DATAMATION 86

DECEMBER 15
A CAHNERS PUBLICATION
OEM EDITION

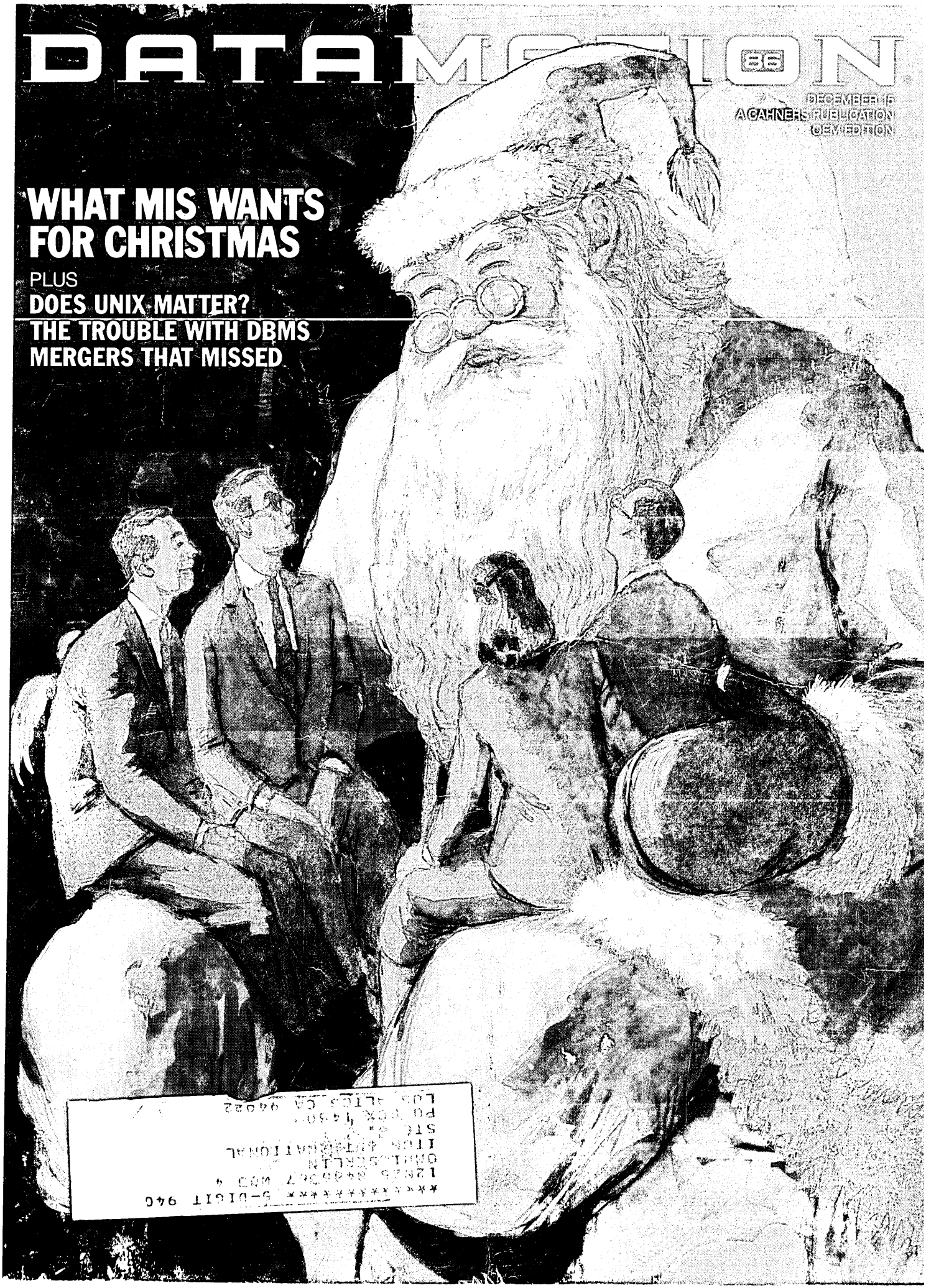
WHAT MIS WANTS FOR CHRISTMAS

PLUS

DOES UNIX MATTER?

THE TROUBLE WITH DBMS

MERGERS THAT MISSED



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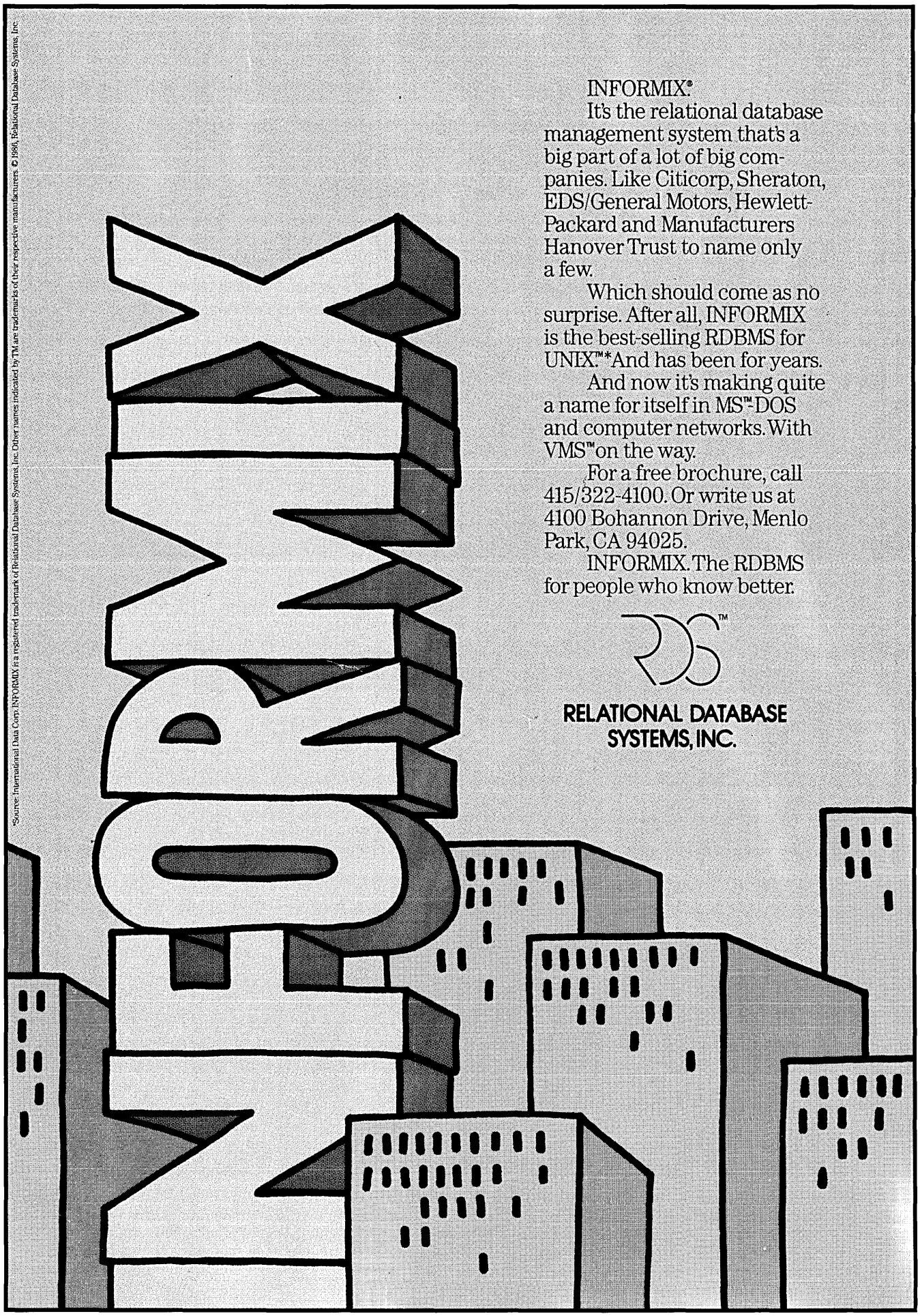


CIRCLE 1 ON READER CARD

Our Competition 'Mythed' The Point

There Is Another Choice In 3270 Terminals

For years now, our competition has been perpetuating the myth that there are only two choices in 3270 systems. Think again. Think Harris.

The Smarter Alternative In 3270 Terminals

We've been providing data network solutions for more than 20 years. Our long-term experience in adding value to IBM networks has culminated in our Challenger family of controllers and terminals.

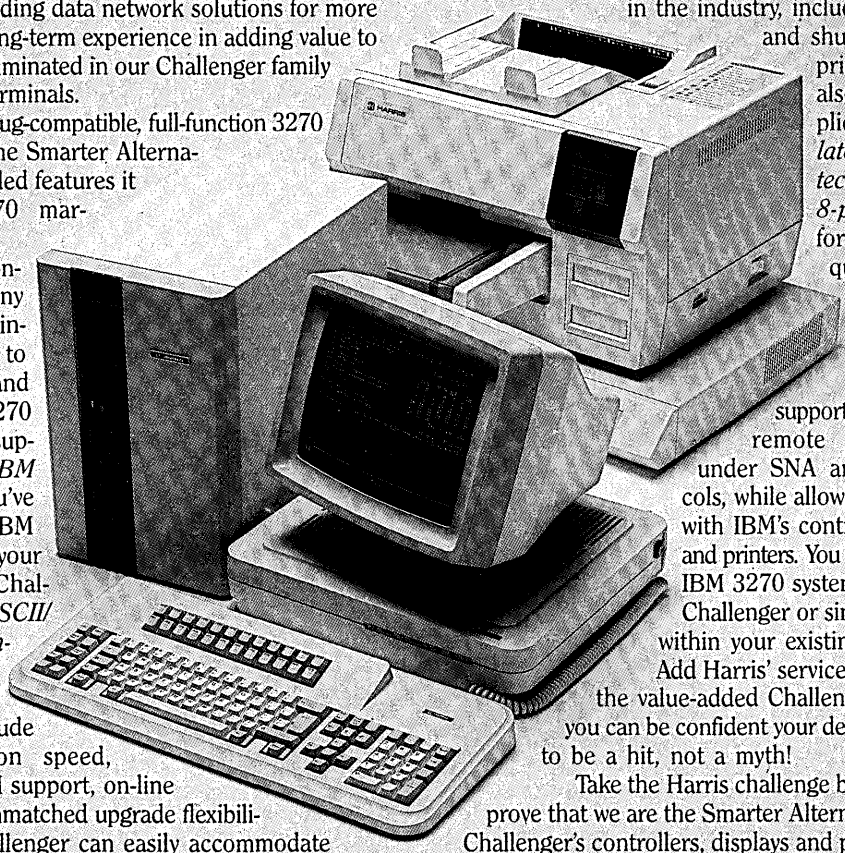
Challenger is a plug-compatible, full-function 3270 system that we call the Smarter Alternative, for the value-added features it brings to the 3270 marketplace.

Our full line of controllers supports many advanced features, including *DFT* with up to four host sessions and windowing on your 3270 PC. Want graphics support for your *IBM 3179-G* displays? You've got it! If you need IBM host access from your ASCII terminals, Challenger supports *ASCII/3270 protocol conversions.*

Additional value-added features include 56Kbps transmission speed, NPDA and IBM RTM support, on-line configurability and unmatched upgrade flexibility, which means Challenger can easily accommodate changes in your system requirements.

Challenger's broad range of IBM-compatible displays offers the flexibility of *multiscreen formatting and color in one terminal.* Now your 3180 applications can have the added productivity of color at a competitive price.

Besides offering support for the widest array of printers in the industry, including dot-matrix and shuttle-matrix line printers, Harris is also the first supplier to offer the *latest laser output technology in an 8-ppm printer,* for presentation-quality business documents.



Mutual Coexistence

Challenger supports both local and remote configurations under SNA and BSC protocols, while allowing coexistence with IBM's controllers, displays and printers. You can replace your IBM 3270 system with a Harris Challenger or simply integrate it within your existing network.

Add Harris' service and support to the value-added Challenger system and you can be confident your decision will prove to be a hit, not a myth!

Take the Harris challenge by allowing us to prove that we are the Smarter Alternative. Compare Challenger's controllers, displays and printers on your network on a trial basis. For more information on Harris Challenger, call 1-800-4-HARRIS, ext. 5000.

Harris Challenger: The Smarter Alternative

FOR YOUR INFORMATION OUR NAME IS

HARRIS

To learn more about Harris Challenger, call 1-800-4-HARRIS, ext. 5000.

HARRIS

CIRCLE 4 ON READER CARD

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The Distributed Database.

With INGRES, you get a truly distributed database. Not just a networked system. Because INGRES is the one RDBMS that works across multiple operating environments. From mainframes to minis to micros. Whether you have a few computers or a few thousand. Which means no matter how large your organization, your data and your applications can be shared. You'll have one consistent relational view of all your data.

The key to your distributed database is INGRES/STAR. Its open architecture gives you universal access to data (supporting multiple vendors' hardware, software and networks), while preserving local control of data integrity and security. Users don't have to worry about where the data is located, how to get it or what type of hardware and operating system are used.

Which means you can build applications and share data that span multiple computers just as easily as if all the data were located on one machine. Your entire company uses one powerful DBMS with consistent, reliable results.

Integrated Application Tools.

Only INGRES gives you a comprehensive application development environment. With a 4GL that includes SQL, a Visual Forms Editor and host language interfaces (ADA, BASIC, C, COBOL, FORTRAN, PASCAL and PL/I). You'll work in an integrated environment that gives you unprecedented productivity in application development.

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So look into the only truly distributed relational DBMS solution. INGRES. You'll see how the INGRES advantage is the key to integrating your dissimilar computers. For more information, call toll-free:

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From Canada, (415) 769-1400

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	Tucson	May 14	**NE**	Omaha	Jan 22
CA	Irvine	Mar 3	**NJ**	Iselin	Mar 4
	Los Angeles	Jan 29		Princeton	Jan 27
		Apr 22	**NY**	Albany	Feb 18
	Sacramento	Jan 13		Rochester	Jan 28
		May 13	**OR**	Portland	Apr 28
	San Diego	Mar 10	**RI**	Providence	Mar 11
	San Francisco	Jun 18	**SC**	Columbia	May 26
	San Jose	Feb 18	**TN**	Memphis	Apr 14
CO	Denver	May 14	**TX**	Austin	Apr 8
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	St. Louis	Feb 18		Quebec	Mar 24

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INGRES. The Distributed SQL Relational DBMS.

CIRCLE 5 ON READER CARD

DATAMATION

DECEMBER 15, 1986
VOLUME 32 NUMBER 24
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A record number of information services and software companies will be sold this year, and, judging from history, most of the acquisitions won't work. Susan Kerr writes of the "Mergers that Missed."

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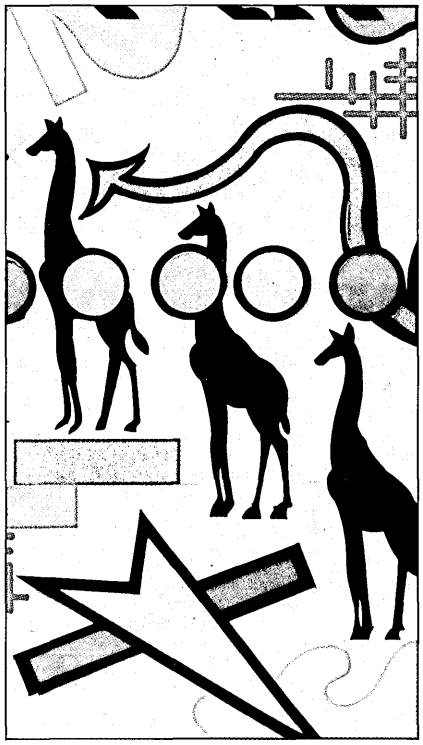

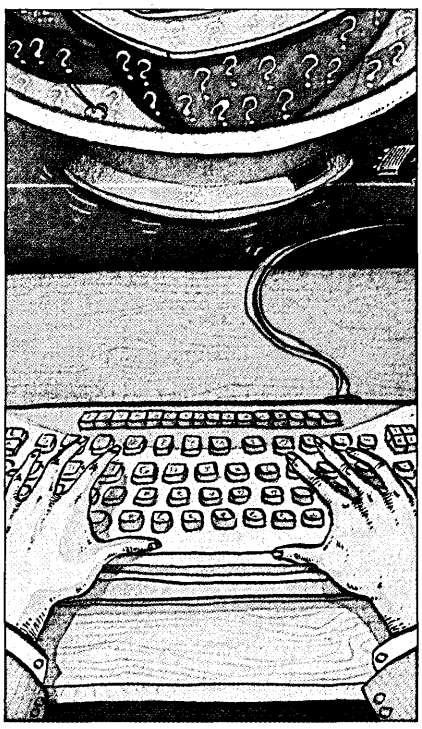

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Jan Lewis
LANs need to be more than administrative tools. They need to be productivity tools for users. When this happens, pcs will be nodes on a LAN just as telephones are nodes on an interoffice voice communications system.

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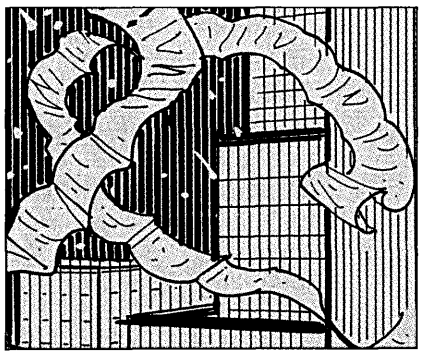

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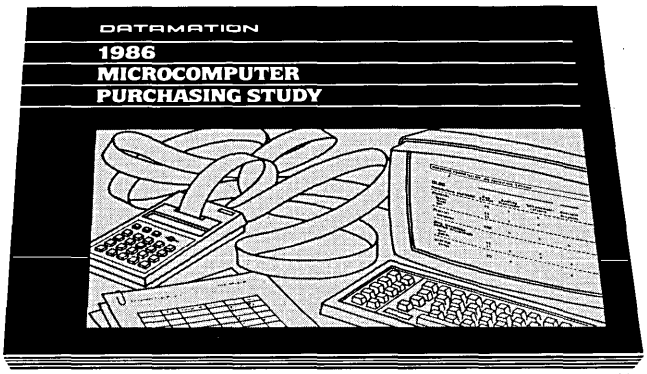

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BPA ABP

The case for fault tolerant transaction processing.

Ask anyone who is seriously involved in OLTP (on-line transaction processing) what worries them most and they'll give you one consistent answer, "system failure." That's when the domino theory goes to work. Because when the computer goes down, your whole operation goes down with it.

Now ask them what they look for most in an OLTP computer and, again, they'll answer with amazing consistency, "affordable power."

So, it should come as no surprise that when people learn Stratus makes the most complete, cost-effective, on-line system featuring hardware-based fault tolerance, they respond, intelligently enough, by buying it.

What is surprising is the fact that Stratus computers are priced lower than many others that offer less power and no fault tolerant architecture.

If you're seriously looking at OLTP systems, do what so many others have already done – pick Stratus. Because we make the most reliable computer for cost-effective transaction processing in the world.

Let us show you how a Stratus fault tolerant transaction processing computer can keep your operation up and running profitably full time. Call our Marketing Services Dept. at 800-752-4826. In MA 800-221-6555.

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The most cost effective fault tolerant OLTP computer you can buy.

Stratus Computer Inc., Marlboro, MA 01752

CIRCLE 6 ON READER CARD

Would your PC software

1. *Does your software include programs for easy access to mainframe information?*

2. *Can your spreadsheet consolidate additional spreadsheets then retrace your steps so auditors can find what they're looking for?*

3. *Can you draw 12 different kinds of graphs, size and position them, put them side by side (4 to a page if you need to) and preview before printing?*

4. *If you have a mainframe connection, can you share information with those who should see it, and protect it from those who shouldn't?*

5. *Can you link a series of commands that will automatically update and assemble comprehensive reports month after month?*

6. *Can you personalize your document by redesigning the layout, or the look of the type, and adding color?*

7. *Can you access a mainframe, store and organize information with a database manager...*

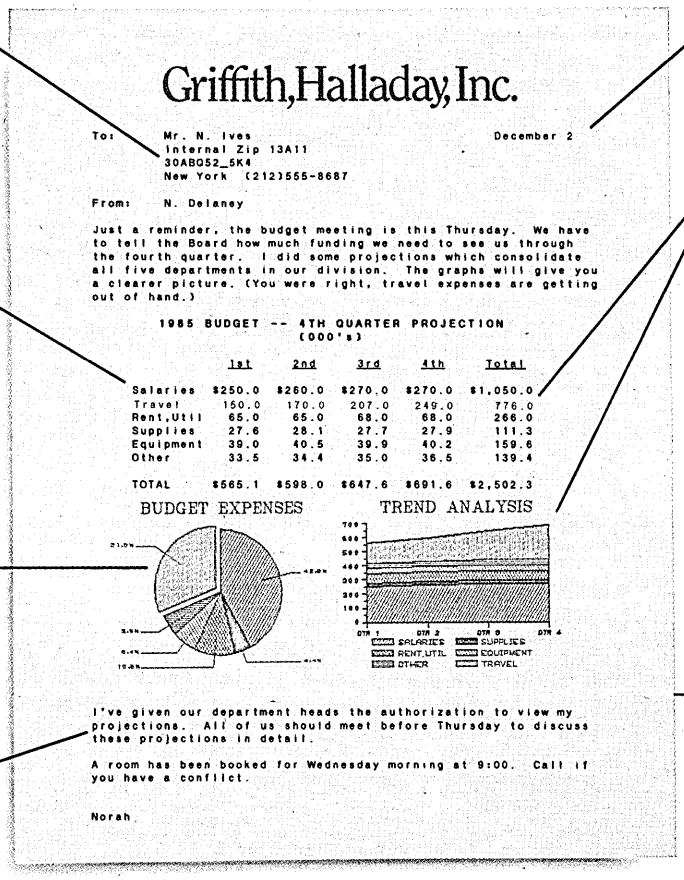
...analyze it with an auditable financial model or spreadsheet...

...present your numbers in lots of different kinds of charts and graphs...

...customize your document, write whatever text you need...

...then take all the work you've done and put it on the same page...

...without scissors, tape or a manual on computer programming?



Griffith, Halladay, Inc.

To: Mr. N. Ives
Internal Zip 13A11
30ABG52_5K4
New York (212)555-8687

December 2

From: N. Delaney

Just a reminder, the budget meeting is this Thursday. We have to tell the Board how much funding we need to see us through the fourth quarter. I did some projections which consolidate all five departments in our division. The graphs will give you a clearer picture. (You were right, travel expenses are getting out of hand.)

1985 BUDGET -- 4TH QUARTER PROJECTION
(000's)

	1st	2nd	3rd	4th	Total
Salaries	$250.0	$260.0	$270.0	$270.0	$1,050.0
Travel	150.0	170.0	207.0	249.0	776.0
Rent,Util	65.0	65.0	68.0	68.0	266.0
Supplies	27.6	28.1	27.7	27.9	111.3
Equipment	39.0	40.5	39.9	40.2	159.6
Other	33.5	34.4	35.0	36.5	139.4
TOTAL	$565.1	$598.0	$647.6	$691.6	$2,502.3

BUDGET EXPENSES

TREND ANALYSIS

SALARIES
RENT,UTIL
OTHER
SUPPLIES
EQUIPMENT
TRAVEL

I've given our department heads the authorization to view my projections. All of us should meet before Thursday to discuss these projections in detail.

A room has been booked for Wednesday morning at 9:00. Call if you have a conflict.

Norah

The IBM Personal

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flunk this simple test?

Try to build a document like this with most popular software programs and you'll be stuck cutting, pasting or studying computer languages. The IBM Personal Decision Series (PDS) makes no such demands.

PDS not only does a lot of jobs well, it combines all of them easily. It's a team of six powerful programs (or Editions), which unlike all-in-one packages, don't have to be bought all at once. You can get some of the programs or all of them, depending on your needs.

DATA Edition is where you begin. It's a flexible database manager that organizes a lot of information, and takes it from a variety of sources. When you use the HOST ATTACHMENT Edition you can get valuable information from an inside source—the central computer—without having to rekey it all.

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You can transform your numbers into different shapes, sizes and colors by using GRAPHS. Or customize your document by making layout and type style decisions with REPORTS+.

WORDS helps you get your point across with an easy-to-learn word processing program. (PDS even works with IBM DisplayWrite.) Then you can combine all the work you've done into one document with a few keystrokes.

It's that simple.

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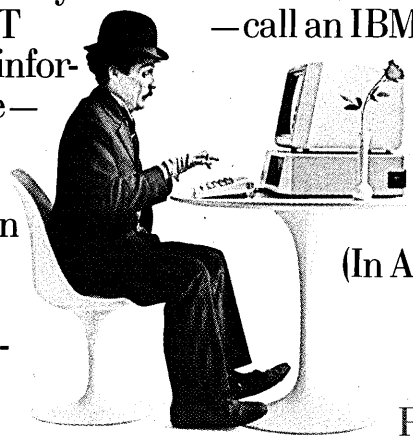

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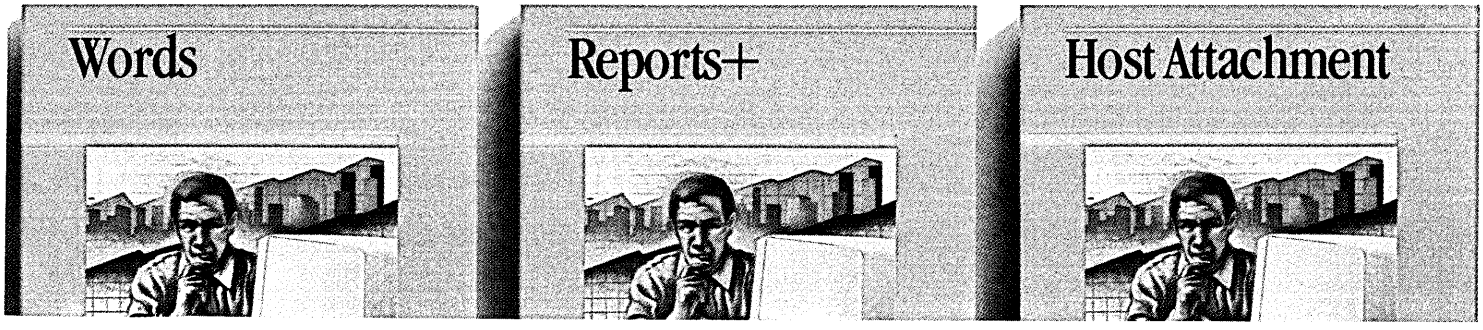
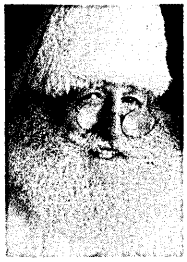


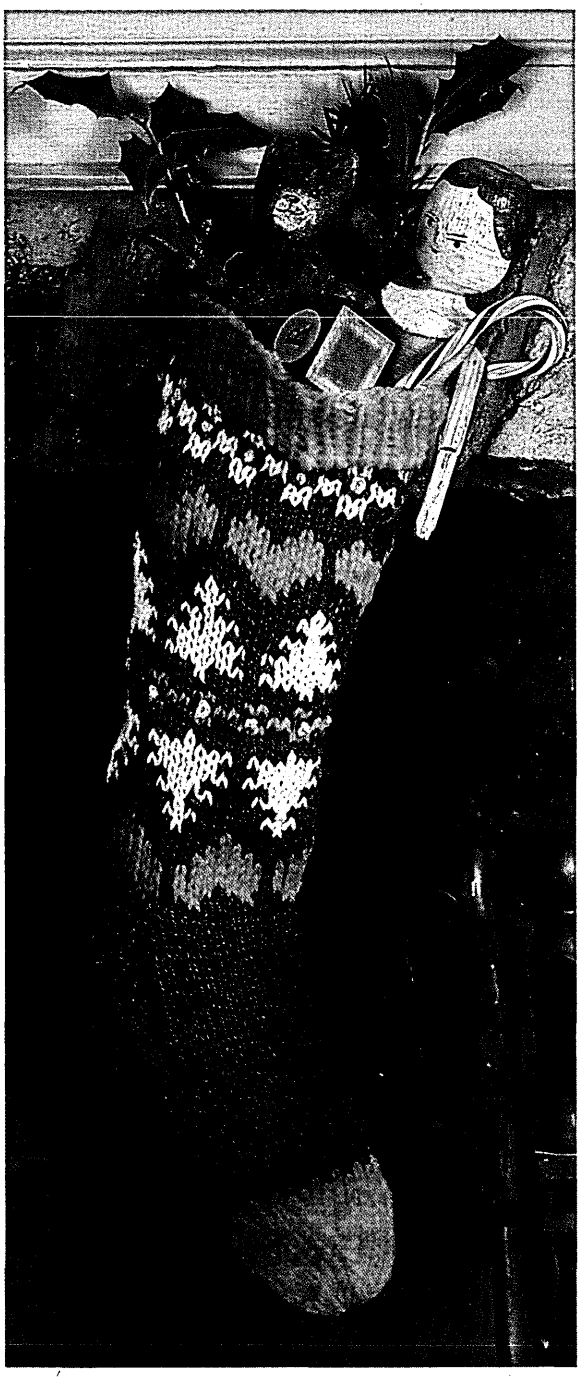
ACCESS **CULLINET.** SANTA WOULD.



"I've got more elves than I can count. And this year I can count on them to be busier than ever. The Workshop needs the efficiency of a relational database information management system. Afterall, I'm not going to get everything done by just laying a finger aside of my nose."

Santa Claus

Santa Claus
President and
Chief Executive Officer
Santa's Workshop, Inc.



The North Pole is a busy place. Obviously. Santa's Workshop is the world's number one manufacturer of Christmas toys. And it's also the Arctic region's largest employer.

Not only does the jolly old CEO have to oversee rigorous toy production quotas and a grueling Christmas Eve delivery schedule, he must manage huge elfin resources. Cullinet's integrated software would fill the bill, because it would really help fill the sleigh.

With Cullinet's IDMS/R, the Workshop would be able to support and maintain large polar databases. Fourth-generation applications packages would handle everything from battery inventory to maintenance schedules on Rudolph's famous nose. And C/ICMS products would put Christmas wish-list processing information on the PC screens of busy workers in divisions all over the Pole – from the toy shop paint room to Mrs. Claus' candy kitchens.

So the next time you hear a hoof on the roof, think about how Cullinet's integrated software could make Santa's job a lot easier. And remember that Cullinet wishes each and every one of you a happy holiday season and the very best in the year to come.

Cullinet

An Information Technology Integrator
For Christmas And Beyond.

CIRCLE 8 ON READER CARD

LOOK AHEAD

AMDAHL'S PLANS FOR NEXT YEAR

With its 5890 mainframe and its double-capacity 6380 disk drives now shipping, Amdahl Corp. of Sunnyvale, Calif., is anticipating a strong 1987 and is increasing the funding of some new product development programs that had been on hold. Among the projects getting additional funding, sources say, are products to allow Amdahl hardware running the Unix operating system to take advantage of communications capabilities currently available on Amdahl MVS-based systems. Specifically, Amdahl plans to be able to support asynchronous terminals under Unix without using a 4705 communications processor as is currently required, and also plans to support its packet switching products under Unix.

LOOKING FOR MR. MAP/TOP

If you had wanted to make your travel plans early in order to beat the crowd for the MAP/TOP demonstration at Autofact '87, don't bother. There isn't going to be a MAP/TOP demo next November, in Detroit or anywhere else. The earliest anyone is going to see off-the-shelf MAP/TOP version 3.0 product is April '88, and that's only if the MAP/TOP powers that be can find a show to coincide with product availability. When MAP/TOP was last seen live in public, at Autofact '85, the demonstration was of test systems only. At the next demonstration, the MAP/TOP steering committees want users to be able to buy products on the spot. That won't happen at Autofact '87 because the first draft of the 3.0 specifications won't be available until next April. That's also the earliest at which the Corporation for Open Systems could have its 3.0 conformance test beds ready.

SYTEK EYES INTEGRATION

Some time around February, Sytek Inc., the Mountain View, Calif.-based local area network vendor, should announce that it is supplementing its broadband line with Ethernet offerings. Also, Sytek is expected to begin emphasizing what one insider terms "total integrated solutions. We will integrate other companies' products with ours." The reason, he says, is that no single networking scheme answers all needs, but customers want to deal with only one vendor.

HP READIES 3000 SOFTWARE

Hewlett-Packard is unveiling software for its Series 3000 minicomputer line this month that will enable HP's IBM AT-compatible Vectra microcomputers to store files on a 3000-based disk drive. The files are accessible through normal MS/DOS commands. The disk sharing "means a lot of people may not need to buy hard disks for the PC," says HP general manager Douglas Spreng. Not bad news for HP, since users instead may choose to buy the larger HP 3000 drives.

LOOK AHEAD

DEVELOPING EXPERT SYSTEM SHELL

Sources say Travelers Corp., Hartford, Conn., and Applied Expert Systems (APEX), Boston, are jointly developing an IBM mainframe-based expert system shell that COBOL programmers can access at run time. In 1982, Travelers engaged APEX to develop Planpower, an expert system for financial planners. The software was introduced late in 1985, and its 6,000-rule base is believed to be the most comprehensive and the only large-scale commercial application of expert systems in the financial services industry.

TRYING AGAIN TO AMEND

The latest target of revenue-hungry state taxation boards is database services. All eyes will be on California next year when that state's Board of Equalization holds hearings to amend its tax regulation 1502 to deal with such services. An earlier attempt to amend the law was shot down in hearings by software and services industry representatives. "We blew the reg out of the water," says Joe Ruble, an attorney for ADAPSO.

MAKING THE PUSH ACROSS THE SEA

CSSL Inc., Seal Beach, Calif., a marketer of micro software, has signed an agreement with two Japanese companies to bring U.S. business applications software to Japan and mainland China. The joint agreement between CSSL, Kanematsu-Gosho, and Tokai-Crate, both in Tokyo, calls for CSSL to evaluate software products for the next three months. CSSL will then choose which ones to bring to Japan, and the Japanese companies will market the products to software companies themselves. Products marketed by CSSL include Word for Word, a document conversion utility; PolyBoost, a memory-resident enhancement product, from Polytron Inc., Hillsboro, Ore., and Select, a word processing program for desktop publishing.

RUMORS AND RAW RANDOM DATA

The long-promised personal computer implementation of Alameda, Calif.-based Relational Technology Inc.'s Ingres relational database system is expected to be announced Jan. 12. . . . We hear that Microelectronics and Computer Technology Corp., Austin, Texas, will offer an artificial intelligence system for commercialization by June. . . . Look for Epson America Inc., Torrance, Calif., to come up with a version of its low-cost image scanner option kit, which turns an IBM PC or compatible into a desktop publishing unit capable of incorporating text with images. . . . Rexon Business Machines, Culver City, Calif., is putting final touches on a program under which it will handle leasing for all of its Summit Series small business computer systems. . . . Look for Sybase, the two-year-old Berkeley, Calif.-based relational database management company, to announce a "full" fourth generation language capability early next year.

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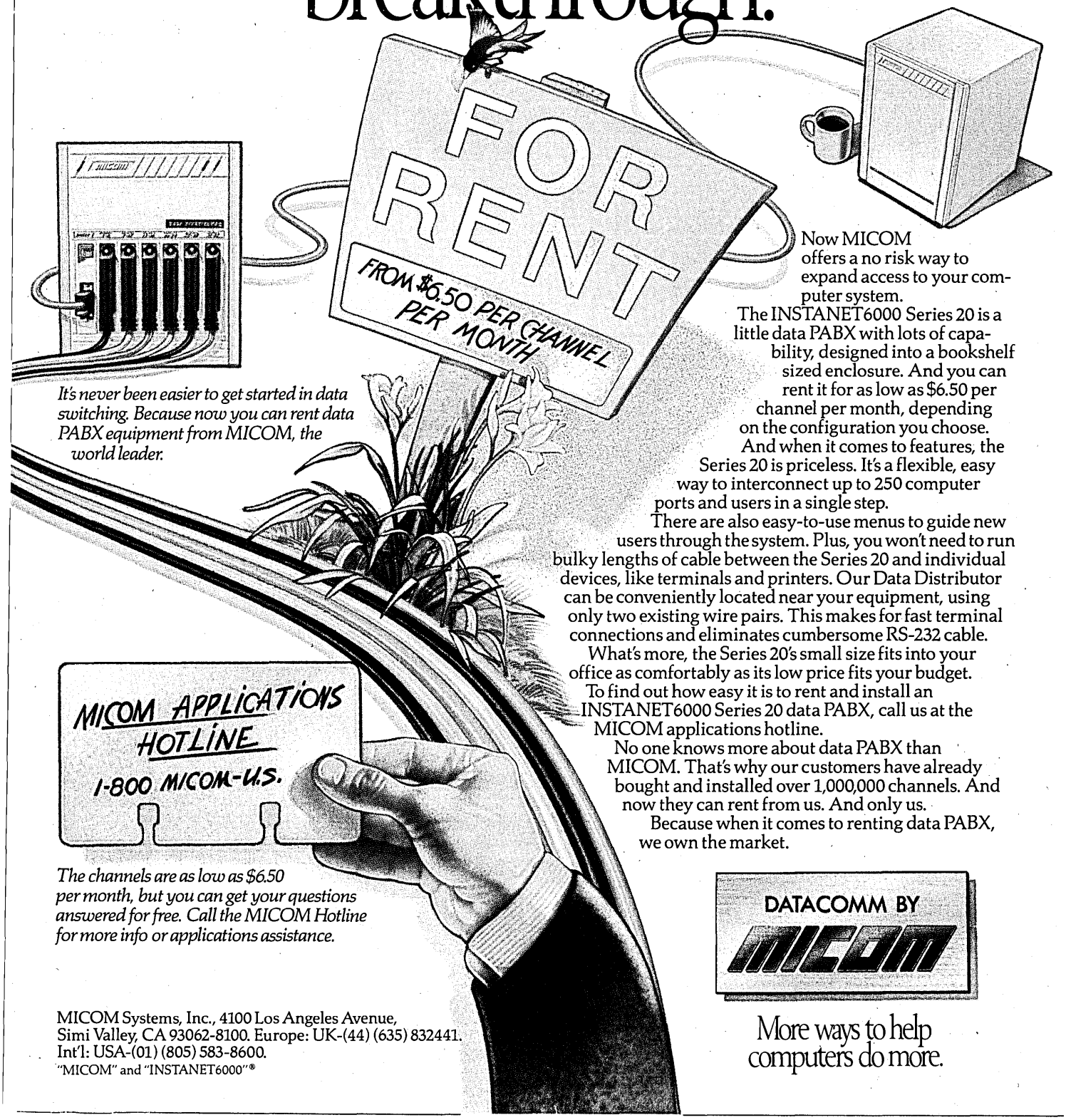

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There are also easy-to-use menus to guide new users through the system. Plus, you won't need to run bulky lengths of cable between the Series 20 and individual devices, like terminals and printers. Our Data Distributor can be conveniently located near your equipment, using only two existing wire pairs. This makes for fast terminal connections and eliminates cumbersome RS-232 cable.

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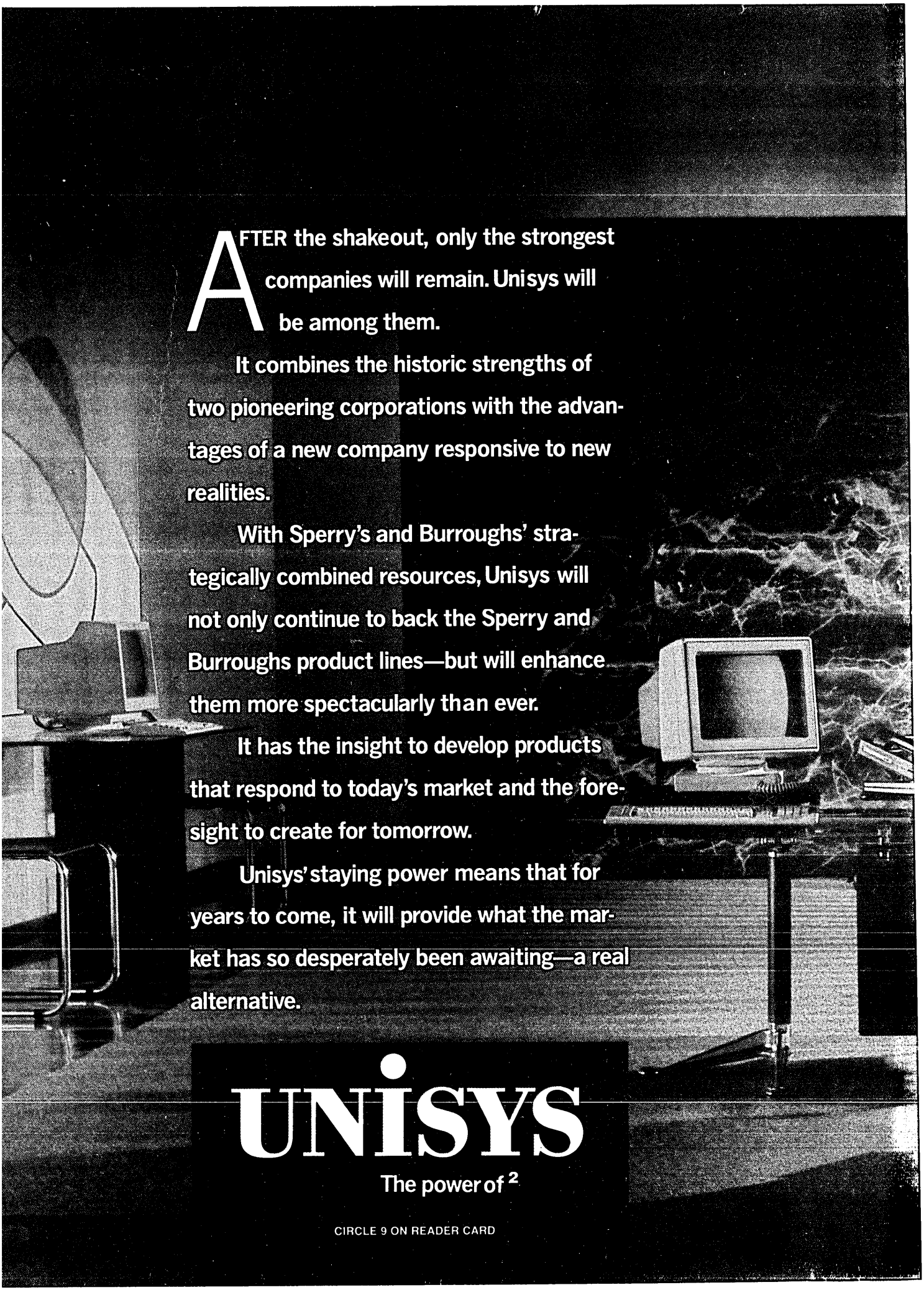
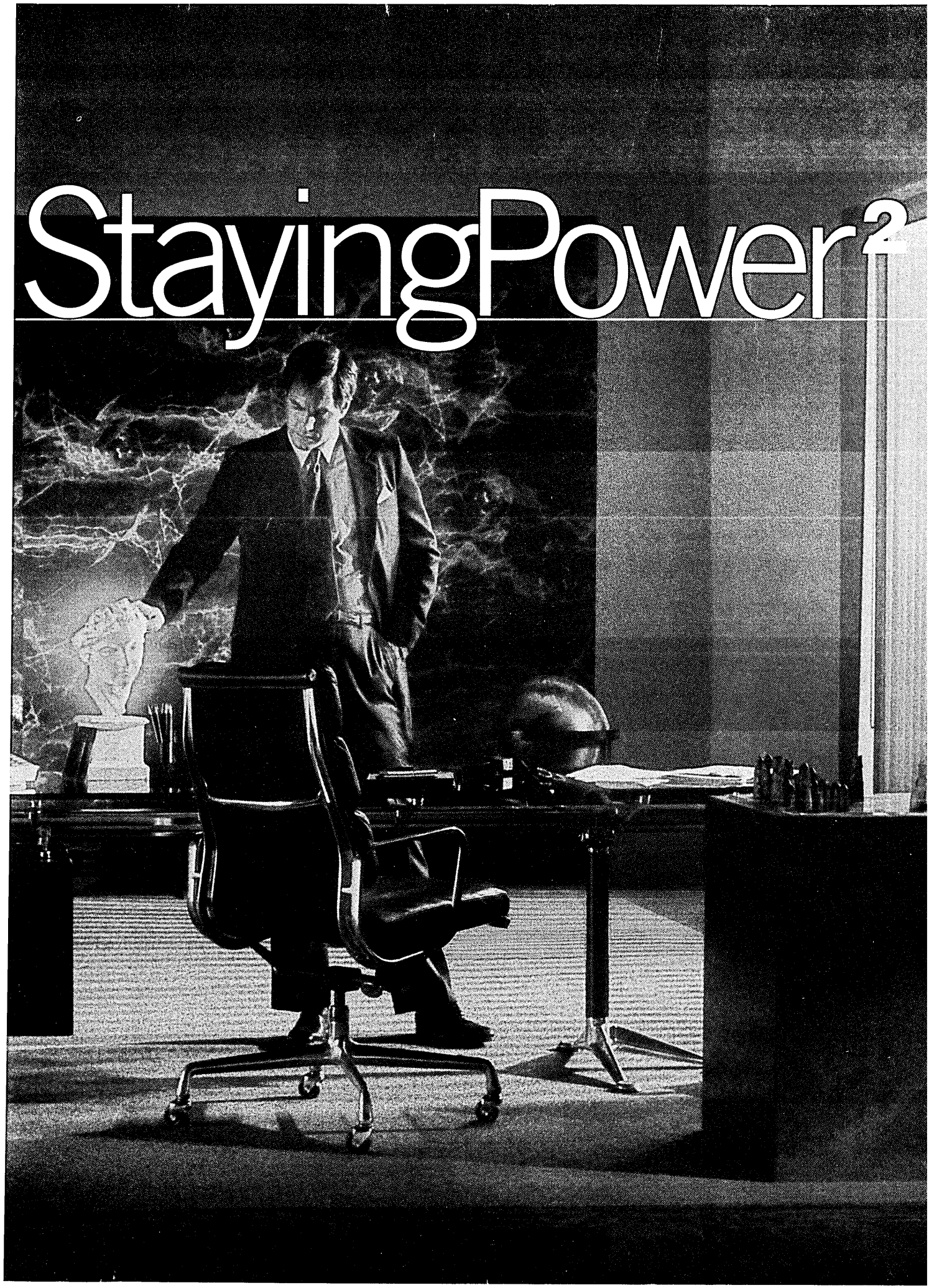


CIRCLE 9 ON READER CARD

StayingPower?



CALENDAR

JANUARY

HICSS-20 (20th Annual Hawaii International Conference on System Sciences).
Jan. 6-9, Kailua-Kona, Hawaii. Contact HICSS-20, Center for Executive Development, University of Hawaii, 2404 Maile Way, B-101, Honolulu, HI 96822.

SaudiComputer 87 (Fourth Annual Computer, Computer Graphics and Office Technology Show).
Jan. 11-15, Riyadh, Saudi Arabia. Contact (in the U.S.) Virginia Jensen, Kallman Associates, 5 Maple Ct., Ridgewood, NJ 07450-4431, (201) 652-7070, or (overseas) Tim Bateman, Overseas Exhibition Services Ltd., 11 Manchester Square, London W1M 5AB, U.K., (01) 486-1951.

MECOM 87 (Middle East Communications Show).
Jan. 12-15, Bahrain, Saudi Arabia. Contact Virginia Jensen, Kallman Associates, 5 Maple Ct., Ridgewood, NJ 07450-4431, (201) 652-7070.

ComLease Winter (Computer Leasing Exposition).
Jan. 19-23, New Orleans. Contact ComLease, 3825-1 S. George Mason Dr., Falls Church, VA 22041, (703) 845-2822.

BUSCON/87 West (Bus/Board Users Show and Conference).
Jan. 20-21, Los Angeles. Contact Bill Weber, Bus/Board Users Show & Conference, 17100 Norwalk Blvd., #116, Cerritos, CA 90701-2750, (213) 402-1610.

UniForum (Unix Conference and Trade Show).
Jan. 20-23, Washington, D.C. Contact UniForum, 2400 E. Devon Ave., Suite 205, Des Plaines, IL 60018, (800) 323-5155 or (312) 299-3131.

SMTS (Southern Manufacturing Technology Show).
Jan. 26-29, Charlotte, N.C. Contact Southern Manufacturing Technology Show, 7901 Westpark Dr., McLean, VA 22101, (703) 893-2900.

Computer Graphics New York '87.
Jan. 28-30, New York. Contact Exhibition Marketing & Management Inc., 8300 Greensboro Dr., Suite 690, McLean, VA 22102, (703) 893-4545.

India Comm '87 (Telecommunications and Computer Exhibition and Conference).
Jan. 28-31, New Delhi, India. Contact Cahners Exposition Group, P.O. Box 70007, Washington DC 20088.

FEBRUARY

CN '87 (Communication Networks '87).
Feb. 9-12, Washington, D.C. Contact CW/Conference Management Group, P.O. Box 9171, 375 Cochituate Rd., Framingham, MA 01701-9171, (800) 225-4698 or (617) 879-0700.

CSC'87 (ACM Computer Science Conference).
Feb. 17-20, St. Louis. Contact Association for Computing Machinery, CSC'87-PR, 11 W. 42nd St., New York, NY 10036, (212) 869-7440.

NEPCON West 87 (National Electronic Packaging and Production Conference and Show).
Feb. 24-26, Anaheim, Calif. Contact Jerry Carter, Show Manager, Cahners Exposition Group, P.O. Box 5060, Des Plaines, IL 60017-5060, (312) 299-9311.

ISSCC (IEEE International Solid-State Circuits Conference).
Feb. 25-27, New York. Contact Lewis Winner, 301 Almeria Ave., Coral Gables, FL 33134, (305) 446-8193/4.

Commtex '87 (ICIA Trade Show).
Feb. 26-28, Atlanta. Contact Bobbie Hunt, International Communications Industries Association, 3150 Spring St., Fairfax, VA 22031-2399, (703) 273-7200.

MARCH

Hannover Fair CeBIT '87.
March 4-11, Hannover, West Germany. For information, contact Donna Peterson Hyland, Hannover Fairs USA Inc., 103 Carnegie Center, P.O. Box 7066, Princeton, NJ 08540, (609) 987-1202.

FOSE '87 (Federal Office Systems Expo).
March 9-12, Washington, D.C. Contact Jackie Voigt, National Trade Production Inc., 2111 Eisenhower Ave, Suite 400, Alexandria, VA 22314, (800) 638-8510 or (703) 683-8500.

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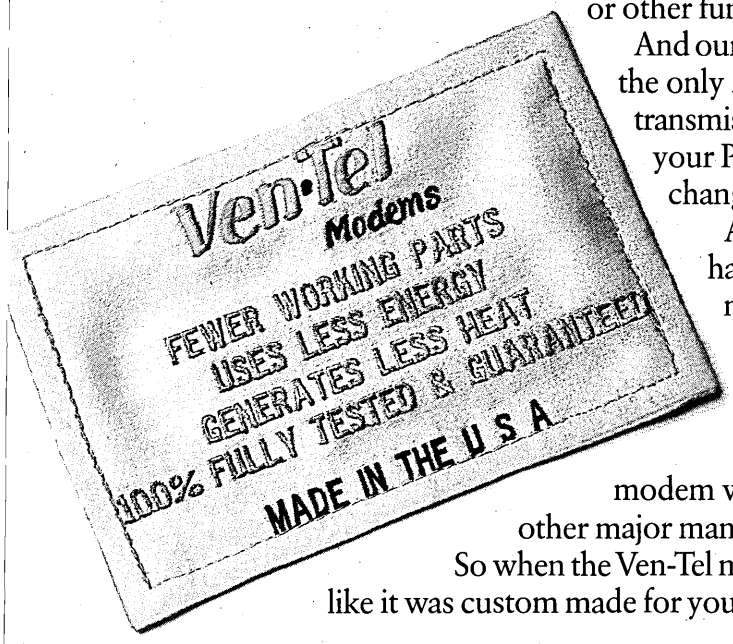

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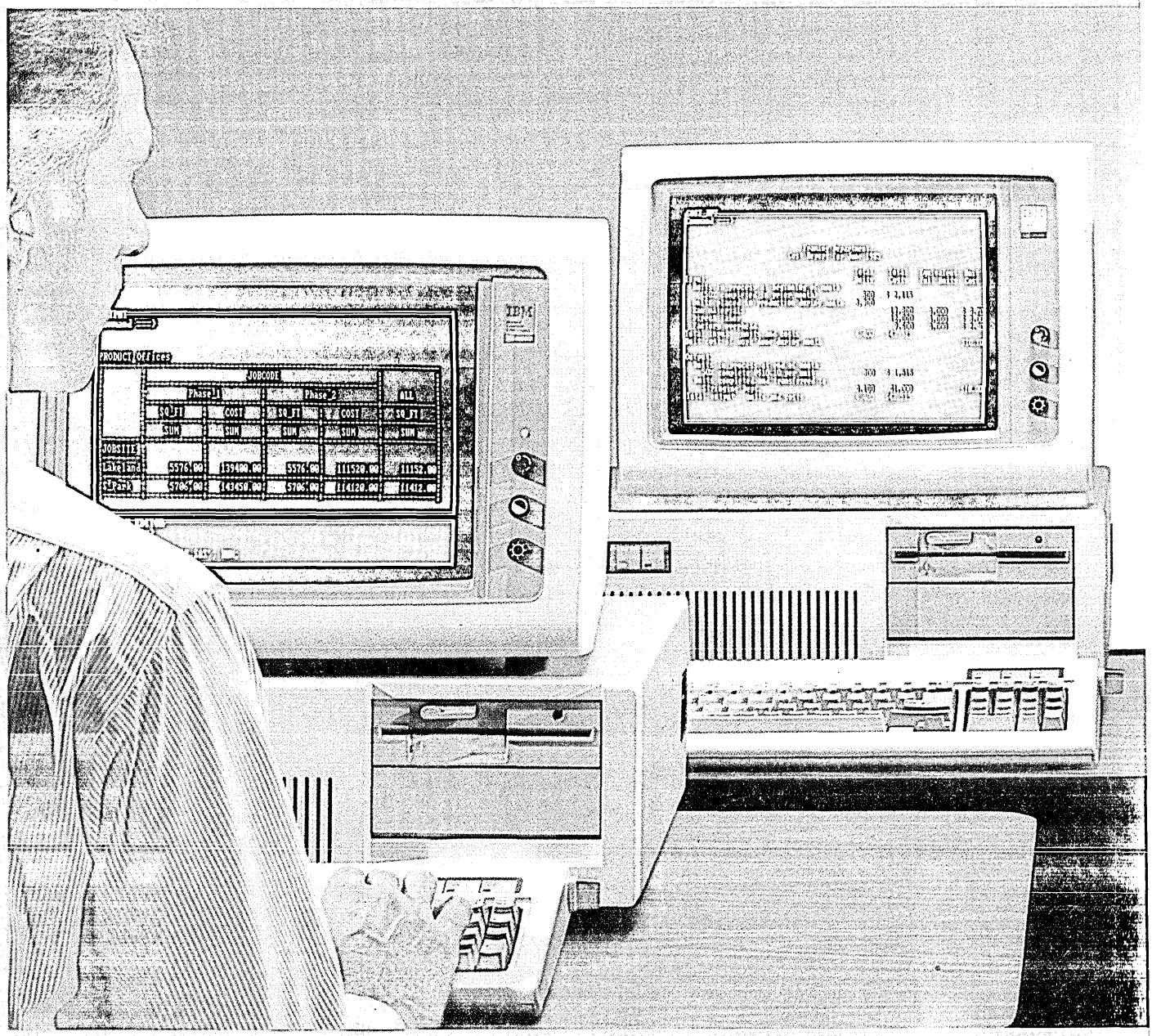

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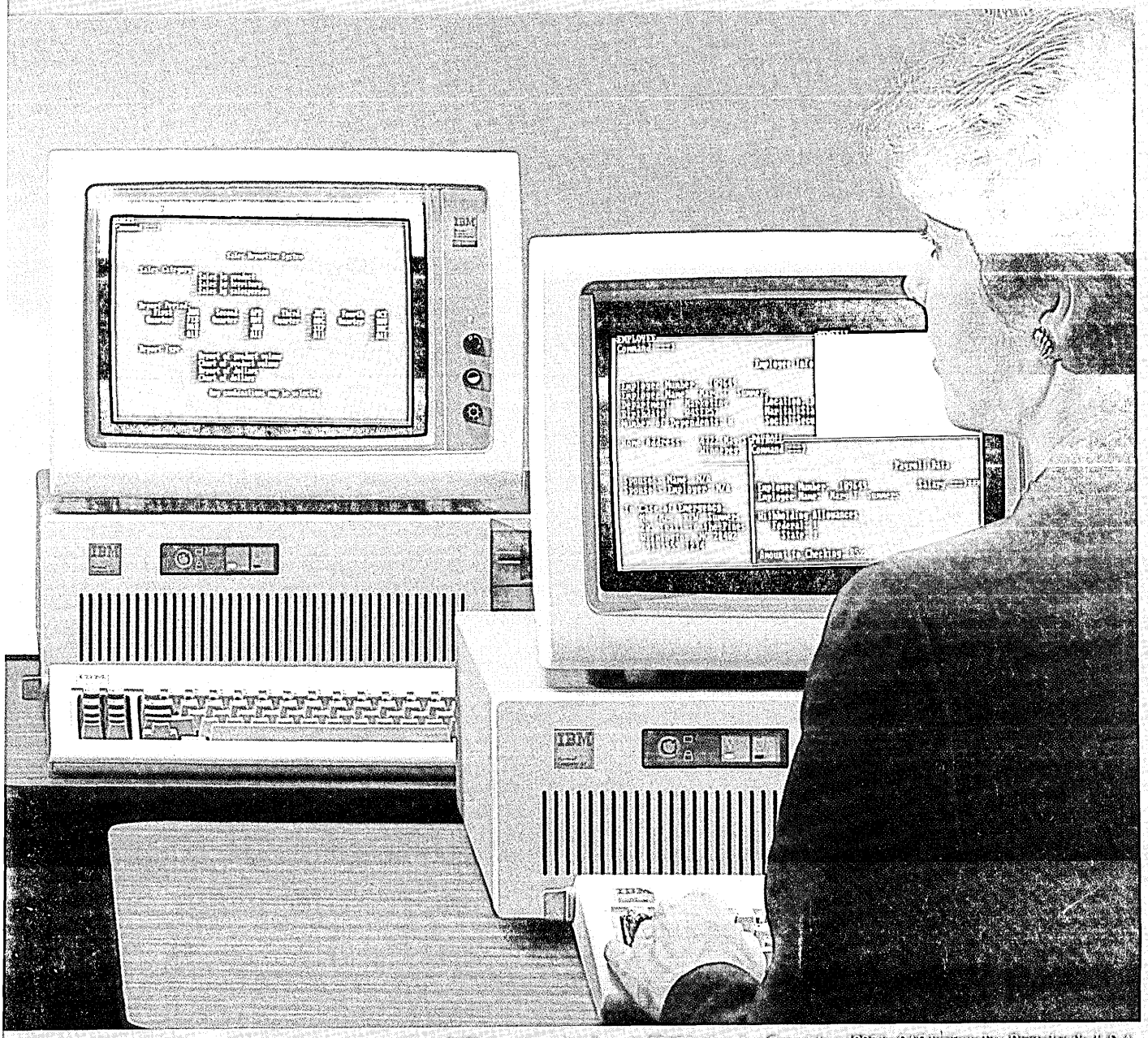

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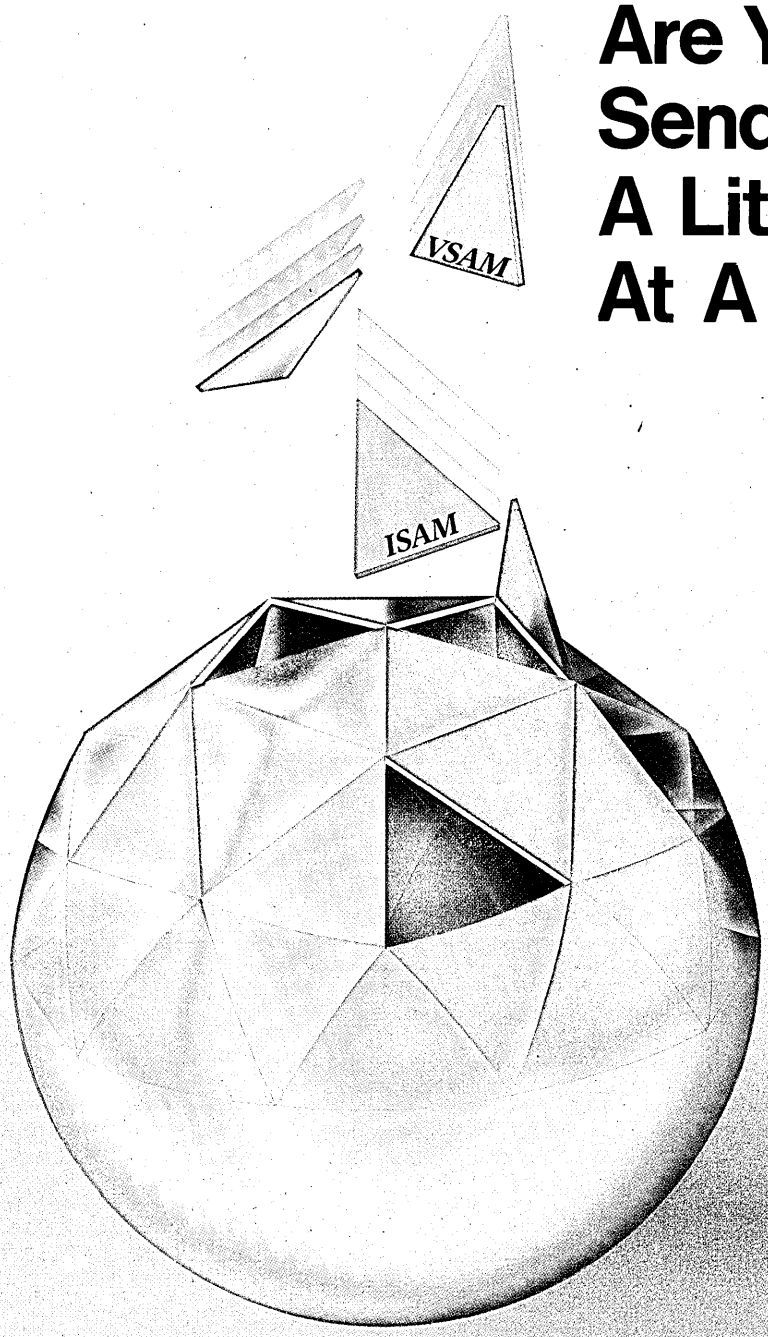

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CIRCLE 11 ON READER CARD

LETTERS

PARALLEL CONSTRUCTION

I would like to point out an important omission in "The Dream Machine " by Edward M. Fisher (Oct. 1, p. 79). One paragraph contains the following: ". . . Intel Corp.'s iPSC, with its Hypercube architecture. Parallel processors use multiple cpus—usually in the form of powerful 32-bit microprocessors . . ." and goes on to mention other manufacturers' microprocessors. It does not mention that Intel's current iPSC is based on an architecture with multiple 16-bit microprocessors, specifically its own powerful 80286.

JACOB TANZ
Regional Application Manager
Intel Corp.
Canoga Park, California

CONGRATULATIONS

Congratulations on your excellent series of articles on supercomputers and their applications in the Oct. 1 issue.

In particular, I appreciate the emphasis placed on the central position occupied by the National Science Foundation-supported national supercomputer centers.

However, I feel obliged to point out that some of your information is somewhat out of date. This is understandable, given the rapidly moving development in this field.

In "Supercomputing in the Real World" by Karen Gullo (p. 70), it was stated that there are four National Science Foundation Phase II supercomputer centers at Cornell, Princeton, Illinois, and San Diego. In fact, there are now five, since the establishment in March 1986 of the Pittsburgh Center.

This center is a joint effort of Carnegie-Mellon University, the University of Pittsburgh, and the Westinghouse Research Center. The Pittsburgh Center is presently operating a Cray X-MP 48 connected to a 128MW solid-state device, which represents the most advanced supercomputing configuration presently available.

In "The Dream Machine" by Edward M. Fisher (p. 79), it was stated that the first of the five National Science Foundation centers began operation earlier this year. In fact, all five of the centers have been in operation since the first part of this year, and are now providing supercomputing service to several thousand research projects in over 200 U.S. universities and research institutions.

The National Science Foundation supercomputing centers are just beginning to make a major impact on computational research. You will hear more from them in the near future.

JOHN W.D. CONNOLLY
Director
National Science Foundation
Division of Advanced Scientific Computing
Washington, D.C.

A DIFFERENCE OF OPINION

"OTIS to the Rescue" (Oct. 15, p. 119) contains some serious misstatements concerning the problems with the New Jersey DMV system.

First, contemporaneous documentation clearly shows that Applied Data Research (ADR) did not have "reservations" about the use of Ideal which it "communicated to Price Waterhouse." In fact, throughout 1984, ADR actively encouraged the use of Ideal and provided numerous assurances that it would work. During the entire period, ADR continued to claim and advertise that Ideal was suitable as a full COBOL replacement. For example, in response to the question, "Do you recommend your product for large-scale, transaction-oriented applications?" asked in a survey on large-scale applications development, ADR was quoted in 1984 as replying, "There is virtually nothing you can develop in COBOL that you cannot also develop with Ideal." Even after the performance problems became a public issue in 1985, Joseph Farrelly of ADR was quoted in the *New York Times* to the effect that perhaps Ideal was unsuited for only about 15% of the system (not the 75% which had to be rewritten). Any assertion that ADR told Price Waterhouse or the state not to use Ideal to develop the Comprehensive Online Driver/Owner Information System is not supported by the written record.

Second, the statements in the article about the design of the Comprehensive System leading to a requirement for additional hardware are untrue. In terms of processor utilization, the system operates at a capacity level which is very close to that estimated by Price Waterhouse in 1984. The requirement for additional DASD directly reflects database growth caused by the state's inability to agree on database purge criteria—an issue Price Waterhouse brought repeatedly to the attention of DMV and the Office of Telecommunications and Information Systems (OTIS).

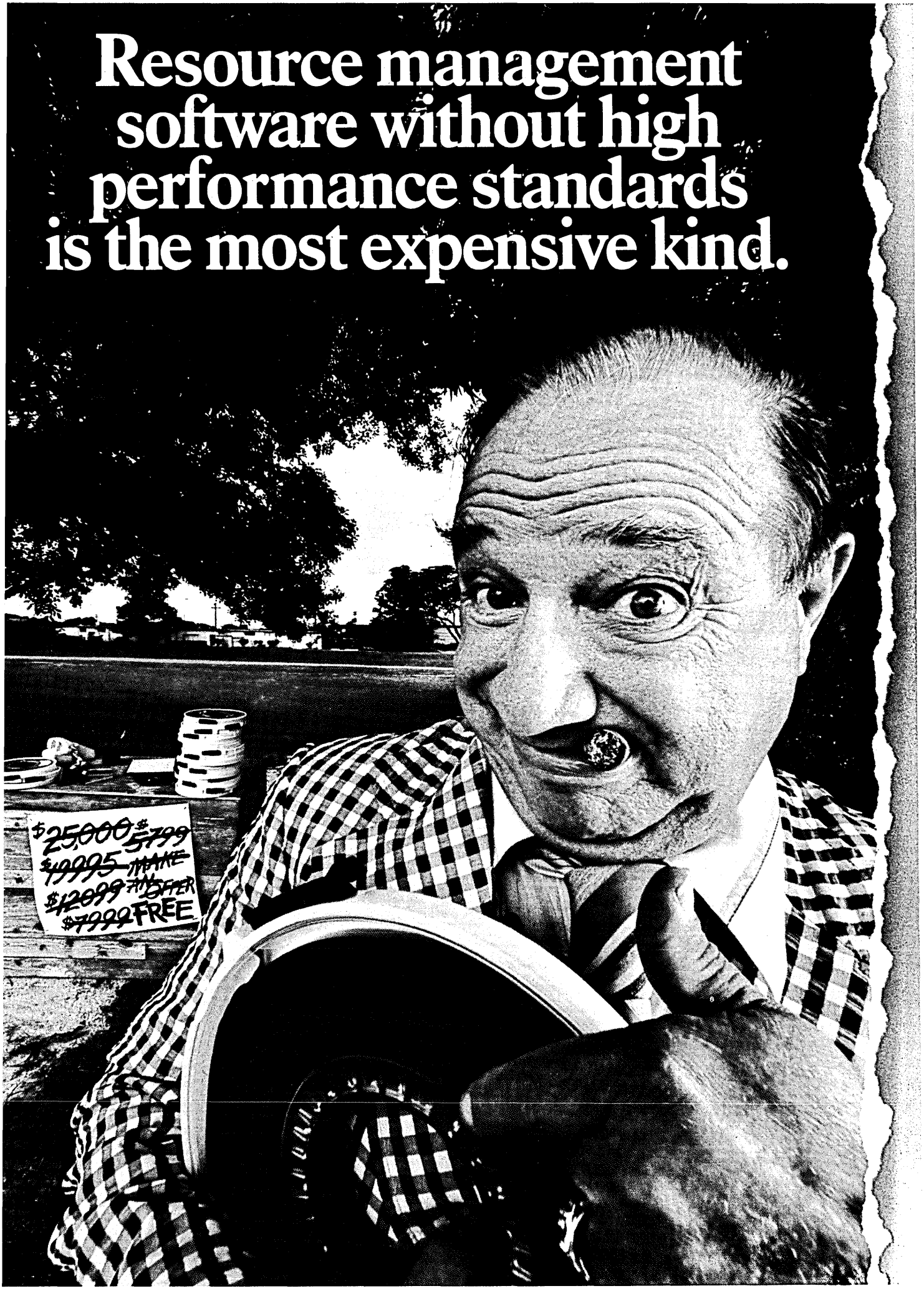
Third, the article claims that "OTIS discovered many errors in the Price Waterhouse system." The record shows that only a few minor errors were reported during the system warranty period—mostly detected by Price Waterhouse itself and all corrected. The system is fully delivered to the state and in full production. OTIS is now responsible for the operation and support of the system.

Finally, Bruce Jones's comments about edits and separate error files do not reflect reality. Most of the errors resident on the error files are there because the absence of edits in the Motor Vehicle Agency software—developed by OTIS—allowed transactions to enter the system without proper database keys such as driver's license number. Since the agency transactions are submitted to the Comprehensive System for batch update, the errors had to be put into error files pending correction. One has to doubt that even Mr. Jones can develop a way to update a relational database without keys. The large backlog of invalid transactions reflects the missing agency software edits, coupled with error rates by motor vehicle agency employees which, at times, exceeded 80%.

DATAMATION's article unquestioningly repeats the self-serving accusations contained in the State Commission of Investigation (SCI) report. In fact, the SCI is utterly unschooled in technical matters. The SCI hearings were guided by a political agenda, and led to a report which is totally unsupported by the evidence presented.

NORMAN STATLAND
National IRM Director
Price Waterhouse
New York, New York

Resource management software without high performance standards is the most expensive kind.



Face it: you'll always find somebody eager to sell you discount software without the proven productivity and comprehensive support you get with UCCEL's MVS and DOS/VSE software. The question is, can you really afford to live with the headaches, the overtime and the sleepless nights you're sure to get with software from a vendor who lacks UCCEL's high standards?

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At the same time, UCCEL has improved the operating efficiency of data centers worldwide by eliminating the biggest barrier to productivity: the unprofitable use of people. We have resource management packages that automate practically every routine manual task in your data center. Resulting in reduced human errors. Increased personnel productivity. Greater supervisory control. And expanded management reporting capabilities.

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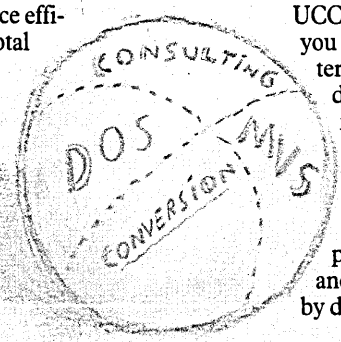

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In the MVS environment, our *UCC-1* package solves data management problems by protecting vital tape data. It informs you of the location of every tape in your inventory, what's on it, when it was created and when it was last used. *UCC-3* helps control valuable disk resources for optimum usage, reducing outlays for additional DASD. Our *FastDASD* automatically analyzes seek activity and recommends data set reorganization. *BlockMaster* improves efficiency by reducing I/O activity, CPU usage and disk storage requirements while *EasyPROCLIB* reduces PROCLIB maintenance. And we offer other storage management products, too.

The *UCC-7* family of products solves production problems in the area of automated workload scheduling, report distribution, archiving, and retrieval and communication between local and regional processing centers—all controlled online. Helping you decrease error-prone manual processing and meet schedules no matter what jobs you're running.

Our exclusive *UCC-11* dramatically reduces the resources consumed due to reruns and restarts. It automates manual processing tasks and provides sophisticated job tracking/analysis functions that facilitate scheduling.

UCCEL software solutions help you manage any MVS data center better. *UCC-4* consolidates physical and financial inventory data, increasing management control and eliminating redundant staff activity. *UCC-8* gives managers the data necessary to plan, coordinate, analyze and control more effectively by drawing together a complete picture of every data center event and its impact. And *UCC-9/R+* decreases hardware failures by pinpointing troublesome devices, reporting trends for each and comparing their reliability to industry averages.

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Clearly, there are two very dramatic differences between UCCEL's resource management software and everyone else's: 1) UCCEL's extraordinarily high support standards, and 2) UCCEL's extraordinarily high productivity standards. And these are the differences that make UCCEL your data center's most productive choice. Now and later.

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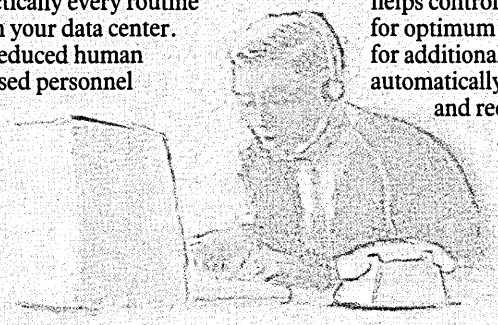

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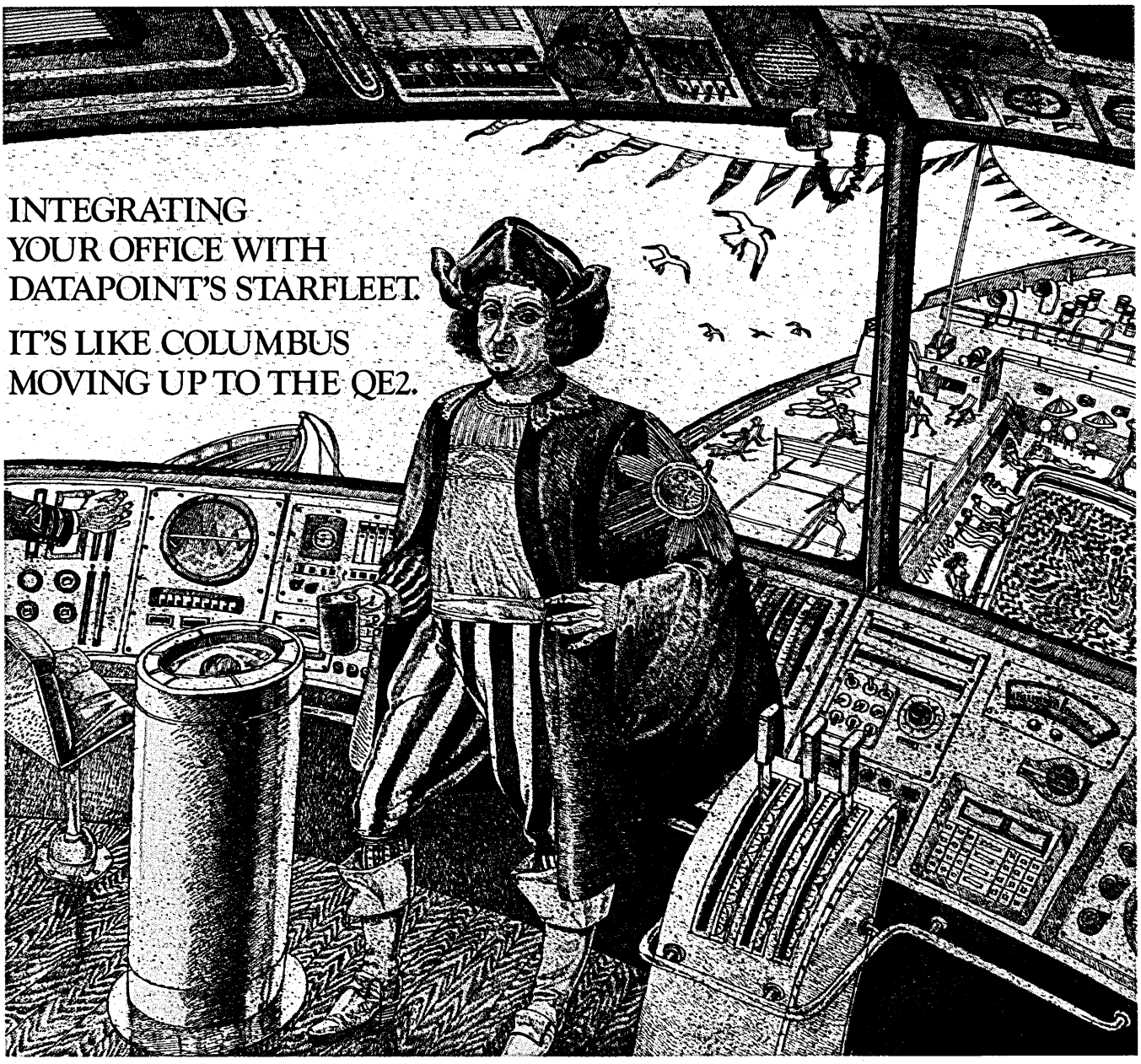

When it comes to large scale departmental computing, many vendors simply don't know the devil from the deep blue sea.

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CIRCLE 13 ON READER CARD

Stephen G. Davis, Assistant Features Editor

HARDCOPY

SOME HOLIDAY BELLS AND WHISTLES

(With apologies to Roger Angell)

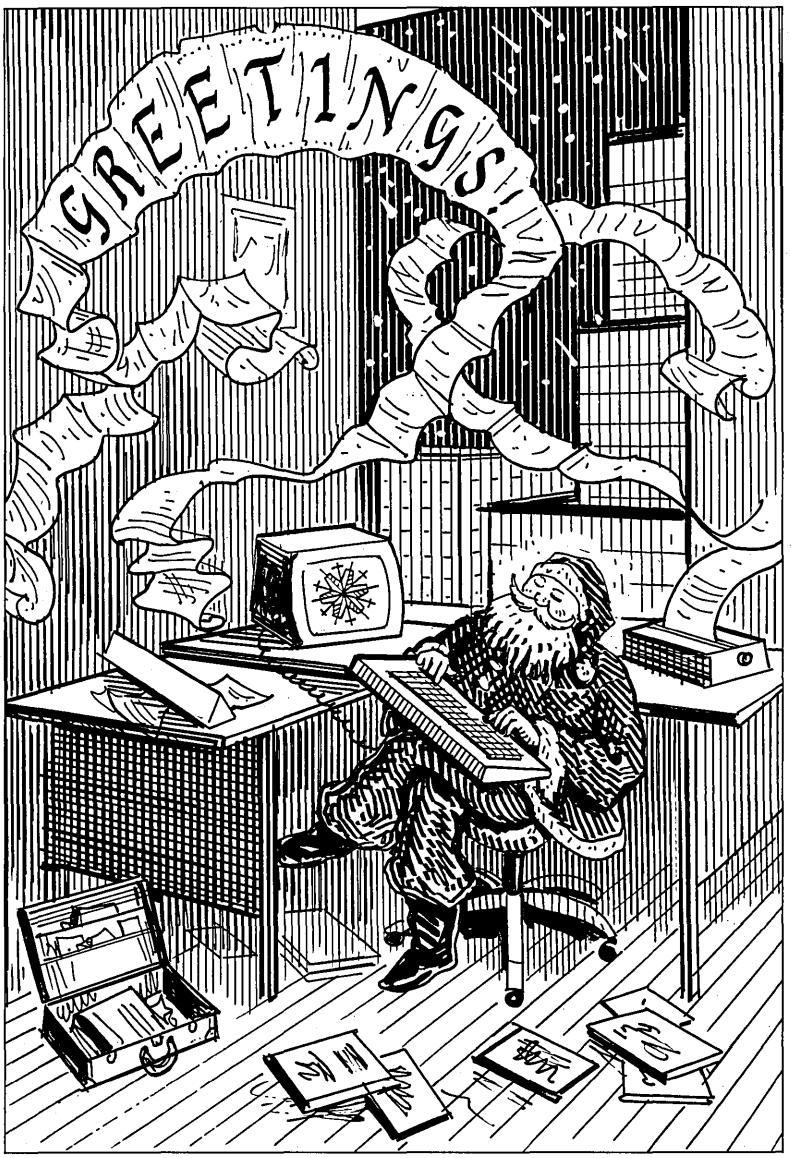

ILLUSTRATION BY ELLIOTT BANFIELD

Log on! Or just, fair readers, read:
A Yule log session is our lead!
So hold all calls, swap in some time,
Note season's greetings here, in rhyme.
Today this space brings low-tech cheer,
Not soapboxing (no more *this* year!)
But, from us at DATAMATION,
Peace! Goodwill! Happy vacation!
Now join us in a Christmas shout,
Enough to turn the office out:
Wassail! Let loose! Coworkers, heed!
No password's needed to proceed!
What? Who's this? Now I remember—
Cheer up, Boss! It's mid-December!
Don't ask about that last batch run,
Save it! (Store it!) Come join the fun.
Add your voice in our glad chorus
To hail Bill Gates and William Norris,
And E.F. Codd—that's the spirit;
For Steven Jobs—now, let's hear it!
Promote good tidings hereby sent
Toward Erik Sandberg-Diment!
And raise cries for Stan Augarten,
Edsger Dijkstra, Henry Martin,
Joe Weizenbaum, and Gordon Bell:
To each, to all, a fond Noel!
Now our office's filled with hugging;
This verse wants room (plus debugging?).
Yo, Muse! More rhymes are what we need
To greet An Wang! [RETURN] [LF]
And set a festive spread before
Ted Withington and Mitch Kapor!
Eggnog! Cookies! White wine and cheese!
Ken Olsen, Herb Grosch: have some, please!
Dear Grace Hopper: did you hark our
Clink with Narendra Karmarkar?
Here I note clear plastics' clangor
Implicating David Sanger,
Marty Goetz, Steve Wozniak, and—
Rattling a cube—Dan McCracken!
Well, Mike Blumenthal, be our guest!
Meet John Verity, and the rest . . .
John Cullinane! Here's John Akers!
Blessings all 'round, merrymakers!
David Parnas, Fred Brooks, Frank Rose:
Entrez, come in! And on it goes. . . .

Soon, we'll leave this nine-to-fiver—
With our designated driver,
Pc user, Series winner,
Davey Johnson—for home, and dinner.
Then on the long and dark commute
(Bumper to bumper slows the route),
We'll lift our gaze and, eyes alight,
Find peace within the starry night.

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Mfg.

Spreadsheet
database
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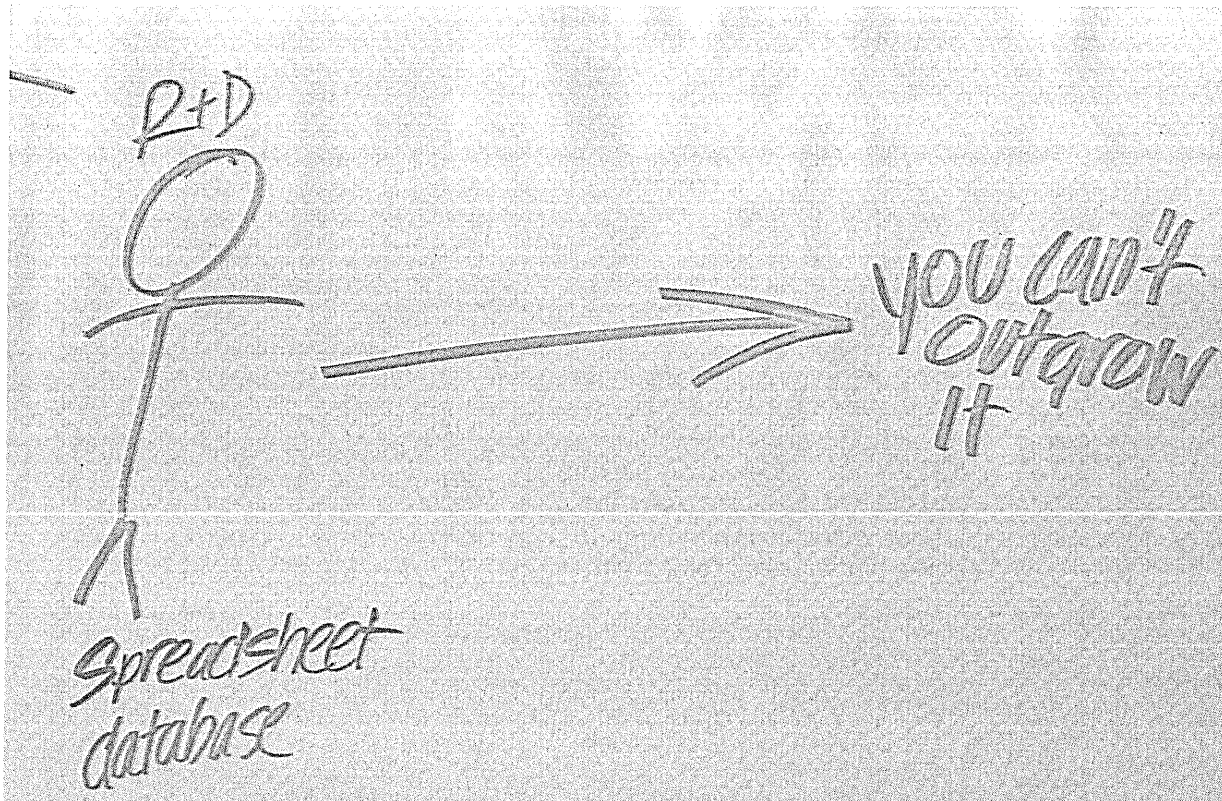

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NEWS IN PERSPECTIVE

STORAGE

FIFTH TIME AROUND

The "new" Memorex is hopeful about its future, but users are raising questions about where new products will come from.

by Jeff Moad

The new Memorex. That's what they're calling the 6,000-employee, IBM-compatible disk, tape, and communications product unit being sold off by Unisys Corp. at the end of this year for $550 million in cash and stock.

Let's see, that makes this the fifth "new Memorex" in the company's tumultuous 25-year history, if you count its founding in 1961, its near financial collapse and rebirth in the mid-1970s under then-ceo Robert Wilson, the 1980 transition, again under financial pressure, from Wilson to former Honeywell Information Systems president C.W. Spangle, and the 1981 acquisition by Burroughs Corp.

Memorex customers have had to ask themselves each time whether the "new Memorex" would continue to be a viable pcm storage vendor or whether it was time to jump ship. This time the questions are no different. While users of Memorex equipment seem satisfied that, under the new regime, the company's sales and support personnel will be unchanged, many of them are wondering where the new Memorex will come by the pcm products it will need to compete with new and current generations of IBM disk and tape offerings.

"I had been very comfortable with Memorex being owned by Burroughs," says Tom J. Vicknair, executive vice president of Texas Commerce Bank in Houston and veteran Memorex user. "I felt the Burroughs ownership gave them the research and development dollars they needed to keep up with IBM. Now I'm not so sure. Just like every other time, I'll have to back off and watch, let the smoke clear. Then, if Memorex can't compete, I'll have to go somewhere else."

Under the proposed sell-off deal, Memorex for the first time will not have control of its own disk drive development and manufacturing operations. Those would remain with Unisys, where they would offer users of Burroughs and Sperry systems the promise of an ongoing supply of advanced disk storage devices, something Sperry users particularly have lacked. Unisys is committed to supplying Memorex with the existing 2.52GB 3680 disk device and the double-density version of the 3680, set for volume shipment in the first quarter of next year after a series of delays.

Beyond that, though, things get fuzzy. Although details of the sell-off are still being worked out, Unisys is not expected to be contractually required to supply Memorex with specific quantities of follow-on DASD products on a specific schedule. As a pcm vendor, Memorex needs to be able to sell products that are competitive with new IBM offerings between 12 and 18 months after IBM starts shipping. So, if the Unisys disk development and manufacturing operations fail to keep up, the new Memorex and its customers could be in trouble.

Unisys and Memorex officials answer that Unisys still has strong motivation to pour research and development dollars into keeping up with IBM, but, they say, if the Unisys storage systems business unit runs into new product development snags—as it has on the 3680 single-density and double-density products—Memorex can now turn to another pcm manufacturer, an option the company did not have as a Burroughs captive.

The Unisys motivation to develop new products for Memorex is twofold, Philip Dauber, Unisys senior vice president and Memorex president, told DATAMATION in a recent interview. First, Memorex, which currently accounts for about $200 million in annual DASD revenue for Unisys, is the company's largest

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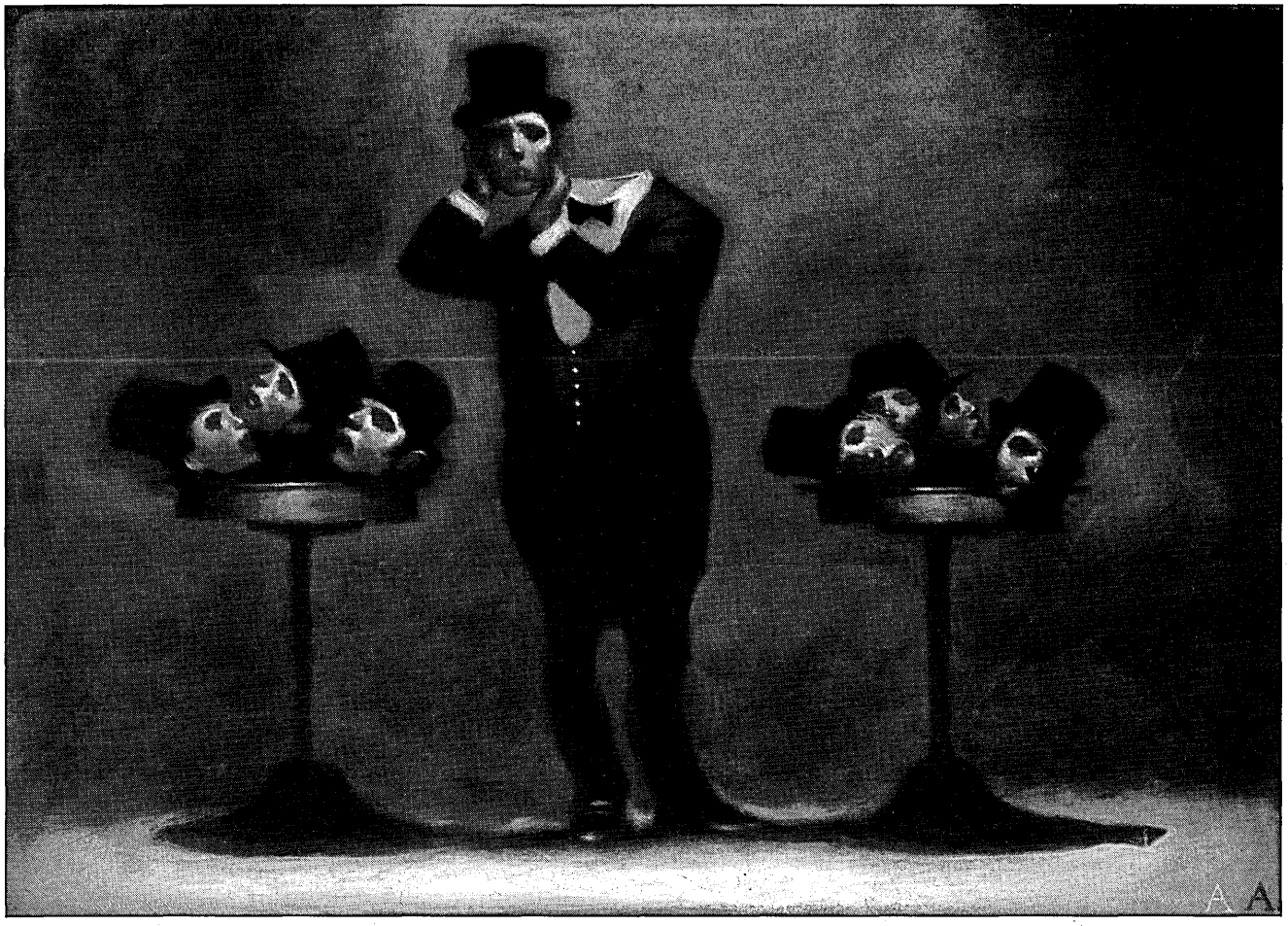
oem customer. Unisys, counting on that Memorex volume to help drive down its DASD manufacturing costs, does not want to lose Memorex as a customer.

Secondly, Unisys continues as an investor in Memorex, having received an estimated $100 million in preferred shares as part of the deal for Memorex. Unisys doesn't want to damage its investment in Memorex by failing to supply it with new products, Dauber says. "We can only make a purchase agreement with Memorex on products that we currently have, but our intent is to cover all of Memorex's disk product needs, and not to sell product to any other pcm vendors. We believe we can continue to do that, but if we screw up, we expect Memorex to look elsewhere for product."

The Memorex employees who will run the new Memorex, most of whom come from its European operations, say they won't hesitate to look elsewhere for



products if Unisys development and manufacturing fall short. In fact, says Giorgio Ronchi, Memorex vice president for Latin America and Southern Europe, the new Memorex already is planning to go to oem vendors for several new products it will sell in the U.S. Some of those, such as nonimpact printers made by Bull and remote applications printers made by Ericsson, are currently being sold by Memorex in Europe, where it is more aggressive about oem reselling.

"Unlike Memorex under Burroughs, we will be a marketing-driven company," says Ronchi, who will be ceo of the new Memorex. "We will add oem products in the communication, printer, and banking terminals areas, responding to our customers' requirements. Under Burroughs, Memorex was concentrating on the problems they had in R&D and manufacturing, so the company suffered from a marketing point of view. Under the circumstances, though, I don't know if anyone could have done a better job than Burroughs did."

Users such as Ronald Woodall, a vice president at Dallas-based Chilton Corp., are encouraged by Ronchi's plan to expand the Memorex product line with oem products. "In Europe, they've gone out and gotten a lot more oem products, and I'd consider it a plus if they did the same thing here. I'd especially like to see more communications products like multiplexors," says Woodall.

Still, what Memorex users care about most strongly is pcm large disk and tape products, and they question Memorex's ability to deliver. "Since the manufacturing and development of DASD goes to Burroughs, we're concerned about whether they'll continue to develop product for Memorex," Woodall says. Most users are expecting IBM to add a faster data transfer rate option to its 3380 drive in the first quarter of next year, and eventually to follow that with higher-density disk devices based on thin film heads and media. "They [Memorex] say they'll have these products, but they're going to have to prove it," says Woodall.

"Since the development of DASD goes to Burroughs, we're concerned about whether they'll develop product for Memorex."

If Memorex does have to turn to suppliers other than Unisys for key products, it will be one of a number of marketing organizations approaching a small group of manufacturers. In fact, currently, only Hitachi and Fujitsu are selling 3380-class disk devices on the oem market, and most of their pcm production is claimed by existing customers—Amdahl in the case of Fujitsu and National Advanced Systems in the case of Hitachi. Aweida Systems of Boulder, Colo., a pcm marketing unit in search of a 3380-class product to sell, recently was required by Hitachi to buy its product from NAS rather than directly from Japan.

Memorex officials argue that their large, worldwide sales force and established customer base will give them an advantage over the likes of Aweida or Amdahl in lining up limited oem products to resell. Just how much weight those factors will carry is being tested currently in the pcm tape market where Memorex, like other pcm vendors, is looking for a cartridge tape product to market against IBM's 3480 device, which has been shipping for one year. Memorex for the last eight years has been selling a 9-track pcm tape drive built by Fujitsu, but the company has yet to line up a deal with Fujitsu or any other potential source of 3480-class devices. "We're working very hard on that, and we feel we're very close to an agreement," says Ronchi.

Meanwhile, Memorex is at a competitive disadvantage in both pcm tape and double-density disk marketing. One

ILLUSTRATION BY DAN ADEL

long-time Memorex tape drive customer, Travelers Corp. of Hartford, Conn., recently turned to IBM for 3480 tape drives after waiting as long as it could for some word on a competitive Memorex product. At Texas Commerce Bank, which was a beta test site for the single-density 3680 Memorex disk drive, four IBM double-density 3380s recently were installed. Although the bank is scheduled to be a beta site for the Memorex double-density disk, "we couldn't wait any longer," says executive vp Vicknair.

Memorex is at a competitive disadvantage in both pcm tape and double-density disk marketing.

Memorex also has some shoring up to do in its 3270-compatible terminal and controller product line. While the new Memorex takes over both manufacturing and distribution of the 3270-compatible terminal products, the company, like other makers of IBM-compatible terminals, has suffered in recent months from increased IBM price pressures and competition from personal computer and 3270 PC-type products. Demand for the Memorex 3270-compatible terminals hasn't fallen off, but Memorex North American operations vice president John C. Scott acknowledges that profits from the once highly successful communications operations have fallen. In a bid to catch up with the IBM 3270 PC, Memorex plans in the first quarter of next year to start shipping an AT-compatible product based on the Sperry PC/microIT personal computer.

With the new pc product, Scott says Memorex's communications unit should return to solid profitability by mid-1987. If the Unisys-owned disk manufacturing operation has in fact solved its manufacturing problems and can begin shipping both single-density and double-density drives in volume soon as advertised, the new Memorex may have a fighting chance, at least initially. Apparently, the junk bond-financed employee group taking over Memorex wasn't the only one to think so. Tulsa-based Telex Corp. acknowledges having made exploratory inquiries about buying the Memorex communications operation, and both Hitachi and Fujitsu were reported to be interested, although both companies deny having made any formal offer.

"We realize users want assurances that a broad range of products will still be available in the future," says Scott. "We're going to assure them of that. Meanwhile, we've gone from being a company that was not very salable two or three years ago to one that was eminently salable, with more than one suitor. That's not too bad." ◉

THE LONG AND WINDING ROAD

The 25-year history of Memorex Corp. has taken as many twists and turns as a sailboat navigating into the wind. Here are a few of the highlights.

1969: Laurence L. Spitters and three others leave Ampex Corp. to form Memorex as a maker of computer magnetic tape. The company later gets into disk media packs and, in 1967, disk drives. By 1970, Memorex is a $79 million company.

1972: Memorex bucks the industry trend and enters the mainframe computer business with two systems that compete with IBM's 360/30 and 360/40. A Memorex executive explains that the IBM-compatible peripherals business "doesn't have a promising long-range outlook." The mainframe effort fails, and Memorex goes $300 million in debt, with a negative net worth of $87 million.

1974: Spitters is ousted and replaced by turnaround specialist Robert C. Wilson. Returning its emphasis to the storage business, Memorex reports $18 million in 1975 profits on $264 million in sales.

1979: IBM turns up the pricing pressure on pcm competitors and Memorex is in trouble again. Wilson looks for a way out, and enters into merger talks with both Amdahl Corp. and Storage Technology Corp. Both deals fall through. Memorex has a $29 million loss in 1980 on sales of $769 million, and Wilson is replaced by former Honeywell Information Systems president C.W. Spangle.

1981: Memorex is sold to Burroughs for the bargain basement price of $117 million. Burroughs insists Memorex will stay in the pcm business and provide storage products for the Burroughs line. In 1982, Memorex introduces a 3380-class disk drive, planning to ship it in the third quarter of 1983. Technical problems plague the product, however.

1984: Spangle is replaced by Burroughs operations whiz Philip Dauber. He decides to keep Memorex in the pcm business, and sets out to fix the technical problems. Memorex doesn't start shipping its 3680 drive in volume until late 1985, however. By then the company lags far behind IBM in 3380 single-density and double-density markets.

1986: Burroughs announces plans to sell off its pcm business for $550 million in cash and stock.

—J.M.

DATABASES

THE CHILLING EFFECT

A new government data classification scheme has caused an anxiety attack among electronic database providers and others.

by Willie Schatz

So how sensitive are things in Washington, D.C., these days? Not even officials in the Defense Department know for sure. And they're the reason so many are so sensitive.

Last month, the department created a National Telecommunications and Information Systems/Security Policy (NTISSP), restricting access to national security information. Naturally, the new deal is called "sensitive." It apparently falls somewhere between "unclassified" and "classified." But no one's quite sure where. And it might apply to private sector databases. But no one knows for certain. So everybody's very sensitive.

The memorandum, which at press time had been much more heard about than seen, was described by sources as signed by the President's former national security advisor Vice Admiral John Poindexter. According to its caption, it is "a national policy on the protection of sensitive but unclassified information in the federal government telecommunications and automated information systems." Issued Oct. 29, the document implements National Security Decision Directive (NSDD) 145 and Office of Management and Budget circulars A-123 (computer security) and A-130 (federal information resources management).

"This is confined to the government," says Harold Relyea, a specialist in American national government at the Congressional Research Service in Washington. "It directs agencies to make some specification on what 'sensitive' is. That's obviously going to be a squishy definition, but the policy doesn't appear on its face to be more than an administrative mechanism to raise the consciousness of people responsible for storing and transmitting electronic information.

"The more interesting question is, what about private sector people who use government databases? Will there be sanctions if NTISSP isn't followed?" Relyea wonders.

Funny, that's just what the private

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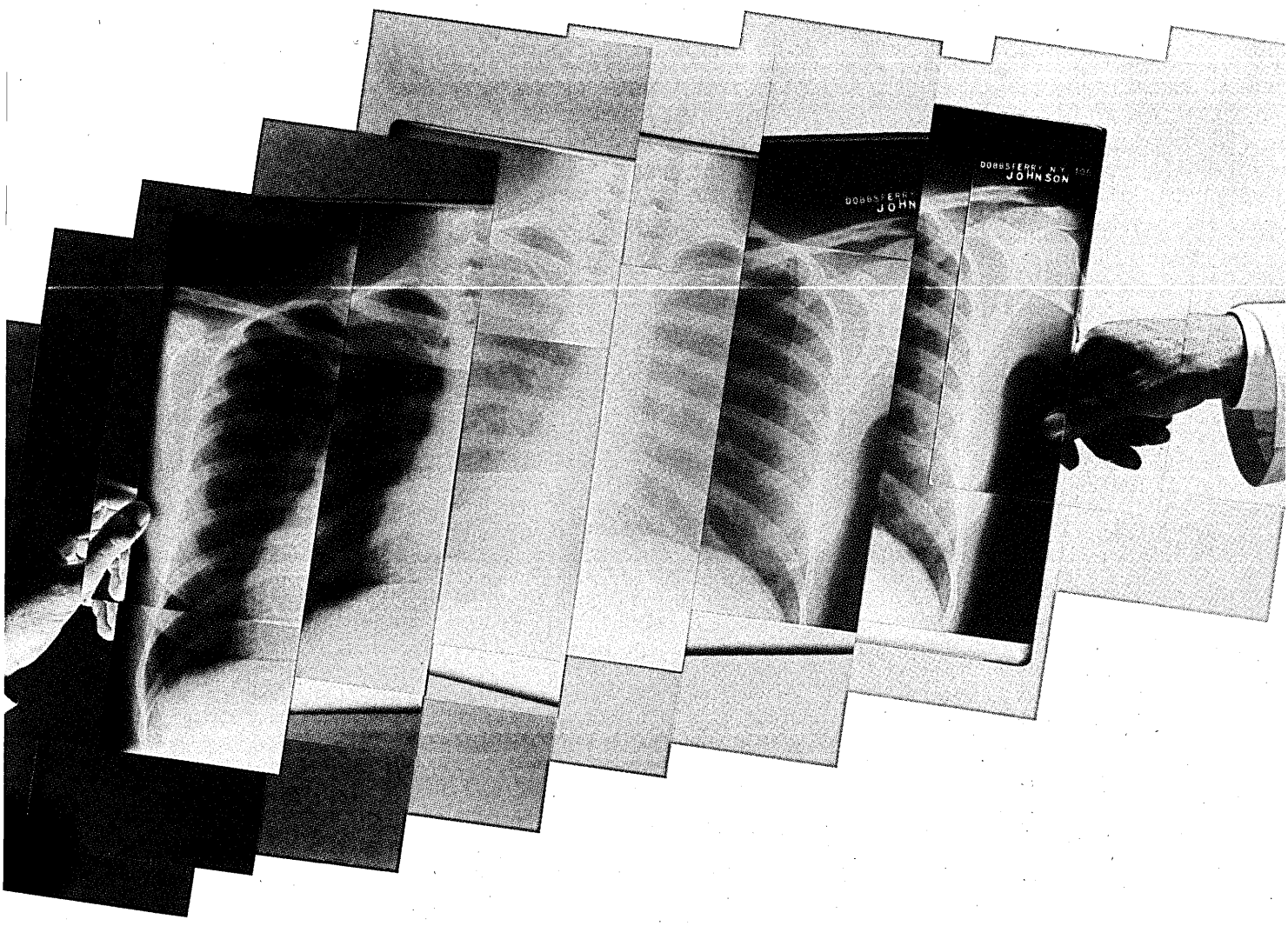

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sector is thinking.

"DOD's theory is that if information in print form is unclassified, it becomes classified as soon as it's gathered in pieces and put in a computer," says Jack Simpson, president of Mead Data Central, Dayton, Ohio. The company produces LEXIS, the country's sine qua non electronic legal research database, and NEXIS, a leading electronic news research database.

"They're saying that the form makes the difference, not the content," Simpson contends. "The computer can track leaks of classified information. That's one of its jobs.

"I'm definitely feeling a chilling effect. I can't possibly accept their theory. They're perpetrating a fiction. Information is either classified or unclassified. 'Sensitive' is so big I can drive a truck through it."

He won't be motoring solo.

"Last year, it was academic conferences and scientific meetings," says Jerry Berman, chief legislative counsel in the American Civil Liberties Union's Washington office. "Now, the export laws are being rolled out to restrict access to databases. This is another example of the administration pressing to limit access across the board. The information industry is becoming more militarized and Kafkaesque."

"Our members are fighting intimidation," says David Peyton, director of government relations for the Information Industry Association (IIA) in Washington. The group held its annual conference last month, at which the DOD-private sector issue was debated with much heat by the potential limitees but with little light shed by the limiter. Diane Fountaine, the director of the information systems directorate for the assistant secretary of defense for communications, command, control, and intelligence (C3I on your roster), told attendees that the issue isn't whether the government is going to protect defense-related information, but what kind and how. Fountaine did not return phone calls by press time.

Last summer, Mead Data and several other database providers received a letter from officials at the National Technical and Information Service (NTIS), a federal government clearinghouse of databases of commercial contracts and technical papers within the Commerce Department, about RECON, the Department of Energy's (DOE) database. NTIS wanted assistance in obtaining the subscriber lists from Mead's member companies that had licensed the DOE tapes. After considerable pressure from the IIA, NTIS withdrew its request.

"We inferred, without knowing, that DOD was behind that," Peyton says. "That's the kind of thing we're increasingly facing. Can the government create an offense for private receipt of 'sensitive' material? We have to rely on our member companies not to roll over and play dead."

They seem alive and well right now, thank you. This subject has been kicking around since September 1984, when President Reagan ordered the Pentagon to study how the Russians gain access to purportedly sensitive information

"The more interesting question is, what about private sector people who use government databases?"

and what steps could be taken to make their information gathering lives a little more difficult.

That study culminated in September 1985 with the publication of "Soviet Acquisition of Militarily Significant Western Technology: An Update," an update of the original 1982 document. The date had changed, but the emphasis hadn't. The Pentagon still cited government and commercial databases as a prime target of Soviet efforts to acquire Western technology and know-how.

Since then, access ain't been what it used to be, and it may get even tougher with the expected mid-December publication of an Air Force report on restricting access of non-U.S. citizens to unclassified electronic databases. The proposal, on which IIA and other trade associations have had input, would remove "sensitive" technical and scientific information from open databases and put it in a special one accessible only to U.S. citizens.

The actual effect may be difficult to gauge. First, the report will be classified. Second, Fountaine has already promised that the version released to the public will be so sanitized as to be barely understandable. Third, the actions of the interpreters will count for much more than the words.

"The general attitude is that nothing will happen," says Benjamin Leon, a professor at Southern Methodist University's School of Engineering and Applied Science and chairman of the IEEE's Technology Transfer Committee. "Alarms have been justifiably raised in the information industry."

With the release of the "sensitive" memo, signed by Vice Admiral Poindexter, the information industry is going to have to do it to them before they do it to the industry.

According to Berman of the American Civil Liberties Union, "Only a political solution is feasible because the Supreme Court has made it abundantly clear that all other interests—from free speech to scientific inquiry—are outweighed by 'national security' claims and it is prepared to uphold as constitutional severe restrictions on the exchange of unclassified scientific and technical data.

"The business community has to realize that the ox being gored over there is you tomorrow," Berman warns. "We've got to develop a broad coalition and hold hands with each other."

Okay, so it's not "Hands Across America." There's increasing concern, though, among members of ADAPSO and CBEMA, both of which are gratefully following IIA's lead on this one. There's also increasing frustration at having to play defense, waiting for DOD to make the next move. Business can't quite take aim on an information policy and expect to score a bull's-eye.

After all, how can you hit something you can't see? The access restrictions aren't going to come overnight. If they come at all, they'll evolve over a period of time.

"I think the agencies are going to scratch their heads for some time on this one," Berman says. "Secrecy is not the administration's ace right now. If the election had gone the other way, I think we'd be seeing some severe guidelines immediately. But both the Senate and House committees are going to want to chew on these guys.

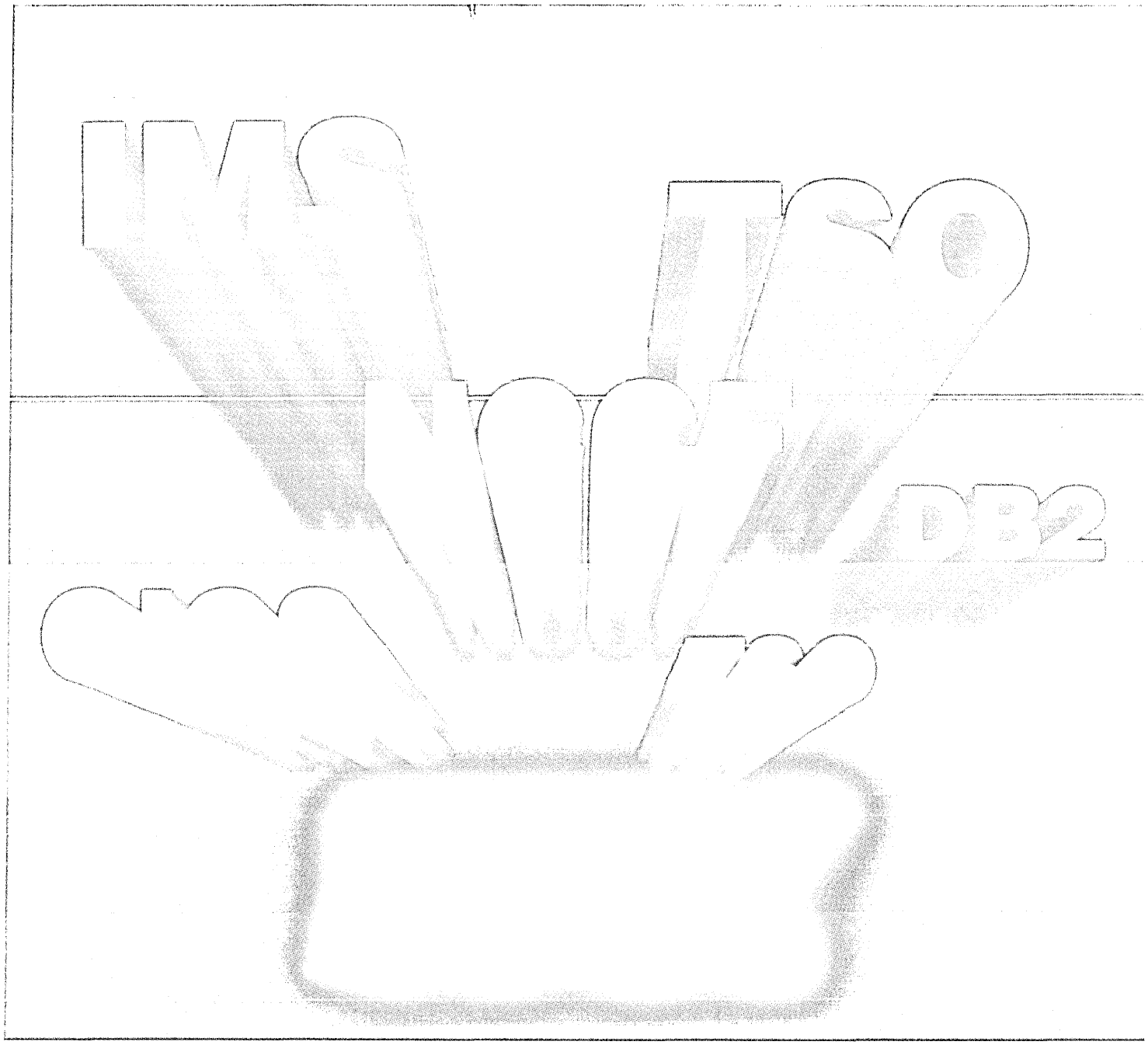
"If they move fast and do stupid things, it's going to make it worse for them. If they're going to do it, they're doing it the right way. Quietly."

This may be the proverbial calm before the storm, however. Mead has already been visited by the FBI, the CIA, and the National Security Agency. The agencies wanted to know how Mead could limit access to the unclassified information in LEXIS and NEXIS and if any suspect foreign citizens had access to either database. Simpson informed his visitors that he couldn't prevent access to the databases and that he knew of no Soviet subscribers. And he fessed up to not giving a citizenship test before allowing subscribers on-line.

"We're working in the dark now," Simpson says. "If they come back with onerous requirements, we'll throw NTIS out of our database to protect LEXIS and NEXIS. NTIS hasn't been a big winner for us anyway. If we remove NTIS, then I'd like to see their argument for restricting access. If they go after NEXIS, every newsroom in the country will come out of its chair.

"The folks who are doing this mean well, but they know not what they do." ◉

Senior writer John W. Verity assisted in the reporting of this article.



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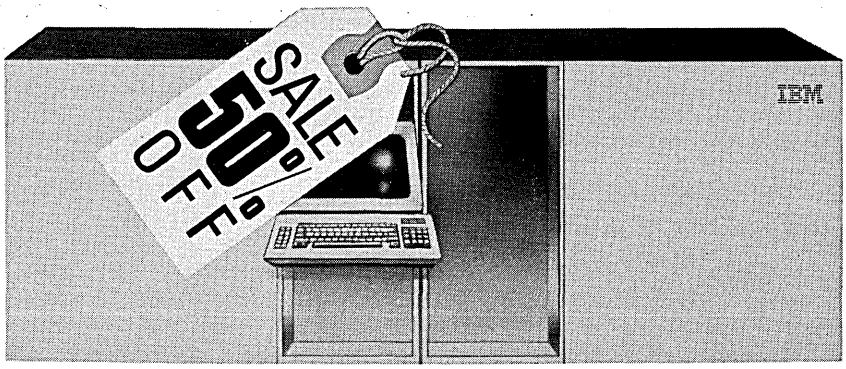

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TRADE

STILL FACING HURDLES

Progress has been made, but the going is still slow for U.S. companies in Japan.

by Bob Poe

A year or so ago it began to look as if Japan was getting serious about opening up to the import of foreign high-technology goods, particularly computers and telecommunications equipment (see "The Kimono Is Open," Nov. 1, 1985, p. 36). Asking around in Tokyo to find out how much of that early promise has been fulfilled often brings a response like that of one executive of a U.S. telecom equipment company: "Things have been proceeding a lot more slowly than we'd like them to. There has been progress, but it seems there's always another hurdle behind the one you just jumped over."

One still unresolved incident illustrates that for Japanese government ministries, old hurdles fall hard. Daini Denden Inc. (DDI), the main telecommunications competitor of the former government corporation Nippon Telegraph and Telephone (NTT), has been trying to get approval from the Ministry of Posts and Telecommunications (MPT) to create a cellular telephone system. The company has a habit of buying foreign. In fact, according to John Sheppard, director of digital switching for Northern Telecom Japan Inc., "Daini Denden seems to be getting most of their products from the U.S." DDI had planned to buy U.S.-made equipment worth millions of dollars for the cellular system.

In theory, that shouldn't present a problem. The groundwork was laid for just such an occurrence during the second part of the MOSS (Market-Oriented Sector-Selective) telecommunications negotiations between the U.S. and Japanese governments, conducted from June 1985 to January 1986, which resulted in the so-called Radio Wave Law. One important point the Japanese side agreed to was that both modified North American and modified European equipment would be acceptable from a technical point of view. It also agreed to study the revision of regulations to permit the issuance of licenses for operating cellular phone services to companies other than NTT; that provision was granted in August 1986.

Thus, it was both technically and legally possible to enter the cellular phone services market; DDI set about preparing its license application for submission to MPT. Later in August, however, MPT suddenly instructed DDI not to submit its application after all, since a third company had in the meantime decided to get into the business.

MPT says it wanted DDI and the third company to form a joint venture and submit a single application. "The guts of it was that the regulatory authority of MPT was being used to prevent what they term 'excessive competition,' " says a U.S. government official.

The entire affair has some observers wondering whether the new openness has been mostly window dressing.

Though the peculiar Japanese aversion to overenthusiastic competition at home was the rationale, other calculations may also have come into play. The matter is still being negotiated—the U.S. government has "expressed interest at the cabinet level," according to the U.S. offi-

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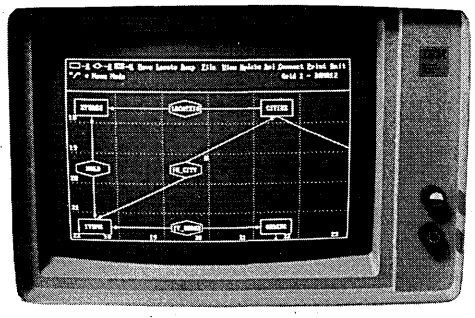

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cial—but the delay itself may be more important than the final outcome. NTT is preparing its own system, which will be ready in April 1988. Since it takes 18 months to set up a network and to order and install the equipment, the official says that "even if they start today, Daini Denden is already six weeks behind NTT." If the joint venture is forced, the delay could be even longer, and the U.S. supplier likely would not get the full equipment order. The entire affair, looking suspiciously like a classic Japanese situational trade barrier, has some observers wondering whether the new openness has been mostly window dressing.

The picture's not entirely discouraging, however. In fact, NTT itself has been making some of the most visible efforts to ease the way for foreign manufac-

Foreign manufacturers may have conceded more of the modem market than they had to.

turers. On Nov. 19 and 20, for example, it held a seminar in Brussels, Belgium, called "Opportunities with the New NTT," to explain its international procurement procedures to European manufacturers. It also has made it easier for foreign manufacturers to apply for procurement in their local languages, and has established a few overseas procurement offices. "NTT seems to be going more and more international," says Northern Telecom's Sheppard.

In addition, a number of foreign companies are doing exceptionally well, according to Herbert Cochran, commercial attaché at the American embassy. One example is AT&T, which says its 1986 sales are quadruple those of 1985, although it won't disclose sales amounts. Its staff has increased to 100 from 20 in the same period. Modem imports also are doing well, says Cochran. A leading recruiting agency bought more than 2,000 Racal Vadik modems in addition to a couple of minicomputers from Prime Computer Inc., Natick, Mass.

In fact, foreign manufacturers may have conceded more of the modem market than they had to. According to John Stern, head of the U.S. Electronic Industry Association's (USEIA) Tokyo office, governmental licensing and standards barriers were cleared up late in 1984, while U.S. products still had the technological edge. U.S. manufacturers didn't jump in soon enough, however, and now Japanese makers such as Epson and NEC have become major players. Cochran agrees with Stern's assessment, and wonders why industry-standard modem maker Hayes Microcomputer Products Inc., Norcross, Ga., in particular, hasn't made an effort in Japan. A Hayes spokeswoman says the company is always interested in new markets, but has no definite plans for Japan at this time.

"There are probably thousands of Hayes modems brought over by people who bought them in the States," says Cochran. "With the Japanese just beginning to get involved in pc communications, I don't know why they aren't selling here." Windows of opportunity don't stay open very long in Japan; Stern feels the one for foreign modem makers is nearly shut again.

Selling in the Japanese market is clearly tough, in terms of both simple product competitiveness and battles with the bureaucracies. Companies that can do well on the first count, however, are beginning to find they have help with the second. The results of the MOSS talks on telecommunications held from the spring of 1984 to January 1986 are probably the most impressive. Stern claims, "They were the most successful trade negotiations with Japan in the past 20 years." He credits them for making the $400 million of annual telecommunications equipment sales in Japan possible.

Stern isn't doing badly himself when it comes to getting results from the Japanese. He is the first foreign director of the Telecommunications Technology Committee (similar to the U.S. T1 Committee), created in August 1985 as a result of deregulation, which now develops voluntary industry standards in place of the mandatory ones formerly decided by MPT. He is also on a committee that is "following up" on the MOSS talks, and is a member of the newly established ISDN

A number of foreign companies are doing exceptionally well, according to Cochran at the American embassy.

Telecommunications Terminal Development Working Group, which is advising MPT on trends in international ISDN standards.

Cochran of the U.S. embassy feels that Stern and Steve Weiner, the other USEIA representative, are providing "tremendous participation in an incredibly key area for companies on the forefront of technology by helping to keep U.S. associations and manufacturers informed on standards. If you don't know the standards you can't sell your product."

Even with such dedicated support, however, the Japanese market isn't an easy one. Says a U.S. official, "Things have gone from being impossible to merely difficult." The USEIA's Weiner may have put it best: "The only way to displace business or create new business in Japan is to be very aggressive and very sincere." ◉

ARTIFICIAL INTELLIGENCE

TO JUNG, WITH THANKS

Can a computer reproduce the processes of the subconscious? A small software firm in Omaha thinks so.

by Edith D. Myers

The promise of artificial intelligence—that it can make computers see, talk, listen, and think like humans—has been expanded by a small Omaha company that contends it can produce in computers processes that emulate those of the human mind.

Seems impossible, right? Most members of the artificial intelligence community think so, and scoff, although there were some attempts to do this at MIT in the early '60s. "These were abandoned," says Harvey Newquist III of DM Data, a Scottsdale, Ariz., high-technology consulting firm that includes AI among the disciplines it watches, because "nobody could really figure out how the subconscious really works."

The folks in Omaha think they do know, especially Stanley J. Reiners, vice president of research and development for Syndetic Corp. Reiners, who has been working on the notion since 1972, contends he has been able to come up with algorithms that can make a mainframe reproduce the processes of the subconscious, at least as far as the learning process is concerned. The company is working on an operating system for IBM 370s that will embody these concepts; it hopes to complete it within a year.

Reiners, who trained in nuclear physics at South Dakota State University, says he stumbled on the idea of the subconscious being the key to the learning process in 1972 as a subcontractor to NASA in Hampton, Va. He was developing a concept for interchangeable languages, "computer languages that could speak to each other, that would make it possible to switch from one language to another within a program, to make it possible for a programmer to use the best language for his needs at all times."

In the course of the project, he says, "we also looked for ways to improve programmer productivity, for ways to break up jobs to be fed to computers. We found components of jobs could, in some cases, apply to different jobs. We also began to look at why certain things were

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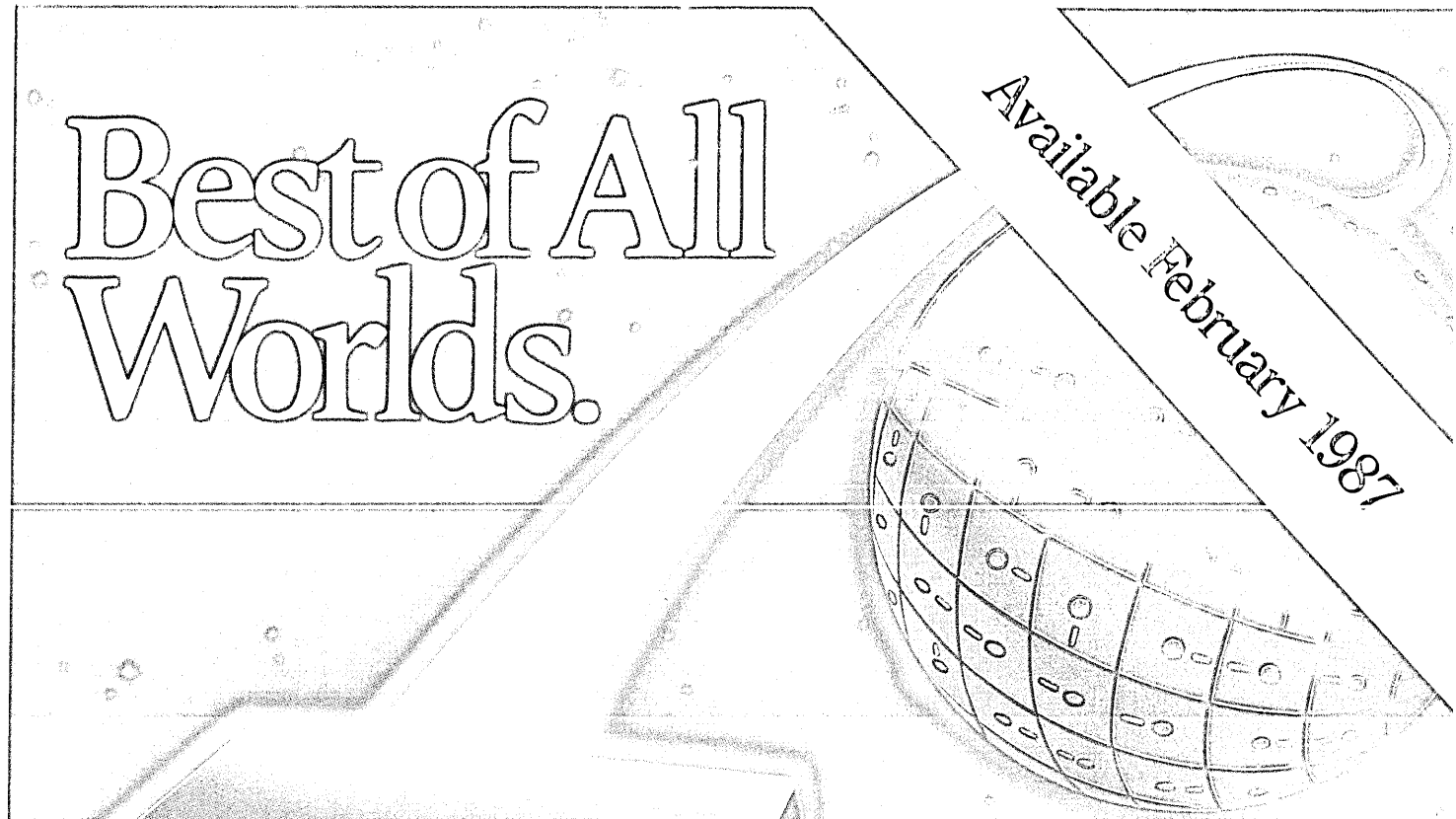

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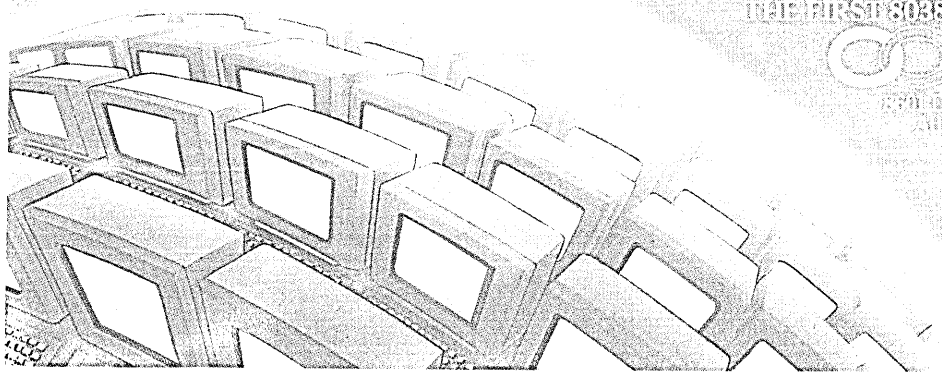

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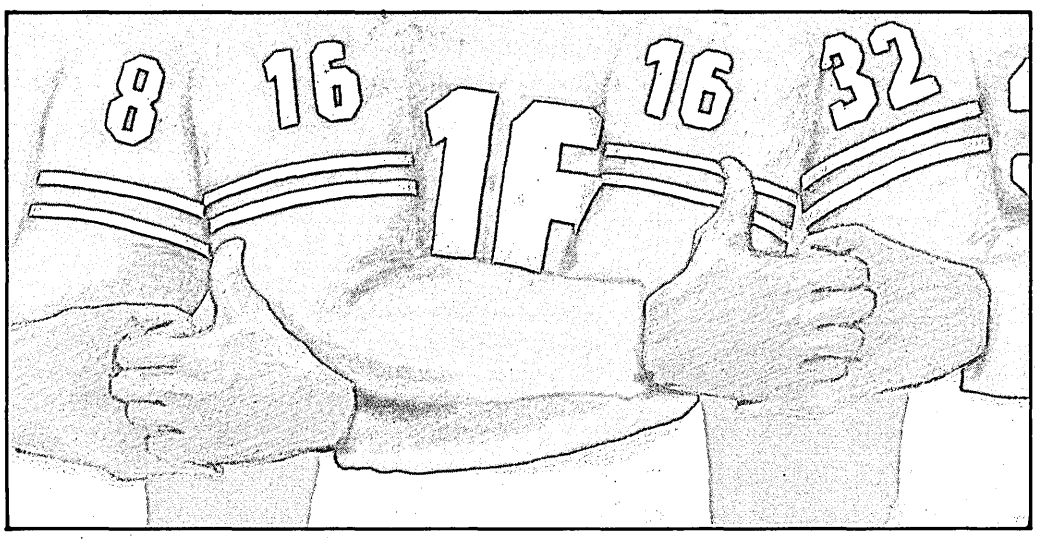

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done. We didn't realize it, but we developed a learning model. It was a manual, static model of thinking processes, although we didn't realize it then."

A year later, Reiners recalls, he put the same principles into a "dynamic, automatic model" in the course of designing for NASA a three-dimensional CAD/CAM program. "One programmer went into an uncontrollable rage after 30 minutes of working with a stage of the program, because it was unforgiving," he recounts. "We didn't realize what we were doing, but we programmed in learning. We identified that true knowledge had to incorporate learning because knowledge is not static but a state of equilibrium, a state that constantly changes."

It was at that point, says Reiners, that he began to study psychology. "I needed to know what was happening. I couldn't find anything helpful in written material on learning theory until I turned to the writing of Carl Jung, which helped me understand the role of the subconscious in learning."

Skeptics point out that relying on one model of the subconscious may be a mistake. "Jung and Freud became bitter enemies because they couldn't agree on how the subconscious really works," says Newquist.

But Reiners, armed with what he considered an understanding of the role of the subconscious in the learning process, left Virginia and returned to his native South Dakota to devote his time to what he believed to be a new approach to

"We didn't realize it, but we developed a learning model. It was a manual, static model of thinking processes, although we didn't realize it then."

artificial intelligence. "We don't deal in symbolic programming," he says, referring to the manipulation of symbols or relationships as opposed to digits or numbers. "We've worked in FORTRAN with mathematical algorithms that simulate what goes on in the subconscious."

From 1978 until this year, Reiners worked on his theory through "a number of companies I formed," the last being Advanced Interactive Automation Inc., which he merged early this year with Medical Processing Systems, also in Omaha. That company was headed by Jack Studenberg, now president of Syndetic. Studenberg's company, says Reiners, "wanted a broader product base and I needed financing and sales capabilities."

Not that Reiners has anything to sell yet. He's working on an operating system based on his learning model, which he calls SOPS (Syndetic Operating System). He contends that any program working under SOPS can become a learning program at the same time that it is an operational program.

In a booth at the November Comdex, tucked into a remote corner of the Las Vegas Convention Center's West Hall, Reiners spoke of his learning model concept. "We're here to declare the baby

Reiners says he stumbled on the idea of the subconscious being the key to the learning process.

is born," he said. "I feel there is no area of computer usage in which this couldn't offer significant improvement."

He acknowledges the skeptics and, indeed, almost welcomes them. "What I want now is to create interest, to get people to begin following what we're doing whether they believe in it or not."

He probably wouldn't welcome Newquist's brand of skepticism. "Anyone selling the notion of simulating the subconscious probably will be selling screen doors or something like that next," says the consultant.

But if the concept produces what Reiners feels sure it will—applications programs that learn as they execute—its potential is almost as unimaginable as the notion itself. ◉

SOFTWARE

TRIMMING THE FAT

After a steady diet of divestiture over the last year, Uccel puts on a new face.

by Robert J. Crutchfield

Uccel Corp. is not the same company that it was a year ago.

During 1986, the Dallas-based software vendor has shed half of its revenue producing businesses, undergone a major realignment of the systems software division, and intensified sales efforts in the banking arena.

Most of the changes at the company are attributed to Gregory Liemandt, Uccel's chairman. Liemandt is no stranger to managing portfolio businesses. He came to Uccel from General Electric Information Services Co., a division of General Electric Co., where he had served as president.

At GE, Liemandt watched his boss, Jack Welch, president and chief executive officer, reshape the industrial gi-

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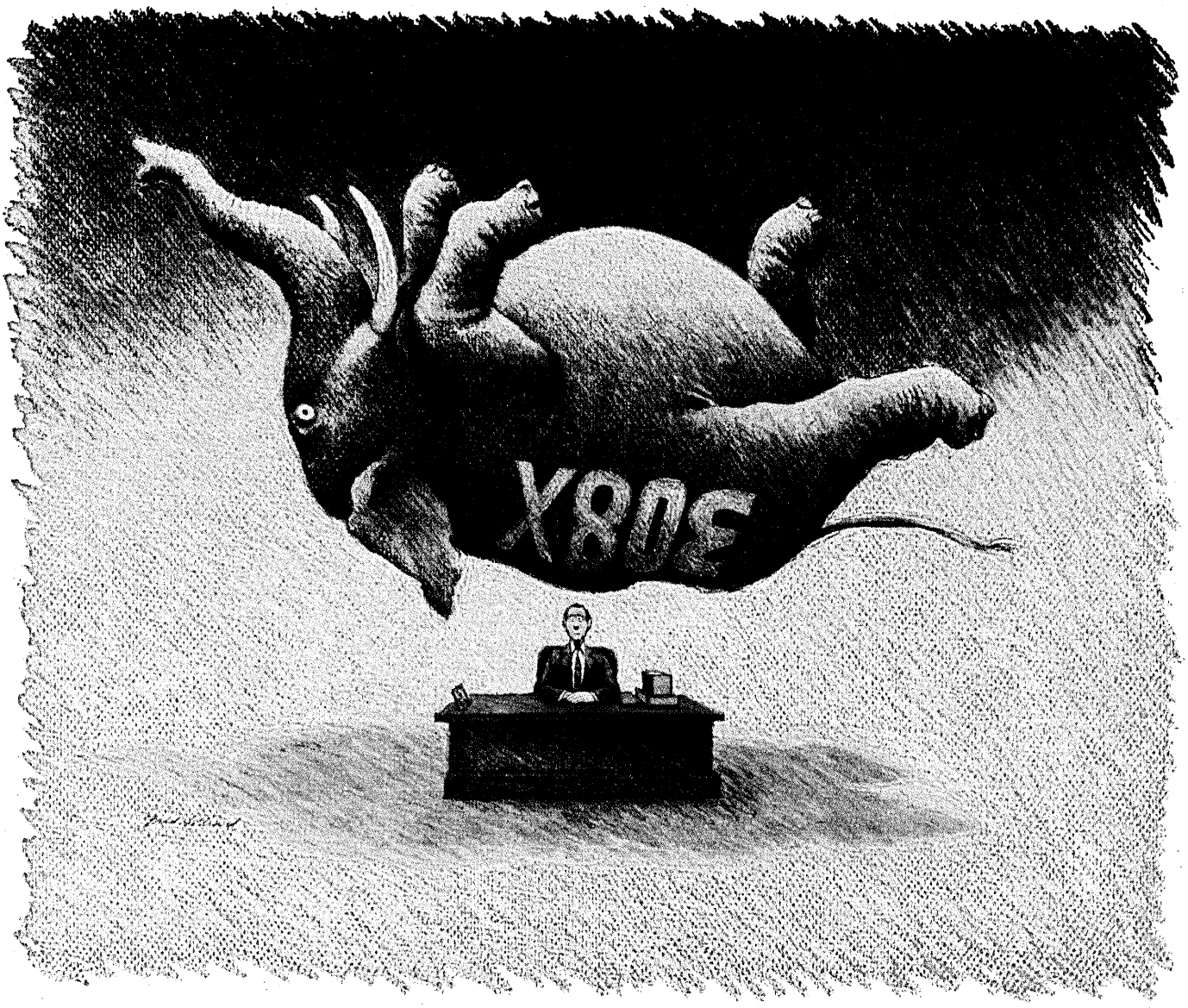

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ant into strategic core businesses. GE divested itself of some businesses and during the restructuring, Welch was—not so affectionately—dubbed "Neutron Jack," because when he finished, the buildings were standing but the people were gone.

Now, Uccel has acquired its own "Neutron Greg." In attempting to sharpen Uccel's focus and redefine its goals, many people and businesses are gone, but the headquarters building is still standing. During the past year, Uccel has sold divisions that accounted for $103 million in revenues. The company's payroll has dropped to 1,100 employees from 2,000.

"I've changed the portfolio of businesses. When I came to Uccel, there were 10 businesses, and now there are two," says Liemandt.

In the course of three years, Uccel went from an acquisition binge to a selling binge. When Liemandt came on board, Open Systems, a developer and marketer of pc-based accounting software, was one of the first companies acquired; it was among the last of Uccel's divisions to be sold. Digital Systems, which manufactured minicomputer turnkey systems, also was recently sold. Both companies were bought by San Jose-based Convergent Technologies last fall.

Other divestitures included the sale of Uccel's domestic and international computing services operation, its Sperry computer-based data processing operation in the U.K., general accounting

"I've changed the portfolio of businesses. When I came to Uccel, there were 10 businesses, and now there are two."

applications software, and CIMCO, a subsidiary specializing in software for use in manufacturing of automated industrial systems.

Acquisitions include several companies that will enhance Uccel's presence in the IBM environment. The company entered the DOS/VSE operating environment by acquiring Boston-based Corodale Inc. Uccel added five MVS system software products and telemarketing capabilities through the purchase of Software Corporation of America, Herndon, Va. The company entered the conversion market by acquiring EXITDOS and TRANSIT software products from Rand Information Systems, Alameda, Calif.

"The [divestitures and acquisitions] represent a new era for our company, one we have been actively working towards since 1983," Liemandt says. "Uccel's emphasis [is now] on systems software and banking applications."

Despite all the change, Uccel users queried by DATAMATION say they see little difference in the level of support the company provides the data center. "Our relationship with Uccel hasn't changed much [during the past year]," says Kevin Jones, assistant vice president for information services at Eastern States Bancard, a credit card processor in Lake Success, N.Y.

Analysts view the company's restructuring program and concentration on systems software and banking applications positively. "The main thrust of Uccel's strategy is a commitment to software," says Stephen T. McCellan, vice president at Merrill Lynch, New York, in a report on the company. "The company has become highly focused on the mainframe software business and has trimmed away lower-margin businesses."

"In the last nine months, Uccel has successfully sold almost all of its slow-growth, marginally profitable businesses," says Robert Williams, an analyst with Eppler, Guerin & Turner Inc., Dallas. "We estimate that about 90% of operating income in 1986 will come from Uccel's two primary growth product lines," systems and banking software.

Despite the sale of half of its revenue producing businesses, the company has performed well financially. Third-quarter figures reveal that revenues increased more than $2.3 million over last year to $33.5 million. The company suffered an after-tax loss, however, of $5.9 million that it attributes to the sale of its turnkey systems business.

Uccel is nevertheless sitting on $115 million in cash and is expected to finish 1986 with revenues of more than $130 million and no bank debt, analysts forecast.

While Uccel has the resources to make a significant acquisition, it has yet to go on a postrestructuring buying binge. The company passed up a chance to buy VM Software Inc., Vienna, Va. Uccel was said to be in negotiations to acquire Cambridge Systems's ACF II software program for $65 million (see Look Ahead, Nov. 1, p. 9). Liemandt declines to comment

"In the last nine months, Uccel has successfully sold almost all of its slow-growth, marginally profitable businesses."

about ACF II, but adds, "I would be very surprised if we went go through 1987 without buying anything."

Meanwhile, the company is readying a new product, Synova, for market. After a year of preannouncements, the company says it is putting Synova into six beta sites. The software consists of session

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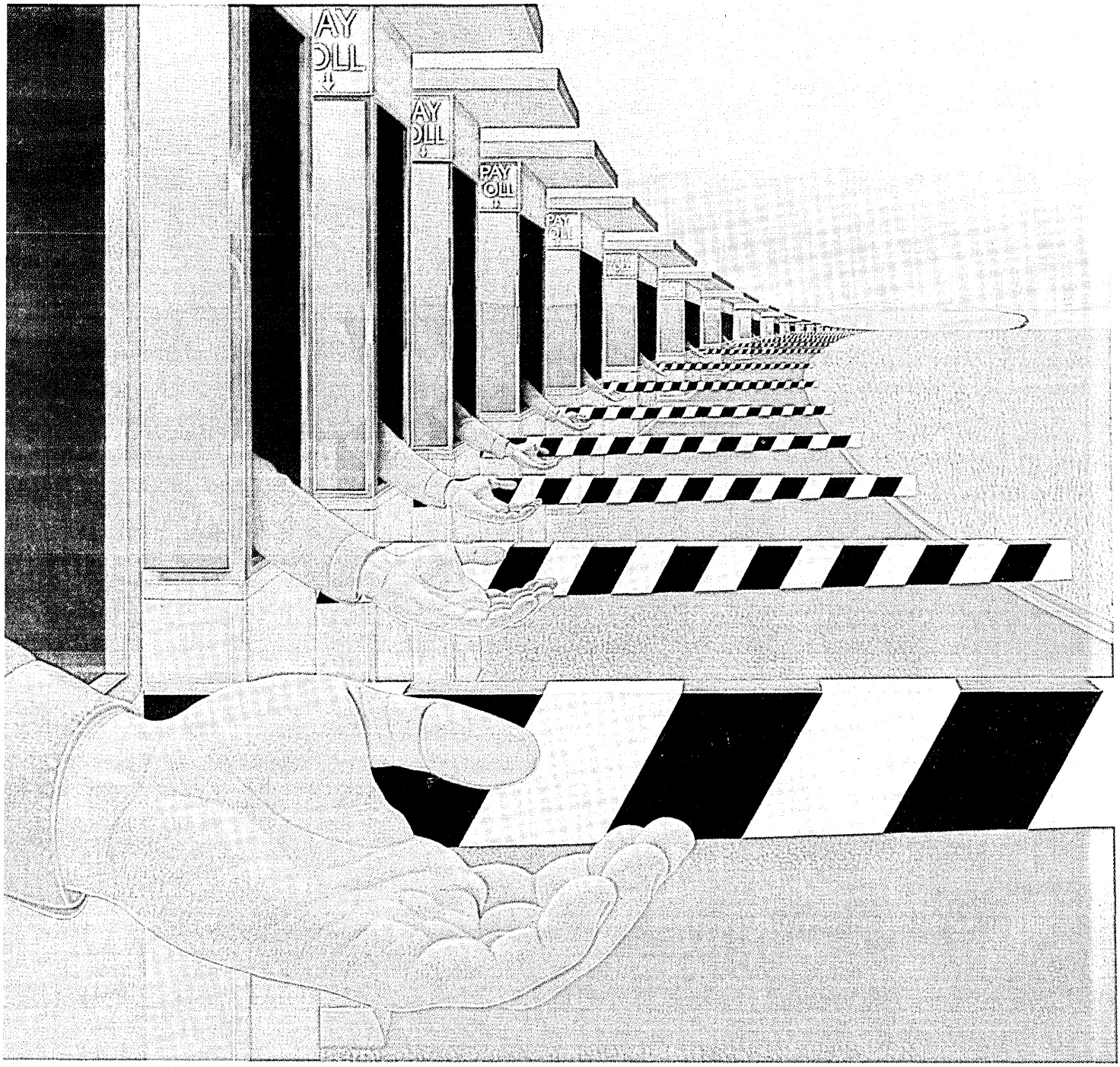

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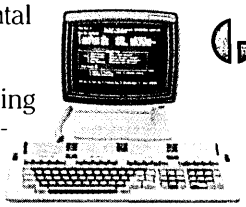

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CIRCLE 22 ON READER CARD

management, dialog management, and communications management. It will allow users to create uniform screens for Uccel applications, in-house applications, and other third-party application software.

According to James Black, director of advanced concepts for the systems software division, Synova is following IBM's published statement of direction and supports VTAM for access management, ISPF for dialog management, and LU 6.2 for communications management.

"We knew Synova would be an uphill battle."

Nova Log, the dialog management component of Synova, is now commercially available. The full-blown Synova system should be available during the second quarter of 1987.

Users, however, have greeted the Synova announcements with some skepticism. Because of the complexity of the system, says Kevin Jones of Eastern States Bancard, "it will be a very difficult task for Uccel to market the product."

"Synova is too new to tell how it will do. The product covers a lot of undiscovered ground," says Carmen Siciliano, computer operations manager for LTV Steel, Cleveland. "Uccel tells you they are going to be able to do a lot of things [with Synova] that are not available today," he adds.

"Yes, we've heard a lot of skepticism expressed," admits Layne Bradley, vice president of product marketing for the systems software division. "We knew Synova would be an uphill battle. Remember, the software is barely in beta sites." Bradley says the company is conducting seminars to educate users.

In addition to fighting skepticism over Synova, Uccel now has the task of competing against IBM in the banking software market. IBM recently signed an agreement with Hogan Systems, Dallas, to market that company's banking software. Hogan Systems was founded by two former Uccel employees, Ben Hogan and Richard Streller.

Despite the competition, Donald Steele, vice president and general manager of the financial systems division, says there is plenty of room to compete in the banking software business. He believes MIS professionals in the medium-sized to large banks are more willing to purchase third-party packages. Recently, Uccel added new loans packages to its Infopoint banking software.

According to a report by the investment research firm Rauscher Pierce Refsnes Inc., Dallas, "Banking applications software is beginning to produce more rapid sales growth. We expect [Uccel] to post $25 million to $27 million in sales of its Infopoint this year vs. $19 million in 1985."

Another area that offers growth opportunities for Uccel is in the conversion of DOS/VSE and BUNCH data centers to MVS/XA shops. Uccel acquired Corodale Inc. to form the core of its conversion solutions group, which is still situated in Boston. The company estimates that upwards of 300 data centers convert every year from IBM's DOS operating system to MVS. Conversions from non-IBM systems number an additional 150 data centers a year. There are an estimated 10,000 DOS/VSE sites in the U.S.

According to Peter Barris, vice president and general manager of domestic systems software, Uccel sees two reasons for growth in the conversion market. First is IBM's drive for data centers to convert. Second, when data centers do make the decision to convert, there are few qualified people to aid in the task. "The real problem is converting users' applications to MVS/XA," he adds.

According to William Moncrief, assistant vice president for the Handleman Co., an electronics distributor headquarted in Troy, Mich., data centers have to convert to MVS to take advantage of that operating system's features. Moncrief says, however, that IBM is helpful in the conversion process only when new equipment is involved.

"IBM cut us off because we bought a used 3083 and wrote a letter to [our senior management] saying we made a terrible mistake by not buying a new 3086 . . . you know, the usual tactics," Moncrief says. Handleman is purchasing conversion software from Uccel.

Not unlike a three-legged stool, Uccel is attempting to gain synergy from Synova and systems and banking software. The company is pitching package deals to prospects, hoping to land deals that include conversion, banking, and systems software. A Uccel executive says that IBM gives the company many conversion leads through "informal channels." Right now, those channels consist of an IBM salesperson contacting his or her Uccel counterpart when it is clear that the availability of conversion software will clinch the deal.

While Uccel makes the transition to being a "software only" company, there are sure to be bumps along the way. The company faces stiff competition from such companies as Computer Associates and Pansophic Systems, as well as IBM. In the meantime, a slimmed down Uccel is hoping that leaner is meaner. ◉

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BENCHMARKS

NAME OF THE BURROUGHS: The merged Burroughs-Sperry company has chosen Unisys Corp. as its new name. The moniker was chosen from thousands of suggestions submitted by employees of the Detroit-based computer giant, which has combined annual revenues of approximately $11 billion. In a related development, Honeywell has agreed to purchase Sperry's aerospace division for just over $1 billion. The cash will help the Burroughs portion of Unisys pay off the debt incurred when it purchased Sperry for $4.8 billion last spring. Meanwhile, the company says it will seek to restructure its Memorex subsidiary (see "Fifth Time Around," p. 26). Also, Unisys says it will work to have its value-added resellers use machinery from both the Burroughs and Sperry sides of the business. Sales and support staffs are being trained accordingly. Sperry is said to have close relations with about 250 vars; Burroughs works with about 130.

DP IMPORTS UP SHARPLY: Computing equipment imports rose 30% in the first half of 1986, resulting in the quadrupling of the nation's dp trade deficit to $976 million compared with the $234 million from a year earlier. Total dp imports, according to a study by the U.S. International Trade Commission, increased to $2.52 billion from $1.94 billion in the first six months of 1985. Meanwhile, the commission says, exports of such equipment dropped 9% to $1.54 billion from $1.7 billion. Trade with Japan showed a U.S. deficit of $486 million in the second quarter, up from $358 million in the corresponding 1985 quarter. Japanese imports accounted for 47% of the imports to the U.S.; 13% came from Taiwan, the commission notes. The principal markets for U.S. exports of dp gear were Canada, taking 15%, the United Kingdom, with 13%, and Japan, at 12%.

SOFTWARE FIRM MERGERS, ONE...: Pansophic Systems Inc., Oak Brook, Ill., has signed a letter of intent to acquire Chicago-based SPSS Inc. Pansophic, a leading systems software supplier, says it will acquire statistical analysis software maker SPSS for $32 million in cash. Meanwhile, Pansophic purchased for $2.5 million the graphics business of Audio Visual Laboratories (AVL), Tinton Falls, N.J. Pansophic will acquire AVL's Starburst micro graphics system.

...AND TWO: Computer Associates International Inc., Garden City, N.Y., has agreed to purchase the Software International subsidiary of General Electric. No terms of the proposed deal were disclosed, but if consummated it would give Computer Associates presence in the market for business applications software designed to run on midrange IBM systems and on minis from Digital Equipment Corp., Wang, Hewlett-Packard, and Sperry. Software International employs 380 persons and has annual sales of about $35 million. It was purchased by GE in 1981 after 13 years on its own.

IBM-HITACHI ACCORD: IBM has drawn up a new arrangement with Hitachi Ltd. of Japan to collect ongoing payments stemming from the latter's alleged involvement in illegal procurement of IBM trade secrets in 1982. While details of the new deal were sketchy, it is reported that Hitachi would license IBM operating system software in the same manner as do other 370-compatible cpu makers. Up until now, Hitachi has been paying monthly penalty fees that were expected to total some $300 million when finished in 1988. The new arrangement comes at a time when IBM is pressing hard on Fujitsu, another 370 clone maker accused of using proprietary IBM technology in its 370-compatible operating system. It is understood that by settling its differences with Hitachi, which was accused of industrial espionage after a joint IBM-FBI "sting" operation in 1982, IBM can gain leverage in ongoing arbitration proceedings with Fujitsu. It is reported, too, that Hitachi has gained freedom in its development and sales of 370-type machines; under the original agreement with IBM, Hitachi was required to permit IBM engineers to study each Hitachi mainframe for possible infringements of IBM's technology. The most sensitive part of that technology, observers have noted, is microcode that forms the interface between the massive MVS/XA operating system and the underlying mainframe hardware.

IBM DEPOT CLOSING: Striving to cut costs in the face of consecutive earnings declines, IBM disclosed plans to shut a midwestern parts depot and distribution center that employs 985 persons. The Greencastle, Ind., facility, with 350,000 square feet of space, is said to be the town's largest employer. IBM is making an effort to reassign the affected workers elsewhere, but observers note the company is also offering incentives to employees for leaving the firm.

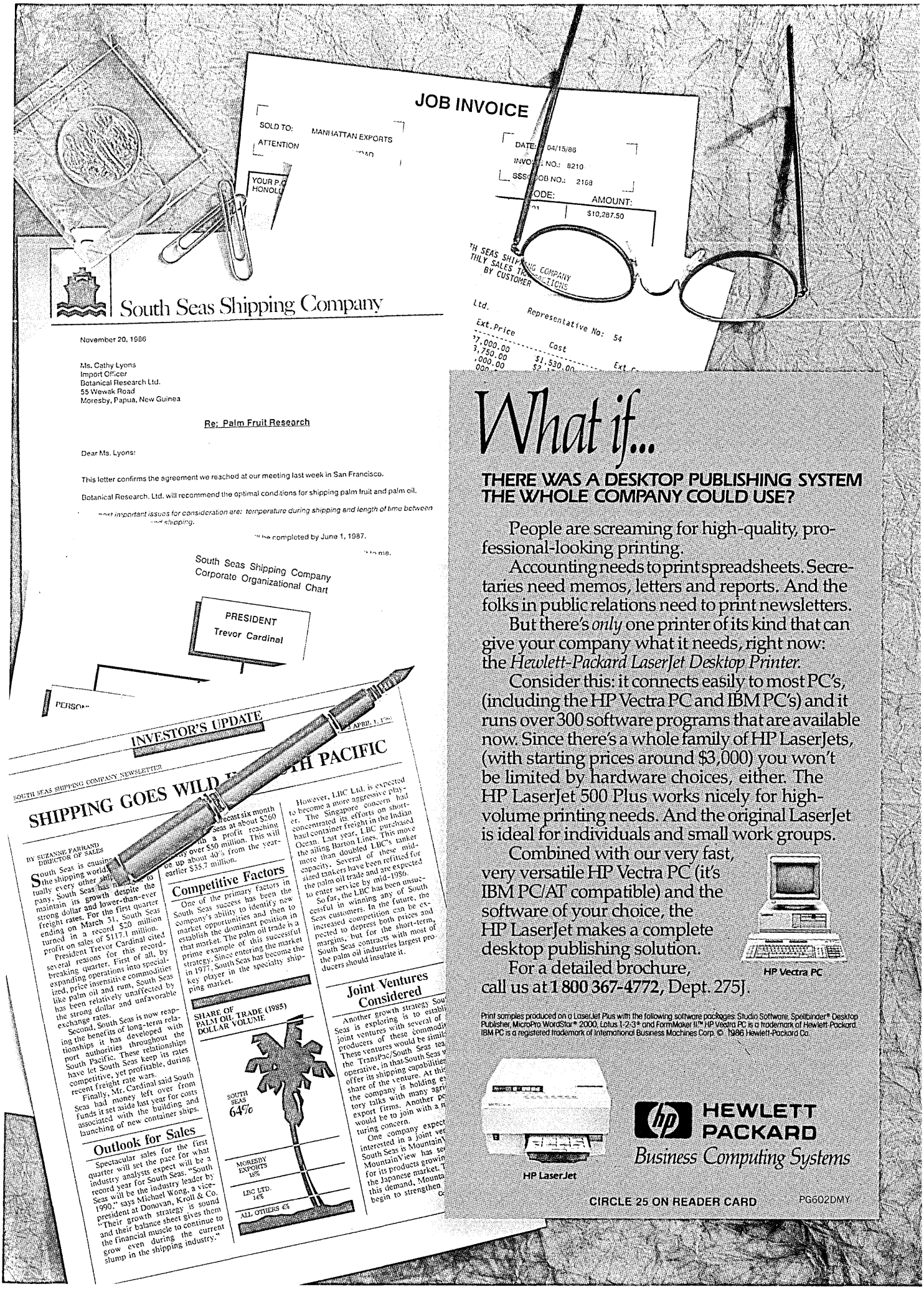
XEROX LAB: Xerox Corp. and its U.K. joint venture Rank Xerox have announced plans for a European systems research lab specializing in human and computer interaction in Cambridge, England. Called EuroPARC, the lab will start off with around 15 specialists and be operational in the first quarter of 1987. Working closely with Xerox's Palo Alto Research Center in California and with Cambridge University, EuroPARC is expected to provide results that will improve Xerox's European sales and benefit work being done on human interfaces in the U.S. Company sources also say they hope to turn research into products faster at EuroPARC than Xerox has been able to do in Palo Alto.

SOLD: French software house Cisi, a subsidiary of the French National Atomic Authority, has thrown in the towel on its three-year-old acquisition, Wharton Econometric Forecasting Associates, Bala Cynwyd, Pa. After buying the firm in 1983, Cisi has been unable to stem the continuing losses and has sold it to a Middle East consortium headed by an economics professor at Louvian University in Belgium. The new holding company, known as Wes Associates AG, will be situated in Basel, Switzerland.

STAR WARS: The Air Force Institute of Technology (AFIT) purchased two Intel iPSC parallel processors for Strategic Defense Initiative research. The 32-node iPSC-VX and 32-node iPSC-MX will be used by AFIT initially for study and analysis of distributed processing systems, including event simulation, finite element analysis, artificial intelligence, and fault tolerant computation.

TRIAL SAMPLES: Selling software is getting more like selling soap every day. They won't find their way into your mailbox, but free samples of software are available to users who buy specially marked boxes of 3M Diskettes. 3M is participating with a Canadian company, pSee Software Promotions Inc. of Markham, Ont., in offering copies of software programs on its diskettes, which can be tried for a set number of times. pSee has made the programs copy-proof and, with the same software protection device, has set the number of times the program can be used. A user wishing to buy one of the programs calls the dealer from whom he purchased the diskettes, triggering a counter update; it also gives him additional tries until he receives the purchased product. The company emphasizes that these are actual programs, not demos. The diskettes, of course, are reformatable and reusable as ordinary blanks.

HP DEAL: Hewlett-Packard and Japanese copier company Canon have reached an oem agreement whereby Canon will sell, in Japan, the newly announced HP Micro 3000 minicomputers, the latest in HP's 3000 business computer line. The computers will bear the Canon name. Canon will incorporate Japanese character sets into the new machines, which have already begun to ship in Japan. ◉



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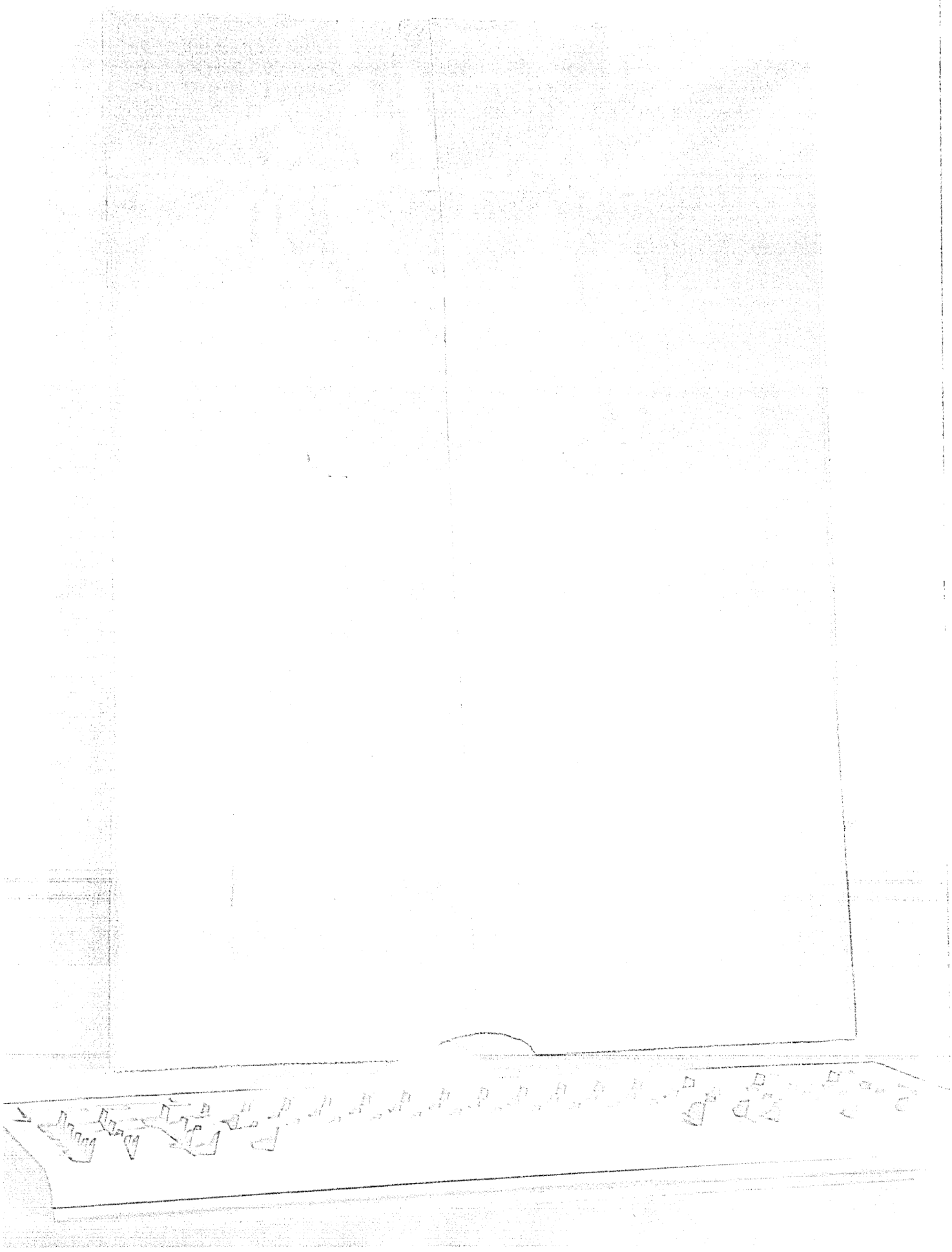

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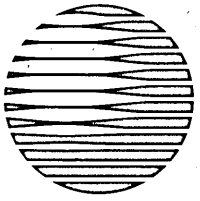

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BEHIND THE NEWS

MERGERS THAT MISSED

Sometimes they're more trouble than they're worth.

by Susan Kerr

In 1984, McDonnell Douglas Corp. appeared like a white knight to Tymshare Inc. The once high-flying communications and timesharing company was losing money and had become the target of a hostile takeover bid by Wang. With the view that it had little choice, Tymshare's management sought a much friendlier suitor and settled on McDonnell Douglas.

"We were fully aware that we'd be slowed down but we also needed their muscle," is how Laszlo Rakoczi, formerly a Tymshare vice president, recalls the acquisition. "But when a large company buys a small one, even if the intentions are right, they seem to blow out the flame. You lose control of your own destiny."

So, after a little more than a year under the new McDonnell Douglas regime, Rakoczi took the money he made from the acquisition and left. Rakoczi now is a partner with Hambrecht & Quist Technology Partners Inc.; he specializes in strategic partnerships because, he says, "we've recognized that most acquisitions don't work."

Although it's too early to judge if that's the case with the Tymshare-McDonnell Douglas venture (last year's $109 million loss by Tymshare and its sister Information Systems Group companies was hardly encouraging), one thing's for sure: a record number of information services and software companies will be sold this year, and, judging from history, most of the acquisitions won't work.

Second only to finance and banking, more mergers and acquisitions take place in the software and services industry than anywhere else, according to Broadview Associates, the Fort Lee, N.J., merger specialists. That's a heady claim in this, the year of merger mania.

In the first half of 1986, Broadview reports, 130 transactions involving software and service companies took place as compared with 82 in the comparable period of 1985. Total dollar value also reached a record $1.9 billion, up 124% from the first six months of 1985.

Of the 114 companies doing the buying in the first two quarters this year, 53 were first-time acquirers of software and/or service companies. Even more important, 50% of these 114 companies were from other industries.

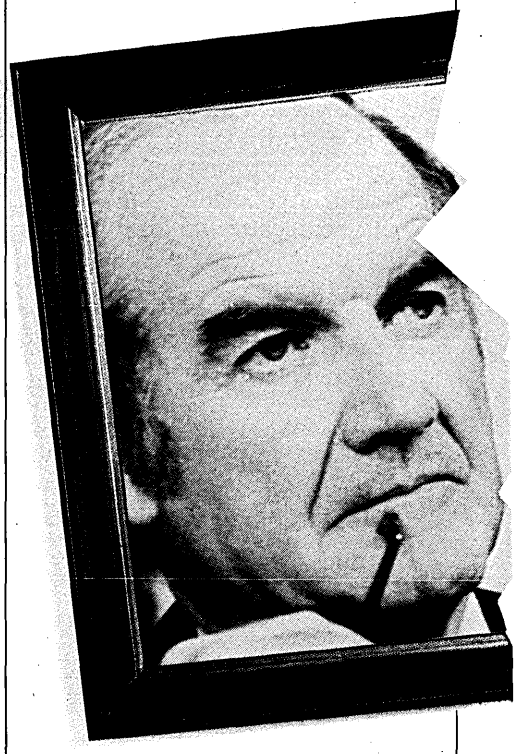
The prognosis for most of these deals is not promising. Although no statistics exist on the failure rate of acquisitions, observers and industry participants agree that it is staggeringly high.

"There are an awful lot of problems with the strategy of growth through acquisition," says Thomas Lawton, editor of the Belmont, Mass.-based *Computer Services Report.* "People tend to get carried away and underestimate the difficulty involved."

That certainly could be part of the reason behind Broadview's finding that software and services divisions accounted for 42% of the sellers in the first half of this year, up from 27% in the year-ago period. Some of these companies were divesting previously acquired operations that just didn't fit in with their main business. Broadview points out as examples Sterling Software's divestiture of divisions of Informatics, as well as Contel Corp. and Ziff-Davis selling off service divisions created by multiple acquisitions.

In general, there are two types of acquisitions: the purchase of a customer list or technology by a company in a similar field or the purchase by a company trying to break into a market. Although nothing guarantees success, intraindustry mergers tend to have a head start. Likewise, if a company is profitable at the time of the buy-out, that's also a help.

How is an acquisition judged a success? If the acquiree is kept as a sepa-



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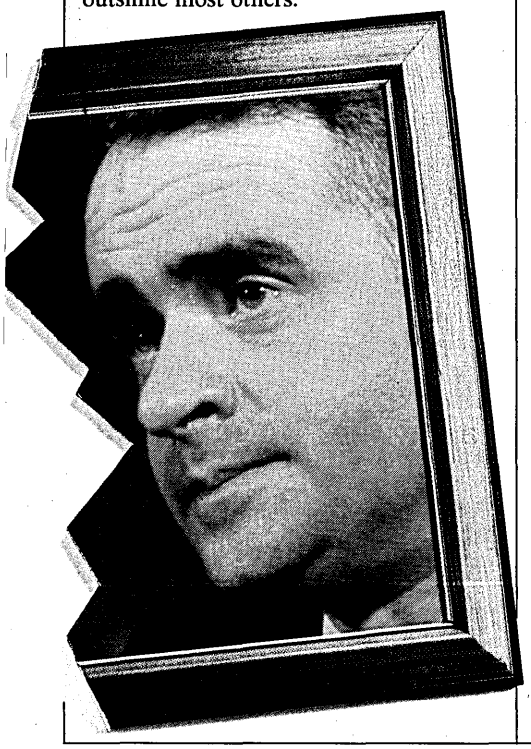
rate entity, profitability is an easy marker. Frequently, though, a firm and its revenue become meshed with the parent firm.

More hazy than money is the issue of technology. Some buyers gain overnight a technological edge that would have taken years of internal development. That in itself may pay for the deal. But few companies then seem able to go any further. Either the job of integrating the newly bought technology with a current product line or getting the hang of marketing an unfamiliar product becomes too difficult.

Charles Varga, chairman of merger consultant Cerberus Group Inc., Frenchtown, N.J., says a purchase must be given at least three years before it can be judged. The first year is typically the get-to-know-one-another period; the second year is when most plans become finalized; year three is when companies assess how well those plans are being fulfilled. After that point, he says, companies may go on the block again.

There are far too many reasons why acquisitions fail. Often, the buyer does not understand the business into which it has just bought and has unreasonable expectations. Personality problems are also cited as a frequent reason for failure. And then there's greed. If one company is looking to strip the assets of another to make a quick buck, that doesn't leave much hope for the future.

Most companies know the pitfalls of acquisitions but are willing to proceed anyway. The lure of easy money is too enticing, particularly in high-technology industries where growth rates traditionally outshine most others.



"There's an enormous redeployment from the smokestack industries into information services. The 20% compounded on average growth is superior to most other markets," says Bernard Goldstein, a Broadview partner.

Even so, those inside the computer industry consider it to be in the midst of a slump. That slowdown means good business for merger and acquisition experts. Outside financing has become more difficult to obtain for private companies, and public companies' stock prices and even

"There are an awful lot of problems with the strategy of growth through acquisition. People tend to get carried away and underestimate the difficulty involved."

earnings tend to be lower than a few years ago. Thus, acquisition becomes an attractive alternative for companies that in the past might never have dreamed of it.

Applied Data Research Inc., Princeton, N.J., falls into that category. The 27-year-old public company was acquired for $215 million in January by Ameritech, the Chicago-based parent of five Bell operating telephone companies. When first approached by Ameritech in August 1985, ADR was in the process of posting a $2.3 million loss for the first three quarters.

"The problem with software companies sold over the New York Stock Exchange is their business tends to be cyclical," remarks Ameritech corporate development director Jim Piepmeier. "So if the company slips a quarter's earnings the stock gets blasted. We said to ADR, 'We're not going to shoot you if you miss a quarter's earnings. . . . We'll supply the cash and protection to allow you to grow.' " ADR, which never before seriously considered an acquisition offer, signed on with Ameritech.

Although ADR and Ameritech fit into the megamerger category along with Electronic Data Systems Corp.-General Motors Corp. and Quotron Systems Inc.-Citicorp, the vast majority of deals involve small, privately held companies. This year's median transaction is around $3 million, according to Broadview.

The software industry is fertile ground for new entrants, given the large number of niche markets that can be addressed with little cash. Over time, many of these companies become potential acquisition targets or seekers.

"Today, the cost of entry is relatively slight," says Peter Levine, program director of the Gartner Group's software management strategies service. "But it's harder to stay competitive. If you come up with a product that's relatively effective and carve out a niche, then the competition comes in and leapfrogs you. It's hard to reinvest, reinvigorate the product." Therefore, concludes Levine, turning to a larger company for a bailout is often the chosen route.

This year, there's another cause for the big upsurge in acquisition activity. A rush is on to beat 1987 tax law changes that are perceived as being costly to buyers and sellers alike. Goldstein of Broadview says the changes to the capital gains tax and the National Utilities Rule could make acquisitions more expensive in the near future.

Beginning next year, long-term capital gains will be taxed at a higher personal and corporate tax rate. At the same time, the National Utilities Rule will be revoked. That rule "permitted the acquiring corporation to allocate the purchase

price to the assets of the corporation it's acquiring," explains Goldstein. Its revocation "could diminish activity."

Good financial reasons notwithstanding, "a lot of acquisitions are prompted by greed and ego," says Warren Prince, president of McDonnell Douglas's Network Systems Co., formerly Tymshare. "Many people acquire because it's the thing to do or because someone in the company is on an ego trip. Those tend to be disasters." But, Prince hastens to add, the McDonnell Douglas transaction "has been a good acquisition for everybody."

Others also have a simplistic point of view of the market. "Acquirers are looking to get into a business and acquirers are looking to make a lot of money," is the opinion of Kenneth Burke, a vp in Baltimore-based Alex. Brown & Sons Inc.'s research department.

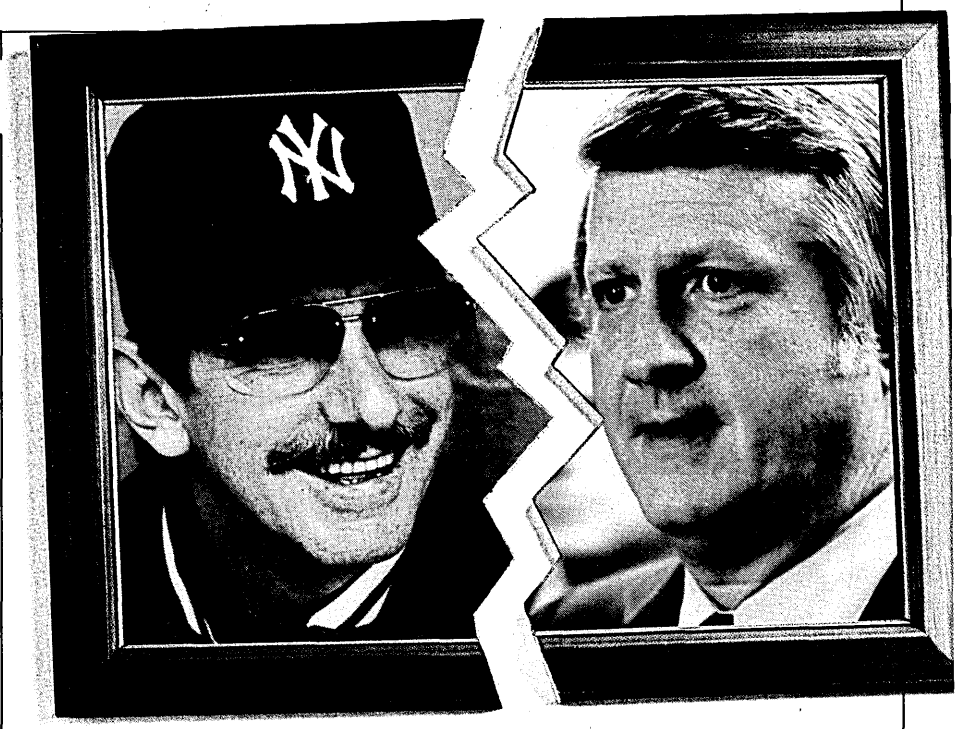
Yet getting into a business is a lot easier than staying in. Typically, the main asset of a software or service company is not tangible. It may be the people who were the brains behind a new software program, or, in the case of service industries, the customer base is the primary asset. In both these instances, there rarely is a way to guarantee that personnel or customers will remain for any length of time.

McDonnell Douglas has had more than its share of departing executives from its Information Systems Group, of which Tymshare's remains are a part. Although the corporation did not return phone calls by press time to comment, several former executives who were contacted did indicate that offers of better and more entrepreneurial opportunities were just too good to pass up. Some of those exits were encouraged by McDonnell Douglas, others were not.

The company's executive staff "did a deal that we felt was good for the stockholders," says one former Tymshare insider. "Once that was done, we started thinking about our futures. Many of us came quickly to the conclusion that we'd leave . . . once our stock options and incentives could be cashed in. In some cases, McDonnell Douglas isolated some people right from the start."

Rakoczi, for one, says he couldn't stand the "excruciatingly long presentations" required by McDonnell Douglas. Even more important, the mindsets of the two companies were radically different.

"In a small company you want to make mistakes," he says. "It's the only way to find the market most of the time. But in a large corporation you really don't want to make mistakes. When you're a small company leader, you're much more focused, energetic, courageous. Those big companies say they appreciate those qualities, but they don't seem to know how to reward them."



UPI/BETTMAN NEWSPHOTOS

On the face of it, McDonnell Douglas should be the perfect acquirer of technology companies. It has lots of money and interest, and is involved in a computer-intensive business. In fact, for more than 20 years the St. Louis giant had a computer subsidiary, McAuto.

Finally deciding to go whole hog into the computer business, McDonnell Douglas several years ago began a slow but steady buying spree. Its prizes include Tymshare, Microdata Corp., and Computer Sharing Services Inc.

Today, none of these companies are recognizable as their former selves. The Information Systems Group (or ISG) consists of 11 vertical market umbrella companies integrating bits and pieces of acquired organizations. Along the way, various parts of the companies have been put on the block. For example, Tymshare's former Travel Management Systems interest was recently sold to Eastern and United Airlines after having been acquired in 1982 from ITT.

A rush is on to beat 1987 tax law changes perceived as being costly to buyers and sellers alike.

"We thought we understood the travel business but we didn't," says Prince. "The technology was unimportant—we just didn't understand the market."

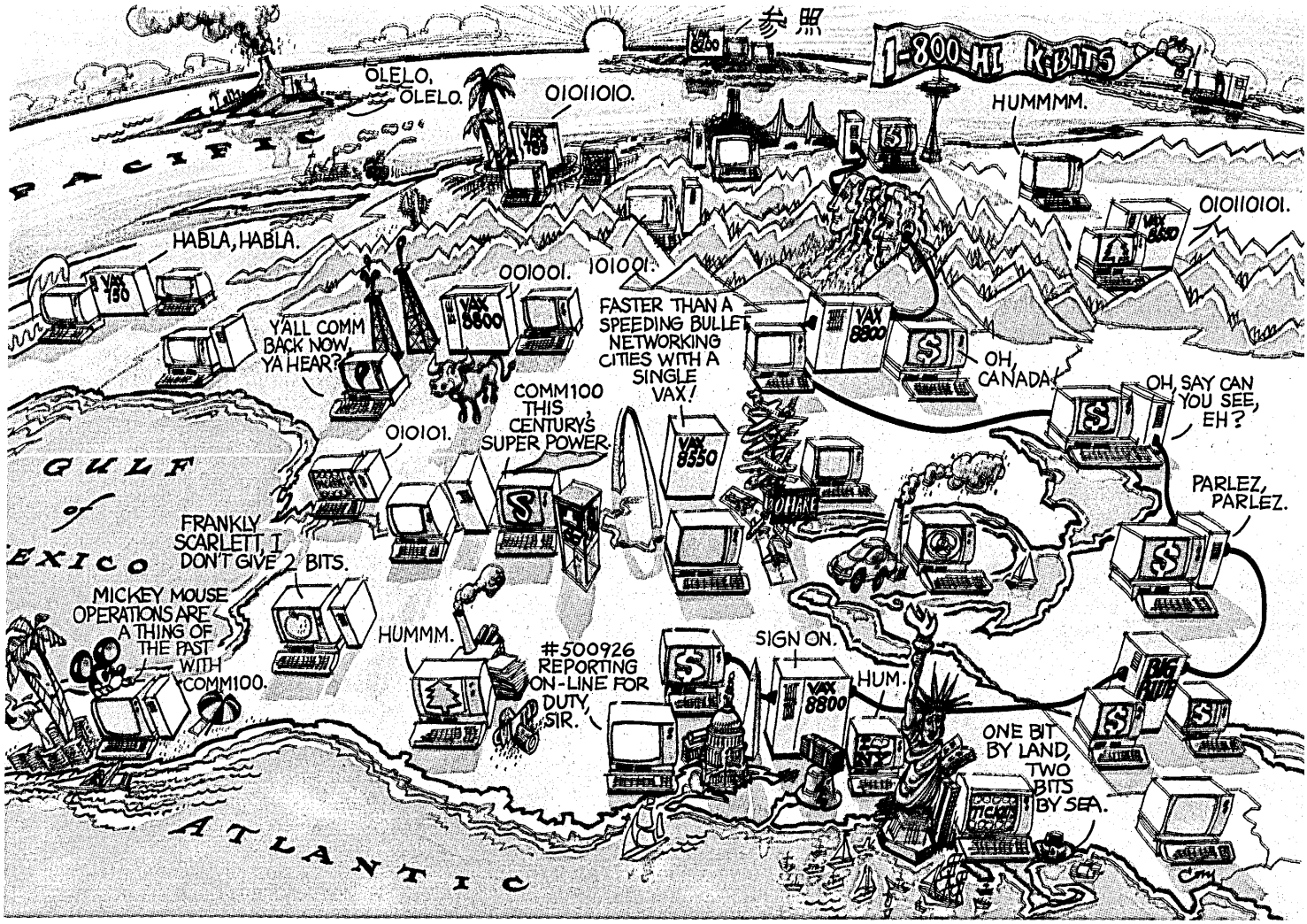
The cost of shifting people, locations, and development has been large. Although sources say the ISG may become profitable next year, it's been a longer process than the company originally thought it would be. McDonnell Douglas has seemed at times unsure of what it's doing. Among its more unusual moves after the Tymshare buy-out was the formation of a triumvirate to run the ISG, which, according to insiders, was a test to see which executive would win out as president.

Robert Fischer, now president and chief executive of Prime Computer Inc.'s CAD/CAM group, was the winner of that race. He admits that "because of the group of three, I may say that it took longer to get where [the companies] should be." Yet he insists that while "the whole thing was very difficult, we had a clear vision. . . . It has not hurt [Tymshare] to be split up into logical businesses. Tymshare was going out of business unless someone was willing to put in a major investment over the long haul."

But despite its problems, at least McDonnell Douglas is still in there pitching. Aerospace companies are frequent buyers and sellers of computer companies but have found success hard to come by.

"The question mark is whether a major aircraft company can create the right cultural environment for a software or services company," points out one industry analyst who requested anonymity. "When a company can sell one airplane and generate as much revenue as a whole computer division, how can you balance that?"

It's not easy. Just ask Martin Marietta Corp., which a few weeks ago divested major portions of its software business, including the former Mathematica and Oxford Software companies. Three years after acquiring Mathematica, Martin Marietta has packed off the company and its RAMIS line of software to On-Line



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CIRCLE 27 ON READER CARD

Software International Inc.

Martin Marietta Data Systems president Pat Zilvitas cited unfamiliarity with software sales cycles and marketing as one reason. In addition, he said in an interview with DATAMATION (see "Clash of Cultures," Nov. 1, p. 22), Martin Marietta wants "to build a business that they'll understand and be able to cope with the ups and downs of because they're similar to the businesses they've had experience with."

The clash of cultures is an easy reason to cite for failed acquisitions. But what about those mergers that seem made in heaven? Ask any analyst to point to a successful acquirer and he or she will most likely single out Automatic Data Processing Inc. ADP chairman Josh Weston estimates that the Roseland, N.J.-based company has made 100 or more acquisitions in the last 25 years. At the start of each new year, he says, the company updates its strategic plan and identifies areas of business in which it wants to be. Often, those areas are entered by acquisition.

While many of ADP's acquisitions supplement the company's primary employer services business, others have helped create a presence in new markets such as the brokerage and collision estimating services industries. The most notable transaction was the $40 million ADP spent in February to acquire Allied Signal's Bunker Ramo Information Systems business, which serves securities analysts.

If ADP is new to a business, Weston says, it tries a decentralized management approach. If the company is in one of ADP's core businesses, the new employees and services are merged as quickly as possible into ADP's established setup.

Weston insists that there is no rule of thumb as to what makes a winning combination. But he knows what makes a conceivably good deal go sour.

"In hindsight," he says, "about 25% of [our acquisitions] didn't work out. The biggest single common reason was that we did a poor job of assessing the management team joining us. Some said they'd stay and they didn't. Others ran out of management capability when the company doubled in size."

Undoubtedly, one of ADP's failures was its attempt to enter the medical benefits administration and computerized claims processing services. ADP tested the waters by buying a small Walnut Creek, Calif., company called National Healthcare Administrators Inc., which had established a customer base of 250 clients. Three years and a few million dollars later, ADP disbanded its efforts and sold what remained of the company to a division of Continental Insurance Co.

Former National Healthcare president Paul Clancy, while admitting that he did well financially from the ADP deal, remains somewhat bitter. ADP is a great company, he says, but didn't know how to do business in his area. "ADP figured that because they were well known they could do business on a direct basis with corporate clients. When I had it, we went through agents and brokers. ADP is excellent in so many things they do but in the insurance market they bit off something more than they could chew."

Recalling the National Healthcare deal, Weston says, "In theory the deal was right, it just didn't go anywhere. . . . We don't deal through independent business agents who have their own agendas."

Although Clancy remained president of National Healthcare through some of the ADP tenure, he notes that "definitely all power was stripped from me. . . . They brought in their own accounting people, corporate people, etc. To be honest, I don't know why they bought it since they changed everything, [even] our claims processing system."

"Many people acquire because it's the thing to do or because someone in the company is on an ego trip. Those tend to be disasters."

In National Healthcare's case, Clancy claims that customers suffered as ADP tried to switch over from the Datapoint-based system he had in place to an IBM-based setup. Among the dos and don'ts of acquisitions are checking "compatibility of hardware and software systems," says Varga of the Cerberus Group. "What systems do they [the acquiree] run on? If you're an IBM-based company, you'd probably like to keep the acquisitions in the family."

The effect on customers and clients of acquired companies can be minimal. But in some cases, everyone becomes a participant. When GM acquired EDS to get in-house technical expertise, almost overnight GM went from accounting for none of EDS's business to 70% of it. Other customers felt the squeeze.

"There was an immediate effect," says EDS client Bradley Loose, a Blue Shield financial analyst based in San Francisco. "The best programmers took off to GM. Apparently, if you didn't get told you were working with GM it was an insult and those programmers would look for work elsewhere. So in came a lot of green people. . . . They didn't used to be stretched as thin."

"We certainly were concerned [about customers]," counters EDS vice president and chief financial officer Davis Hamlin. "Part of the charter from GM was not only to be their data processing services supplier but to grow our base business—[but] we've had to concentrate a little more vigorously around GM the last year or so."

Unlike a good portion of companies, after the acquisition EDS expanded its number of employees and facilities. Since the acquisition, EDS's employment roster has jumped to 44,000 from 13,500. In Detroit alone, EDS now has 12,000 workers, up from virtually none two years ago. EDS now has its own recruiting staff and educational facilities to provide training and development, Hamlin says.

Given its massive nature, analysts agree, five years or more will be needed to judge the success or failure of the EDS-GM merger. One point in its favor is that EDS founder Ross Perot is now GM's largest stockholder and has more input into the parent company's decision-making than is typically the case. On the flip side, however, because EDS is so dependent on GM, its fortunes are tied to GM's. GM's reduced capital spending plans reflected by auto plant closings are expected to trickle down and affect EDS's outlook.

Still, EDS is now a $3 billion company thanks to GM, and $3 billion is a lot better than the preacquisition $700 million, says Hamlin.

"We've certainly had an interesting two years with them, and they haven't been problem free," he adds. "I don't believe there's any acquisition that doesn't have challenges. But the company being acquired and the acquirer must work very diligently to ensure that the basic tenets of the agreement are followed. It's when you start to drift that there are disagreements." ◉

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WORLD WATCH

TOKYO - Next month, a team led by Clinton W. Kelly III, director of the Pentagon's Strategic Computing Program, will be touring Japan in search of leading-edge manufacturing technology. Focusing on robotics, machine vision, and artificial intelligence techniques, the team will pinpoint key innovations that could form part of a defense technology transfer deal. Japanese firms are becoming wary of such transfers, however, fearing that U.S. firms will use the technology commercially, or that their innovations will become subject to restrictive U.S. security policies.

SYDNEY - An Australian equivalent of the European, Japanese, and U.S. support groups for the Open Systems Interconnection (OSI) networking standard is to be set up here next year. Backed with $650,000 from the Australian government and the local computer and telecommunications industry, it will be called the National Protocol Support Center and will be based in Melbourne, Victoria.

PARIS - IBM Europe plans to launch a new range of terminals next year designed for use with the Integrated Services Digital Network (ISDN). Known as the IBM Office Master, it is based on the Intel 80386 and depends heavily on digital communication facilities to offer a broad range of functions including messaging, document processing, local and external database access, and shared storage.

LONDON - Britain's mainframer ICL plans to set up a U.S. subsidiary of its newly formed array processing company Active Memory Technology (AMT). Headquartered in the U.K., AMT's first product is ICL's Distributed Array Processor (DAP), which is being pushed as an attached processor for Digital Equipment Corp. VAX machines. ICL claims DAP can improve basic VAX performance by a factor of between 20 and 500.

PISA, ITALY - Watch for an icon-rich package front-ending Unix on the Apple Macintosh that has won the backing of one of Unix's earliest advocates--Bob Marsh, the founder of Plexus in San Jose. Called MacNIX, the package was developed by Pisa-based software house List SRL, and although it was tested in the U.S., Plexus has launched MacNIX only in Europe so far.

OSAKA, JAPAN - Following other old-style Japanese firms into the age of high technology, farm machinery company Kubota Ltd. has leapt from the fields to the future by purchasing 25% of supercomputer startup Dana Computer Inc. of Sunnyvale, Calif. The $20 million deal gives Kubota manufacturing and marketing rights across the Far East for Dana's 40MIPS machines.

CAIRO - The Egyptian government is preparing to reorganize all its internal data processing planning. Following a visit to Ottawa last month by senior Egyptian officials, a new system modeled on the Canadian method of annual planning reviews is to be introduced in Egypt next year. In a bid to centralize control over dp purchasing, all Egyptian government departments will be expected to submit details of annual performance and plans for dp projects for the coming two years.

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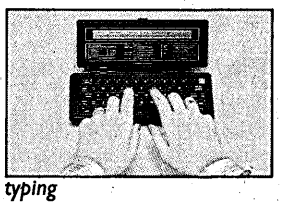
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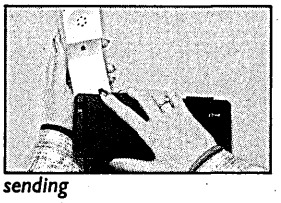
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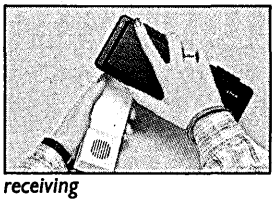
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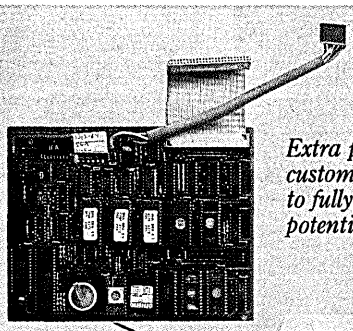

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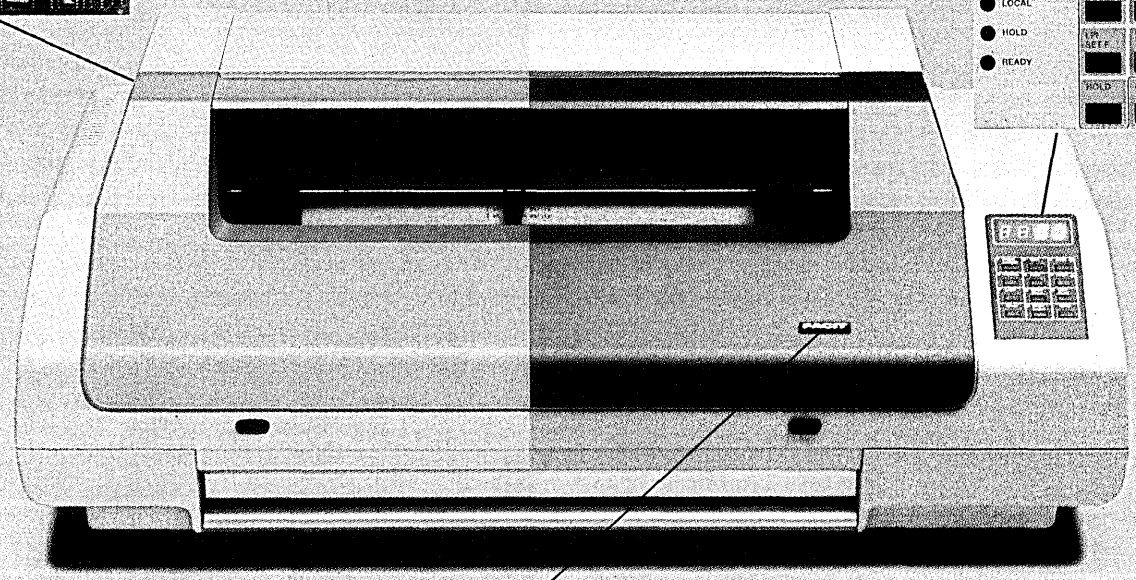

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The troubleshooting and routine maintenance options available to vars and oems are more diverse than ever.

SHOPPING FOR SERVICE

by Dana Blankenhorn

When you sell a computer system, somewhere down the road your customer will need service. Is this a problem or an opportunity? For most oems and value-added resellers, it's a problem. A big one.

Typically, vars and oems turn to third-party organizations like Sorbus or TRW or Xerox to deal with a customer in trouble, but today's resellers have a wider choice. Hardware manufacturers have improved their service organizations, and third-party maintenance organizations are better than ever. Oems and vars also have taken the load on themselves, in whole or in part.

Some industry analysts say service is more than an opportunity; it's a reseller's whole bottom line. Donald F. Blumberg of D.F. Blumberg & Associates, Fort Washington, Pa., puts it this way: "The profits from service are now making up for losses from products at large companies." Service revenues can do the same at small firms.

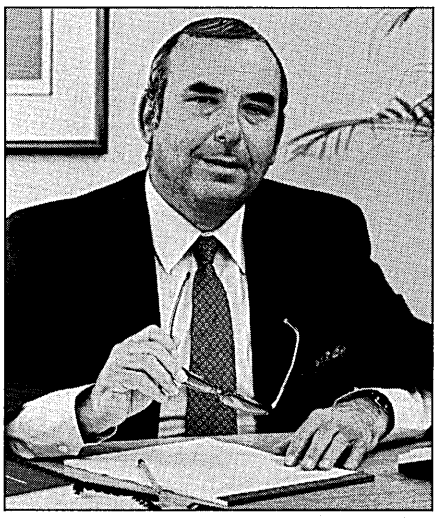
"Look at IBM," Blumberg says. "They always sell products at 20% more than the competition, never offering advanced technology, yet they dominate the market because of service.

"A good rule of thumb, often misunderstood, is that one third of the price of a typical computer will really consist of warranty service," Blumberg adds. "Over the life cycle of the product, you'll shell out 20% of its cost, per year, for service. At $10,000 per box, with $3,300 going into initial service and $2,000 per year over seven years, you're talking about $17,500 in service charges, and hardware costs of $6,500," assuming you keep the equipment the full seven years.

Those vars and oems who ignore service, Blumberg warns, ignore the bottom line. "Vars and oems concentrate on the product. The profit margins are dropping there, whereas profits on service are growing. When you need the service, you'll pay for it."

Hardware manufacturers have certainly learned that lesson. Talk to executives at IBM, Digital Equipment Corp., Harris, or Prime Computer about what sells their machines, and they'll brag about their service first. As an oem or var of one of these manufacturers, a reseller has the option of piggybacking, to a varying degree, on the manufacturer's service efforts.

Or, the var or oem can sign agreements with third parties—either majors like TRW (Cleveland), Sorbus (Frazer, Pa.), or Intelogic Trace Inc. (San Antonio), or a smaller company, such as Computer Maintenance Corp. (East Rutherford, N.J.), which is affiliated with a third-party maintenance organization like the National Computer Services Network (Washington, D.C.). These firms might even pay resellers a commission on the service business they generate.



CONSULTANT BLUMBERG: ignore service, and you'll ignore your bottom line.

Finally, vars and oems can take on the service responsibility themselves. This course holds great profit potential, but also great risk. If a reseller can't deliver fast, quality service for any reason (and at reasonable prices), or if the firm can't compete with the factory and the best of the third-party service organizations, its trusted customers will become enemies.

A HIGHER LEVEL OF SERVICE

Do you remember this old saw: a conservative is a liberal who's been mugged? Well, a computer skeptic is a user who's needed service. Manufacturers realize that now, says Rick Brusuelas, manager of customer service programs at Input Inc., Mountain View, Calif. "I know manufacturers are becoming more interested in making sure users get a high level of service," he says.

A higher level of service today includes working with other companies' products. IBM announced last August that its service technicians will now fix a list of outside products, including Hayes internal modems and AST add-in memory cards that are inside IBM PCs, under regular maintenance contracts. (Blumberg's consulting firm estimates that IBM's service force numbers 20,000, second largest in the industry behind AT&T's 22,000.)

A higher level of service is more than just fixing what goes wrong. Service includes regular updating of the technology, training and retraining the people who use it, and designing and building new installations, particularly when your engine of choice is a minicomputer or mainframe. Amid all the talk that Digital's rise was based on "VAX, VAX, and VAX," the company says service, service, and service had a lot to do with it, too.

"The profits from service are now making up for losses from products."

For its vars and oems—and their customers—Digital now offers a flexible set of service plans. Under the heading of DEC-Compatible Service, the company can have all its engineers trained to service a reseller's equipment (175 products from 50 vendors have it), or it can train a few engineers around the var's biggest customers and keep some spare parts handy (900 products, including peripherals, are serviced this way). When Digital officials discuss service, they include training in the mix.

Under its Oem Portfolio Plan, Digital can either back an existing service effort or take it all on. Its new Net Care Line, announced in 1986, will offer a similar set of services for data networks. "Customers want just one person to take responsibility," says Nick Houpis, a Digital spokesman. "This is all customer driven."

At Prime Computer Inc., Natick, Mass., Richard Gibbs is manager of customer service. His firm offers its vars and oems two options. "One is where we will provide full service for the Prime portion of the configuration," Gibbs says. "The second is a participatory arrangement, where we offer the reseller a service of repair and exchange and they provide full on-site support to the end user," Gibbs adds. Although Prime has 200 service centers worldwide, Gibbs says most Prime hardware oems prefer to have their own people take the first call.

No matter who takes that first call, however, customers won't accept excuses. Tom Davidson, president of Datatel Inc., Alexandria, Va., a Prime software var, has all his customers under Prime maintenance contracts but still makes his own service people available to Prime when trouble strikes.

"The customer wants a total package; he doesn't want finger pointing," Davidson says. Datatel also installs high-speed modems at all of its software installations, so service technicians can diagnose problems from their own offices.

MORE REPAIRS ON-SITE

Even IBM has made what it considers great changes in its service policies, particularly where the PC line is concerned. The company's August service announcement detailed over 90 different, non-IBM products that its service technicians will now repair at a customer's office, including boards from AST Research Inc., Hayes Microcomputer Products Inc., Digital Communications Associates Inc., Tecmar Inc., Amdek Corp., and Hercules Computer Technology. In each case, IBM specifies minimum repair charges, or surcharges on maintenance contracts.

INTILE OF COMPUTER MAINTENANCE: providing less hassle.

What if your IBM PC-based systems include products not on the list? "For an additional $30 per year on the maintenance agreement, IBM service representatives will remove or disconnect a non-IBM feature and replace it with a customer-supplied spare," says an IBM spokesman. Customers who don't have spares handy have to pay for a second service call.

Even more significant was an October announcement that IBM is reducing its service agreement prices an average of 16% over a three-year term. (PC service charges dropped an average of 24%.) The same announcement said network customers under corporate service agreements can place service calls electronically, with the calls forwarded directly to technicians in the field.

"The reductions reflect the increased quality of IBM products and our customers' willingness to participate in the service process," says Michael J. Quinlan, an IBM vice president and president of the North Central Marketing Division Information Systems Group, White Plains, N.Y.

IBM will never admit it's also responding to competition by dropping prices and adding third-party products to its service list, but that conclusion is inescapable.

In offering their products to vars and oems, all major manufacturers are now touting service. Harris Corp., Melbourne, Fla., which formerly sold unique operating systems on its computers, now sells Unix-based machines similar to Digital's, as well as IBM-compatible devices. That puts Carleton Smith, vice president of customer support operations in Dallas, on a hot seat. In addition to having to work on telephones and newspaper publishing systems, he must compare his response times and service organization with Digital's and IBM's.

Changing technology helps keep him competitive, Smith says. "There is tremendous competitive pressure in maintenance pricing. VLSI chips are much more reliable, and we've seen devices go from one failure per year to one failure every five or 10 years."

In figuring the cost of making a service call—and hence the profit from the call—Smith also must estimate what he calls windshield time. "That's where the repairman is looking through the windshield of his car—when he's being paid to drive."

In areas where traffic is heavy and Harris or any other manufacturer has a low density of end users, windshield time can make it impossible to make a profit. No matter how good the equipment is, Smith says, if you're too slow, you create end-user aggravation.

RESPONSE TIME OPTIONS

Harris has found a few ways around this, Smith says, by offering customers options on response times. "If you want very fast response, that will cost you a lot more than if you'd be willing to wait until tomorrow. If we can plan the repairman's run each day, we can work quickly. When the guy wants special treatment, I have to have more people ready." Smith says that in discussions with vars he encourages questions about where service centers are located for what they're reselling.

In all of this, Harris is trying to become more responsive to customer demands, including those of end users and vars and oems, but the company isn't doing it out of the goodness of its heart. Asked if his organization is expected to be a profit center to Harris, Smith responds, "Oh, my God, yes. We measure ourselves on customer satisfaction and profit. You have to keep them in balance, but we're expected to be profitable."

While manufacturers' organizations are expected to show a profit, third-party companies must show one. Richard Intile, vice president of Computer Maintenance Corp., says his company is doing better as more end users create multivendor solutions for themselves, with an assist from vars and oems.

"You have a large spectrum of equipment out there. End users are more sophisticated and expect single-source service," says Intile. "It's a very important factor, which third-party maintenance has going for it. Users are now more intelligent,

more knowledgeable about the equipment, and they've configured their own systems, while still looking for less hassle. That's what we provide."

Intile adds that as more users create customized solutions with parts from a variety of sources, costs to provide that service go up, but as the equipment gets better, service needs decline. "Reliability is increasing, and serviceability is getting easier and faster," agrees Input's Brusuelas.

New tools, such as remote diagnostics that can be tapped over a phone line, reduce service needs and windshield time and increase service profit. They also tie the customer more closely to the hardware manufacturer.

"I think it's the wave of the future," says Datatel's Davidson. He acknowledges it can hamper the efforts of both outside hardware vendors and third-party maintenance organizations to get inside his customers' doors, but calls that "good competition."

"Manufacturers can patent whatever they use for remote diagnostics," says Brusuelas. "As a result, third parties will not have access to that technology. I'd hate to imply that it's not okay to do that, because anything you develop to make your own job easier is to your advantage in business." He adds the hope that "it might encourage third parties to develop their own remote diagnostics technology."

TRW already has. Bill Fredell, a spokesman for TRW's customer service division, explains, "We've developed our own diagnostics for VAX systems, available to oems. They're very competitive with what DEC has. We have sold a tremendous number of these diagnostics to our competitors for Digital maintenance, and to oems and self-maintainers, because DEC had a very tight policy. We've gotten around that, creating diagnostics that are transportable. This is the inventiveness you see in the industry."

Brusuelas says: "Third-party maintenance recognizes that parts acquisition and access to the diagnostic technology are vital to their profitability. Hardware companies are selling parts to anyone, but third parties would like to see volume discounts, guaranteed parts agreements, and so forth." A case now going through the California state courts—Datagate vs. Hewlett-Packard—could clarify some of these issues, he says.

The California lawsuit raises a more general question of increased competition between manufacturers and third-party service providers, particularly for the service needs of oems and vars. Third-party organizations have a long record of service to oems, vars, and manufacturers, notes Brusuelas.

"Traditionally, third parties have had three main markets," he explains. First, "they looked at equipment the manufacturers did not support any more, either because they'd gone out of business or on to new product lines. They also looked to companies that could not do the service themselves, like an Altos, which did not have a service organization in place, and to users who felt the manufacturers were charging too much or [who] were just plain dissatisfied.

"Now, more and more, you see third parties competing not only on price, but on quality of service," Brusuelas continues. "They're more head-to-head on current product lines, and moving into areas where manufacturers have a good service presence."

VAST SERVICE ARMIES

In the course of that competitive effort, vast service armies are being raised. Their generals are telling vars and oems that they will protect reseller interests, just as they have long protected the interests of smaller manufacturers like Altos, promising to give var and oem customers the same level of service they'd get from Digital or IBM, at no cost to the reseller.

Donald Blumberg notes many of these forces belong to manufacturers who are now offering third-party maintenance on their own. Digital's service force numbers 7,000 and NCR's 6,000. Honeywell's service force has 3,800 and so does Sperry's, compared to Sorbus's 3,500 and TRW's 3,000. All these third-party maintenance organizations are dwarfed by Xerox, which has quietly raised a 15,000-person service force offering on-site repair and installation of any computer system you'd care to name.

Those 15,000 people fix copiers too, says Robert Janusz, manager of product marketing for Xerox in Rochester, N.Y. They also represent 25% of Xerox's 60,000 employees, and around $1.6 billion per year in revenues.

Janusz says Xerox has been keen on third-party service since 1983, and that careful planning preceded it. "We went through a process and spent time and money to get into this business, so our infrastructure will let us add new products

SHOPPING FOR SERVICE

Consultant Donald F. Blumberg of Fort Washington, Pa., offers guidelines for vars and oems trying to decide whether to go it alone in service, hand off to the manufacturer, or pass on their customers' requirements to third parties.

Before choosing a service mode, he suggests, take a look at your needs. The four primary areas of service responsibility are design engineering, installation and implementation, maintenance and repair, and moves, adds, and changes. Match your needs with what's available from all possible sources.

The basic steps involved in any service decision, he adds, are these:

- Define the service needs and requirements,
- Establish a service specification and evaluation basis,
- Solicit service proposals,
- Evaluate the proposals, and
- Monitor vendor performance.

"The steps involved in choosing a service vendor are, in many ways, equivalent to those involved in choosing the product itself," he says. But, "a formal selection process should be utilized separately for both product and service to ensure that both are optimal. This is particularly true in a multivendor or mixed-equipment environment."

Here are some more hints:

Look first to the reputation and quality of the service organization. Blumberg says Japanese companies initially lost out in the American market because they signed up with the largest third-party maintenance groups they could find, not the best.

Get a guarantee of response and repair times. "The underlying key to service is time. The organization that's not willing to talk to specific targets isn't the right organization to deal with," Blumberg asserts.

Learn how the service group controls the call. Are calls handled on a regional or centralized basis? Will you receive reports from them on their performance?

Check out the quality of the personnel and how they handle spare parts. Says Blumberg, "A fairly good percentage of situations where customers are down a long time relate to the fact their servicemen didn't have the right parts."

Finally, negotiate a commission. "Third parties used to say they'd take service problems off your hands," remarks Blumberg. "Today, service companies should be willing to compensate you for the business they're getting from you."

—D.B.

Windshield time—the time spent in a car getting to the user—can make it impossible to make a profit.

quickly and profitably. There's a right way and a wrong way, and if you've done your homework, you can do it right and do it quickly. Without the infrastructure, right and quick are different things."

At first, Xerox made most of its deals with manufacturers and large vars and oems. Today, Janusz says, the company deals primarily with large corporations under master agreements.

"The prime focus is not individual users, although we do the business and welcome it. The prime focus is on major accounts. We do business with all kinds of companies," he explains. Whether for an oem, var, or corporate user, Xerox stands ready to negotiate all kinds of terms, "depending on the products involved, geographic coverage," and other factors.

What if the oem or var wants to mark up the service and handle the paperwork? "Some vars' approach is [that] they want to sell Xerox and have the customer work out the paperwork with us. In other cases, [resellers] say Xerox does the work, but they do the paperwork and they may mark the price up to make a profit on it," says Janusz.

Intile of Computer Maintenance is also chairman of the National Computer Services Network. He sees the armies being raised by companies like Xerox on one side and TRW on the other, and he's worried. He is particularly concerned about what remote diagnostics could do to his business, or small businesses like his.

"Years ago, three or four companies held the majority of the marketplace. Today, independents are doing most of the service for vars and oems." Now, Intile says, manufacturers—and particularly Digital—are trying to take that revenue stream back by fair means and foul.

The legitimate approach to recapturing this business, in Intile's view, includes doing repair on third-party equipment in Digital installations. "That list is growing very fast, as more and more customers say they're attaching new pieces and want us to train our people," says Digital spokesman Houpis.

The unfair means, according to Intile, involve parts procurement and documentation. Service manuals that come out late or not at all, and parts that are marked up in price and hard to get both concern third-party maintenance people.

David Starratt, U.S. business field service manager for Digital, says third-party maintenance firms can buy manuals and spare parts from the same warehouses Digital itself uses. "When third parties buy parts, they're getting the same products and turnaround as our own people."

Starratt calls companies like Intile's independent maintenance suppliers (IMSs). "To us, they're competitors in the service business. We'll supply them the basic things it takes for them to be in business," but Digital will not sell any of those parts on an emergency basis.

OFF-LIMITS TO OUTSIDERS

A similar policy exists on Digital repairs. Competitors can send equipment to Digital for repair or replacement, but the DEC Mailer program, with its guaranteed five-day turnaround, is off-limits to the competition. Starratt admits it can take six to eight weeks for old parts to go through Digital's system and become new parts when independents are sending them in.

As to remote diagnostics, independents can use them—if they buy a VAX system and become Digital customers. "Diagnostics are available to anyone who owns a DEC system, even an IMS, if they own a system. We hold them proprietary but license them to all DEC system owners."

Starratt says these policies are under continuous review, and that they were more restrictive until mid-1986. "We liberalized them quite a bit. The points I mentioned are the only ones in contention right now."

Still, Intile says his organization is considering a lawsuit to force further liberalization. "There's a big difference in what we view as basic vs. what they view as basic," he contends.

A study of third-party service conducted by International Data Corp., Framingham, Mass., early in 1986 showed the industry to be highly fragmented. Because the profit potential has lured huge firms like Bell Atlantic (Sorbus), Pacific Telesis (Spectrum), and Xerox into the field, and because manufacturers like Digital have become more restrictive to protect their own margins, Intile says that trend has since reversed. Larger players are now busily acquiring small companies like his.

"Many manufacturers, rather than subcontracting to someone like TRW, feel if they buy maintenance companies, they have power in the industry again." Two examples he cites are Grumman's purchase of Arrow Electronics's Field Service Division, or General Electric's acquisition of RCA Service through the purchase of its parent company. The acquisitions made each "one of the top service firms in the country."

To compete with the threat of remote diagnostics, and difficulties in obtaining parts and manuals, third-party service companies are getting bigger and touting their abilities to service a wide variety of equipment. Says Bob Walters, manager of new markets for Sorbus, "We have a larger parts availability list than IBM does. They're not a sole source." The price is lower than it is with IBM maintenance. Walters adds that the multivendor environment that end users typically operate in makes the future bright for third-party firms like his, not dim.

Bill Fredell of TRW agrees with Walters's conclusion. Multivendor capabilities are "a very important selling point," he says, "and major manufacturers have now realized they were slicing their own wrists" by not offering them. "They're realizing that it gives third parties a competitive edge," he adds.

Fredell expects competition between manufacturers and third-party groups like TRW to heat up. "There's been so much media hype about the service industry that a lot of people see it as a huge money-maker, and it really isn't. Business isn't easy anyplace, so manufacturers want to take back maintenance." Fredell expects that the trump card for companies like his will remain pricing, which is generally 20% lower than manufacturers' service rates.

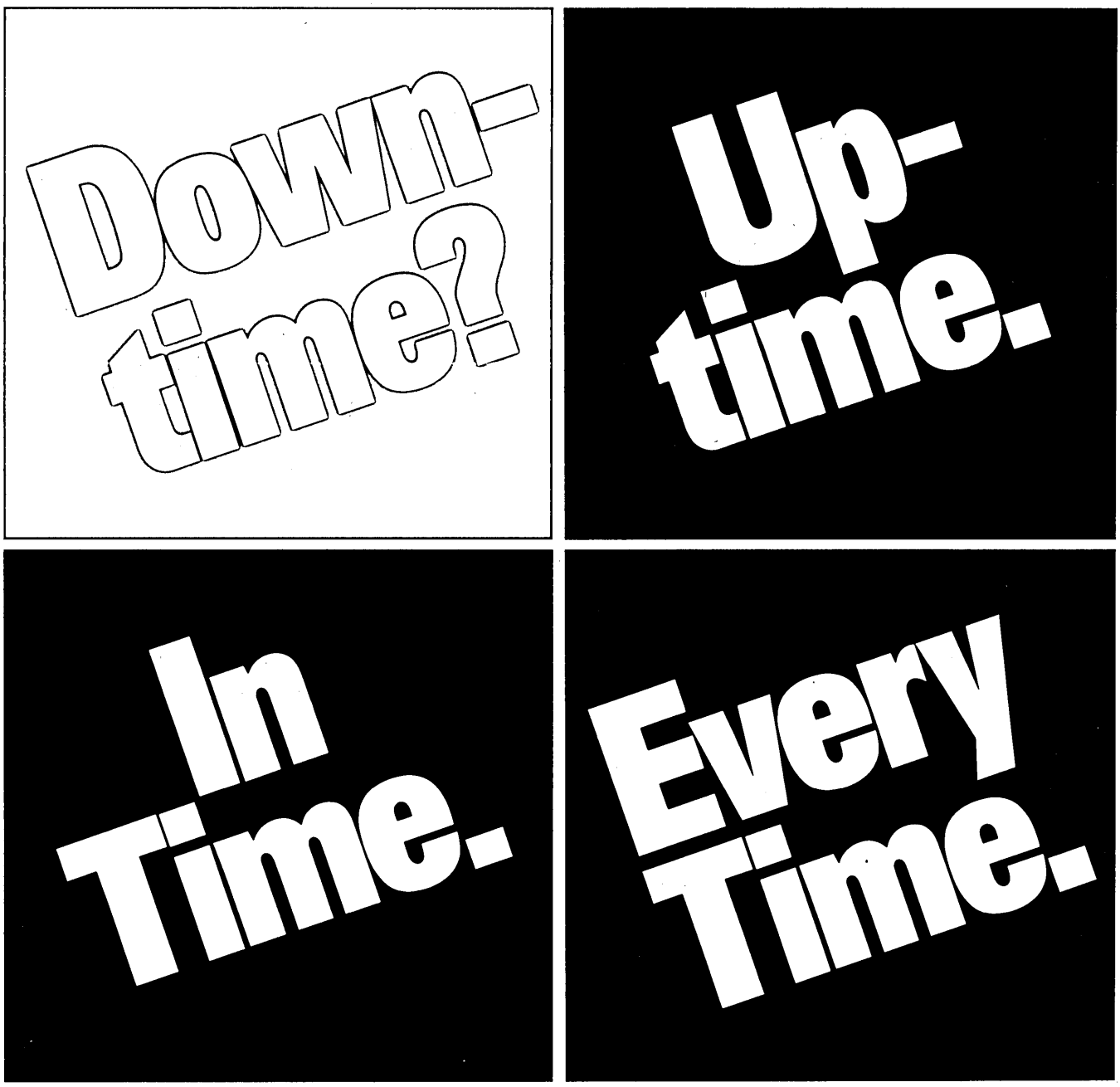
At the Association of Field Service Managers meeting in Las Vegas in early October, a panel of third-party maintenance people agreed that while problems with parts, manuals, and remote diagnostics are serious, the increasing multivendor nature of end-user installations represents just as great an opportunity, especially when the user has pcs. It's very likely those pcs contain boards from many different manufacturers.

Even if the manufacturer deals with some third-party boards, the company won't deal with all of them. (In fact, even some computer stores are reluctant. My Sears pc maintenance contract does not cover parts—like Quadram boards and monitors—that Sears doesn't sell.) Third parties say they will service anything.

Reviewing your service relationships with customers could be the most important thing you do in the next 12 months to keep your firm's business healthy. While both manufacturers and third-party providers offer lots of choices, they're not doing it for your benefit, but because they know service is where tomorrow's profits lie.

Before you give anyone your customers' business, shop around. Those oems and vars who make the best deals for themselves and for those who buy from them will be here tomorrow. ◉

Dana Blankenhorn is a freelance writer based in Atlanta.



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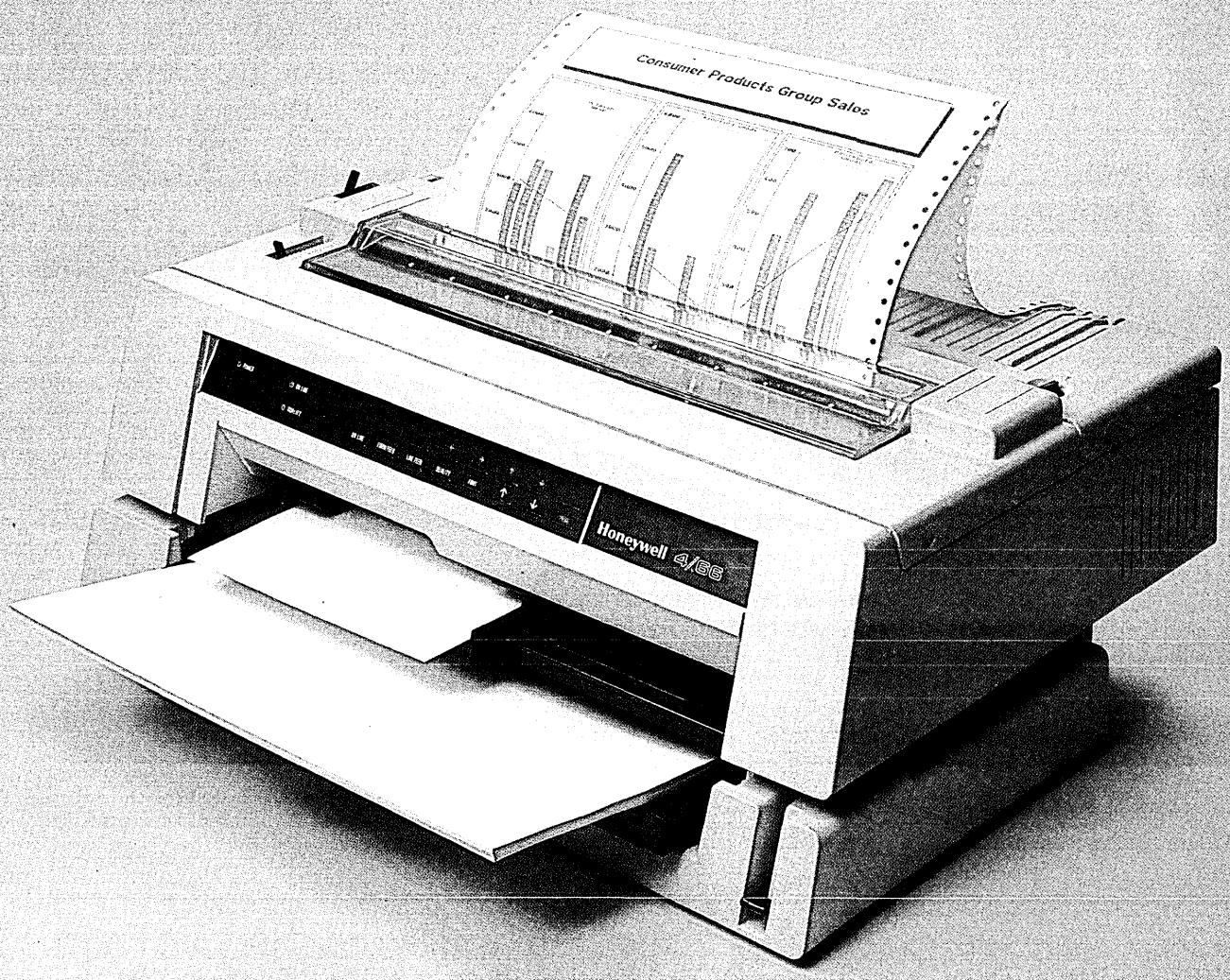

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CIRCLE 57 ON READER CARD

Corporate rebounds in the oem field.

BACK FROM THE BRINK

by Edith Holmes

Economics alone do not account for the two-year slump the computer industry has endured. Addressing the relatively sparse crowd at this year's National Computer Conference in Las Vegas, Robert Crandall, chairman of American Airlines' parent AMR Corp. and the first computer user to keynote the NCC, blamed lackluster dp sales on too much hype and too little attention to what customers really want.

Faced with the choice to either change course or go out of business, some companies have found the means to step back from the precipice. They have looked abroad for capital and new markets, developed generic products that can be tailored for specific markets, and scaled back on acquisitions.

Here are three companies that are turning around after tough times. All three—Pertec Peripherals Corp., Data Access Systems Inc., and Esprit Systems Inc.—have experienced past difficulties for different reasons, but all three depend on the oem and reseller channels to ensure their futures.

From 1977 through 1983, the Chatsworth, Calif., company that is now Pertec Peripherals Corp. introduced no new products. Instead, Pertec chose to live off its reputation as an early leader in half-inch tape drives. As other firms entered the mass storage field, new reputations were made, memories faded, and Pertec's fortunes in the oem market declined.

"We didn't have a lot to say for years," acknowledges W. Clay Matthews, Pertec's president since 1980.

That changed in late 1985. Pertec launched its comeback at Comdex in Las Vegas, when the company unveiled several new high-capacity disk and tape storage products featuring LSI and VLSI technology. With these products—families of 8-inch Winchester disk and half-inch streaming tape drives—and the promise that at least one new tape and one new disk product will be introduced each year for the next three years, the firm predicted it would regain its status as a pacesetter in the competitive data storage market.

That process is under way and sales are increasing, but it will be months before Pertec's managers know whether they have achieved their goal. Clouding Pertec's future is the decision by its parent, Triumph-Adler North America (TANA)—a part of Volkswagen of West Germany—to sell the company. Despite the impending loss of TANA's financial muscle, industry analysts believe that Pertec now has a chance to return to profitability and to build its market share.

At last November's Comdex, a determined Matthews beamed as he described the products that Pertec was there displaying for the first time. For him, the show marked a turnaround that began with TANA's acquisition of Pertec in 1980 and was sustained through subsequent moves to divest the company of all products except rigid disk and tape drives.

"We cut back on everything but R&D," Matthews says. The company decided to focus on the development and production of mass storage devices for mini and micro makers and systems houses. Nearly 25% of Pertec's revenues between 1983 and 1985 went into research. Meanwhile, management ordered a low profile for the 700-employee firm until there were new, technologically innovative products to announce.

PERTEC'S NEW PRODUCTS

The products that Pertec introduced last year included its FS Series of half-inch tape drives and the DX Series of Winchester drives, as well as an oem-oriented packaging scheme that wraps two DX 8-inch Winchester drives and power supplies into one desktop or rack-mount unit. Pertec's high-end tape product offers quad density, multiple speeds, and data capacities ranging from 23MB to 270MB. Its high-end disk drives provide capacities of 368MB and 548MB, access times of 18msec and 20msec, and transfer rates of 14.52MHz.

The DX368 and DX548 drives are built around custom-designed VLSI circuits, which lower the cost of these products while increasing their reliability. Other Pertec innovations include the use of thin-oxide media and composite heads. The company was careful to develop products that offer increased capacity over its earlier drives while maintaining their overall size.

To produce and service these products, the company has built two Class 10 clean rooms that are used for head assembly and testing. While some subassembly of its tape drives and the printed circuit boards that remain on its disk drives takes place offshore, final assembly and testing is completed at the company's manufacturing facilities in Chatsworth, Matthews says.

Today, Pertec is shipping all of its new products and is pleased with the response. Prior to Comdex/Fall '85, the firm had shipped more than 200,000 half-inch tape drives and 50,000 rigid disk drives worldwide. The privately held company won't release annual shipment figures, but does claim that sales of both product families have increased. The company is profitable, with annual revenues that industry sources put in the $60 million to $90 million range.

From mid-1985 through the beginning of 1986, the company signed more than 25 oem contracts, adding Four Phase Systems, a division of Motorola in Tempe, Ariz.; Dansk Data in Denmark; CGT-Random in Italy; Intertechnique in France; and GEC Computers in England to a customer list that includes Digital Equipment Corp. and Convergent Technologies in the United States and Schlumberger in Europe.

The international market is particularly important to Pertec since its domestic oems ship between 30% and 40% of their products overseas. The European market now accounts for 25% of the company's sales and that share is expected to grow to 30%, according to company officials.

In selling its new products, Pertec is looking for distributors who specialize in a particular geographic area or product line, such as DEC or Data General equipment. The company also stresses sales to local

The international market is particularly important to Pertec.

area network and computer aided design and manufacturing firms and to systems houses that market to industries like banking and insurance with multi-user/multitasking application requirements.

For now, Pertec is less interested in courting those systems houses in narrow vertical markets that are subject to wide swings in product demand. By concentrating on LAN and CAD/CAM companies and the aftermarket for DEC and DG products, "we are better able to spread our risks," says a Pertec marketing official.

To be sure, TANA's divestiture of Pertec will disrupt the company's comeback. Pertec has considered Volkswagen's name recognition, particularly in Europe, as crucial to reducing any concern its oem customers have had about purchasing its products. The peripherals company's sales could slow until a buyer is found and its future becomes more secure.

Ultimately, whether Pertec wins in its attempt to regain its earlier stature in mass storage depends on its ability to expand its market share in disk drives. "Its market share remains quite small," says James N. Porter, president of Disk/Trend Inc., Mountain View, Calif. "In 1984, they weren't even at the noise level."

The high-end, 8-inch Winchester drive market "is a tough game," he says. "But Pertec has good, experienced management now. If there is enough time, the company has a chance to become a factor in the marketplace."

Data Access Systems Inc. took the first step on the road to financial recovery when David Cohen, a former personal injury attorney with a knack for helping troubled firms, agreed in January 1983 to take over as chairman and ceo. Cohen secured a $5 million line of credit to allow operations to continue and insisted that the Blackwood, N.J., computer equipment distributor enter Chapter 11 proceedings while a plan was worked out to pay creditors the $29.5 million owed them.

The 17-year-old company—today a single-source vendor for the sale, lease, and service of personal computers, computer terminals, and related peripherals—ran into difficulties when its profits were plundered by top management.

Convicted of fraud in a scheme that involved the diversion of Data Access funds through other companies he controlled, former chief executive Gerald R. Cicconi was fined $2 million and is serving a four-year sentence in an Alabama federal prison. Earlier this year, Data Access founder and former chairman Robert T. Coppoletta was indicted on charges of involvement in a fraudulent invoice scheme that allegedly resulted in the siphoning of more than $1 million from the company.

Under Cohen's leadership, Data Access emerged from the protection of the U.S. Bankruptcy Court in November 1984 with a plan to pay creditors in full by 1991. Despite the firm's problems, it maintained its sales volume and customer base.

While operating under Chapter 11, the publicly held company recorded its first profitable year since 1978, achieving earnings of $1.6 million on revenues of $34.7 million. For the fiscal year ended Aug. 31, 1985, Data Access earned $935,147 on revenues of $35.5 million. For the first six months of fiscal 1986 ended Feb. 28, the company broke even with a net income of $5,102 based on revenues of $17.7 million.

"This company's trouble came not from a lack of business, but from management," says Cohen.

FUTURE LOOKS BRIGHTER

The company's future looks brighter now. In May, Data Access gained a new president, James D. Gallagher, a graduate of the University of Pennsylvania's Wharton School and a 32-year veteran of the computer industry. The company also entered the Philadelphia stock exchange. In September, the firm acquired a software company—PDF Systems of Baltimore.

Data Access currently represents 27 vendors and distributes over 220 products through a national network of 18 sales offices and 28 service centers, as well as through international distributors in England and Canada. The company has more than 20,000 customers, including Fortune 1000 corporations, financial institutions, government agencies, and universities.

With its renewed credibility, the firm has become a value-added dealer for IBM and a value-added retailer for AT&T. It has been an authorized distributor of Digital's products for some time.

Cohen regrets the length of time it took to convince IBM that Data Access would survive. "As a result, we came late to the IBM world when the bloom was slightly off the trees in the industry," he recalls. Data Access received its first shipment of IBM PCs in February 1985.

Last October, Data Access entered the oem market with a semiproprietary product, a terminal dubbed the AT1183, which emulates Burroughs' ET1100 device down to its specific control code characteristics. A program called View 132, which allows users to work with large documents like spreadsheets and takes advantage of the terminal's 132-column display, has also been introduced. Data Access has signed 20 oems for the emulator. Cohen expects to do between $5 million and $7 million worth of business in the current fiscal year with this product alone. Between January and September of this year, the company delivered 4,000 of these devices; its executives had expected to sell 2,300 AT1183s.

The company will introduce a second semiproprietary terminal, a Hewlett-Packard 2392 emulator, to the oem market by year-end and plans Tandem 6530- and Honeywell-compatible terminals. "We believe these markets need terminals with nice user and security features," says Bob Meason, director of product support for Data Access.

In fact, Data Access plans multiple emulations based on one generic engine built around a Z80B processor for oem distribution, Meason says. Technology Venture Management of Lansing, Mich., designed the firmware for both the Burroughs and HP emulators, and Zentec Corp., Santa Clara, manufactures the AT1183 for Data Access.

The development of terminals to serve these and other vertical markets is key to the company's growth. The dumb terminal field, once Data Access's primary market, "is a rotten place to be these days, because profit margins are too low," notes Meason.

Cohen echoes this thought. "We need to sell higher-ticket items," he says. Eventually, Data Access executives want to add minicomputers, such as DEC's MicroVAX II, to their product offerings. The company is already selling AT&T's 3B computer line.

Higher-ticket products are part of the company's broader strategy to become a systems analysis and support firm. Cohen believes in beefing up the service side of the firm's business—which grew 35% last year and is projected to grow as much this year—and in training the company's technicians to service every piece of equipment that Data Access sells or leases.

"We can't service everything on the market," he adds, explaining the company's constant evaluation of the products it markets. "As it is, we have too much gear right now." Aside from the cost of training its technicians in these products, Data Access spends over $6 million annually on spare parts.

Since Cohen's arrival, Data Access has built a product support staff of 19 that will be expanded further in the months ahead. This group trains the company's 100 service technicians nationwide, provides them with marketing support, and oversees the custom design of firmware for Data Access's emulator products.

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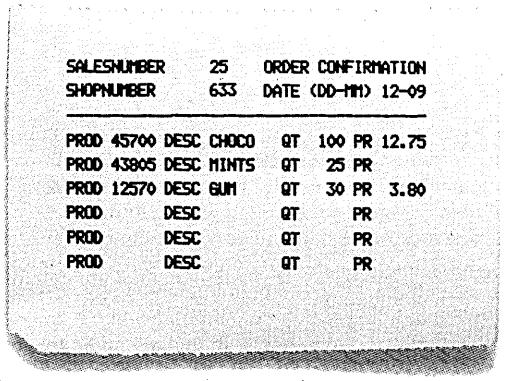

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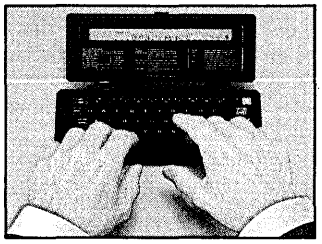
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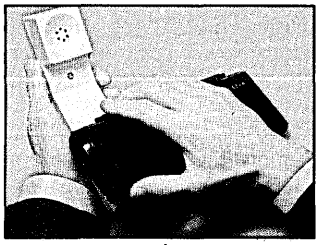
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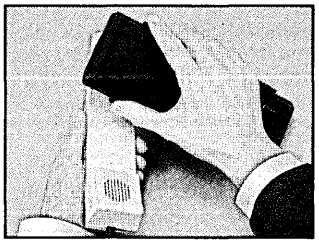
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CIRCLE 58 ON READER CARD

Data Access hopes to add minicomputers to its product offerings.

To meet the firm's overall growth goal, Cohen looks for acquisitions that fit the firm's emphasis on service and support, its desire to expand into international markets, and its determination to stay away from manufacturing and retailing.

Meantime, growth—both internal and through acquisitions—will be limited until the company finishes paying its creditors. Data Access has shelled out more than $15 million since January 1983, and some of its debts will be discharged completely this year.

What will Cohen do in 1991 when he has the money to spend as he chooses? At the top of his priority list is to have enough cash for R&D to develop proprietary, rather than semiproprietary, products. Then he would expand the servicing and leasing sides of the company's business. Leasing, which today earns Data Access over $5 million a year, "should be quadrupled at least."

TOUGH YEAR FOR ESPRIT

Like so many other companies in the computer field, Esprit Systems Inc. of Melville, N.Y., had a tough 1985. With the industry slowdown, the maker of vdts, intelligent workstations, and multi-user microcomputers saw inventories swell, prices erode, and competition for market share increase.

These common difficulties coincided with the company's entry into a variety of new markets through acquisition, private labeling, and new product development, all of which further strained Esprit's resources.

The firm increased its short-term borrowing from just under $3 million to nearly $9 million to finance its losses during the fiscal year ended May 31, 1985, and to acquire DBS International Inc., a Montgomeryville, Pa., company that became part of Esprit Computer Products Inc., a wholly owned subsidiary formed to design, develop, and market small business computer systems.

By taking this course, Esprit exceeded its loan formula and was no longer able to give its principal product supplier, Advanced Datum Information Corp. (ADI) of Taiwan, letters of credit in the amounts or at the times required by the companies' manufacturing agreement. As a result, the firm suffered product shortages and lost sales.

Though revenue for 1985 was $30.7 million, an increase of 15% over 1984's $26.6 million, the publicly held company posted a net loss for the year of almost $6 million, or $1.51 a share. The year before, the firm had a net profit of nearly $1.2 million, or 35 cents a share.

Contributing heavily to the 1985 loss were one-time write-offs of $1.9 million in unamortized goodwill in Esprit Computer Products; a write-off of nearly $1.1 million of the company's investment in Lantech Systems Inc., a developer of Unix-like operating systems and utilities for use in network environments; and write-downs in inventories totaling almost $1.8 million.

Management at Esprit, the successor to Hazeltine Corp.'s computer terminal operation, turned the company around by seeking and achieving closer ties with its foreign manufacturer. In March, ADI completed the purchase of 3.7 million new shares of Esprit's common stock for a 49% ownership in the firm. As a result, the U.S. company received $2.5 million in new equity capital, a $1.5 million product purchase credit line, and more favorable product pricing from ADI.

Then, in August, Esprit's management discontinued the company's unprofitable microcomputer product line, electing to concentrate on its core business of supplying vdts for multi-user computer systems. In addition, management was restructured and overhead was reduced. Anthony P. Palladino, chairman of the board and chief financial officer, and Allan Maurer, vice president of sales and marketing for the microcomputer product line, resigned, having helped the company back to health. Palladino remains a member of Esprit's board.

ESPRIT RETURNS TO PROFIT

Esprit returned to profitability in its third fiscal quarter, ended Feb. 28, 1986, with dollar sales up 48% over its second quarter. Profitability continued in the fourth quarter, which ended May 31, with a net income of $40,000, or one cent per share, despite a loss from discontinued operations of $470,000, or six cents per share. Esprit's fiscal 1985 fourth quarter saw a net loss of nearly $3.9 million, or 99 cents per share.

"With the year of financial difficulties behind us, we have the opportunity to get back on a track of growth and market leadership," says John A. Sasso, Esprit's president and chief operating officer and, since June, its chief executive officer. With a presence in the terminal market beginning in the early 1970s, "Esprit is one of the enduring, long-term players," he adds.

"Strategically, ADI's investment in Esprit represents the coming together of manufacturing and engineering and marketing for the company," says Sasso. He suggests that the fruits of this new ability to act as one company can be seen in recent product introductions, particularly in terminals, which account for more than 80% of Esprit's revenues.

In January, Esprit entered the Data General segment of the vdt market with the introduction of the ESP 6210, a joint effort by the company and its Taiwanese partner. The new terminal is compatible with Data General's Dasher 210 and 211 terminals but adds display, editing, and ergonomic enhancements not found on the DG units. In addition, the ESP 6210 is being offered to oems and large vars at discounts as much as 42% below Data General's oem prices, according to Esprit.

Two months later, the company unveiled Esprit ATerm, a fully compatible IBM AT terminal. Priced at $479, the ATerm is aimed at multi-user environments where applications now run under the Pick and Xenix operating systems.

Esprit launched a new family of ASCII terminals this summer and plans to add to it this fall. The first of these products, the OPUS 2, sits next to, and in some instances replaces, the company's ESP line of ASCII machines. A midrange terminal, the OPUS 2 has a flat screen and improved design. The terminal was recognized for excellence in design achievement by the Industrial Designers Society of America in September.

In addition to new products, Esprit has initiated a buyer protection program aimed at its network of domestic and international distributors, oems, and systems integrators, as well as its end users. Under this program, begun in April, the company offers to replace its own or any competitor's failed terminal within 24 hours. The effort is intended to increase Esprit's share of the large DEC VT220 market, in particular.

Designed to blunt the price erosion the company sees in this market by emphasizing value, Esprit's program consists of three parts. "Esprit to the Rescue" provides a free replacement unit, for a 30-day evaluation at no cost or obligation, for any competitive terminal that fails. "Esprit Express" offers replacement of its $629 ESP 6515, a DEC VT220 emulator, at an annual fee of $39 a unit. And, finally, in addition to the 90-day warranty that comes with Esprit's 6515, the company guarantees that if the terminal fails more than once in 30 months, it will be replaced free of charge.

Sasso is convinced that his company's new products and aggressive marketing programs will lead to growth in market share. "Though we're not nearly to the point of forecasting any boom times, we foresee a steady improvement," he says. ◉

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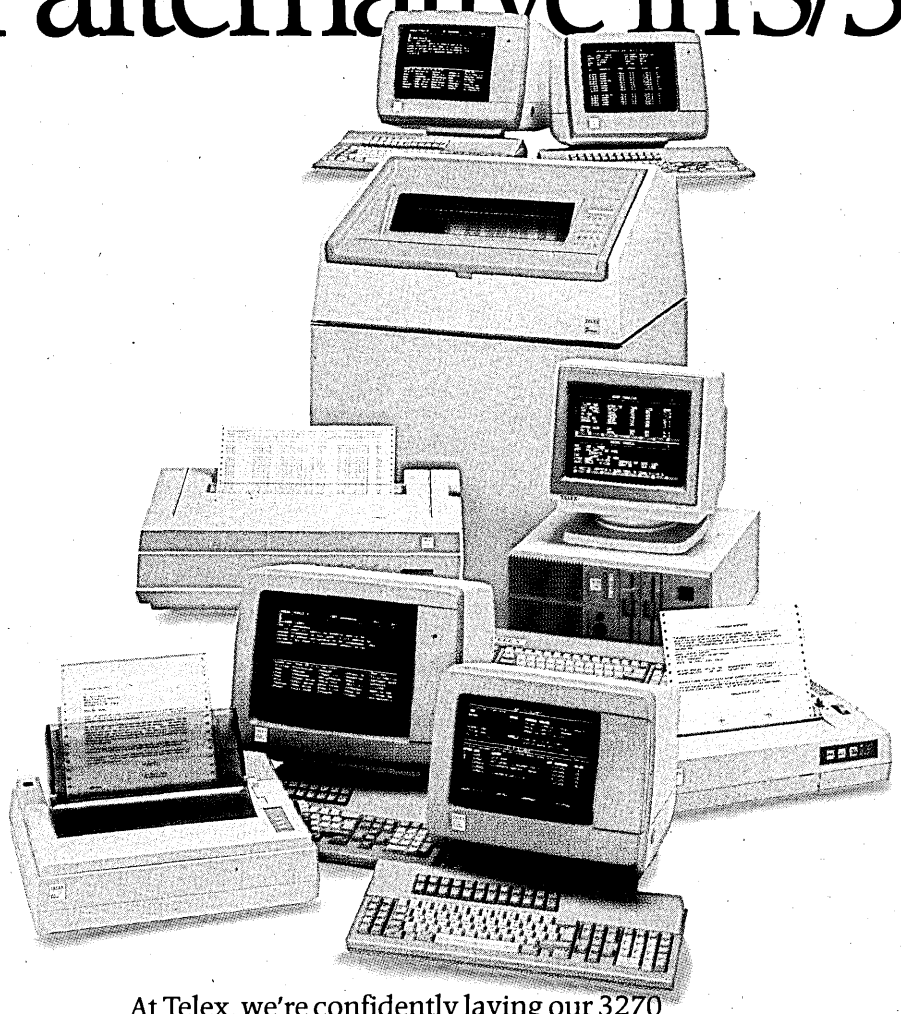

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CIRCLE 30 ON READER CARD

MIS managers tell DATAMATION their Christmas dreams.

WHAT I WANT FOR CHRISTMAS

by Peter Krass

While data come in ever-fewer nanoseconds, Christmas still comes but once a year. At this beloved time even data processing managers, normally the most serious of adults, react with childlike glee when asked, "And what would you like for Christmas?" Though far too old for visions of sugarplums, MIS execs can still imagine what they'd like in their yuletide computer rooms.

Donning the fur-trimmed Santa Claus suit (alas, a smaller pillow is needed this year) and boarding the trusty, if somewhat rusty, sled (outfitted with the latest digital display dashboard), it's off to visit the managers of some leading computer shops throughout the country to ask what they'd like to unwrap on Christmas morn. Their answers make up a wish list of technology tools users can't currently get from their Santa suppliers. Who knows? Maybe their list will inspire the elves slaving away in Silicon Valley, Armonk, Japan . . . and, of course, the North Pole.

At the top of the list for Barry W. Lawson, senior vp at First National Bank of Atlanta, is "five more telecommunications analysts." On a more realistic note, he says he'd like to have a fully integrated programmer's workbench that's cost-effective. "We're starting to see lots of different programming tools coming out," Lawson explains, "but very few of the product lines have tools integrated in a way that could be effective in minimizing training. Rather than buy a lot of miscellaneous tools and just lashing them together, we'd like to see somebody come out with a more integrated approach."

Lawson is also dreaming of a fully functional database management system that includes both end-user computing and transaction-based systems. "There are two directions for data administration today: large data system administration, where you see IMS and other such tools, and end-user computing, where you see things like DB2. We'd like an approach that ties those two ends together," he says.

Database software is also on the wish list of John D. Kirklan, vp of information systems and services at New York Life Insurance Co., New York. "For some of the very popular dictionary-driven database management systems," he says, "there ought to be some decent simulation software that allows you to project internal computer usage, response time, and batch update." There isn't, so Kirklan and his staff of 350 applications programmers base their benchmark tests on samples. "People are fooling around with databases that contain not 100,000 records, but more like 8.5MB records," he says. Since these records are much larger than the DBMS designers envisioned, Kirklan's programmers create overnight batch window problems and response-time delays. Without simulation software, they "can't estimate how severe those problems will be."

WISH FOR A YULE JEWEL

A more vendor-specific wish for a yule jewel came from Samuel Hunt Jr., who manages a Digital shop as general manager of Copley Computer Services, La Jolla, Calif. The visions dancing in his head feature "larger-capacity disk drives that run faster and are more reliable." Hunt runs a DEC System 10 equipped with 13 500MB RP07 disk drives. He has traced many system bottlenecks to the DASD units. Although Digital plans to announce an 800MB disk unit, he feels that's not enough. "DEC is not moving fast on disk drive technology," Hunt complains, "and they tend to be expensive."

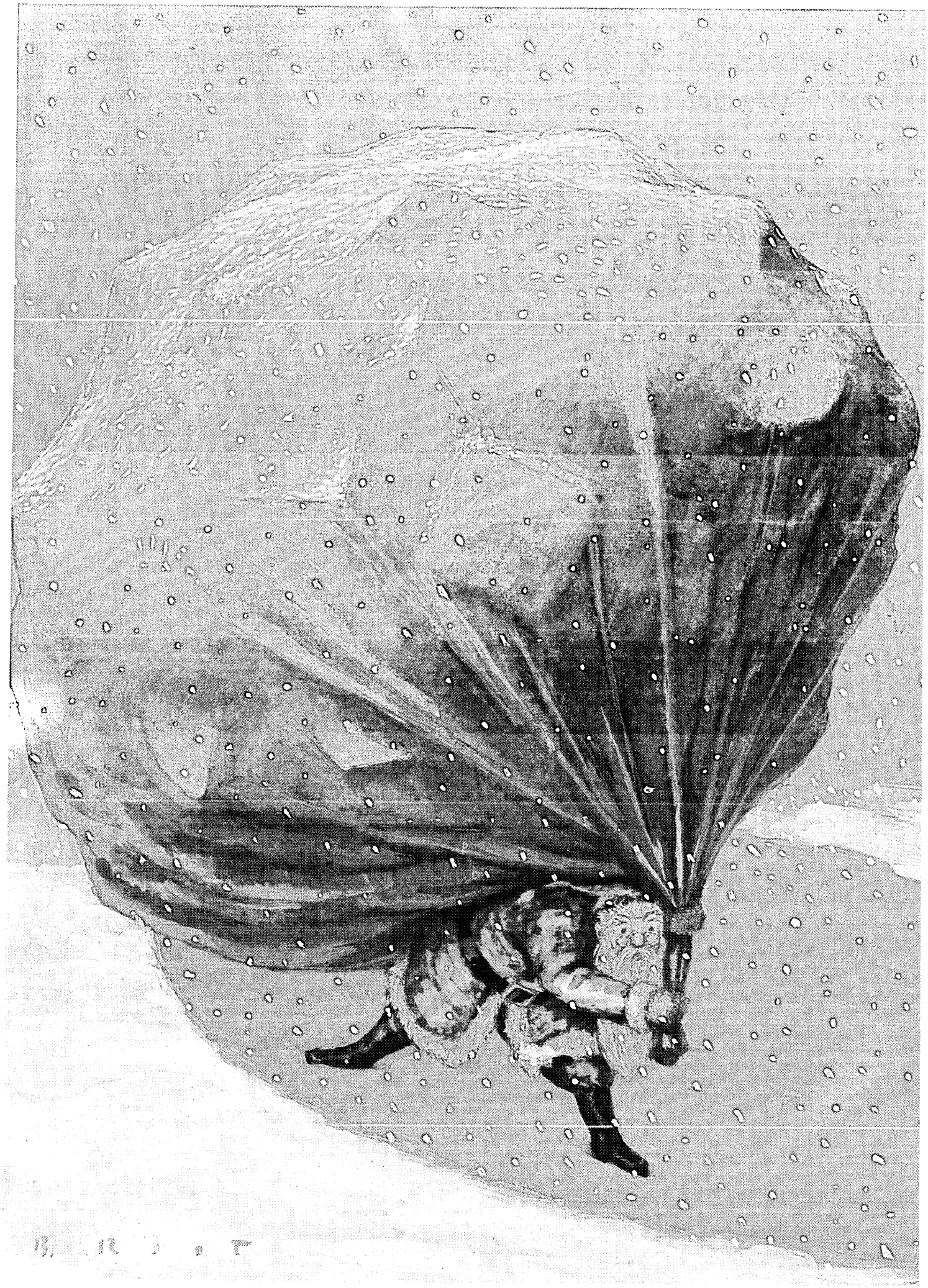
Hunt would like his shop to migrate to the newer DEC VAX 8500 computer, but his older disk drives would not run on that machine. "We'd have to reinvest in disk drives, buying RA-series drives," he continues, "but, really, we won't get that much more for our money. We'll completely reinvest in disk drives that either match the performance of what we've already got, or we'll get only slightly more capacity."

Another vendor tied to a top billed item on a dp manager's Christmas list is IBM. William Harrison, vp of information management at the Hartford Insurance Group, Hartford, Conn., declares, "The thing I would like most right now is a clear perception of what our real choices are regarding departmental computing. Though IBM is a leader, we don't understand what IBM's position is."

Hartford Insurance Group would like to build departmental systems for its field offices, but, bemoans Harrison, "we're totally frustrated." The cause of that frustration is no solid statement of direction from IBM, Hartford's primary vendor. "IBM's position today is that System/36 and System/38 are the vendor's distributed processing machines," says Harrison, "but we don't feel these are the long-range architectures."

Harrison also wishes for a long-term architectural commitment from hardware vendors, so users can change applications without worrying about switching architectures. Hartford Insurance has already turned to another vendor, Wang, for a distributed system, because IBM's offering seemed inadequate. Harrison would prefer to stay true blue, or at least

ILLUSTRATION BY BARRY ROOT



"I wish the communications industry was three to four years ahead of where it is now."

light blue, following IBM's standards. "If IBM comes out with a departmental solution that is good," he says, "I think other vendors will go in that direction. Then we'll be able to pick and choose the vendor that best meets our needs."

Vendor troubles threaten to dim the yuletide spirit of Gordon Brazas, director of computer networks for Kellogg Co., Battle Creek, Mich. Brazas has problems with IBM . . . and Sperry . . . and Digital. He's pining for a way to move data to and from various computer systems. His staff, which transfers most data from system to system by tape, also uses some limited file-to-file communications. What could Santa's elves build to solve this problem? Brazas answers wistfully, "A true network between our computers, one that would make it transparent between the terminal that's sitting on somebody's desk and whichever computer they're really on. That's a real wish."

Brazas rejected solving the problem with a single vendor. "Retraining an entire staff to go from a Sperry environment, let's say, to a DEC one takes time, and by the time you get there, it could be IBM's turn to have new products you need. You want to take advantage of the best technology any company comes out with," he says.

Ultimately, Brazas's Christmas present might come from an independent, common protocol governing the links between his disparate systems. "Maybe some third party will come in and do it," he muses.

Communications software is what DATAMATION advisor Carl Reynolds would like to see peeking out of his stocking on Christmas morn. Reynolds, who is staff vp for communications and data processing at Hughes Aircraft Co., Long Beach, Calif., states, "I would like instant transferability of all word processing programs. That is, no matter how you wrote a document in a word processor, you could send it to somebody else and he could alter it on his word processor."

As another stocking stuffer, Reynolds would like a solution to his company's electronic mail morass. "There's lots of places in the company where we have to produce documents from different organizations," he explains, "and with 80,000 people, you've got quite a few different systems."

PLEASE, SANTA, A TOOL SET

Under the tree, Reynolds hopes to find an integrated set of application development tools for his programmers. "We can buy estimators that work alone, system analysis tools that work alone, data dictionaries that work alone," he declares, "but if they do work together, they don't work on large projects." Some of the tools for systems analysis he's found are bigger than one pc can handle. The software programming tools "don't talk to the development tools," which means information that crops up during problem analysis must be reentered before further work can be done.

The micro-to-mainframe link ranks high on the list of Ted Tansi, vp at Phoenix Mutual Life Insurance Co., Hartford, Conn. "What we've got going here between pcs, terminals, and mainframes is a one-lane bridge," he declares. "Everyone says everything is compatible, but if you really look at SNA, for example, you find that everyone has his own SNA. There really is a traffic burden because of this lack of compatibility."

Tansi would also like to see one particular peripheral—a reliable, rewritable laser disk drive—in his Christmas stocking. He believes rewritable laser disks would be "a tremendous asset." Such a disk drive would help Tansi's shop in two ways: by decreasing the cost of storage per bit for mass storage and by taking up less floor space in his data center. "Archival information that you're never going to change is fine for today's laser disks," he insists, "but the mass databases we use now are constantly changing." Acknowledging that rewritable laser disks are an unlikely prospect for this Christmas and probably the next, Tansi adds, "The technology is definitely coming. The question is, how quickly?"

All that Ron Brzezinski, vp of information systems at Quaker Oats Co., Chicago, would like for Christmas is freedom from obsolescence: "I would like to have assurance that any decisions we make in the area of local area networks and other communications devices will not be obsolete in six months. It's impossible, yet extremely important."

Quaker's dp staff is currently selecting a local area network for its shop. The staff predicts the LAN market will remain in its present state of tumult for the next three to five years. Brzezinski explains, "It's not just the communications hardware that's a problem, it's all the integration it must have with the applications, as well as the security systems you have to buy."

Quaker plans to move its information systems operations to a new building in early 1987, and the new plant is already wired with twisted pair cabling. "We're trying to make all the right decisions about optics and other standards," Brzezinski says, "and yet we know we're going to be obsolete as soon as we move—not so much technologically obsolete as paying more than we'll be getting added value for."

What else would Brzezinski really like for Christmas? "I wish the communications industry was maybe three to four years ahead of where it is now in the development of some pretty standard approaches," he says.

Not all MIS execs dream on such a grand scale. Some still believe good things come in small packages, especially for small amounts of money.

"AN OCR WE CAN AFFORD"

Affordable optical scanners figure in the dreams of Jim Bonner, director of information systems and services at MacMillan Bloedel in Pine Hill, Ala. "I'm really interested in optical scanners that allow you to scan preprinted material—both graphics and characters—into a pc and then take one of the popular word processors and manipulate the two," he says. "We're really anxious to see one that we can afford."

If Bonner had the system he envisions, his company could store its parts catalog—which lists 40,000 spare parts kept in inventory—on an optical disk system. A user would see a picture of a desired part on a pc screen, along with a breakdown of the part's components, part numbers, and any other relevant information.

Bonner also believes that an optical disk-based system would replace a lot of retyping now done in his company. "Those of us that live with computers all the time think we've gotten away from paperwork," he attests, "but the truth of it is, we're just swamped trying to move paper around. Optical disks would be just the way to help us get the computer more involved in shuffling those papers around."

Also pining for small, inexpensive packages is Des DeFiguriedo, MIS director of Allied Supermarkets, Detroit. Des DeFiguriedo would like Santa to bring him an inexpensive handheld terminal that communicates with mainframe computers via FM radio waves. Why? So that his store managers could more easily check prices and inventory and compare them with information stored on the company's central mainframes.

The need for constant price checking arose when Allied switched from marking the price on each item to affixing UPC stickers that are scanned at the register. While UPC numbers ease inventory control, they require an update of the computer files every time an item's price is changed.

According to DeFiguriedo, store personnel are "constantly walking the stores, scanning the product, going back,

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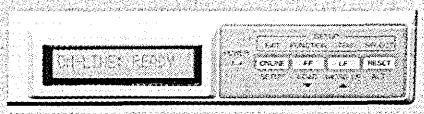

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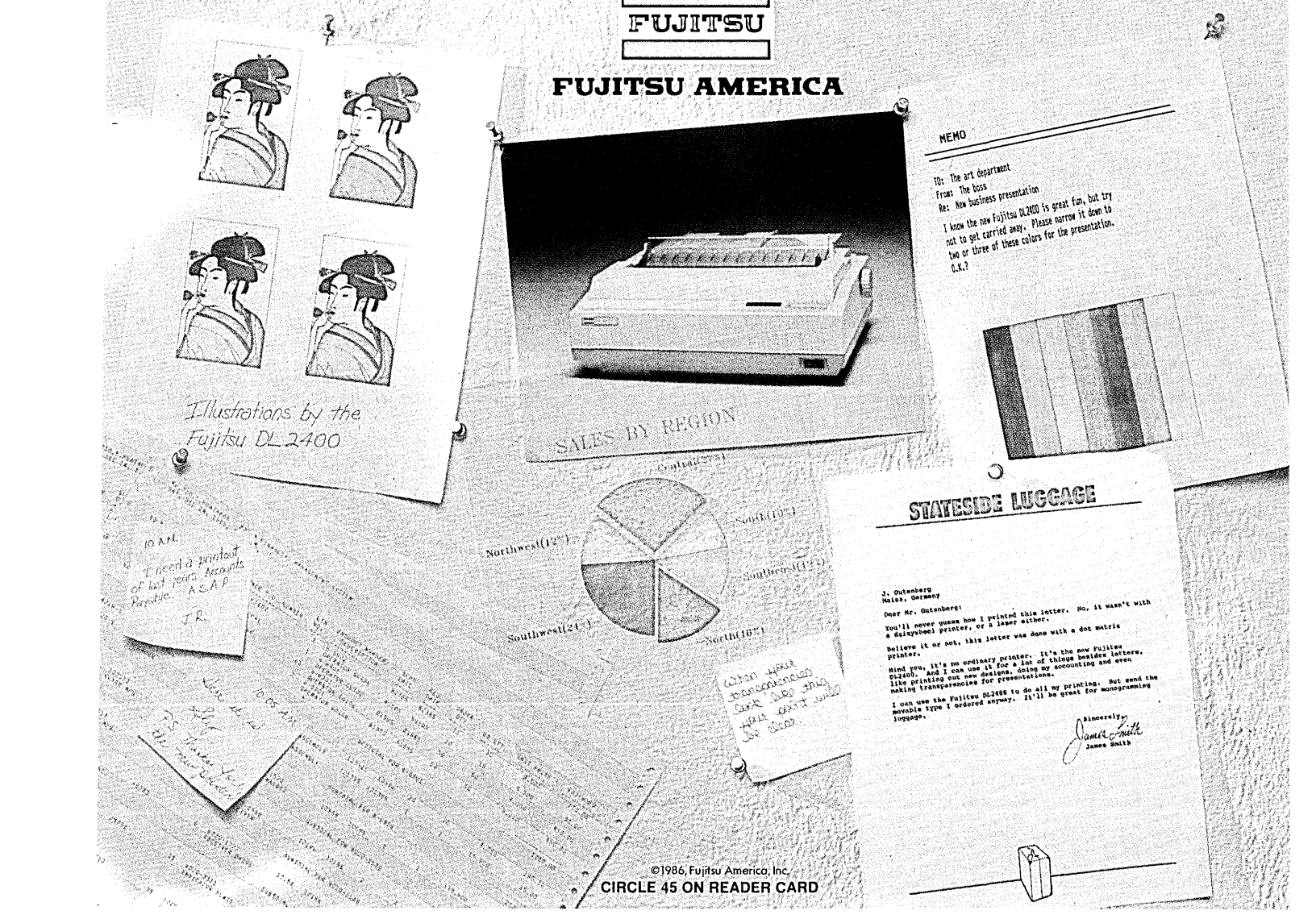

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CIRCLE 45 ON READER CARD

Some managers would like to find small, inexpensive packages like handheld terminals in their stockings.

keying the price, dumping it into the computer, waiting for the printout, then comparing what the computer thinks the price is with what the price tag on the shelf says it is. It's a lot of manual effort."

DeFiguriedo fantasizes a system in which the price checker would scan the product with a handheld terminal, key in the price, and press the send button, which would transmit the UPC code, via FM radio waves, to a central computer. The mainframe would then retransmit its file on that product to the handheld terminal, and the store worker would compare the files. If the price on the shelf matched the price in the computer's file, the clerk would go on to the next product. If not, the worker would note that the computer file needed updating. "The technology for this is close," asserts DeFiguriedo, "but expensive."

Some MIS execs wish vendors would get a jump on the Christmas crunch by speeding up their most far-reaching projects. William E. Trischler, director of the corporate data center for Westinghouse Electric Corp., Pittsburgh, would like to see expert systems that can be used for day-to-day development. "We've done searches of the literature," he reports, "and we don't think anyone's very far on it."

Other computer professionals just wish vendors would deliver on their promises. Chris Scharff, division manager of information systems for Yamaha International Corp., Buena Park, Calif., wishes Santa would bring him the truly user-friendly utilities that vendors tout.

"I'd like utilities where we can very easily extract data from our databases and where users can easily make ad hoc requests, such as, 'I'd like these data, and I'd like them downloaded to my pc because I want to build a model of these data.' " Scharff's staff, working primarily on Burroughs mainframes, now has to write COBOL programs to produce files for downloading when users request complex reports. "I want a good data-extracting tool for a formal database," he says.

Other MIS managers have a far simpler request for old St. Nick. "I'd like a couple more million dollars in my budget," quips Tom Duckhorn, manager of computer operations at Crown Central Petroleum, Baltimore. "And what would you do with all that money?" Santa asks him. "Oh, probably just improve the physical plant, toss out a few older pieces of equipment, and replace them with newer stuff. I'm not hung up on the lack of some particular hardware or software product. My problem is budgetary restrictions."

Although no one thought to ask us, we have a Christmas wish of our own: that DATAMATION readers chip in and buy us a CD player for our sled. ◉

New York freelance writer Peter Krass is the editor of *Infoperspectives*, a monthly newsletter for large-systems users published by Technology News of America, New York.

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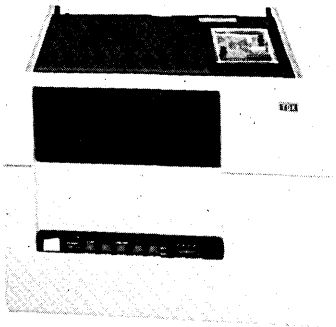

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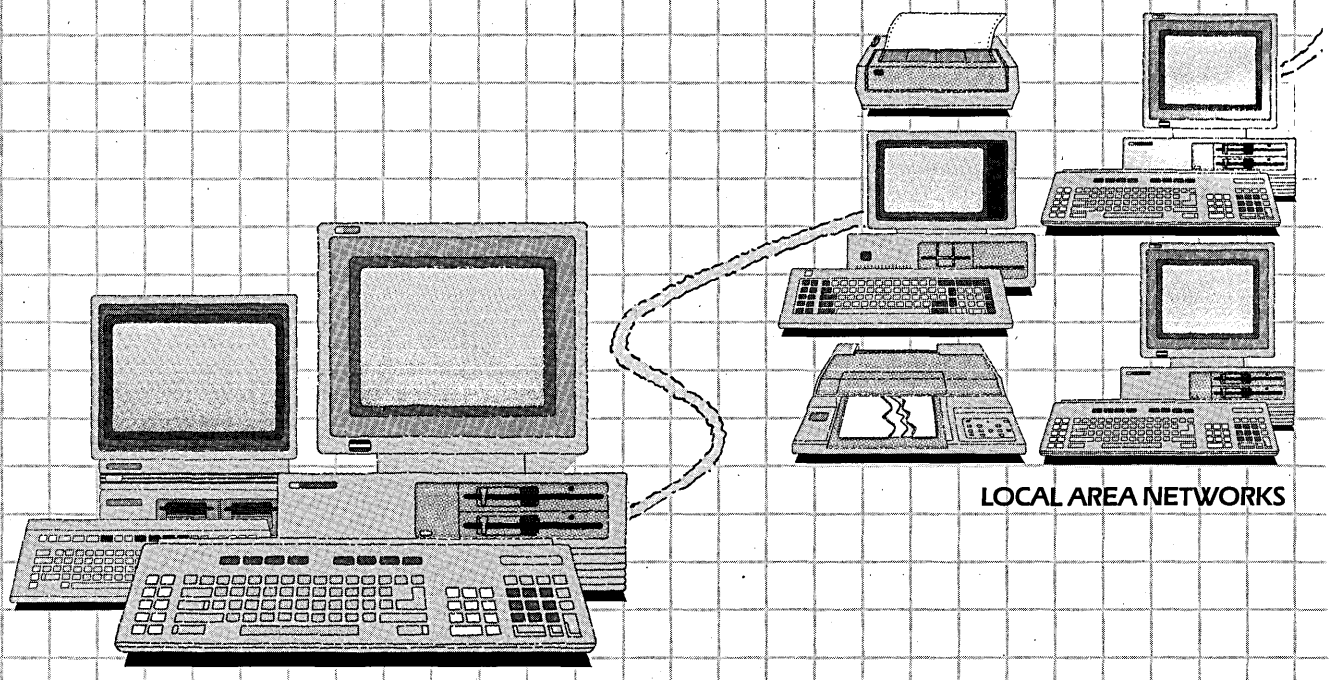

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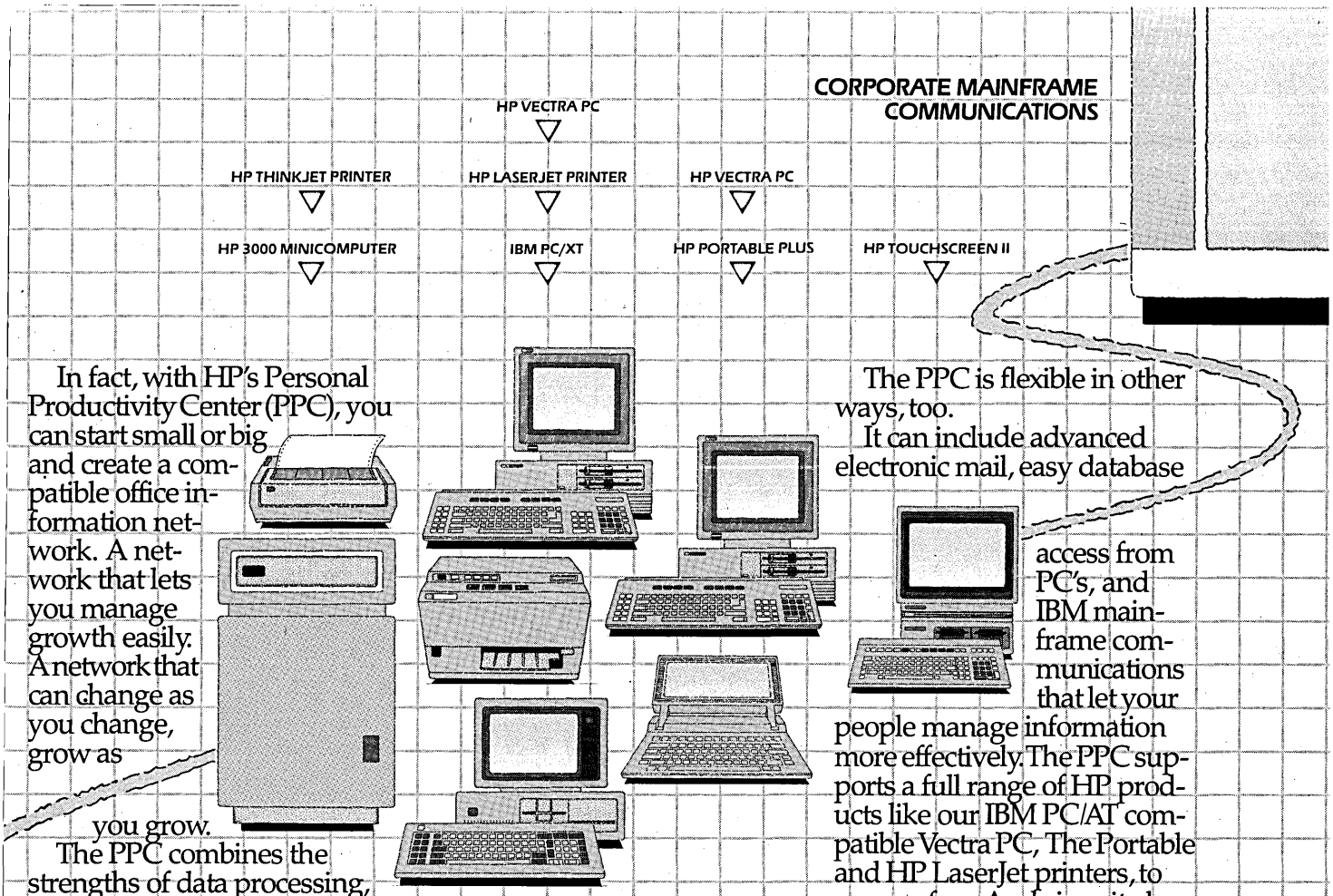

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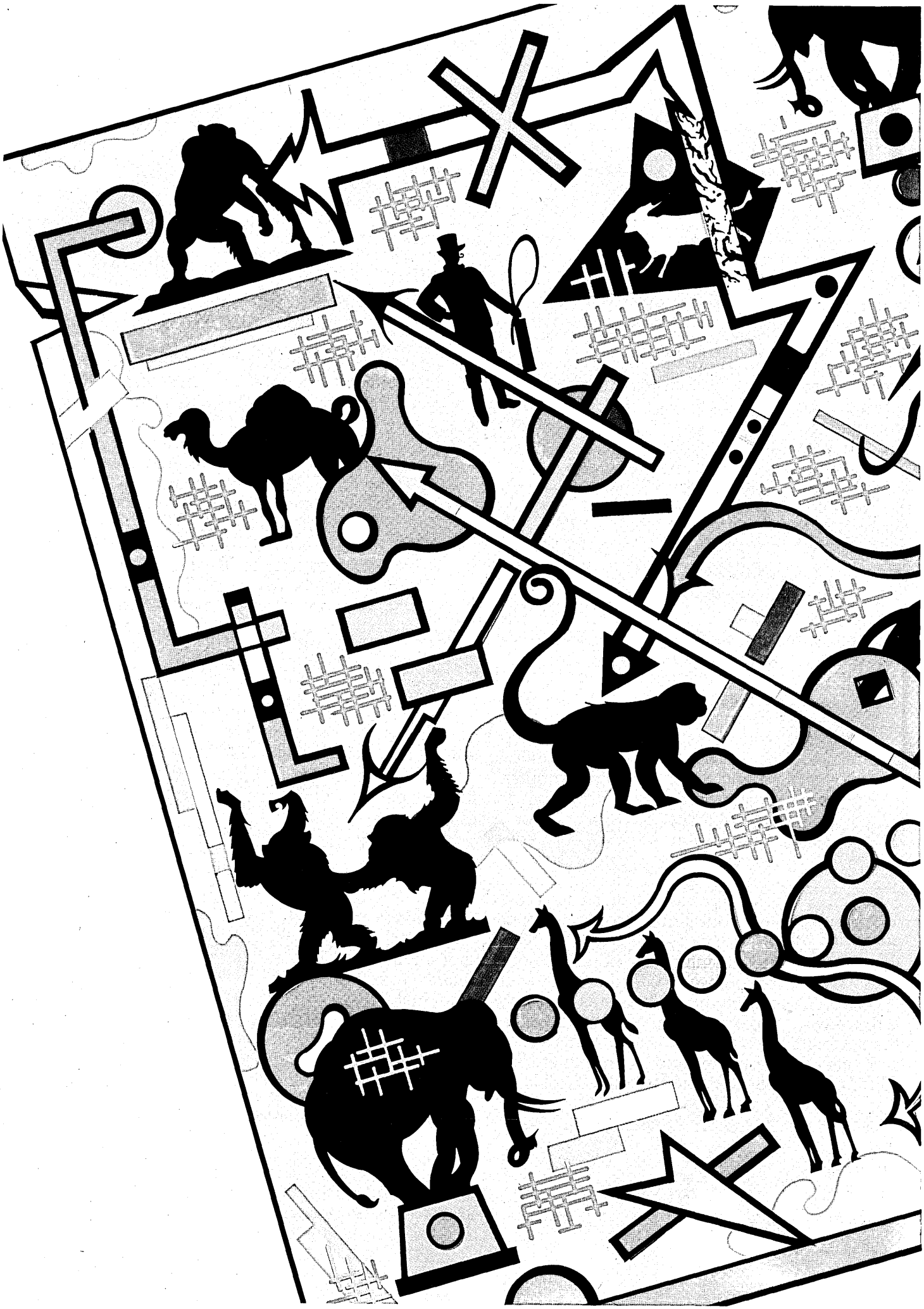

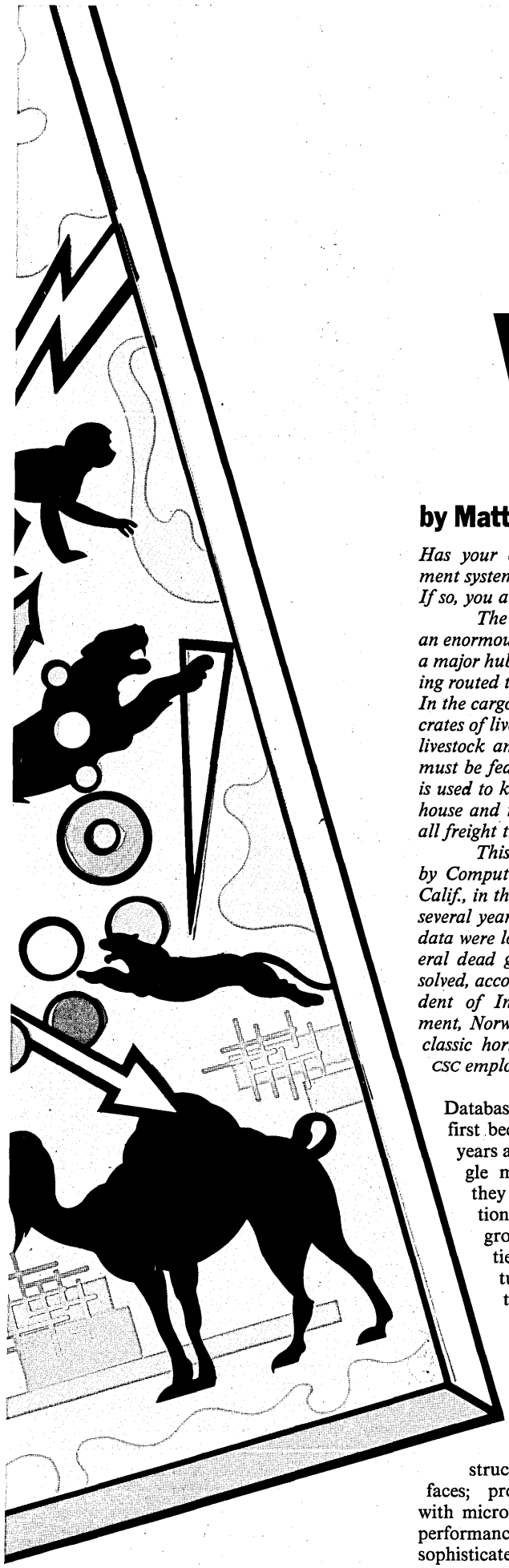

Users wish vendors would listen to their complaints about...

WHAT'S WRONG WITH DBMS

by Matthew T. Schroeder

Has your off-the-shelf database management system given you any problems lately? If so, you are not alone.

The Amsterdam air cargo terminal, an enormous, fully automated warehouse, is a major hub where cargo is stored before being routed to destinations all over the world. In the cargo on any given day are numerous crates of live animals, from dogs and cats to livestock and zoo animals, many of which must be fed during their stopovers. A DBMS is used to keep a mirror image of the warehouse and to track the physical location of all freight traffic.

This system had first been installed by Computer Sciences Corp., El Segundo, Calif., in the 1960s and had worked fine for several years until the DBMS failed. All the data were lost. It took several days and several dead giraffes before the problem was solved, according to Ken Bosomworth, president of Information Resources Development, Norwalk, Conn., who learned of this classic horror story through some former CSC employees.

Database management systems, which first became widely available some 20 years ago, are, for many users, the single most crucial piece of software they will ever own. While the selection of DBMS software continues to grow and yesterday's new capabilities become today's standard features, users still complain about the functional limitations of their DBMS software and the failure of these programs to live up to expectations.

Minicomputer- and mainframe-based DBMS packages are often criticized for their incompatible data structures and inflexible user interfaces; problems commonly associated with micro-based DBMSs range from slow performance to their inability to manage sophisticated programming tasks.

In addition, several areas of concern are common to both classes of DBMSs: a troubling absence of data integrity and security functions, the lack of standards, and vendors that advertise inherently nonrelational systems as relational.

The incompatible data structures of different vendors' DBMSs are perhaps the most common problem associated with large-scale systems. Along with many other organizations, RCA Business Systems, Princeton, N.J., suffers from the classic problem of having several independent databases, in different locations, based on DBMSs of different vendors. Barry Groves, the manager of accounting systems, says RCA Business Systems has five different mainframe-level DBMSs in operation for personnel matters alone—an industrial relations system, a corporate retirement system, a payroll system, an unemployment control system, and a talent inventory system.

The DBMSs at RCA, which run primarily on IBM or Univac mainframes, are IDMS from Cullinet of Westwood, Mass.; Ramis II from Mathematica Products Corp. in Princeton, N.J.; and Focus from Information Builders in New York. Listings by employee name are found in each of the database systems, so there are five copies of each employee's name.

Incompatibility across multiple DBMSs is not necessarily just a software problem, but one of different machine architectures, as is the case at RCA.

SOFTWARE IS MAIN PROBLEM

The main problem is with the software itself, however. One reason incompatibility across database systems is so common is that DBMS packages have undergone constant evolution over the last 20 years. Today's relational DBMSs, which organize data into tables, are generally not compatible with the traditional models that store data in a hierarchical, treelike structure.

In the traditional database concept, information is organized according to a branching hierarchy, and information is accessed through a logical path extending

ILLUSTRATION BY DOUG TAYLOR

Many systems are advertised as relational when they really aren't.

branch to branch. Efficient access requires an expert knowledge of the underlying database structure.

Development in the 1970s of the network DBMS model simplified the access method somewhat by providing more than one relationship between a given set of records, but a sequential access path was still required.

Both methods are very efficient at high-volume or batch-oriented transaction processing where performance (speed) is the major concern. Usually, these types of applications are highly structured to begin with, like an airline reservation system in which information is stored and accessed by the ticket holder's name only.

RELATIONAL DBMS IS ALL THE RAGE

The buzzword for DBMS software for the past decade, however, is relational. The relational model, originated in 1970 by Dr. E.F. Codd working as a fellow of IBM, is based on a more flexible row and table format. Codd has been a very outspoken proponent of the relational model. A true relational DBMS implements a concept called data independence, which means the logical database structure is buffered from the physical database design. This frees the user from having to become an expert on the internals of the system.

A true relational DBMS is best suited to handling ad hoc queries and databases that require constant updating. Relational DBMSs are also touted as godsends for programmers because of their abundance of tools designed to reduce development time and maintenance costs.

The relational vs. hierarchical/network model controversy is waged mostly in the high-end mainframe market, where vendors have had years to fine-tune their hierarchical products for transaction-intensive applications. Hierarchical models can be very fast but difficult to modify.

The interface to mainframe DBMSs—both hierarchical and relational—comprises another area of dissatisfaction for users. High-level interface commands shield the user from the underlying structure of the database, from having to know exactly how a query is being routed. Several independent vendors sell add-on tools like SQL optimizers designed to improve database access, but, according to some users, few are living up to their billing as easy-to-use programs for retrieving data.

"By and large, most end users are not sophisticated enough to use these tools," says DATAMATION adviser Irene Nesbit, president of Nesbit Systems Inc., a Princeton, N.J. consulting firm. "They don't understand enough about the data structures, and there is a lack of a promise that data will be easy to retrieve in an ad hoc fashion."

Even with high-level interface commands, the problem of incompatibility often remains. Nesbit, for one, complains about the lack of standards for DBMS interfaces. There is no question that IBM's clout in the marketplace has pushed its SQL a long way toward being the accepted standard interface, but even SQL implementations vary from vendor to vendor.

Moreover, complex interfaces typically carry a performance cost. This is true of both hierarchical and relational models; however, this can be a particular problem with the latest relational models, some of which are designed to be used with programming aids like fourth generation languages.

"One thing that you have to understand about today's relational DBMSs is that all those great features cost you additional processing, and the trade-off is performance," warns Robert Cramer, product marketing manager for Relational Technology Inc. (RTI), the Alameda, Calif., vendor of the Ingres Unix-based DBMS. "In time, relational systems will get there," he predicts. "We're seeing 40% to 50% performance increases each year."

Even at today's level of technology, Cramer says, a good relational DBMS's access optimization is always better than the average programmer's. "If you leave system integrity outside the DBMS, you have the opportunity to do things wrong, like leaving it to the programmer to provide transaction and concurrency control," he states.

Most DBMSs for midrange systems are built upon the newer relational concept. Such products include Ingres from RTI, In-

WHAT'S WRONG WITH DBMS ON MICROS

The hierarchical designs that characterized early mainframe DBMSs have never had much influence on the microcomputer world. Micro-based DBMSs tend to be almost exclusively relational (or at least billed as such), since the newer technology became available about the same time as a generation of new 16-bit processors hit the market. Two barely distinguishable classes of micro DBMSs nevertheless emerged, producing a different set of problems for users.

Micro DBMS software like dBase III from Ashton-Tate (Torrance, Calif.), R:base 5000 from Microrim (Bellevue, Wash.), PSF:File from Software Publishing Corp. (Mountain View, Calif.), and Personal Decision Series Data Edition from IBM fall into two categories of usage—end-user database programs and programming environments.

Dissatisfaction runs rampant when a programmer-oriented DBMS is used for simple data storage and retrieval; likewise, using an end user-oriented DBMS for application development can lead to frustration. Programmers especially find it easy to outgrow pc-based DBMSs.

Jim Goroff, manager of the in-house micro store for the Kemper Group, the insurance corporation based in Long Grove, Ill., says his organization uses IBM's Personal Decision Series for local list reporting. "We looked at a DBMS mostly for end-user usage, and one of the main considerations was simplicity of operation," he says.

Ken Michielsen, projects director at Nesbit Systems Inc., a Princeton, N.J. consulting firm, uses micro DBMSs mostly for programmer tasks. "Aside from finding several undocumented bugs, the main problem with a micro DBMS is speed," he says. "When files get too large, things like sorting and ad hoc query and retrieval become difficult."

Users also cite inflexibility as a typical problem with pc-based DBMSs. "Once you decide on a field size, to change it using a DOS-based DBMS with fixed-length record formats requires some kind of reprogramming, and that can be very expensive," says Phil Earl, product marketing manager for Pick Systems Inc., an Irvine, Calif., developer of the DBMS-based Pick operating system.

"Things change in the real world and you have to be able to respond quickly," Earl continues. As an example, he cites the post office's sudden decision to make zip codes longer. Using most pc-based DBMSs, you would have to reprogram everything to update the database with the change, he says.

"What you really want to do in this case is be able to store the zip code information in a primary file, rather than in multiple files. This makes the updates easier and also saves on data storage, because you aren't storing the same info over and over again," Earl explains.

One of the newer uses for pc-based DBMSs is to connect them in an office local area network. Users, however, report many problems with sharing data in a LAN, most of which have to do with data integrity and security.

—M.T.S.

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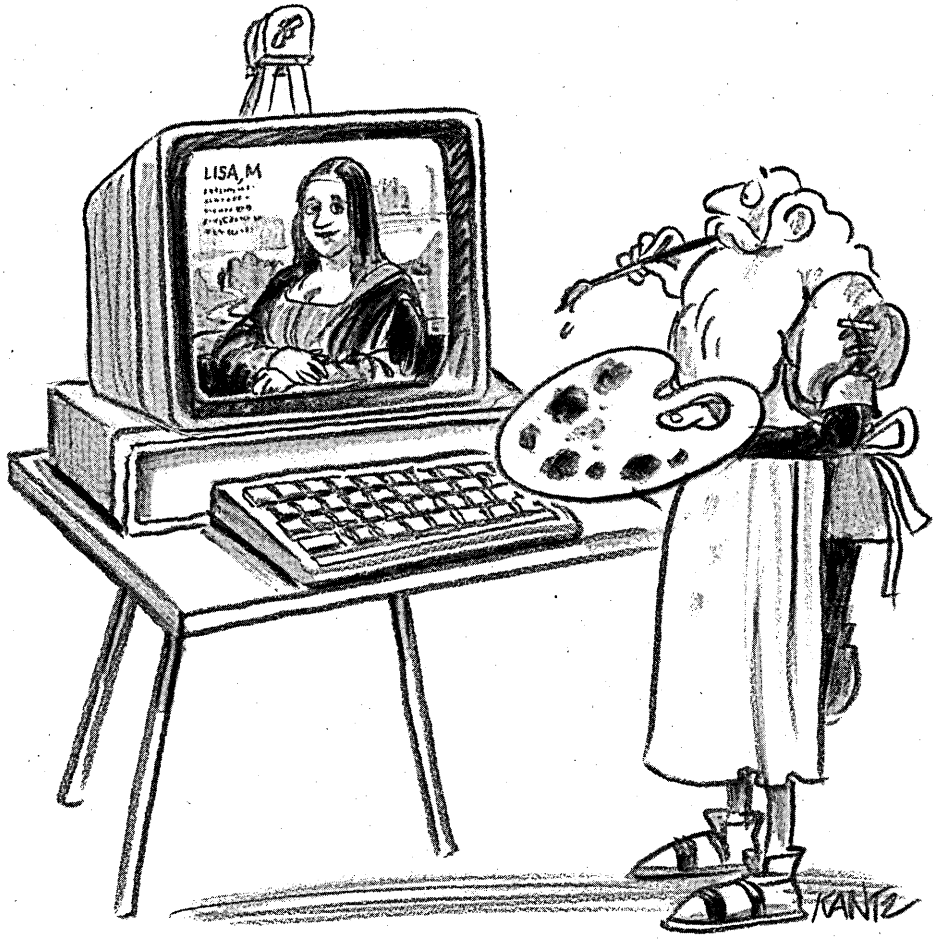

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For all the new capabilities, users still complain about the functional limitations of DBMS software.

formix from Relational Database Systems in Palo Alto, the Digital Equipment Corp. version of PRO-IV from Pro IV in Littleton, Mass., Rexcom D and Rexcom E from Rexcom in Houston, and Mistress from Rhodnius Inc. in Toronto.

There are inherent performance disadvantages to relational DBMSs. RCA's Groves reports that the relational Focus and Ramis DBMSs in use at his company do not handle large volumes of data as well as hierarchical systems, but, he says, they do offer a better user environment and have a strong following at RCA based on those merits alone.

LACK OF ADD-ON FEATURES

Other users gripe about a lack of add-on features for the latest DBMSs. For example, IBM's DB2, like many relational DBMSs, does not have a full-featured data dictionary—a library of information about the data in the database. Information about common fields, for instance, and information about the data and the community that uses the data are required. This shows which applications use the fields and why it's important that they do. Without a good interactive data dictionary, programmers have to hard code the information into their applications.

Nicholas Nierenberg, president of the Lake Oswego, Ore.-based Unify Corp., vendor of the Unify relational DBMS, concedes that demands from applications are higher for mainframe-based DBMSs and the fastest products are still network or hierarchical in design.

RTI's Cramer argues that many high-end systems that are advertised as relational often fail to provide full relational capability because they were originally designed as hierarchical DBMSs.

"What some vendors have done is put a relational interface on top of the DBMS that fails to hide the underlying structure," Cramer declares, "but in terms of power and report generation and transaction processing capabilities, they are very competitive."

To make matters more confusing, IBM is offering both models for its mainframe equipment. According to a phone survey conducted by the Redwood City, Calif., consulting firm International Technologies Group (ITG), users in the IBM DBMS world wonder how IMS and DB2 will fit into a long-range DBMS strategy. IMS is IBM's conventional hierarchical structured DBMS, while DB2 is its answer to the relational concept.

ITG director of research Brian Jeffery reports that firms using both IBM mainframe DBMSs are experiencing a lot of redundancy in storage and access. IBM has positioned IMS for more batch-oriented transaction processing applications requiring heavy information retrieval and manipulation. DB2, which is designed for more interactive end-user applications, is better suited for ad hoc queries. Users employing both DBMSs will often need to duplicate the information, again because of incompatible data structures, Jeffery says.

Users can also run into trouble when their expectations and needs change and they try to use the wrong type of database for the job.

"The evaluation [of DBMSs] is best done with as much knowledge about the type of data you want to access and how it should be extracted as anything else," advises IRD's Bosomworth. "If you set yourself up in a highly structured world and then try to use a highly relational DBMS to get at that information, you run into problems."

"It all goes back to the problem of defining the data to be accessed," explains Nesbit. "You can do something like developing focus code for ad hoc retrieval, but that's a very difficult thing to do."

Some users are finding that ad hoc modifications are better than building a database management system from scratch. When Burlington, Mass.-based M/A-COM Inc.'s Telecommunications Division found itself shopping for a DBMS to assist with network control functions in a Digital VAX-based packet switched network, the key requirement was the ability to run multiple databases with high-speed access. RTI's Ingres relational DBMS was chosen because of its ability to continually change the structure of the database, but M/A-COM's system engineers soon found that access times achieved with standard Ingres were too slow.

"The traditional use of Ingres was for an application with a few tables and 100,000 or more records," says M/A-COM department manager Jeff Scott, "but our application is more like thousands of tables with about 80 or so records per table." The performance requirements forced M/A-COM engineers to develop their own memory resident cache on the front end. Database access then went through the cache, cutting down the number of times the disk was accessed.

Other users, like Bullock's department stores in Los Angeles, have forsaken commercial DBMS products altogether for the complete do-it-yourself method. All the stores in the Bullock's chain are on-line; they feed reports to the main system through the company's dedicated real-time operation.

"We do anywhere from 800,000 to 900,000 transactions a day," reports William Sumner, Bullock's vp of information systems. "I don't want to even think about the additional cost in machine overhead that it would take to use an off-the-shelf DBMS."

Those hardware overhead headaches don't bother micro users of database management systems. Micro users have a different set of DBMS drawbacks to contend with (see "What's Wrong with DBMS on Micros"). Nevertheless, micro, mini, and mainframe users all complain about vendors that falsely claim their DBMS wares are relational. Then there's the matter of security.

For micros, as well as mainframes, the whole idea of security and data integrity is conceptually opposed to the objective of most DBMS programs: to make data easily accessible to the user. This inherent dichotomy will not just disappear. Security procedures necessarily restrict information and limit who has access to it.

The upsurge in the use of personal computers in the office in recent years has spawned a new set of problems for data centers. Micro-to-mainframe communications and distributed database configurations hold out the promise that multiple pc-based DBMSs in various company departments or divisions can communicate both with each other and with the corporate database.

What is often encountered in the real world when trying to network DBMSs, however, is several different systems that are incompatible with each other. This means that the same information must be duplicated on different databases.

This new dilemma for microcomputer users is familiar to their colleagues in the mainframe world. Just ask RCA Business System's Groves, who wants to establish a common database under Cullinet's IDMS using Cullinet's applications and utilities across all five of RCA's personnel systems. "I'd like to see it integrated to the point where there is only one copy of a data item, and we're not feeding one system to another." As it is now, he says, "You could ask each system a question and get five different answers." ◉

Matthew Thomas Schroeder is a writer based in New York.

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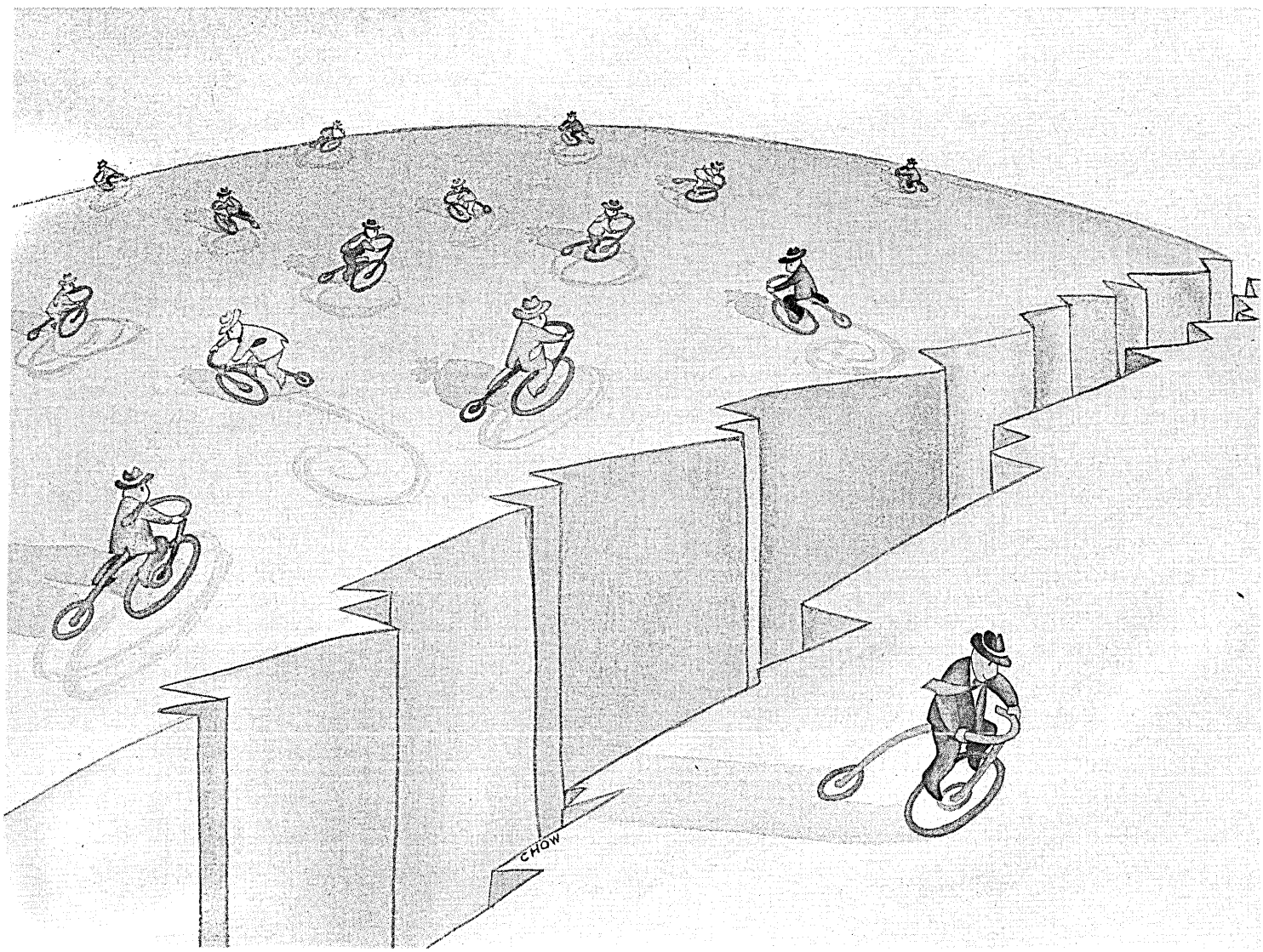

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Why would any dp manager bet on a technology that has yet to have substantial application in commercial data processing?

DOES UNIX MATTER?

by Marc Meyer

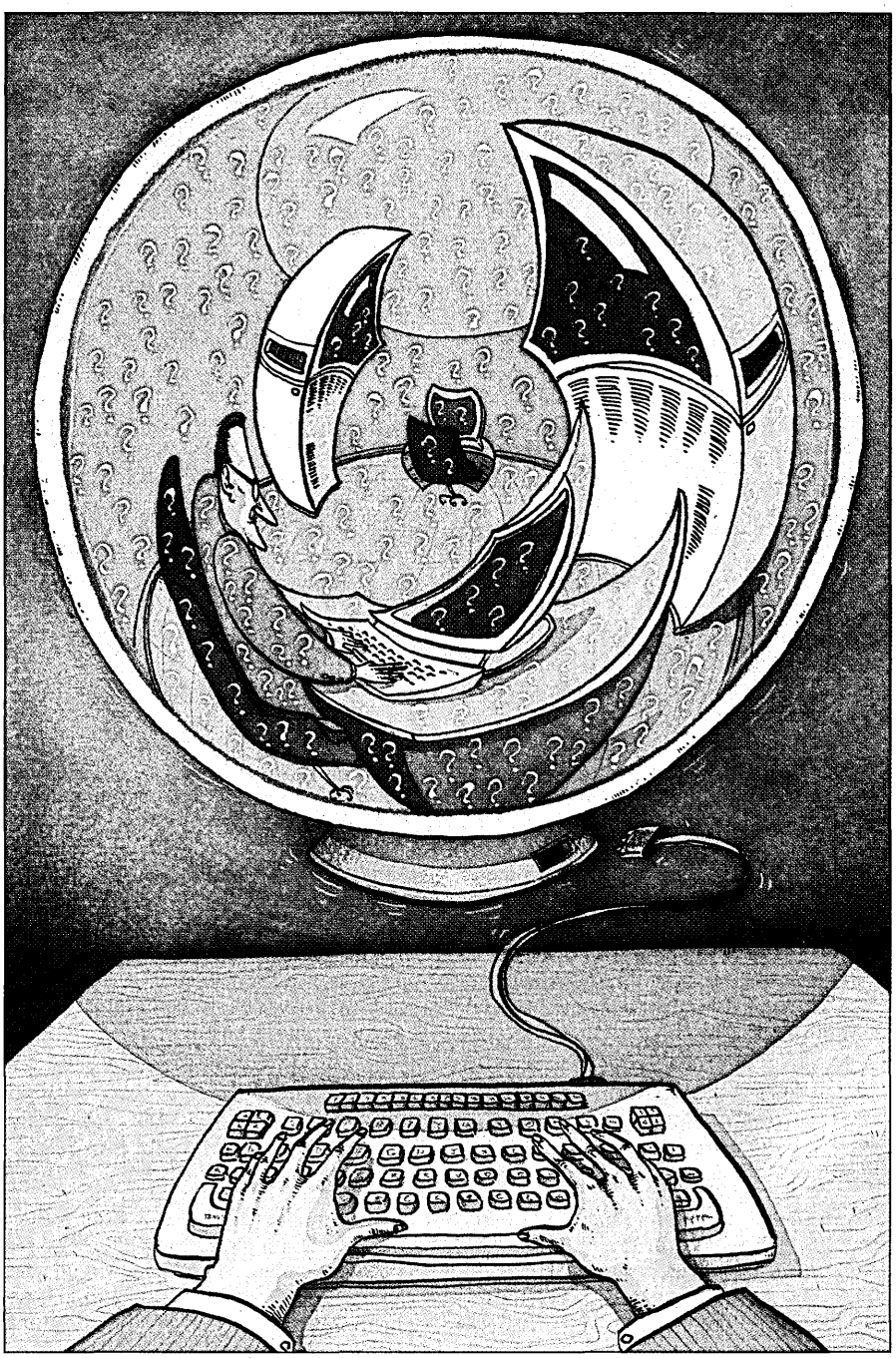


ILLUSTRATION BY STEVE ATTOE

For much of the dp community, Unix can be summed up by three points: it is a multiuser operating system developed in universities and Bell Labs and is sponsored chiefly by AT&T; it runs on many different computers, ranging from mainframes to desktop microcomputers; and, while Unix is reported to have some redeeming qualities for programming, most people involved in building and supporting commercial applications have avoided it. Healthy skepticism might suggest that something must be wrong with the technology, otherwise Unix would be far more prominent in the commercial dp world than it is today.

MIS managers continue to be confused about the operating system, mainly because of the fragmented nature of the Unix marketing and support industry. Until recently, AT&T played a passive role with respect to its nonproprietary operating system, and doubts persist about the company's long-term commitment to the computer business. For the sale and support of Unix, the ball was traditionally passed to resellers, who, being left to their own devices—literally—have proven selective about which Unix utilities they wish to provide. Hardware resellers often have turned to Unix "porting houses" for their operating systems, limiting the level of Unix expertise held by other than true believers.

Nevertheless, Unix has some clear advantages in the OS face-off:

- The applications movability that Unix provides gives buyers the power to be aggressive price shoppers.
- Unix's strength in communications is unquestioned. For local area networks, Unix and Ethernet now go hand in hand. Interfaces to SNA networks—subject of intense development activity at AT&T—are expected soon.
- Unix permits rapid software development, allowing programmers to build large applications by connecting small, more manageable modules, and Unix applications can be device independent.
- In the Unix environment, sharing data be-

WHITHER AT&T?

Of more than mild controversy inside some elements of the Unix industry is the degree to which AT&T should actively enforce System V standards by demanding that licensees pass a "verification suite" or else lose their rights to distribute Unix. This seems unnecessary because even the traditional Berkeley 4.2 shops, such as Sun Microsystems and DEC, have publicly committed themselves to System V compatibility. The benefits for the "open systems" approach that the standards create are strikingly apparent to manufacturers, software developers, and users. What is still lacking are premier Unix systems integrators serving commercial markets. This in fact may be AT&T's avenue for growth in the years ahead, i.e., to become the best problem solver in situations where Unix can play a role. Assuming the stance of an integrator, AT&T could bring to bear its own proprietary communications technology, nonproprietary Unix (which presumably it knows better than anyone else), and yet unproved capability in the area of large-scale applications implementation. Further, AT&T does not need to push its own hardware (which may not be competitive in terms of cost-performance) to succeed, but rather it could become a leader in achieving the open systems architectures that large organizations require today.

—M.M.

tween programs is part of the inherent architecture of the system. How often have we heard users complain about doing massive amounts of work in one package, and not being able to use some of those data inside another application? Still, the Unix industry remains highly fragmented. With many players involved, each with a different level of intensity and commitment both to supporting Unix and to actively helping customers solve Unix problems, dp managers might easily be discouraged, not knowing whom to turn to or what to expect when a set of vendors is selected.

Unix is therefore a fascinating study of the relationship between technology and marketing in an evolving industry. Within a complex industrial environment, a clear fact emerges: the wide-scale local innovation that facilitated Unix's technological growth also impeded its commercialization. A body of technology was created that never stood still long enough for dp managers to get hold of it and use Unix for critical applications.

UNIX—A TENACIOUS BEAST

But Unix is a tenacious beast. A few hardware manufacturers, such as Hewlett-Packard, Sperry, and Sun Microsystems of Mountain View, Calif., developed substantial in-house sophistication about Unix and have actively supported their Unix offerings, and vendors that have traditionally dwelt outside the Unix camp have recently announced support of the operating system. Today, Unix runs on more different types of computers than any other operating system, and continues to be migrated to new generations of computer hardware, including a broad range of engineering workstations, desktop microcomputers, superminis, and, more recently, mainframe computers. IBM now has Unix for VM. Digital has it for its VAX computers. Wang and Data General have signed on. Sperry has aggressively pursued a Unix strategy for its distributed systems integration activities.

Further, such chip manufacturers as Intel are now developing "generic" Unix ports for their new chips. Motorola 68000-based computer manufacturers supply Unix as their standard operating system.

Moreover, a number of very large federal government procurements have been Unix based, right from the request-for-proposal stage. Despite the general downturn in the computer market over the past few years, several companies that sell Unix-based systems, particularly in the graphics workstations market, have continued to show impressive growth.

Unless you are an operating systems afficionado or a computer historian, a reasonable response to all this hardware activity might be, "So what?"

Some people might argue that Unix is still trying to reach first base in large-scale data processing. How many organizations are using Unix for significant, let alone critical, business applications? Much of what we have read in the press suggests that AT&T has stumbled in its effort to become a force in the business computing industry. While IBM offers Unix on VM as well as for its RT and AT desktop workstations, why does it appear that IBM's commitment to Unix is little more than lip service? And, while Unix has long been touted as an ideal software development environment by computer scientists, why is it that the new, exciting computing projects in the areas of artificial intelligence and expert systems are being implemented in alternative environments such as LISP or Prolog? Why would any dp manager risk his or her reputation on a technology that has yet to have substantial application in commercial data processing?

Technologies that are not specifically focused in their application can often fail: prospective users cannot point to any single, rock-solid success and say, "This technology is going to work for me." Unix has not been focused; it has not found a "home" that the commercial dp manager can relate to directly. However, Unix is a technology whose strength has been its flexibility to adapt to new computing environments. Over the course of its 15-year history, Unix has evolved continually, both in its internal technology and recently in key aspects of its commercialization.

The character of Unix as it has evolved has remained largely consistent with the design objectives of its founders. As an operating system, Unix is both simple and elegant, and remains highly movable. The simplicity of the operating system surfaces in a number of critical areas. The memory management scheme in Unix has been to "swap" entire processes in and out of memory for execution. Another example is that programmers use the same system calls to read and write data to files, terminals, or internal buffers for interprocess communication. It is also relatively easy to add new device drivers in Unix. This facilitates the moving process. New devices with file systems on them can be "mounted" as part of the user's current file system and then accessed through the standard directory-path naming conventions. For the systems integrator, dealing with a diverse set of cpu and peripheral hardware, Unix provides a rich environment for piecing together different parts of a total system.

CHAOS IN THE DP COMMUNITY

While the "open architecture" of Unix and the nonprofit, public domain attitude surrounding it spawned substantial creativity, it also led to problems and would-be problems for would-be commercial users. Perhaps the best example is that Unix was so successful in one university, the University of California at Berkeley, that the computer scientists there added substantial new functionality to Unix that was not initially reincorporated into AT&T's version. This created a second Unix camp, spelling chaos to the dp community at large. Since Berkeley had many VAX machines, it made sense for its computer scientists to seek better performance by adding demand paging to Unix. Also, to link up different departmental computers more effectively, Berkeley added networking system calls, called "sockets," to the Unix kernel.

As a result, the Berkeley Unix offered enough distinctive benefits that many other organizations preferred it to AT&T's. Berkeley, however, is not a commercial support organization: the myriad of bugs that cropped up in its Unix were poorly handled. Hundreds, if not thousands, of "bug fixes" for both Unix system internals and its programming utilities have been broadcast by Unix users around the country on the Unix public domain network, USENET. It isn't surprising that Unix developed a reputation: using Unix in a critical business application might be tantamount to a game of Russian roulette.

DOS is becoming an excellent pc training ground for using Unix on more powerful computers.

User interfaces have also been a troubled area for Unix. User interfaces in Unix have always been left to programmers or systems integrators to develop. There are document processing and CAD-like applications built under Unix, for example, whose interactive user interfaces are superior. The flip side of the coin is that end users who must use Unix without the benefit of a programmed user interface must learn how to work directly in the Unix shell. For inexperienced end users this can be difficult, and Unix earned the reputation of being something of a bear—hard to learn, overly terse, and not particularly nice about telling the user when he or she has done something wrong.

(Interestingly enough, MS/DOS on the pc is becoming ever more like Unix, yet one does not find MS/DOS developing a similar reputation for user unfriendliness. For example, one of the "breakthroughs" in the DOS command interpreter has been the ability to make the output of one program the input of another. This is called "piping," and it has always been one of the outstanding features of Unix. One cannot help regarding the merging of Unix and DOS in a somewhat humorous light. More than one Unix applications developer has commented that DOS is becoming an excellent pc training ground for using Unix on more powerful computers.)

All these difficulties admitted, there are signs that AT&T has assumed a far more active role with respect to Unix while still providing open access for other companies to the Unix source code. It has done this by setting standards (see "Whither AT&T?"). Specifically, it published a document called the System V Interface Definition (often called the SVID), which defines systems calls (for file handling, interprocess communication, etc.), error handling, and many other aspects of the operating system. By strongly advocating compliance with the SVID, AT&T has brought a far greater degree of uniformity into the Unix world, and in fact, has taken active measures to bring the Berkeley camp back into the fold. For example, one finds that AT&T has incorporated the most beneficial program development utilities and libraries from Berkeley Unix into its System V product. These standards may be the launching pad into the commercial market that Unix has always needed.

From a technology perspective, AT&T also appears to be listening to the user community. Two examples are the presence of demand paging and a networked file system in System V Release 3. Unix has had a reputation for being unsuitable for transactional applications in the commercial world, lacking support for record locking, and not having a demand-paging memory management system to allow code sharing in large systems. Both weaknesses are addressed in the System V Unix standard. System V Unix is now migrated to a number of large computers, including those of IBM, Digital, Amdahl, and Wang Laboratories.

ANOTHER LOOK AT UNIX?

Is it time to take another look at Unix for your own dp needs? The answer may well be yes. Existing large-scale Unix-based systems already show clear benefits of Unix for the commercial dp world. The best examples lie in the federal government, where some observers estimate that well over half of the large computer systems procurements now specify Unix as the base operating system. The National Security Agency awarded a nearly $1 billion procurement that involved AT&T hardware and Unix. The NSA has also purchased a large number of IBM PCs that are destined to become Unix workstations. Similarly, the Department of Agriculture awarded a roughly $250 million contract to Electronic Data Systems, Dallas, to automate both its central and field offices. The Army recently awarded a comparably sized contract to Sperry, which will place 1,800 Arete Systems 5000/80 minicomputers that are Unix based. Unix has been used for longer periods of time by the federal court system, the Department of Labor, and the Internal Revenue Service. These systems tend to combine office automation tasks, such as word processing and mail, with agency-specific applications for internal budgeting, case management and investigation, or other types of so-called client services, like loan processing.

These large procurements have several aspects of direct relevance to commercial dp managers:

- The applications are highly distributed office data management systems, where geographically dispersed computer sites are communicating with one another on a regular basis and sharing data for purposes of either consolidating information upwards through the organizational bureaucracy or dispersing reports and messages laterally throughout the organization.
- Federal dp managers want to build their applications quickly, often based on database management systems, and they demand that their work be highly movable across new generations of hardware that will be infused throughout their agencies over the coming years.

An example is the Department of Labor's distributed case investigations system for catching unemployment insurance cheaters. DEC Professional 380 microcomputers, running DEC's System V version of Unix ProVenix, are located in each state across the country. Equipped with Forte 3270 communication cards, these microcomputers automatically extract large amounts of employment data from the IBM mainframe databases located in the states, and pass these data up to a VAX 11/750 situated in Washington, D.C., without user intervention. The VAX 11/750 has Ultrix (Digital's Unix for VAX). Random record selection routines select cases for subsequent investigation on the VAX. The cases are automatically sent back to the state micros. At the state level, extensive data entry screens and information-providing routines help the investigator to track down fraud.

All results are sent back to Washington, where consolidation takes place, and the final results are reported to senior management. Software made on the VAX in Washington is directly movable to the state-based microcomputers. Furthermore, as the Department of Labor is now upgrading some of its pcs to the more powerful MicroVAX workstations, it is assured that all of its software will be operational in the new environment.

In fact, while one finds electronic mail and document preparation packages a standard feature on these systems, the most distinctive strength of Unix and Unix development tools appears to be their suitability for building distributed decision support systems. Like the Department of Labor, the Federal Judicial Center is now installing a DSS among the federal courts that tracks the status of court cases, the assignments of judges, and the mountain of documents filed during the course of each case.

AVOIDS HARDWARE LOCK-INS

A basic feature of the federal Unix-based procurements is movability. Movability allows the purchasing agency to avoid hardware lock-ins. Usually pigeonholed as a software development environment—not a run-time environment per se—Unix is perceived by many government managers as a big money saver because it allows them to be aggressive price shoppers. A dp manager inside the Department of Agriculture who was part of the Unix selection process comments, "We wanted a widely accepted, relatively standard operating system that was available on a broad range of equipment—an environment that could offer us the software movability to keep us from getting locked into one set of hardware."

While most visible in the purchas-

AT&T has taken active measures to bring the Berkeley camp back into the fold.

ing of large numbers of computers, the independence factor is equally important in the procurement of peripheral devices. A basic design rule of Unix applications is something called "device independence." This is achieved typically through databases maintained inside Unix that hold critical information about the features of hundreds of output devices. If a user wants to move to a new graphics terminal, ASCII terminal, printer, or plotter, he does not have to rewrite or recompile any of his applications, but only make sure that an entry exists inside one of these system databases. If it doesn't, adding a new entry is a rather simple matter.

In its procurements the government has also demanded that Unix come out of its shell and communicate with other operating system environments. There tend to be two directions in this communications activity: "going up" to transfer data with IBM mainframes, and "going down" to DOS-based pcs. Unix workstations are now commonly networked through Ethernet LANs.

The architecture of Unix has always facilitated the creation of new device drivers, the pieces of internal systems code that support such things such as disks, tape drives, or serial ports for modems. Unix has also had higher-level utilities for implementing serial-based communications between computers, the most important one being Unix to Unix Copy (UUCP). Further, Unix's adoption of the standard ASCII format for its data has made life that much easier for transmitting data or mail within these computer networks. For Unix users, more than for any other population of computer users, communications has been fairly standard stuff.

In recent years, this combination of rapid driver creation and comfortable computer networking has been the platform upon which Unix has been extended to high-speed local area networks. Most commercial offerings of Unix now have drivers that support Ethernet, which is used primarily in office environments. Similarly, AT&T now provides Starlan support for the office on its 3B family computers and pcs, a LAN that is suitable for PBX applications where voice and data should be integrated.

Another specific area of Unix LAN activity is factory automation. In this past year, the General Motors and factory automation product suppliers that are participating with GM in the MAP (Manufacturing Automation Protocol) development consortium selected Unix as the common operating systems platform for product development. In the near future, vendors will be providing operating systems support for token ring LANs.

HIGHLIGHT OF FEDERAL STORY

Perhaps the most important highlight of the federal computer story is the role of the systems integrator. Given the newness of Unix for many of these government administrators and the sheer size of the procurements, the presence of an effective systems integrator has been an essential part of Unix's success. That Electronic Data Systems, for example, chose to go after the Department of Agriculture's $250 million, 10-year contract is something of a milestone for the Unix industry. EDS is by no means the only effective integrator working with Unix today. Others include Sperry, AT&T itself, and Computer Sciences Corp., El Segundo, Calif.

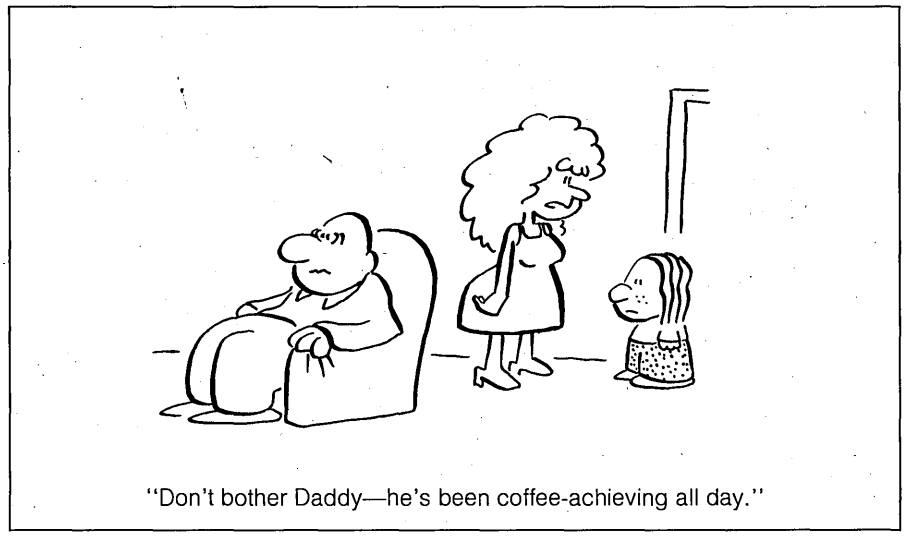
What does this mean to MIS? Where might Unix fit into the MIS organization? While a handful of companies have modified Unix to create high-speed, parallel processing transactional computers, the real potential for Unix is in the nontransactional decision support marketplace.

Looking at the needs of computer managers in that area, what do we find? First, different computers must share data, and further, different pieces of the entire DSS must run on different computers and screens. Second, the nature of DSS is that such systems are developed incrementally and therefore require a highly modular, rapid development environment. These needs play to the strengths of Unix. In the commercial arena, this has been discovered by Citibank, Merrill Lynch, Quotron, and Davis, Polk and Wardell (a large New York law firm). These companies are the "lead users" of Unix in commercial dp. The insurance industry, with its geographically dispersed sales and customer service activities, is a prime candidate for distributed applications development under Unix.

As with any new technology, there are numerous pitfalls to getting started with Unix. The MIS manager cannot allow himself or herself to be swamped with information about the technology per se, but rather, needs information about how the technology can be applied to specific problems. As one dp manager comments, "I don't need to know how to program in Unix. I need to know if I should tell my programmers to learn how to do it." An experienced consultant with a combination of technical and management skills regarding Unix applications is more in order. Alternatively, there is a set of hardware vendors highly committed to Unix whose salespeople can provide a great deal of applied information. In many instances, if a procurement is sufficiently large, the technical support staff of these vendors may even prototype key parts of an application as part of the sales process. Remember that with the correct development tools, these prototypes can be created in relatively short periods of time without a major programming effort.

The bottom line to all this is that Unix is a sound and continuously improving body of technology that is well suited to meet the challenges of integrating different types of computers, applications, and communication networks faced by dp managers in commercial enterprises. ◉

Marc Meyer is a professor at Northeastern University, Boston, where he teaches about technological entrepreneurship and information systems. He is also a consultant for large corporations on technology management, software productivity, and systems integration.



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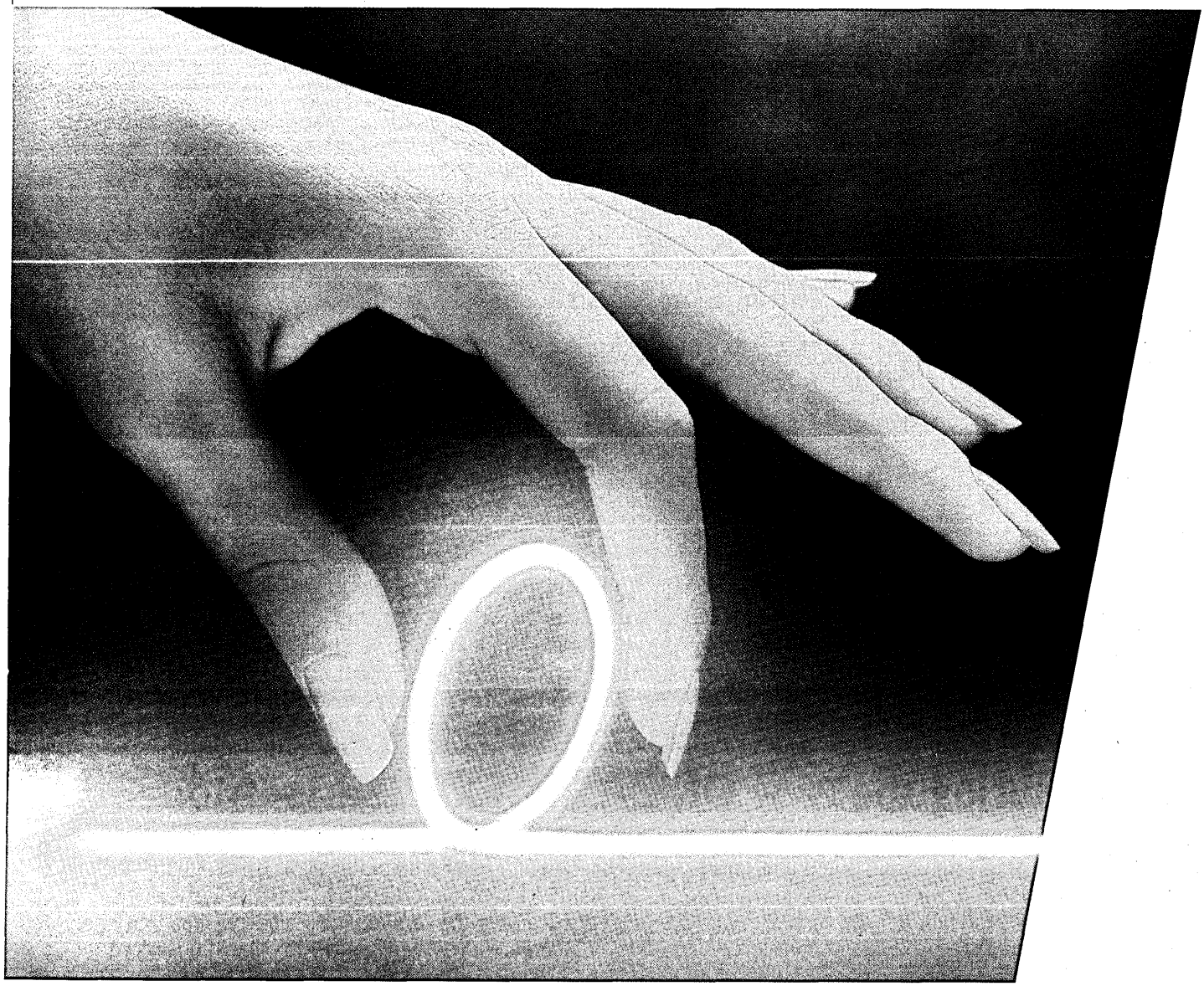

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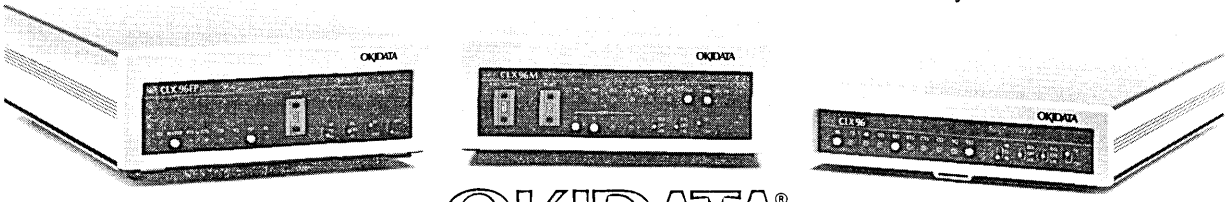

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GROUP PRODUCTIVITY SOFTWARE

by Jan Lewis

For the past few years, we've been hearing that the upcoming year will be the Year of the Local Area Network for microcomputers. The truth is that the year, or era, of the LAN won't happen until users experience the productivity pluses promised by LANs.

LANs need to be more than administrative tools. They need to be productivity tools for users. When this happens, pcs will be nodes on a LAN in much the same way telephones are nodes on an interoffice voice communications system. A number of so-called group productivity software packages have recently been introduced that will be the driving force behind increased use of LANs.

When LANs were first introduced, there was little applicable software. Today, major software developers like Ashton-Tate and MicroPro are rewriting their software to run on networks. While this is a step in the right direction, the packages are just adaptations of existing programs. They are not written specifically to take advantage of LAN capabilities.

What does take advantage of those capabilities is group productivity software, which provides users with the incentive to install a LAN: increased productivity. This new wave of software allows users to retain personal data and still communicate whatever they want with whomever they want. Better still, the software does it without disrupting the flow of work.

Group productivity software takes advantage of the network environment and allows a work group to communicate more efficiently. Unlike packages such as dBase III Plus or the network version of WordStar 2000, these new packages form a separate applications group.

In focus groups conducted by the Palo Alto Research Group, corporate microcomputer users discussed the LAN features they wanted. These users described the ideal LAN as one that allows them to determine who receives what data, lets them run their existing base of software, requires minimal time to learn and to use, and performs routine tasks more easily and more efficiently. While a network, by itself, cannot live up to all these demands, group productivity software that runs on a LAN can help it achieve these goals.

Recently, I reviewed four group productivity software packages that I think will make users want to buy networks, just as Lotus 1-2-3 gave businesses a reason to buy IBM PCs.

One of these packages is Network Courier, developed by Consumers Software of Gilroy, Calif., for the IBM PC and compatibles. Late last year, Tandy Corp. of Fort Worth and Apricot Computers of Santa Clara (formerly Applied Computer Technologies) signed distribution agreements with Consumers Software. Consumers' deal with Tandy provides for custom design of the Network Courier system for use on Tandy's ViaNet network; Apricot will distribute Network Courier under the name Apricot Mail.

Network Courier functions in the same manner as RAM-resident programs, appearing on the screen with a single keystroke. The program previously displayed can be retrieved with another keystroke. For example, a salesperson running Lotus 1-2-3 on Network Courier can copy a section of a spreadsheet for the district manager. The salesperson calls up Network Courier, copies the spreadsheet section or the entire file into it, includes a short note, and sends it electronically to the manager's pc. If the manager is logged on, a note will appear in the corner of the screen, announcing the incoming message. The manager can then read the message without exiting the current program.

Network Courier allows users to comment on messages sent. A file can be marked "certified" or "RSVP," which generates a return message listing the day and time the file was read. Files can be assigned codes from one to five, with five being the most urgent. Users who receive messages can scan these codes to determine which files need immediate attention and which can wait until later.

LAN HELPS PHYSICS LAB

Network Courier is improving communications at the Applied Physics Lab at Johns Hopkins University, which recently installed a LAN running the package. The lab's offices are scattered throughout five buildings, making communication between staff members difficult, explains Paul Bohm, program manager for the lab. "We have to deliver a lot of Lotus worksheet files," Bohm says, "and sometimes someone will find an error in a template. Before installing the LAN, it was difficult to notify everyone about the error and correct their spreadsheets. Now we can keep the templates on the file server and correct just the one copy. We also can send electronic mail to everyone on the network, alerting them about the error."

Bohm believes that using Network Courier has improved the lab's communications and productivity. "Now, people can send each other files easily, rather than carry the diskettes around," he attests.

Similar to Network Courier, another group productivity software package is In Box from Think Technologies, Lexing-

Networks without useful software are like cars without rubber tires.

FIG. 1
SHOPPING FOR SOFTWARE PACKAGES

PRODUCT	VENDOR	PRICE	REQUIREMENTS
Network Courier	Consumers Software Inc. 8315 Monterey St. Suite A Gilroy, CA 95020	$695 per network	MS/DOS 3.1 or higher NetBIOS-compatible network 320KB RAM on file server 192KB RAM in client PCs
In Box	Think Technologies 420 Bedford St. Lexington, MA 02173	$295 for first three users $75 for each additional user	One 512 Macintosh dedicated as file server Appletalk network and a hard disk
Higgins Administrative Software	Conetic Systems Inc. 1470 Doolittle Drive San Leandro, CA 94577	$995 for first five concurrent users $695 for each additional concurrent user	MS/DOS 3.1 or higher IBM PC Net or compatible 320KB RAM
Datastore: LAN	Software Connections Inc. 1435 Koll Circle Suite 112 San Jose, CA 95112	$1,295 for first five users $495 for each additional five users	MS/DOS 1.0 and higher 256KB to 512KB of RAM, depending on network used One hard disk or two 360KB floppy drives

ton, Mass., which runs on Apple's Appletalk network. Like Network Courier, In Box functions as RAM-resident programs do. It offers the same file-sending capabilities as Network Courier but it can send only complete files. The message system for In Box features a phone memo that looks like a sheet from the ubiquitous pink "While You Were Out" pads. The user clicks on the phone icon from the menu list, fills it out, and sends it on.

Another group productivity software package is Higgins from Conetic Systems Inc. of San Leandro, Calif. Conetic Systems has developed close business relationships with 3Com and Novell, making the company a class I independent software vendor to 3Com and a netware affiliate of Novell.

Higgins handles office administration, allowing users to coordinate companywide scheduling. For example, if a company executive wants to schedule a meeting with five different department heads, their schedules can be checked through Higgins, as can the availability of conference rooms and audiovisual equipment. This package also includes many desktop accessories, including note pads, calculators, expense reports, to-do lists, tickler files, and phone directories.

Although Higgins has access to all pcs on the network, it is equipped with security measures that help ensure the privacy of individual databases, messages, and appointment lists. All text files are fully encrypted to prevent anyone—even the system administrator—from reading files.

The last package is Datastore: LAN from Software Connections Inc., San Jose. This program is a relational database management system for LANs that allows several users to read the same database file at the same time. When two users attempt to modify the same file simultaneously, one user is "locked out," ensuring that data are not accidentally overwritten by another user.

The package also features an audit trail that protects the database from unauthorized use. In addition, field-level security gives the system administrator control over user access to confidential information.

Datastore: LAN is currently being used to improve the efficiency and communications of the White House Conference on Small Businesses. The conference tracks registration information for 40,000 to 60,000 participants in 57 miniconferences, using a 3Com Ethernet LAN running Novell's Netware/E operating system, Software Connections' Datastore: LAN, and WordPerfect from Satellite Software.

"We have a staff of 56 people generating vast amounts of data on the conference," explains Larry Gordon, budget director for the conference and manager of the network. "Much of that information has to be shared. In addition, I must be able to access that information at any time to generate management and financial reports." Gordon says the productivity software enables him to divide his group's work more efficiently and track delegates more accurately.

These four group productivity software programs perform everyday office tasks easily and efficiently. With them, business computer users no longer have to traipse down the hall to hand the latest database disk to a coworker. They no longer have to worry about whether or not a piece of information is worth the time it takes to write a memo, print it out, put it in interoffice mail, and hope the receiver reads it. Group productivity software makes these tasks second nature.

The first airlines to hook their schedule information into travel agents' computers had a clear edge over their competitors. I believe that companies using networks with productivity software will have that same competitive edge.

Networks without useful software are like cars without rubber tires. They work, but who wants to buy them? In 1984, when group productivity software had not yet hit the market, LAN vendors sold only $400 million in equipment. Now that group productivity software is available, that figure should grow to $1.4 billion for 1986 and continue to climb through 1990 as more LAN software becomes available. ◉

Jan Lewis is president of Palo Alto Research Group, which provides research and consulting services for the computer industry.

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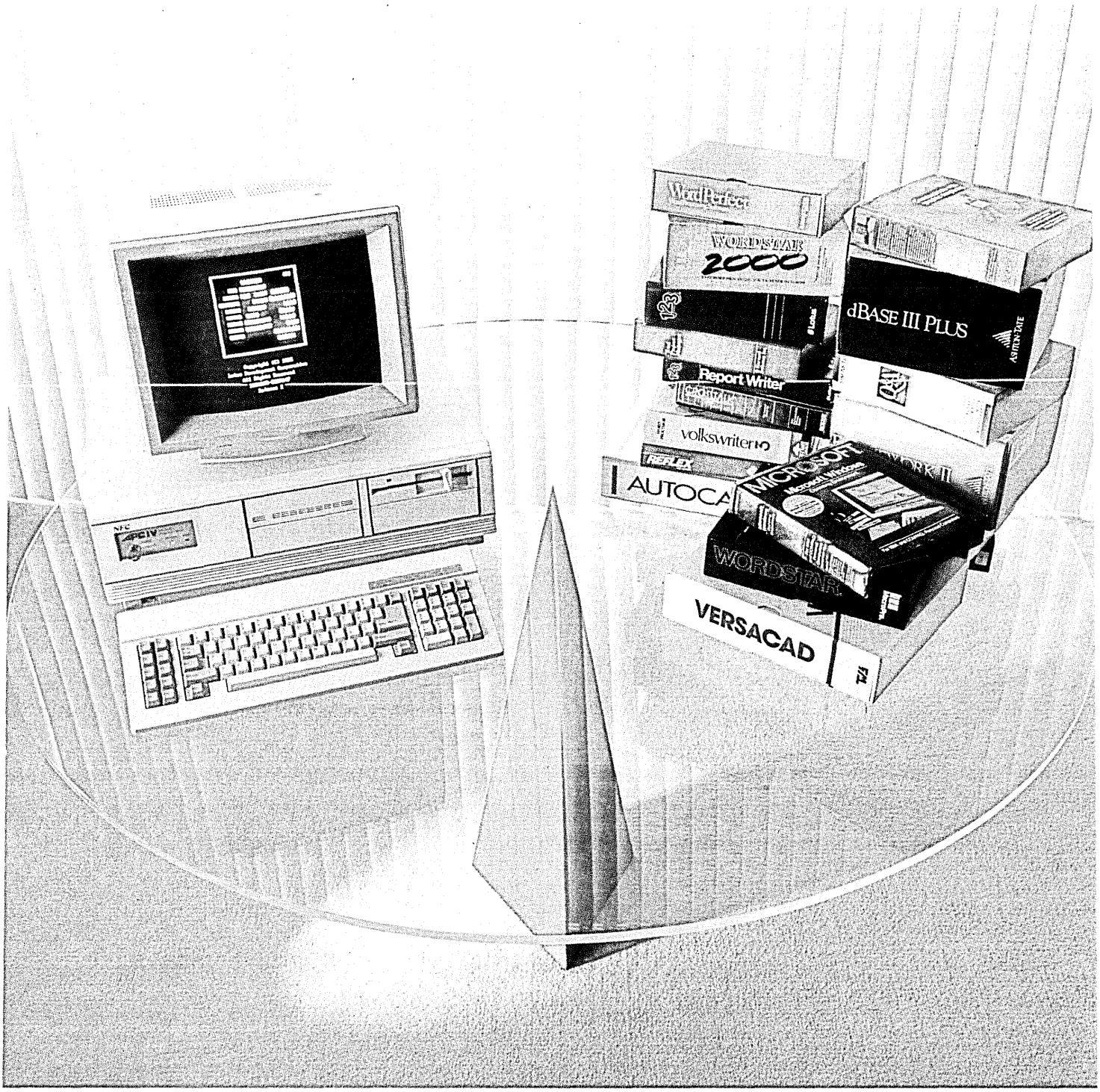

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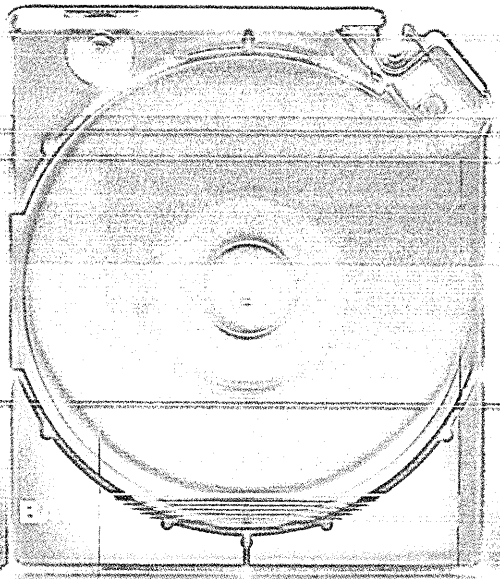

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CIRCLE 42 ON READER CARD

A bold new approach to storing data could sweep away many difficulties users face.

THE TYRANNY OF THE FILE

by Theodor H. Nelson

The fish does not see the water. And we computer people, even the savants, whizzes, and frontiersmen among us, generally fail to see the most oppressive and devastating aspect of our working lives. I refer to the file, and the conceptual structure of the storage methods it forces us to deal with. Chaotic and fragmented, the world of computer files presents an enormous barrier to the creation of the clean systems of tomorrow.

We tell beginners, "It must be this way." But I believe there has to be a fundamental redesign of the way we use computers, undoing this harm and difficulty. A clean new interface to our worlds of information could sweep away a vast amount of the difficulty that people have with computers.

Indeed, what the world needs is a generalized form of storage that will grow and adapt and hold data for every type of application; that may be shared among all applications, yet does not slant or gerrymander those data in any particular way; that creates a common, clarifying, and universal system of storage.

Computer use is principally concerned with maintaining order in a growing jumble of files. Some files stand alone, some must be managed in clusters, but typically they are all piled together on disk with archival copies and backups in an ever more confusing tangle.

Having to keep track of files is an endlessly complex and exasperating chore. You have to name each one. You have to rename them. You have to keep copies. You have to move them by copying and then deleting one of the survivors. (Deleting the correct file in a jungle of similar names is roughly like holding your baby and your garbage over the incinerator and letting go of one, 10 times a day.) Then there are the endless problems of making backups and finding space for them (often in dark crannies of the disk), the escalating annoyance of disk volumes filling to capacity, and the emergency transfers and deletions that must be made.

Typically, from time to time, somebody just throws it all away and starts afresh, or just puts the whole mess in storage somewhere and starts over, or does a sweeping reorganization of files during which a great deal of data is lost.

Attempts have been made to organize these chores according to various schemes, the most popular of which is the hierarchical file structure. With catalogs and directories, this structure originally seemed an improvement because it provided more places to put things and because it seemed to match well the structure of certain applications.

Some people think hierarchically and that's fine, but those who don't should not be forced to do so. There are those who imagine that forcing a problem into a hierarchical structure promotes clear and rigorous thinking. But that is, to use the politest possible term, malarkey; mapping any set of ideas to any other may present interesting exercises to the mind, but there is little point if the two sets do not match well.

Unfortunately, the hierarchical model imposes intricate, fixed pathways that we must commit to and memorize and which are quite hard to change. Yet the way we think of our work is constantly changing at the highest level. (Lucky are they whose ideas are fixed and unchanging.) Unfortunately, existing file methods stick us forever with the groupings that we start with—those divisions and hierarchies that seemed appropriate at the beginning—unless we do the elaborate reorganizations that nobody has time for anyway.

Many sets of data need to be divided into separate files even though they are related to each other, but the connections, not being represented, tend to evaporate. Cross-references between them, the interconnections of shared material, commonality and parallels—all these become easily lost because they are not easily represented.

There are ad hoc programs we can build to cope with what is not built into the storage system. These include programs for comparing files, indexing programs that mark points in text, delta list programs to manage the history of changes, and software configuration management programs, which produce different versions of the same programs from a common library. But I insist that if we had proper storage, all these functions would be handled in the data structure as a common reference system, available to all software.

SOFTWARE AFFRONTS USER

Most software based on this file model affronts the user with tedious formalities of opening and closing. Since files, their names, and versions constitute the surface structure of this universe, selecting and opening them is a level of annoyance that makes firing up an application as tedious as opening a bank account. Such unnecessary distraction and formalism wear you out before you even start and they forbid acting on inspiration. The situation is comparable to having to deal with a desk clerk in order to make love. (Programs like Sidekick from Borland International help in this regard, but the elaborate formalities are still necessary to put files away when the user is done.)

We should be able to work on numerous things at once, Ping-Pong style, never having to deal consciously with the formalisms of opening and closing files and applications. Many would say you could escape some of these annoyances by conventional methods. Today's windowing packages are a start, but they just disguise underlying conventional file methods that must be grappled with as usual when the day is done.

There are subtler problems to be solved. I would argue that the conventions of files as we know them put pressure on software design to take certain oversimplified forms. For instance, we are familiar with the database model, in which separately coded items, or records, may be searched according to various criteria. We are also familiar with the word processing model, where sequential text may be scanned, revised, and printed. But why can't these approaches be combined? What if one wants to provide categorical codes for sections of text inside their documents, to flag them for reference by another application? Today's software does not permit that. (A partial exception is the software product Dayflo from Dayflo Corp., Irvine, Calif.) You might also like to search for the coded pieces and sort them like database

Some people think hierarchically, and that's fine, but those who don't should not be forced to do so.

items, yet see them in their living contexts at the same time. While these functions are possible to program, the conventions of files strongly pressure the programmer to oversimplify both the data and their uses.

What we need, I submit, is a world without files. By that I mean a world where the user sees his or her latest work in its preferred appearance and format while still being able easily to trace interconnections and compare versions. Each application should be like a door to a world: the user opens doors into applications, with multiple views of materials, each a different context or way of working on it. We need multiple pathways to the same material at the user level. Whole environments—application programs and their open files—should easily be snapshot (frozen and put away so that they can be brought back to life quickly without reopening files one by one). This has been the intent of many integrated software packages, notably Lotus's Symphony, which tries to make available several different views of common materials.

Often the same pieces of text or, more common in the future, graphics, need to be worked on in several different contexts. As a result, different versions of the materials develop, growing apart in different ways. It should be possible, however, gradually to change and separate different versions, yet keep their commonalities traced back to the original version. This does not exist in any well-known system.

DIFFERENT STORAGE APPROACH

What I propose requires a different approach to storage. It is best explained by degrees, starting with the case of text storage and expanding toward a generalized structure. We called the old units files. Let us choose a new name for units that can link and overlap. I propose the term document, since text documents are often interconnected in the way we plan to permit. The purpose of a document is the same as that of a file—it is a useful collection of data—but it offers additional advantages.

Let us begin by collecting all text into a pool of dated bytes. Each byte knows when it was created. A document is a list of pointers into this pool. Conversely, each byte knows the origin and location of its corresponding pointers. (This is related to the "piece table" approach of such word processors as Samna from Samna Corp. of Atlanta.) Different documents may point into the same text pool, using the same materials in different ways. As the documents get modified they depart from one another, and their pointer lists change.

This data structure may be implemented for a variety of different functions to go to an arbitrary part of any document; to find what documents use a given string or byte, and where it falls in each; to find out whether two specific documents share a piece of text; to see the same text as it appears in two different documents. While this has certain unusual speed advantages, it also allows rapid jumps to arbitrary positions in text, since the program steps through pointers instead of text.

This facility would permit a user to reuse and rework the same materials repeatedly in different ways and for different purposes, unconfused as to their origin but always able to identify which sections are common between what documents and versions. Multiple documents and users could share material without redundant storage. This would be especially useful for boilerplate applications, where the same materials are often reworked for different documents.

Even for the lone user, this approach could bring clarification. It would be easy to keep track of the parallel maintenance of different versions, the continuing connections to the origins of each part, and differences between all working versions. Note also that the storage overhead from maintaining many documents (and saving back versions) would be reduced in proportion to the amount of overlapping material.

The payoff could be even greater in a file server for many users who are sharing material. The data would stay in place, they could participate in many documents of different kinds, and each document could evolve separately, but connections would be continually traced among them. Where the same materials and boilerplate are repeatedly used, as in law offices, such facilities can be vital.

The text pool, by the way, should contain only "pure" text, uncluttered with information about paragraphs, fonts, and the like. Such information will be different for different users and thus must be purged from the text to assure that only a clean base of shareable materials is in the common pool. Therefore, a separate set of format pointers is needed, isolating the formatting information from the "raw" data. Formats become sets of pointers into this pool.

MARKING DATA FROM OUTSIDE

This same approach may be deeply generalized. What we have found is a way to mark the data from outside, so that those applications that need to share data and the markers may do so freely, but the markers do not clutter the data for applications where they're not wanted. We really want a much more general facility, one permitting arbitrary markings in a pool of data that may be used for different purposes by different users of these data, but that do not obstruct or encumber the data for users who don't want them. This can be accomplished through a generalization of the format coding system.

We would like to mark and link data for many purposes. Markers can be used to point at specific items, to hold a place somewhere in a text or other document, and to indicate items or sections of a certain type. We may also want links between different parts of our data to show comments, to show structural interconnections, to show corresponding parts (e.g., between code and documentation), and so forth.

We will want to move markers and links out of the data but keep them where different users can use them for different purposes. Each of the different types of links and markers would therefore be kept in a separate, individual pool.

These markers and links may be of many types, but by pooling them we gain numerous advantages: we can find which ones attach to any given section of data; we can search them by type, by time of entry, by owner, and so on. Let's consider how this will work in a text system for the storage and maintenance of linked materials and arbitrary forms of annotation. Each document can be read in sequence, every use of a piece can be traced to the other documents to which it has migrated, and overlapping pieces can be coded in numerous ways without obstructing other operations.

What we call here links are easily used for database-type coding. Thus the data structure easily supports the application described earlier: coding parts of documents and searching for them so they may be seen in their living document contexts. Word processing and database applications map data to existing file structures; they grow toward each other as the programmer continues to add features, but in the process become increasingly awkward. In contrast, suitable storage facilities would reflect a deeper structure, making intermediate applications easier and specialization unnecessary. This style of data structure exerts no pressure to design applications a given way and so escapes the styles of problem analysis and divisions into simplified solutions that are fostered by conventional files.

This notion generalizes to a new storage paradigm with wide-ranging impli-

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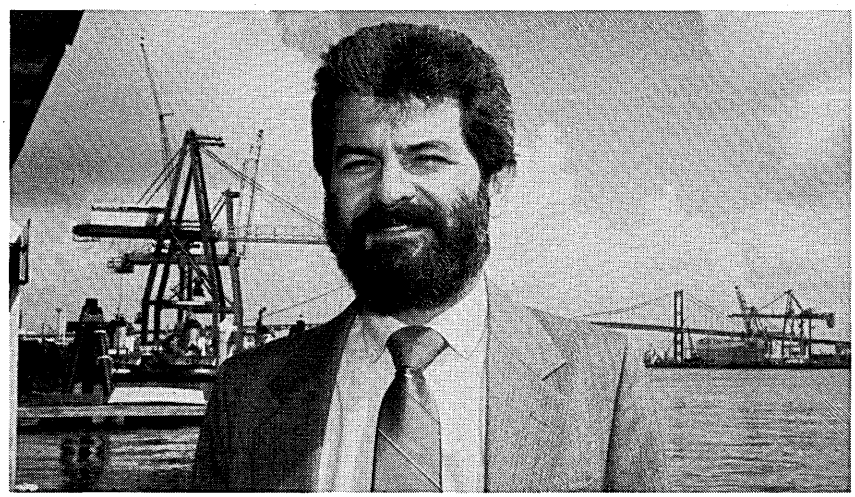

BACK IN TOUCH—Shipping agent Bill Lowe after rescue.

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CIRCLE 43 ON READER CARD

Using software based on today's file model is comparable to having to deal with a desk clerk in order to make love.

cations. I believe it is a unification that can exactly represent the intrinsic structure of all data. Though it is not generally recognized, this representation is needed in all fields and applications, not simply computing. Engineering, law, medicine, computer science, art history, entomology, and intelligence work have the same need to represent linkage and origins of data, commonality between documents, and historical backtrack. This is true for all types of data, including text, graphics, business data, and scientific data. Without these facilities, I submit, there is no way to build the kinds of features that the true paperless office will require, eliminating the debris of loose and lost files that are accumulating everywhere.

On-line publishing so far has sold chunks of text too big to be useful—the customer is forced to buy a side of beef when all he wants is a hamburger. Users need instead to be able to browse on-line through forests of interconnected material, paying only for the small pieces as they go. The approach I have described is excellent for on-line publication since everything's origin is identifiable down to the byte level, and royalties can be calculated accordingly. When a document is read out by a user, the owner of each byte may be minutely rewarded from the user's account with no intricate mechanism, just as the user of a jukebox automatically pays royalties to a song's owner and performer. We may even envision a new literature where linkage, intrinsic everywhere, now becomes a part of the structure of the writing itself.

PROBLEMS, CHAOS, AND GROWTH

The problem of massive digital archives is growing at an extraordinary pace. There is an increasing chaos of different programs and formats for the millions of megabytes that our society is storing for future historians and others. It is not known whether the software used to produce some of these data will even continue to exist, let alone be maintained, when historians want to study the material it created. Even next year, the boss may not be able to find out what his employees have created. There are word processors and spreadsheets of every conceivable kind, there are forests of graphics and 3-D shapes produced by a variety of systems, and much more. The increasing need for archival storage demands that a universal archival form be found to which all existing data structures and arrangements may be mapped. What is needed is a stable and generalized form of storage on which persons of goodwill can agree, leaving out nothing that is represented in any other system. I believe this can be achieved.

Separate, isolated computer files have their limits. What will replace them will be an automatically expanding storage structure. We need a stable indexing scheme that works across node boundaries if we are to have an indefinitely extensible network of instantaneous accessibility. And that is what must be. ◉

Ted Nelson, a self-styled top-down idealist, has been designing interactive systems for personal computers since 1960. His ideas are further explained in his book *Literary Machines* (available from Project Xanadu, 8480 Fredericksburg, Suite 138, San Antonio, TX 78229).

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CIRCLE 49 ON READER CARD

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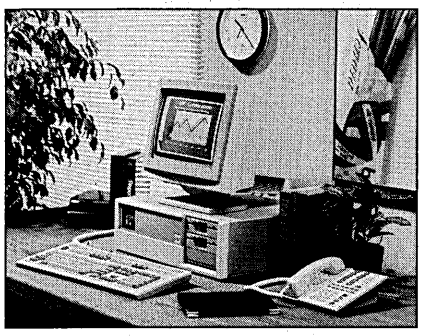
CIRCLE 44 ON READER CARD

HARDWARE

AT "CLONES"

Having made its name in add-in boards for IBM PCs, AST Research has introduced a software-compatible version of the IBM AT processor. The Premium/286, designed around a proprietary bus architecture, is said to outperform the standard 8MHz AT by up to 50%. Using a VLSI chip set, which replaces up to 80 ICs on competitive machines, the Premium product incorporates seven expansion slots, two of



which are special slots for AST-designed memory and processor boards that run without wait states at 10MHz. The machines come in four models, which range in main memory from a half megabyte to a full megabyte and in disk capacity from 1.2MB of floppy storage to 70MB of fixed storage.

Also standard is an EGA graphics adapter and a 101-key keyboard. By bundling this product with a previously introduced laser printer and a text/graphics scanner, AST is hoping to capture market share in the desktop publishing arena. It claims such popular publishing software packages as PageMaker, Ventura Publisher, FrontPage, and PageWork are compatible with its new hardware. The computer is scheduled for shipment in January 1987. Prices range from $1,995 to $3,995, depending on disk capacity. With scanner and laser printer, the machine lists for $9,995. AST plans to sell the machine through retail chain stores and value-added resellers. AST RESEARCH INC., Irvine, Calif.

FOR DATA CIRCLE 301 ON READER CARD

ENTERS PC MARKET

Packard Bell has entered the pc market with its VT286 Business Computer and a line of peripherals, all of which are IBM AT-compatible.

The VT286 utilizes 20286 technology and comes standard with 640KB of RAM, expandable to 1MB on the motherboard, and a 1.2MB floppy disk drive. It runs under MS/DOS, and can be operated under Xenix Version V. It runs at 8MHz and features a Winchester disk capacity of 20MB, expandable to 170MB. Also featured are a Centronics parallel port and one serial port, eight expansion slots, and a clock/calendar. Options include an 80287 math coprocessor, additional 360KB or 1.2MB floppy disk drive, and a 45MB to 60MB tape backup. The price for the VT286, which is available now, is $2,495.

Peripheral products introduced recently by Packard Bell include the PB1435EG EGA Color Monitor, compatible with the IBM EGA Monitor 5154, priced at $799; two 12-inch monochrome monitors priced at $179 and $199; the PB1200 external modem for $285; and the Laser Printer PB8300, base priced at $2,495. PACKARD BELL, Woodland Hills, Calif.

FOR DATA CIRCLE 311 ON READER CARD

KOREAN PC

The Hyundai Electronics Industries Co., a subsidiary of the South Korean conglomerate whose low-priced automobiles debuted in the U.S. this year, is producing a $699 personal computer designed to compete with the IBM XT. The Hyundai microcomputer has been introduced in the U.S. by Blue Chip Electronics Inc., an Arizona-based marketer and manufacturer that will distribute the computer under its own name.

The Blue Chip Personal Computer is an 8088-based 16-bit system that comes standard with 512KB RAM (expandable to 640KB), one 5¼-inch floppy disk drive, one serial port, one parallel port, a high-resolution monochrome video card, and six full-height expansion slots. An IBM AT-style keyboard is also standard.

The system can be upgraded with a second floppy or a 20MB hard disk. A high-resolution 12-inch monochrome monitor for the system is available.

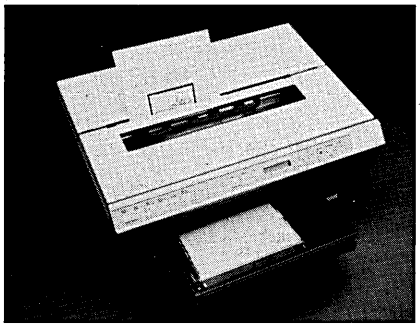
The pc, which is being sold through retail chain stores like Target, Caldor's, and Toys 'R' Us, carries a one-year warranty. Blue Chip is also offering a money-back guarantee if the pc fails to run any software written for the XT. BLUE CHIP ELECTRONICS INC., Chandler, Ariz.

FOR DATA CIRCLE 302 ON READER CARD

SOLID INK PRINTER

The Model SI 480 Solid Ink printer from Dataproducts incorporates ink in a solid form within a pellet, using technology developed through a joint venture with Exxon Printing Systems. When shot onto the paper, the ink leaves a raised impression. Horizontal resolution is 480dpi at print speeds of 200cps and 240dpi at 400cps.

Two font styles are available and the printer supports both RS232C and Centronics parallel interface protocols.



Its handling of paper includes automatic feed of cut sheets and tractor feed. Each pellet of ink is good for approximately 350,000 characters and Dataproducts estimates printing costs to be 3½ cents per page.

The printer is being positioned as a "prestige" printer, with laser and daisy-wheel printers. The base price is $2,795.

A Power Pedestal, upon which the printer rests, is optional; it has two paper bins holding up to 2,500 sheets of paper and is priced at $895. DATAPRODUCTS, Woodland Hills, Calif.

FOR DATA CIRCLE 303 ON READER CARD

ISDN CHIP LINE

With the addition of 12 new chips to its line of ISDN-compatible offerings, Canadian chip maker Mitel Semiconductor claims that its chips can now be used by telephone equipment manufacturers to implement all ISDN interfaces from basic to primary access. For example, a two-wire digital telephone compatible with the "U" interface can be built with three Mitel chips; a four-wire phone compatible with the "S" interface can be built with two chips.

Some of the features provided by these ISDN chip sets include interfaces to standard telephone transducers, hands-off speakerphone operations, ringing tone generation, full duplex operation to 160Kbps, and interfaces to both Motorola and Intel microprocessors. All devices are low-power ISO-CMOS and can be line powered.

Pricing for the chips ranges from $7.50 to approximately $20 each, in quantities of 1,000. MITEL CORP., Kanata, Ont.

FOR DATA CIRCLE 304 ON READER CARD

SHARED LASER PRINTER

The PrintServer 40 from Digital Equipment Corp. is a monochromatic laser printer with an integrated MicroVAX II that can serve as a shared printer for LANs, local area systems, and single-host computers, via Ethernet. It offers 300 by 300dpi resolution for output of text, graphics, and scanned images. A dedicated MicroVAX II data controller interprets application programs that output in PostScript.

Software utilizing ANSI text/pixels, ReGIS, or the Tektronix 4010/4014 format are supported on the PrintServer 40 through host-based translators. Twenty-nine resident typefaces are provided, which can be scaled to any point size, rotated to any degree, and positioned anywhere on a page, as can graphics and scanned images. Three input trays hold up to 2,500 sheets of paper. Digital says the printer can produce between 30,000 and 100,000 pages a month. It began shipping last month and is priced at $47,900. DIGITAL EQUIPMENT CORP., Maynard, Mass.

FOR DATA CIRCLE 306 ON READER CARD

DIGITAL PBX

The Saturn I is an under-100-line digital PBX from Siemens designed for the small business market that offers voice and data communications features available on the vendor's larger systems. It can be used with conventional single-line phones or with the vendor's Dyad or Jr-Dyad digital phones to provide end-to-end digital service. Saturn I features 1.25MB of memory using Intel 80186 microprocessors and incorporates 16-port line cards for efficient shelf utilization.

Currently available software that will run on it includes Automatic Call Distribution, Voice/Mail Interface, Shared Tenant Services, Health Care Services, and Office Communications II (OC II) for digital data communications.

OC II provides for the implementation of a star configuration LAN allowing terminals, pcs, and workstations to send and receive files, share hardware resources such as pooled modem groups, and access various databases at 20 different speeds up to 19.2KBps.

Saturn I end-user equipment pricing will range from $400 to $1,000 a line depending on features selected and installation requirements. SIEMENS INFORMATION SYSTEMS, Boca Raton, Fla.

FOR DATA CIRCLE 315 ON READER CARD

WINCHESTER DRIVE

Conner Peripherals recently made available to oem customers its CP340, a 50MB (unformatted) 3½-inch high-performance Winchester drive, which is the company's initial offering for the next generation of 32-bit computers.

The drive features 29msec average seek time (including settling), 75g shock resistance (nonoperating), and 7 watt power dissipation. It weighs 1.2 pounds, and includes a rotary voice coil actuator, embedded servo, and integrated controller with the Small Computer System Interface (SCSI) under the Common Command Set (CCS). The single-quantity price is $1,095. CONNER PERIPHERALS, San Jose.

FOR DATA CIRCLE 309 ON READER CARD

I/O PROCESSOR

The Intel UPI-452 (Universal Peripheral Interface) is a VLSI component that incorporates a buffer allowing host processors to communicate with peripherals in streams or bursts of data rather than in bytes, alleviating I/O bottlenecks, the company says.

The UPI-452 combines the following onto a single chip: a 128-byte, two-channel, bidirectional first-in, first-out buffer; a two-channel direct-memory access process; 8KB of erasable, programmable ROM; 256 bytes of RAM; and an MCS-51 microcontroller with 40 programmable I/O lines. It provides a high-speed interface to microprocessors such as the Intel 80286. Available this month in quantities of 1,000, EPROM and ROM-less versions are priced at $70 and $30 each, respectively. INTEL CORP., Santa Clara.

FOR DATA CIRCLE 308 ON READER CARD

—Theresa Barry

HARDWARE SPOTLIGHT

SUPERCOMPUTING

Convex has just unveiled its Extended Supercomputing Architecture (CXS), along with two new members of its C-1 family of supercomputers.

The CXS architecture enables all members of the C1 family to work simultaneously but independently on multiple individual applications per cpu, says Convex. Each node in the architecture is claimed to be a complete Cray-like computer system with dedicated memory bandwidth and I/O resources for each cpu. Also provided is a global file system structure, whereby all computational resources can share files via high-speed data movement protocols; file access can be local and independent of the global file system. The price for the complete CXS ranges from $25,000 to $30,000, depending on the configuration; upgrade prices will vary greatly.

The C1 XL is Convex's new low-end supercomputer. It provides up to 64MB of physical memory, has an 80MBps I/O bandwidth, and is compatible with Convex's original C-1. It's available in a variety of configurations and the entry price is $350,000. The C1 XP offers surface-mounted megabit chip technology providing physical memory extension to 1GB.

Convex claims it offers up to 50% performance improvement over the XL through the use of 20,000 gate array CMOS components and an instruction cache four times the size of the XL using higher density static RAMs. Convex also claims 60% greater I/O capacity over the XL. There is an upgrade capability for existing C-1 supercomputer users. Two models are available, the XP2 and XP4; prices start at $475,000. The XL, XP, and CXS are all available now. CONVEX COMPUTER CORP., Richardson, Texas

FOR DATA CIRCLE 300 ON READER CARD

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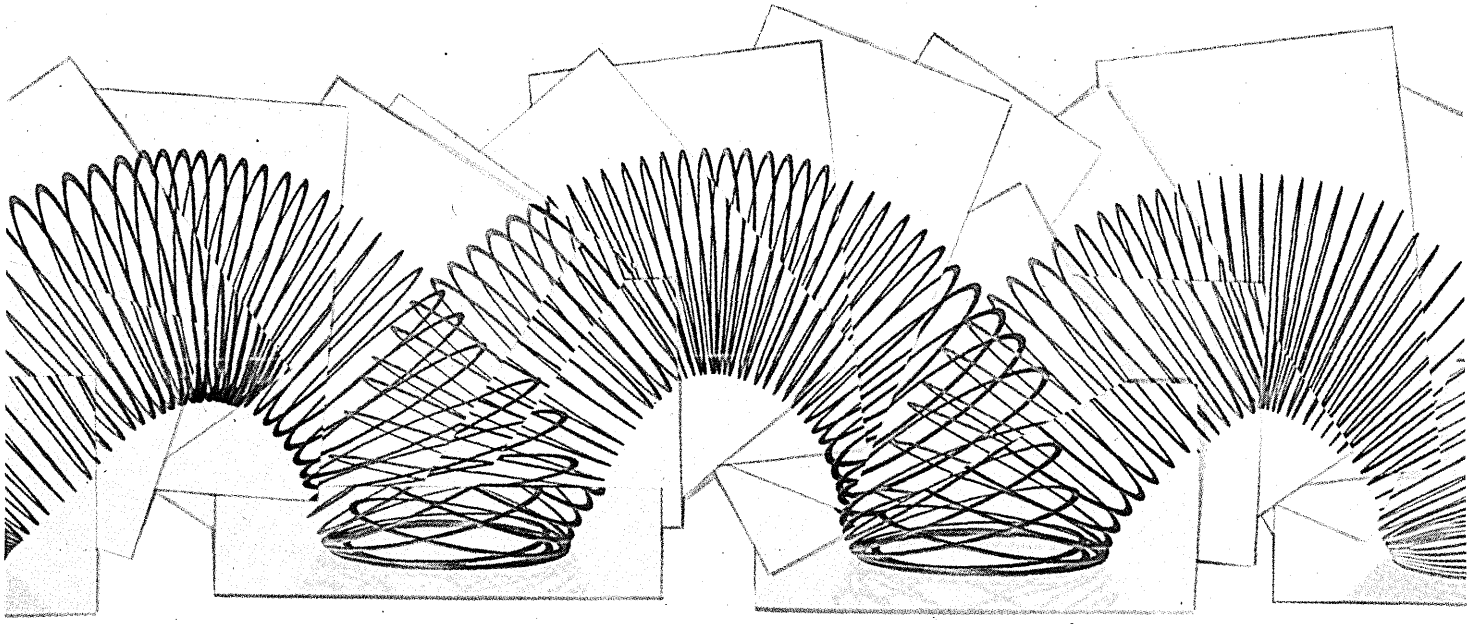

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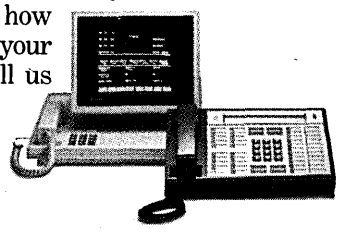

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CIRCLE 46 ON READER CARD

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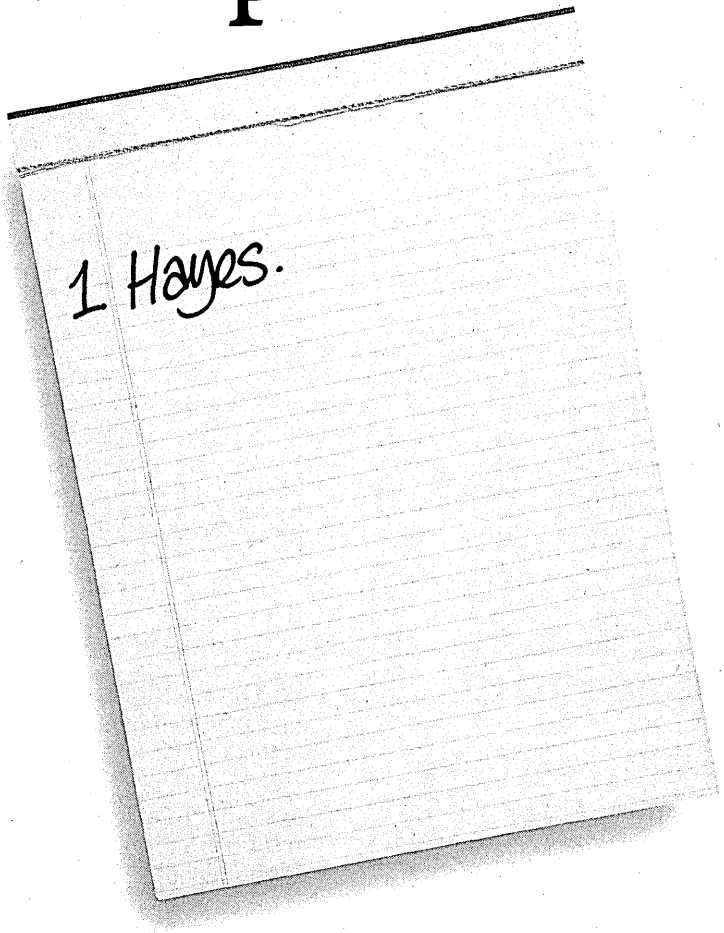
A complete list of things to know about 2400 bps modems.



Now that you've memorized that, here's a partial list of why a Hayes® Smartmodem 2400™ is best for you.

1. The Hayes Smartmodem 2400 allows you to communicate with the vast installed-base of 300,1200 and 2400 bps "Hayes-compatible" modems. The Hayes Standard "AT" Command Set allows you to use Smartcom II® and other software that communicates.

2. Through synchronous/asynchronous technologies, the Smartmodem 2400 permits your PC to access mainframes, minis, and on-line services previously inaccessible through asynchronous-only modems.

3. The Hayes Smartmodem 2400 is efficient...it pays for itself in just 4 hours of annual use over long distance.

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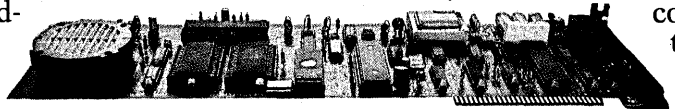
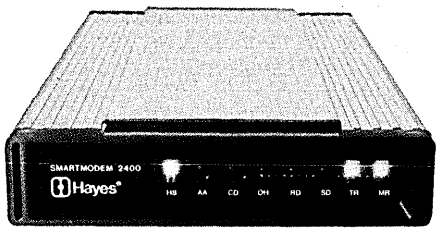


5. The new Smartmodem 2400B™—a plug-in board for the IBM PC and compatibles—allows synchronous and asynchronous communication through the same Com port.

6. You will also get the Hayes standard 2-year limited warranty and the opportunity to extend the warranty to 4 years.



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CIRCLE 47 ON READER CARD

SOFTWARE AND SERVICES

SUPERMINI COBOL

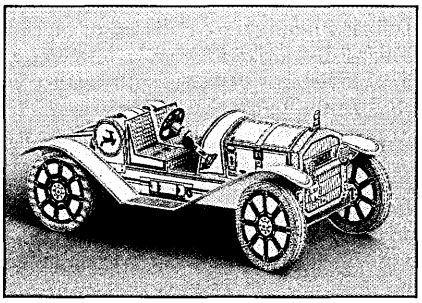
Pyramid Technology recently introduced its COBOL Development System, which consists of a native COBOL compiler, a source-level debugger, and a COBOL run-time system. It is said to allow COBOL-based applications developed on personal computers and minicomputers to run on Pyramid's Unix-based superminicomputers. The run-time system of the COBOL Development System supports screen management, data checking, and error recovery functions. Sequential, relational, and indexed-sequential data access methods are also supported. The source-level debugger includes English language error diagnostics and source listings. Once compiled, programs can be tested with the run-time debugger. Pyramid's COBOL compiler, based on source code licensed from San Jose-based Austec Inc., meets ANSI '74 standards. The COBOL Development System is available now for Pyramid's WorkCenter departmental system, for $6,000, and for its 90x through 98x superminis, for $8,500. PYRAMID TECHNOLOGY CORP., Mountain View, Calif.

FOR DATA CIRCLE 326 ON READER CARD

BUSINESS AND PLEASURE

ForComment is Broderbund's latest business program, which manages the process of document review and comment. ForComment works by first having a word processing document read into it, leaving the original unchanged. The copied words appear in a top window; comments or revisions are entered in a lower window. The user moves the cursor to the line to be commented on in the lower window. Line-specific and general comments about the document can be made. Each comment is labeled with the reviewer's initials and the date. Broderbund claims ForComment works with major word processing programs like WordStar, MultiMate, and WordPerfect. Documents prepared on other word processors can be read into ForComment via an ASCII file transfer process. ForComment can be used in both networked and stand-alone environments. It's available now and is priced at $195 for a single author and $995 for the network version, which allows up to 16 authors.

For holiday gift giving, Broderbund has come out with the Toy Shop. This program allows users to select from a menu a model, ranging from a 1911 Mercer Raceabout to a flying helicraft, add personalized graphics or text, and then print out the precision parts. The pieces can then be mounted on cardstock, cut out, and assembled with glue, rubber



stripping, wooden dowels, wire, or cotton cord. There are 20 models, including, in addition to those mentioned, a replica of Lindbergh's *Spirit of St. Louis*, a balloon-powered horizontal steam engine, a 1910 antique truck, a medieval catapult, and an antique carousel with horses. The Toy Shop is available for the Apple II for $59.95 and for the IBM PC and Macintosh for $64.95; a version for Commodore is coming. Included with the software is a starter supply of construction materials and a construction manual. BRODERBUND SOFTWARE, San Rafael, Calif.

FOR DATA CIRCLE 327 ON READER CARD

FILE MANAGER

RapidFile is a file manager from Ashton-Tate for IBM PCs and compatibles that allows business users to manage data, create reports, write form letters, and produce mailing labels.

The file manager in RapidFile provides six visual layouts for viewing, entering, and retrieving data. It supports such search criteria as "and," "or," "not," and partial or exact match. The report writer of RapidFile features a quick report capability which is said to automatically calculate subtotals, averages, and grand totals and apply the date, title, and page number to the printed report. The memo writer provides standard word processing capabilities. RapidFile reads ASCII files directly.

RapidFile uses files directly from dBase II, III, and III Plus, which allows for transparent access to dBase data. It can also import and export Framework II, pfs:File, and Lotus 1-2-3 files.

The package operates on the IBM PC, XT, AT and compatibles with 256KB of RAM and two 360KB floppy disk drives, or one 360KB floppy and a hard disk drive. Monochrome and color monitors are supported. RapidFile is available now for $395. ASHTON-TATE, Torrance, Calif.

FOR DATA CIRCLE 328 ON READER CARD

REPORT WRITER

Outlook Software's Outlook Report Writer, recently unveiled, is an assembler-based product that runs on the IBM S/38 and provides access to its database. Outlook says up to 15 files can be accessed at once, and the information can be manipulated, output in a report, displayed on-line, or graphed. Within the Report Writer, reports can be automatically or custom formatted. Users can define their own calculated fields, and 30 predefined financial and statistical functions are provided. S/38 security features, such as the ability to restrict users to specific menu functions and to have different data dictionaries for different users, are provided. Additional features include full selection criteria when accessing file information, 25 print edit codes and 30 display edit codes, and job streaming where multiple report writing functions can be executed from a single job. Outlook Report Writer is available now and is priced at $5,500; in February the price will increase to $6,500. OUTLOOK SOFTWARE INC., Schaumburg, Ill.

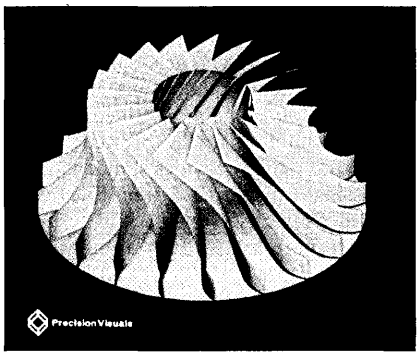
FOR DATA CIRCLE 329 ON READER CARD

SOFTWARE AND SERVICES

MODELING AND GRAPHICS

DI-3000 XPM and AddSys-3000 are two new products from Precision Visuals.

DI-3000 XPM is modeled after the PHIGS (Programmer's Hierarchical Interactive Graphics System) for hierarchical object modeling, output primitives, object editing, and spatial transformations of 2-D and 3-D objects. The product uses the device-independent library of the Precision Visual's DI-3000 library for graphics output to graphics terminals and hardcopy devices. Features include a hidden line removal utility that processes complex models and generates line output onto laser printers, ink-jet plotters, and graphics terminals; the ability to selec-



tively display structure groups; a quick view feature that lets users take softcopy or hardcopy snapshots of models; and a fast mode to speed the display of solid objects. Available now on VAXs running VMS, the price starts at $9,000 on a MicroVAX II; upgrades range from $2,700 on a MicroVAX II to $12,000 on a VAX 8800.

AddSys-3000 provides a gateway to the Tektronix 4107 through 4125 display list terminals, and supports the 2-D functionality in them. A compatible system for the Tektronix 4128 and 4129 terminals provides access to local 3-D segmentation, 3-D graphics input, and the manipulation of 3-D images on the screen. AddSys-3000 is available now for VAX/VMS, IBM, and Unix systems and is priced from $1,000 to $10,500. PRECISION VISUALS INC., Boulder, Colo.

FOR DATA CIRCLE 330 ON READER CARD

C COMPILER

Computer Innovations recently introduced it's newest C language programming tool, the C86Plus compiler.

The vendor says the compiler is based on new technology that applies artificial intelligence techniques to produce highly optimized code, allowing C86Plus to take advantage of powerful hardware, such as Intel's 80286 and 80386 microprocessors. Computer Innovations says the compiler provides Microsoft C code compatibility, and claims it runs up to 70% faster than its current C86 product. The language includes the latest ANSI C library functions, and additional features include Unix System V-compatible functions; small, medium, and large memory model support; 8086/186/286/386 code generation options; in-line 8087/287 floating point and auto detect emulator; and mixed model support, including near and far type modifiers. C language source code is also included.

C86Plus is available now for $497 and it runs on the IBM XT, AT, and compatibles running MS/PC DOS 2.0 or higher. A hard disk drive and 512K of memory are required. COMPUTER INNOVATIONS INC., Tinton Falls, N.J.

FOR DATA CIRCLE 331 ON READER CARD

THE THIRD WORD

Microsoft Word Version 3.0 is for Apple Macintosh systems. Features unique to this version, Microsoft says, include flexible menus, compound documents, and quick switch, page preview, page layout, and desktop publishing capabilities—including compatibility with Aldus's PageMaker and PostScript support, integrated outliner and style sheets, a conversion utility for the IBM Document Content Architecture format and two-way conversion with other packages, column manipulation, and an 80,000-word spelling corrector.

Microsoft Word Version 3.0 requires a Macintosh with 512K of memory and is priced at $395. It will be available in January and will not be copy protected. MICROSOFT CORP., Redmond, Wash.

FOR DATA CIRCLE 332 ON READER CARD

FAULT TOLERANCE FOR PC

CSSL Inc. and Kolod Research have jointly introduced Fail-Safe, a fault tolerant system for pcs. A software and half card version called DFT (Disk Fault Tolerant) and a hardware-only version built around firmware and a controller card, called DFT II, were also introduced. Each configuration addresses full hard-disk fault tolerance, transaction logging, image backup, and dynamic disk error recovery, claims CSSL. Disk caching, encryption and password security, and non-DOS support are also available for DFT and DFT II.

Fail-Safe requires an IBM PC or compatible with DOS 2.0 or later and uses approximately 24K of RAM. The software-only version of Fail-Safe is for single-unit pcs and is available now for $395. DFT, for use on a 15-pc network, consists of the Fail-Safe software in nonvolatile memory and RAM on a half card that fits expansion slots. It's also available now and is priced at $595. The hardware-only version, DFT II, has software embedded in nonvolatile memory and RAM on a replacement disk controller card and is a complete plug-in replacement for IBM-type controller cards. It's slated for second-quarter availability. CSSL INC., Seal Beach, Calif.

FOR DATA CIRCLE 333 ON READER CARD

PLOTTER EMULATION

LaserPlot is a software utility from Insight Development Corp. that provides HP 7470A plotter emulation for the HP LaserJet line of printers. It's designed to accept the high-resolution vectors used by plotters and convert them into the raster oriented bit-mapped image required by the laser printer. The utility is self-configuring and does not require an installation program or any configuration file modifications, Insight says. LaserPlot forms a transparent bridge between the application package and the printer. Features include a pop-up menu, a table of patterns, and line width selections for popular pen sizes and user-specified pen widths. The price is $150 and it's available now. LaserPlot requires an IBM PC, XT, AT, or compatible, and it supports HP LaserJet, LaserJet Plus, LaserJet 500 Plus, and compatible printers. INSIGHT DEVELOPMENT CORP., Moraga, Calif.

FOR DATA CIRCLE 334 ON READER CARD

—Theresa Barry

SOFTWARE SPOTLIGHT

SNADS CONNECTION

IBM's SNA Distribution Services, or SNADS, is the software mechanism by which users at terminals or host machines may send messages to one another in a store-and-forward fashion along SNA networks. SNADS is the post office of SNA, routing electronic mail, storing addresses, and monitoring traffic as it moves from device to device. As such, it is a key facility in future 370-oriented networks and compatibility with it will be necessary for all outside vendors who want to participate in such networks. Communications Solutions Inc. has come out with Access/SNADS, a software product written in C, which is designed to provide such compatibility. The package is expected to be useful not only for traditional electronic mail, but also as a means of moving any type of file from application program to application program. Unlike LU 6.2, however, SNADS does not require sender and receiver to be active on the network simultaneously. Initially, Access/SNADS is designed to run under Unix System V operating systems, but other environments are said to be forthcoming. The one-time license fee is quoted at $400 per network node, "in quantity." COMMUNICATIONS SOLUTIONS INC., San Jose.

FOR DATA CIRCLE 325 ON READER CARD

Retire Your PC Coax Connection

The PC-to-host coax connection. She was a good piece of equipment working with coax cable and cluster controllers, but time just passed her by. End users started needing more than simple host access. They also needed their PCs to share resources around the office. That's when local area networks came along to fill the need.

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CIRCLE 50 ON READER CARD

ON THE JOB

LEADING BY ONE'S SAMPLE: THE RISE OF DRUG TESTING

"There's a common feeling, beyond any legal definition that I know," says Bob Taggert, vp of public affairs at Southern Pacific Transportation Co., a San Francisco-based railroad, "that it's fair to test the engineer of the railroad for drugs, fair to test the airline pilot, and maybe even fair to test the auto worker who's bolting the brakes onto your new car, but how far do we extend this line? What about a computer programmer whose work determines how something might be built?"

Taggert's speculation on the fairness of testing computer programmers for drugs is not entirely rhetorical. Southern Pacific is currently defending itself against a wrongful dismissal suit brought by a former programmer, Barbara Luck, 35, who was fired in July 1985 after refusing to submit to urinalysis. Luck's suit states, "She believed [the test] to be a violation of her personal rights." Public uproar over the incident led San Francisco late last year to pass the nation's first ordinance restricting the use of blood and urine testing by private employers.

Luck's suit, which is expected to reach trial next spring, promises some legal clarification on a matter of increasing importance in the American workplace. Over 30% of the Fortune 500 companies test applicants or employees for drugs, according to a recent count, up from around 25% last March. Among leading computer and electronics firms, IBM began screening all new job applicants in North America in 1984 and AT&T began screening applicants for manufacturing jobs last spring. The nation's largest drug tester, the Pentagon, began widespread random testing of employees in 1982 and currently administers over 3 million tests a year.

The increase in drug testing represents employers' attempt to fight the use of drugs on the job, a phenomenon perceived to be costly in many ways. A *Time* cover story last March recounted an incident at a major airline in 1985 involving a stoned computer operator who failed to load a crucial tape into a reservations system. The mistake crashed the system for eight hours and cost the airline $19 million. "That was a very expensive joint by anyone's standards," *Time*'s source said.

Between 10% and 23% of all U.S. workers use dangerous drugs on the job, say government experts. Southern Pacific, which had been testing its train operators for many years under federal mandates, began expanding its testing to include office workers like Luck in August 1984. Says Taggert, "We recognized that safety concerns could not be limited to those individuals with their hands on the throttle."

Drawing public attention to drug abuse was an early aim of the Reagan administration. The topic has been a national media staple since the ad hoc President's Commission on Organized Crime last March completed a 32-month investigation by advocating mandatory drug testing of all federal government employees and contractors and urging that private companies consider testing their employees as well. The recommendation immediately drew fire from members of Congress, employees' organizations, and civil libertarians. Attorney General Edwin Meese III publicly defended the constitutionality of the proposal.

Critics see widespread mandatory testing as a threat to the Fourth and Fourteenth Amendments' safeguards of privacy and due process and call the tests themselves misdirected and unreliable. While users of cocaine, heroin, and PCP need stay clean for just two days to pass urinalysis, the tests can detect traces of marijuana for two months after its use—whether or not it was used on the job. Marijuana use has been decriminalized in 11 states.

The precise accuracy of urinalysis is a matter of some debate, but proponents concede that the tests currently in wide use are imperfect even in the best of circumstances. A study conducted by the Centers for Disease Control found that the worst labs, when testing for drugs other than marijuana, returned false positive results as many as two out of three times. In 1982 and 1983, according to *The New Republic*, a group of 9,100 Army employees received dishonorable discharges that the Pentagon later concluded were based on faulty results.

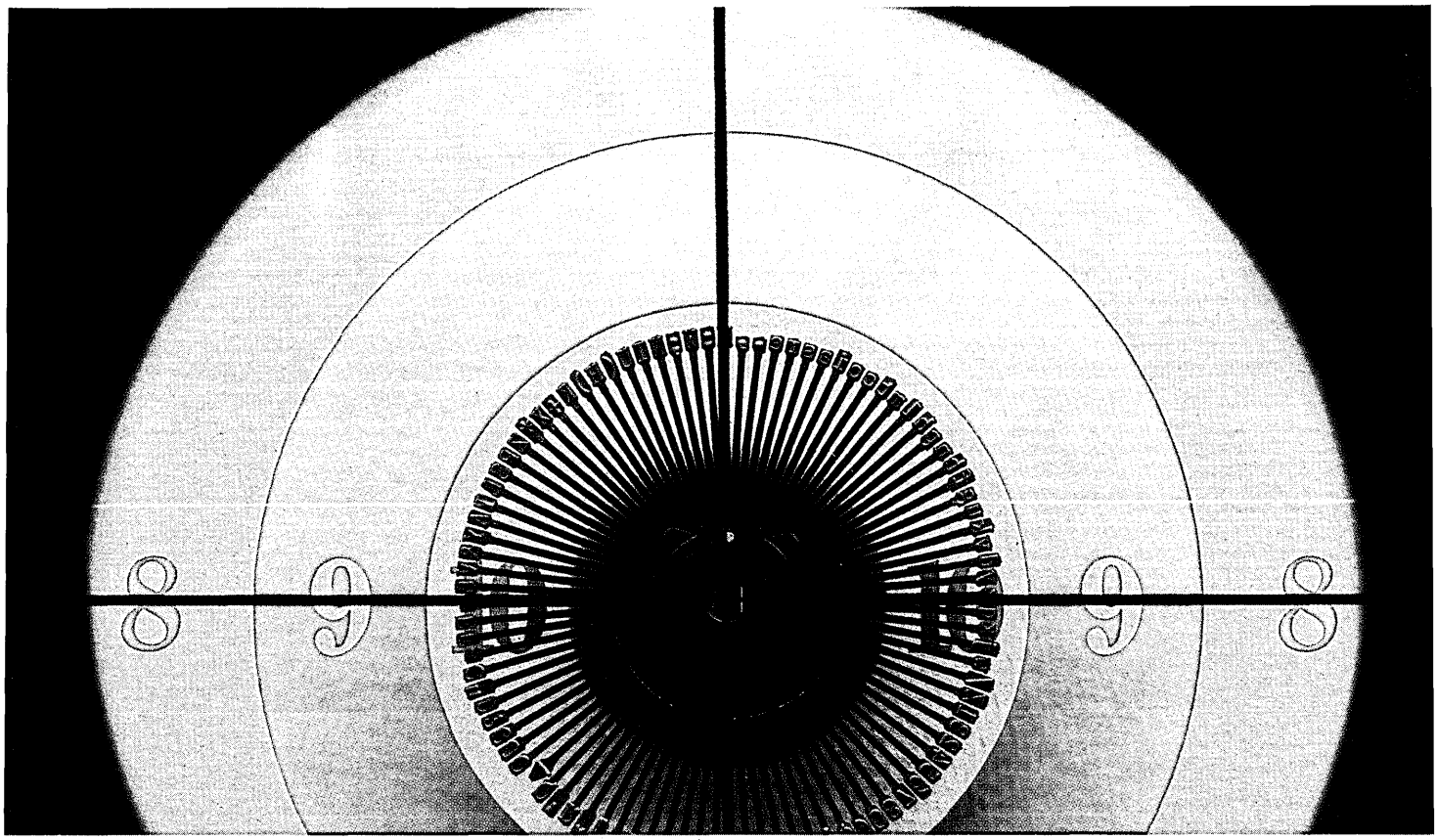
Despite such problems, an increasing majority of Americans support testing of workers, according to recent national polls, and continued growth of employee testing seems likely. A testing program that may affect half of the federal government's 2.1 million workers is a key part of the $900 million antidrug plan President Reagan unveiled in September.

Supporters have their own statistics to suggest that testing programs do work. According to Southern Pacific's Taggert, the number of the railroad's employees testing positive for drugs this year is half what it was when the company first widened its program. A consultant with the Navy commented in DATAMATION last year (see "Getting Straight Again," Aug. 15, 1985, p. 32): "At the time [the Navy] started testing, 47% of the sailors in junior grades admitted some kind of drug use within the past 30 days. Subsequent testing showed that 37% had in fact used drugs. . . . After two years of testing and education, we now have that number down to about 4% positives."

All of which is blissful news to the one clear winner in the emerging drug testing trend: the makers of the tests themselves. The two leading manufacturers of drug tests, Syva Corp., which is part of Syntex Corp. (Palo Alto, Calif.), and Hoffman-LaRoche Inc. (Nutley, N.J.), accounted for $60 million out of a worldwide market estimated at $73 million in 1985. Analysts who follow the diagnostics industry predict the market for tests will double by 1990.

Also benefiting from increased testing are the smaller consulting firms that advise companies on drug abuse policies and design employee assistance programs. The approval voiced by Ted Shramm, president of San Diego-based consulting firm Behavior Research Inc., extends beyond self-interest, however. "I've got to believe that the mere fact of getting the nation's attention on this issue will ultimately be beneficial to us all," he says. "Isn't it about time we asked ourselves why so many people in our society want to get high?"

—Stephen G. Davis



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If you pick daisies for your System 3X, you know all about the IBM 5219. So do we. That's why we built the PageWriter 8. It's absolutely plug-compatible with the 5219, and better at just about everything.

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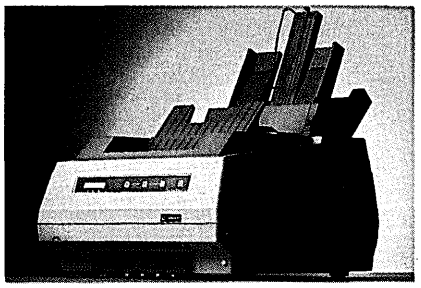

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CIRCLE 52 ON READER CARD

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LOOKING BACK

PROGRESS, BYTES, MAN

December 1966: "The computer has *already* had an impact on man's personality," wrote sociologist and IBM consultant Robert S. Lee in this month's DATAMATION, which addressed the social implications of dp. After noting that by and large, "few people have yet seen a computer firsthand," Lee wrote, "yet there has been a psychological impact—a dim awareness that because of the computer . . . man's position in this world is no longer the same." Lee's article, "The Computer's Public Image," was based on interviews with 3,000 Americans in May 1963.

"The prevailing attitude toward computers," Lee reported, "is that they are an exciting and beneficial tool of progress. . . . But there is, however, [a] secondary undercurrent of uneasiness . . . related to the notion that the computer is an autonomous thinking machine."

IBM'S ORIGINAL MINI SERIES

December 1976: The debut of IBM's Series/1 line of computers, unveiled in November, marked Big Blue's belated and somewhat modest entrance into general purpose minicomputers. (Digital Equipment Corp. virtually created the small-systems category when it began shipping the highly successful PDP-8 in 1963; by the early 1970s some 75 vendors were selling minicomputers.) An article by Angeline Pantages and a technical profile by Phil Dorn (both are currently DATAMATION advisors) introduced readers to the Series/1, which Pantages characterized as "a bare-bones box that the user can configure to taste." Unrelated to any existing IBM machine architecture, IBM's new minicomputer family consisted of two models ranging in price from $4,400 for a stripped model 3 to $100,000 for "the biggest model 5 conceivable."

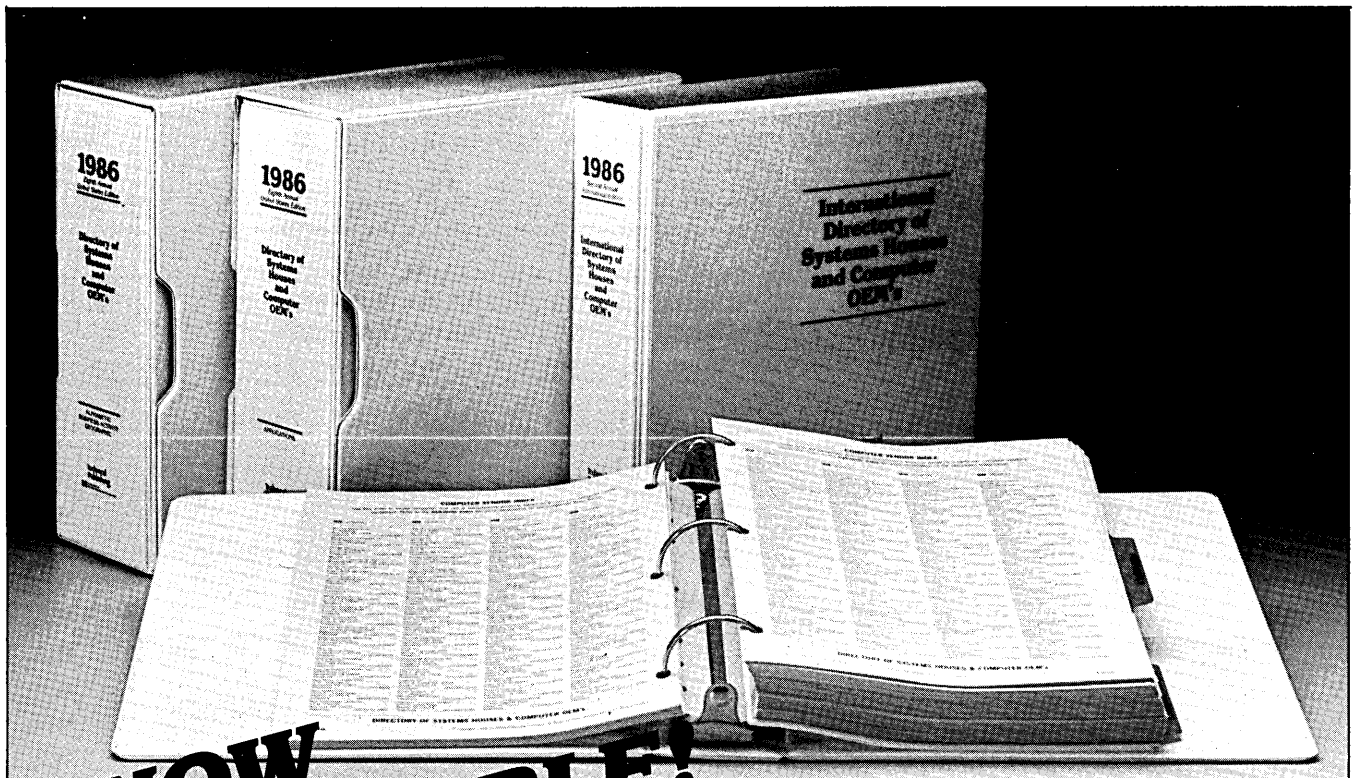
The Series/1 was an unusual IBM product for reasons other than its architecture. For one thing, it was available on a purchase-only basis. Also, at the outset IBM offered no high-level programming language for the Series/1. IBM's aim was to sell the Series/1 to its corporate customer base, which was beginning to turn to Digital, Data General, HP, and other mini makers for distributed processing machines, as well as to traditional minicomputer users with scientific, engineering, and industrial applications such as process control.

Of course, even with the programming languages and other software that came later for the Series/1, IBM has yet to dislodge DEC from its number one position in minicomputers. Still, by 1980, IBM had risen to second place in revenues in the DATAMATION/Cowen & Co. annual mini market survey (see "Annual Minicomputer Survey," Nov. 1980, p. 145). IBM's rapid success in minicomputers was due to steady sales of the Series/1—after some initial weakness—and in some cases better sales of four subsequent offerings: System/34 (introduced in 1978), System/38 (1978), 8100 (1978), and 4300 (1979). In 1983, IBM introduced System/36 as an upgraded path for System/34 and replaced the 4331 with the 4361.

IBM's five more or less incompatible families of small systems will be joined in 1987 by another, the 9370, which will be the first line of IBM minis to run 370-family software (see "Catching the Wave," Nov. 15, p. 24). The 9370s will lead to "the entire phasing out of one machine, the 4361," the *Wall Street Journal* recently reported. Last June, however, IBM announced new models of S/38 and S/36 (upgraded S/38 models began to be shipped in August) and, according to the most recent DATAMATION/Cowen & Co. market survey (see "Minis, Micros, and Maturity," Nov. 1, p. 65), demand for both lines remains strong.

The Series/1, meanwhile, ranked third among IBM's minicomputer systems (S/36 and S/38 were numbers one and two) and ninth overall in anticipated customer demand in the most recent survey. At the October press conference announcing the 9370, IBM marketing executive Robert E. Dies said, "We will continue to support Series/1."

—Stephen G. Davis



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READERS' FORUM

'TWAS THE NIGHT BEFORE CHRISTMAS

'Twas the night before Christmas, quiet more or less,
Not a creature was stirring, except MVS.
The wish list was hung by the tape drives with care,
In hopes that St. IBM soon would be there.

The programmers were nestled all snug in their beds,
While completion code zeros danced all through their heads.
And all of them trying to dodge any flap,
Had just settled down for a long winter's nap.

When out on the lawn there arose such a din,
I hoped right away it was not an abend.
Away to Control we fled like a flash,
Tore open the shutters (for there was no sash).

When what to our wondering eyes should we see,
But a giant mainframe and eight tiny pcs.
With a little old driver (no one could be cuter),
And I knew right away it was old St. Computer.

More rapid than nanos his coursers they came,
And he whistled and shouted and called them by name.
"Now Victor, now Apple, Atari, and Osborne.
"On Sinclair, on Compaq, we'll be there by morn."

To the top of MIS lickety-split,
Now respond, now respond, now respond real quick.
And then in a twinkling I heard at the door,
The beeps of the tubes led by old Commodore.

As I drew in my head and was turning around,
Through the door St. Computer came in with a bound.
He was dressed all in modems (the strangest of sights),
And his clothes were all tarnished with circuits and bytes.

A sack full of products (he sure had a bunch),
Just like a vendor without the free lunch.
His eyes how they twinkled, his dimples how deep,
His cheeks were like cursors, his nose made a beep.

He was chubby and plump, a right jolly old man,
And I thought he could help us with our very own LAN.
He said not a word but went straight to his work,
And I knew that his code would be clear with no murk.

And laying his finger aside of his ear,
I felt with his system we'd nothing to fear.
He sprang to his mainframe, and then he hit ENTER,
And away they all flew through the darkness of winter.

But I heard him exclaim with a great sense of fun,
"Merry Christmas to all, and may all your jobs run."

—Bob Hargrove
Houston, Texas

COMPING IN THE EIGHTIES

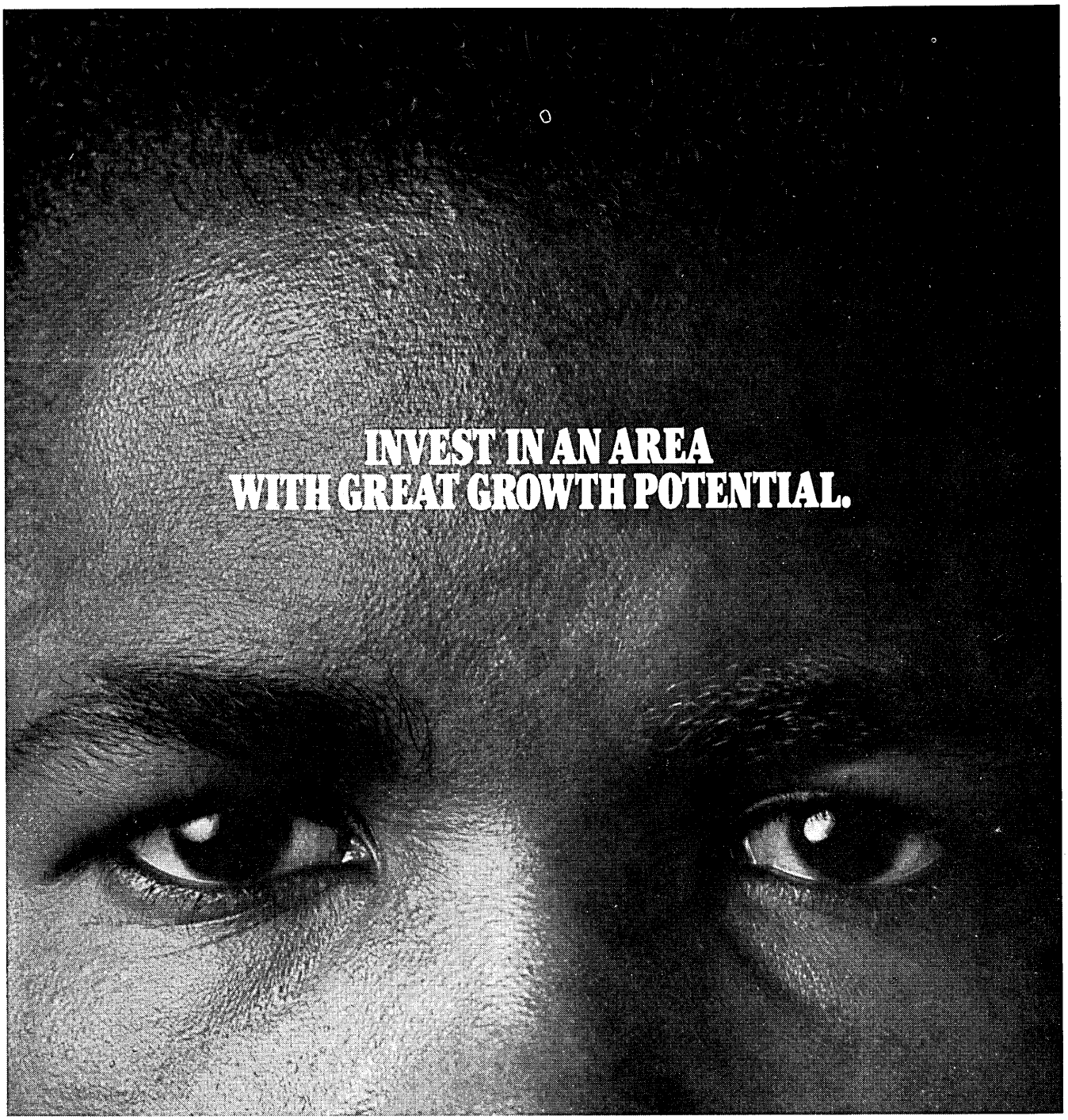
I'm attempting to establish a new generic word in this computer age to replace a good, simple word that has lost its place in society. The verb "to type" has served writers admirably since the late nineteenth century. That word, which in this sense means "to write on a typewriter," doesn't *have* to go away because another meaning of "to type" is "to keyboard" or "to capture or set (as data or text) by means of a keyboard."

I help produce documentation for computer types who always tell me, "You can't use 'type,' because we're not dealing with a typewriter—we're dealing with a computer. Fine. "Keyboard" is too awkward, and "key" just doesn't have a nice ring to it. A generic word *is* needed to mean "to write with a computer." I was thinking of this the other day when my daughter came up to my house to use my pc and write a school paper. "My daughter's coming up to type her paper on *Macbeth*" just doesn't convey enough information and could be misleading.

Therefore, I propose the use of the verb, "to comp." The word is short, it conveys a sense of computer use (as well as the sense "compose"), and it doesn't dilute the word "compute," which a computer was originally designed to do with numbers, not with words and common language.

Some jazz types may object, saying that word means "to punctuate and support a jazz solo with irregularly spaced chords." To that, I reply, "A word is merely a *symbol* we use to communicate with one another. The symbol is *not* the object it represents, and any symbol, word, or name can have more than one meaning. In fact, I can use any symbol I want, as long as you understand what I mean to convey. You jazz cats can use 'comp' all you want when you're playing jazz. So, let me feel good about saying, 'My daughter's coming up to comp her *Macbeth* paper.' " (And, by the way, I comped this myself.)

—Dan Culberson
Boulder, Colorado



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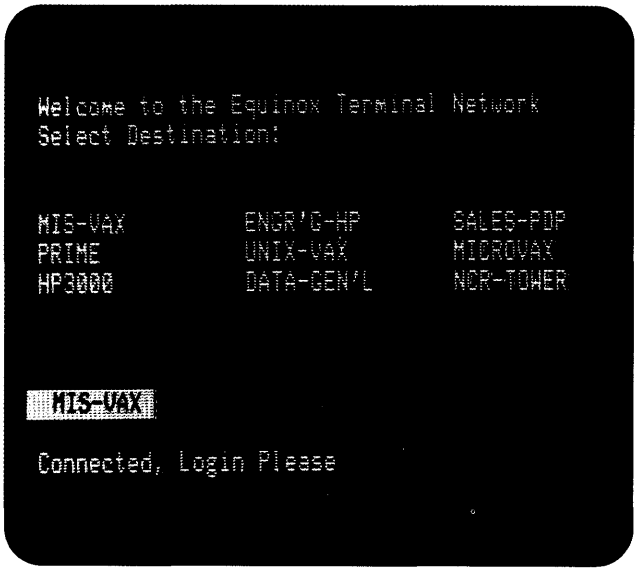

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