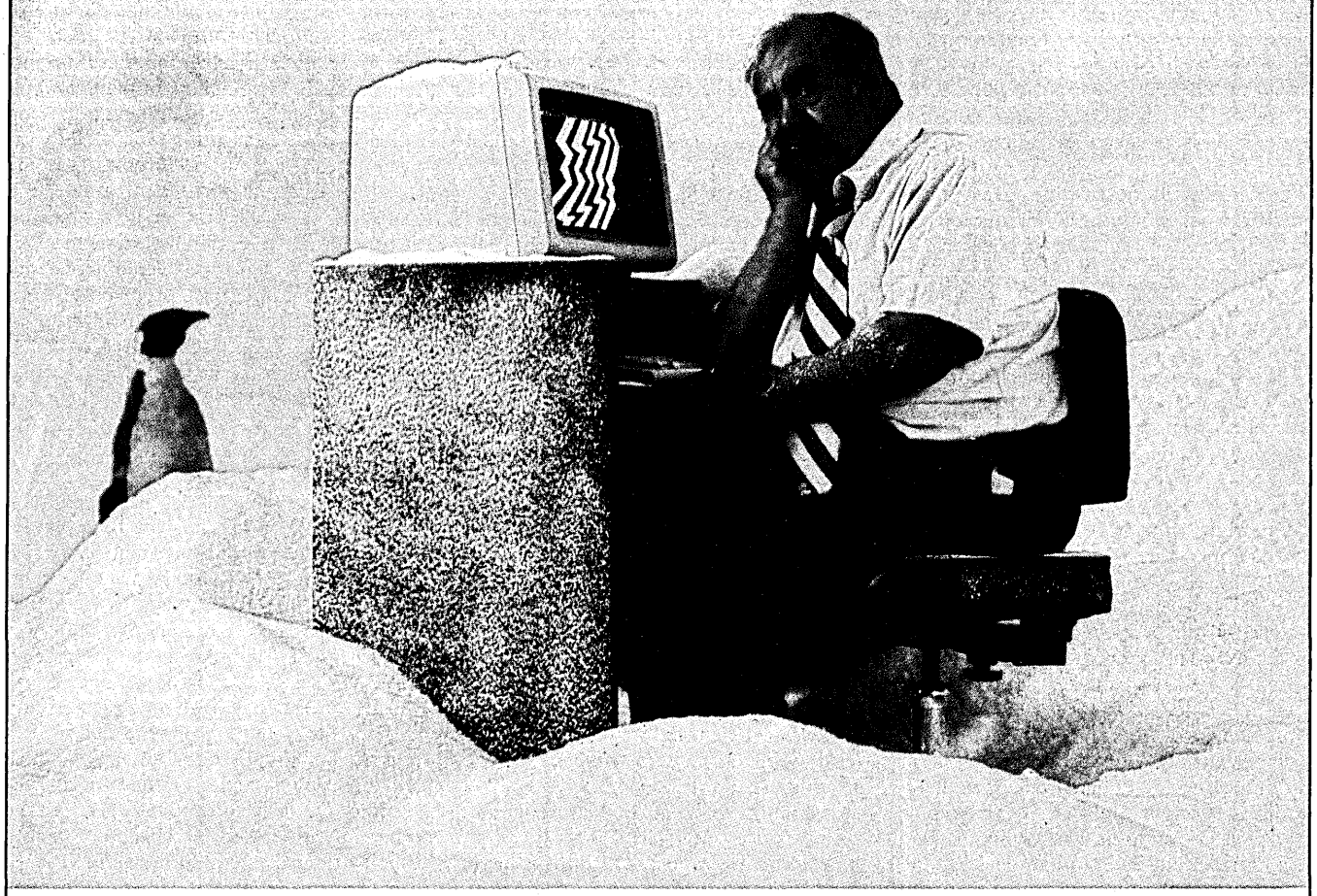

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CIRCLE 71 ON READER CARD

Close links to the KGB or the GRU are equivalent to having access to an elevator.

start his new job until April 1981.

"Elorgkomplekt, the subject of whose activities is the export and import of active electronic components;

"Elorgkomponent, the subject of whose activities shall be the export and import of passive electronic components." This is a roundabout way of saying that Elorgintegral will deal with integrated circuits (microchips) and that Elorgkomponent will handle other, simpler electronic devices, such as resistors and capacitors. Vladimir Sokolovsky and Fridrikh Vissart were appointed the respective directors in April 1979.

"Elorgintech, the subject of whose activities shall be the import of computer software, special-purpose minicomputers and microcomputers, and samples of new technology." Fresh from a five-year stint as a trade representative in Afghanistan was the new director, Vladimir Yakovenko. Another firm was set up in Elorg later in the year, and still others were to follow.

In essence, the overall objectives for the reconstituted organization were, "The export from and import to the USSR of minis and micros, software, office electronic equipment, active and passive electronic components, spare parts, and component blocks. . . the export from the USSR of multipurpose computers, accessories thereto, and SM peripheral devices. . . the import to the USSR of multipurpose computers, accessories thereto and storage devices, and peripherals to multipurpose computers."

PROFILES FOLLOW PATTERN

Heading the management board of Elorg was general director Yury Shcherbina. His six deputies were Valentin Antonov, Lev Arkharov, Alexey Vassilyev, Yevgeny Mikhailov, Nikolay Shishkov, and Viktor Kedrov, to whom we shall return later. The profile of these functionaries follows a familiar pattern. After graduating from college with a technical degree, each entered one of the FTOs in a minor capacity. The key to advancement to a more senior position was graduation from the All-Union (Federal) Academy of Foreign Trade, which most seemed to attend on a part-time basis. Graduation usually occurred between 10 and 15 years after the man first joined the FTO. Transfers between FTOs and other parts of the foreign service were fairly common. Each deputy speaks at least one foreign language; most of the directors speak two. English and German are the most popular. Service abroad was also helpful (apart from being an important perk). These assignments were in the Eastern Bloc, third world countries, or, preferably, Western Europe or North America.

Membership in the Communist Party is a vital rung in the career ladder. Close links with the KGB or the GRU are equivalent to having access to an elevator. And such links do exist. The biography of Gorlenko, the director of Elorg-SM, a graduate of Bauman Technical School, has a four-year gap following his course at the Academy of Foreign Trade in 1966. He next appears as an officer at the USSR trade delegation in London in 1970, but his first overseas appointment was a short one; the following year he was expelled, along with 104 of his colleagues, when Prime Minister Edward Heath agreed to M15 requests for a purge of suspected [Soviet] intelligence officers. After a brief respite back in Moscow as an office director at Mashpriborintorg, he was sent to Helsinki to work for Koneisto, a company jointly owned with the Finns.

Deputy Director Viktor Kedrov is also suspected of being an agent of the GRU. After being based in London between 1964 and 1968, he reappeared in Copenhagen in 1971. In a combined operation with the British Intelligence Service, the Danes expelled him for high-tech espionage in 1974. In the late 1970s, he was involved with a West German businessman, Werner Bruchhausen, in a conspiracy to divert large quantities of semiconductor manufacturing equipment from California to the USSR. Kedrov disappeared from the hierarchy of Elorg toward the end of 1982. Most of the other FTOs went through the same process of restructuring and the appointment of new directors as Elorg did. That organization serves here as an example.

The May 1978 edict from the Central Committee called for the greater involvement of the various ministries. They had always been involved to some degree, especially in a technical consulting capacity, but this was to be increased to ensure that the apparatchiks obtained the most current technology. An interesting example of this was the large number of staff members of the Ministry of Electronics who were linked in one way or another to the negotiations with Peter Gopal, a Silicon Valley specialist in "reverse engineering" who visited Moscow on a number of occasions. The business cards in Gopal's possession at the time of his arrest for stealing trade secrets included those of Alexander Ivanov (manager of Special Technological Equipment Department), Leonid Dymov (chief of department), Vasily Kurdin (director of marketing), Gennady Verkhovenko (sales manager of semiconductors), and Vladimir Sokolov (diploma engineer, department of licenses, know-how, patents). The Ministry of Electronics is, of course, responsible for the manufacture of integrated circuits in the Soviet Union.

Another organization that is important in the Soviet planning of high-technology acquisition is the State Committee on Science and Technology. The Central Committee's edict of 1978 called for the GKNT to be "consulted on matters referring to technology." The universities, research institutes, and the administration to oversee trade agreements, the planning of expositions, the allocation of research and development funds, and the monitoring of R&D activities in both the Soviet Union and in other countries is the Council for Mutual Economic Assistance. It is also believed to be responsible now for coordinating the participation of the KGB and GRU agents involved in the activities of the FTOs.

THE TRADER SPIES

The Eastern Bloc plays a relatively small role in international scientific conferences and trade shows in the West. The reasons are probably twofold: in most Communist nations foreign travel is viewed as a privilege, and an expensive one at that. Only one person (and perhaps his watchdog) may attend an important conference. He can make notes, and these, plus copies of the official proceedings of the event, would be given to the other interested bodies back home. From time to time, Eastern Bloc countries have been known to present papers at conferences; this is particularly true of the Hungarians. Many Eastern Bloc technical personnel could benefit from attendance at the staff training seminars held in Western Europe. These, however, can be even more expensive than the conferences, and it is usually more cost-effective for the institution concerned to persuade the training company to present the same seminar for a number of people on an in-house basis.

The least expensive way for the Russians to gather information on the advance of high technology is through the systematic reading and abstracting of the thousands of learned journals and trade publications released each day in the West. There are estimated to be no fewer than 35,000 of these published in no fewer than 65 languages each year. This yields about 1.5 million articles and papers to be read, assessed, summarized, and, in some cases, translated. The logistics of this should not be underestimated, but the fact remains that it is the most efficient approach to the problem.

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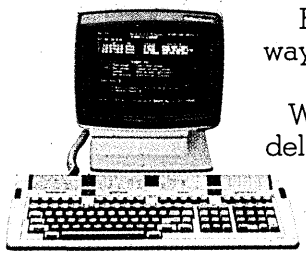

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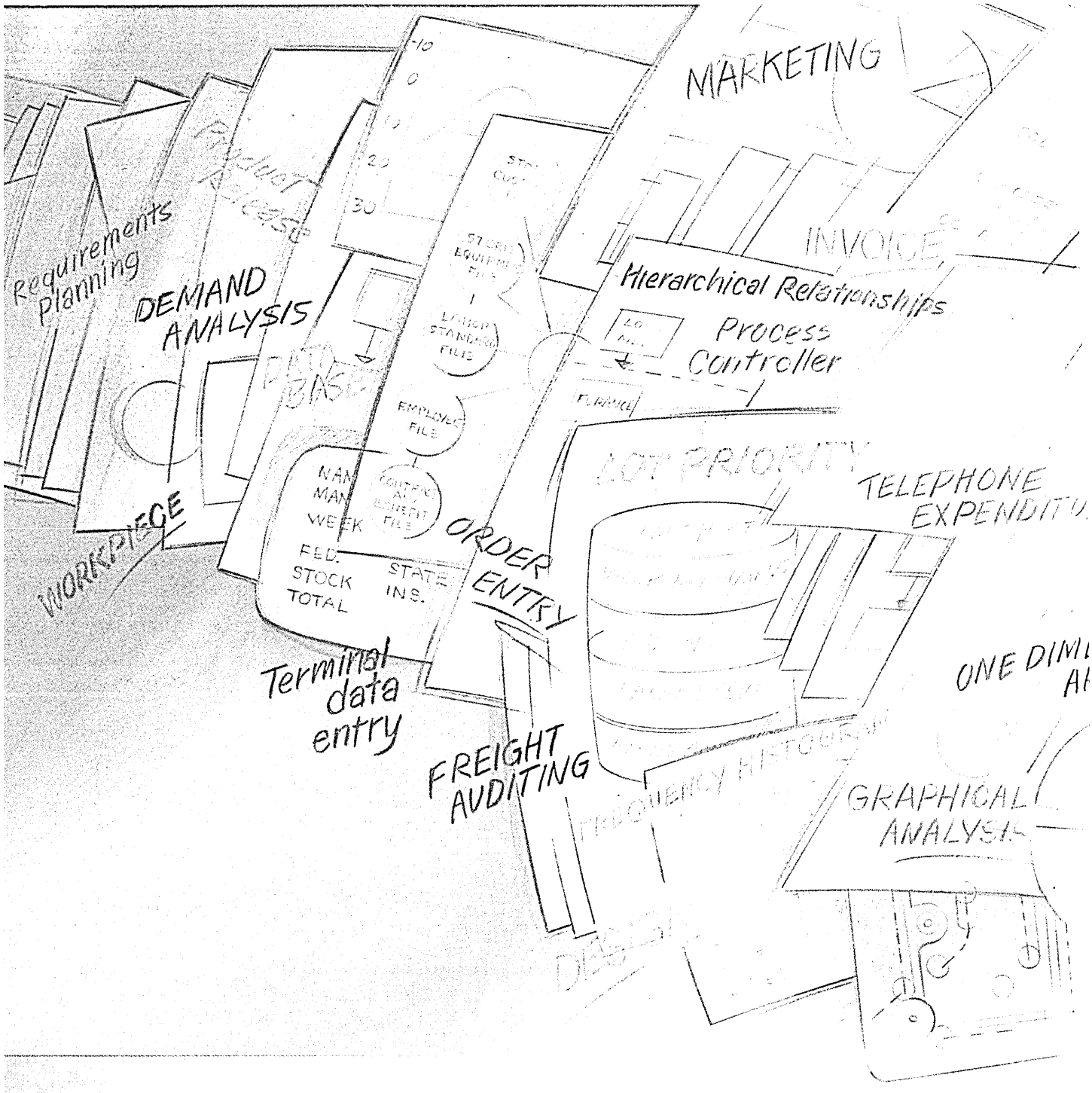

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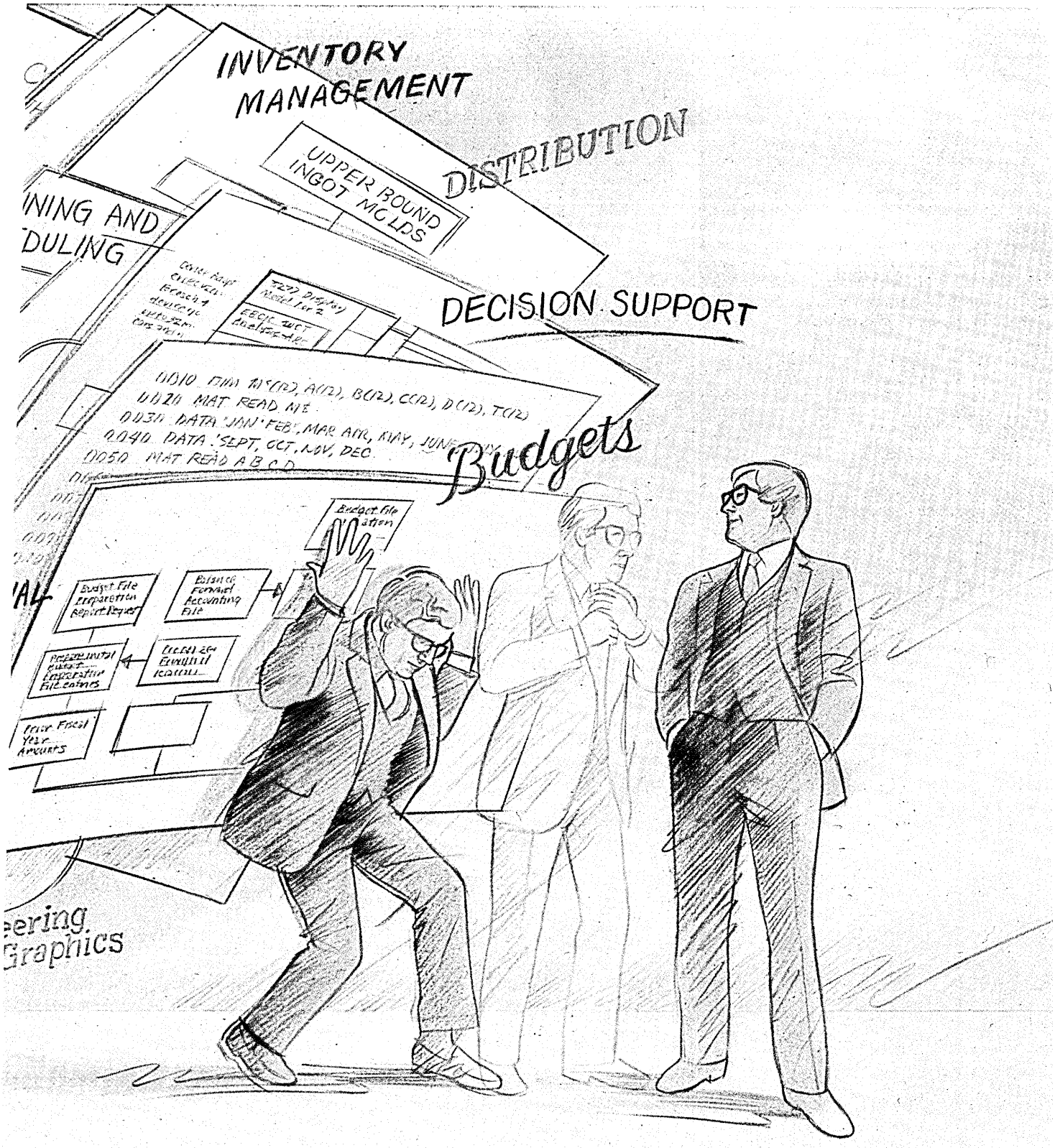

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In American terms, the KGB is a massive group that embraces the scope of both the FBI and the CIA, with a few other areas thrown in.

apparatus was headed by Vladimir Semichastny. The appointment of the former Communist Youth League bureaucrat to this important post proved to be a bad decision for the Soviet leadership. Unsuitable in manner, Semichastney was a bungling administrator; he was fired.

His replacement was a very different man. Yury Andropov had few KGB connections prior to his appointment to the post by Leonid Brezhnev, but his wide experience with the Soviet political machine equipped him well to succeed as head of this uniquely Russian organization. One of his earliest decisions was typical of his style. He took the important First Chief Directorate out of the dreary, claustrophobic Dzerzhinsky Square headquarters, which it shared with the Lubyanka Prison, and into a spanking new modern building on the Moscow ring road. But the changes were not merely cosmetic; within a few years new procedures and training methods had been introduced, and an unusual air of efficiency and confidence began to prevail.

In American terms, the KGB is a massive group that embraces the scope of both the FBI and the CIA, plus a few other areas: border guards, armed forces security, protection of defense installations, and approval of entry and exit visas. Apart from the 300,000 elite border guards, it was estimated in the early 1970s that the KGB included 90,000 staff officers and another 100,000 clerical workers, building guards, and "special troops." The number of informants and spies runs into hundreds of thousands. The KGB is well described as the bastion of the Soviet Communist Party.

Broadly, the Second and Fifth Chief Directorates cover the same ground as the FBI. The First Chief Directorate, roughly equivalent to the CIA, is the body responsible for the KGB's involvement in the activities of the GKNT, the ministries, and the foreign organizations. The First Chief Directorate comprises a number of sections called directorates and departments. During Andropov's chairmanship, their work was consolidated and expanded to meet the needs of the time. Most interesting of the subdivisions is the Scientific and Technical Directorate, referred to internally as Directorate T. Created during the last years of Khrushchev's rule, Directorate T was expanded dramatically during the 1970s. Its brief was, and still is, to acquire data on space, missiles, and nuclear research, and to monitor advances in such key areas as robotics, cybernetics, cryogenics, holography, and advanced industrial processes. Included in its assignment is the whole area of electronics and computers. Within the directorate, the department known as Line X is specifically responsible for field operations abroad. This, in turn, leads to its involvement with the FTOs.

"And now, here is Mr. Arvin K. Woodly with a rebuttal to this evenings news."

CARTOON BY SIDNEY HARRIS

SPIES IN WESTERN CAPITALS

The very nature of the FTOs dictates their need to have personnel based outside the USSR—in most, if not all, of the foreign capitals of the West. Inevitably this has caused the FTOs, the consulates, and the trade missions to be used as a "cover" for the traditional intelligence activities of the KGB and the GRU. This should come as no surprise to Western observers; the CIA and the British Secret Intelligence Service are also known to have adopted the same approach by using both embassy trade officials and businessmen working for private companies. There was a furor in 1962 when the KGB arrested the British "businessman" Greville Wynne. He was charged with being the Moscow controller for the spy Colonel Oleg Penkovsky of the GRU, probably the highest ranking Soviet officer to cooperate with the West, and was sent to prison for eight years. Penkovsky was shot. Wynne was exchanged in April 1964 for Konon Trofimovich Molody, alias Gordon Lonsdale. Some years later, in his autobiography, Wynne admitted that he had been a British agent and had worked for the Intelligence Service since the Second World War. Virtually everything the Russians accused him of was true.

Notwithstanding this tradition of using trade officials as a cover for espionage, the relationship between the KGB, the GRU, and the FTOs seems to have changed some time during the latter half of the 1970s, probably in 1978. At that point it became evident to the Soviet authorities that they would need to supplement their internal deficiencies in many areas of high technology; they would have to increase their dependency on the techno-bandits. Ensuring the best possible flow of illicit high technology would require some degree of "field craft," which was not available to the FTOs. Since these skills apparently are not taught at the Academy of Foreign Trade, the quickest way they could be injected into the trade organizations would be through the assignment of professional KGB and GRU officers. More than a few full-time trade officials were already representing the interests of the ubiquitous organizations in addition to their regular

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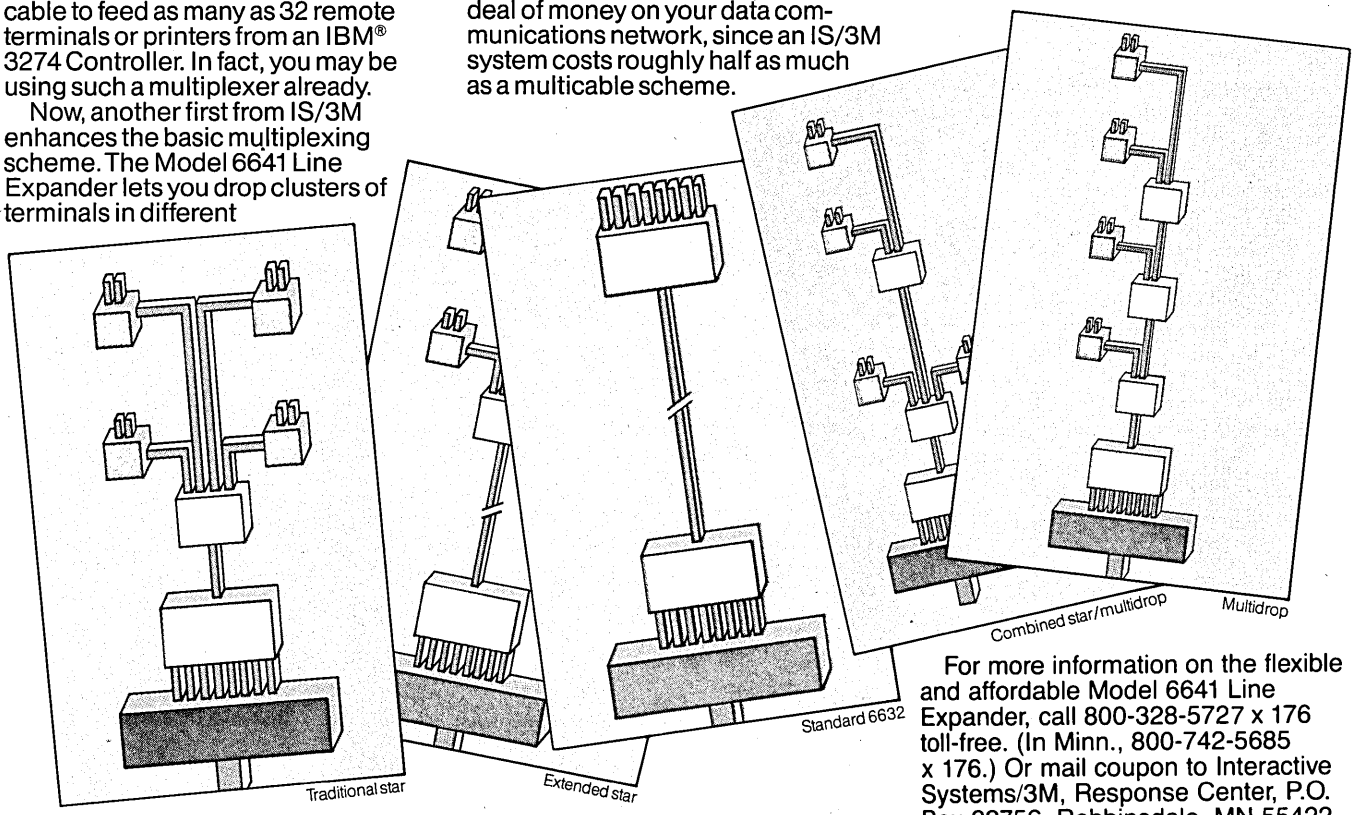

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CIRCLE 73 ON READER CARD

"Each year I attend half a dozen shows in Moscow and get approached by someone with funny connections looking for something not licensable."

duties; now the FTOs at home and abroad were to get assistance.

The 1982 CIA report (based on the Paris dog and pony show) places much emphasis on the part played by field KGB personnel in acquiring both products and know-how and cites large numbers of successful agents.

One cannot deny the importance of the Soviet intelligence groups in the business of high-tech smuggling, but it is clear from discussions with East-West "gray" traders that the last thing these people want in the West is "help" from the KGB. First of all, once the techno-bandit gets his purchase contract from the FTO, it is unlikely that he will need the support of agents in obtaining the goods and arranging the shipment. Second, the discovery of any involvement with known KGB or GRU agents is likely to increase any subsequent charges from misdemeanors associated with licensing and Customs declarations to something closer to espionage. In any case, such an association would be bad field craft in itself; both the techno-bandit and the intelligence agent would be placed at risk. Good agents are valuable; their safety cannot be entrusted to amateurs.

CONTACTS MOSTLY IN MOSCOW

Most, if not all, contact between outsiders and the KGB is limited to Moscow. Approaches at trade shows are the favored technique; the very presence of the businessman is taken as an indication that he is prepared to do some kind of selling. One California businessman who is not involved in the gray end of the trade said, "Each year I attend half a dozen shows in Moscow and get approached on average two or three times by someone who has funny connections and is looking for something that is not licensable. When you point this out to them, they look appropriately embarrassed and apologize. It is all very polite."

An Englishman who was to become involved in the sale of surveillance systems to the KGB told of the first time he was approached, "If you are primarily involved in the legitimate trade, you will spend most of the time sitting around the waiting rooms of the FTOs, waiting for appointments. My earliest contacts in Moscow were a couple of Laurel and Hardy characters called Gregoryev and Yushkov; the fat one was the 'black hat' guy, and the thin one wore the 'white hat.' They worked for the Ministry of Foreign Trade, ostensibly. Somehow, I must have given them the impression that I would be prepared to 'do some business.' A few months later I was setting up an exhibition stand at a show in Kiev. We were unloading a container of products that had been shipped over by one of the companies I represented. My associates had taken some packing cases into the exhibition hall and I was on my own in the back of the container. Someone tapped me on the shoulder; he was a short, stocky individual, clean-shaven and smartly dressed. He introduced himself as Yury and said that Gregoryev and Yushov had given him my name and that he would like to talk to me."

It turned out Yury was not the man's real name. The English businessman continued: "I said that I was busy and asked him to come back later. He was persistent, but left when his colleagues returned." It soon became apparent that Yury was to be the trader's main contact from that point on. All business was done through Yury, who took the Englishman to parties held by senior officials and generally became his dyadya, or uncle, in Moscow. On one occasion, the businessman realized that his visa was about to expire before the end of a trade show. When he approached the head of the exhibition with his request for a temporary renewal, he was refused. A few hours later, after he made a telephone call to Yury, he received a new visa.

The Englishman did not have dealings with Gregoryev and Yushkov again, but he did learn that Yushkov was one of the Soviets' leading experts on bugging systems: "I only saw him again once. I was living in Luxembourg and recognized him in the street. He ignored me. This was the same year that the new European Parliament building was being constructed. I was struck by the coincidence."

Although it is clear that much techno-smuggling can be initiated by the Soviets from the comfort of their own homes, a little foreign travel is sometimes involved. There is more than the the routine office work in trade missions and the systematic collection of open literature for analysis; the work has its dangers. Once in the field, KGB and GRU agents inevitably attract the attention of the local security services.

SOVIETS FOUND IN NEVADA

Two Russians based at the Washington embassy of the USSR certainly attracted the attention of the FBI. The assistant director of the Intelligence Division reported to the Senate in 1982:

"In October 1979, two Soviets, dressed in jeans and sports shirts, and almost 2,500 miles from their posts in Washington, D.C., visited Ely, Nev., a potential basing site for some MX missiles. They identified themselves as Vladimir Kvasov and Vladimir Militsin, listed respectively by the Soviet Embassy as a lieutenant commander/assistant military attaché and as a civilian employee of the attaché's office. The assistant librarian at the Ely Public Library was previously notified by the FBI as to a possible visit by them. They showed up at the library dressed very casual and described themselves as travelers from Washington.

"The younger Russian went to the newspaper rack while his friend asked for books on industry in Las Vegas. Las Vegas is a restricted area for Soviet Embassy personnel because of its proximity to Nellis Air Force Base and the Nevada nuclear test site.

"After browsing, they both came back with a book on the Nevada sites—a 300 page environmental impact statement for the Nevada site where the U.S. Government conducts underground tests of its nuclear weapons. They received permission to copy the volume, which was done at a cost of $47 at a nearby store. The Russian who did the copying identified himself as an energy engineer from Washington. The two Russians subsequently made several other stops, inquiring about the area and the kind of industry in the area."

The fate of the two diplomats is not recorded.

Viktor Baryshev, a 47-year-old official at the Soviet trade mission in Bangkok, managed to get his arrest by Thai security officers videotaped and photographed. On May 19, 1983, the Southeast Asia posting for Baryshev and his wife came to an an abrupt end in his favorite coffee shop at the Windsor Hotel:

"At 11:50 a.m. he stepped into the hotel lobby. Five minutes later a Thai in a dark blue safari suit entered. There was not a hint of recognition between the two, but within minutes they were huddled together at a corner table. . . . The waitress who served them had done so before, but the foreigner's mood, she noticed, was different. 'He usually smiled,' she said later, 'but he looked sad that day. He ordered tea instead of his usual coffee.'. . . Shortly before 12:15, Thai security men saw Baryshev's safari-suited companion pass him some papers, then leave the coffee shop. Baryshev, the papers in a trouser pocket, was on his way out of the hotel at 12:20 when a uniformed policeman stepped in front of him and announced: 'You're under arrest on a charge of espionage.' When the Russian tried to bluster past the policeman, protesting that he had diplomatic immunity, converging plainclothes policemen locked him by the arms. Shocked into silence for a few moments, Baryshev then agreed to be es-

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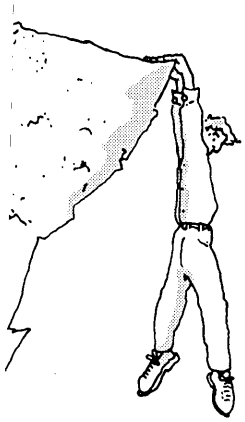

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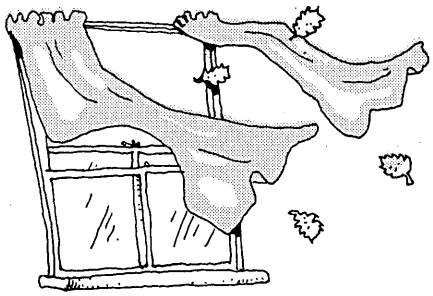

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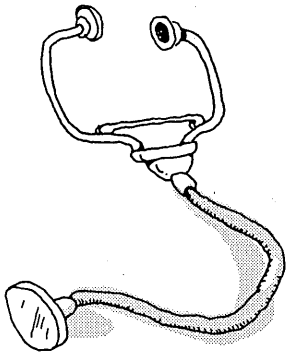

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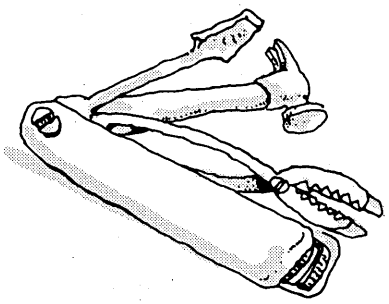

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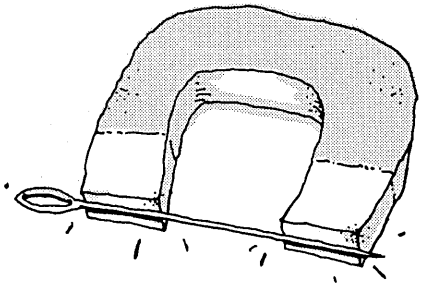

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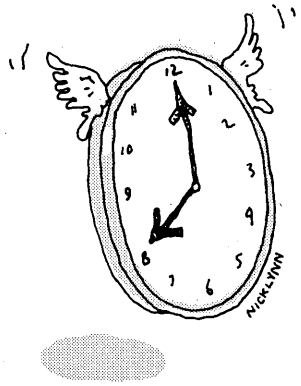

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CIRCLE 74 ON READER CARD

"There was not a hint of recognition between the two, but within minutes they were huddled together at a corner table."

corted—in his own Toyota Corona bearing white diplomatic plates. Declining the offer, the policemen coerced him into their own car."

Special Branch Police Major General Opas Ratanasin supervised the search personally. In the left trouser pocket of the Russian—code-named Mee-uan, or Fat Bear, by Thai counterintelligence agents—was a three-page report on military installations on the Thai border with Cambodia. But the Thai authorities were subsequently to claim that Baryshev's terms of reference did not include intelligence only on Cambodia and China; he was also responsible for "the reexport of Western and Japanese high-tech products to Moscow." Given the use of Thailand's low-cost labor in the completion of Silicon Valley-produced microchips, the use of Bangkok as a center for gathering samples of new microchips does not seem unreasonable. The following day the Russian was expelled and left with his wife on an Air Vietnam flight for Hanoi.

HIGH-TECH POACHER CAUGHT

On Jan. 6, 1983, Vladimir Chernov finished work at his small office in London's Haymarket and walked the 100 yards to Piccadilly Circus underground station. His coveted four-year posting as a translator at the International Wheat Council was about to come to an end. He was not aware of this yet.

A mile or so to the south, in Downing Street, a top secret dossier lay on Prime Minister Margaret Thatcher's desk. It contained information from Whitehall's top intelligence watchdog, the Joint Intelligence Committee, that left her in no doubt as to what she should do. Within days, Chernov, his wife, and young son were packing their bags for home. He would soon be back at his old job in Moscow's Foreign Trade Ministry on Pudovkin Street, another victim of the Western drive against high-tech poaching.

Chernov had played a pivotal role in briefing Moscow on the latest applications of computers in advanced agricultural research. The Wheat Council, despite its unassuming title, had been a perfect place for Chernov to harvest information about the West's most sophisticated wheat development projects and the kind of computer hardware used in agricultural genetic engineering. The information Chernov supplied was of enormous value to the Soviet economy. Despite considerable efforts over the years to increase grain production, the Soviets were still forced to rely on imports from the West. Any breakthrough that would increase wheat yields could help the Soviet Union to break free of that dependence. Chernov was not the first high-tech spy to be expelled. Nor, as it turned out, would he be the last.

The USSR had reacted to the growing gap between the West and the East in high technology by deploying its best intelligence resources in Moscow and throughout the world. But in the early 1980s the Western security agencies were alert to the problem, and in the first six months of 1983 alone as many as 90 Soviet agents were expelled from their base countries for varying degrees of intelligence-gathering activities. Forty-seven were sent home from France, four from Britain, four from Italy, 18 from Iran, and three from the United States. There were also expulsions from Holland, Spain, West Germany, Norway, Australia, and Japan. In Denmark, Yevgeny Motorov—thought to be the local head of the KGB Directorate T's Line X—was also expelled. In Belgium, Elorg owns a company jointly with the Belgian Government. In the first half of 1983 its director general, Yevgeny Mikhailov, was invited to leave the country. His predecessor had left the same way seven years earlier.

The Soviets had reacted to the technology gap, but so had the West. ◉

Excerpted by permission from *Techno-Bandits* by Linda Melvern, Nick Anning, and David Hebditch (Houghton-Mifflin Company, Boston, 1984).

Linda Melvern is a leading British investigative journalist. She recently served as staff reporter with the London *Sunday Times* and was a member of the paper's "Insight Team." She has also worked for the *London Sunday Standard* and the *Boston Globe*, and is coauthor of a book on the Corsican Mafia.

David Hebditch is an expert on computer crime and high-technology industrial espionage. He is a DATAMATION contributing editor and a member of the editorial board for *Transnational Data Report* (Washington, D.C., and Amsterdam).

Nick Anning is a highly regarded freelance journalist and researcher in Britain. Since 1976 he has contributed regularly to many British newspapers and magazines including the London *Sunday Times*, the *Statesman, New Society, New Scientist*, and the *London Observer*. He taught Russian language and Soviet literature at Nottingham and London Universities from 1966 to 1976 and is a recognized scholar in Soviet Studies.

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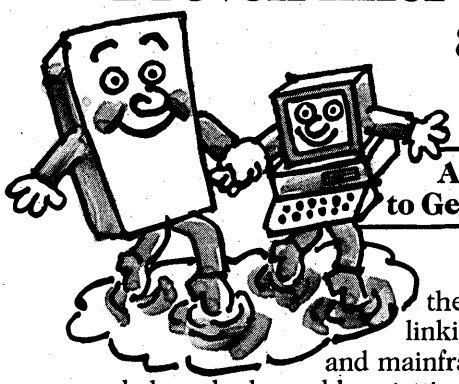

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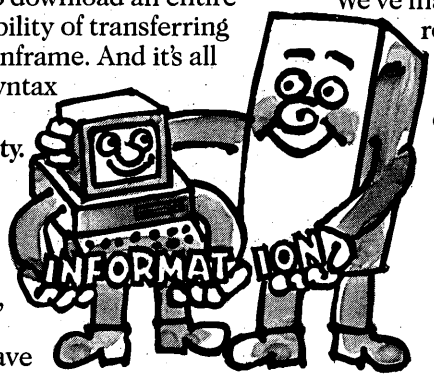

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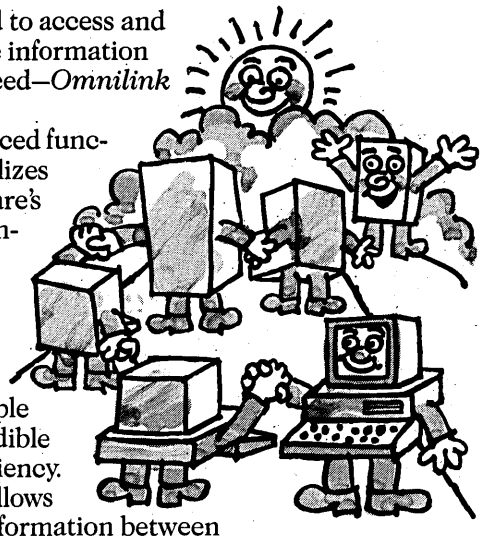

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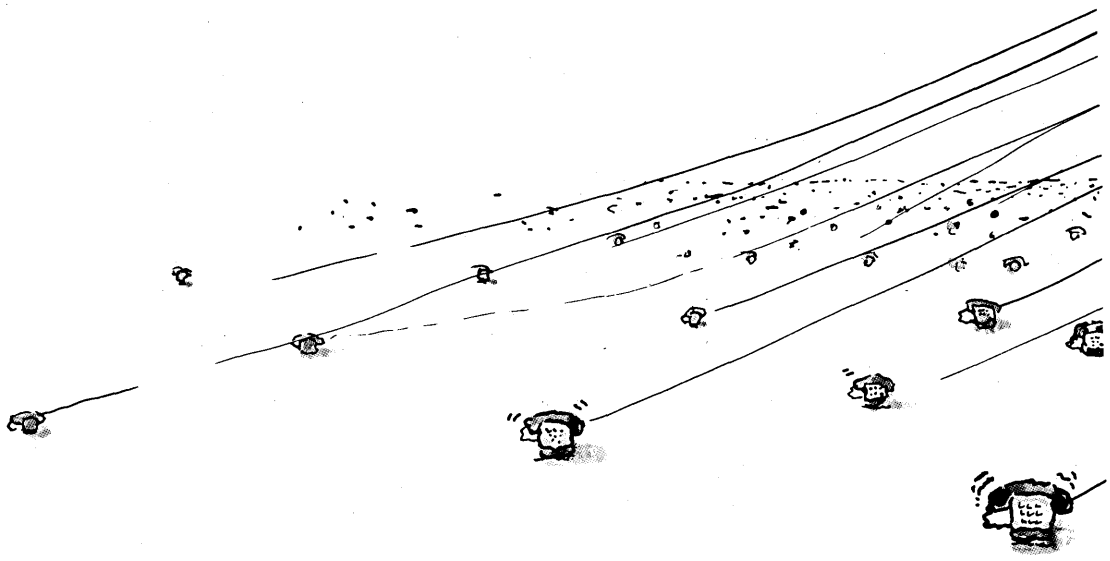

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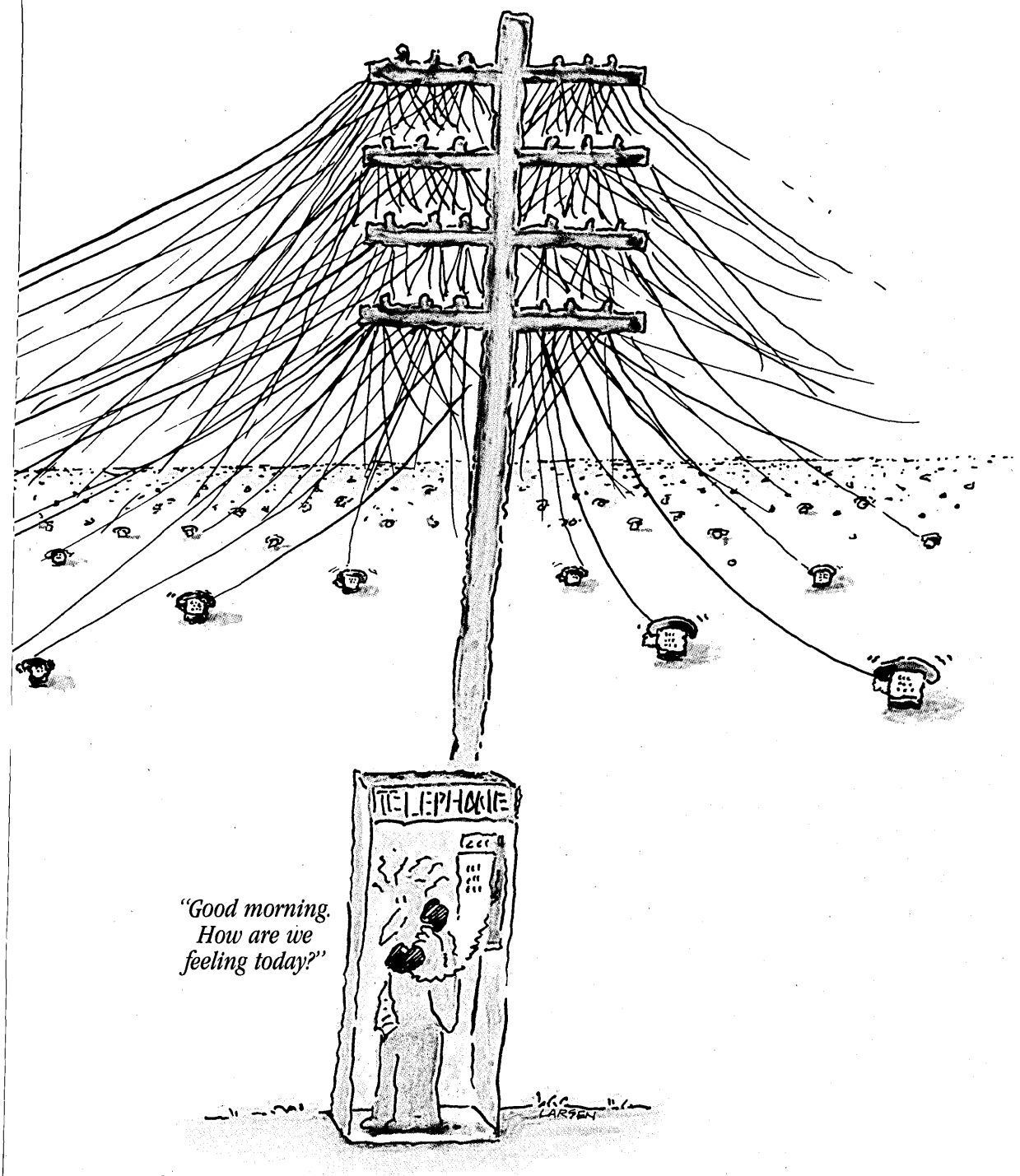

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So far, the information-at-your-fingertips promises of videotex have all been written in red ink.

VIDEOTEX: INTO THE CRUEL WORLD

by Efrem Sigel

"The waiting is over." That's the message on the cover of the promotional kit for Viewtron, Viewdata Corp. of America's Miami-based consumer videotex service. But for Knight-Ridder Newspapers, parent of VCA, the waiting is far from over; in fact, it has just begun. Viewtron was launched in south Florida last Oct. 31, after more than three years of experiments, putting Knight-Ridder in the hole to the tune of $17 million, with an additional $17 million investment slated for 1984. Cash continues to drain away, not only for Knight-Ridder, but for other companies in the business: AT&T, Times Mirror, Honeywell, Digital Equipment Corp., IBM—as well as many European and Japanese suppliers. A worldwide investment in videotex approaching a billion dollars is not an implausible estimate; it's hard to find two companies in the field that have earned a dollar.

The problems with consumer videotex services can be summarized in two propositions, each closely related to the other. First, almost none of the intended customers knows what videotex is and what it can do. Second, those people who are the most likely users of a computerized information service already own or are in the market for personal computers. It is extremely unlikely that they will go out and acquire a second piece of hardware in order to access videotex. As of this writing, no personal computer can access a videotex service, and no dedicated videotex terminal can perform any of the functions a pc can.

Nowhere are the promise and the ordeal of videotex better illustrated than in Viewtron. Viewtron delivers news, sports, classifieds, games and quizzes, financial information, and electronic messages, all in a frame-by-frame format featuring easy-to-use menus, high-resolution graphics, and up to 16 colors at a time. The Viewtron database stores well over 100,000 frames of information, but permits access to many millions through its gateway facility.

Gateway refers to a computer-to-computer connection that enables a subscriber who is on-line to the Viewtron computer in Miami Beach to be switched into one of seven other computer systems, operated by American Express, J.C. Penney, E.F. Hutton, Grolier, Commodity News Services, Official Airline Guide, and VideoFinancial Services (see Fig. 1). This last supplier is an electronic banking intermediary, formed by six major banks to provide services in various regions around the country. Although home banking is often mentioned as one of the prime advantages offered a videotex customer, it is off to a slow start in south Florida: as of early May, only Southeast Bank was actually offering the service, and the subscribers numbered about 200. (Elsewhere, where a pc rather than a videotex terminal is required for electronic banking, services are meeting a better response. See below.)

Viewtron's experience shows how complex it is to organize and deliver videotex. Knight-Ridder is the system operator in south Florida, responsible for creating the information, storing it in Tandem Non-Stop computers, and signing up, serving, and billing customers. However, the functioning of Viewtron also depends on:

- communications lines furnished by South ern Bell in its local area data transport (LADT) network;
- Sceptre videotex terminals manufactured by AT&T;
- information supplied by outside publishers, including *Consumer Reports,* the *New York Times,* Dow Jones, *Congressional Quarterly,* and the American Library Association;
- advertising from both local and national companies. These range from Dadeland Mall, Alpha Rent-A-Car, and Prager Travel to Merrill Lynch and Pan Am. Advertisers pay $1 per frame per week for storage, although a new package plan will give them about 50 frames for a year—including frame design and creation—for $5,000. (By comparison, when Times Mirror's service starts, its package of several hundred frames will cost advertisers $25,000; it

PHOTOGRAPH BY JAMES JOERN

Getting these systems to mesh smoothly is "like performing a high-wire trapeze act."

wants to present this as market research rather than a media buy.)

TYPICAL MONTHLY CHARGES

In order to use Viewtron in its original form, the customer had to acquire an AT&T Sceptre Videotex terminal (regularly priced at $900, but offered in south Florida for $600), pay a monthly subscription fee to Viewtron of $12, and pay $1 per hour to Southern Bell for phone service. Viewdata figured the typical monthly tab at $26.

The marketing of Viewtron involved getting the customer to purchase the terminal at one of 19 AT&T Phone Center stores in south Florida, or any of 24 other participating retailers, including Burdine's department stores and ComputerLand outlets. Despite heavy media advertising and personal selling to well-heeled individuals like preferred bank and brokerage customers, sales in the first six months were slow. At its April annual meeting, Knight-Ridder announced it had signed up 1,500 subscribers, 80% in south Florida and the rest scattered throughout the country. That number represented less than a third of its announced goal of 5,000 by the end of the first year. Since the $600 price tag on the terminal was an obvious obstacle to getting subscribers, Viewdata shifted gears in April, announcing a package plan that would lease subscribers a terminal, provide 12 hours of phone service, and unlimited access to the database for $39.95 a month—with a three-month minimum.

(Times Mirror's price will be $19.95 for service, $29.95 including a terminal; it will get off the ground in late summer in Orange County, Calif., where most phone customers have unlimited local service for a fixed monthly fee.

Another videotex provider, Keycom Electronics Publishing, Schaumburg, Ill., will offer variable pricing when it starts in Chicago this fall. After a sign-up charge of $25, customers will pay $9.95 a month for the first five hours of database access, and an additional $15 for the next 10 hours. Keycom is a joint venture of Centel (the majority owner), Rupert Murdoch's News America, and Honeywell. A Honeywell subsidiary will make the videotex terminals, to be available through Chicago area retailers at about $750 each.)

The problem of selling videotex, however, goes well beyond the pricing of the terminal and the monthly service. When Norm Morrison, executive vice president of Viewdata, was asked what will induce consumers to sign up, he answered, "We never believed there would be, and there is not a single compelling reason to buy." Among the services that can be attractive to potential customers are home banking, stock quotes, airline schedules, and news. Indeed, news—updated around the clock and available at the touch of a button—is turning out to have strong appeal.

Ask other videotex proponents what will make consumers embrace the service and you get similar answers. James Holly, executive vp of Times Mirror Videotex Services, argues that "the hook to get new subscribers on day one is home banking plus a really good news service." The importance of news, he says, is simply that "some people are very attracted by the idea of having the news before anyone else."

At IBM, William Seelinger, manager of videotex market development (and chairman of the U.S. Videotex Industry Association), also attaches considerable importance to financial services. As new financial giants reach for ways to attract customers "they'll be looking fervently for ways to outdo the other guy." One way can be to have a videotex application that involves packaging hardware and service.

FIG. 1

VIEWTRON'S GATEWAY SERVICES, SOUTH FLORIDA

SUPPLIER	NATURE OF SERVICE	CHARGE
American Express	Travel, vacation planning, other	Free
E.F. Hutton	Review of customers' portfolios, market position, cash, and margin balances	$17 per month
J.C. Penney	Sales of merchandise from catalog, with order confirmation, credit authorization	Free
Grolier Inc.	Academic American Encyclopedia full text: 9 million words in 28,000 articles	Free
Commodity News Services	Stock and commodity price quotes, other information on major markets	Free
Official Airline Guide	Airline flight schedules, fares between hundreds of cities	$3 per hour
VideoFinancial Services	Home banking through Southeast Bank, 10 other banks	Banks set fees; Southeast charges $3 per month minimum

SOURCE: COMPILED BY COMMUNICATIONS TRENDS INC., FROM VIEWTRON

WHAT HOME BANKING CAN'T DO

Of course home banking by computer has its limitations. While customers can authorize payments, transfer funds between accounts, and check their balances, they cannot make deposits or get cash as they could with an automated teller machine (ATM). Furthermore, Viewtron banking is not real time. The transactions are transferred at the end of each day to the VideoFinancial Services computer, from whence tapes will be cut for each participating bank. Getting these different computer systems to mesh smoothly is, in the words of Morrison, "like performing a high-wire trapeze act" between the twin towers of the World Trade Center. Banks could speed the process by investment in new systems and equipment, and by aggressive marketing of the new service—but that would mean significant outlays that most are reluctant to make until they see a glimmer of consumer demand. "Come see us when you have 10,000 subscribers" is what some banks have told the Viewtron people.

Whether the hook is home banking, or the ability to order merchandise from Penney's, or being first with late-breaking news (Viewtron subscribers knew that Andropov was dead even before Reagan was awakened with the news—one of the service's early news beats), it helps to have a clear idea of why customers are buying videotex and what they'll get from it. Perhaps it's unfair to expect videotex companies to define their customers very precisely today, but they have to try. Morrison says the Viewtron customers are "upscale, achievers, family people, professionals, hard drivers, self-starters," which doesn't quite explain what they want it for. He also in-

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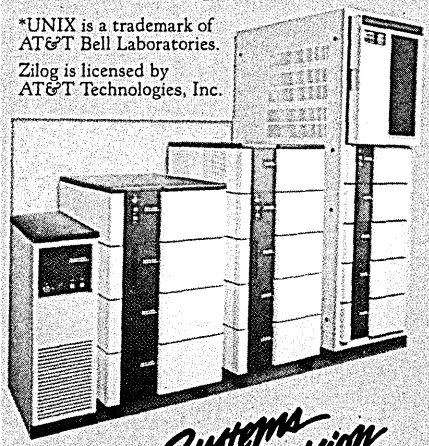

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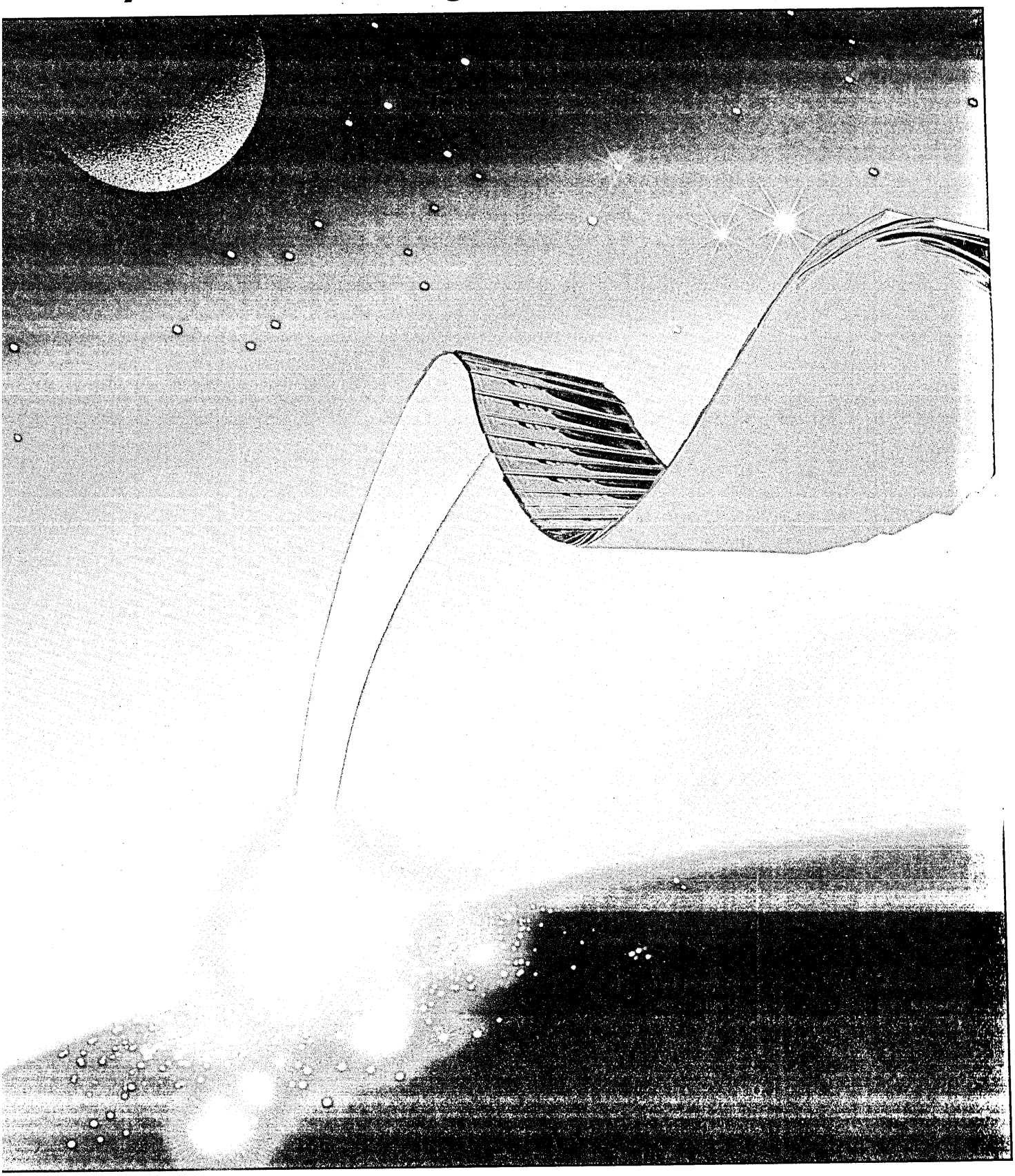

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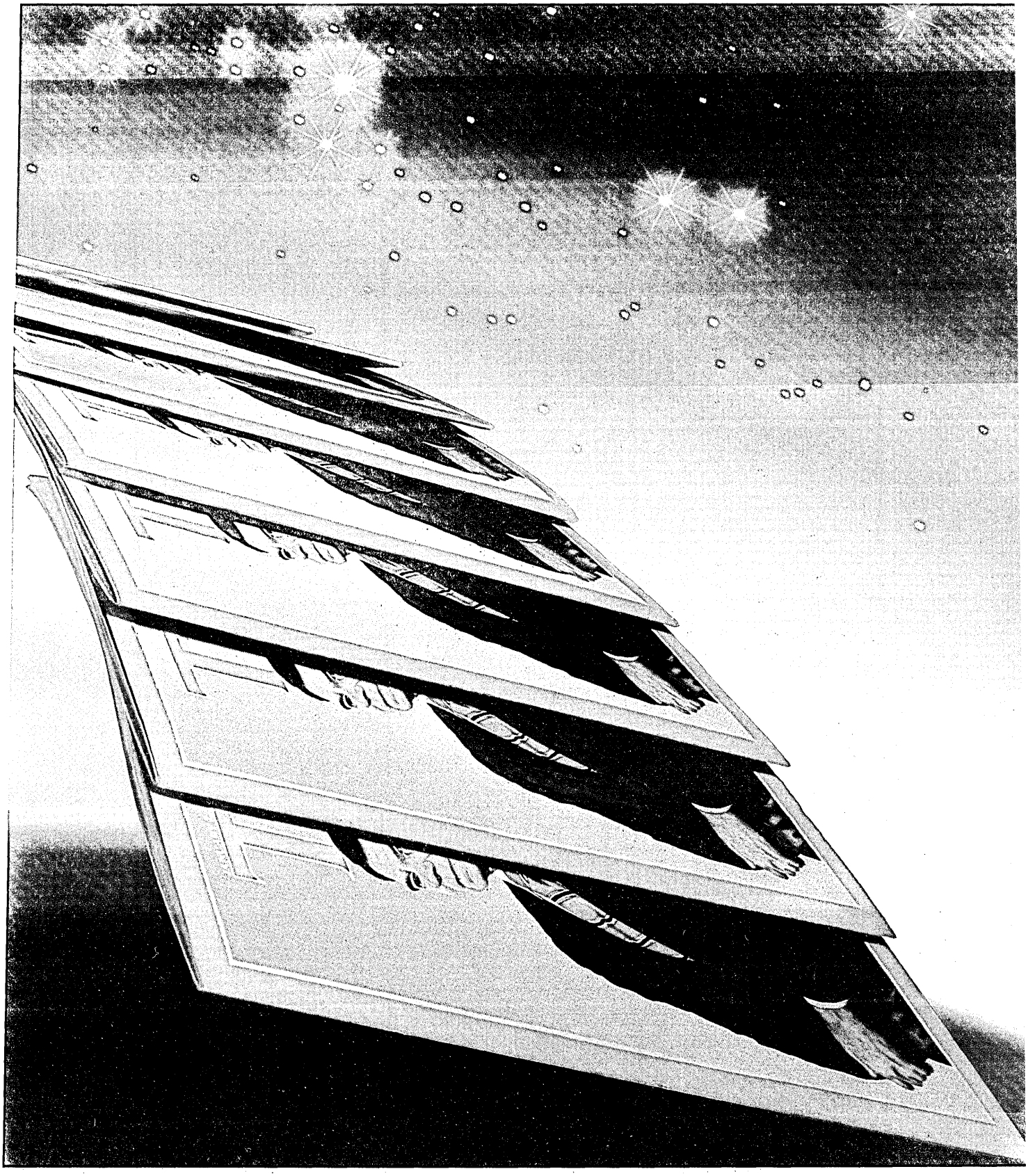

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MOTOROLA / codex

Videotex might have had a chance back in 1977, 1978, even 1979, before the pc makers got rolling.

sists that they are not computer buffs.

To test these perceptions, I phoned three out of the four subscribers whose names were given to me by Viewtron. Two of them were young boys, nine and 11 years old, whose fathers had bought Viewtron for them as gifts; both families owned home computers. The nine-year-old said he used the service every three days or so to play games like Trivia Quizzes. He pronounced the service "better" than his Atari 600XL because "you can do more things with Viewtron," like checking stocks or making purchases (though it's unlikely he does much of either). The 11-year-old said he spent two hours with the service every day, doing homework assignments from the Academic American Encyclopedia (yes, a printer—not yet available—would be a big help, he agreed), scanning sports results, and looking at news headlines. He, too, prefers the service to his computer, a Coleco Adam.

The third purchaser, Alexander Graham of Fort Lauderdale, Fla., confessed that he was "not a very good candidate" to give his opinion, having dropped the service. The idea for Graham was that Viewtron would be an educational experience for his 10-year-old daughter, but after 10 days "she had done all she could," so they took the Sceptre terminal back and got a refund. Graham said Viewtron had a number of appealing things, "but in terms of what we bought it for—to assist her in her education—it was not what we wanted." The Grahams are now considering purchasing a home computer.

These three cases are far from a systematic sample, but they do point up some lessons that those who design consumer information services often forget. Consumers never buy videotex or a VCR or a compact digital audio player in isolation, but as a choice from among hundreds of alternatives. Despite the Viewdata slogan, no consumers have been hanging around the house "waiting" for videotex to arrive on the scene. Rather, they have been indulging their desire for the latest electronic gadgets, or doing what they feel they must for their kids' education, by buying VCRs, home computers, encyclopedias, or by sending their children off to computer camp.

To establish itself as a viable service, let alone a force for sweeping social change, videotex must provide specific benefits at an attractive price. Buying a $300 home computer or a $900 encyclopedia is a one-time expense; in contrast, there are probably few parents willing to spend $40 a month indefinitely on a Viewtron subscription just because it is edifying for the youngsters. Also, because the range of services available on videotex is so broad, the temptation is to avoid zeroing in on a few, easily communicated benefits and instead to sell the service as the passkey to a new world of information at your fingertips.

FIG. 2

PERSONAL COMPUTERS AND VIDEOTEX, THE MARKETING COMPARISON, 1984

	VIDEOTEX	PERSONAL COMPUTERS
Principal suppliers	3	50
Retail outlets	40	10,000
Advertising/promotion	$5 million	$750 million

SOURCE: COMMUNICATIONS TRENDS INC.

FIG. 3

ELECTRONIC HOME BANKING SERVICES, 1984

	NUMBER OF SUBSCRIBERS	
SERVICE	JUNE 1984	DECEMBER 1984
Viewtron/VideoFinancial	250E	1,500E
Chemical Bank: Pronto	6,000	20,000P
Bank of America: HomeBanking	10,000	25,000P
All others	3,750E	13,500E
Totals	20,000E	60,000E

SOURCE: COMMUNICATIONS TRENDS INC., FROM COMPANIES
P = PROJECTED BY COMPANIES.
E = CTI ESTIMATES.

SERVICE IS NOT UNIVERSAL

Someone who knows all too well the dangers of the "information-at-your-fingertips" approach is Richard Hooper of British Telecom, who has been running the Prestel service—the world's first commercial videotex offering—for four years. According to Hooper, the Prestel developers made a number of near-disastrous blunders, of which the biggest was the erroneous assumption that they had a service with universal appeal, one that would bring "a world of information" to consumers in their homes. Prestel abandoned that delusion long ago to concentrate on a few highly targeted groups—mostly business—that could use specific information in the Prestel database to their immediate benefit. Hence, Prestel has become the means whereby travel agents learn the latest tour prices and availabilities; stockbrokers scan securities prices; farmers look up prices for crops.

After five years, Prestel now has about 45,000 subscribers, a far cry from the more than 1 million that its backers envisaged. The service has cost untold millions of pounds to develop and sell, although revenues and costs have been brought into a closer balance by simplifying the original, unwieldy network of computers, trimming the staff, and orienting the marketing to well-defined groups of customers. Along the way, some of Britain's most prestigious publishers—the *Times, The Economist, The Financial Times*—have withdrawn as information providers, unable to find a market for the uninspired repackaging of printed information in electronic form. They've been replaced, says Hooper, by smaller, entrepreneurial companies that understand the peculiarities of the demand for computerized information.

Hooper says the key to marketing videotex is to understand the difference between a trigger service and an incremental service. A trigger service is an application so vital to a given group of customers that they'll pay the cost, even if what they're getting is access to only 10 or 20 frames a day. An incremental service is one customers will use once they've acquired videotex, but will never cause them to buy it in the first place. Thus, travel agents would never acquire Prestel to look up weather reports,

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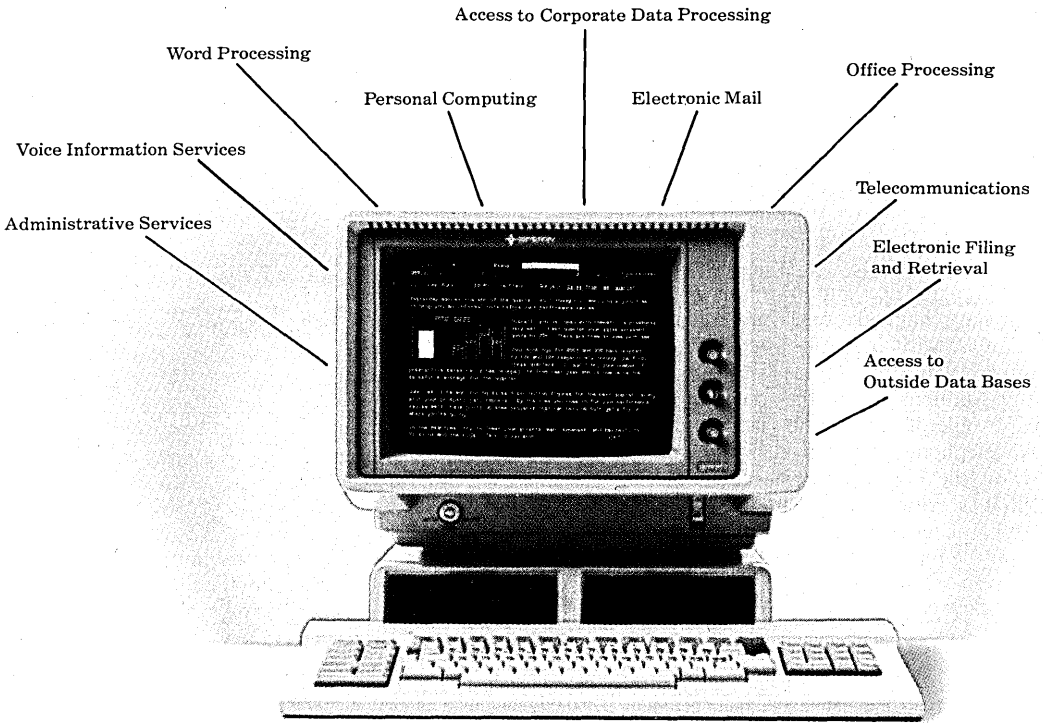

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but having bought it for tour prices, they might occasionally use it to get the weather.

The approach in France is still to build a mass consumer market for videotex, but with a unique twist: to offer telephone directory assistance as the principal benefit, by making available an on-line directory to consumers; and to subsidize the development of the industry by providing millions of small black-and-white terminals free to telephone customers. By the end of 1984, the French telecommunications authority will have handed out a million of these Minitels, with plans for 3 million by the end of 1986. Imposing costs of this magnitude—billions of dollars—on phone users is possible, if not entirely justifiable, when the telephone system is a national monopoly. In the U.S. it is out of the question. What is critical here is lining up support from the pc manufacturers, not support from the phone companies.

FIG. 4

THREE VIDEOTEX APPROACHES

	KNIGHT-RIDDER	TIMES MIRROR	TRINTREX
System launch	October 1983	Fall 1984	1986
Type of owner	Newspaper company	Newspaper, diversified communications company; Canadian systems company*	Computer company, broadcaster, retailer/financial services company
Terminal	AT&T Sceptre	AT&T Sceptre	Microcomputer
Most important service	News, home banking	News, home banking	Home shopping
Subscription price	$39.95/month	$29.95/month	Low
Advertiser support	40%-70%	60%-70%	80% plus
Cumulative investment**	$34 million	$15 million	$130 million

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**THROUGH FIRST YEAR OF SERVICE
SOURCE: COMMUNICATIONS TRENDS INC., FROM COMPANIES AND OTHER SOURCES. FIGURE FOR TRINTREX INVESTMENT IS CTI ESTIMATE.

SCEPTRE NOT A BARGAIN

At present, even AT&T knows that its Sceptre videotex terminal is not much of a bargain compared to a personal computer like the Apple IIc or even the much-maligned PCjr. Thomas E. Farmer, AT&T's director of consumer information products, acknowledges that Sceptre is an "immature" product but says improvements are on the way. Sceptre, which is cordless and lightweight, has no computing capacity, cannot run packaged software, has a small and hard-to-use keyboard—and faces an insurmountable marketing battle in any head-to-head comparison with the personal computer. Personal computer and software companies will spend about $750 million this year to advertise and promote their products to customers, while Knight-Ridder, Times Mirror, AT&T, and a few other brave souls might, between them, spend $5 million (see Fig. 2). In this sort of contest, you don't have to wait for the final bell to know the outcome.

As hardware, in fact, the dedicated videotex terminal bears the same relationship to the personal computer that the ill-fated consumer video disc bore to the video cassette recorder—a less versatile newcomer that inevitably must flunk the test of consumer acceptance.

The standalone videotex terminal might have had a chance back in 1977, 1978, even 1979, before the personal computer makers got rolling. Today, however, there is no chance for a videotex service that is not linked to the microcomputer business. Dow Jones and CompuServe, operating the two largest database services, have learned this lesson well: both hitched their fortunes to the microcomputer more than two years ago, and each has passed the 100,000 mark in subscribers. Dow Jones, which closed 1983 with 120,000 subscribers, figures on doubling the number in 1984.

Home banking is only one of numerous services that are taking off among personal computer owners. In contrast to the several hundred banking users on Viewtron, as of June Chemical Bank had more than 6,000 customers for its Pronto service in New York at $12 per month, while Bank of America had just over 10,000 in California at $8 (see Fig. 3). Both services can be accessed through a variety of personal computers. Both organizations see little advantage in videotex color and graphics for customers who want to log-on, make their payments, and log-off. At Chemical, senior vice president Robert Willumstad says, "We don't think the North American Presentation Level Protocol Syntax [NAPLPS] standard offers any significant advantage" over an ASCII display. At Bank of America, vice president Stephen Yotter agrees: "From a home banking standpoint, it's probably not important" to have videotex color and graphics. Neither Chemical Bank nor Bank of America says openly what must also be prominent in their thinking: if it's banking that people want, let them get it directly from the bank rather than through the intermediary of a videotex system operator.

Some proponents of videotex still look down their noses at what Dow Jones and CompuServe are doing because these services use the ASCII format for data transmission, are limited to black-and-white displays, and are not designed to be used with the home tv set. Such limitations, it's argued, rule out a broad consumer market and exclude any possibility of attracting advertisers to defray part of the cost.

The NAPLPS videotex format developed by AT&T and embodied in the Knight-Ridder and Times Mirror services, is an article of faith for videotex backers. Seelinger observes that the ASCII display format is only one cause for the limited use of terminals; hard-to-use retrieval protocols and uncomfortable keyboards must also share the blame. The videotex display and retrieval scheme, he notes, have the advantage in "usability, appeal, convenience." And videotex is tied to the home tv, which people like, not to the computer terminal, which many people fear.

Nevertheless, companies selling videotex recognize that unless they find a way to market to existing microcomputer users, they've locked themselves out of the most obvious market. After all, with an annual sales rate of 5 million units, manufacturers of home and desktop computers sell 20 times as many units every week (100,000) as Viewtron hopes to install in one year.

PCS WITH VIDEOTEX DISPLAYS

Software that enables home and desktop computers to display information in a videotex format is beginning to appear: Avcor, a Toronto company, has announced a $100 cartridge that turns the Commodore 64 into a videotex terminal; Wolfdata, in Cambridge, Mass., has a similar package for the IBM PC; and IBM has announced its own product, PC Videotex, for shipment in October. PC Videotex will cost $250 in its PC or XT versions, $220 for PCjr. To use it, the customer needs a color graphics card, color

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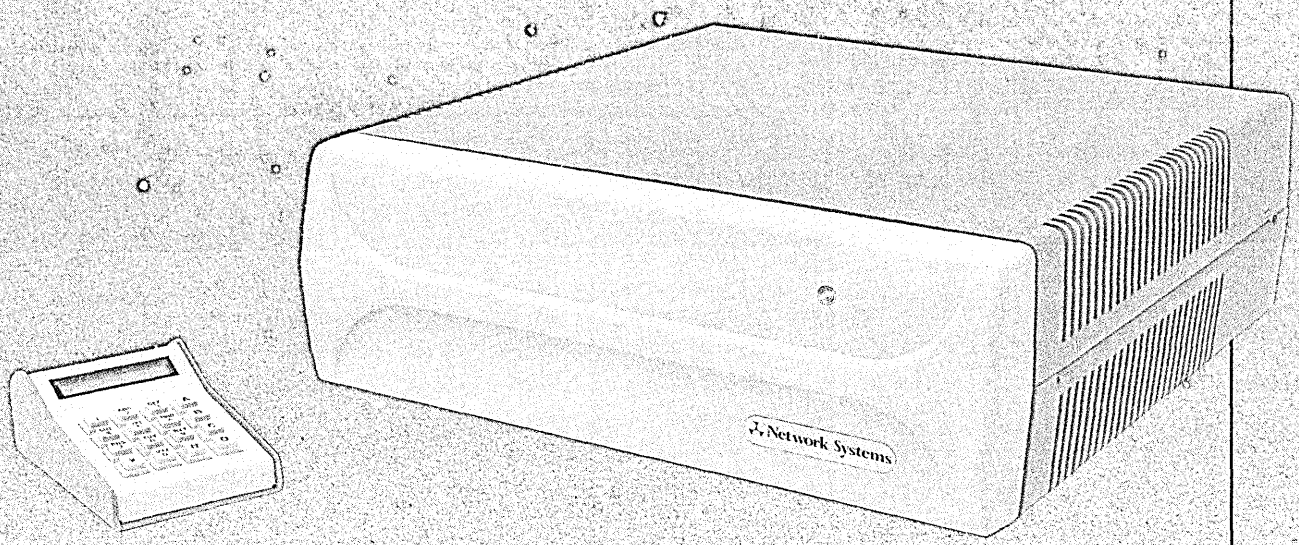

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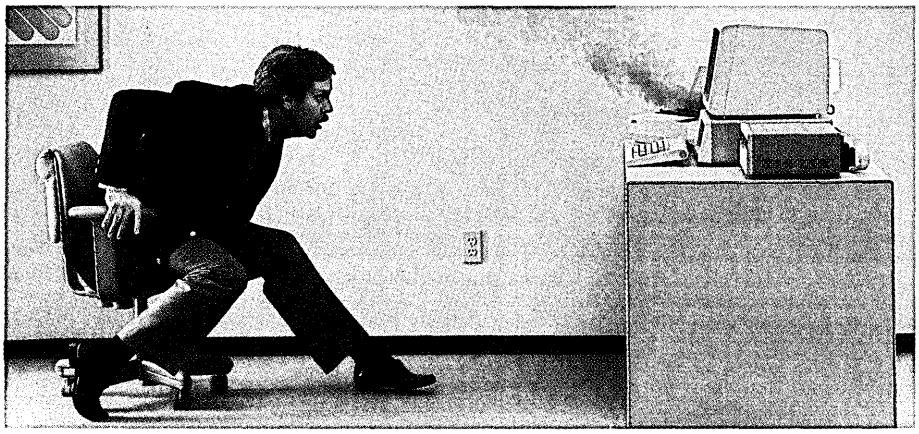

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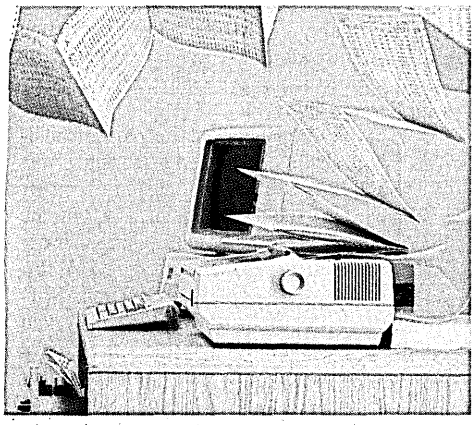

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CIRCLE 81 ON READER CARD

After all, the telephone and automobile took decades to penetrate 50% of American households.

monitor or tv set, and 1200-baud modem; the price of the color graphics card and modem will usually add another $500 to $700 to the cost. Because of this added expense—which makes the videotex software more expensive than the Sceptre terminal—James Holly at Times Mirror declares that the new software "is not the whole answer, but it helps." He says Times Mirror Videotex would like to become a marketer of the software when it launches its service later this year.

For now, however, IBM's marketing of PC Videotex seems to be aiming at a business, not a consumer audience—even though Seelinger says both markets are important. The product will be sold through IBM's National Account Division and National Marketing Division sales forces as well as through IBM Product Centers. It complements IBM's Series 1/Videotex System, based on the Series 1 minicomputer, which allows companies to create in-house videotex systems for employee and customer information. Although IBM itself, Buick, Equitable, and other companies have in-house videotex systems, their overall numbers are small. Link Resources, New York, has surveyed 50 corporate MIS directors in the past year and found a lack of interest in videotex; it estimates only 25 private systems have been installed.

Another IBM videotex venture is aiming squarely at the consumer market, however. This is the joint venture with CBS and Sears that was announced in February, and which has since been named Trintrex. The Trintrex mission is specifically to offer a videotex service through home and personal computers, including any with a substantial installed base: the Apple II family, the Commodore 64, and of course the IBM PC are obvious choices, although Trintrex says it's too early for specifics. It will spend the next two years working out technical and service details before launching a business.

Aside from the enormous financial resources that the three partners bring to Trintrex, and the preeminent position that the microcomputer will occupy as a delivery medium, a few other differences are apparent between it and the Knight-Ridder and Times Mirror approaches. For one thing, Trintrex will be a national service from the outset, unlike the newspaper-sponsored offerings, which are confined to a single region. (Both Knight-Ridder and Times Mirror have agreements with other newspapers to offer licensed versions of their services, depending, of course, on consumer acceptance in the initial markets.)

For another, the Trintrex plan—always subject to revision—gives the most prominent place to at-home shopping as the motivating force for consumers, and to national advertising as the economic underpinning. This is understandable in view of Sears' position as the largest direct marketer (through its catalog sales) and the role of the CBS Television Network as the nation's largest single national advertising medium. Electronic shopping, nonetheless, has not been notably successful in any one of a number of two-way cable tv trials. Comp-U-Card—the one company engaged in it on a national scale—derives most of its revenues from membership fees rather than from the actual sale of goods and services.

The third difference, which is a corollary of the second, is that Trintrex expects most of its revenues to come from advertising and transaction fees, rather than from subscriber payments. Not that Knight-Ridder and Times Mirror downplay advertiser support; in Viewdata's projections it represents anywhere from 40% to 70% of revenues; in Times Mirror's, from 60% to 70%. Trintrex, however, is obviously aiming even higher.

Finally, the new venture will not suffer from undercapitalization. Whereas the $17 million budgeted for Viewtron this year is equivalent to nearly 5% of Knight-Ridder's after-tax cash flow from operations, combined cash flow for CBS, IBM, and Sears last year exceeded $15 billion (of which IBM accounted for 76%). The companies refuse to give details about their investments, but it would be surprising if each weren't committed to at least $50 million initially. Fig. 4 compares what is known of Trintrex to two other videotex ventures.

(It bears repeating that big investments can mean big losses as well as big payoffs. CBS dropped more than $40 million on CBS Cable. IBM's investment in Satellite Business Systems, still deeply in the red, runs into the hundreds of millions; its loss on DiscoVision Associates, never publicly disclosed, was tens of millions of dollars.)

SOME VIDEOTEX PROPHETS

Those who believe strongly in videotex often voice their faith in the language of social prophecy, not of business. IBM's Seelinger downplays the early, slow reception of Viewtron in Florida. Videotex, he says, represents "a major behavioral and cultural change in our society" and notes that "we don't adapt to changes like this so readily." After all, the telephone and automobile took decades to penetrate 50% of American households.

Albert Gillen, president of Knight-Ridder Broadcasting and of Viewdata, speaks in similar sweeping terms: "Videotex is going to have a profound effect on our social and behavioral patterns. It will change the way we buy and sell products and services in America. It will enable families to rearrange the time demands of their life-styles." At AT&T, Farmer says, "No, we're not discouraged. We know this thing requires changes in habits." The experience thus far only demonstrates the "need for staying power" on the part of industry suppliers.

This long view on the part of business is admirable, but seems incongruous. We usually look to poets, social thinkers, or visionaries to tell us what society will be like in the future. From companies we expect something more concrete. When AT&T, IBM, Knight-Ridder, and Times Mirror all talk about how wonderful a given technology will be in the future, they leave themselves open to the suspicion that they haven't got a product that anybody wants today.

In truth, the picture is more ambiguous than this. The evidence is that hundreds of thousand of business customers want, and are willing to pay for, databases that deliver market prices, stock quotes, financial reports, technical and scientific citations, and a host of other specialized data. The evidence is also that a minority—perhaps a significant minority—of people doing work or managing investments at home are willing to do the same. Moreover, there is every reason to think that when the right mix of banking services is offered at the right price, millions of people will forsake written checks for electronic payments—though this does not solve the problem of making deposits and getting cash.

To generalize from this state of affairs to a mass consumer market for computerized information and transactions in the specific videotex format, with NAPLPS color and graphics, is to make a leap of faith as yet unwarranted by facts. The videotex visionaries undoubtedly have their sources of inspiration for such leaps.

The rest of us will have to wait for more earthly persuasions. ◉

Efrem Sigel is the author of two books about videotex entitled *Videotext: The Coming Revolution in Home/Office Information Retrieval* (1980, Knowledge Industry Publications) and *The Future of Videotext* (1983, Knowledge Industry Publications). He is president of Communications Trends Inc., Larchmont, N.Y., which does publishing, research, and consulting about computer services, software, and electronic information services.

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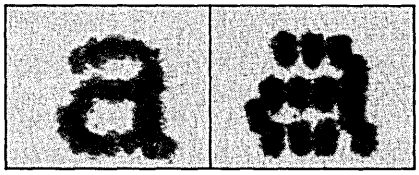

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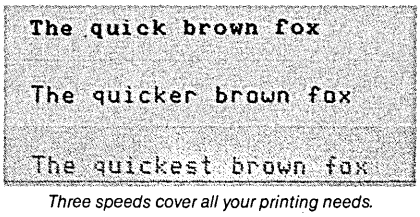

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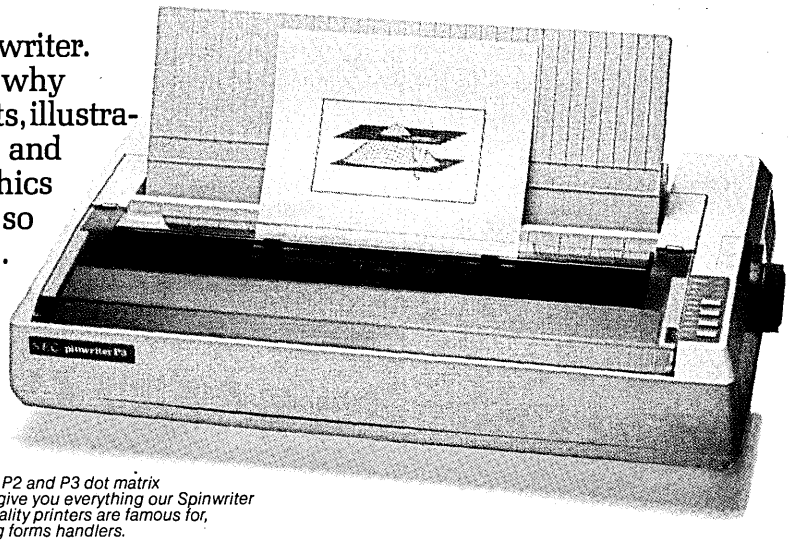

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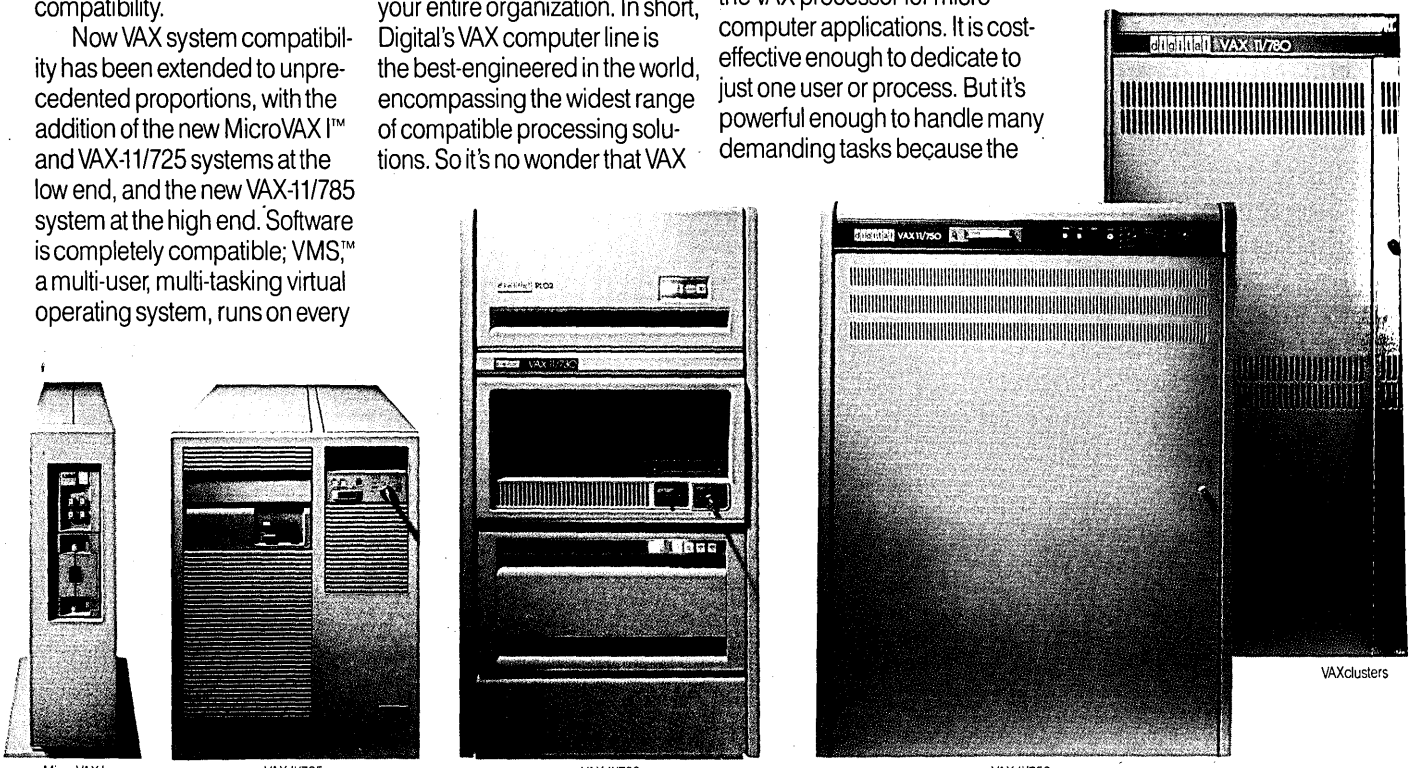

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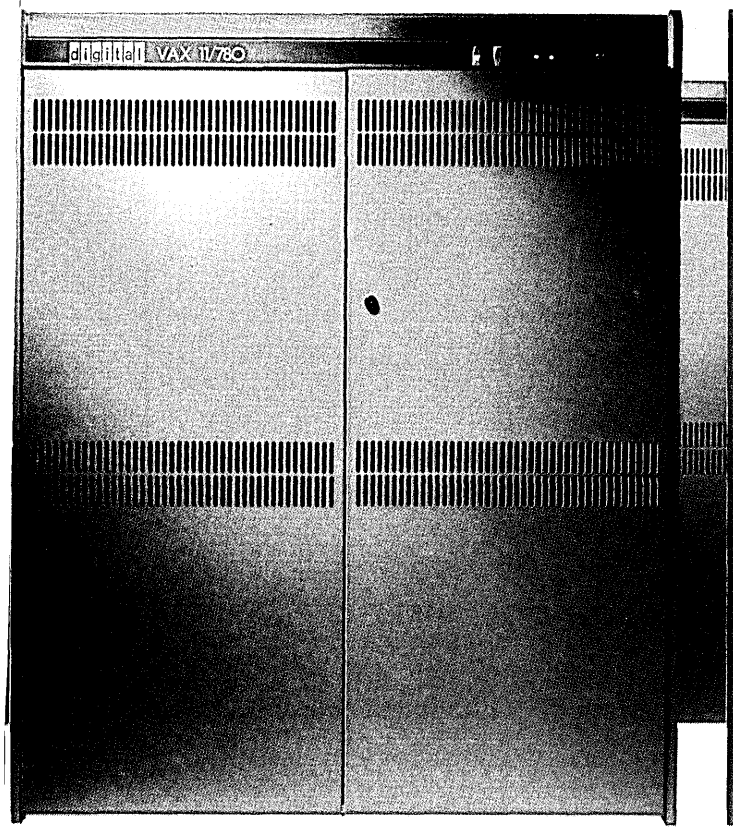

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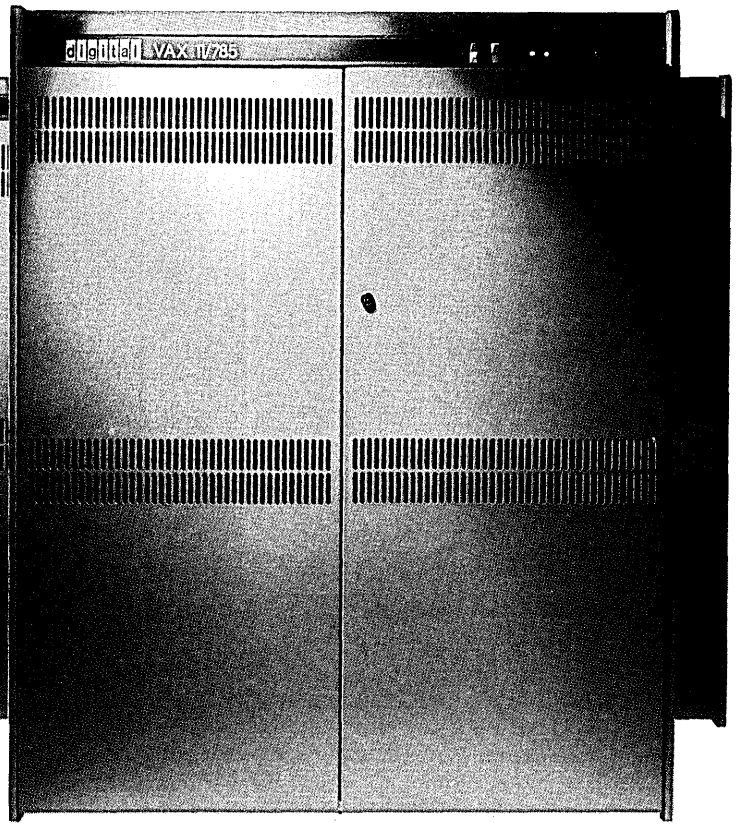

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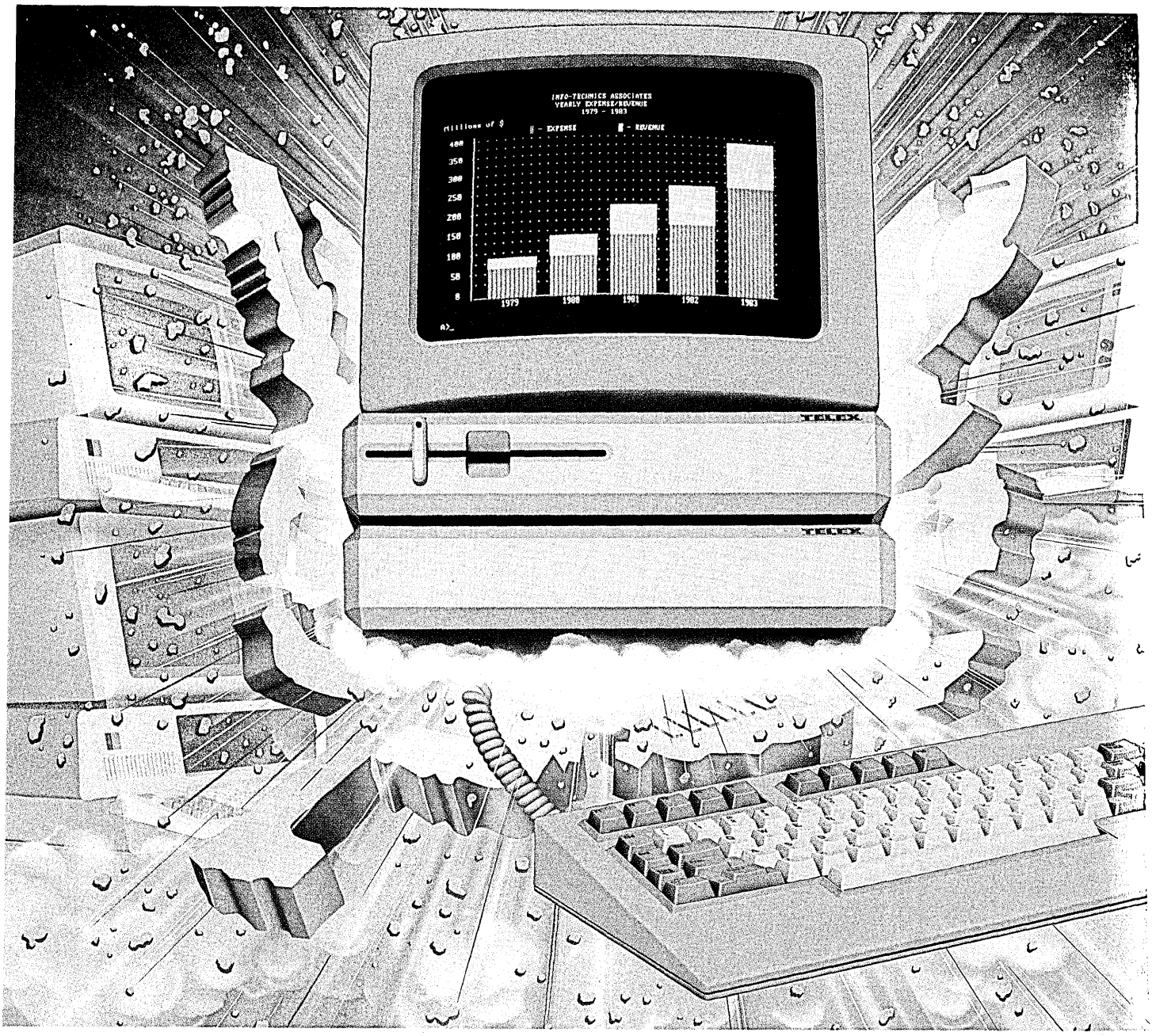

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CIRCLE 83 ON READER CARD

HARDWARE

OFF-LINE

Museums and art galleries are filled with treasures that are hundreds if not thousands of years old. Usually, when you think of museums, you conjure images of things that are old and musty. The same holds true for antiques. One school of thought is that one person's junk is another person's prize antique. With few exceptions, there are not many clocks, rugs, or furniture pieces less than 30 years old that are considered antique, and fewer pieces still in that age range are found in any museum.

But look at the computer industry. In just the last quarter century it has grown to surpass the revenues of many of the decaying smokestack industries. And with that rapid growth has come an accelerated aging process. Relatively new inventions become artifacts. In fact, the first full-scale transistorized computer, the TX-0, and other antique devices like punch cards, paper tape, core and drum storage, and the Hollerith code, can be found in the Computer Museum. It was created in 1979 as a private museum sponsored by Digital Equipment Corp. Then it became a public, nonprofit institution in 1982. The museum has grown and is now in the process of relocating from a DEC facility in central Massachusetts to a new, permanent facility in downtown Boston. Five of the eight galleries will premiere at its grand opening on November 14. Four of the galleries will cover the computing industry's growth from 1950 to 1973, from giant room-sized vacuum tube computers to desktop machines run by microprocessors. In the fifth gallery, an airplane wing, computer aided design systems, and the world's first interactive video game will be featured in an exhibit called "The Computer and the Image."

As part of its opening, the Computer Museum has kicked off a $10 million international capital campaign to purchase its new quarters at Museum Wharf. Approximately $3 million of the money raised through the campaign will be used to "create exhibits that will dramatically illustrate the story of the information revolution and its roots," says Gwen Bell, the museum's director. A $4 million endowment will also be established to "ensure the future of the museum," Bell adds. The museum will also use $3 million to purchase half interest in Museum Wharf and the adjacent quarter-acre waterfront park that overlooks downtown Boston and Fort Point Channel. The Museum Wharf was built as a wool warehouse in 1888 and was renovated in 1979 to house the two museums.

"Like the computer industry, the Computer Museum has grown at an astonishing pace," says John Poduska, chairman of the museum's board and the founder and chairman of Apollo Computer Inc. And, at the rate the computer industry is growing and with the pace of innovation accelerating, don't be too surprised if your grandchild holds up a tiny silicon chip one day and remarks, in much the same way we speak of the old transistor and vacuum tube machines today, "My, isn't it amazing how something this big holds so little?"

According to the U.S. Customs Service, the personal computer is becoming a commonplace item in travelers' bags. The agency is familiarizing international travelers with the regulations and pitfalls of taking a micro overseas or buying one abroad, saying that travelers should be leery of buying copycat products. Generally, travelers are allowed to take a micro out of the U.S., providing it is not headed for the Eastern Bloc.

PROTOCOL ANALYZER

Designed to help MIS managers troubleshoot faulty multivendor communications networks, this device monitors data

transmissions as well as simulating network components for network testing. The new HP 4953A joins the vendor's 4955A and 4951A analyzers as a device that can monitor bit-oriented protocols at speeds up to 256Kbps and perform simulations at speeds up to 72Kbps without loss of triggering. The product can control remote 4953As and can transfer measurements and data files, which are collected on a tape cartridge, to the other protocol analyzers, the vendor claims. Such transfers take place by physically moving the cartridge or by automatic transmission over a data link. The unit's crt screen displays X.25, X.75, DDCMP, BSC, HDLC, SDLC, and user-defined async and synchronous protocols. Data codes supported include ASCII, EBCDIC, Baudot, EBCD, and Transcode. Designed for field service as well as home office use, the product lists for $12,000 with extended memory an extra $1,000. Delivery is 4 to 6 weeks ARO. HEWLETT-PACKARD, Telecommunications Div., Colorado Springs.

FOR DATA CIRCLE 301 ON READER CARD

MINICOMPUTERS

The Astra 300 series is a line of 32-bit minicomputers that use custom NEC

HARDWARE

chips. This system can support up to 32 workstations in a computer and communications environment. It is also compatible with the vendor's 200 series.

The system is a multi-user, multitasking system. It supports electronic mail, word processing, relational database, general accounting, calendaring, telephone cost accounting, and other software packages. The Astra 300 costs $15,000. NEC INFORMATION SYSTEMS INC., Boxborough, Mass.

FOR DATA CIRCLE 303 ON READER CARD

DISK EXPANSION MODULE

The 16/8 Disk Expansion Module is designed to work with this vendor's line of personal computers. It combines 5¼-inch disk drives and expansion slots in one module. Available in 5¼-inch dual floppy or combined floppy, 10MB, 5¼-inch Winchester disk configurations, the module uses the vendor's proprietary CP/M disk utility to enable user-transparent bidirectional conversion of data files between CP/M and MS/DOS programs.

According to the vendor, CP/M and MS/DOS data files can now be used by its 8-bit and 16-bit processors with full capabilities for converting files from CP/M format to MS/DOS and vice versa. The unit can also read and write data to disks formatted on the IBM PC. It also has four expansion slots for system enhancements.

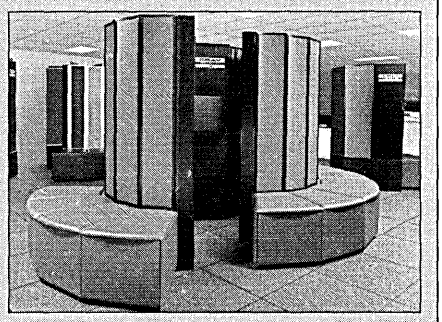
The floppy disk drives have 348KB of usable storage and accommodate double-sided, double-density 5¼-inch media. Rigid drive usable storage is 10.2MB. RAM is 128KB expandable to 256KB on the 16-bit side, which utilizes an Intel 8086 microprocessor, and 64KB on the 8-bit side, which utilizes a Z80A chip. Each processor has its own memory, allowing the computer to process two applications simultaneously.

The unit comes with a keyboard that includes six system function keys, 10-key numeric keypad, and 12 programmable function keys. In a double floppy configuration, the 16/8 Disk Expansion Module costs $1,050. The full system price of display, keyboard, and disk drive is $3,300. The full system price in a Winchester drive configuration is $5,300. XEROX CORP., Rochester, N.Y.

FOR DATA CIRCLE 304 ON READER CARD

HARDWARE SPOTLIGHT

ENHANCED X-MP SERIES



The enhanced X-MP series consists of six models based on the X-MP central processing unit, which has a 9.5 nanosecond clock cycle time. Each model offers very fast scaler processing and high-speed processing of long and short vectors. Additionally, on the multiple cpu models, the cpus may operate independently on separate jobs or can be organized to operate on a single job.

The X-MP/48 has four identical cpus that share an eight million-word ECL bipolar central memory arranged in 64 interleaved banks. Memory bandwidth is 16 times that of the Cray-1. Each cpu on this systems offers gather/scatter and compressed index vector instructions, which allow for the vectorized processing of randomly organized data. The mainframe is arranged in 12 columns in a 270-degree arc and requires the same electrical power as the Cray-1.

The X-MP/22 and X-MP/44 systems are now half the size and require half the electrical power as their predecessors. The units feature two cpus and 2 or 4 million words of ECL bipolar central memory arranged in 16 or 32 interleaved banks. Maximum bandwidth is eight times that of a Cray-1. These systems can operate independently on different programs or can be harnessed together to operate on a single-user program.

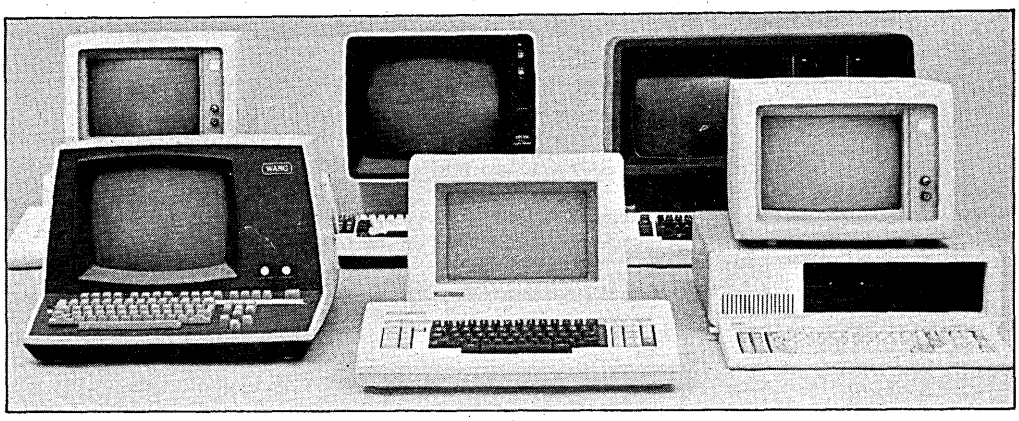
The X-MP/11, 12, and 14 systems combine a single Cray X-MP cpu with 1, 2, or 4 million words of static MOS central memory, respectively. On the 4 million-word system, memory is arranged in 32 interleaved banks, and on the 1 and 2 million-word systems, it is arranged in 16 banks. Memory bandwidth is four times that of the Cray-1.

The vendor also introduced additional I/O products. The DD-49 disk drive has a 1,200MB capacity and a 10MBps transfer. A new model of the Solid-state Storage Device (SSD) offers 1,024MB of very fast random access secondary MOS memory and can connect to the Cray X-MP/48 through two very high speed channels with a maximum aggregate transfer rate of 2,000MBps. The SSD is also available in 64MB, 128MB, and 256MB capacities.

Each model of the X-MP series uses the same software and peripheral equipment as existing Cray systems. Mainframe prices range from $5 million to $14 million. CRAY RESEARCH INC., Minneapolis.

FOR DATA CIRCLE 300 ON READER CARD

Making multi-vendor office systems work together requires just one thing.



Soft-Switch.™

The idea seems simple enough: connect all of your office systems so that documents can be freely interchanged for editing, storage, display, and printing. That includes word processors, PCs running word processing packages, and mainframe terminals accessing DCF and PROFS.

Soft-Switch is compatibility

ITI's Soft-Switch is a program product for your IBM mainframe (MVS or VM) that allows users to send documents to other users with document translation performed automatically, to store documents in host libraries, and to retrieve documents from these libraries.

Soft-Switch communicates with IBM, Wang, Xerox, and NBI. It communicates with the MultiMate word processing program on the IBM PC, with DCF and with PROFS; with the IBM 6670 laser printer, and with standard hard copy printers.

Soft-Switch solves today's problems

Let's say an analyst prepares a document on his PC with MultiMate. He executes Soft-Switch (which executes in the PC, as well as in the IBM host) and specifies distribution to his secretary's Wang word processor and to the 6670 laser printer down the hall. Soft-Switch provides the micro/mainframe link, transports the document from the PC to the IBM host, translates the document from MultiMate format to DCA, translates the DCA format to Wang's WPS format and the IBM 6670 laser printer OCL format, and routes the documents to their final destinations.

Soft-Switch: a path to tomorrow

Already installed at many FORTUNE 100 companies, Soft-Switch integrates the technologies of protocol translators, text management systems, micro/mainframe links, message switches, and electronic mail systems to provide organizations with integrated office systems.

It's a product you need today, and will, no doubt, need even more tomorrow. To learn more about how Soft-Switch will make your multi-vendor office systems work together, call TOLL FREE

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200 North Warner Road
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HARDWARE

SOLIDS MODELING

The 2020 models extend the capabilities of the vendor's previously announced Model 7115, designed for wireframe CAD/CAM applications. It features hardware-assisted 3-D transformations to accelerate dynamic interaction with design models. The unit adds hidden surface removal for solids modeling applications.

The 2020 series products incorporate 3-D coordinate transformations, with clipping, perspective, hidden line removal, high-speed scan conversion, a hierarchial segmented 3-D display list with dynamic attribute assignment, and a 60Hz display. The models include the vendor's raster processor, a proprietary VLSI/ECL design for ultrahigh performance scan conversion. Local 3-D geometry calculations are performed by a special purpose geometry processor, which offloads intensive geometry calculations from the host computer. The geometry database manager builds, manipulates, and maintains the display list. Operations include creation and editing of pictures and subpictures, and attribute assignment such as highlight, color, and blink.

All models include a 19-inch diagonal color crt with 1,280 by 1,024 pixel resolution (up to eight bits per pixel) and 768KB of user memory for storing display lists. Processor instructions and interprocessor communications are maintained within their own 256K of memory. Model 2020 prices start at $28,000. RAMTEK CORP., Santa Clara, Calif.

FOR DATA CIRCLE 302 ON READER CARD

PEN PLOTTER

The LVP16 is a graphics pen plotter that draws on plain paper or transparencies and offers a choice of six colors from a palette of 10 for paper and seven for transparencies. It accepts standard U.S. and European paper and transparency sizes. The unit provides graphics with .001-inch accuracy, a maximum speed of 15 ips, weighs 16 pounds, and is designed for installation on desktop or stand. With a standard RS232 interface included, the plotter can communicate with systems that support the HP-GL protocol.

Once the pens are loaded in the carousel, color selection is under software control, allowing creation of graphics without manual intervention, though the plotter can be interrupted with a "view" button. For headlines and text to accompany the graphics, the plotter has 19 character sets. For extensive text printing, the plotter can be connected to a serial printer and the printer to a host. The LVP16 costs $2,000. DIGITAL EQUIPMENT CORP., Maynard, Mass.

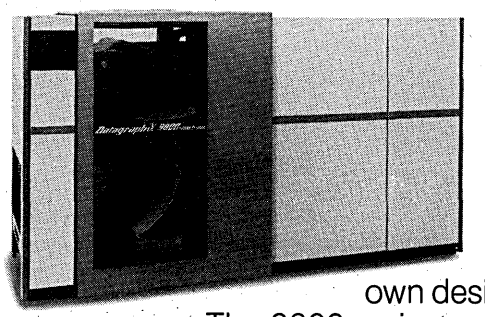
FOR DATA CIRCLE 306 ON READER CARD

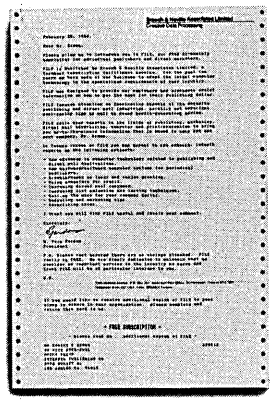
—Robert J. Crutchfield

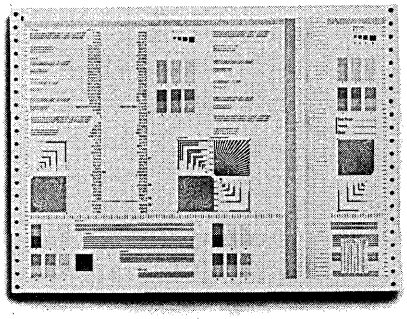
OUR 21,000 LPM PRINTER TAKES MANY FORMS.

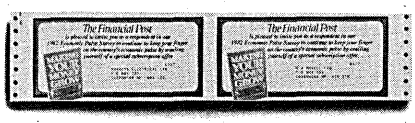
If you need high volume and flexibility, you should know that the DatagraphiX 9800 isn't just a 21,000 LPM laser printer. It also accepts the widest variety of paper form sizes of any non-impact printer, with form widths of 6.5" to 16" and a length range of 3.5" to 14." And all 9800 printers feature perf-to-perf printing on paper weights of 16 to 110 pounds, depending on paper type.

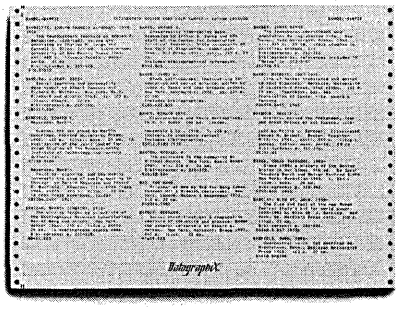
The 9800 series is an entirely new generation of non-impact, high speed laser printers—with more functions, features, and reliability. It offers up to 34 standard character sets, with a font editor that helps you create a nearly unlimited variety of fonts, logos or signatures of your own design.

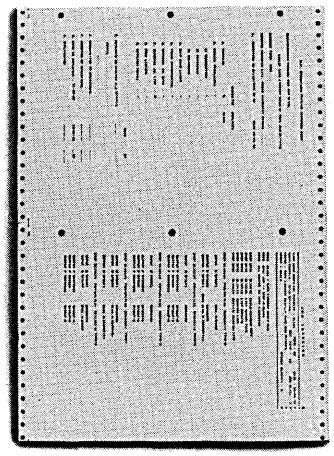


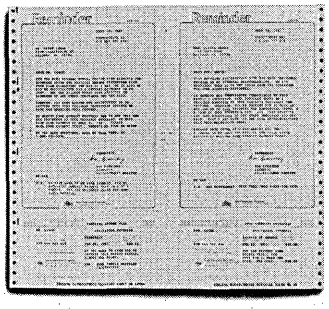


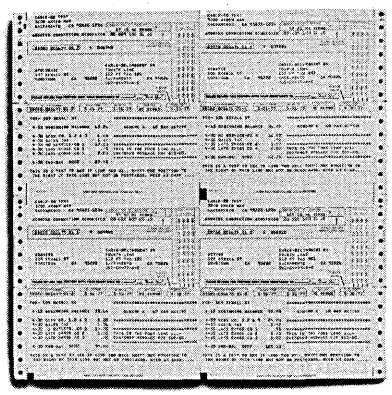


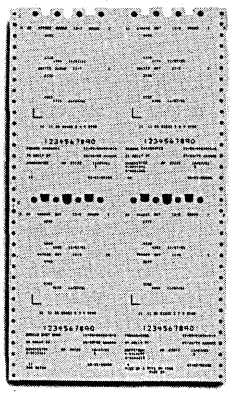












The 9800 series comes in a variety of on-line, off-line, or on-line/off-line configurations compatible with a broad selection of CPUs. Off-line models offer user-oriented menu-driven software, hard copy log, 6250 BPI tape drives with ping-ponging capability and more. On-line models offer full IBM 3800 compatibility, in addition to the advantages of DatagraphiX's advanced engineering.

Combine these advanced features with excellent print quality and unmatchable reliability, and you begin to see why DatagraphiX is recognized as a supplier of superior computer output management products. The full-featured 9800 printers are available now, setting industry standards for up-time in customer sites throughout the U.S. and Canada.

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CIRCLE 85 ON READER CARD

"We asked for an encore.

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Lotus gave us a Symphony."

"We've been using 1-2-3™ from Lotus™ almost from the day it was introduced.

"It's the one software program we've tried that meets the analytical needs of almost every department. From Equity Research to Corporate Finance. Right now, we're using 1-2-3 for planning, forecasting, and decision support.

"With the success we're having with 1-2-3, we were naturally excited about new Symphony.™ Symphony's word processing simplifies our preparation of in-house reports and with Symphony's communication capability we can easily access a wide range of information sources.

"We also recommend Symphony to our clients because it's the ideal complement to Huttonline™—our online service that gives clients direct access to their portfolios, stock quotes and critical investment research. All this right on their own PC's.

"With Symphony, our clients can now get this information in really useable terms, and in exactly the format they want: spreadsheet, graphics, database, or words. And like 1-2-3, Symphony comes with everything in one package.

"In a business where timely information is everything, Symphony clearly meets our needs."

To find out which Lotus product is best for you, visit your authorized Lotus dealer.

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One great idea after another.™

SOFTWARE AND SERVICES

UPDATES

Questions have been raised as to whether "office automation" has really caught on in the workplace. Last winter's Office Automation Conference in Los Angeles cast some doubts on the popularity of the show as well as interest in this area. With OAC '85 around the corner, Harry Bunn, a senior consultant with PA Consulting Services in Princeton, N.J., said in a recent speech that office automation has outgrown the experimental phase of pilot projects and should now be assessed by top management "as a productivity tool like any other." He cautioned, though, "that there is no point in spending money without first investigating exactly what people in the office are paid to do." The management and technology consultant contends that office automation today is "very big money." The era of the few thousand dollar experiment, he says, is over. "Companies are looking at investments in the range of millions of dollars." He also pointed out that automating the status quo in an office usually produces only "marginal" results. "The real benefits are gained by companies who use the flexibility that office automation gives to take a completely fresh look at their office functions." Bunn referred to several "hidden benefits" of office automation, which he said included up-to-date systems that act as an aid to recruitment and confer an entirely "new degree of flexibility on an organization."

Another office automation view that seems to support some of Bunn's claims comes from San Jose research firm Creative Strategies International. It contends that the office automation software industry will see explosive growth and rapid change in the next five years as accelerating user demand at all levels -- most notably in the microcomputer software segment -- results in a "flood" of new product introductions and an upsurge in competition. Growing at a compound annual rate of 40%, this market will reach $16 billion by 1988, CSI says. Further, software will be "the key to solving the current major office automation problems as hardware advances level off and the market itself solidifies," the firm says. Issues of compatibility and the user interface are central to software product development, with integrated programs, windowing, and mouse input emerging as front-runners in the race toward computer interaction. Integrated software packages are expected to provide up to half of the basic office functions by 1988, and will account for as much as 24% of total units shipped that year. Communication software will also show exceptional growth during the forecast period as research and development in this sector increases and network standards are established, the report adds.

Part of the lure of office automation is the promise of a "paperless" or quasi-paperless society. Not so, says John Adderluh, vice president of marketing for Moore Business Forms. He says there will actually be a growth in the business forms industry and attributes the growth largely to the "proliferation of small computers. As more businesses use computers, large areas of opportunity [for business forms] are being created."

Informatics General Corp. has inked another deal with a microcomputer software firm. This time, the Woodland Hills, Calif., vendor and Lotus Development Corp. are marketing Lotus/Answer, a micro-to-mainframe link that lets users massage IBM mainframe databases using 1-2-3 and Symphony.

MICRO INTERFACE

Data Interface System 31 enables an IBM PC or PC-compatible micro to interface to IBM or non-IBM mainframes, ultimately including DEC, CDC, Sperry, and Burroughs mainframe systems. The workstation performs activities similar to full-screen 3270 software, but employs a separate asynchronous dial-up protocol.

Users can request formatted reports in real time, either directing them to an attached printer, or capturing them on diskette. Mainframe facilities include application development tools. Four call-level entries to the host module are the only departure from standard COBOL facilities. COBOL file handling is used for all files other than the terminal. Each call passes a screen map and a return code between the application program and the software. Screen maps are defined using a PC-based screen painting facility, and are transmitted to the host system for inclusion into COBOL programs. A terminal/host interface protocol includes both data compression and transmission reduction algorithms.

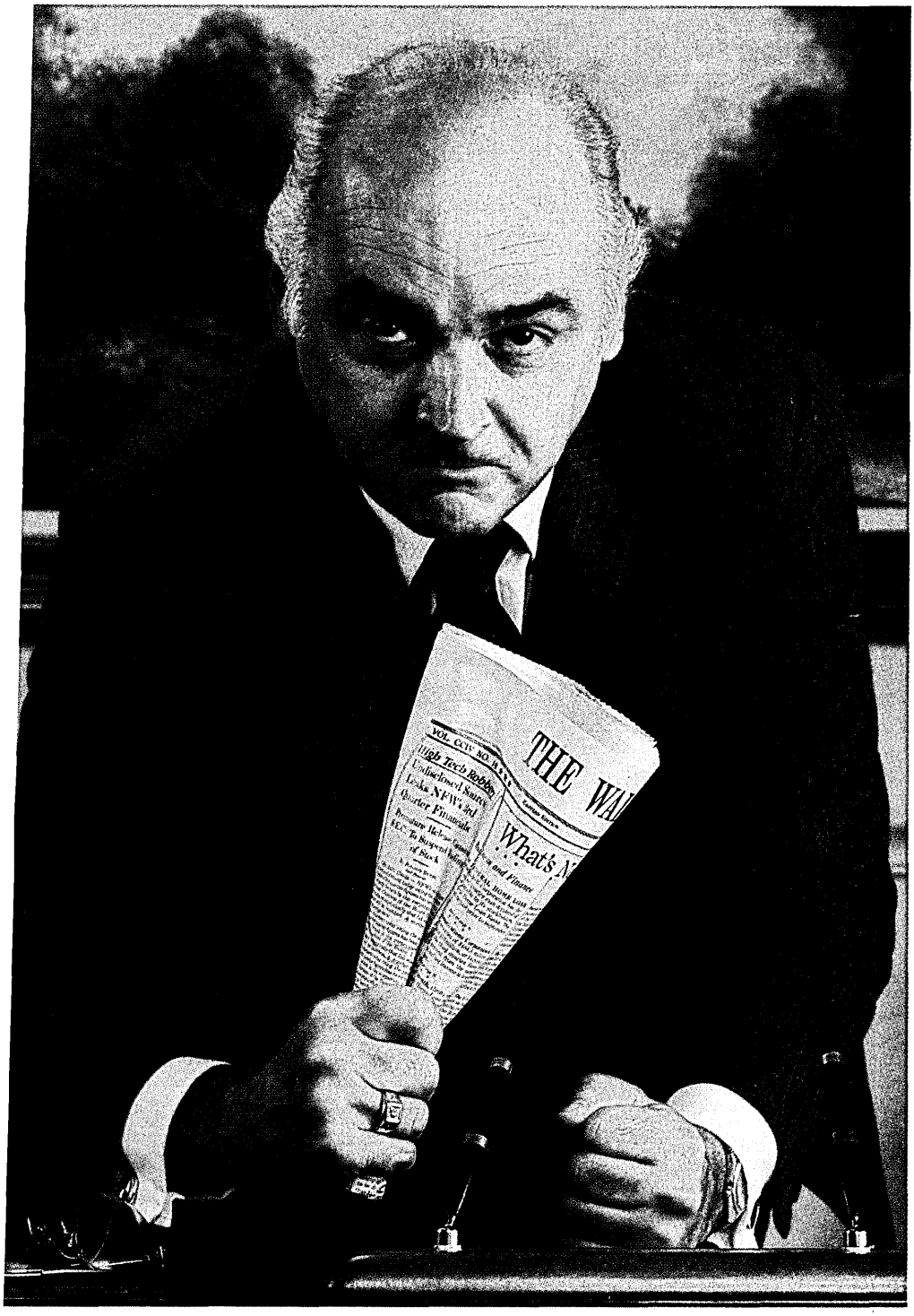
The vendor has targeted two market segments for the product: geographically compact networks whose users can dial into a host at local telephone rates, and geographically dispersed networks with monthly connect times too low to cost justify dedicated bisynchronous lines. The first release of this product runs on IBM 360/OS and upward mainframes under TSO. VM/CMS will be the next host system. Data Interface System 31 (DIO31) costs $9,750 for the host software, plus $475 for each PC, with lower rates for governmental and educational organizations. Volume discounts begin with the fifth PC. DATA INTERFACE SYSTEMS CORP., Austin, Texas.

FOR DATA CIRCLE 326 ON READER CARD

BUSINESS AND MANAGEMENT SYSTEM

The Primeway Transaction Development and Management System is a software

WHEN THE CHAIRMAN EXPLODES OVER A SECURITY LEAK, WHAT'S YOUR DEFENSE?



VMCENTER:

THE ONE INDISPENSABLE SURVIVAL TOOL FOR VM DATA CENTER MANAGERS.

It doesn't matter who actually leaked it—if there's a failure in system security, it's *your* problem.

But now, at last, you have an ally. In VMCENTER.

VMCENTER puts you squarely in control of system resources—providing multiple levels of authorization, for maximum protection against security violations.

It also allows you to do a lot more. Change passwords in a flash, encrypt data through simple commands, and keep top management informed of potential problems through a variety of reports.

Best of all, VMCENTER makes *you* secure—knowing that problems are being taken care of *before* they happen, not after.

But there's more.

In addition to security problems, VMCENTER solves a lot of others, like disk and tape management, resource scheduling and accounting, even workload balancing. And it does it all in an integrated manner that's more effective than any possible collection of quick fixes.

VMCENTER. It's a survival tool—and then some. Once you use it, you'll wonder how you ever got along without it.

And the Chairman may even learn to feel the same way about you.

For more information on VMCENTER, call or write VM Software, Inc., 2070 Chain Bridge Road, Suite 355, Vienna, Virginia 22180, telephone (703) 821-6886.

VM SOFTWARE INC.

CIRCLE 87 ON READER CARD

1-DTM-0984

package that integrates business transaction processing capabilities with application development tools. It is designed to increase the productivity of software developers.

The software can be used in either a distributed or centralized dp environment. It also performs software maintenance and modification chores. According to the vendor, with programming development and execution integrated into one product, dp departments have greater control over the development and maintenance cycle of applications, resulting in cost savings for the department and increased productivity.

The software is targeted for high-performance transaction markets like banking, utilities, insurance, education, and government. Within these market segments, typical applications would include production and quality control, inventory control and distribution, personnel records management, trust management, hospital administration, patient care, and order processing.

The product runs on all Prime 50 series processors under PRIMOS R. Primeway is available in two packaged configurations. A combined Primeway Development/Execute package, which includes COBOL/74, DBMS, DBMS COBOL support, DBMS Query, and 35 educational credits for customer training, costs $55,000. The Primeway Execute-Only package, which includes COBOL/74, Execute-Only, and DBMS Execute-Only, is priced at $9,600. PRIME COMPUTER INC., Natick, Mass.

FOR DATA CIRCLE 329 ON READER CARD

BASIC VIDEOCASSETTE SERIES

BASIC Power, an eight-part videocassette series that teaches BASIC, is now available for purchase and rental from the University of California Extension Media Center. The series guides the viewer step-by-step from the most elementary to moderately sophisticated computer programming. At every step it stresses the importance and characteristics of good programming style, user friendliness, and logical thinking. It shows the novice programmer how to create a variety of well-written and documented programs, how to avoid common programming pitfalls, and how to take advantage of some of the tricks of the programming trade.

The series is designed for introductory programming courses in high schools, colleges, and vocational and continuing educational programs. It is also valuable for public libraries, many of whose patrons own or have access to a microcomputer.

A workbook accompanies the video lessons. It includes a summary, a programming exercise, and a quiz complete

SOFTWARE SPOTLIGHT

CONTRACT MANAGEMENT

Compass-Contract is a software package that enables government contract manufacturing and job shop organizations to manage their financial and production management operations better. The integrated system includes budgeting, costing, and reporting features, as well as a planning system that incorporates changes in manufacturing resource planning specific to contract-oriented operations. It is an on-line, interactive, full-screen system, written in COBOL, and is expandable. The system provides security controls at the database, program, and data access levels.

Compass-Contract comes in modules. Prices range from $80,000 to $160,000 with a basic system costing $90,000. WESTERN DATA SYSTEMS INC., Calabasas, Calif.

FOR DATA CIRCLE 325 ON READER CARD

When you're comparing forms processing equipment

The TAB® Advantage is more features per dollar

With TAB's line of Bursters, Decollators and Imprinters the cost of processing continuous forms decreases while your output increases.

TAB Bursters are engineered to handle all continuous forms in one pass, at speeds of 15 to 350 feet per minute. And with TAB's Power Stacker, forms are automatically gathered in a compact stack in exact sequence.

Capacity is no problem with TAB Decollators. Whether your forms are multi-part or carbonless, they'll be processed at up to 475 feet per minute in one operation...with no mess.

The TAB Imprinter puts signature, trademarks and small blocks of information on multi-part forms, card stock, mailers and checks. Quick and easy.

The features of the TAB line are as continuous as the forms they handle. See if they don't match or exceed the features of more expensive models. Look for us in the Yellow Pages under "Data Processing Supplies," or write us at 1400 Page Mill Road, Palo Alto, CA 94304. In Canada, 550 McNicoll Avenue, Willowdale, Ontario M2H 2E1.

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CIRCLE 88 ON READER CARD

with solutions for each of the eight lessons. The BASIC used in this series runs on an Apple computer. Major differences between this and other important forms of BASIC are explained. The rental price for BASIC Power is $30 per cassette. The purchase price is $1,000. UNIVERSITY OF CALIFORNIA EXTENSION MEDIA CENTER, Berkeley, Calif.

FOR DATA CIRCLE 327 ON READER CARD

AI LANGUAGE

OPS5 is this vendor's first commercially available artificial intelligence product designed to run on its line of VAX computers. This language enables programmers with AI experience to write expert system programs. The software is targeted for companies with in-place AI departments, for oems, and for software houses wishing to build expert system applications. The language runs under the VAX/VMS operating system. It is intended for use by software engineers trained in AI methodology and technology to encode knowledge from human experts in the form of production rules.

According to the vendor, expert systems are applications that mimic the way a human expert performs a task that requires decision-making based on varying data or knowledge about that task. The OPS5 package for VAX computers is a version of the language originally developed at Carnegie-Mellon University, and it perserves the original capabilities of the CMU version. It is described as a forward-chaining, rule-based language that can handle large production systems. It provides two different conflict resolution strategies so users can choose the one that best meets their application needs. OPS5 is priced at $5,000, with right-to-copy licenses at $3,000. The package is available through the vendor's External Application Software Library. DIGITAL EQUIPMENT CORP., Maynard, Mass.

FOR DATA CIRCLE 328 ON READER CARD

MICRO DBMS

This vendor's popular database management system has been upgraded to handle larger amounts of data, offer more runtime assistance to users, and take full advantage of 16-bit and larger microprocessors.

Using many of the same commands as its predecessor, dBase II, the new product, dBase III, enables the user to write whole applications and can be interfaced to programs written in other languages. The product's storage capability is said to exceed 2 billion records per file. It can also handle 128 fields per record and up to 10 files can be open simultaneously. Color displays and pull-down menus and prompts are provided.

Written in C, the software runs on IBM PC and XT machines (as well as PC-compatibles) with at least 256KB of RAM and two 360KB floppy disk drives. Suggested retail price is $695, with immediate delivery. ASHTON-TATE, Culver City, Calif.

FOR DATA CIRCLE 330 ON READER CARD

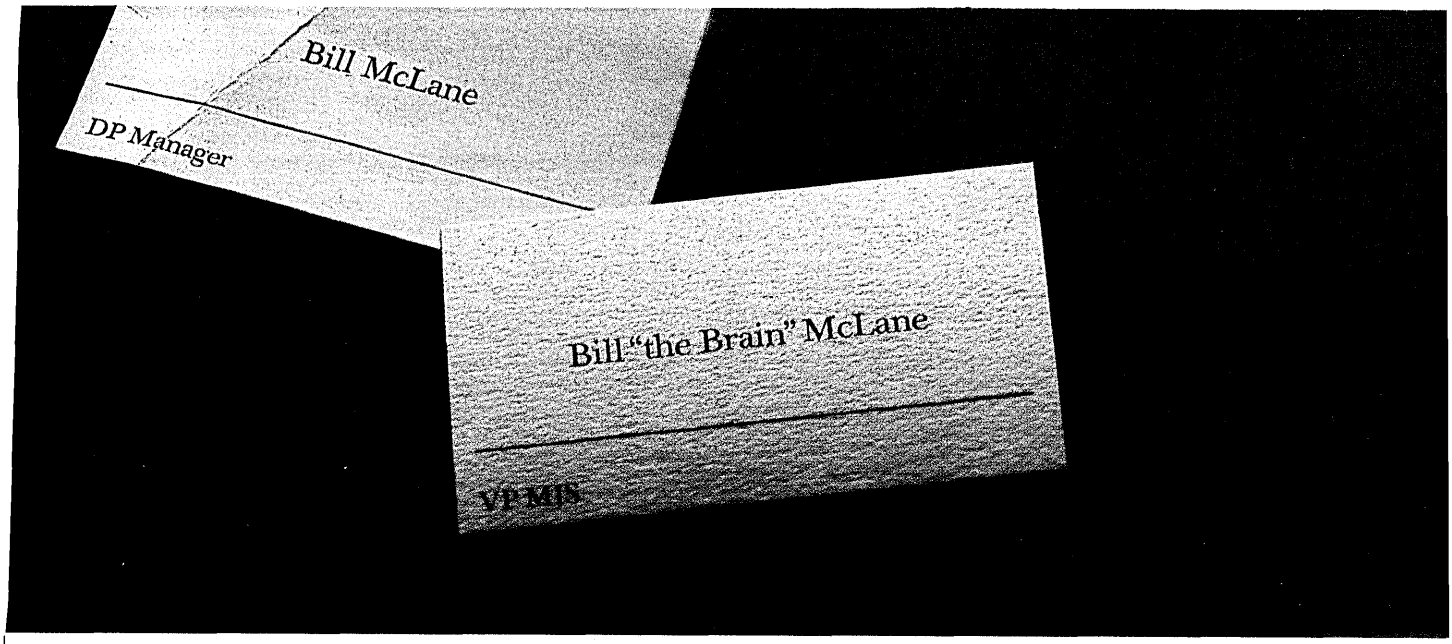
UNIX-BASED SOFTWARE

CS/Xtend is designed specifically for Unix-based operating environments. The integrated products include both application development aids and end-user productivity tools.

The Unix-based software is designed to be compatible across multivendor and multi-operating system environments. The products include a multi-user shared database, terminal management, end-user information retrieval management, interactive application builder, and a system for managing databases that are distributed across multiple computers. CS/Xtend's price ranges from $675 to $66,000. CINCOM SYSTEMS, Cincinnati, Ohio.

FOR DATA CIRCLE 331 ON READER CARD

—Robert J. Crutchfield



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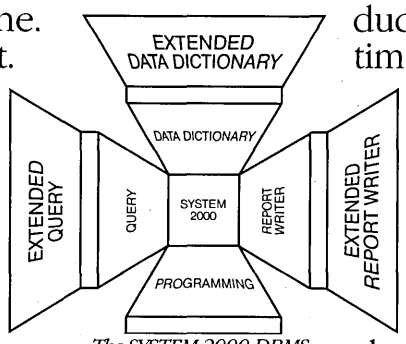

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CIRCLE 89 ON READER CARD

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These people, whose roots go back to the very beginning of the computer industry, are the nucleus of the Gould Software Division. They are immensely talented, and possessed of the vision which has allowed them to recognize both the challenge and the opportunity inherent in an emerging Information Age: to create portable software products that deliver productivity improvements for software development and decision making processes in an increasingly distributed computing environment.

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The Marketplace... SOFTWARE SERVICES

ADVERTISERS' INDEX

ON THE JOB

MACRO GAP IN MICRO TRAINING

It's no big news—everybody's buying micros. According to CBEMA, 1984 micro shipments are projected to be around 877,500 units (up 35% from 1983).

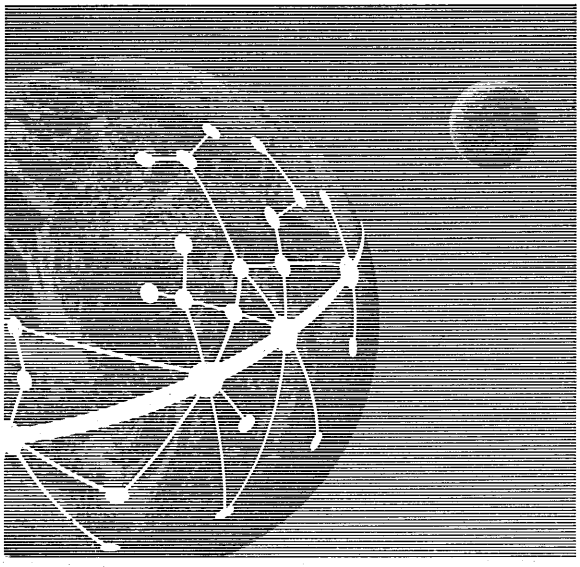
The New York-based accounting, tax, and management consulting firm Arthur Young claims that despite the obvious implications, micros have made a limited mark on U.S. corporations. This, they feel, can be partially blamed on the absence of training programs for managers.

The company recently conducted a survey of 435 firms which revealed that only 25% of them have a formal training program to teach employees how to operate micro equipment and software. In addition, only 24% of these companies have seen training materials that they approve of. Only 15% of the respondents are experiencing widespread use of micros within their organizations, and nearly 60% reported little or no use of the computers.

David Wilson, national director of education sevices for Arthur Young, feels that the results indicate no one is taking responsibility for training these new micro users. Wilson thinks that "corporations are looking to the computer industry to increase computer literacy. Hardware manufacturers, however, are looking to the software companies to do the job, and software companies, in their rush to develop more sophisticated pro-

Look to the Leader

Bank of America



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- Applications Programmers/Analysts-2-5 years IMS DB/DC, COBOL, Structured Analysis, ADF a Plus

In Miami

- Data Base Administrator-IMS DB/DC
- Data Base Design Analyst-IMS DB/DC
- IMS Internals Specialist
- Data Administrator
- Systems Programmers-MVS, VM, IMS/VS
- Capacity Planner-OS/MVS, IMS DB/DC, Plus Related Hardware Knowledge
- Applications Programmers-IMS DB/DC, COBOL, ADF a Plus
- Systems Analysts-IMS DB/DC 2-5 years, Structured Analysis, COBOL, ADF a Plus

In Hong Kong

- Sr. Data Base Administrator/Design-IMS DB/DC, ADF
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grams, view their user manuals and tabloids as the answer. The final result is that too many managers without data processing backgrounds are totally avoiding micros or are left by themselves to grope at the keyboards."

What's more, Wilson doesn't think that the lack of formal training for management stems from companies' doubts about or lack of interest in micros. More than 57% of the respondents anticipate increased use of the micros in the next year, and 42% have considered using training materials. Among the companies reporting widespread micro usage, 95% expect to see increased use of the computers.

So why the big gap between micro availability and actual use? "Many companies are relying too much on self-training texts, some of which are very difficult to follow," Wilson comments. He says that executives are often too busy or not computer-oriented enough for some of these materials. "Some companies rely on internal or inexperienced trainers, who sometimes lack the crucial blending of teaching, business, and technical expertise," he adds.

The relative youth of the micro industry is another factor. "As the computer training industry simultaneously grows, it too will mature," says Wilson. "Training, which now is largely text and computer-based, will include more audio-visual materials and demonstrations in the future, and will be offered on a formal basis by more companies."

READING, 'RITING, 'RITHMETIC, AND RESOURCES

Another place where the use of computers may be limited is in the educational process. According to some of the educators at the University of Texas (UT), the problems of equity and teacher training may be hindering the potential of computers in schools.

Dr. Joseph Deken, assistant professor of general business and computer sciences, feels that some schools may not be able to afford the new technology, thus students graduate without essential computing skills. Other schools may be reluctant to invest in computer equipment because it might become obsolete in a short time.

And just having the equipment available doesn't automatically guarantee a better education. Dr. Alan K. Cline, professor of computer sciences and mathematics at UT, says, "We need to have students at the high school level learning about . . . what's going on inside computers, but few teachers know enough about the machines to go beyond using prepackaged software to supplement instruction in subjects such as history, math, and science. . . . And given the salaries that most public teachers get these days, as soon as they learn that stuff, they're going to quit teaching. They're going to go out and become programmers themselves."

Both educators agree there has to be an entirely new approach to education if computers are to have any real impact in the classroom. They feel serious consideration must be given to determining the priorities of the educational process in order to allocate resources where they'll do the most good.

The nature of the computer also dictates that teachers take a new attitude toward their own education. Says Deken, "The creative use of the computer requires educators to update constantly their understanding of computer applications and technology." He suggests an adoption of the notion of lifelong learning, along with higher teacher salaries and incentives for computer professionals to teach in the schools, would slow the flow of the "brain drain" to a trickle.

—Lauren D'Attilo

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We're pioneers in fiber optics, and we are building, in Los Angeles and San Francisco, the most sophisticated metropolitan communications systems in the world.

We're brand new, but still the most experienced kid on the block.

At Pacific Bell, we never forget our heritage. We come from a long history of communications knowledge and innovation. We bring some of our most valuable experience with us. And we leave behind the excess baggage of old-fashioned structure and mired-in-tradition thinking. We're brand new. But we're not untried.

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SECOND ANNUAL

Software User Survey Forecasts Prosperity and Problems for Major Vendors

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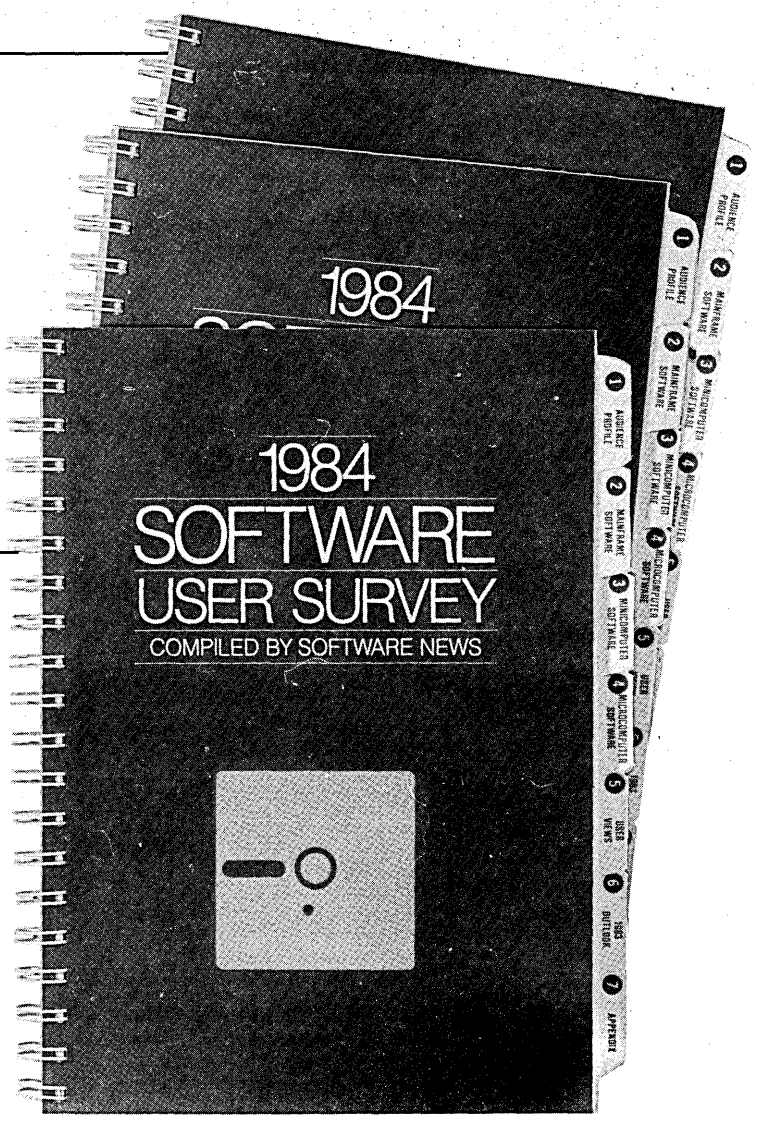

The results are now in from the second annual Software User Survey conducted by Software News. Over 2000 major national accounts participated.

Virtually every sector of the U.S. economy was polled...banks, insurance firms, manufacturers, distributors, medical and legal groups, educational institutions, systems

)uses, process industries, c. The respondents iden-ied the software ıckages they are now ;ing and what they plan ' buy in 1984. The main-ames, minis and micro-)mputers currently in use ıd those planned for pur-ıase in 1984 are also lentified.

The 200-page report of ıe survey results ranks ıe leading software endors by their relative ıarket shares. The xpected increases in 1984)ftware expenditures are ıalyzed separately for ıainframes, minis and ıicros. Twenty-seven pecific categories of pplications and systems oftware were studied to lentify the fastest growing egments. Examine the able of Contents for more etails.

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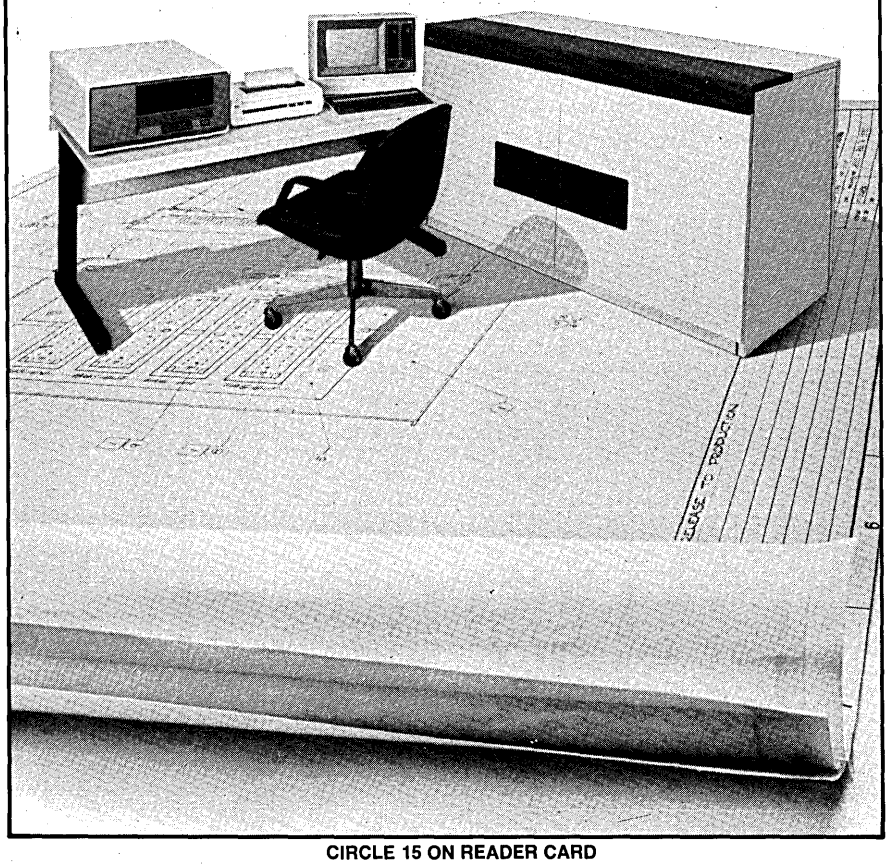
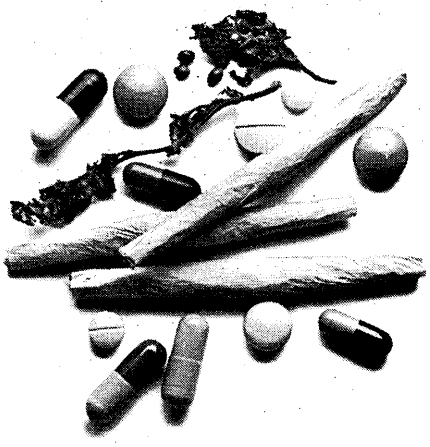


CIRCLE 15 ON READER CARD

Get involved with drugs before your children do.



Sooner or later, someone's going to offer to turn your children on.

It could be their best friends.

And chances are, you won't be anywhere in sight.

So what can you do?

Obviously, the time to talk to your children about drugs is before they have to make a decision on their own.

Which means you have to learn something about drugs.

Learn the dangers. And learn to recognize the signs of drug use. Listlessness in your child. Sudden drop in school grades. Temper flare-ups and staying out late a lot.

Learn about peer pressure on a twelve-year-old. Then show them you understand how important their friends are to them. But also tell them that real friends won't insist they do drugs.

Check your own personal habits. You can't tell a child about the dangers of drugs with booze on your breath.

But it's through love and understanding that you can be the most effective. Threatening to tear their arms off just won't work.

You can get a lot more ideas from the booklet, "Parents: What You Can Do About Drug Abuse." Write: Get Involved, P.O. Box 1706, Rockville, Maryland 20850.

Remember, it doesn't always happen to someone else's kids.

After all, there are over 35 million drug users in America.

And they're all someone's children.

Ad Council A public service of this publication and the National Institute on Drug Abuse.

An exchange of readers' ideas and experiences. Your contributions are invited.

READERS' FORUM

WORKING ON MOON MOUNTAIN

It was shortly after I took early retirement from Honeywell, so it must have been September 1982 when Paolo Soleri, the noted architect, brought a group of his disciples and workers to Phoenix for discussions with several HIS people. The topic was the proper integration of computers into the house and office architecture of the future. For Soleri is a futurist in action, in the process of building a city called Arcosanti, in the desert north of Phoenix. I was invited to the discussion because I had been involved in using a computer from home since 1972.

I had considered the matter before that, however. At the first Software Engineering Conference in Garmisch, Germany, in October 1968, I had met Dr. Edward David, then in charge of the Picturephone project at Bell Laboratories. I was planning to build a house atop an old volcano in Phoenix, and wanted to plan it as much as possible for future computer work. Even then we sensed the tremendous potential of integrating computers and communications. The house would be sited clear of interference for microwave, if that option should open. A wall would be reserved for a holographic screen, if that science fiction should come true.

Ed said he would try to get me the first Picturephone in Arizona as a test bed, and recommended bringing in 25 telephone lines to the house as a precaution for high bandwidth requirements. I had to go quite high in the hierarchy of Mountain Bell to get that done. Everyone thought I was out of my mind to want 25 telephones! Finally they agreed, and put in quite a fancy switchbox, at no particular cost to me at that time, with AT&T still integral.

The Picturephone project did not fare well in the original two cities chosen for test marketing. In addition, Dr. David left the project to become President Nixon's Science Advisor. I did have a need for the lines, however. In 1972, I became editor of the *Honeywell Computer Journal*, a now-defunct magazine that we nevertheless published well enough at that time to win over *Scientific American* in a contest sponsored by the Printing Industries of America.

Writing and creative work is not called up by opening the tap between 8 a.m. and 5 p.m. Inspirations really do come at odd hours. I convinced Honeywell to tie one of my lines to its telephone switching network, and brought home one of their Terminet 300s—a hardcopy terminal, since there were few video screen terminals in existence at that time, and they were not fitted out for word processing. That term, you may recall, was unknown then. I was setting out to do it, however, because we were going to put on magnetic tape the files we created on a Honeywell computer, to take to Datagraphics, a Phoenix firm, for photocomposition directly from our own copy. But that is a different story, and has nothing to do with working at home.

Although the journal ceased publication in 1974, whereupon I returned to more of a programmer status, I discovered (rediscovered?) that programming, too, is creative work. From then until this day, I apparently program during my sleep, and cannot wait to get it into a permfile on the computer. What with showering, dressing, breakfasting, and driving to work—I could possibly lose the most important parts of my new code.

So I have worked at home for over a decade. This qualifies me, I believe, to assert some of the advantages and disadvantages of this mode of operation, perhaps in a manner that will amuse as well as instruct.

First, are you married? If so, your spouse is obviously the key element in the way you work. Mine, a woman, knew little of the technical details of the computer profession despite having been the receptionist for IBM World Headquarters. Her most pressing concern was why didn't I go to the office more? Wouldn't Honeywell fire me for not being there so someone could check on whether I was actually producing anything useful? Eventually she began to see articles in periodicals and newspapers about this mode of working and became more comfortable with it. I got no pioneering credits, however.

Here are some of the advantages of this mode of work:

- You're on hand for emergencies like a broken water line. A call to the office and a (perhaps long) trip home are saved.
- You have more flexibility in planning the work of the day, to interleave it with other activities such as shopping. Or if a movie is less crowded in the afternoon, why not see it then and do your computer work in the evening?
- If your spouse also works with computers, then you need not worry about the distance between your two offices.

There are, however, some disadvantages:

- You're on hand for more than emergencies, like walking the dog if it whines. There may come a time when you will have to bang the door shut and yell, "@!£$%—I am at the office!"
- Speaking of those dogs, when you get up at 3 a.m. so as to not lose your latest gem, they are likely to wake up with you, concurrently (a nice computer word) waking the spouse, who may not wish to be awakened.
- If you and your spouse disagree on other matters, and if he is male, then he may have a job away from home, which avoids friction. If a female, then long absences from home may be indicated, and your shopping will include a great many tv dinners.

Now we discuss the relative physical comforts of the home office vs. the office office. You may think I am going to

READERS' FORUM

discuss the square footage and the desk available. I am not.

The advantages:

- The attire required may be informal. A bathrobe can do until the computer goes down about 10 a.m. Then a shower while they reboot; you haven't really lost any time.
- The attire may be *very* informal in climes comparable to that of Phoenix. I like to put my terminal out by the pool in the summertime. That way I can get a good suntan (all over, which is an advantage of a mountaintop where nobody can see you) while simultaneously doing useful work. When it gets unbearably hot, a quick back flip into the pool does nicely. (Always remember to dry your hands before returning to the keyboard.) When I tell people of this they often ask, "Why don't you get a light pen that writes under water, so you can just stay in the pool?"
- The size of your office, and whether it has a door that closes, are of no consequence. Privacy and pecking order morale are assured.

The disadvantages:

- It is difficult to read a video terminal in bright sunlight. I do not think the designers have considered this problem yet. One must build a sort of enclosure and turn the brightness up as far as it will go. And there will always be somebody who writes programs using the faint intensity for emphasis.
- Services are distant. You may use up your last red marking pen. There is no secretary to send to a supply cabinet. If your terminal has problems you will have to haul it to work and back for repair. Unless, of course, you know something about electronics yourself, and the company has provided you with spare parts. For hardcopy printers you must keep a good supply of paper handy, always remembering to stock up at the office when supplies are low.
- Services hardly exist on Saturday and Sunday, and you will surely be working then, so make up a Friday checklist in preparation for the exodus.
- If you are the type that goes to many meetings, in contrast to getting out the work, working at home will be a problem unless your office is *very* close to your home. Fortunately the electronic meeting software is advancing nicely, and this problem will disappear.

The last comparison is on the matter of intellectual stimulation and ongoing education. In the meeting with Paolo Soleri, I was introduced as an ardent advocate of working *alone* (they didn't say *at home*, which is different). I protested vigorously, saying that there were two types of information transfer—directed and broadcast—and they must not be confused.

The advantages:

- For directed information transfer, working at home is ideal. You are free from disruptions, such as the casual walk-in to your cubicle. Such contacts may be deferred until a better time to read and answer your electronic mail, which is much more efficient and less time-consuming. Of course, if your motivation is to have fun at the office, rather than producing, then you should read this memoir no further!
- They really have to want you at a meeting before an invitation is sent, and they know it must be planned, not just spur-of-the-moment. Having the participants come in specially for personal meetings superimposes a needed structure on work.
- At the office, some offices are closer than others. At home, by electronic mail, all are equidistant. Zero, that is. I recall a particular example of what Sperry Rand used to advertise as "synergy," where the output was greater than the total of the inputs. I was working, from my home, on System X, about two miles away. Gerry Despain was at his office on Camelback Road, some 10 miles away, working on the same mainframe. He modified a program of mine and asked me, via electronic mail, to try the improved version. I did, saw how it could be even better, remodified it, sent him mail, and so forth. Back and forth, until we shortly obtained a joint product better than either of us

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CIRCLE 92 ON READER CARD

ADVERTISERS' INDEX

*OEM Edition

READERS' FORUM

would have done individually. Yes, people can approach this at the office, but the odds are smaller that they will do so. If you don't believe me, try to get two people to make the experiment. It is an exciting and stimulating method of working.

The disadvantages:

• One may read journals to keep up with developments in one's field, but the time lag to publication remains long. It will probably stay long, even though the obsolescence cycle in the computer field grows ever shorter. To really keep up you must not only read the trade papers, but mingle—in the cafeteria and in conferences—anywhere there is broadcast information. Don't depend upon electronic publishing as it is now. It is a joke. My eye takes in a printed sheet as a single frame. I may or may not opt to read anything there. The mechanics of how I scan this way need not be explained. The fact is that I do it, and there is no way today that I can scan an electronic page similarly, or as cheaply as a printed one.

• Electronic mail is also directed. There is no easier way to pick up information than gossip, or talking to friends. Face-to-face conversation can wander in free-form, as electronic mail can never do (ever try interrupting electronic mail?). One thing sparks another; then someone mentions having heard from someone else that Joe Xyz has something that may interest you.

Working at home is advantageous in more ways than just cutting transportation costs, but I think it has been successful only because I have not acted the hermit as a result of it. Having my own business would be less effective without my ties to Honeywell—using new software as it is tested, reading and following those good mail suggestions, and talking to people when I go to pick listings from the page printer. Those are my links to broadcast information. With them I can function effectively at home, via directed information, without becoming out-of-date.

Before sending in this article for publication, I naturally composed it into a readable draft, and notified a friend or two by electronic mail, to get their usual good ideas and have them catch mistakes.

One was the Gerry Despain just mentioned. I thought his comments could add a certain flavor, and validate and augment my own experience:

"Being at Camelback, I sometimes feel left out of 'broadcast' information myself. There is not a large group of us, and some of the people I would like to be in closer communication with are at the Deer Valley Plant.

"So even working in an office sometimes requires overt action to involve oneself in broadcast information. It is partly to satisfy these needs that I spend time every day in reading the Multics forums. Even for people at Deer Valley, the forums give access to discussions carried on by people all over the country (in fact, the world) that is more like broadcast than directed information.

"One of the things I miss at home is easy access to a printer—or in your case a high-speed printer. I have only one telephone line. My wife wishes I had 25.

"Working at home you are more susceptible to problems. For example, parity errors and "RETRANSMIT LAST LINE" for 24 hours every time we have a heavy rain (or our neighbor waters his garden—in the middle of which is our telephone post), or lightning hits on mountaintops.

"Is Moon Mountain really of volcanic origin?"

My kudos to the electronic meeting software are endorsed, and the answer is yes, Gerry.

—Bob Bemer
Moon Mountain, Arizona

If you'd like to share your opinions, gripes, or experiences with other readers, send them to the Forum Editor, DATAMATION, 875 Third Ave., New York, NY 10022. We welcome essays, poems, humorous pieces, or short stories.

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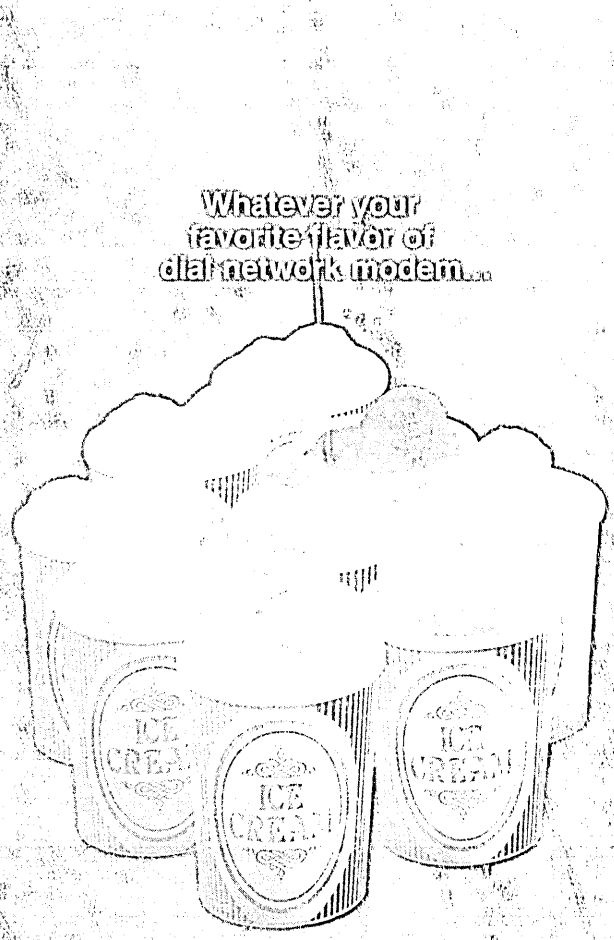

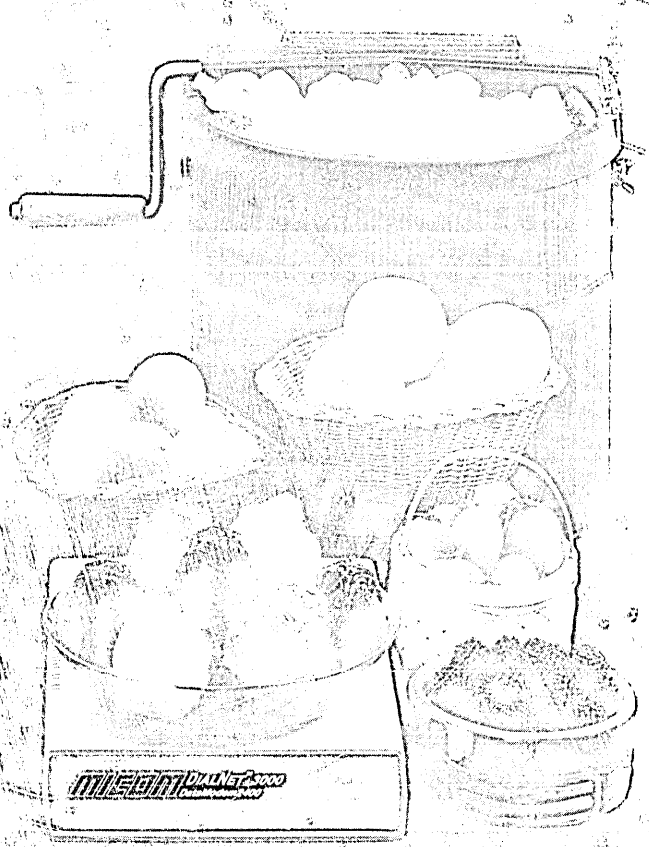

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