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DATAMATION 84
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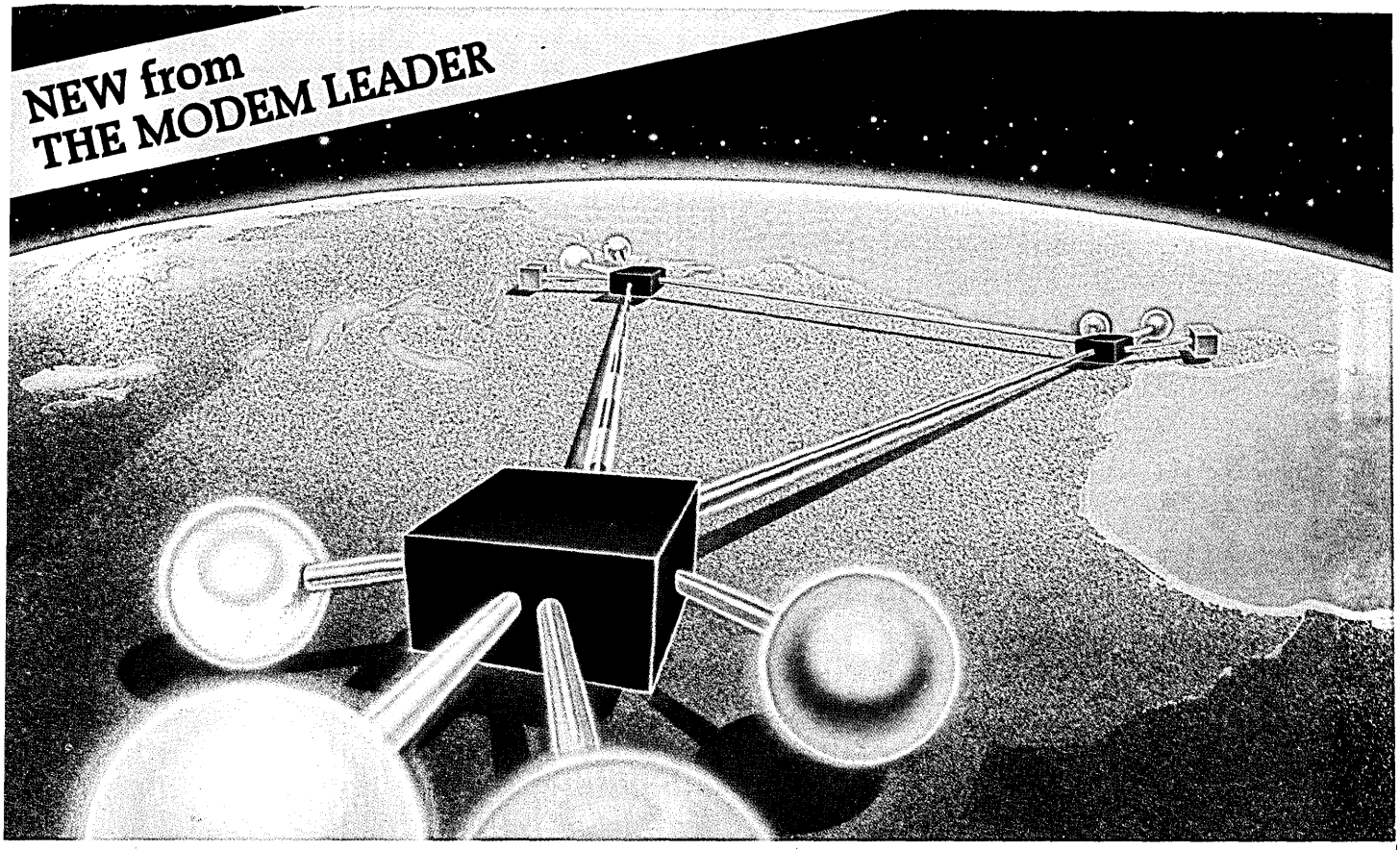

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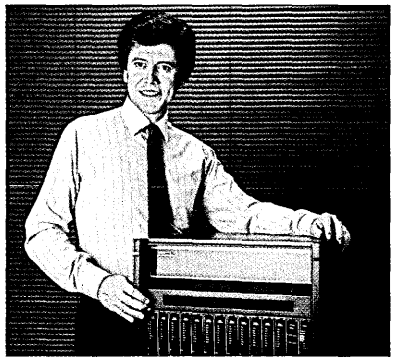

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Engineers have used the computer to automate every industry but their own.

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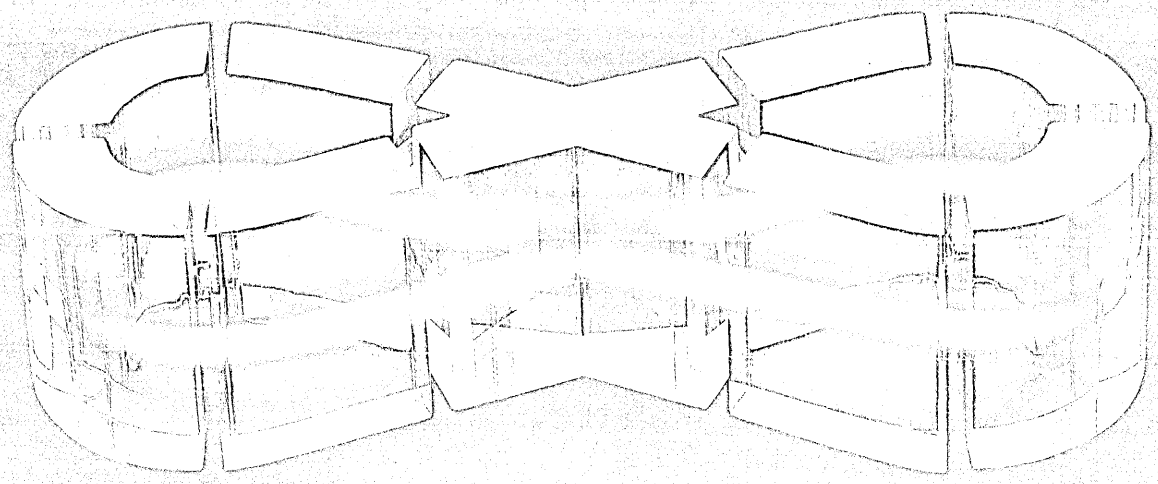

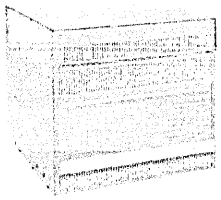

Flexibility in function, configuration and control.

[illegible] Intelligent Switching [illegible] the functions of [illegible]

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Advanced Network Integration assures you that the IS4000 [illegible] to our network concentrators and statistical multiplexers. That Infotron products will grow with [illegible]

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CIRCLE 5 ON READER CARD

DATAMATION

OCTOBER 15 1984/$3.00 U.S.A.
VOLUME 30 NUMBER 16
This issue, 183,493 copies

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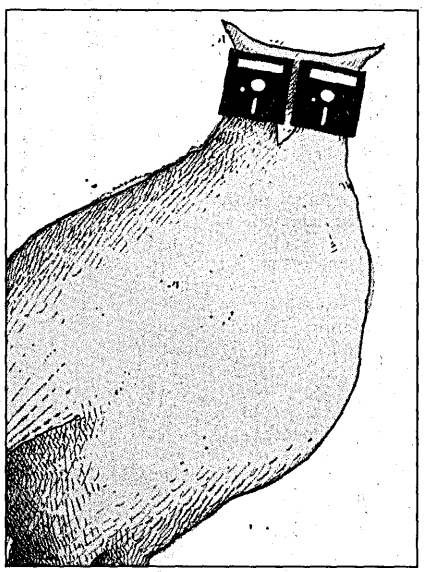

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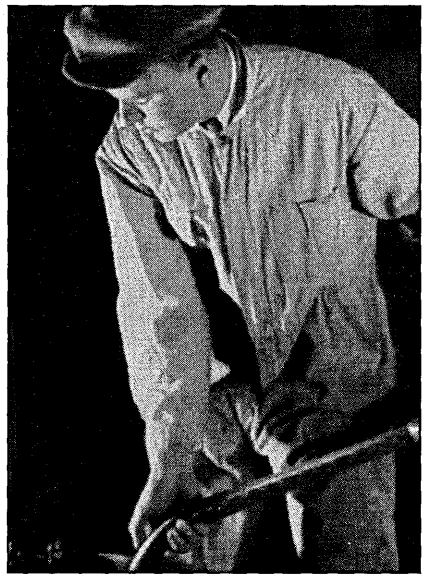

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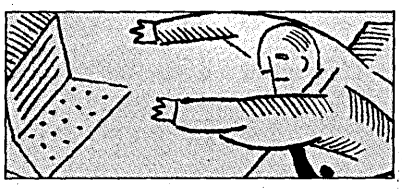

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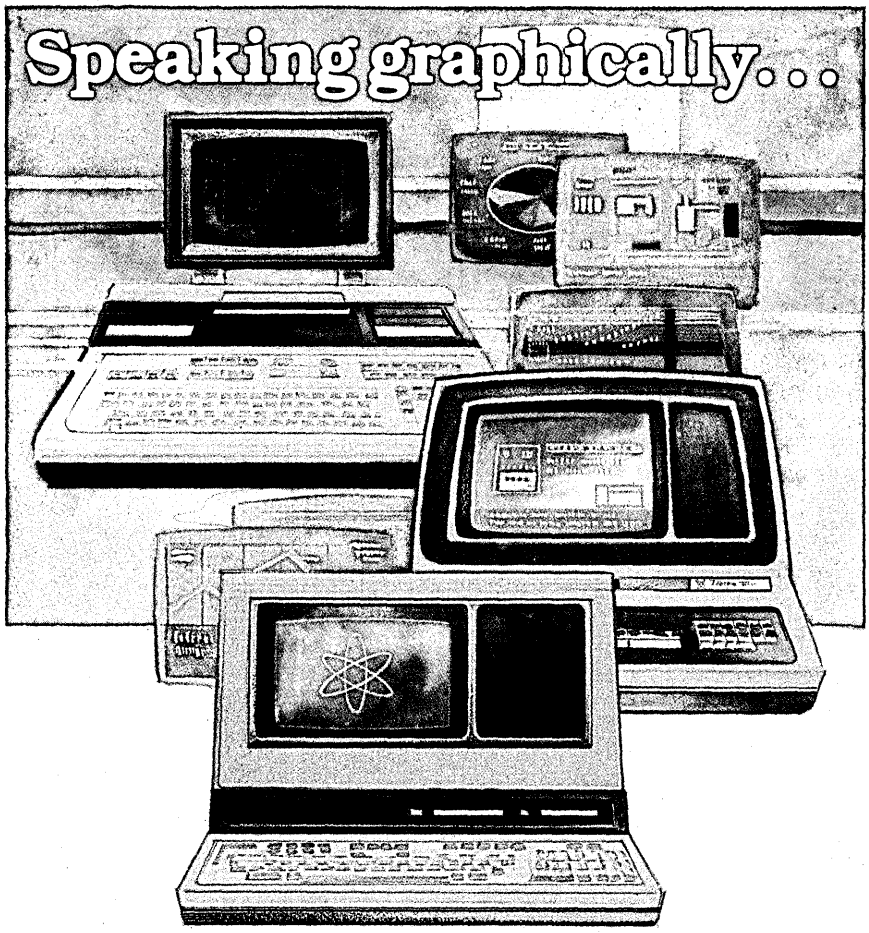

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EDITORIAL OFFICES

Headquarters: 875 Third Ave., New York, NY 10022. Phone (212) 605-9400; telex 429073. **New England:** 1 Chaucer St. RFD 2, Sandwich, MA 02563, (617) 888-6312. **Washington, D.C.:** 4451 Albemarle St. NW, Washington, DC 20016, (202) 966-7100; **Western:** 1801 S. La Cienega Blvd., Los Angeles, CA 90035, (213) 559-5111; 2680 Bayshore Frontage Rd., Suite 401, Mountain View, CA 94043, (415) 965-8222. **International:** 130 Jermyn St., London SW1Y 4UJ, England, (441) 839-1840, telex 914911; 13 Stanley Place, Budd Lake, NJ 07828, (201) 691-0592, telex 499-4308.

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CIRCLE 7 ON READER CARD

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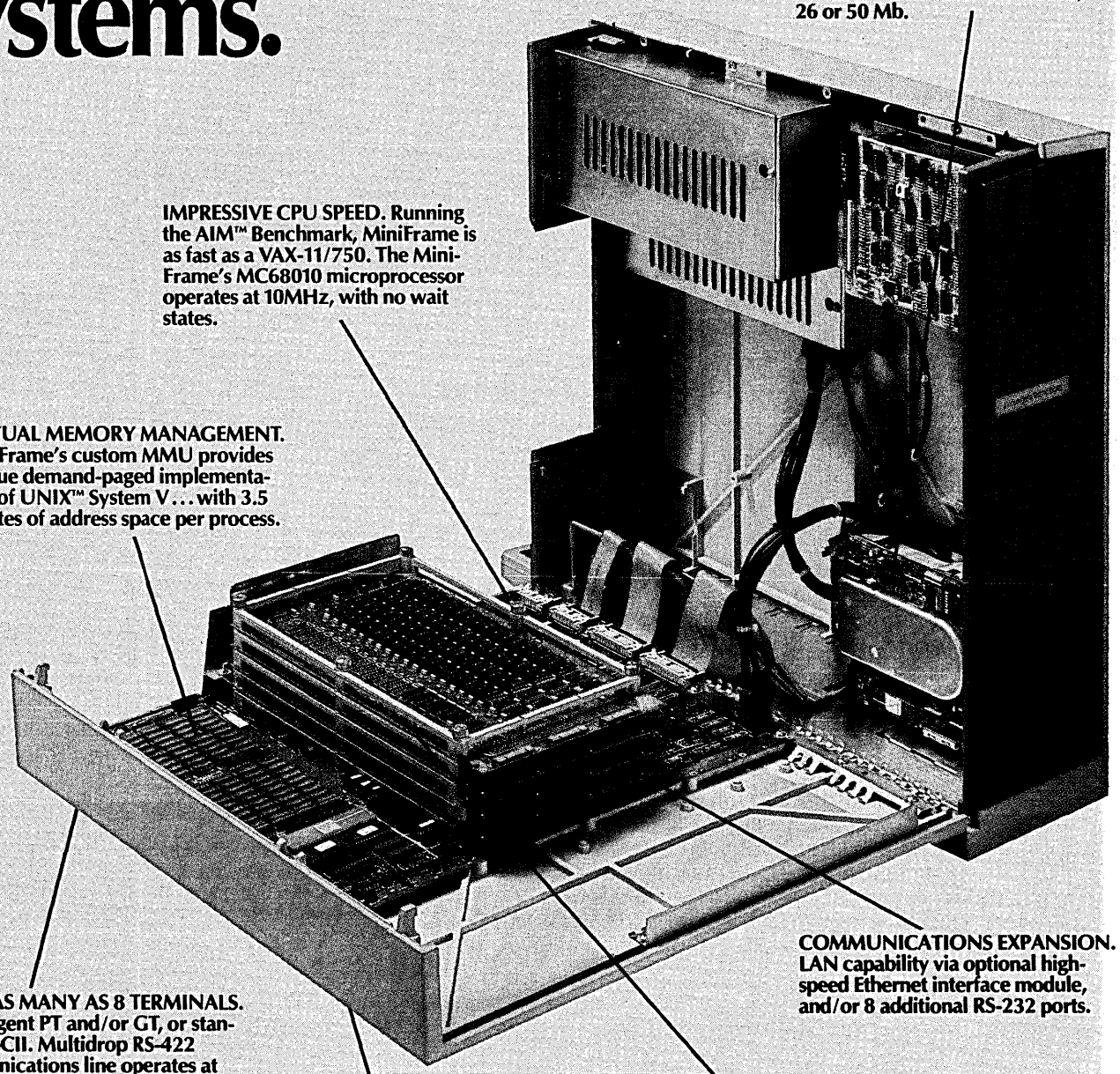
ONE TO EIGHT USERS. MiniFrame can be configured for up to 50 Megabytes of integral mass storage: 5¼" Winchester fixed disks of 13, 26 or 50 Mb.

IMPRESSIVE CPU SPEED. Running the AIM™ Benchmark, MiniFrame is as fast as a VAX-11/750. The MiniFrame's MC68010 microprocessor operates at 10MHz, with no wait states.

VIRTUAL MEMORY MANAGEMENT. MiniFrame's custom MMU provides unique demand-paged implementation of UNIX™ System V... with 3.5 Mbytes of address space per process.



COMMUNICATIONS EXPANSION. LAN capability via optional high-speed Ethernet interface module, and/or 8 additional RS-232 ports.

RUNS AS MANY AS 8 TERMINALS. Convergent PT and/or GT, or standard ASCII. Multidrop RS-422 communications line operates at 307 Kbit/sec.

ECONOMICAL MEMORY EXPANSION. MiniFrame provides ½ Megabyte of RAM standard; up to three boards can be added for system expansion to 2 Mb.

FOR HIGH-SPEED PRINTERS, a Centronics-compatible parallel printer port is standard in the MiniFrame processor.

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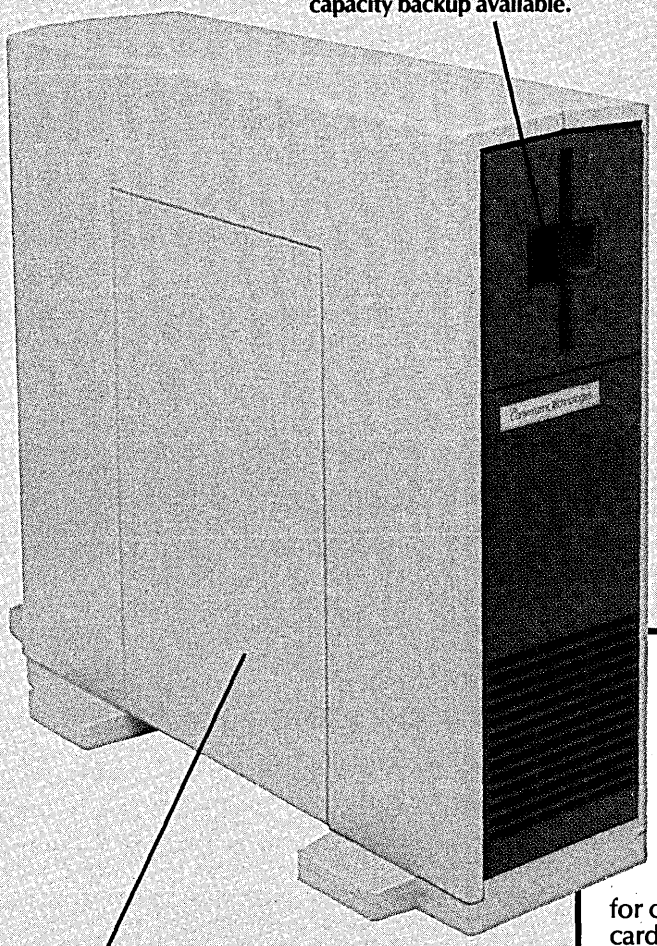
Convergent Technologies, Inc.

MiniFrame: another first from Convergent Technologies. Super-minicomputer power at PC prices.

OEMs can now meet the needs of small to medium-sized organizations for low-cost, high-performance systems capable of handling large UNIX-based applications.

The MiniFrame system—which effectively opens a whole new market for you—is unique not just for its price/performance advantages. It also provides complete flexibility in meeting requirements ranging from single-user "personal UNIX systems" to eight-terminal data-processing installations.



Convergent Technologies achieved this breakthrough by adapting the innovative hardware and software developed for its MegaFrame multiprocessor.

The result is a powerful, compact and expandable unit priced to give you the maximum opportunity of capitalizing on a rapidly growing UNIX market.

There are, of course, many other unique benefits of the MiniFrame system.

Convergent provides foundation software for office applications—including a powerful, Wang keystroke-compatible word processor, an advanced financial spreadsheet and complete electronic mail facility.

The Window Manager permits viewing and manipulating of up to four applications running simultaneously on Convergent's PT or GT terminal screens.

Major performance increases result from utilizing these terminals with the MiniFrame. At only slightly higher cost than standard "dumb tubes", our PT or GT terminals offer high-speed communications plus built-in processor with enough memory to execute key portions of the system code.

Programming languages include industry-standard High Level COBOL and BASIC, full FORTRAN-77, Pascal and C.

OEM prices for the MiniFrame start at less than $5,000; an eight-user MiniFrame can be configured for under $10,000. Prices like these make it an open-and-shut case for choosing the MiniFrame.

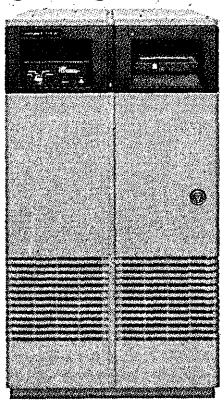
WE'VE CLOSED OUR CASE... now send for a complete information package. Write to Convergent Technologies, Data Systems Division, 3055 Patrick Henry Drive, Santa Clara, CA 95050. Phone: 408/980-0850. Telex: 176-825.

Convergent Technologies

Where great ideas come together

Graceful upgrade path to the MegaFrame™

The MegaFrame, Convergent Technologies' revolutionary super-minicomputer system, utilizes multiple processors; has expansion potential to 128 users, 8 MIPS and gigabytes of disk storage. It enables OEMs to handle today's growing demand for computing services without discarding a single piece of hardware ... or being forced into expensive CPU upgrades.



Applications software can be transported—unchanged—from the MiniFrame to the MegaFrame whenever the workload requires it. The two systems are object-code compatible, allowing OEMs to provide a complete family of systems.

MegaFrame: proof that if anyone can build a UNIX system the way it should be built—it's Convergent Technologies.

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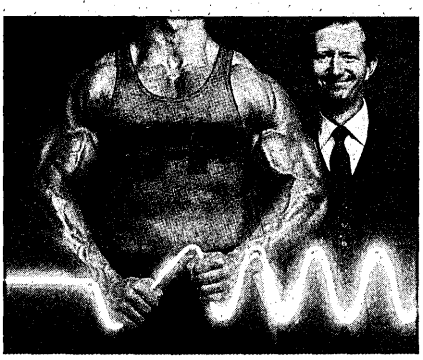

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CIRCLE 9 ON READER CARD

Twenty Years Ago/Ten Years Ago

LOOKING BACK

ELECTION PROJECTIONS

October 1964: With the Nov. 3 elections just around the corner, there was much ado about the use of computers in projecting presidential winners.

An article by Jack Moshman, a mathematician, statistician, and vp of professional services at CEIR Inc., Washington, D.C., outlined the procedures used by his company and others to forecast the event. Moshman was already a veteran of such projects, having been in charge of the the two CEIR teams that worked with the NBC network in projecting election winners in 1960 and 1962.

The use of computers to forecast voting results was not new: the first national computer projections for an election night were made on a Univac I in 1952. Yet in 1964 many people were still debating the merits and/or demerits of their use, much as they do today. Some thought the early projections would influence the portion of the electorate that had not yet voted. Others charged only that the projections took all the fun out of election night.

Moshman noted that the project placed enormous responsibility on the networks as well as on the companies selected to handle the mechanics of making projections. Claiming that election night in a presidential year was undoubtedly the biggest single exposure working computers make before a mass audience, Moshman said the project meant a great deal to the computer industry's public image. Just one mistake, however, could provide much ammunition for the computer industry's adversaries.

Finally, Moshman noted that a good comparison could be drawn between computer voting projecting and weather forecasting. The weather forecaster, however, has one advantage: even if the forecast proves wrong, the forecaster's peers will judge him only on his interpretation of the available evidence. With valid evidence, he avoids censure. But election projectors cannot expect such understanding from *their* audiences. Said Moshman, "The computer forecaster, too, bases his projections on scientific principles, but there's no science which can with complete accuracy account for all the vagaries of the human psyche, nor is it likely one will be developed soon."

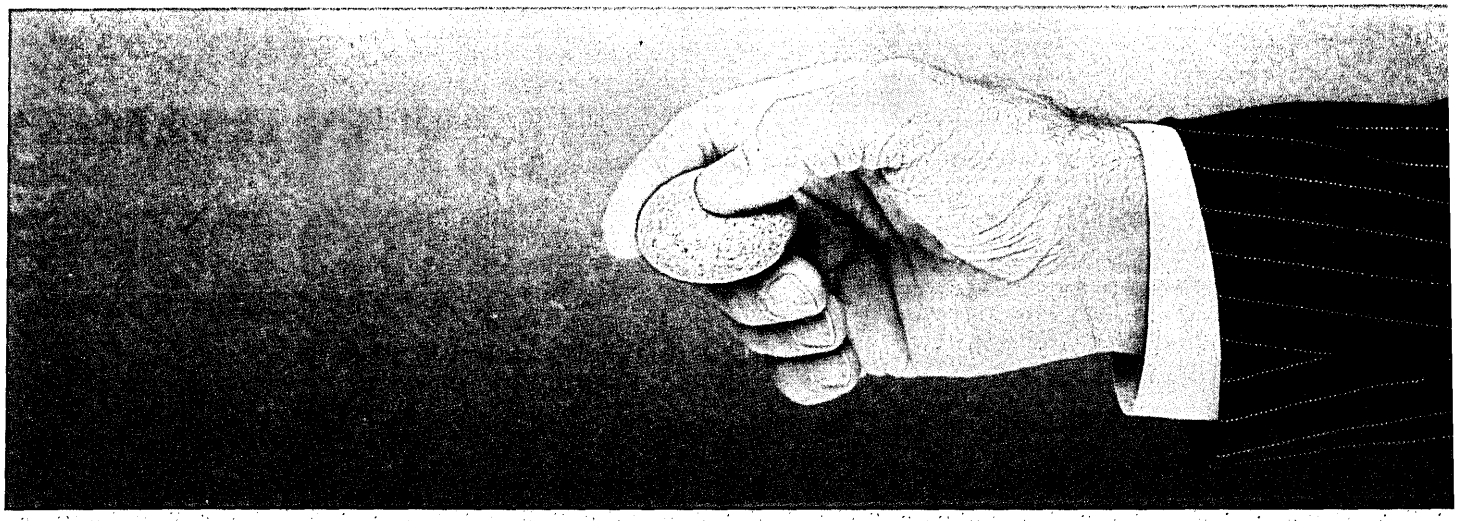
WHAT COMES DOWN, GOES UP?

October 1974: An IBM ad in the September issue of *Atlantic Monthly* boasted, "While the cost of just about everything has risen dramatically in recent years, the cost of doing things by computer has been a noteworthy exception."

Ironically, that was the same month the company slapped price increases of 6% to 8% on equipment, services, and maintenance. DATAMATION reported the announcement came at a time when 1975 dp budgets were being brought to a standstill by cash-short managements, and many installation managers were highly distressed. Actually, IBM wasn't the only one raising prices; its Sept. 18 announcement came just one day after Univac hiked its prices by 6%. Control Data had also previously upped prices 2% to 10%.

While the increase seemed to reopen opportunities for the lower-priced offerings of independent peripherals manufacturers, these suppliers were expected to follow suit. Memorex announced price increases ranging between 4% and 15%, which came just weeks after an average 5% increase on lease and maintenance contracts. Storage Tech announced 6% price increases on rental equipment after IBM's announcements. Memorex and Storage Tech still figured to be below IBM's prices. Calcomp, on the other hand, raised its prices for oems but not for end users. A Calcomp spokesman said of the IBM action: "It's IBM's first price announcement in years that enhances our market position because, for a change, it isn't a price reduction."

—Lauren D'Attilo



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

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- Our fourth generation language system transforms the data into information.
- Our end-user products deliver up-to-the-minute data to support better and faster decisions.
- And tomorrow's products will meet your needs by putting information power into wider and wider circles of users.

CIRCLE 10 ON READER CARD

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

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

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

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

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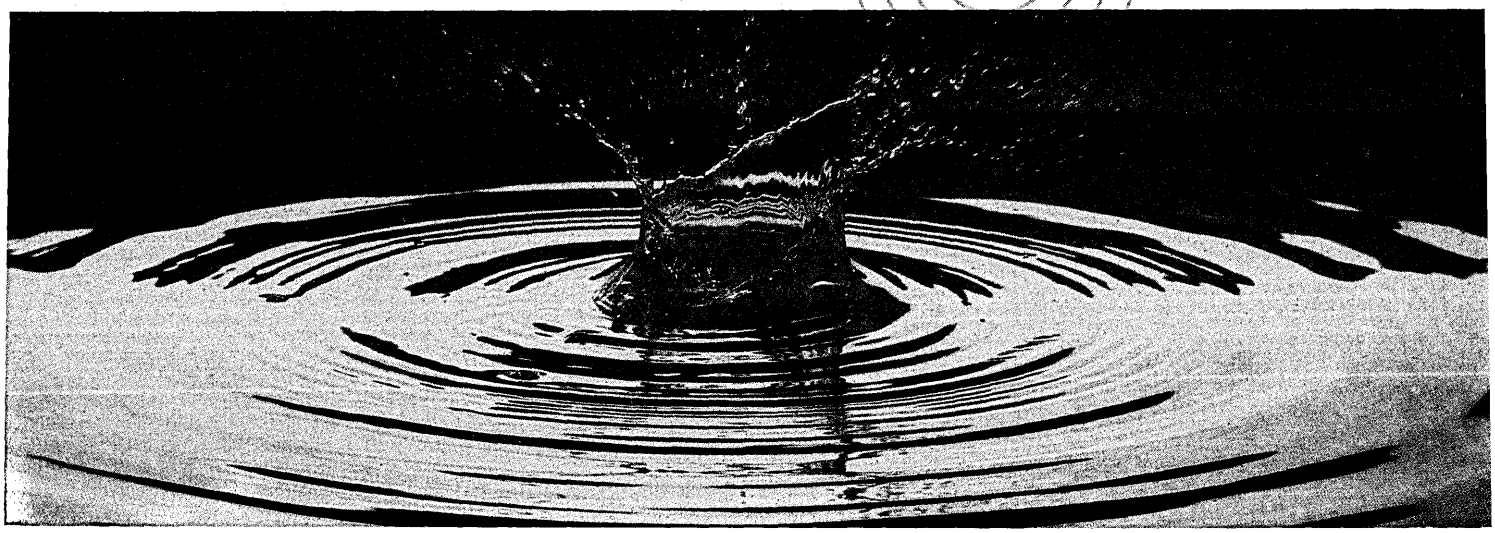
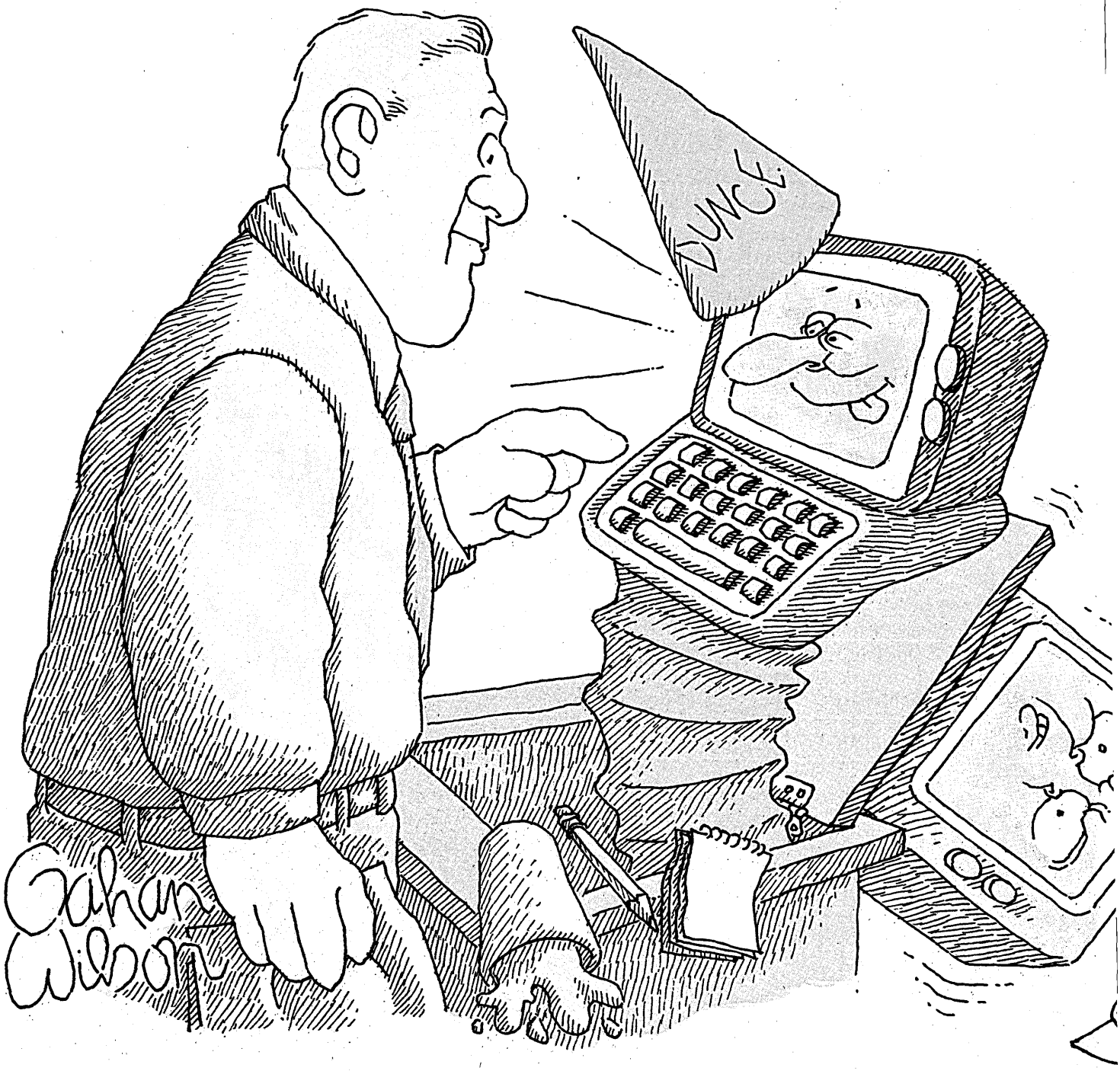
DM1015



SURPRISE. YOU JUST TURNED INTELLIGENT PCs INTO DUMB



PROTOCOL. THE END OF THE DP

ALL OF YOUR TERMINALS.

It's a classic DP nightmare.

Your company just spent a fortune to buy PCs, and put all that processing power on people's desks. Now it's your job to give those PCs access to your mainframe.

Here's where something horrible happens.

The host communications board you add converts your smart PCs into dumb 3278 terminals. Terminals that can only handle one task at a time. Terminals with none of the intelligence and processing power you paid for in the first place.

Is there no end to this nightmare?

INTRODUCING PCI-LINK.™ THE FIRST SMART WAY TO LINK AN IBM PC TO AN IBM MAINFRAME.

Relax.

Now there's PCI-Link™ from Protocol Computers. The first add-on communications board that doesn't turn a smart PC into a dumb 3278 terminal.

With PCI-Link, your PC can access an IBM mainframe, and virtually any other ASCII device—computer, microcomputer, public network or LAN—simultaneously. You can even view and compare data from different sources in up to four windows.

Result? A multi-task workstation that combines the power of IBM 3270 communications with the intelligence of the PC. Plus complete file transfer capability.

What's more, PCI-Link delivers special, exclusive features that make it the smartest communications board you can buy. Like an on-screen floating calculator and electronic notepad. Pop-up menus for ease of use. 3278 keyboard mapping options. User defined macros. Even a special status line in addition to the standard IBM 3278 status line.

And all of PCI-Link's power and functionality is mouse supported.

Is that smart or what?

FOR MICRO TO MAINFRAME COMMUNICATIONS, NO ONE TALKS TO IBM LIKE PROTOCOL.

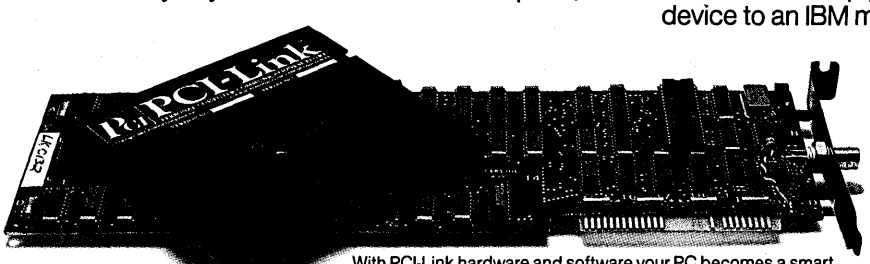
PCI-Link is just one reason why Protocol Computers is the leader in communications technology.

In 1980, we introduced the first successful protocol converter. And today, PCI is the only single resource with a complete array of mainframe access product technology. Advanced protocol conversion boxes. Communications boards. And powerful support software.

So we can help you connect virtually any ASCII device to an IBM mainframe with greater performance, less cost and positive security.

For complete technical information on PCI-Link and our full range of protocol converters, call Ron Ockander, V.P. Marketing, at 1 (800) 423-5904. Or just send the coupon.

Your DP nightmares are over.



With PCI-Link hardware and software your PC becomes a smart, multi-task workstation that gives you the power of IBM 3270 communications—plus more special features.

PCI PROTOCOL COMPUTERS, INC.

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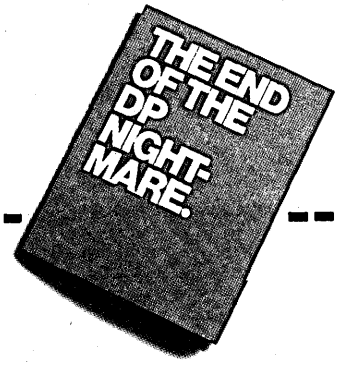
NIGHTMARE.

CIRCLE 11 ON READER CARD

I want to wake up from the DP nightmare. Please send me my free "The End of the DP Nightmare" kit today.



Protocol Computers, Inc.
6150 Canoga Avenue
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DAT 10/15/84

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Just as important, our flexible system allows for easy remote configuration from your central site and is compatible with all interfaces. And because our system features completely distributed intelligence, our Series 9000 can still perform all its necessary functions even if your central site goes down.

Best of all, our Series 9000 is priced within your easy reach, and comes with a comprehensive one-year warranty.

Invest in the system that puts total network control at your fingertips. The IDS Series 9000 Network Control System.

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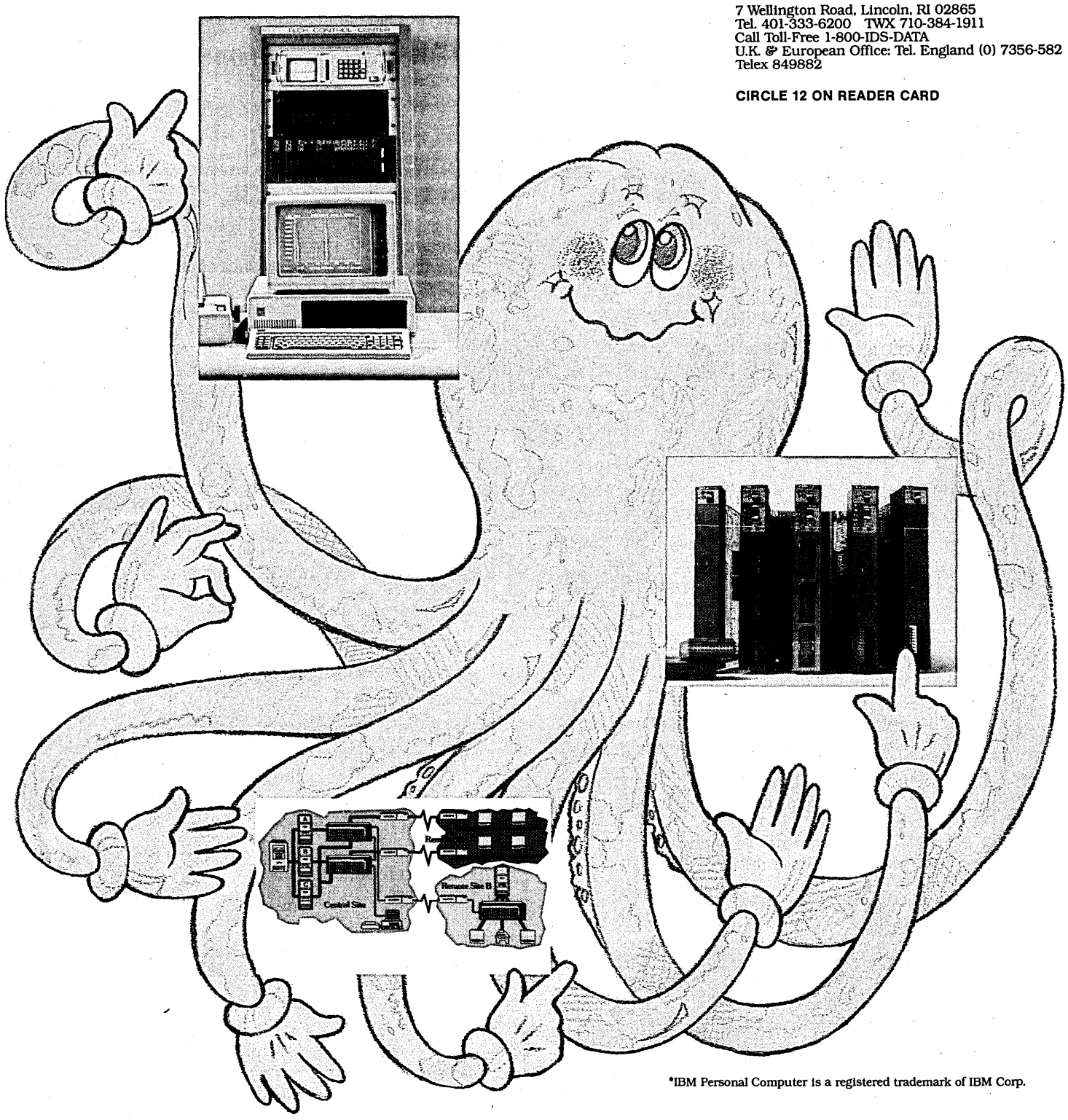

*IBM Personal Computer is a registered trademark of IBM Corp.

LOOK AHEAD

NEW IBM MACHINE	IBM is preparing an upgrade path for the System/38, a machine being referred to by informed value-added resellers as the System/40. Said to be fully software compatible with the S/38, the new machine's power range will overlap the 4300 mainframe series, which is also due for some new members shortly. It is likely that installed S/38s may be upgraded in the field to the S/40. Look for a product introduction in December and shipments early next year.
NAS GOES DISTRIBUTED	National Advanced Systems, Santa Clara, Calif., is to unveil in January an MS/DOS pc, token-passing local network, and an NAS 6600-based "satellite processor" to control clusters of workstations. In the works for future introduction are further distributed processing products such as a 32-bit VM/Unix-based desktop machine and a 4361-like processor from Hitachi.
AT&T PREPARES HIT LISTS	Determined to throw the yoke of deregulation off its back, beleaguered AT&T is preparing a big bucks lobbying campaign. Despite last year's divestiture, AT&T is still burdened with having to obtain time-consuming approval from regulators for tariff changes in long distance calling rates. It also wants instituted a controversial access charge, which would add to consumer and business phone bills. To help it get the most persuasion for its money, the telephone giant has hired high-powered political consultants who are preparing hit lists of key opinion makers and legislators in Washington. The New York Times reported recently that AT&T has also been paying hired workers a fee for each signature they collect on petitions the company plans to submit as evidence of public support.
VM/CMS GETS OVERHAUL	A major rewrite of the VM/CMS operating system, aimed at tailoring it to small cpus such as the desktop XT/370, is under way at IBM's Yorktown Heights, N.Y., labs. Originally written in the 1960s in assembly language, VM is being rebuilt from the ground up in IBM's PLS language. One of the goals of the rewrite is to streamline the system's multiprocessing and file handling facilities in order to make VM more compatible with Unix. The first fruits of the work aren't expected to hit the market until 1986-87. Meanwhile, work on the XA or 31-bit addressing version of VM is said to be finished and awaiting introduction as a product by the end of this year.

LOOK AHEAD

IBM LASERS IN THE ROCKIES	Meanwhile, the industry leader is understood to have added some 300 workers to its Boulder, Colo., facility where work is under way on a new line of laser printers. Prices are to range from under $10,000 to over $100,000. The target cpus will be everything from desktops to mainframes. Boulder already works on copiers and tape and disk drives.
CAN YOU READ THIS?	Optically encoded credit cards are on the way from Card Japan, a joint venture funded by Toshiba Credit, Sanyo Electric Credit, Sharp Finance, and Mitsubishi Electric Credit, all credit union affiliates of major Japanese electronics companies. The cards, costing $1.68 apiece, use a recording technology developed by Drexler Technology Corp., Mountain View, Calif., and can store up to 2 million characters of information. Standard magnetic cards store only 350 characters for 40 cents per card.
MODEMS MOVING UP	Industry sources say the 2,400bps modem market will likely see a surge in coming months as low-priced pc-oriented products hit the market and public data networks up the speed of their access ports. While many pc modems operate at 1,200bps, users still find it time-consuming to send long files over switched lines. Look for Telenet to offer 2,400bps access to its public net by the middle of next year. Meanwhile, IBM will probably enter the consumer modem market next year with products based on technology it is said to be licensing from other modem makers.
NEIN DANKE	In an attempt to sell home computers to West German women, Commodore International has started an ad campaign there that features a naked man, his equipment in full frontal display, sprawled across a double spread in Cosmopolitan magazine. Punning on the male gender of the German word for "computer," the ad explains that "he is easy to handle" and will give women "more time to let yourself be weak."
RUMORS AND RAW RANDOM DATA	Developers at IBM's Rochester, Minn., plant are said to be working on a comprehensive PROFS-like office automation system for the System/36 small business system. Some analysts think that machine is likely to emerge as a cluster controller and departmental file server for future workstations. . . .Word has it that Apple Computer is preparing a color version of the popular Macintosh machine as well as a lap machine using some of the same technology. Most likely to be seen first is a hard disk for the storage-hungry Mac.

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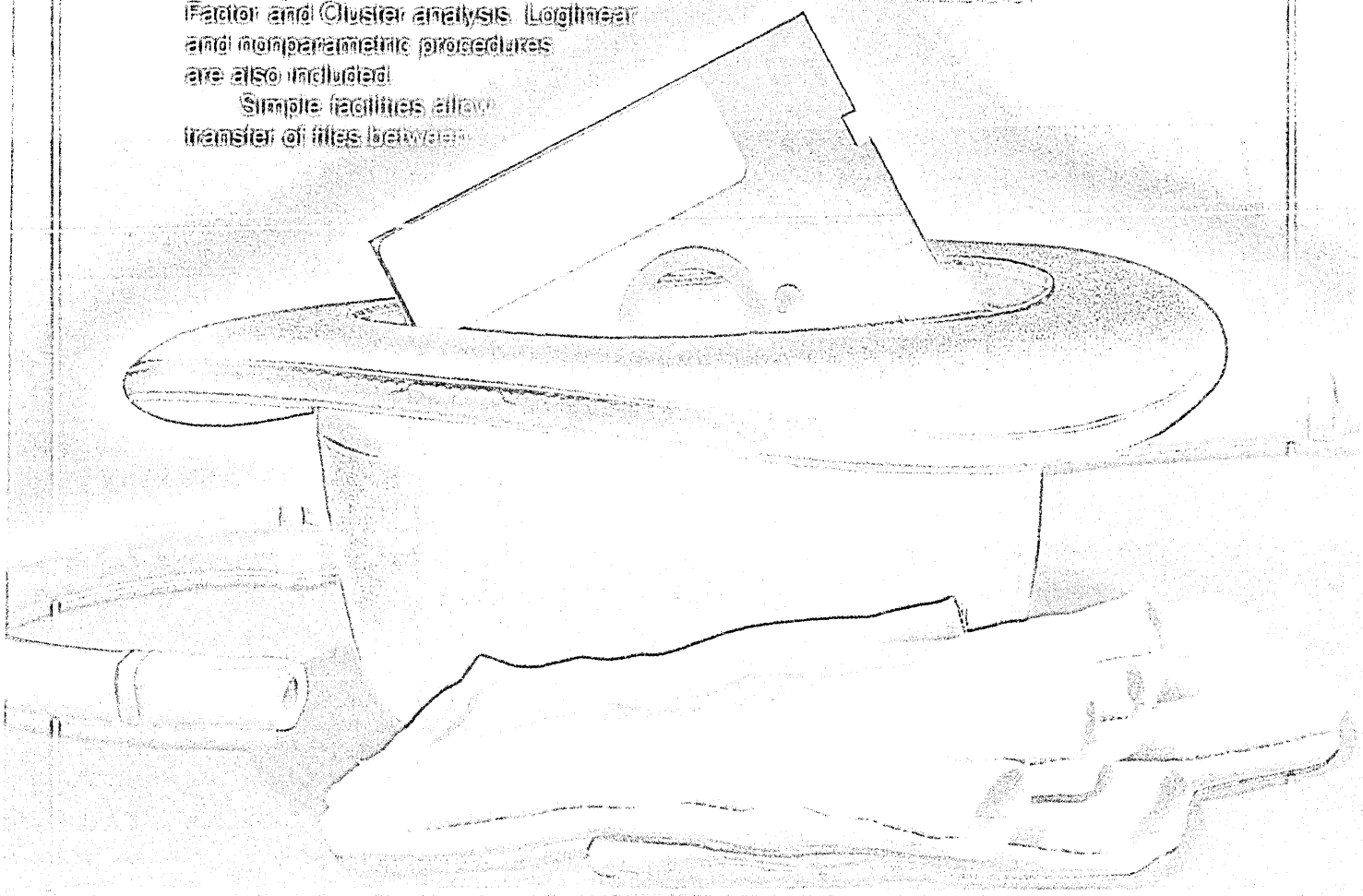

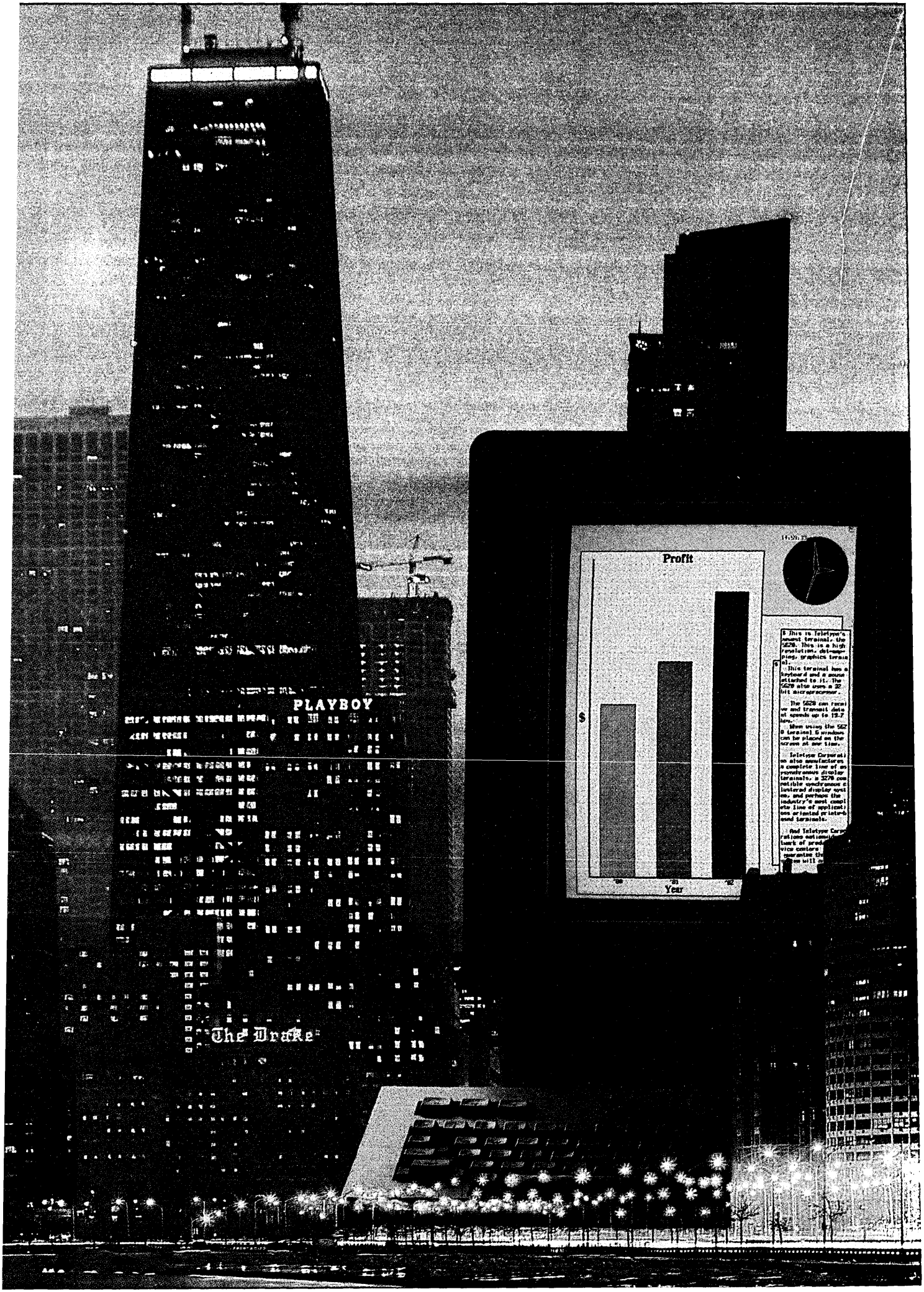
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The Drake
Profit
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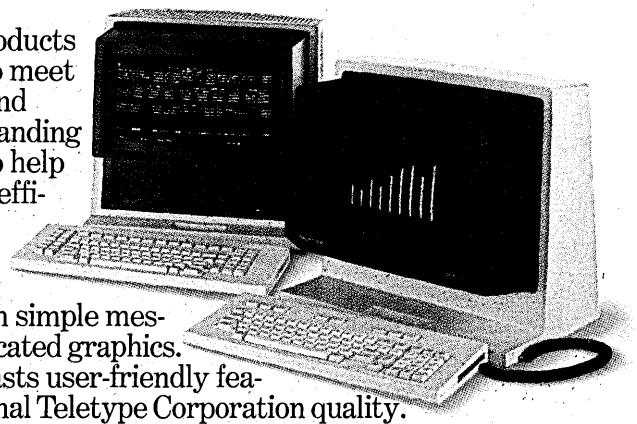
Year

TELETYPE CORPORATION.
THE WAY OUR BUSINESS IS GROWING WILL HELP YOUR BUSINESS GROW.

At Teletype Corporation, we believe that if our products help you get ahead, then we'll come out ahead. So as part of the AT&T family, we're busy developing the kinds of terminals and systems you'll need to compete in the Information Age.



Our wide range of products puts us in an ideal position to meet all of your terminal needs. And with the ingenuity of our expanding R&D, we'll be in a position to help you run your business more efficiently for years to come.

Today, our full line of printers and CRTs fit a wide variety of applications—from simple message transmission to sophisticated graphics. Each and every terminal boasts user-friendly features that exemplify traditional Teletype Corporation quality.

We're also actively branching out into new areas such as intelligent terminals. Our 5620 intelligent graphics terminal, for example, is indicative of the kind of terminals you'll be working with in the future. It's a UNIX* System V-based CRT that can perform up to six functions simultaneously.

But while we're exploring new areas, we're also improving the products that have earned Teletype Corporation a strong reputation for value. Take our 5540 line of terminals that represents our third generation of 3270-compatible devices. And our new 5300 family of printers is the best yet in our long running line. The new printers combine the reliability we're known for with a 200 cps speed that's ideal for business applications.

So if you're looking for ways to make your business grow, look to Teletype Corporation. To find out more about our products and services, write Teletype Corporation, Dept. 3223-A, 5555 Touhy Avenue, Skokie, Illinois 60077, or call **1-800-323-1229, ext. 913.**

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AT&T
Teletype Corporation

CIRCLE 14 ON READER CARD

CALENDAR

OCTOBER

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

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

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

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

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

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

NOVEMBER

Autotestcon '84.
Nov. 5-7, Washington, D.C. For more information contact: Autotestcon '84, Suite 704, 1725 Jefferson Davis Highway, Arlington, VA 22202.

China Comm 84.
Nov. 5-13, Beijing, China. For more information contact: Clapp & Poliak International, P.O. Box 70007, Washington, DC 20088, (301) 657-3090.

DAK/DAP '84.
Nov. 6-9, Sandvika, Norway. For more information contact: Tor Rustad, Messebyrået As. Sandviksvn. 184, Info-Rama. Postboks 530, N-1301 Sandvika, Norway, tel. Oslo 02-39-27-04, telex 72 680 INFRA N.

EDCOMPCON-84.
Nov. 8-10, San Jose, Calif. Contact: Dr. David C. Rine, Computer Science, Western Illinois University, Mascomb, IL 61455, (309) 298-1315.

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

Electronica '84.
Nov. 13-17, Munich, Germany. For more information contact: Kallman Associates, 5 Maple Court, Ridgewood, NJ 07450, (201) 652-7070.

Comdex/Fall '84.
Nov. 14-18, Las Vegas, Nev. For more information contact: The Interface Group Inc., 300 First Avenue, Needham, MA 02194, (617) 449-6600 or (800) 325-3330, telex 951176.

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

Los Angeles Computer Showcase Expo.
Nov. 29-Dec. 2, Los Angeles, Calif. Contact the Interface Group Inc., 300 First Ave., Needham, MA 02194, (617) 449-6600.

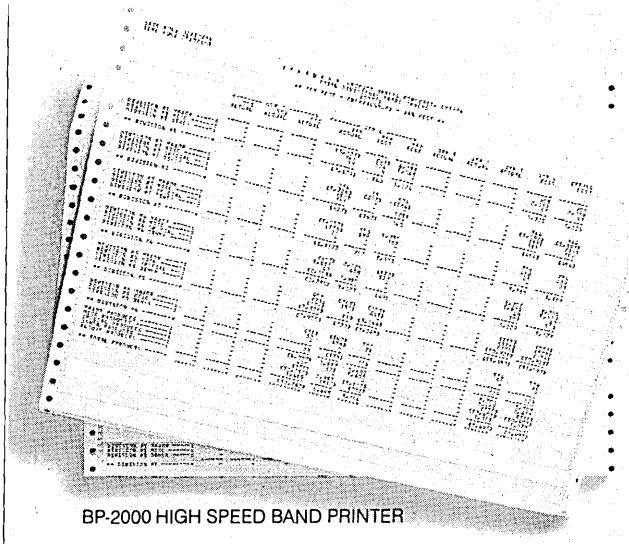
DECEMBER

Great Southern Computer Show.
Dec. 6-8, Tallahassee, Fla. Contact Laurel Netzer, Great Southern Shows, 1222 Shacleton Rd., Jacksonville, FL 32211, (904) 743-8000.

Washington, D.C., Computer Showcase Expo.
Dec. 6-9, Washington, D.C. Contact the Interface Group Inc., 300 First Ave., Needham, MA 02194, (617) 449-6600.

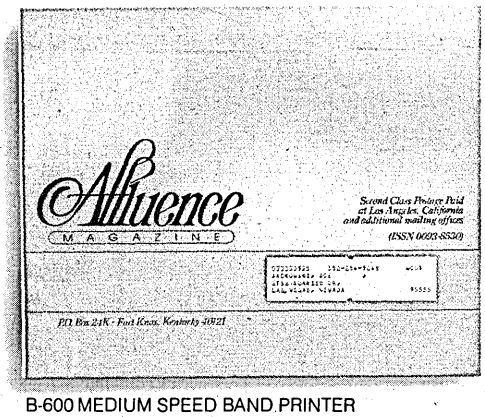
DEXPO West (Sixth National DEC-Compatible Industry Expo).
Dec. 11-14, Anaheim, Calif. Contact Natalie Kaye, Expoconsul International Inc., 55 Princeton Heightstown Rd., Princeton Junction, NJ 08550, (609) 799-1661.

Fifth Generation and Super Computers.
Dec. 11-13, Rotterdam, The Netherlands. Contact Fifth Generation and Super Computers Symposium 1984, c/o Rotterdam Tourist Office, Stadhuisplein 19, 3012 AR Rotterdam, The Netherlands, tel. (010) 14 14 00, telex 21228 vvvnl.

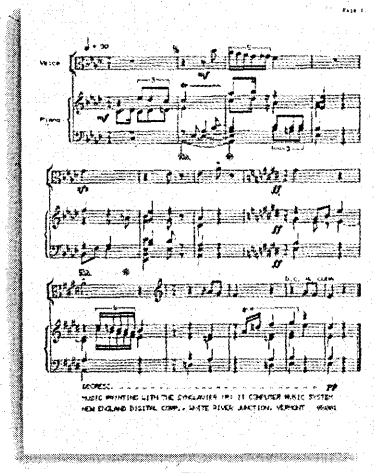


BP-2000 HIGH SPEED BAND PRINTER

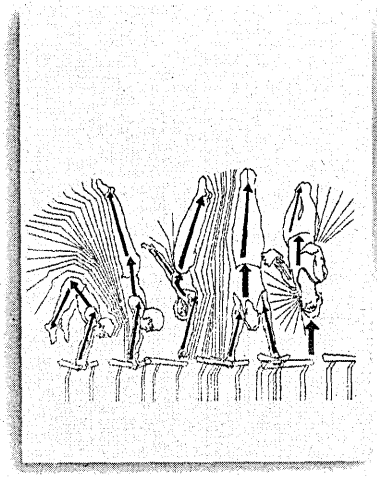
M-100L
MATRIX PRINTER



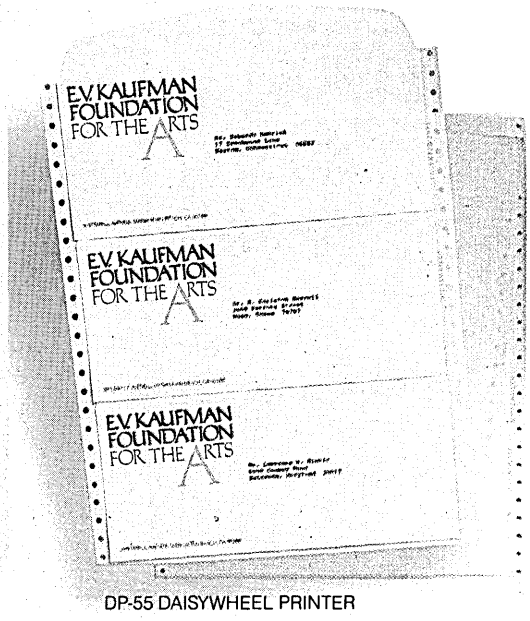
B-600 MEDIUM SPEED BAND PRINTER



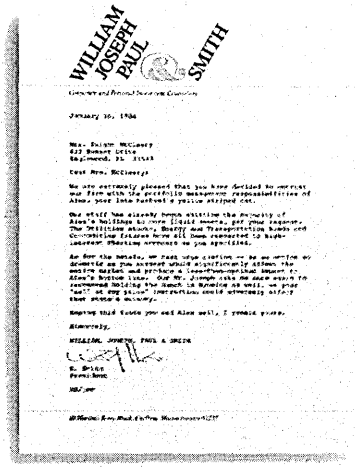
8010 MATRIX PRINTER



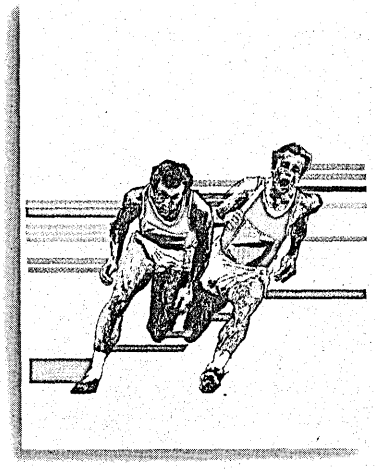
8020 MATRIX PRINTER



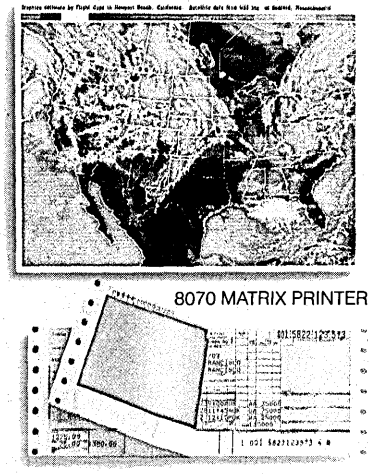
DP-55 DAISYWHEEL PRINTER



DP-35 DAISYWHEEL PRINTER



8050 MATRIX PRINTER



8070 MATRIX PRINTER

M-120 MATRIX PRINTER

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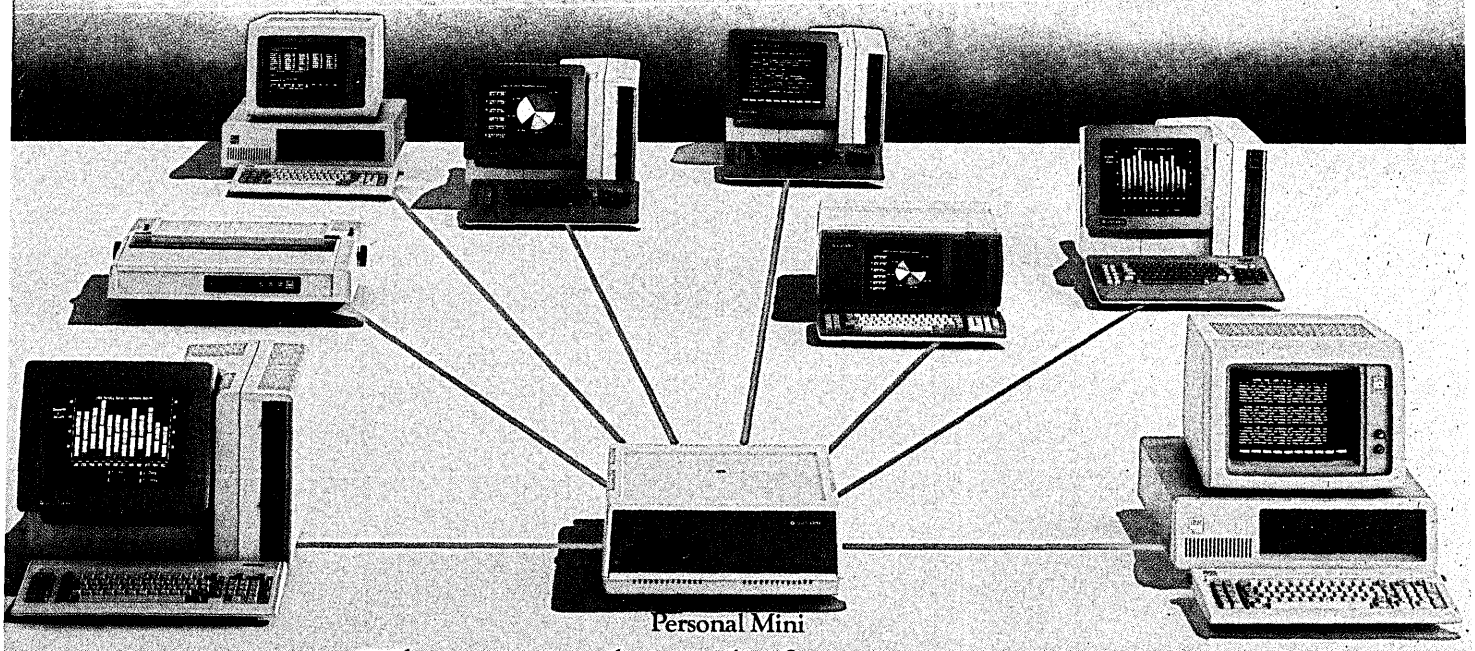

Personal Mini

The growth path for everyone.

People in your organization realized they outgrew their personal computers the first time they tried to share information or work together on a task. Standard PCs simply fall short of fulfilling their total business needs. Until now.

Until the TeleVideo® Personal Mini.™ It's the next rational step in your PC growth path. Just plug into it and grow.

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It's the simple way to dramatically increase computing power and group productivity without sacrificing system manageability. It's the low cost way to network IBM,® TeleVideo, and compatible PCs, as well as the new IBM PC AT.

Runs PC, multiuser and mini software.

Its powerful operating system easily supports popular PC software, minicomputer programs and especially, multiuser applications development using such languages as RM/COBOL™ or Micro Focus™ COBOL. Without speed or performance tradeoffs. And with its 3270 emulation, any PC can talk to your mainframe. So your original investments in software, hardware and computer training can only become more useful.

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We also paid special attention to DP concerns. For reliability. System security. Total system manageability. And of course, future growth.

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The TeleVideo Personal Mini. The first PC compatible multiuser system.

TeleVideo Computers

TeleVideo Systems, Inc.

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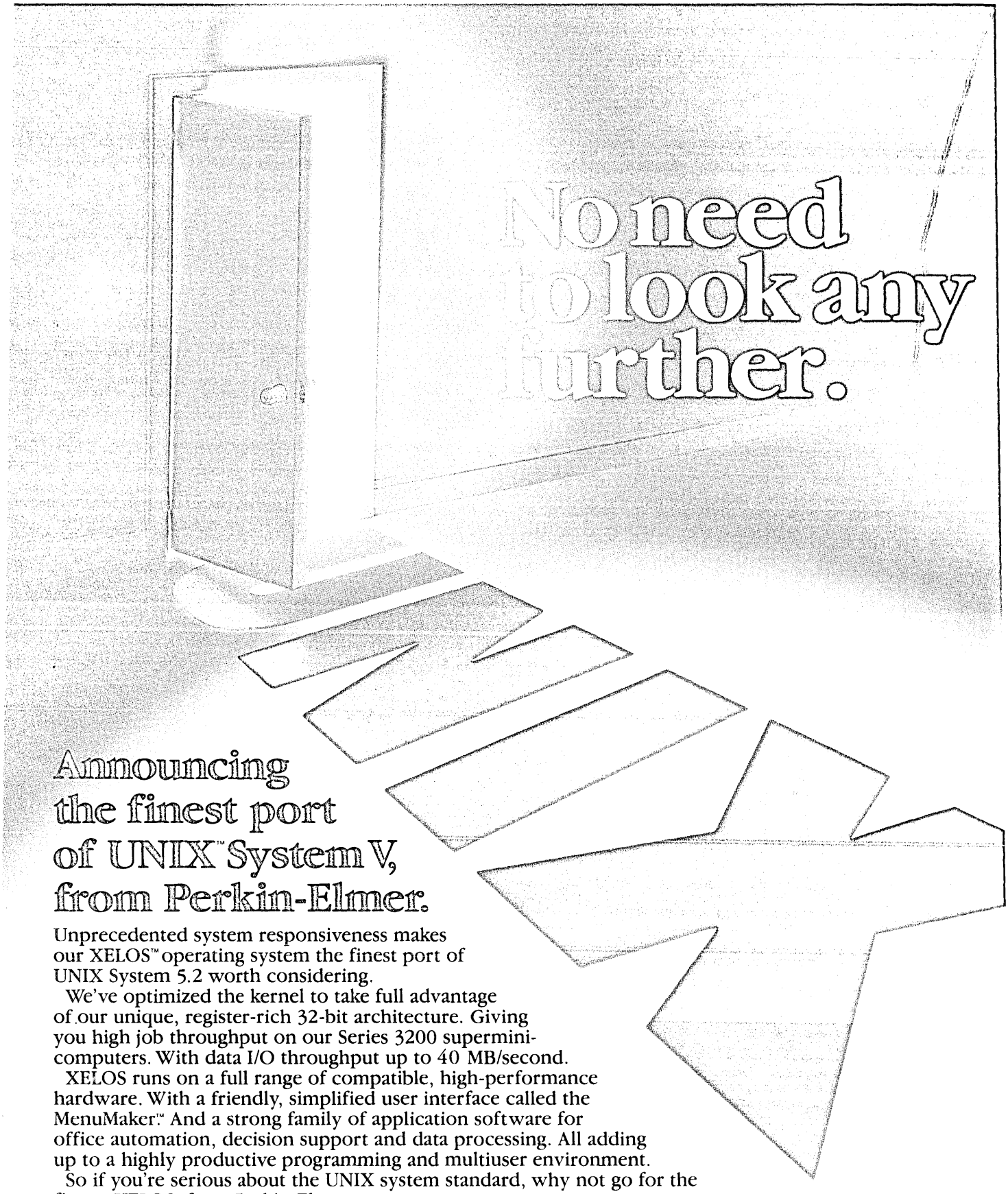
CIRCLE 16 ON READER CARD



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So if you're serious about the UNIX system standard, why not go for the finest: XELOS, from Perkin-Elmer.

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CIRCLE 17 ON READER CARD

LETTERS

HOW TO WORRY ABOUT UNIX

The article "How Not to Worry about Unix" by David Morris (Aug. 1, p. 83) does your readership a great disservice. Unlike the usually authoritative articles you so often publish, Morris's is founded upon ignorance.

To begin with, Morris seems to lack an understanding of the difference between a database management system and an operating system. He declares that to access the data on a mainframe successfully, "it's best that the mainframe and the pc use the same or compatible operating systems."

The implication Morris is attempting to draw is that since Unix is not a popular operating system on mainframes, and since Unix on a pc is not compatible with the prevalent mainframe operating systems, the mainframe-pc link can only be hindered by Unix on a pc.

The problem with this argument is that the choice of operating systems is fundamentally unrelated to the success of the link. The proof is that not a single IBM PC link runs the same operating system as the mainframe to which it provides access.

The correct conclusion is that Unix as an operating system will neither impede nor facilitate the pc-to-mainframe link. But because Unix "furnishes program writers with software tools to help develop highly sophisticated programs," one might presume that the Unix environment would facilitate the development of better pc-mainframe links.

Morris asserts that "the capabilities of existing pc operating systems are so sophisticated that they already do everything Unix can do. . . . " In the very next paragraph he states that some of Unix's features "are only now being incorporated in newer operating systems." Your copy editor should have caught that one.

Morris's lack of sophistication has also prevented him from understanding the reason why one might want to run Unix on a pc. He seems to think that the reason for multitasking is to run a general purpose timesharing system on a pc. Pc stands for personal computer: a computer to be used by a single person. Why might a single user want a multitasking environment? Dozens of applications suggest themselves. How about an alarm clock function running in parallel with your word processor? How about a file transfer from your mainframe running at the same time? It's silly to tie up your machine with this function for half an hour without being able to use it for anything else. These three functions are just the beginning of what even today's pcs are comfortably capable of processing in parallel, and none of these predicates his condemnation of multitasking.

These are the major errors of Morris's article. I am greatly disappointed that the misconceptions that prevent the computing community from understanding Unix are perpetuated by such articles.

Unix has its weak points. But to intelligently determine what future Unix might have requires an understanding of what Unix is. Contrary to most magazine articles (including Morris's), which parrot the idea that Unix is not user friendly, I suggest that Unix has the ability to be the most user friendly; or that, counterintuitive as it may seem, Unix's popularity may be it's downfall.

REMON LAPID
President
The Software Foundry Inc.
New York

WHAT, IF ANYTHING, IS A NORMAL FORM?

Frank Sweet ("What, If Anything, Is a Relational Database?" July 15, p. 118) quotes my aphorism for remembering the three normal forms but gives examples that are back to front.

"Nonkey data items depend upon the key . . . " is the first normal form. In an employee history record with employee number and date as composite key, my job title and salary (at that date) clearly belong there—quoting my employee number and date selects the one job title and one salary I had at that date. But some other data items do not belong. If employees can have more than one phone on their desk, each one of a different color, a data item "phone number" should not appear in this record type because one (and only one) phone number cannot be selected by quoting employee number and date: it needs an additional qualifier of "phone color" to select it.

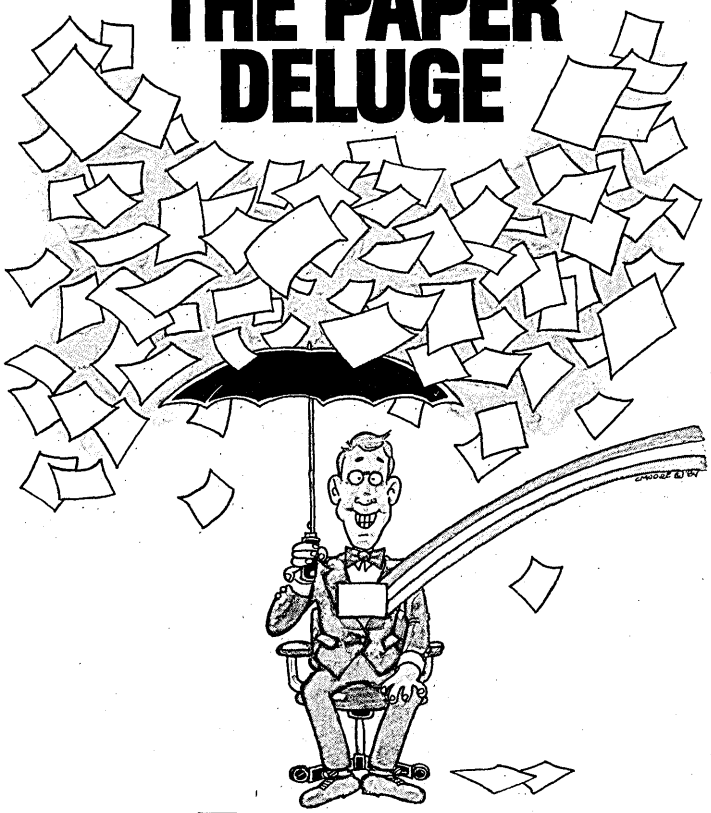
"The whole key . . . " is the second normal form. Neither my date of birth nor sex should appear: they are uniquely selected by quoting my employee number only—date is unnecessary. If reincarnation and sex change operations are excluded, each of my records (i.e., the ones with my employee number) would—if these data items were present—contain the same date of birth and sex.

"And nothing but the key" is the third normal form. The allowable salary range for my job should not appear in the record. Even though quoting my employee number and date would select my one allowable salary range at that date (the one for the job), it does so via my job title, i.e., a salary range is selected by quoting my job title which, in turn, is selected by quoting my employee number and date.

The end result would be three files (each with a single record type); the keys are in italics:

employee-number date salary job-title
employee-number date phone-color
phone-number

MAN AGAINST THE PAPER DELUGE



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LETTERS

job-title salary-range
(Or, if the salary range for particular jobs changes with time, "date" should be added as part of the key of the third file.)

These three files are all in third normal form (and in fourth and fifth normal forms as well, but that is another story).

MAX STEWART
Oakham, Leicestershire
England

OVERLOOKED BUT NOT FORGOTTEN

A news item in the Look Ahead section of the July 15 issue highlighted the upcoming introduction of a VAX-based PROLOG implementation and mentioned other implementations that are on their way. However, this news item overlooked one important development in the PROLOG world: LM-PROLOG, the first PROLOG implementation for serious logic programming introduced in the U.S. LM-PROLOG, which is distributed exclusively by Lisp Machine Inc., was introduced in January of this year and is now in use in a number of research and commercial organizations. By this oversight, the news story improperly implied that DEC will be first with a PROLOG implementation.

KENNETH M. JOHNSON
Vice President
Marketing & Sales
Lisp Machine Inc.
Los Angeles

BOTTLENECK REVISITED

"Avoiding the Von Neumann Bottleneck" (May 15, p. 173) is an appropriate title for a story on this thorn in the flesh of systems/applications programmers. We've lived with the Von Neumann "albatross" for almost half a century—and without much complaining!

There is no other choice but to live with the inherent architectural design limitations of the present generation of computers. Nevertheless, it makes the work of systems/applications programming exciting and mysterious—manipulating words, bits, bytes, megabytes, etc. Little can be done in this area until designers overhaul the whole Von Neumann approach to data processing, coming out with radical design data transfer mechanisms or methods.

The author of the article, T.M. Merrett, provides an academic yet practical historical exposition of this bottleneck. I find his analysis of a fairly simple commercial system easy to read and comprehend.

As a student of computer science, I greatly appreciate such articles and hope to see more in your magazine.

ROBERT JOHN WILSON
The Netherlands

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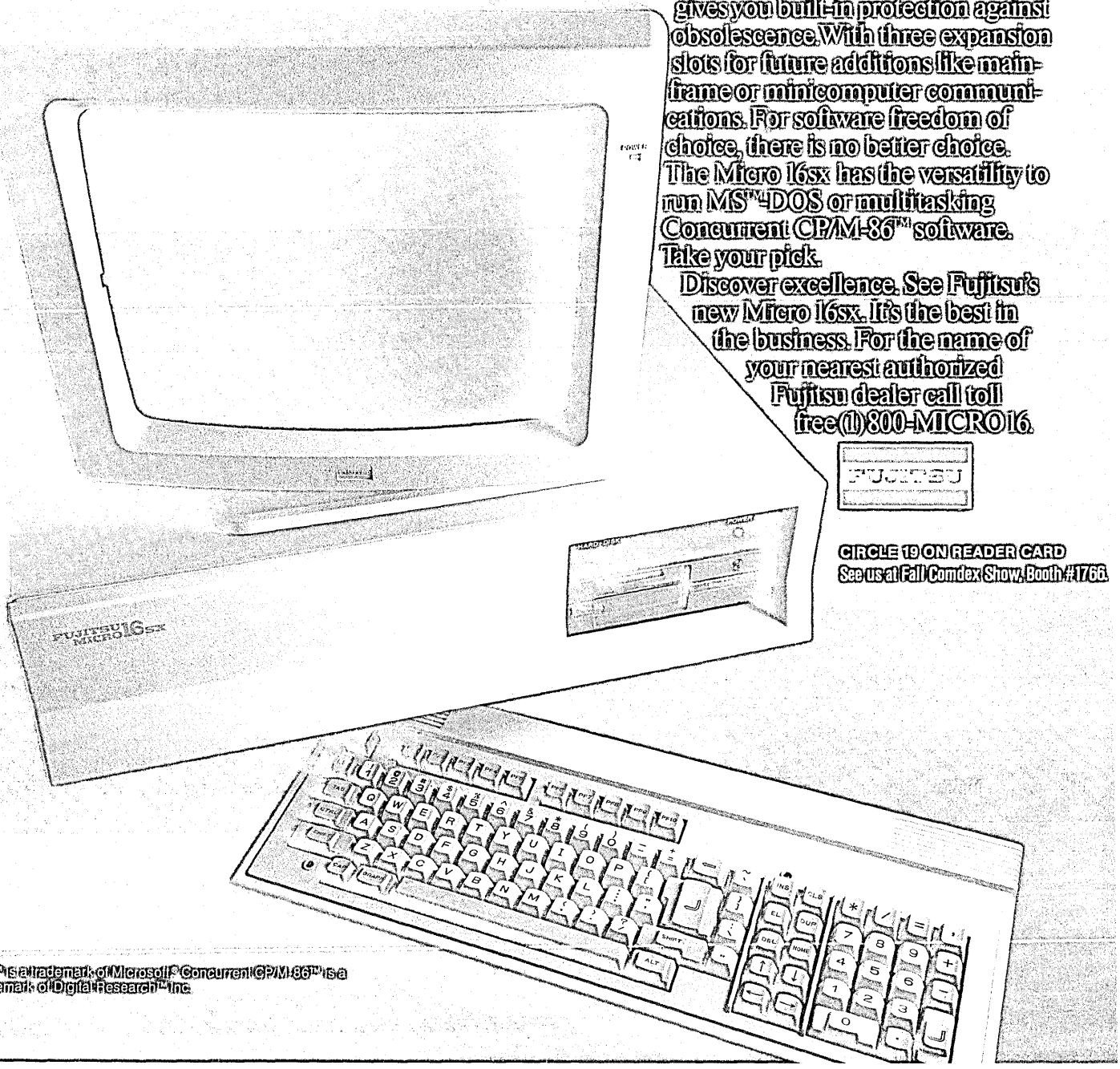

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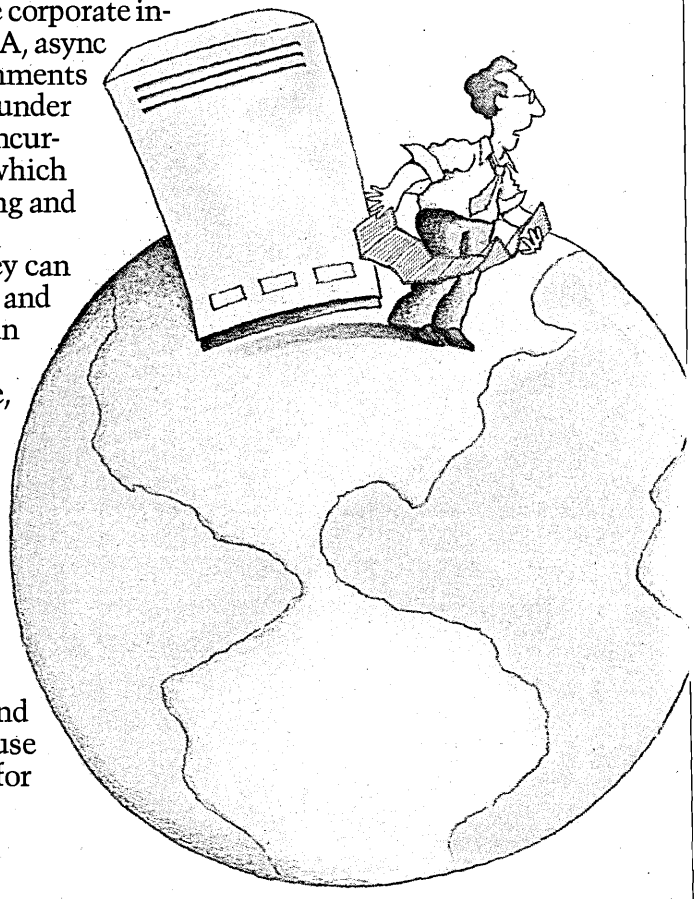

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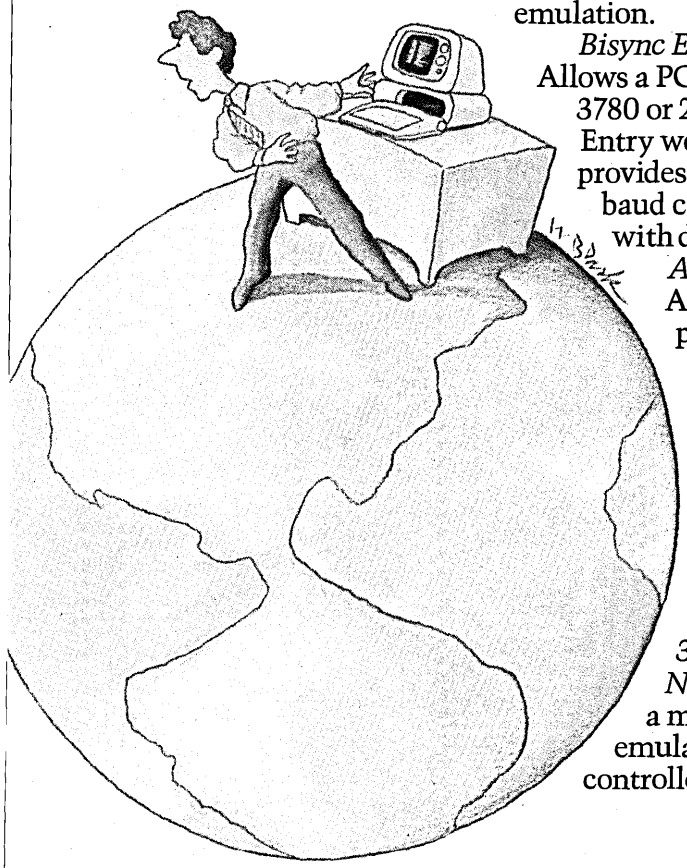

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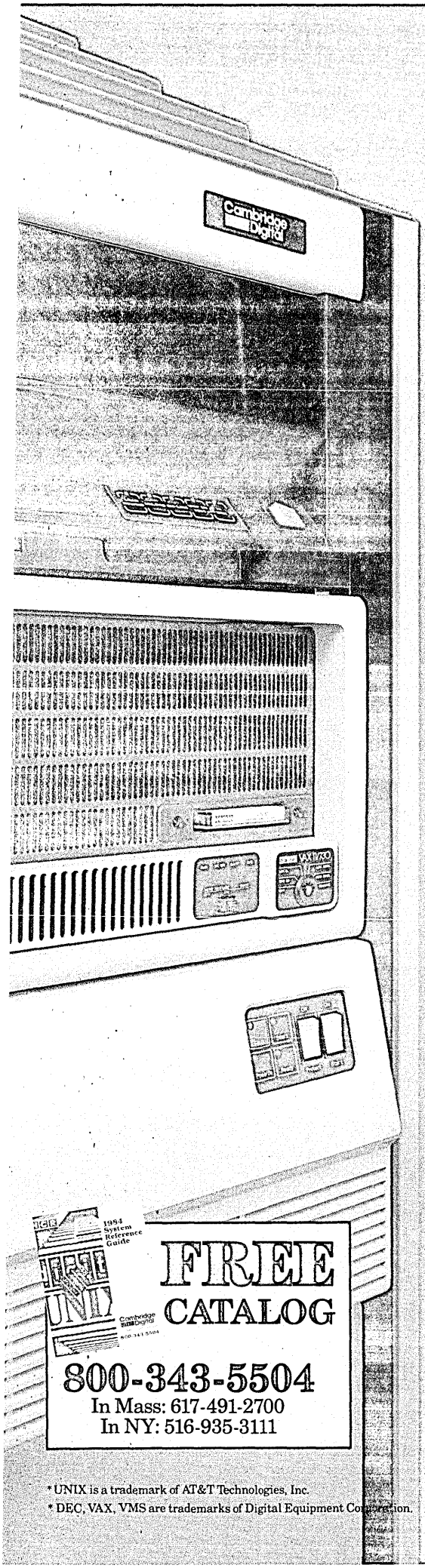

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Rebecca S. Barna, Editor

EDITORIAL

TWISTING IN THE WIND

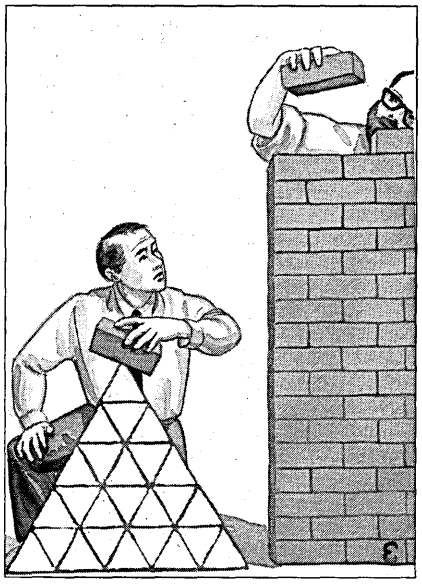

ILLUSTRATION BY DORIS ETTLINGER

A few weeks back, we were sitting around the office discussing really important issues, namely the pennant race, how to avoid trips to Las Vegas, and the identity of the next PC clone to disappear. One of our graybearded veterans wandered in with a slightly puzzled look. Now, our senior folks are really senior; they've been in the business a quarter of a century or more. Little surprises them. A few incisive questions and a good lunch later, the source of the astonishment became clear. It was the story we're running in this issue by R. Emmett Carlyle, "VSPC Users Lose Out," (p. 46).

We'll paraphrase a long, blurry conversation. The gist of the matter is simple, according to our old-timer. What you are witnessing is the normal reaction of installations that took a different road and wound up in a dead end. This has nothing to do with the question of whether VSPC is good, bad, or indifferent. What counts is the number of installations that made a decision to take a position unsupported by the vast majority of other large shops.

Our house patriarch further contended that this isn't the first or last time this has happened. He remembered way back in the '50s when IBM stopped supporting the FORTRAN Monitor System, and again in the '60s when Commercial Translator bit the dust. When the system in question doesn't achieve support from at least a significant minority of potential users, sooner or later IBM will yank development support. Anybody remember Type 1 RJE?

Now, said our ancient observer, these installations have been caught in a trap, partially of their own making. Somebody is going to have to tell their top management of the millions of dollars invested in a product that isn't going anyplace. That is an unenviable task in a large corporation; MIS managers have lost their jobs for less. So, it's a lot easier to make a loud fuss, blame IBM, claim they were misled, and cry to the press. Who wants to face the truth? A bad decision was made and a fat bill has now come due.

We thought about this a while and came to the conclusion that our somewhat war-weary consultant was right. In the dp world, there are no rewards for pioneers who guess wrong. They've played "You Bet Your Job" and lost.

Our feelings about VSPC are mixed. It's a nice enough system, more widely used in Europe than in the U.S. For a while, IBM marketed the system vigorously, promoting it as a breakthrough in easy-to-use timesharing. But the same goal of providing effective end-user computing can be attained at least four other ways: using VM/370's Conversational Monitor System (VM/CMS); running the old MVS standby, Time Sharing Option (TSO); using an independent software vendor's timesharing package; or connecting up personal computers. In fact, IBM now offers CMS on a desktop, the PC XT/370.

Granted, those shops with happy users plugging away at well-understood VSPC applications must feel betrayed, especially if what they say about their vendor's lack of support in getting out of the VSPC pickle is true. That's understandable. But there's no reason, it seems to us, to go to war for these installations. They have other options available. IBM gave them plenty of warning of VSPC's impending demise. And no installation could contend IBM abruptly dropped all support. What IBM calls "functional stabilization" is only the beginning of the end. Errors still get fixed.

What we are left wondering is how installations get caught in these cul de sacs. These shops are part of the SHARE/GUIDE establishment. They are large enough to know what is happening and read IBM's tea leaves correctly. Somehow, they seem to get fixated on one and only one method of solving a problem. And, in the end, they are caught in a blind alley.

Our oldster was right. This same situation has been seen many, many times in the past. Doubtless, it will happen again in the future. Installations based on bum decisions get left to twist slowly in the wind.

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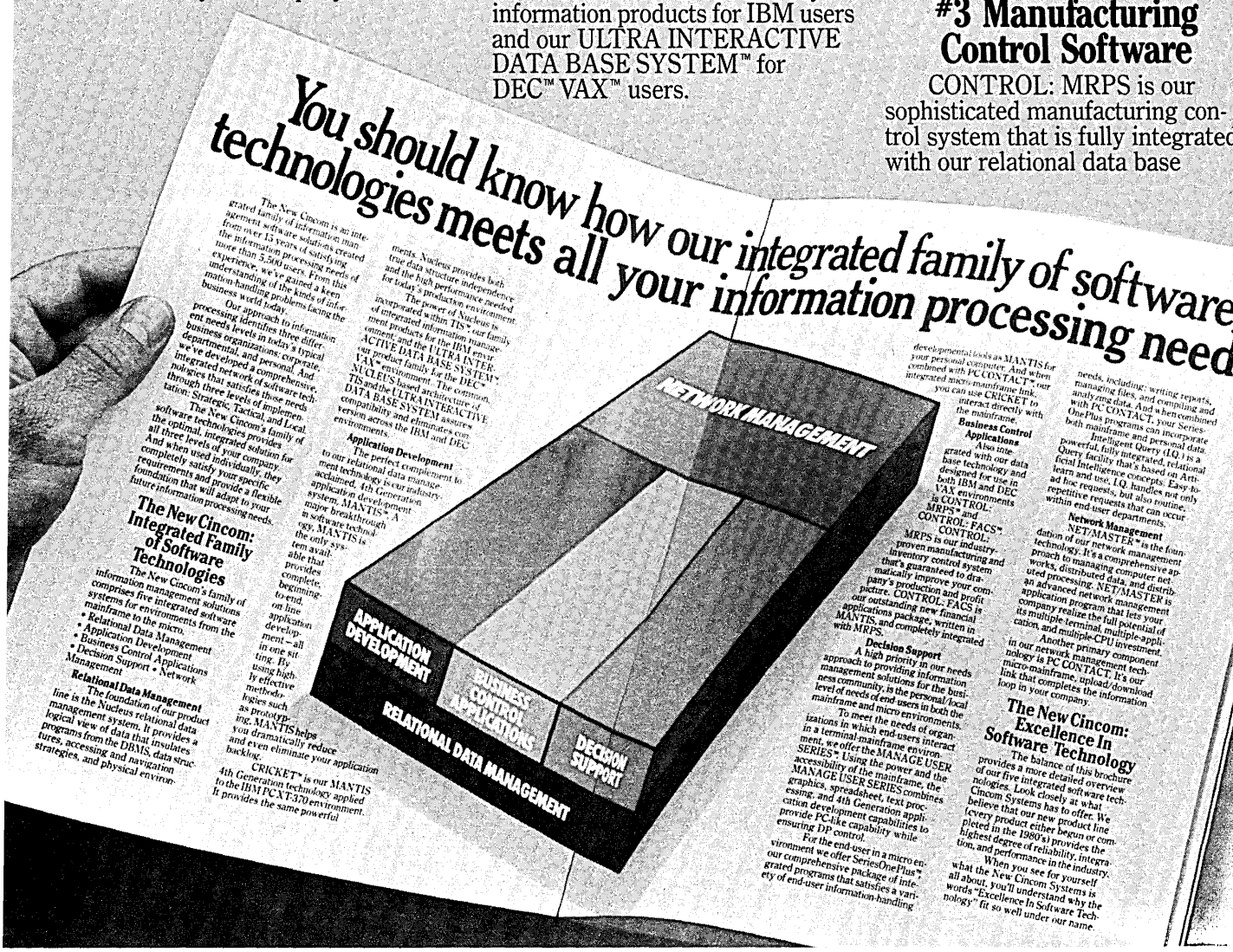

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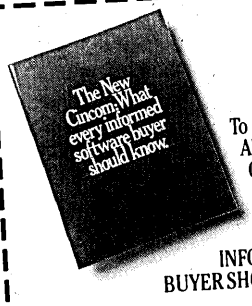

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IN FOCUS

PSYCH-OUT SOFTWARE

Do-it-yourself analysis is now available on pcs.

by Jill Neimark

"Men are all alike," the girl began.

"In what way?" her therapist inquired.

"They're always bugging us about something or other."

"Can you think of a specific example?"

"Well, my boyfriend made me come here."

"Your boyfriend made you come here?"

"He says I'm depressed much of the time."

"I'm sorry to hear you are depressed."

That was the conversation that launched an empire. The year was 1966. The girl was just a girl. But the therapist was a computer.

More specifically, the therapist was a computer program named Eliza that managed to fool some of the more skeptical scientists at MIT into believing it was a practicing psychiatrist. Eliza was actually created by MIT scientist Joseph Weizenbaum just around the time when the concept of artificial intelligence was spreading like wildfire in academic circles. Now, 20 years later, the lure of expert systems, or machines that can assist and advise humans, is big business. Research and development is being heavily funded by major corporations like IBM, Xerox, and Texas Instruments. Japan alone is currently spending half a billion dollars on developing fifth generation computers that will be able to reason, draw conclusions, make judgments, and understand the spoken word.

Psychology software plays no small part in this race. Is it possible to program a computer to think, to probe the human psyche, and offer insight and advice?

Not yet, say the experts, though computer science may well be heading in that direction. "The microcomputer industry is still at its birth," says Vince Desi, a Manhattan-based software agent and president of Desi Network Inc., which develops and sells psychological software programs. "It's like a day-old baby." At present the expert system—any expert system, whether it's used for medical or psychological diagnosis, to help design better computers, or evaluate the potential of a particular land site for valuable minerals—is a tool, not a colleague.

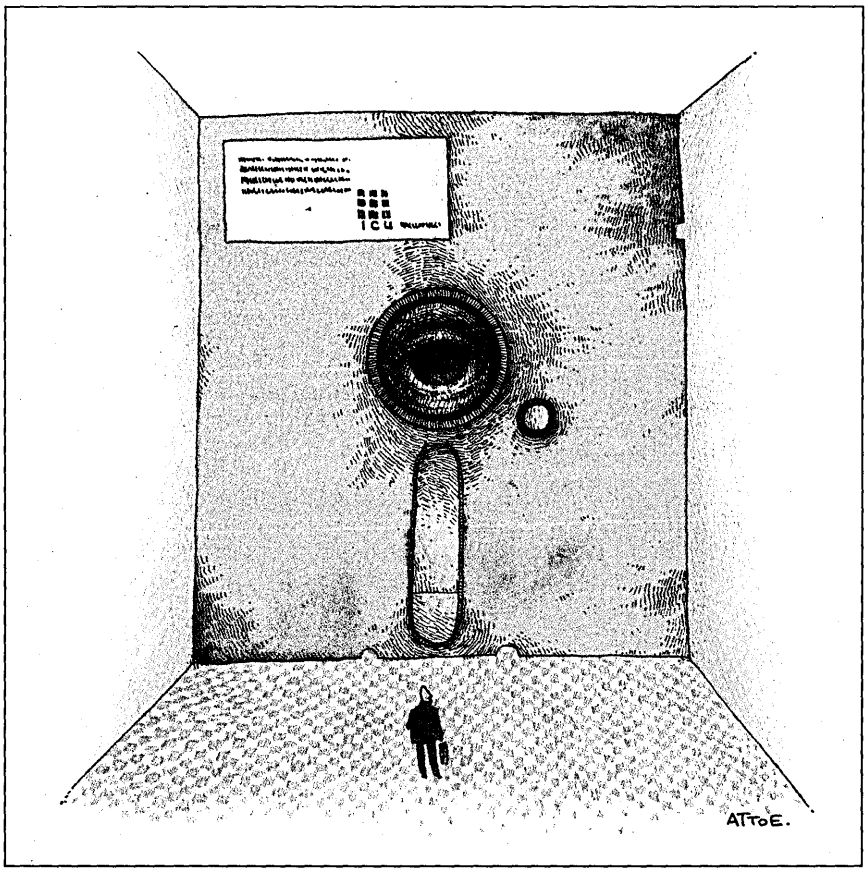
That tool, however, is making some fantastic inroads. Computers can talk to and help rehabilitate the brain-damaged, draw from tens of thousands of statements in order to make psychiatric evaluations, improve your memory, and help you relax. The boom in psychology and the programs now available run the gamut from personality profiles to assessments of neurological damage, the meaning of dreams, and just what makes your business partner tick. Sit in front of the screen and, according to the more extravagant claims, a computer can treat impotence, rid you of stress and depression, hypnotize you so you'll stop biting your nails, or measure your baby's developmental milestones.

This kind of programming has been nicknamed "psych-out" software. Originally designed for managers, salesmen, and others in business, it functions as a plug-in consultant that will explain the motives and behavior of business associates and map out strategies for negotiating deals, closing sales, and managing subordinates. The market for these programs is estimated by one of the leading manufacturers, Human Edge Software Corp. of Palo Alto, Calif., to reach $73 million by 1987. That estimate may be conservative—consider the fact that corporate America already spends $3.1 billion each year on management training programs alone, according to the 1983 U.S. Training and Census Report. In such a climate, computer programs for managers may become as popular as VisiCalc is with accountants.

"It's often easier to get a message across if it comes from a computer."

Psychological software actually began to take hold about six or seven years ago, when hospitals, clinics, and private offices began administering standard tests by computer (though these tests had been in limited use since the 1950s). In 1978, a Baltimore-based company named Psych Systems began selling computerized testing to professionals. After a slow start, it caught on.

A computer can instantly print out evaluations that normally take days or weeks to complete. And, according to many professionals, people tend to be more honest when addressing an impersonal computer than when confronting a human. Seated at the terminal, the patient spends about an hour answering hundreds of questions, from "Do you love your mother?" to "Do you think people



in your office talk about you?" The computer compares the answers to standardized norms, and draws from tens of thousands of conclusions stored in its memory to produce its report.

"God, is there a market for it," says Dr. Joy Stapp, director of the Human Resources Office at the American Psychological Association, Washington, D.C. Nearly all the APA's 35,000 members already perform some type of psychological testing, and since the prices of the software are falling steadily (systems that formerly cost $20,000 are now available for about $14,500 to $15,000), it's likely that more and more psychologists will rely on them in the future.

Over 700 clinics and offices now test the mentally disturbed by computer, and the number of companies manufacturing diagnostic tests has soared to over a dozen in the last year, according to a recently published survey. A mail-order cottage industry seems to be springing up as well, with doctors devising and marketing their own individually designed tests.

Psych Systems, which has worked closely with the APA to establish computer testing guidelines, initially experienced fantastic growth. In 1980 sales were $606,143 but by 1983 they exceeded $5 million. Recently, they have cooled, as operating costs increased and sales have slowed—with only a 25% increase in revenues from fiscal 1983 to fiscal 1984, perhaps because of growing competition.

Presently the company offers a range of software and hardware, from microcomputers such as the IBM XT, to mainframe-based systems linked by modems with up to 14 separate terminals, printers, and software. Any of the systems are capable of running all the testing software that Psych Systems offers, but the larger packages have up to 20MB of memory and the capacity for automated testing of the patient load experienced by a hospital, a large group practice, or a cluster of independent psychologists. Prices range from $20,000 to more than $60,000, but the company plans to slash its prices to rival those of its primary competitor, Compu-Psych Systems Inc. of Kansas City, Mo.

In general, computer testing programs offer up to 50-page assessments of everything from supposed psychosomatic complaints to potential for drug addiction. "Not only can they give a quick diagnosis," says psychologist Mark Brenner, who uses them as part of a large group practice in King of Prussia, Pa., "but it's often easier to get a message across if it comes from a computer. People feel it's objective. Actually, it takes a lot of clinical skill to evaluate these things, and they should only serve as a counterpart to intuitive clinical work."

They don't necessarily serve adjunctively, however, and that's what has psychologists worried. Computer assessments have found their way into the police force, the U.S. Army, the courtroom, and the boardroom. "My experience has been that people who are not trained in psychological testing just love to overrely on a computerized report and tend to take it as gospel," says Gaines A. Thomas, a Fresno, Calif., psychologist.

One nearly tragic case occurred when a California mother was refused custody of her child based on a computer anaylsis. She came from a conservative religious background, a factor the computer was not programmed to take into consideration. As a result, her answers were misinterpreted. After analysis of the program's deficiencies, the court decision was reversed.

"The more you look at these programs, the more limited they seem," contends Dr. Lorraine Eyde, former chair of a subcommittee on testing for the APA. "There are a lot of hits, but a lot of misses, too. You can test somebody by computer and easily get away with calling it your own work. But the minute it makes the decision for you, you're in trouble."

When her committee gave identical answer sheets to two computer testing companies, they sent back differing interpretations. In another instance, a test report called a patient "frequently irresponsible" and, a few pages later, "conventional and somewhat controlled." This kind of contradiction occurs because the computer, working mechanically, classifies answers and then produces appropriate interpretations.

Over 700 clinics and offices test the mentally disturbed by computer, and the number of companies manufacturing diagnostic tests has soared to over a dozen in the last year.

Dr. Joseph D. Matarazzo of the Oregon Health Sciences University in Portland, warns that "a flood of litigation involving unqualified users of this new technology is just around the corner." As far as the APA is concerned, psychology software is one of the hot topics this year, and many conferences have already been called to help establish guidelines on automated testing. "Computers cannot substitute for humans. One day they may," says Matarazzo. "Not now."

Nonetheless, there are times when a computer can outdistance a human. According to Dr. Robert Sbordone, clinical neuropsychologist at the University of California at Irvine, the talking computer programs he has designed have "the patience of Job and the wisdom of Solo-

mon." They unflinchingly spend hours a day assessing memory loss, disorientation, perceptual dysfunction, and other types of brain damage, and adminster on-screen tests to rehabilitate patients. These tests can be as simple (for the severely damaged) as pressing a key to keep a circle inside a moving square; the computer will administer this task for hours if necessary, and it is programmed to assess how well the patient is performing and advance him to harder tasks as he improves.

"The results have been nothing short of amazing," Sbordone claims, citing the case of a teenager who, as a result of an auto accident, was in a coma for six months and emerged unable to walk or talk. He was turned away by a major rehabilitation center because his attention span was only one second and his memory lasted only a few minutes. "He's been working at the computer four hours a day for the last two years. Recently he wrote me a letter that began, 'You'd think that after two, count 'em, two years of doing what everyone says is boring, menial work that I'd be sick to death of it. The fact is, I love it.' "

Computers are also used to teach psychology students—by making them subjects in their own experiments. As Prof. Susan Brandon of Hofstra University in Hempstead, N.Y., explains, the programmer selects a phrase—such as "I like"—and the computer rewards the student each time he uses it by giving him a point. The student is not aware of what the phrase is, but interacts with the computer by answering questions and obeying commands.

"Students are continually fascinated and surprised to discover that when they finish the programs—even if they haven't been consciously aware of what's going on—the phrase that was rewarded occurred more and more often as time went on." What better way is there to illustrate how reinforcement changes behavior?

A mother was refused custody based on a computer analysis. She came from a conservative religious background, a factor the computer was not programmed to take into consideration.

Psychology software is in fact breathing new life into the behaviorist approach to psychology. Once the big movement of the 1950s, it showed how simple systems of reinforcement can change the way we act—and made psychology a "hard" science that could be quantified by running rats through mazes, or training pigeons to press a bar for water.

Computers fit easily into this framework—and part of their captivation for psychologists and lay people alike is that they seem hard, quantifiable, objective. "What the computer does can look fantastic and magical on the surface," says Sandy McIntosh, software publisher and writer in Great Neck, N.Y., "but underneath it's just a set of algorithms. That's true of Eliza, or any other program."

It's that aura of infallibility that has spurred the boom in the more popular psych-out software as well. Though no corporation or individual expects to buy intuitive brilliance in a computer disk, there is the hope that the computer will give them a quantifiable competitive edge.

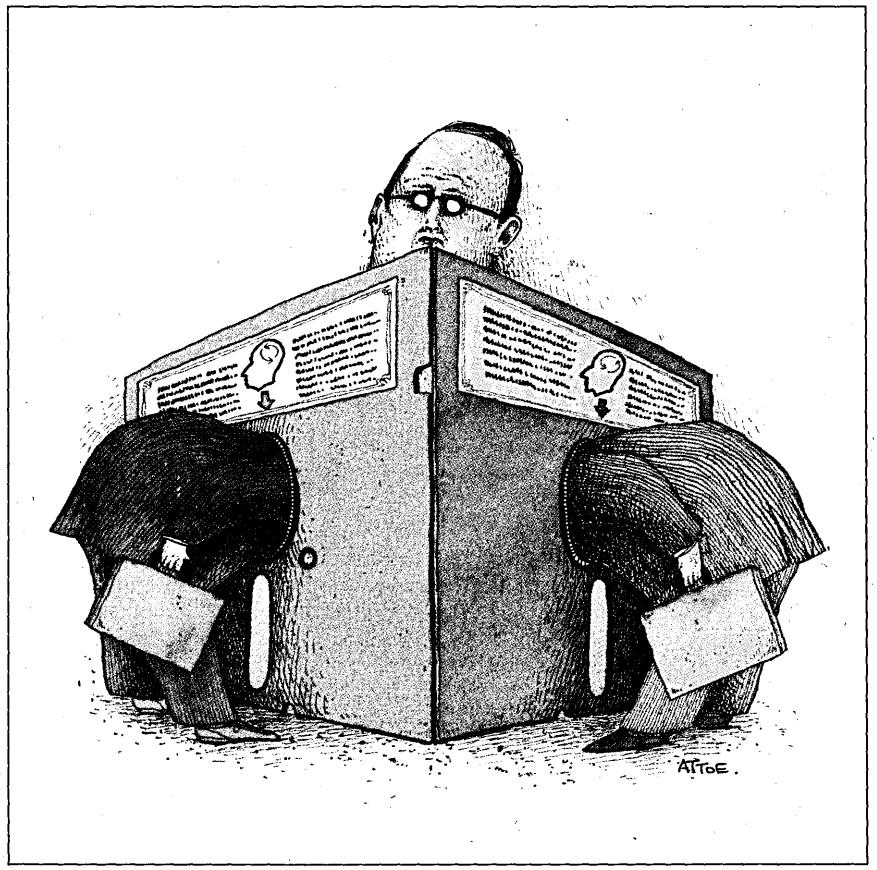
One of the most popular business programs, packaged under the name Thoughtware, from Thoughtware Inc., headquartered in Coconut Grove, Fla., claims just that. The program offers to replace conventional methods of management training with "less expensive yet more effective individualized training."

Hundreds of companies currently use Thoughtware programs, the company claims. The programs, which sell for $350 to $450, are designed for the IBM PC or the Apple IIe, and use striking color graphics. Says founder Dr. Jack Levine, "It's as though the personal computer were invented exclusively for teaching people how to be proficient managers and executives."

One of the most talked-about packages, Leading Effectively, asks the user to react to a series of leadership situations. It then analyzes the responses and helps evaluate and improve the user's leadership style. The word of mouth on Thoughtware is essentially positive; most managers agree it is thought-provoking and a helpful focusing tool. "It allows the manager to conduct his own training seminar in privacy," says Monte Andress, manager of professional development for Syntex Labs, in Palo Alto, Calif. On the other hand, users cannot control the pace, and some complain it's too slow at times.

In the end, of course, no touch is as expert as a human being's. Doug Raynor, director of management development at New York University, finds the Thoughtware program wonderful for assessment and evaluation of leadership abilities, but says, "I can teach you key concepts on a tv screen, but that's not the whole story. It's not sufficient for you to know something. What's sufficient is to do it."

Thoughtware's fiercest competitor—and, by all accounts, a more flamboyant and controversial company—is the Human Edge Software Corp. Human Edge offers four programs—The Sales Edge, The Negotiation Edge, The Management Edge, and The Communication Edge, each of which retails for about



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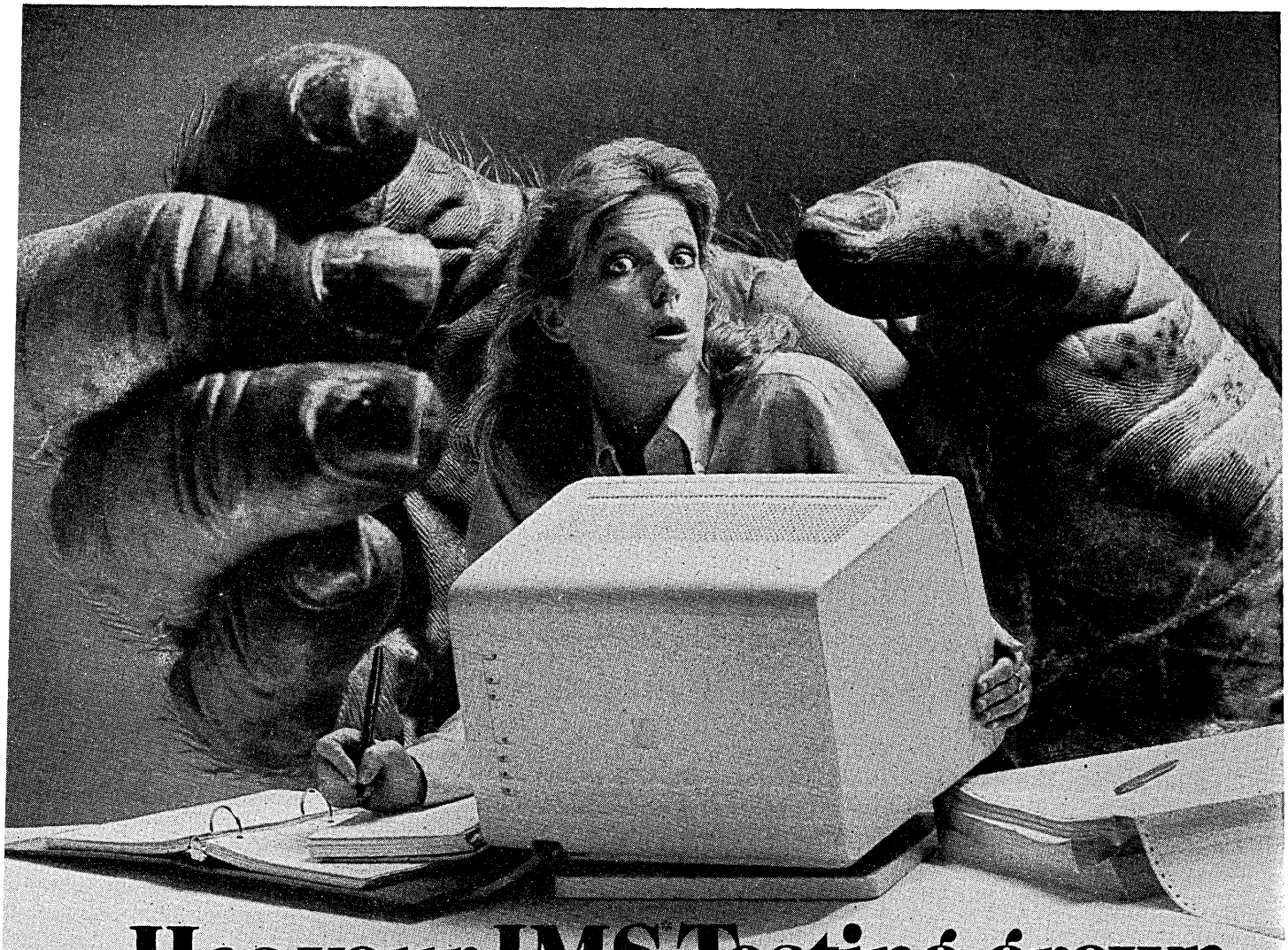

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$250. Billed as business strategy software that will give you the "edge in business—and in life," they are for use on the IBM or Apple personal computers, and usually require half an hour each at the computer answering questions about yourself, the person you will be dealing with, and the circumstances under which you will meet.

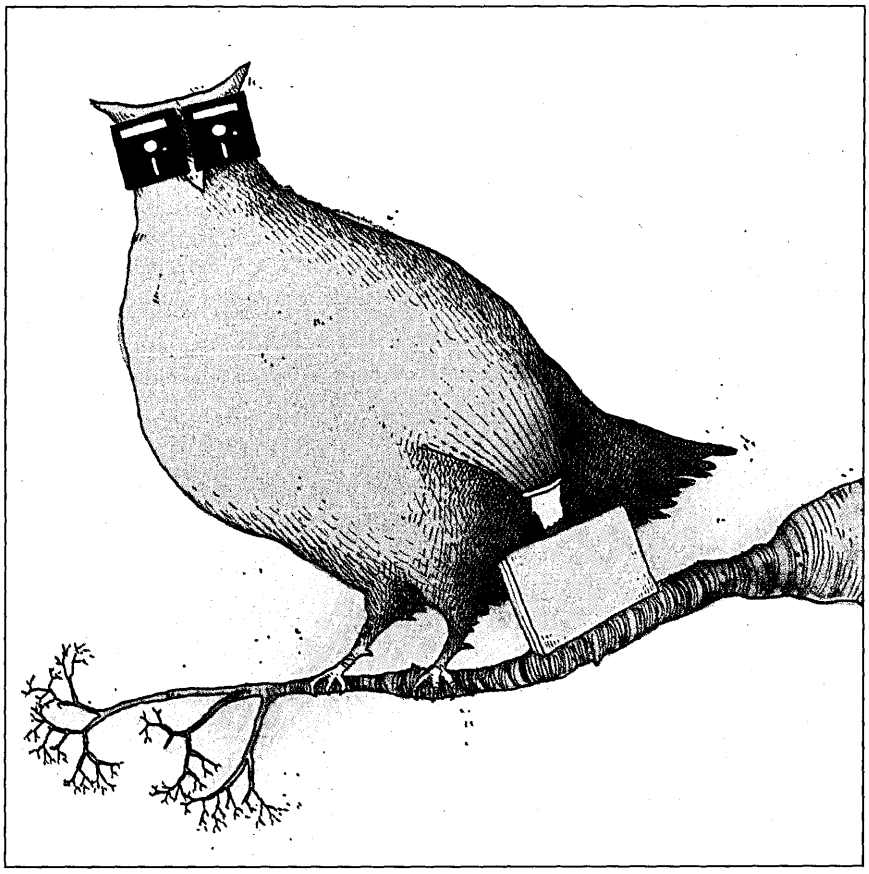
As for the battle over which company's products are the best, Thoughtware's marketing manager, Angie Niehoff, says, "We have a lifetime supply of PhDs and so does Human Edge. But we are a reusable management tool, and they are meant to psych-out your opponent on a one-to-one basis. They've got an interesting gimmick, but how far it goes I don't know."

Human Edge could answer her simply with a list of its clients, which include some of the biggest of the Fortune 500 companies: American Express, E.F. Hutton, Coca-Cola, and Xerox. The firm was founded by 43-year-old Jim Johnson, who gave computerized psychological testing its big boost six years ago when he cofounded Psych Systems. In April of 1983 he left the company to start his own.

Johnson is one of the more colorful entrepreneurs in this burgeoning field—part preacher, part teacher, and part affable cynic. Formerly an IBM salesman who exceeded quotas by 400%, he completed his PhD in clinical psychology at the University of Minnesota, where he began designing expert systems. He estimates over $5 million in sales this year, and reports the company is already outpacing its monthly projections by 15%.

Obviously, none of these programs is for use in dealing with strangers—you must have a certain familiarity with the person you are describing. The packages supposedly cull expert advice from management trainers, psychologists, and academics, as well as popular books. A typical sample of a strategy report: "You tend to doubt yourself, worry frequently, and are a very cautious bargainer. Mr. Adams holds strong opinions, is somewhat headstrong, and often makes demands spontaneously." The report then advises, among other strategies: "Set up the seating so you sit near Mr. Adams. Don't allow yourself to be seated across from him. Move your chair around so you can 'hear better.' Make sure your chair is of equal height to his . . . . .These situations will minimize his appearance of authority over you."

Human Edge has been sparking media interest ever since the London *Financial Times* ran President Reagan and Prime Minister Margaret Thatcher through The Sales Edge program, and came up with surprising insights such as: "R.R. is inclined to seek the limelight, to perform for others. Appeal to R.R. with flattery," and, for Prime Minister Thatcher, "Your tendency to place emphasis on details may bore R.R. Be aware that R.R. can be impulsive and make quick decisions."



Although Johnson's initial emphasis was the high-need achiever businessman, he is already branching out to "life strategy" programs, which are designed to appeal to a less well-heeled audience, as well as women; it turns out that women have not been avid buyers of his packages.

"I hope nobody else gets The Management Edge, because it's like a secret weapon, like being able to hear somebody's dreams."

His newest package, The Mind-Prober, explains other people and how they work, and retails for about a fifth the price of the business programs. It is even being touted as a tool to be used in finding the right person at a singles bar, with sales to bar owners as part of the marketing plan.

There's no doubt that Human Edge has touched a nerve. As reported in *Newsweek,* one minister suggested the programs might be the work of the devil, but afterward privately inquired as to where he could buy The Management Edge to help run his church. Gary Chapman, sales manager for EEV Inc., an electronic parts firm in New York, says, "I hope nobody else gets The Management Edge, because it's like a secret weapon, like being able to hear somebody's dreams." Dell Still, a sales manager in Oregon, says, "I used it to help deal with a subordinate who wasn't getting his work done. Usually I would go in and pound the desk and scream. But the program told me if I did that he'd just retreat into his shell."

Critics simply shrug their shoulders in disbelief. One software agent asks,"Why would a $5 million-a-year manager sit down and spend an hour with a computer that suggests how he deal with people, when it's his brilliance that got him there in the first place?" It's a good question, and some psychologists have suggested that the programs appeal to managers who, despite their high salaries, fear they are mainly information conduits rather than decision-makers.

Johnson has a different hypothesis. "The kind of person who says he doesn't need The Sales Edge is usually the guy earning $25,000 a year who's not cutting it but thinks he has all this intuitive knowledge. Two thirds of our users are owners, presidents, or chairmen. The fast-tracker always wants to learn. The loser never does—that's why he's a loser."

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Dr. Ray Fowler, treasurer of the APA and resident scientist at Psych Systems, feels these popular programs "are the worst kind of pop psychology. You might as well have do-it-yourself brain surgery. I'd rather drill my own teeth. When the professional is out of the picture, then you have trouble."

"These programs are the worst kind of pop psychology. You might as well have do-it-yourself brain surgery."

Johnson, however, makes light of such criticism. "There's nothing wrong with presenting yourself in the best possible light. These programs talk sense."

The number of psychology packages is growing rapidly, and it looks as if they're here to stay. For example, Fastware Inc. of East Orange, N.J., markets a program designed to make you think better. Named after the Norse god of thunder, Thor (or THought ORganizer), it is geared to the manager, allowing the user to amass, categorize, and connect thoughts through a technique called brainstorming.

The BHT Group, a team of child psychologists and programmers in California, is creating software for parents. The first, Discover Your Baby: Birth to Two Years, is designed for the Apple II, and allows parents to track their baby's milestones by answering questions each month. The computer then recommends activities to augment each baby's skills. Although BHT claims it doesn't want to plug into the superbaby syndrome, the package may do just that—the firm has not tested the complete program on any parent.

The list goes on. From Psycomp Self-Help Software, in Woodland Hills, Calif., comes a smattering of self-help programs to treat everything from impotence to stress, priced at $90 each. Founder Dr. Robert Reitman estimates sales of more than $1 million for this, his first year. "The big surprise response was from business," he says, "from companies wanting us to tailor programs to their own needs. I feel like Horatio Alger. I started these programs for patients and my peers, but whenever I mention them, people want to buy them."

From Lotus in Cambridge, Mass., The Idea Processor; from the University of Minnesota, MAGIE, a video-computer program used in couple therapy; from Psychological Psoftware, in Del Mar, Calif., The Dream Machine, which analyzes your dreams instantly, and Assertiveness Training, which teaches you "how to say no without feeling guilty."

It's this rush to peddle untested software that has the APA upset. As Ray Fowler says, "If my baby turns blue every morning, I don't want the computer, I'll have a doctor, thank you."

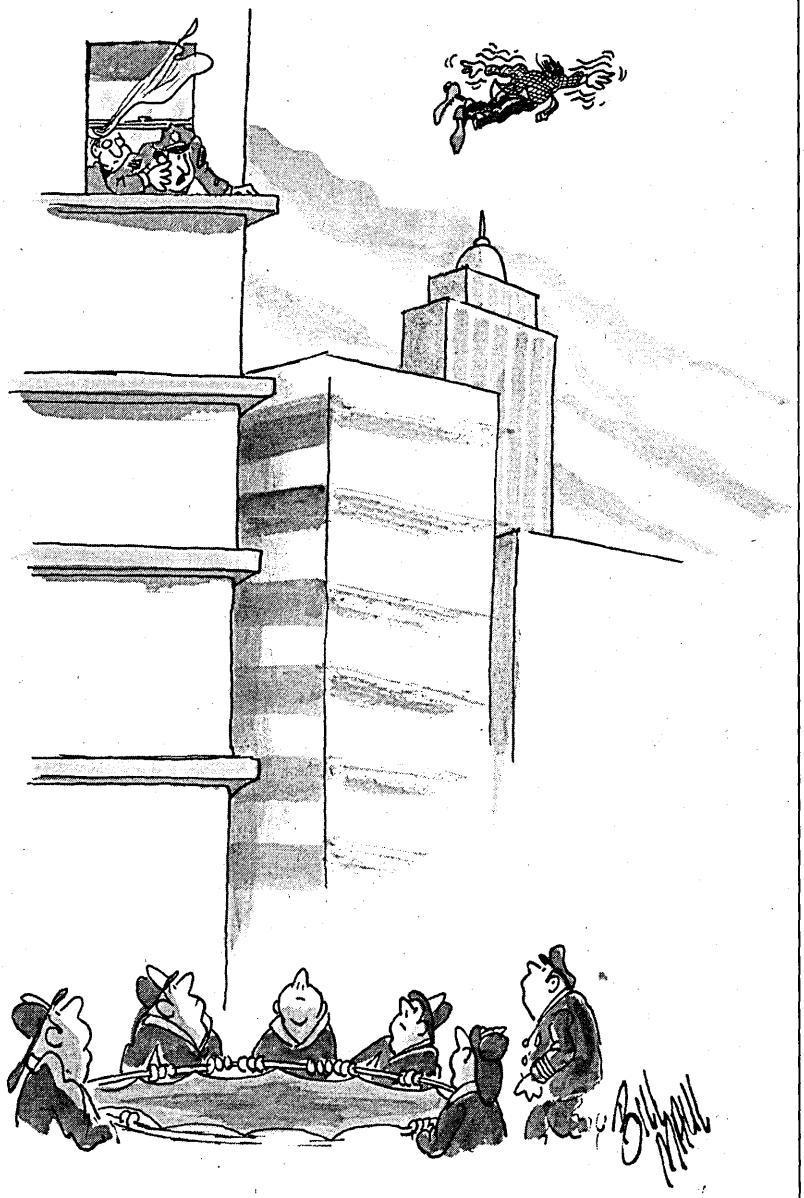
At best, psychological programs available on computer are helpful and sometimes they may prove to be superb tools. But even the best of them "are not very deep," says Marvin Minsky, one of the presiding geniuses of artificial intelligence and a professor at MIT. "An expert can sometimes get by with deep but narrow bodies of knowledge—but common sense is, technically, a lot more complicated. There is no program around today that will tell the difference between a dish and a cup."

At best, psychological programs available on computer are helpful and sometimes they may prove to be superb tools. But even the best of them "are not very deep."

That difference, which seems so simple, eludes computers—as does much of human nature.

As child psychologist Lee Salk of New York sees it, psychology software can be helpful, but "human beings are sufficiently complex to defy simplified approaches to personality analysis. Computer analysis violates the beauty of the unpredictable nature of humankind." ◉

Jill Neimark is a free-lance writer living in New York. She writes frequently on medical and psychological subjects, and just published a children's book about ice cream.



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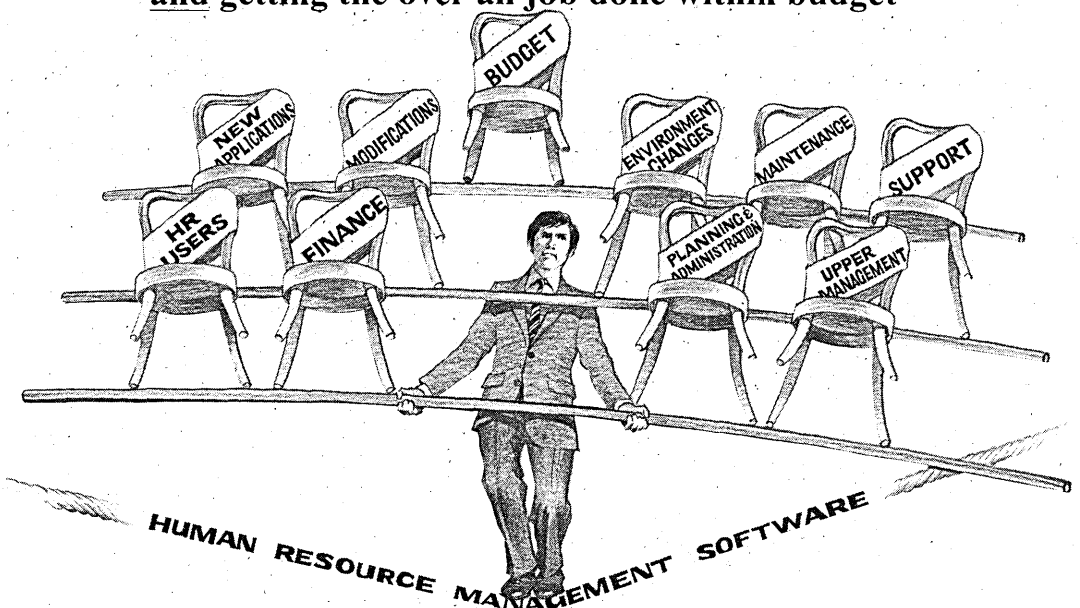

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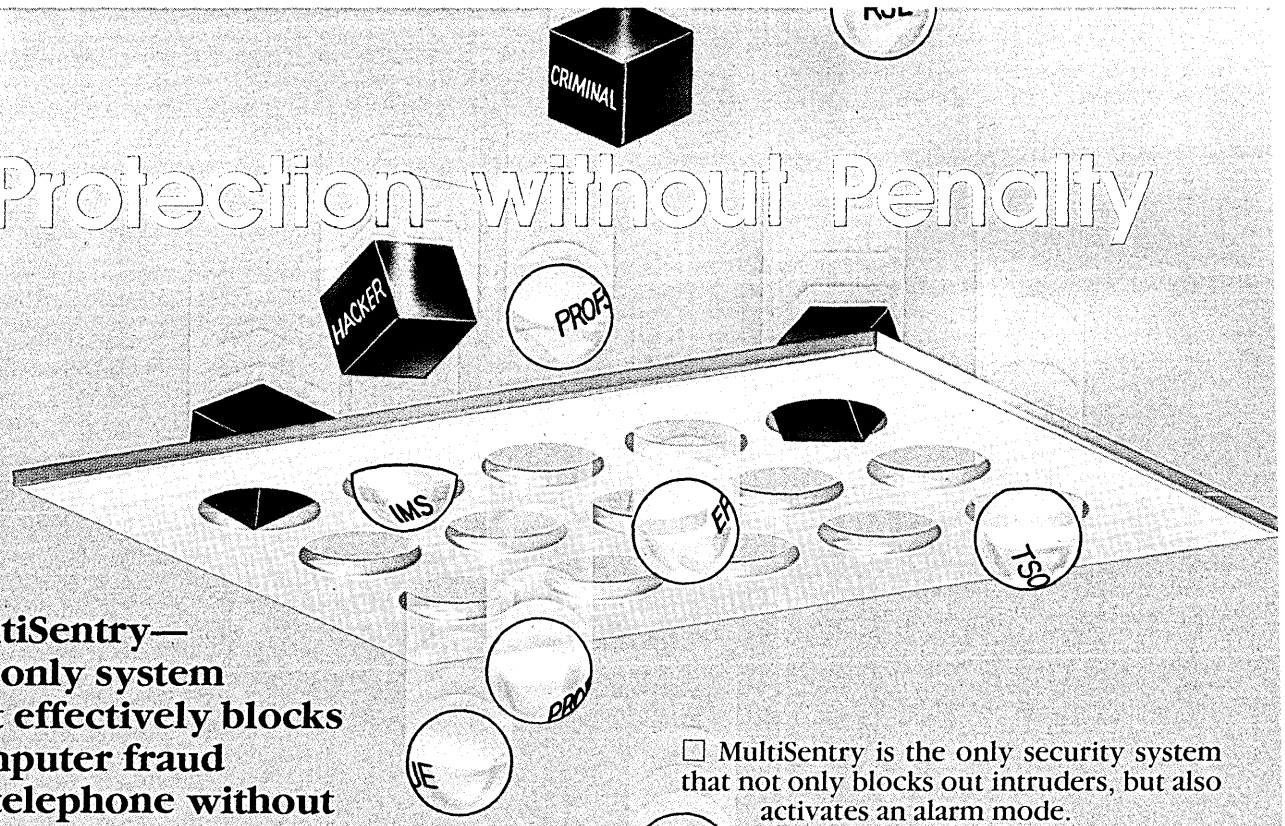

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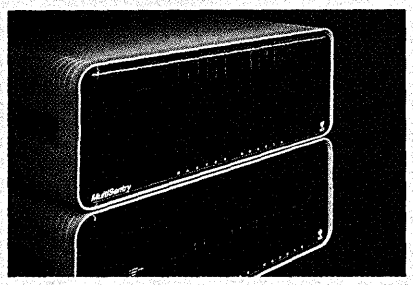

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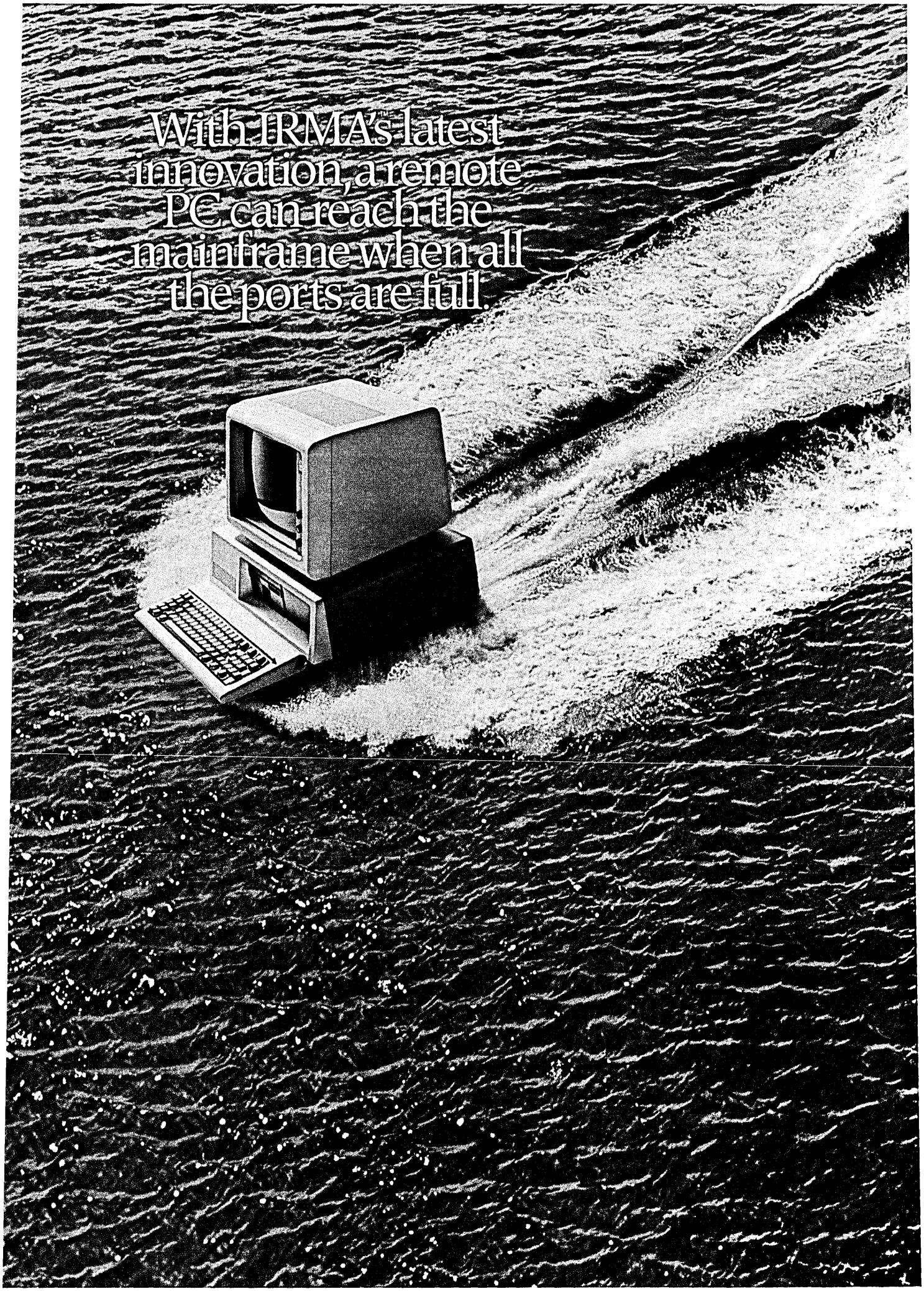
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NEWS IN PERSPECTIVE

TIMESHARING

VSPC USERS LOSE OUT

Some dp managers are going to have some explaining to do as IBM pulls the plug on their timesharing system.

by R. Emmett Carlyle

Despite its presumed obsolescence, the notion of timesharing a mainframe has a strong hold on the lives, jobs, and emotions of many big IBM customers.

To outsiders the issue of which shared cpu system is the best may seem academic in this era of personal computers for all. But to those who have invested millions of dollars and hours in IBM's centralized computer architecture, the issue of finding the correct approach to timesharing remains vital.

IBM has long enjoyed the fruits of its centralized system architecture. A base of some 8,400 MVS customers has grown up in the U.S. using the original Time Sharing Option (TSO) software. TSO takes the batch mainframe's cpu cycles and parcels them out to users individually. It has found much use in program development, but is not viewed as particularly well suited for casual end users. TSO worked quite well until the on-line population began to soar. It is now groaning under the strain and large customers have been pressing their vendor for direction on how to maintain central control in a world overrun by micros.

Unfortunately, say some customers, no such direction seems forthcoming. IBM seems unsure of the way ahead, and that uncertainty is reflected in an increasingly contradictory and inconsistent approach to the issue of timesharing, users explain. "In the past IBM spoke with one voice, but today there is no uniform response," says Wayne Pendleton, manager of technical services at American Airlines' dp shop in Tulsa, Okla. "In fact, IBM seems to be speaking with many contradictory voices. It's confusing."

A heated debate on the timesharing subject is expected at a meeting of the user group GUIDE early next month in San Francisco.

IBM told MVS customers they should migrate to a new extended release of TSO (called TSO/E Release 2) because it features a new information center option (ICO) for those wishing to create end-user database query facilities. But IBM is apparently not set on supporting TSO's evolution as much as some other software systems. As Lockheed, Burbank, Calif., pointed out (July 1, p. 46), IBM is geared instead to the creation of new applications for its VM/370 operating system, not MVS. Lockheed and others claim that more than 75% of IBM's new applications are being written for VM/CMS, an alternative to TSO. Since a timesharing operating system is merely a delivery mechanism for applications, this by itself could persuade IBM's customers that VM, and VM alone, is IBM's strategic operating system.

Another inconsistency is revealed when IBM acts as a service bureau to its customer base. Here the company is inclined to use yet another timesharing system, Virtual Storage Personal Computing (VSPC), which like TSO runs under MVS. Yet, last summer IBM shocked many large customers by freezing VSPC—"functionally stabilizing the product," in IBM terminology—and effectively denying users the chance to continue with VSPC operations in years ahead. These same customers are now being directed by IBM to mount arduous, often lengthy, conversions to TSO.

VSPC started life in the early '70s as an interactive driver for APL programs and grew to encompass other languages such as FORTRAN, PL/1, and BASIC. Like TSO, the product runs under MVS with SNA background support, but unlike TSO, it brings a personal computing dimension to the end user, as its name suggests.

"We thought it was a hell of a good product," says Alan Greene, former VSPC development manager at IBM's General Products division in Santa Teresa, Calif., talking of the software's early strategic importance to IBM. "Unfortunately, the customers didn't agree," he adds.

The total number of VSPC sites has remained a closely guarded secret. Even VSPC project managers at the GUIDE and SHARE user groups say they don't know for sure. Greene, now a market planning manager at Dialogic Systems Inc., Sunnyvale, Calif., said he knows the number but signed a confidentiality agreement with his former employer not to tell. Best guesses put the United States VSPC base at about 350 licenses, far less than the number of TSO sites.

"Unfortunately for IBM the names on the VSPC user list are some of its biggest customers," said Greene. Giants from such diverse industries as oil, steel, insurance, fast foods, airlines, and public utilities have graced the roster: Gulf Oil, the McDonald's hamburger chain, Lockheed Aerospace, Pan American Airways, American Airlines, and National Steel Corp.

"Some of these customers developed an enormous number of applications

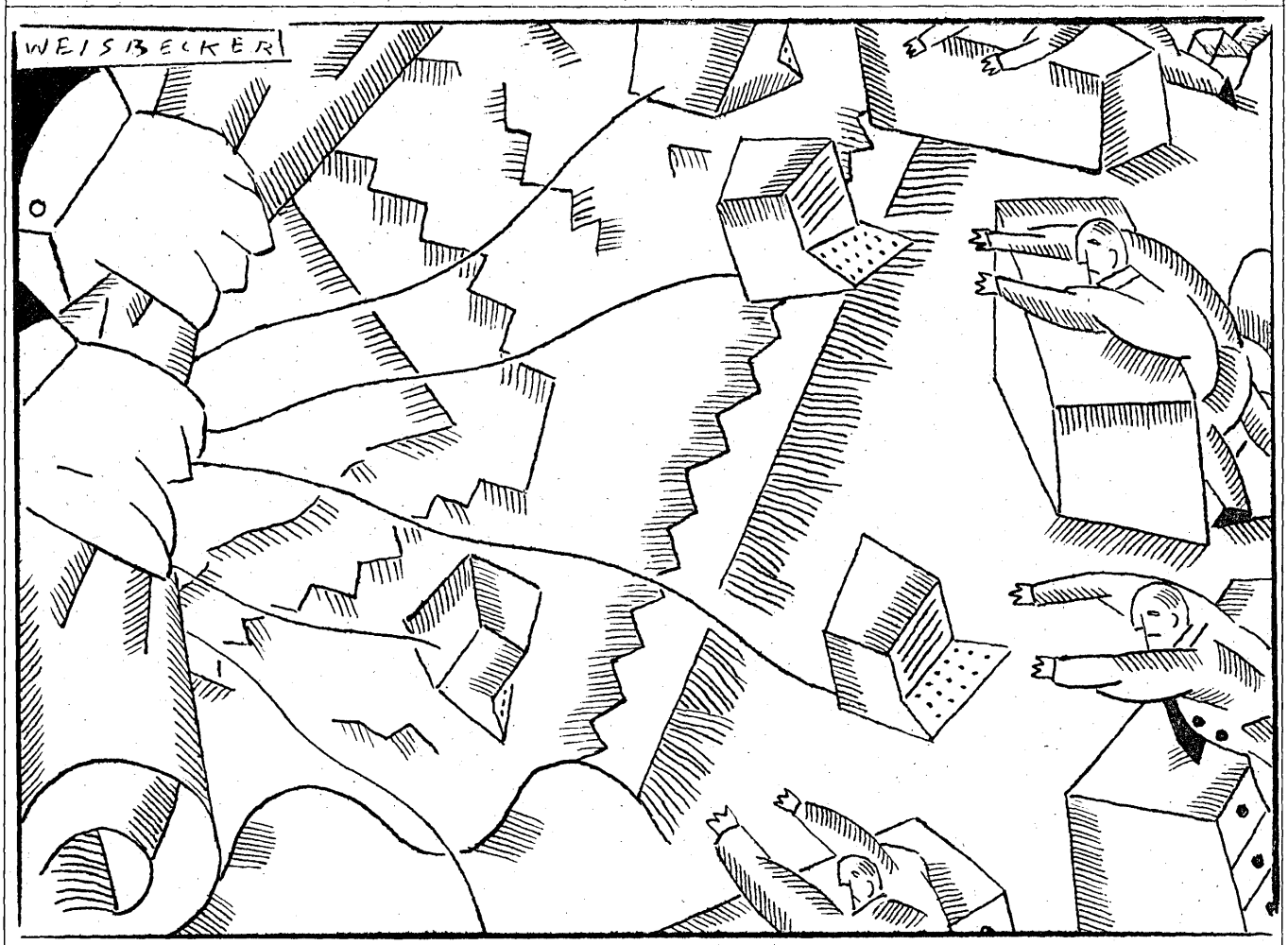

ILLUSTRATION BY PHILIPPE WEISBECKER

under VSPC. Others used only one language, usually APL," says Greene. "They have millions of dollars and man-hours invested in the product." He nevertheless defended IBM's decision to kill VSPC. "There simply aren't enough licenses to justify the resources IBM would have to bring to bear. Any customer in IBM's position would have come to the same decision," he argues.

IBM said it had polled customers and discovered that a majority of their requirements were satisfied by MVS and TSO.

"Up to a point that's true," said Richard Gravois, VSPC project manager at the SHARE user group, "except that TSO doesn't exactly satisfy our main requirement, namely, personal computing in a dp context."

The conversion effort is now under way at many user sites polled by DATAMATION. Some describe the process as "relatively straightforward," others as "disturbingly complex."

Gulf Oil in Houston is believed to be the largest conversion site, with thousands of end users, but it declined to comment.

American Airlines said it doesn't expect a difficult time changing to TSO because the bulk of its user programs are in APL. The company has secured the help of Interprocess Systems, Atlanta, and expects to be through the bulk of its migration by year-end. The Atlanta firm has supplied a file processing system, AFM, which can help convert APL programs written under VM/CMS, TSO, and VSPC.

"The majority of our cost will be in retraining 1,500 end users. TSO is not as user friendly or easy to learn as VSPC," said American's Pendleton.

The total number of VSPC sites is an IBM secret, but the best estimates show approximately 350 licenses altogether.

Sources claim that IBM dead-ended VSPC even though it learned before the stabilization was announced that VSPC was far and away the best timesharing system of the three contenders. Sources claim benchmarks were conducted on the three systems early last year at Gaithersburg, Md. It is believed the three were tested running the most popular of user applications, the APL-based ADRS (a departmental reporting system). Several customers heard about the tests and informally pressed for the findings, but the figures were never made available to them at the direction of Ron Hankinson, senior programming manager, MVS systems. (An IBM spokesman said no such benchmarks took place and none will be forthcoming.)

Rumor has it that VSPC ran eight times faster than TSO and two to three times faster than CMS in the benchmark. If these figures are true, it follows that IBM may be knowingly pushing its VSPC customers into a TSO migration that will call for a considerable amount of extra overhead in cpu and disk (DASD) capacity.

IBM didn't reveal how much extra hardware resources will be required for the TSO migration, but according to a knowledgeable source at Superior Oil, Houston, probably the second largest VSPC customer after Gulf Oil, "The answer is there in the first guinea pig conversion effort by Travellers Insurance," of Hartford, Conn.

Superior's Don Ehrig, senior systems analyst, technical services systems software and engineering group, said the "intelligence gathered from Travellers' experience has been a real eye-opener and has stiffened our resolve to stay with VSPC for as long as we can."

Ehrig, who doubles as co-VSPC project manager at GUIDE, said that as

much as two to three times more disk space could be required for TSO over VSPC. "But that's just a small part of it. We hadn't realized that such a major dataset conversion was involved. VSPC and TSO share data in a completely different way." He added that VSPC languages and compilers are different from their TSO equivalents so that difficult program conversions are required in some cases. "But the real headache will come in retraining our more than 1,500 end users to use TSO," he states.

Since IBM announced its decision to stop VSPC development, users have been particularly concerned about the way TSO uses disk storage. While VSPC is based on the Virtual Storage Access Method (VSAM), TSO uses the older and less efficient partioned and sequential

Gulf Oil, Houston, is believed to be the largest U.S. user of VSPC, but it isn't talking.

datasets, according to GUIDE and SHARE members. As a result, they claim, TSO uses up to three times more disk storage than VSPC. IBM said "no absolute data exist" on TSO disk storage vs. that of VSPC.

Not all VSPC users have as much at stake as Superior, especially those with fewer applications programs to convert and simpler system environments than the oil company.

A source at National Steel Corp., Pittsburgh, expressed the generally held view of such users. "What concerns us is not so much that VSPC has been killed—that was perhaps inevitable—but rather IBM's attitude to the migration, its lack of useful support and notice of future direction."

"At first IBM reassured everybody that VSPC to TSO would be a migration. No big problem. Now they are describing it as a full-blown conversion," commented a VSPC user in the insurance sector. Once again users are puzzled by IBM's apparent attitude. The company has stated that TSO/E Release 2 is the correct direction to go, but the minimal conversion aids so far offered to customers are geared instead to the old TSO. The IBM spokesman said the company is engaged in an "ongoing dialog" about issues concerning users migrating from VSPC to TSO.

While defending IBM's decision to kill VSPC, Greene agreed that IBM has mounted only a minimal conversion effort on its users' behalf. "It's probably on the grounds of cost and too little interest," he speculated.

IBM must also face the fact that not all VSPC customers will move to TSO if and when they move. This idea emerged from a recent survey of large VSPC sites that revealed over one third of those responding were prepared to migrate to a *non*-MVS-based timesharing system and a completely different IBM operating system for their future needs. Their alternate choice is VM/CMS. IBM recently said it plans to offer full SNA support for VM from the third quarter of next year, which will make that operating system more attractive to multisite users. In addition, VM has been steadily absorbing key elements of MVS into its Control Program, the next of which, according to sources, will be native support for shared databases under CICS.

Lockheed has proved to be the chief show site for the VSPC-to-VM/CMS approach, and has proclaimed that the two operating systems have much in common. Unlike the other VSPC sites, Lockheed has many applications programs written in BASIC, which has attracted the company to the new VM BASIC package, according to a company source.

"If you migrate to TSO you must ask, 'Where are PROFS or TIF?' " he notes, referring to IBM's VM-based office automation and decison-support systems for departmental use. It's no surprise, he adds, that VM/CMS has become the choice for emerging information center-type applications.

Emotions run high at VSPC sites, making neutral views hard to come by. In

Users claim to be upset over how little support they say IBM has provided them in making the conversion to TSO.

addition to the many dollars of development and training, some managers' careers have been invested in the system. "Even IBM is a house divided," says William McCain, a consultant and VSPC specialist in Palo Alto, Calif. "Its past and most of its software development dollars are invested in MVS/TSO, but now that the market is shifting to the real end user, IBM

BOOSTING TSO

IBM's insistence on using large batch mainframes to provide the cpu cycles for timesharing is increasingly at odds with industry trends. An unremitting decline in the cost of processing power—an average of one order of magnitude every five years—has made it possible to offload much interactive computing to microcomputers. Computing power that cost $1 million in 1973 and $100,000 in 1978 costs $10,000 today.

Three-year-old startup Dialogic Systems Inc., Sunnyvale, Calif., hopes to take advantage of the falling cost-per-MIPS and apply it to timesharing systems from IBM. Former IBM, Amdahl, and HP employees, led by onetime IBM manager Alan Greene, have created a microprocessor-based system to offload cycle-hungry TSO functions. After a preparation phase that has gobbled up $28 million in venture financing, the 150-person concern is ready to push for its first sales.

"TSO residing on the host is slow and cumbersome for the legions of applications developers who have to work with the system," Greene explains. Dialogic estimates that some 2,100 of IBM's 8,400 TSO sites use the System Productivity Facility (SPF), a full screen editor, to submit jobs and do limiting testing. Dialogic plans to emulate and simulate this SPF user interface on its own hardware, thus freeing the IBM mainframe of all editing and syntax checking chores.

"According to IBM's own figures," says Greene, "40% of a host cpu's cycles in a typical applications development environment like COBOL are used for human-intensive functions such as editing." He adds that another 44% of the total cycles were used for the COBOL compilations, "40% of which are aborted due to syntax and semantic errors."

Thus Greene and his colleagues see an offload potential of more than 50% of total cpu cycles to the Dialogic box and big savings in overhead and response time for TSO users. The company claims it has added other refinements to the SPF-like interface, including the ability to support four concurrent activities through a windowing scheme. "Though IBM's SPF offers two windows," Greene states, "only one of them works at any one time."

The company believes that IBM's 370 architecture is not suited to interactive work. Dialogic's processor is built from 35 Motorola 68000 microprocessors coupled together in a parallel processing configuration. The system sells for $200,000 and up, and connects directly to an IBM 3274 to work with any SNA terminal. Greene reports that future versions would probably include 3274 controller functions.

"We fully intend to control our own destiny and will offer complete maintenance and support for the product ourselves," Greene says. So far, the Dialogic system has been installed at five beta sites of all colors and flavors. "When we feel our support preparation is complete we'll push for acceptance. Next year, we expect to secure our first sales," he adds.

The company faces a long uphill struggle as IBM brings what Dialogic terms FUD—fear, uncertainty, and doubt—to bear. "We're flattered to have made it onto their competitive analysis hot list alongside Amdahl and the others," says Greene. "But we don't see ourselves as competing with IBM, only enhancing." **—R.E.C.**

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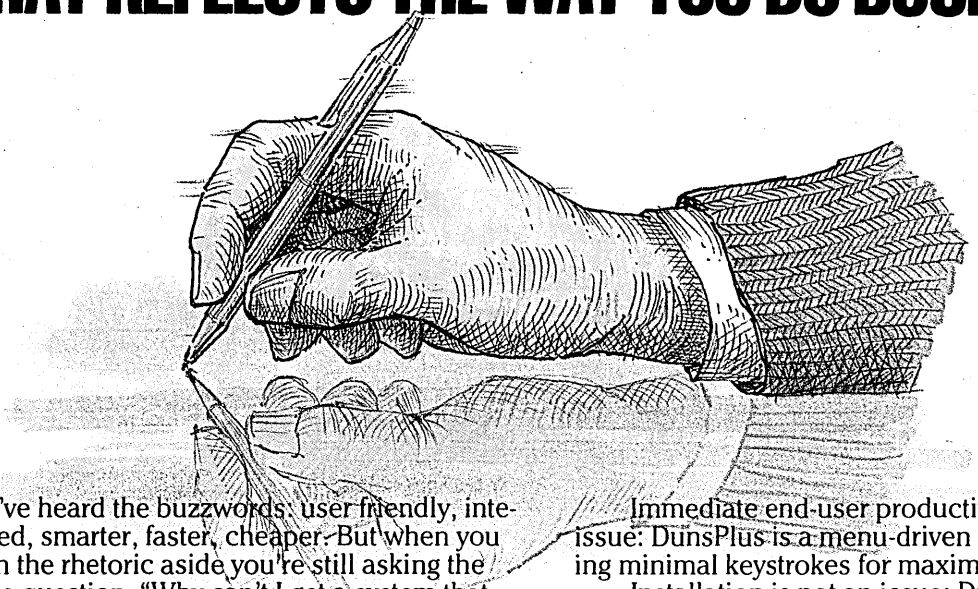

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CIRCLE 31 ON READER CARD

is coming down on the side of VM as its strategic account control weapon."

McCain adds that the debate over which shared cpu operating system is better may be irrelevant. "You don't have to be an MVS bigot or VM bigot. There's a third option: personal computers." He recalls the old, irreverent definition of an IBM timesharing system: one computer using 200 people. "It's clearly time for one person, one computer." ◉

TELECOMMUNICATIONS

THE DISASTER DOSSIER

The federal government has a secret plan for the military to take over users' computers in case of national emergency.

by Charles L. Howe

Even before the founding of Rome, governments were making secret plans for all kinds of national emergencies. Some of these plans were never used, others were broadly revised, and some became operational by military or civilian orders. Now a group of San Francisco lawyers has collected evidence that the United States has sweeping plans, in the event of of a national emergency or World War III, that would have a major impact on computer manufacturers and users.

The group, which calls itself the Bay Area Lawyers Alliance for Nuclear Arms Control, obtained some of the plans under the Freedom of Information Act (FOIA). The lawyers filed suit late last year against the Federal Emergency Management Agency (FEMA), a government organization whose duties include everything from flood relief to civil defense, to obtain further documents. Among the plans that FEMA declassified as part of the FOIA filing are:

- A scheme to requisition private property that could include everything from modems to data communication centers. A form for this purpose, originally classified secret, has been obtained by DATAMATION.
- Seizure of plants producing equipment for needed national defense when such plants fail to produce materials previously contracted. If implemented, virtually the entire electronics industry would be affected.
- The establishment of an office of censorship. Duties of this office would include censoring *all* telecommunications leaving the United States. Apparently unmindful that most international data communications are packet switched for economy and often employ encryption schemes for security, the censorship order makes it a felony "to use any code or any other device" when transmitting.

James L. Holton, a FEMA spokesman in Washington, D.C., says he cannot comment on the documents because the matter is still being litigated. He notes that one of FEMA's duties is to evaluate and coordinate federal plans and programs for ensuring the effective operation of local government during an emergency.

William A. Brockett is a former Navy officer who is spokesman for the lawyers' organization. "We are a militantly middle-of-the-road group," he says. The group is part of the Lawyers Alliance for Nuclear Arms Control, a national organization of more than 400 attorneys. Brockett's group includes a former California state supreme court justice and a former U.S. federal district judge. "Five of our board are ex-Marines," he adds. Among them is former U.S. Congressman Paul R. McClosky of California, holder of the Navy Cross, the nation's second highest decoration for valor.

Brockett says his group filed the action because it believes the public has the right to know what is being planned in the event of a nuclear attack on the United States. "The documents show plans for local senior military commanders to impose martial law if there has been a complete breakdown in the exercise of government function by local civilian authorities," Brockett says, "but no document thus far obtained describes any standard for making the determination, or for returning government to civilian authorities once the crisis has passed."

Apparently the earliest document the lawyers have obtained is dated April 4, 1980, less than a year after FEMA was created. It seems to verify Brockett's charges that the military will seize the civilian helm in the event of an ill-defined national emergency, or following a nuclear war.

The document is headed "Major Emergency Action VI: A . . . Responsible Agency: DOD." The document purports to fulfill requirements in the event of war "to restore law and order and ensure the public safety. The purpose is to maintain an orderly society so that the nation may take effective action to deal with the emergency at hand."

The second purpose is less clear. "Peacetime: Plan for action to restore and maintain law and order where it has broken down and existing authorities are incapable of carrying out these functions." This document makes it clear that the Defense Department will be in charge of an apparent military government: "To make plans: DOD; to carry out actions: DOD . . . ."

Formerly classified secret, this partially censored document establishes an office of censorship, provides for the secretary of defense to assume control over national telecommunications and of commercial radio stations in the civilian maritime and aviation services, and establishes "requisitioning authority over all telecommunications facilities subject to the jurisdiction of the United States, as described in the Communications Act of 1934, amended."

Another document appears to be a draft bill that would be presented to the House and Senate to give the President authority to have sweeping powers during a national emergency. Called the "Defense Resources Act" and nowhere mentioning a declaration of war, this 72-page document begins:

"The emergency situation confronting the United States requires that the President be authorized to act immediately to mobilize fully the nation's resources. It is the purpose of this act to provide such authority and it is the intent of Congress that the powers herein granted should be broadly construed to effectuate that purpose, but with all possible regard to the ultimate preservation of our form of government, our personal liberties, and our way of life."

This act includes sections that would allow the government to requisition and seize private property that includes factories; to solicit and, perhaps require, for government service critically needed workers, including everyone from data processing managers to programmers to circuit board assemblers; and to censor all telecommunications leaving the United States.

"No document yet describes any standard for returning government to civilian authorities once the crisis has passed."

Section 1002(a) of the act relating to censorship reads: "Any person who willfully evades or attempts to use any code or other device for the purpose of concealing from such censorship the intended meaning of such communications shall be guilty of a felony and shall be fined not more than $10,000 or imprisoned for not more than 10 years, or both; and any property, funds, security, papers, or other articles or documents, or any airplane, vehicle, or vessel, together with her tackle, apparel, furniture, and equipment, concerned in such violation, shall be for-

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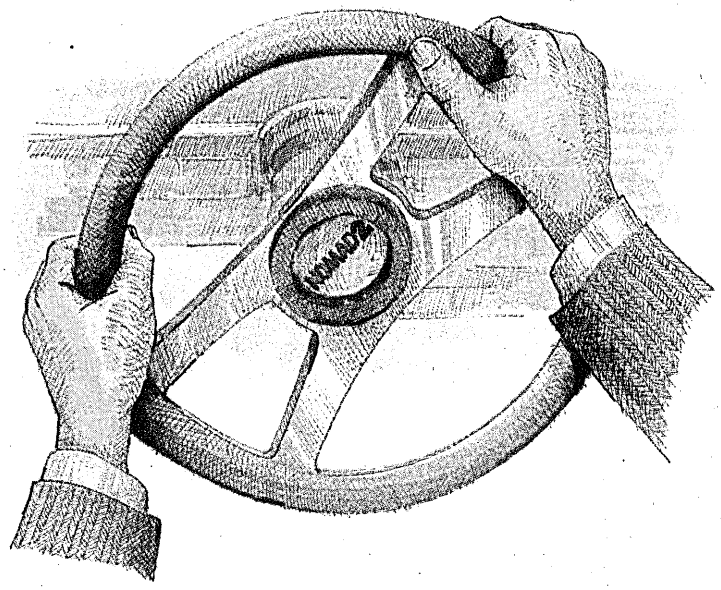

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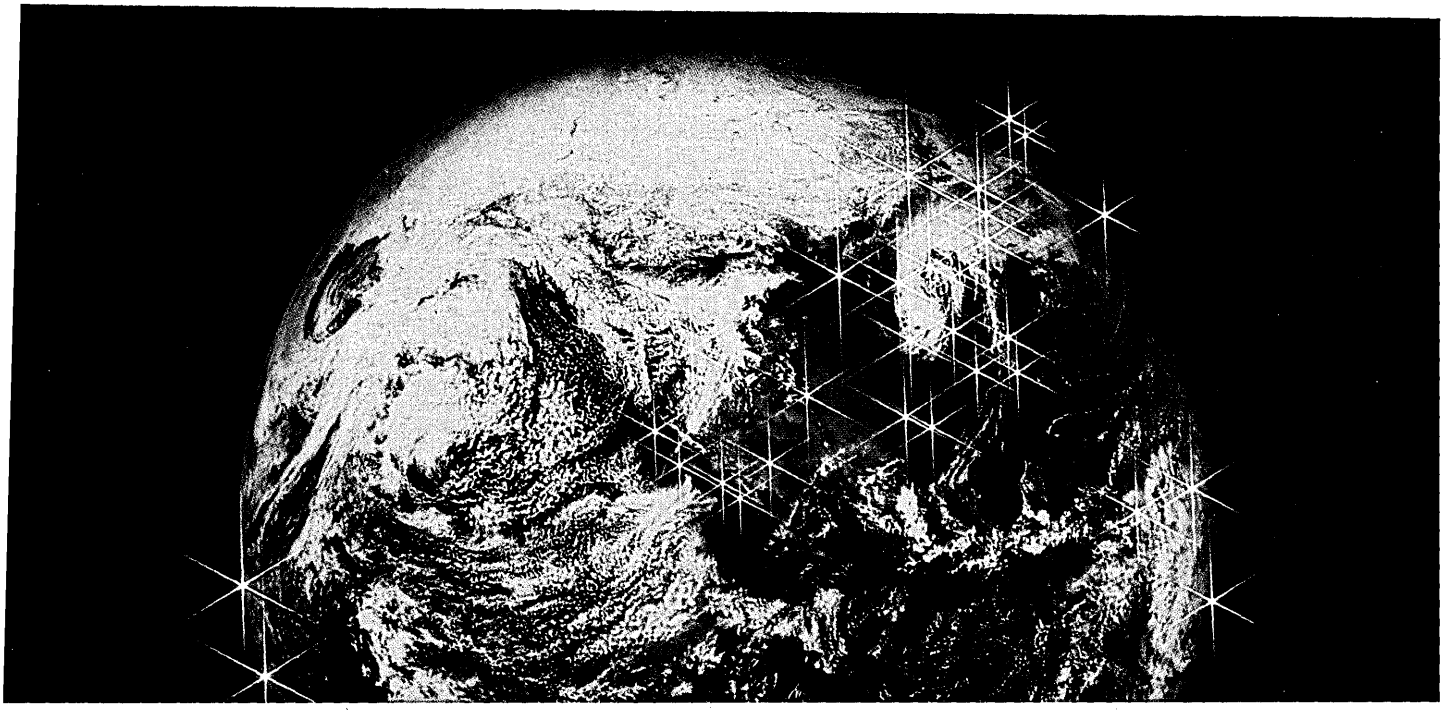

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feited to the United States."

In a declared war, all democratic governments can exercise their right to censor communication leaving their borders. This nation's last declared war began in 1941 and lasted until 1945. In those days, communications leaving the United States were by letter, radio, and telegraph. Government censors examined these communications on an "as needed" basis and a handful of international record carriers including Western Union handed over copies of cables when requested.

Since then, the data communication industry has dawned. Banks like Citibank and Bank of America routinely send long messages via packet switching, which involves a kind of encryption. Each message is broken into smaller fixed-length units called packets. Each packet is then routed through the network in a store-and-forward manner similar to message switching. The packets are reassembled at the destination node.

Likewise, many banks, oil companies, insurance companies, and other firms intentionally encrypt sensitive international messages. Some firms use the National Bureau of Standards Data Encryption Standard, developed by IBM, which uses a random 58-bit key. Others use proprietary software or encryption boxes. Finally, many users and carriers employ forms of international video teleconferencing, whose transmissions are routinely encrypted by coder/decoder (codec) devices. Nowhere does the Defense Resources Act material on censorship deal with these assorted technologies.

Pending the release of further documents—and Brockett's group returns to federal court in San Francisco Nov. 1 in an attempt to get them—it is unclear just how far along the government is in its plans for a national emergency of any sort, or just how much of a role the military will play. However, a spot check with assorted civilian data communication groups shows that the government has not made its plans known to them.

- The Bank of America has had no dealings with FEMA, and knows nothing of censorship plans of its worldwide network.
- The largest public packet-switched communications network in the United States, Tymnet, connects to some 38 countries via international record carriers, and provides host interfaces for a number of Defense Department users. "Neither FEMA nor any other government agency has told us about these censorship plans," says a spokesman for Tymnet, which is based in Cupertino, Calif., and was recently acquired by McDonnell Douglas Co.
- At press time, several other major firms gave a tentative no to queries of their knowledge of censorship, but were still checking with corporate executives for a definitive answer.

FEMA's role in telecommunication censorship, if any, would seem to run counter to a federal court order written as part of the Bell System breakup. The agency properly charged with overseeing the 22 divested Bell operating companies (BOCs) in time of national emergencies is Bell Communications Research Inc. (Bellcore), headquartered in Washington, D.C., and funded by the BOCs.

Bellcore was created by the order of federal judge Harold H. Greene, who is overseeing the divestiture of AT&T. Greene wrote in that order, "The [consent] decree requires a BOC single point of contact for national security and emergency preparedness . . . . The group will coordinate and direct, if necessary, the development and implementation of uniform technical standards and nationwide emergency plans and procedures for the BOCs."

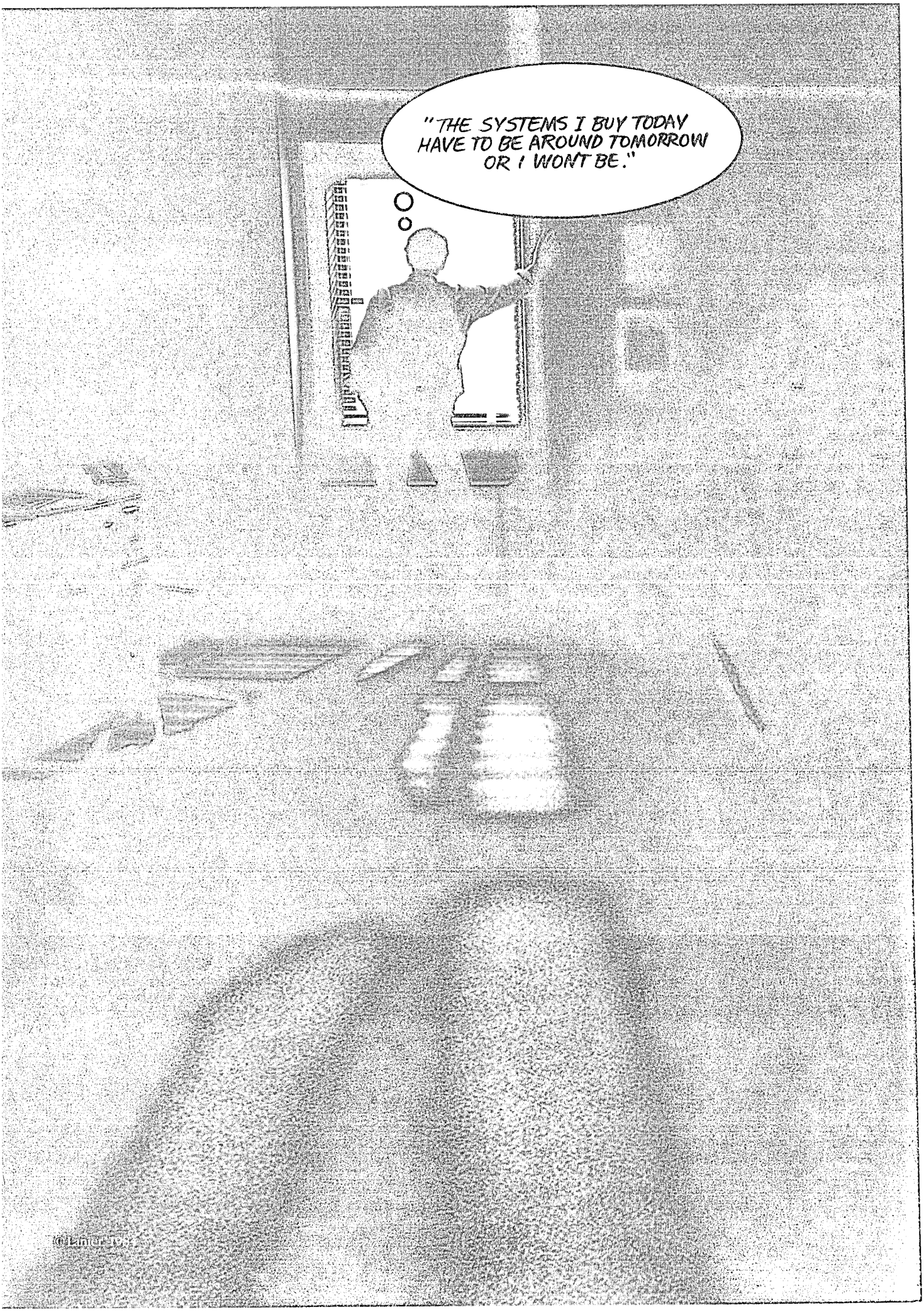
In a brochure prepared by Bellcore, that agency says, "The four major responsibilities of the Technical/Operations Liaison organization described above will require constant interfacing with agencies at all levels of government (federal, state, and local)—and with all communications industry entities—for the coordination of National Security and Emergency Preparedness emergency plans, restoration procedures, and disaster response."

Nowhere does the draft censorship bill deal with widely used encryption or packet switching technologies.

In Washington, a spokesman for the 7,000-member Bellcore says, "We have not been contacted [by FEMA] or any of those people" in connection with planned censorship.

At first glance, FEMA seems poorly prepared to act as an effective liaison between the DOD and thousands of civilian agencies. The agency was created in 1979 by President Jimmy Carter. Among other things, FEMA is charged with ensuring the continuity of government and coordinating mobilization of resources during national security emergencies. FEMA is also charged with coordinating civil emergency preparedness for nuclear attack, nuclear power plant accidents, and nuclear weapons accidents. Additionally, it administers the national flood insurance program and sets goals for the nation's defense stockpile.

FEMA's known record of performance is not unblemished. Last year the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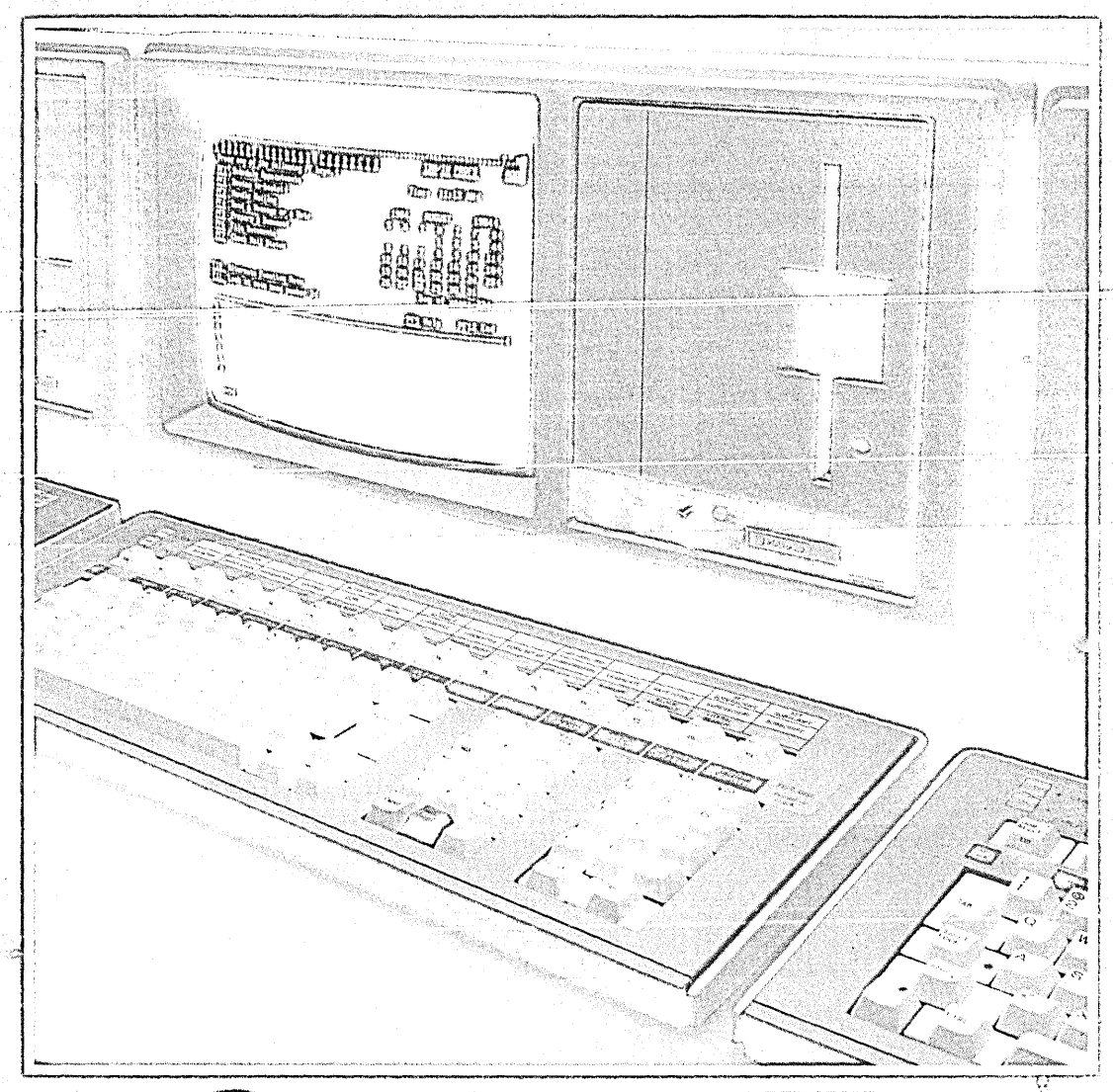

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U.S. General Accounting Office said that evacuation procedures at nuclear power plants may be seriously deficient because FEMA had not established minimum planning standards for such a contingency.

This year, FEMA was twice in hot water. Congressional investigators discovered that 667 key radio stations around the country that were sampled for emergency preparedness did not have a mandated 14-day supply of food and water on hand, and none was fitted with gear that FEMA had mandated for neutralizing the electromagnetic interference that would be a byproduct of nuclear war. FEMA's director, former National Guard general and expert on counterterrorism Louis G. Giuffrida, blamed the problems on cutbacks in FEMA funding. His agency's announced goal is to outfit, equip, and protect 2,771 radio stations by the end of this century.

The agency got yet another jolt in August, when Fred Villella, its executive deputy director, resigned after being confronted with charges of spending $170,000 in FEMA funds to buy a gourmet kitchen, wet bar, and fireplace for an office-residence. Villella was also accused of sexually harassing his security guard/chauffeur, a woman named Connie Peresada.

It seems apparent to many that, with a budget of some $181 million and a data communication network mainly limited to dial-up lines, the civilian-staffed FEMA would be unable to do much more than sound sirens and wave signal flags in the event that the balloon goes up. Would the nation then pass directly into the hands of the Department of Defense? The Pentagon has no immediate comment. ◉

ONE FOR ALL, ALL FOR ONE?

The breakup of AT&T has spurred the development of shared telecommunication systems.

by Willie Schatz

It had to happen sooner or later. Sharing, the virtue your mother always preached but you never practiced, has gone electronic.

The latest version is called multitenant shared systems, AKA intelligent or smart buildings. It's been around for a while, but no one really paid it any mind until the divestiture of AT&T. In all those years B.D. (Before Divestiture), someone every so often got the idea that one telecommunication system for all was a much better way to conduct business than every company for itself. But, like Big Brother, AT&T was always there to crush the idea.

"One of BOMA's [Building Owners and Management Association] members in Atlanta applied to put a shared system in his office," says Gardner McBride, executive vice president of BOMA. "From the chairman's office in New York, AT&T denied him that opportunity."

That wouldn't happen today. Now, in these halycon days A.D., there's not much the phone company can say. No one has to ask it for permission anymore. In fact, the phone company's service lately is among the reasons why tenants think getting together is better than ever. "The telephone system is working less and less," says Howard Frank, president of Contel Systems in Great Neck, N.Y. "As the infrastructure breaks down further, a shared systems property becomes more attractive."

But, tenants aren't the only ones attracted to shared systems. The guys who build and the guys who rent are rapidly becoming more and more interested in the subject. And they're not turning theory into reality to be Mr. Nice Guy. They're only looking at one line—the bottom one. They see big bucks there. Maybe even megabucks.

They've got some numbers behind them, too. According to Jerry Lucas, president of Telestrategies, a McLean, Va., research and consulting firm, 18 million square feet of office space were equipped for shared services in 1983. That brought in $135 million. But in 10 years that could be peanuts. Lucas forecasts 320 million square feet of shared systems space in 1992 and revenues of $10 billion by 1994. He estimates that profits could range from 50 cents to $1.50 per square foot.

"The economy of sharing has always been there," Lucas says. "It was made practical by long distance resale, which started in 1981. The multitenant business would have happened without divestiture, but it wouldn't have exploded like it is now. It's beginning to be thought of as a standalone business."

And he says, customers are listening. "The multitenant business is being helped by the boardroom perception that the phone company is slow and unresponsive. Now, multitenant is an easier sell."

Well, maybe. It usually is an easier sell, at least to small- and medium-sized companies. For those organizations, a multitenant system offers economies of a scale that are simply not obtainable if the company tried to cut its own deal. Other benefits include the speed with which the service is established, the ability to add enhancements, the reliability of the system; the improved service in comparison with the phone company's track record, and the ability to complain to the landlord if the system goes down. One call solves all.

But that's not all, folks. The shared system user parts with only a minimum investment in return for an advanced communication system. That user also can obtain simultaneous voice and data transmission, reduced long distance costs due to the increased volume, and possibly a local area network.

"It's great for medium-sized offices," says Jeffrey Held, staff consultant for Network Strategies of Burke, Va. "In fact, it's perfect for them. That's probably 75% of the market."

"The multitenant business is being helped by the boardroom perception that the phone company is slow and unresponsive."

And the other 25%? They're a much tougher sale. Large companies often have their own telecommunication systems and don't want to share them with anybody, be it a tenant in the same building or the provider of the building's telecom system. They're not about to give up the network for which they worked so hard and spent so much.

But that doesn't mean the big boys aren't trying to get their share of the business. United Technologies and AT&T Information Systems (AT&T IS) jointly want to offer building management services, including communication, to these very same multitenant buildings. AT&T IS would supply the PBXs, most probably the System/85, while United Technologies would take care of mundane matters like elevators, heating, and air conditioning. But the FCC has put the venture on hold, citing Computer II's prohibition on AT&T IS's reselling of most private line, or basic, service. AT&T IS has asked for a waiver. It's still awaiting the FCC's answer.

Another major player is Olympia and York, the largest developer of real estate in North America and the second largest landlord in New York City. Its wired offspring, OlympiaNet, will eventually connect Olympia and York's 23 buildings in nine cities. That means that when tenants therein want to make a phone call, they won't have to worry about either the local or the long distance phone company.

Developers and owners might do themselves a large favor by learning some lessons from the "smartest" building in the country. Planning Research Corp. (PRC) claims its McLean headquarters

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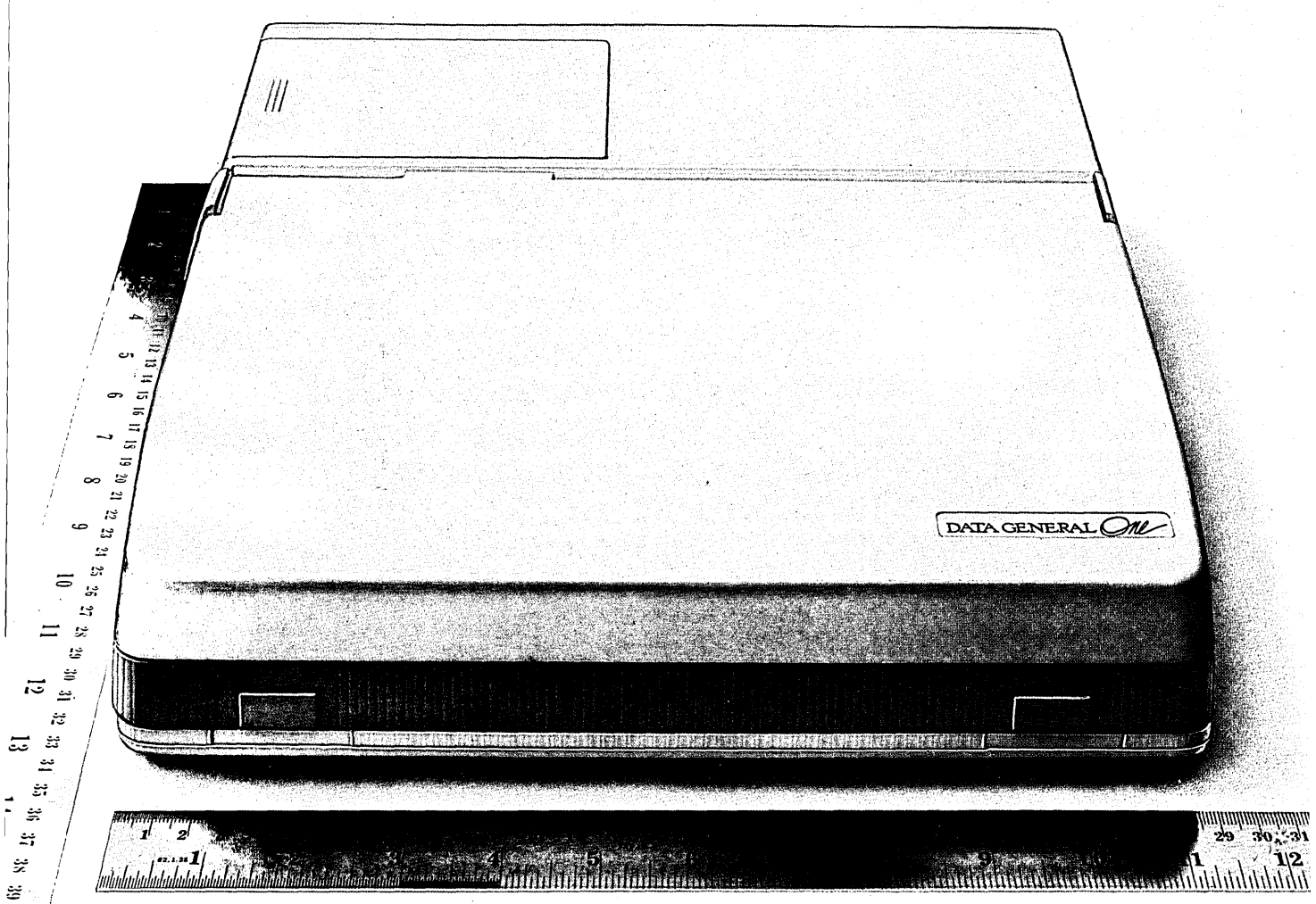

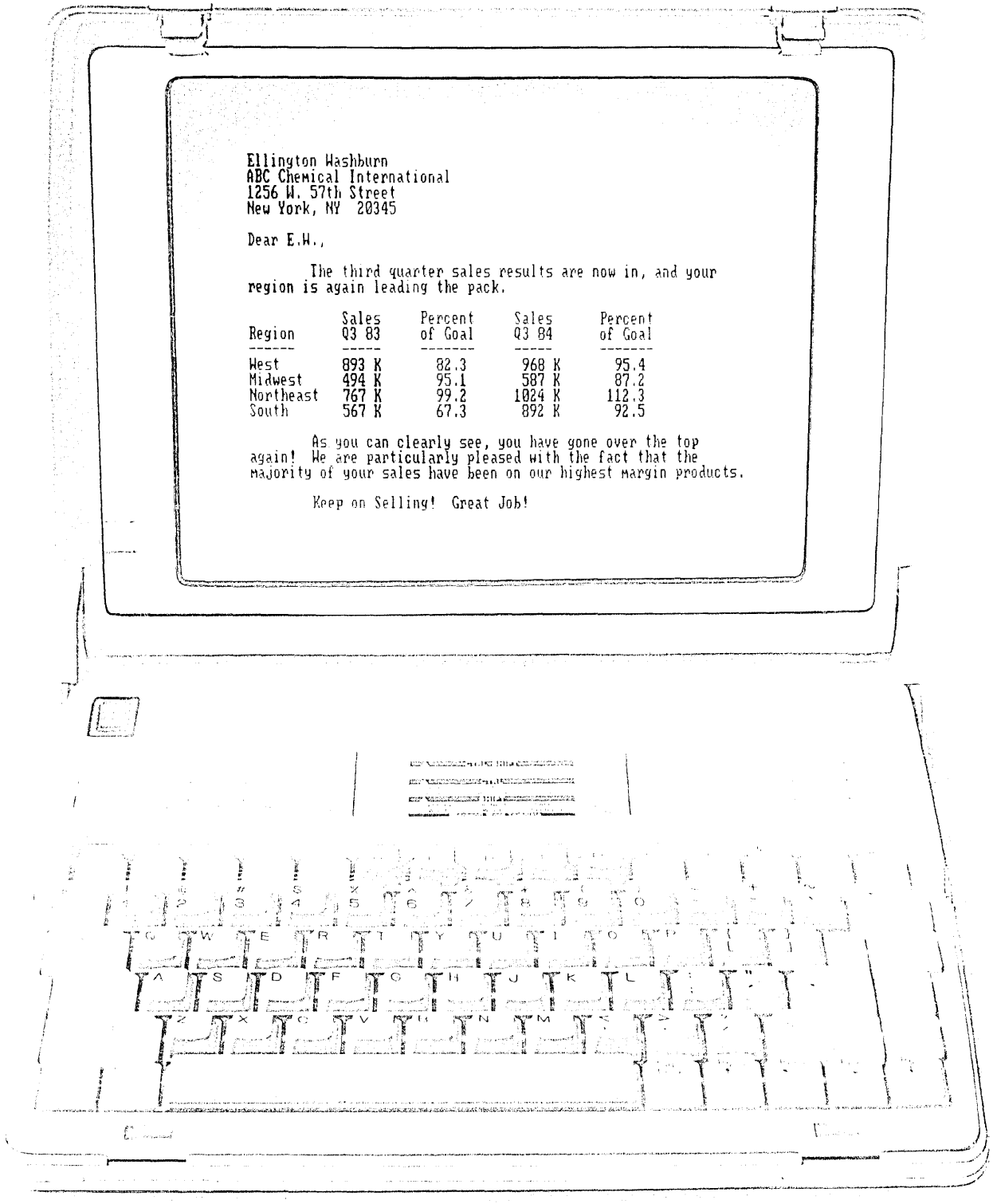

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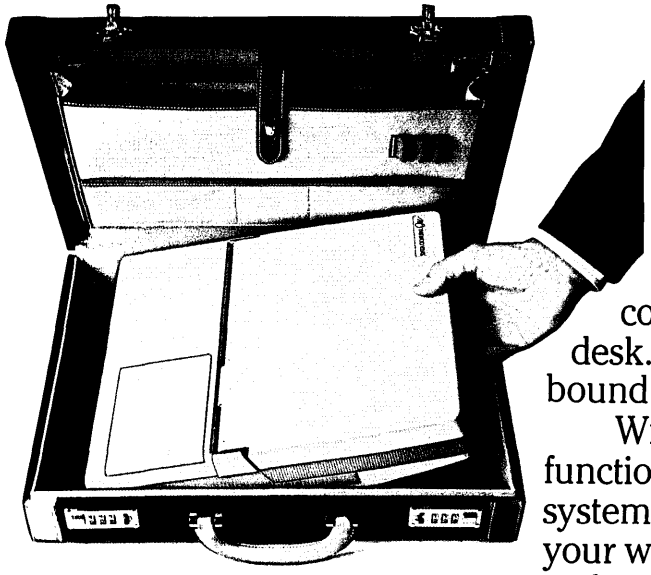

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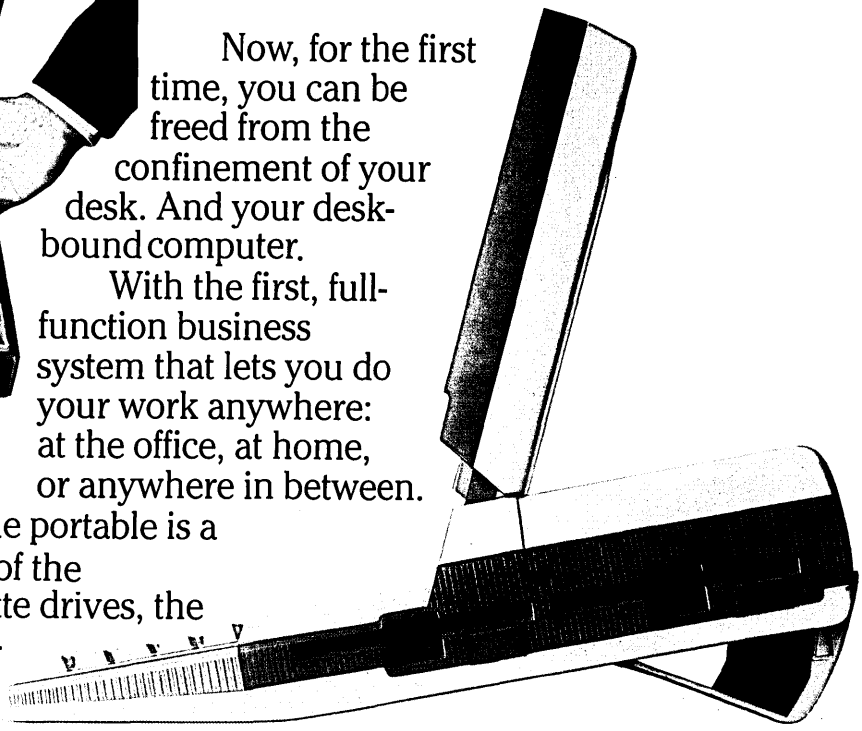

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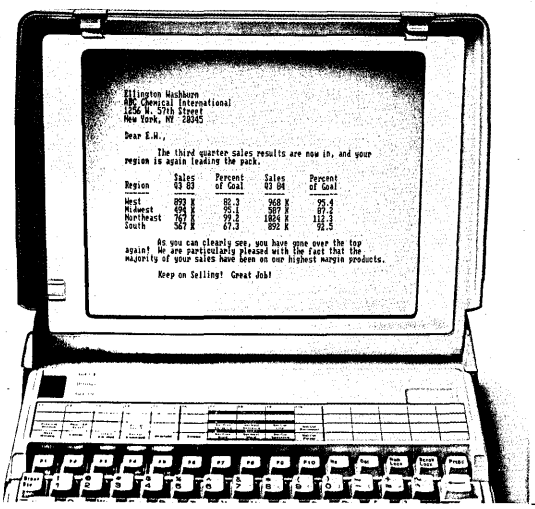

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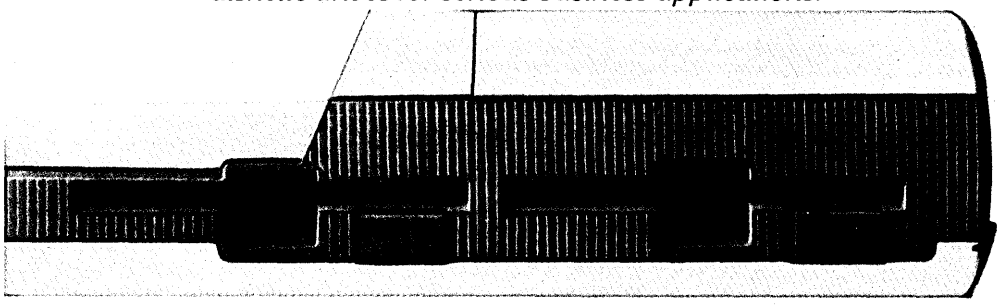

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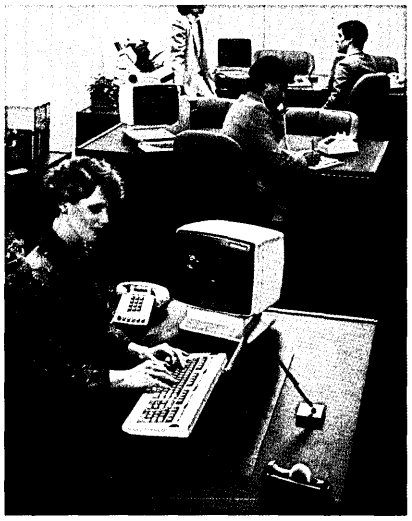

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meets that description. It certainly has given new meaning to sharing. Even your mother wouldn't have taken it this far.

PRC, a consulting and engineering firm, moved into its building in June 1981, and sublet extra space to tenants on short-term leases. But the tenants are getting much more than square feet. What's PRC's is also theirs. That means a total telecom system, including a message center, call detail reporting, and automatic route selection. It's all based on a Northern Telecom SL/1 VLE stored logic, 1,500-line digital switch. But PRC also throws in use of the cafeteria, art department, publi-

Planning Research Corp. says its Virginia headquarters building is the "smartest" in the country.

cations department, print shop, jogging trails, and locker rooms.

"The benefit is simple. It's a revenue producer," says John Daly, PRC's telecom manager. Daly is also president of the newly formed Multitenant Telecommunications Association, whose almost 50 members include AT&T IS.

"Every amenity we provide to our PRC employees we also provide to our tenants," Daly explains. "The messsage center saved us $250,000 in hardware costs. Our tenants helped defer the cost of that. They also enjoy an economy of scale not realizable if they purchased a system on their own. And they don't have to put in the time and effort to buy their own system. It also makes the building much more attractive for possible resale."

No one is quite sure just how many smart buildings exist. Daly contends his is unique. BOMA's McBride says there are not more than 60 buildings committed to a shared PBX, and no more than 30 of those are working. Telestrategies' Lucas claims there will be 140 buildings operating by the end of this year, 290 by the end of 1985 and 6,000 by 1994.

Will there be enough people to fill them? That is the question that shared systems can't quite answer yet.

"I think this is mainly hype to get the real estate value of the buildings up," Contel's Frank contends. "The real estate people don't know telecom. They're completely at the mercy of the vendor. The tenant's not getting a local area network. The owner's only providing him with a chance to get a piece of the PBX. I can't see data communication users gaining anything over the next decade through shared systems."

Users may be losing right now. Not all shared system projects are going as smoothly as planned. Suppose a vendor and owner don't get along? What happens when a tenant decides that it does indeed want to go its own way? What if an owner miscalculates how many tenants will subscribe? What about obsolescence? Like the Long Island Expressway, telecommunication systems these days are outdated almost as soon as they're built.

Thus the tenants may be getting more than they bargained for. In trading control over the system for the security blanket of not having to worry about it, tenants are often subjecting themselves to the whims of the owners. Owners are responsible for the success or failure of a particular system—and, in fact, for the ultimate success or failure of the entire concept of shared systems.

"There are pros and cons to shared systems," Frank says. "There is value in the concept. It's a nasty environment out there, and it's getting nastier. People don't need that hassle. You're trading control for security."

Nonetheless, he says, "the whole thing is being oversold. The owner wants to spend a minimum on communications, then sell for as much as possible. All the owners are really giving the tenant is basic telephony over the next decade. And there are some regulatory issues that haven't been decided."

"Tenants are always at the mercy of the owner," Held contends. "An owner is going to be leery of any customer that wants to change what's already in place,

In trading control over the system for the security of not having to worry about it, tenants are subject to the whims of the owners.

because then he loses control. It all comes down to management. Owners and developers aren't ready for the demands of users. But there will be a substantial market for shared systems in small- and medium-sized firms, as long as the first few people don't get burned. It's likely there will be screw-ups."

There already have been. But, undaunted, shared systems proponents roll on. They claim to have seen the future, and they say it comes from sharing. "It is the new business of the office of the future," PRC's Daly says. "Because of sharing, you can have a feature-rich office you couldn't afford otherwise."

"As a shared user, you pay no more for an advanced system than you would individually for a lesser one," says Ray Loffler of OptiCom, a Richmond, Va., telecommunication consulting firm. "You get more for your dollar. It's not the cure-all for everybody's communication system. But everyone should look at it and consider it as an option."

Then they just have to decide if they're into sharing. ◉

COMPUTING IN BRITAIN

ICL LTD. JOINS STC LTD.

The merger of two British companies will create a $2.6 billion competitor to IBM Europe.

by John Lamb

The craze for mixed marriages between computer and telecommunication interests has now hit Britain, with the merger of International Computers Ltd. (ICL) and Standard Telephones and Cables (STC).

The wedding, which carries a $540 million tab for STC, will create a $2.6 billion revenue company employing 50,000 people and selling mainframes, office automation, telephone switching, radio, semiconductors, and cable.

STC, which is one third owned by ITT, the U.S. conglomerate, launched a surprise bid for ICL this July, snapping up 10% of ICL stock in a dawn raid on the London Stock Exchange and making a confident bid for the rest. After token resistance ICL accepted a share swap offer worth $540 million. The British government has decided not to take action under U.K. monopoly law, but in return STC has persuaded ITT to reduce its stake in the company. Before the bid, ITT owned 35% of STC. The takeover itself will reduce the holding to around 26%, and ITT has agreed to reduce its interest to under 25% over the next seven months, thus losing an affiliate company.

The move is designed to protect STC's government business and to prevent charges that a foreign company is interfering with a strategically important British interest. Under British law anyone with more than 25% of a company is assumed to have a "material" interest in it.

Originally, ITT had begun to buy shares in an attempt to keep its holdings at just 30% after the takeover. But it was thwarted by the government issue. STC hopes to sell System 12, ITT's main telephone exchange, to the British PTT.

ITT is no stranger to such arguments. It originally acquired STC—or the Western Electric Company, London, as it was then known—in the 1920s after AT&T sold off overseas interests, including STC, in return for being allowed to establish a regulated U.S. monopoly. More recently, it has been ITT's turn to sell off the company, a process which began in

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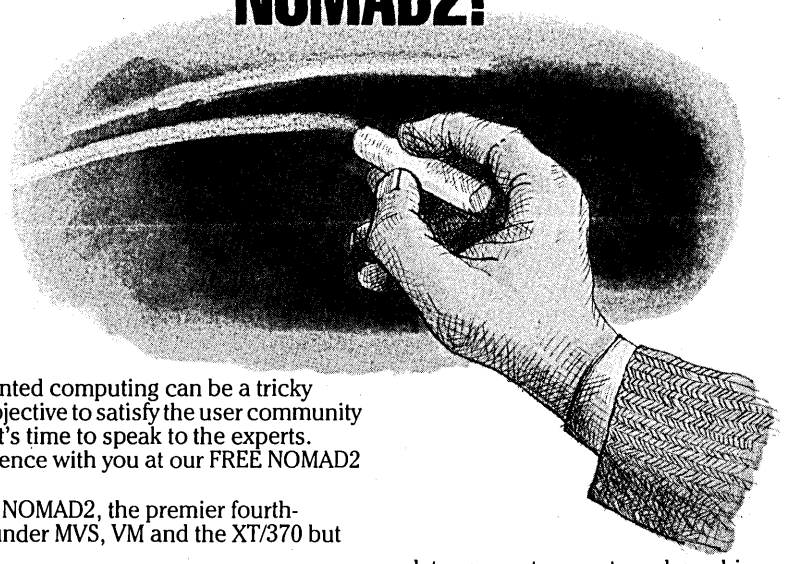

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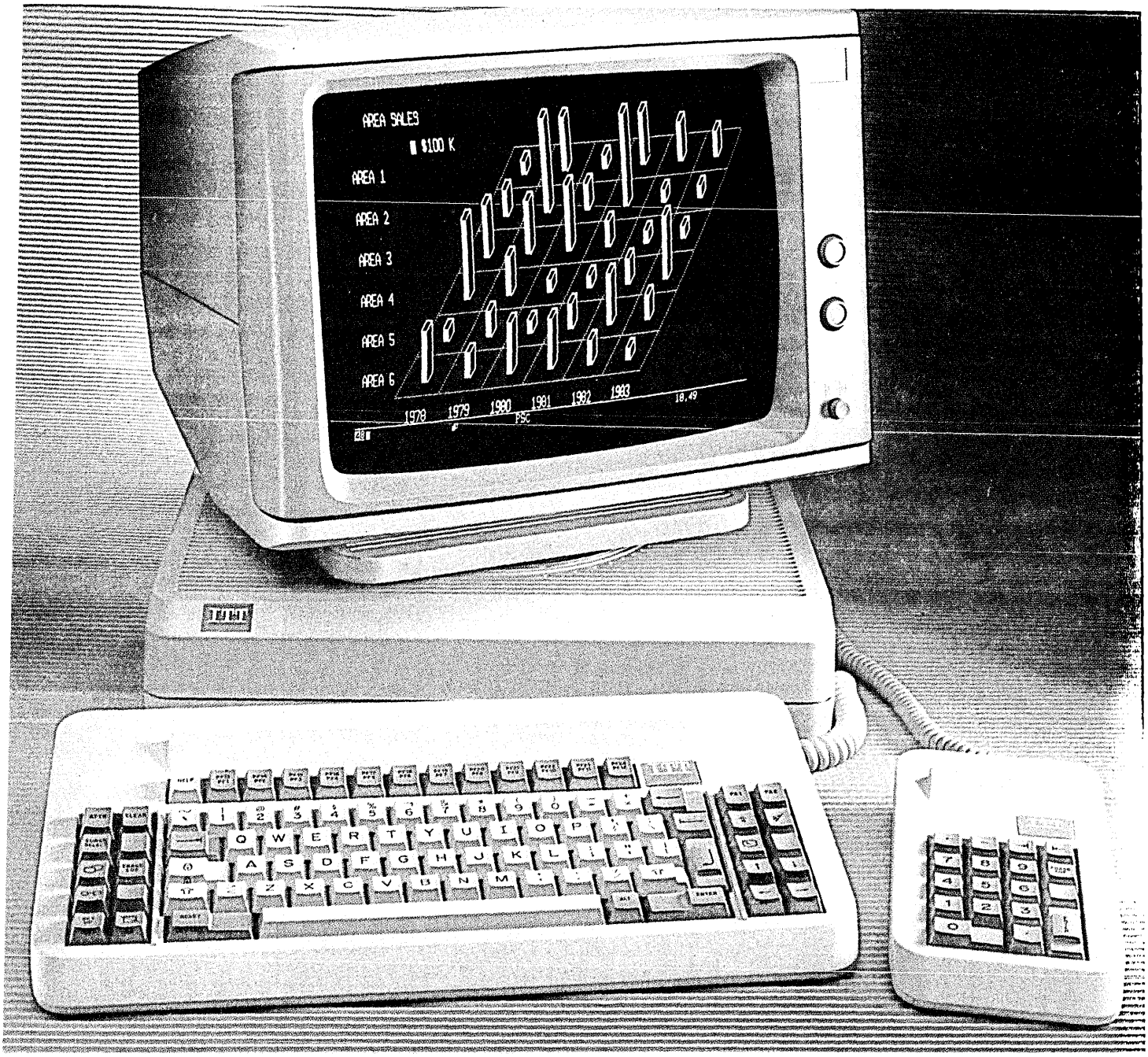

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1979 and was completed in 1982. ITT did this to give STC a freer hand with government orders, according to ITT boss Rand Araskog.

STC chairman Sir Kenneth Corfield describes the ICL merger as "an extraordinary match. There is no product in ICL which conflicts with one of our own," he maintains. City of London brokers have been more cautious, questioning the cost of a cash settlement that STC is offering as an alternative to the share swap.

"We've been wondering about the advantages of the deal," says Philip Augar, investment analyst with brokers Wood, Mackenzie. "Our analysis suggests that STC's telecom side is running out of steam and ICL has tax losses that could be useful to STC in the longer term."

The main money spinner for STC is a telephone exchange called the TXE4. But

STC chairman Sir Kenneth Cornfield describes the merger as an "extraordinary match."

orders from the local PTT British Telecom for the exchange will have dried up by 1987, costing STC at least $32 million in profits. Augar expects ICL with its handy tax losses will help plug the gap.

ICL, which has been struggling back to health after a disastrous start to the decade, is expected to cash in on STC's guaranteed markets. "We buy the industry convergence argument," says Augar, "and believe ICL has a better chance with STC."

So far ICL's return to profitability has relied heavily on collaborations with overseas firms. ICL has marketing and technology transfer agreements with Fujitsu of Japan, Mitel of Canada, and the Pittsburgh-based Perq Systems. Fujitsu is by far and away the most important partner since future ICL mainframes will rely on processor boards and chip know-how supplied by the Japanese company. Fujitsu has played an important part in the design of ICL's DML (due for launch early next year) and Estriel mainframes.

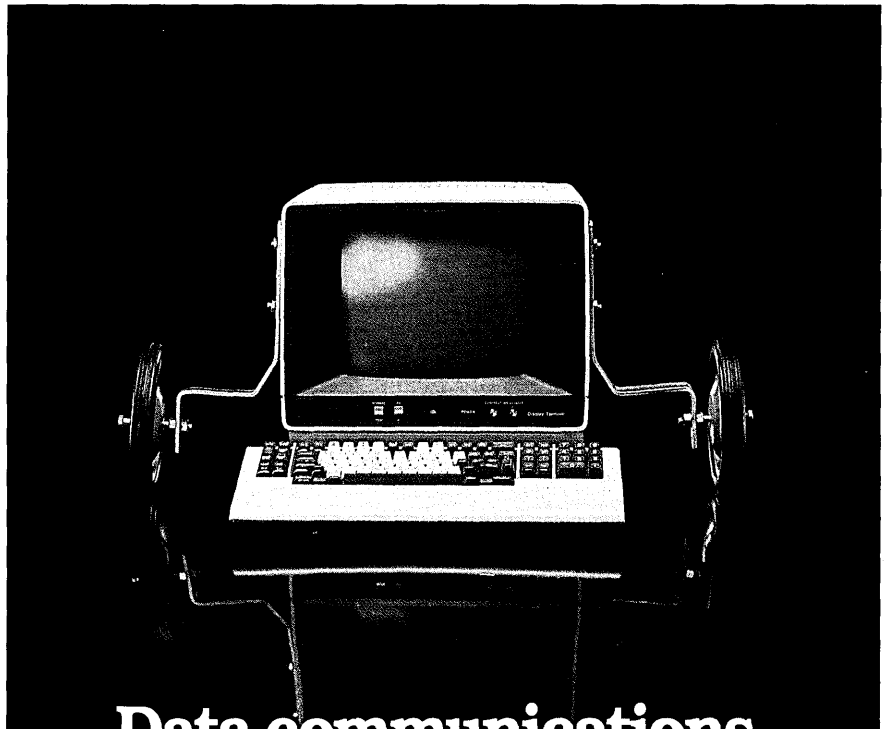
The big question is whether the takeover by STC will affect the existing agreements on mainframe development. ICL has managed to renegotiate the deals, which last until 1991, with Fujitsu. Fujitsu had the option of calling them off if more than 20% of ICL was sold. ICL, however, is reluctant to reveal whether the deals remain the same. "Fujitsu has been a priority for us," is all it will say.

What has worried ICL most is STC's connection to ITT. Until 1982 STC was not only an ITT subsidiary, but also the company's main research and development arm. STC's Harlow laboratory still carries out contract research for ITT. Would Fujitsu accept the risk of its technology ending up in American hands?

At STC, Sir Kenneth Corfield says he expects all the ICL tie-ups to continue. He maintains that ICL will operate as an autonomous company within STC, and its research and development will not be part of exchanges of technology between STC and ITT. Equally, Sir Kenneth goes out of his way to play down the importance of mainframes at ICL. "Mainframes are immaterial to us," he comments, although 40% of ICL's revenues still come from large machine sales.

ICL, meanwhile, remains remarkably tight-lipped. "We regard ourselves as being in information systems rather than mainframes," says a spokesman, adding that the collaborations will "continue as before." At press time ICL stockholders had yet to formally accept the STC offer. "Legally the two firms are separate, so there is little we can do in planning before the shareholders meeting," comments the spokesman.

Important changes at the top of ICL have, however, already taken place.



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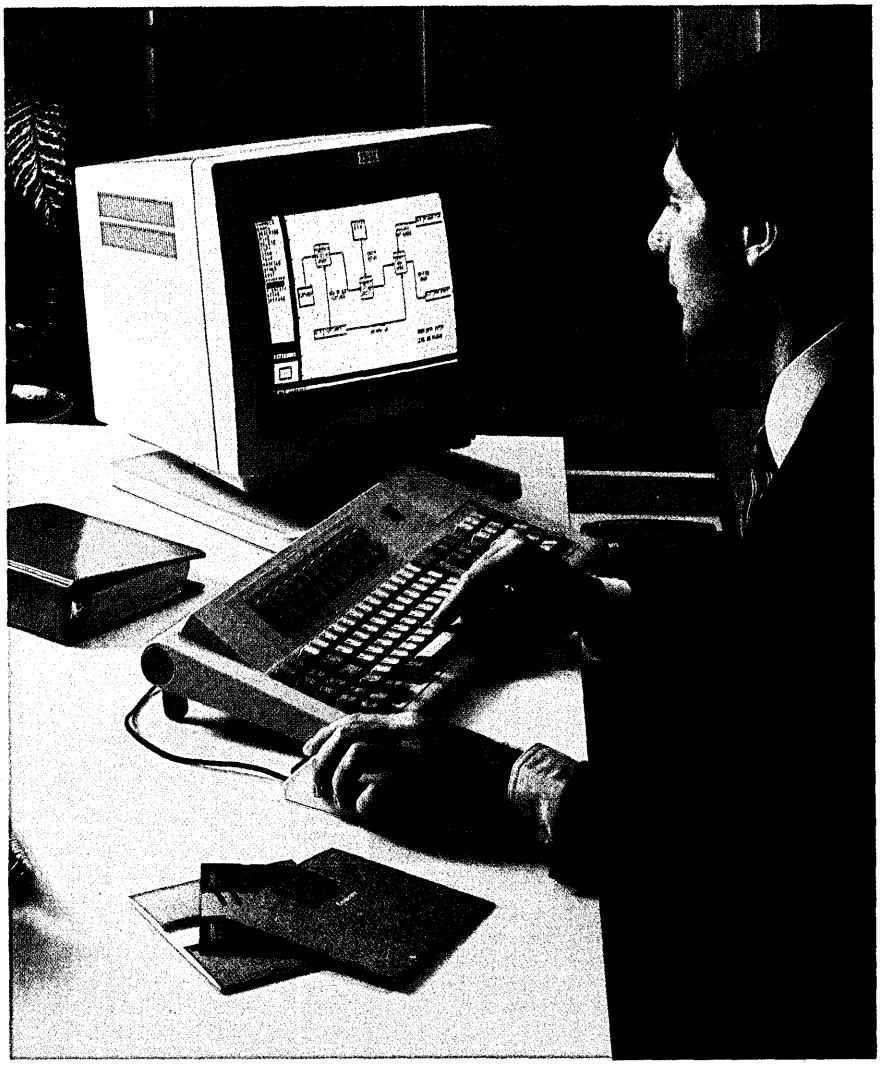

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NEWS IN PERSPECTIVE

Out goes chairman Sir Michael Edwardes, who only took up the job in April and was expected to give ICL a cutting edge, and in his place comes Robb Wilmot, the present managing director. Edwardes, with whom STC says it has had "friendly relations," could receive close to $900,000 in share options and outstanding contract payments. ICL's new managing director is Peter Bonfield, a marketing man generally regarded as a go-getter.

One group keen to get answers from ICL on a number of points is the ICL Computer Users Association. In general, John Atkin, chairman of the ICL CUA, welcomes the takeover, since he believes STC cash will enable ICL to produce a stronger product line. "We are very interested to know which STC equipment is incompatible with ICL kit and to what extent ICL's product line will be depleted," says Atkin.

Despite Sir Kenneth's claim that there is no overlap in products, the two firms do have competing lines at the lower end. STC sells a range of IBM-compatible terminals, a telephone terminal called the Executel, and the ITT Xtra microcomputer, which is STC's major offering in office systems. In the longer term STC has plans to build a PABX-based office automation system called Basys from some of these products.

ICL, on the other hand, has a micro from British company Rair, and a multiuser system of its own called the DRS 20. Last year the company also won approval to connect the DNX 2000, a Mitel PABX, to public lines. In January ICL plans to launch the One Per Desk, a low-priced terminal incorporating Sinclair Research television technology.

"Our only worry is that STC will knock the ICL pc on the head," says Atkin. "I'd keep the IBM-compatible stuff going as a separate enterprise and stick with ICL for multi-user systems."

So far, ICL users have had no official news on what effects the takeover will have on ICL products and services. At press time they were waiting for a meeting with the company. But Atkin dismisses the idea that any reorganization would affect ICL customers: one of the attractions of ICL for STC is its 17,000 strong sales and support team. "It probably won't worry us very much," he opines.

What does worry Atkin personally is the role of ITT with its three directors on STC's board. Although Sir Kenneth claims that the takeover was set in train without direct consultations with ITT executives, Atkin believes ITT may well make its presence felt. "There is always a danger that ITT will interfere," he says. "If you've got a third of the shares and three members on the board there is al-

ways a temptation to interfere. I would personally be very glad if ITT wasn't involved."

It is a fear that is shared by the U.K.'s Labour party. The opposition party's leader Neil Kinnock sees ITT and IBM as "fighting for effective control of European telecommunications," and he criticizes the government for running down its support for ICL "at a time when the company needs at least as much support and active partnership from government as other governments provide to its international competitors."

STC, which was on the acquisition trail for most of the last year and has been stalking ICL for the past three months, has no doubts that the creation of a company with a foot in each camp is good for the country. "I think it would be extremely good if Britain had another company the size of British Telecom or GEC," says the chairman. "Without a large company we are just going to sink, sink, sink."

In short order STC has bought a communication company, International Aeradio (IAL); announced plans for semiconductor manufacturing; and completed several smaller deals. The company also has its eyes on an American acquisition.

STC has been growing rapidly. Between 1982 and 1983 revenues increased by 50%, with almost one third of sales going to British Telecom. STC's strong links with PTTs should benefit ICL, which is also moving into networking. ICL employees welcome the deal, at least those who have shares in the company do. "Morale is high," says one. To many, STC's move is a mark that Wilmot has at last succeeded in putting the firm back on its feet. ◉

SINCLAIR GOES AI

The man who brought you the $50 computer is aiming high with his next round of products.

by John Lamb

Sir Clive Sinclair, Britain's king of the cheap home computer, plans to extend his kingdom to include so-called fifth generation computing. The mercurial Sir Clive, whose ups and downs as an entrepreneur have kept U.K. industry observers entertained for more than 20 years, is combing Britain for design talent in chips, computer architectures, and software. These he needs to help in the construction of artifi-

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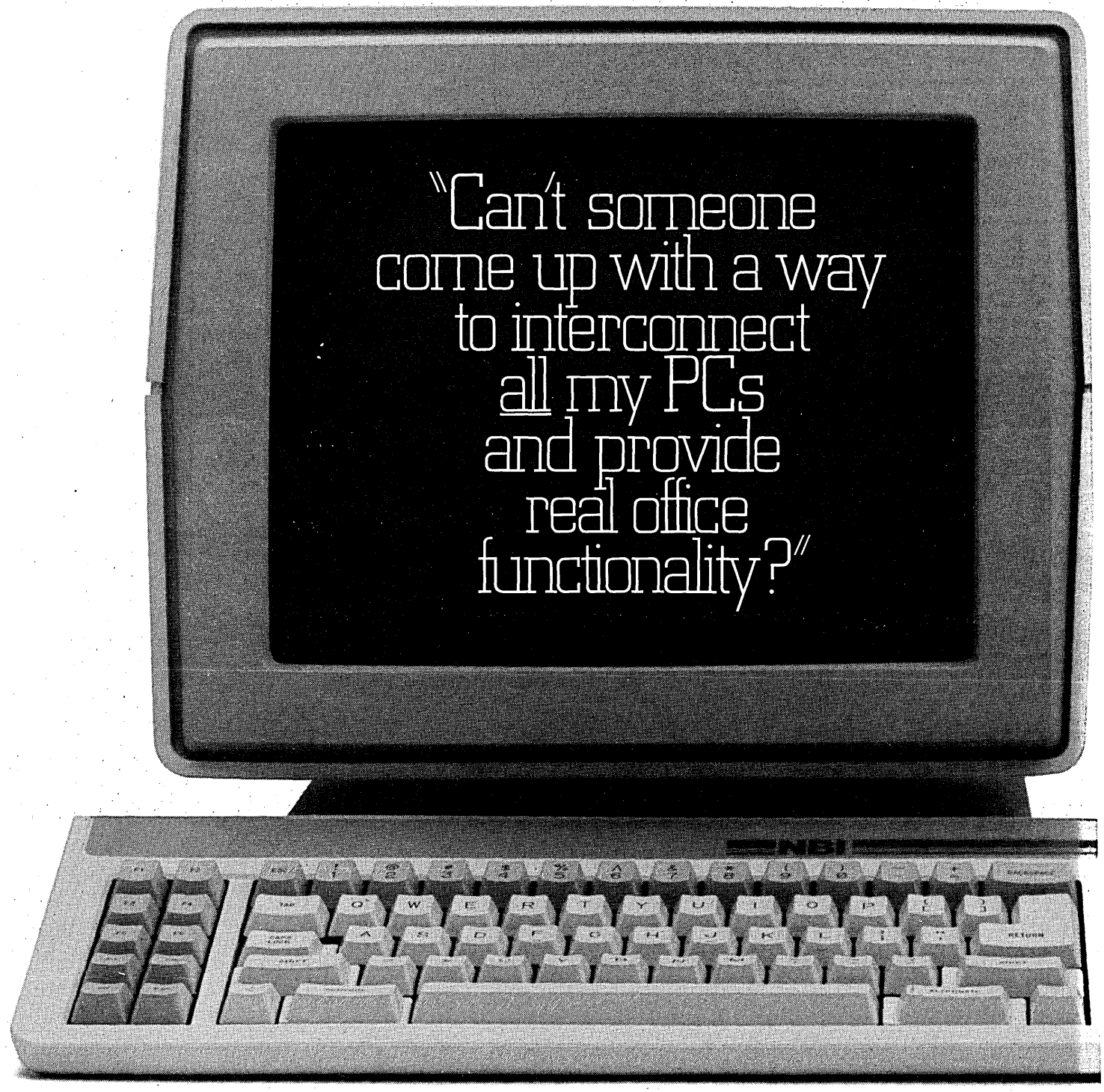

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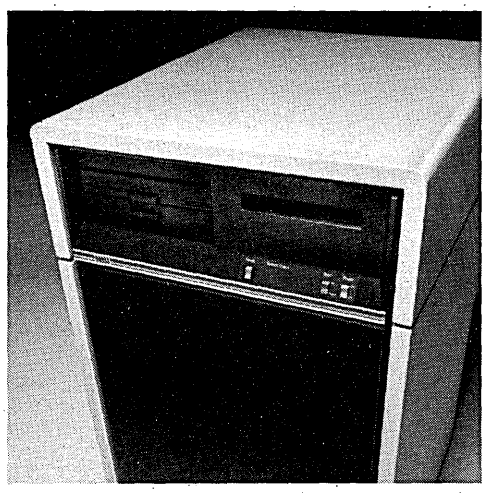

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OFFICE AUTOMATION SYSTEMS

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cial intelligence systems, which could include expert systems, speech processors, home robots, and powerful desktop machines that incorporate parallel processing.

Spearheading this effort is MetaLab, a wholly owned research center set up a year ago in the university town of Cambridge. There, Sinclair Research has assembled a team of 45 researchers who are working on new product development in partnership with universities.

The first products from MetaLab will be wafer-scale integrated (WSI) memory and processor chips. The size of silicon wafers that are normally sawed into many smaller devices, the chips would give better performance than batteries of individual chips laid out on printed circuit boards. Sir Clive is following in the footsteps of Dr. Gene Amdahl, whose Trilogy Ltd. has already spent $300 million on the technology, to little effect.

Catt's idea is for a chip that operates in a serial mode, stringing memory cells together in a chain-like shift register.

Such big chips pose problems for designers. Current semiconductor manufacturing processes are not reliable enough to produce unblemished wafers, so ways must be found to identify and isolate damaged circuits. Moreover, the massed circuits produce much heat, as much as 1,000 watts per wafer, which calls for new cooling methods. Amdahl thought he had both problems licked, but has had to lower his sights severely.

"I don't know enough of the details of what is happening at Sinclair to comment on its chances of success," says Amdahl. "All I know is there are a host of problems in a great many areas of this technology, but I am certain there is a chance for success."

Organizing the large team of researchers needed on an ambitious wafer-scale integration problem is the biggest headache Trilogy encountered, says Amdahl.

Despite the tribulations of other firms involved in WSI, such as Trilogy and Texas Instruments, Sir Clive is joining the ranks of systems builders Hughes, McDonnell Douglas, and Burroughs, and remains undaunted. "Wafer-scale isn't a game for children," he says. "We have an immense knowledge of integrated circuits at MetaLab."

Sinclair Research has hired Malcolm Wilkinson, an ex-Burroughs man who worked on the U.S. company's wafer project. The company has also bought the rights to a wafer-scale memory chip patented by a Briton named Ivor Catt.

Catt's idea, dating back to the late '60s, is for a wafer-scale memory chip that operates in a serial mode and is literally created from those cells of silicon that work after the wafer production process. After manufacture, a chain or so-called spiral of working memory cells is created by testing each cell and then linking those that work to each other. The chain creates a large shift register from which data is retrieved serially, in the same way as from a magnetic tape.

Unfortunately, the memory has a slow access time, around 10 microseconds, compared with a few nanoseconds for fast dynamic random access memory. So, Sinclair Research can use the technology to produce only a half-megabyte memory chip next year as an add-on to its current pc, the QL. He calls it the silicon Winchester, and claims it will cost his company 40% less than trying to provide the same storage with conventional chips.

The spiral memory was first dreamed up by Catt over 15 years ago, but until Sinclair Research came along he had been unable to interest anyone in the idea. The invention was scrutinized in the late '70s by Dr. Michael Lea of Brunel University on behalf of the Department of Industry. "At the time, our findings were basically favorable, but we advised against investing in the idea, because the semiconductor industry wasn't ready for such a quantum leap," says Lea.

Apart from the memory chip, MetaLab is also working on a microprocessor of comparable physical size that will incorporate parallel processing techniques. Lea of Brunel is himself designing what is called an associative processor in which arrays of processing engines cooperate on different parts of some overall processing task. He is pitching for a company contract for a separate undisclosed project.

Sir Clive says that combining processor and memory on the same chip is vital for the development of fifth generation architectures. "Wafer-scale integration is not an act of faith with us. Thanks to all the work done in this country, we have a world lead." He believes that the move into components is vital for Sinclair's survival as a computer company.

Sir Clive is confident enough of his firm's semiconductor know-how to contemplate building at least one chip plant to feed its growing appetite for components. An announcement is expected on this piece of vertical integration early next year. Wafer research and plant could cost Sinclair Research a cool $70 million. Sinclair himself says he plans to spend millions of pounds on the projects. Beyond that there is the development of a parallel architecture machine, which may be four to five years off, and the development of applications for it.

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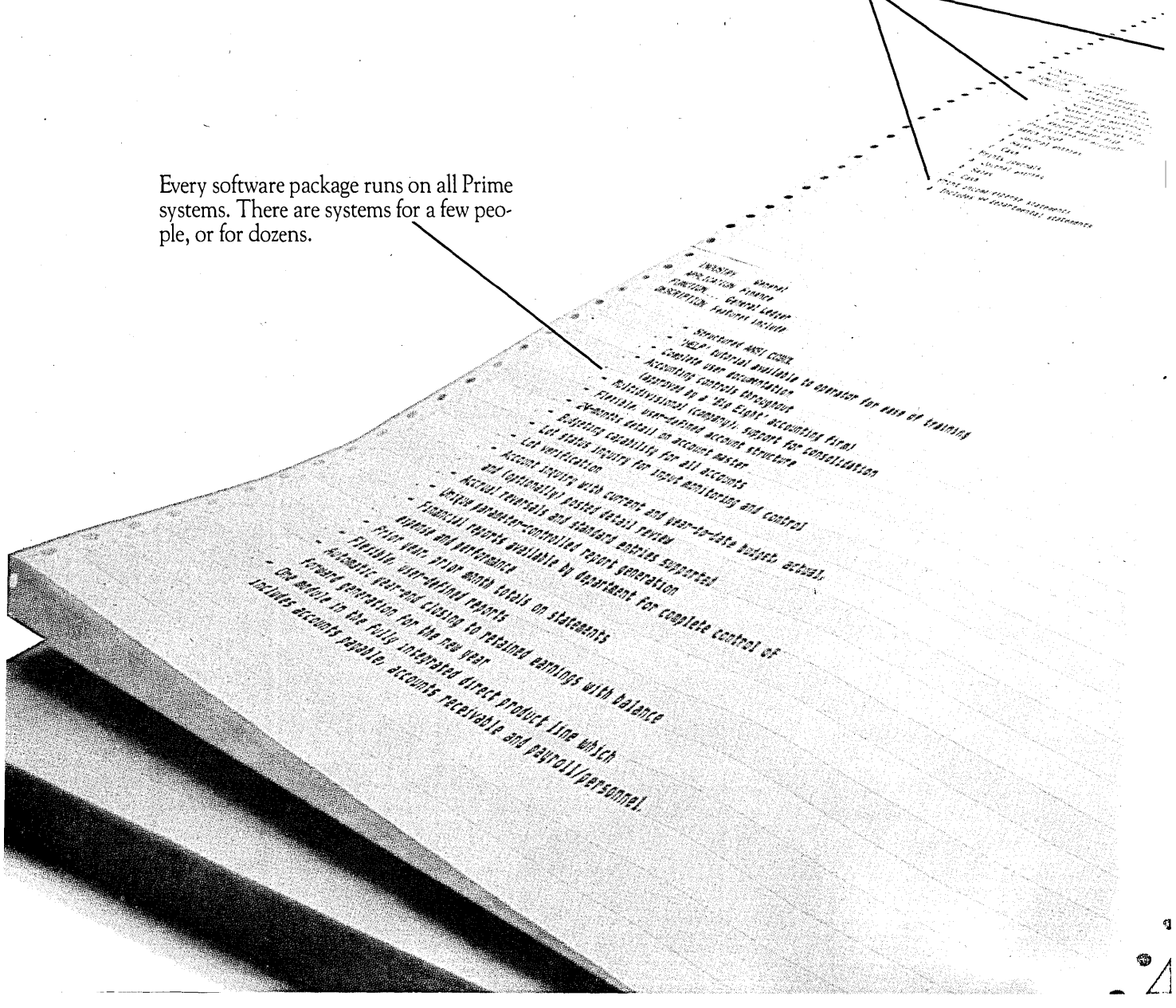

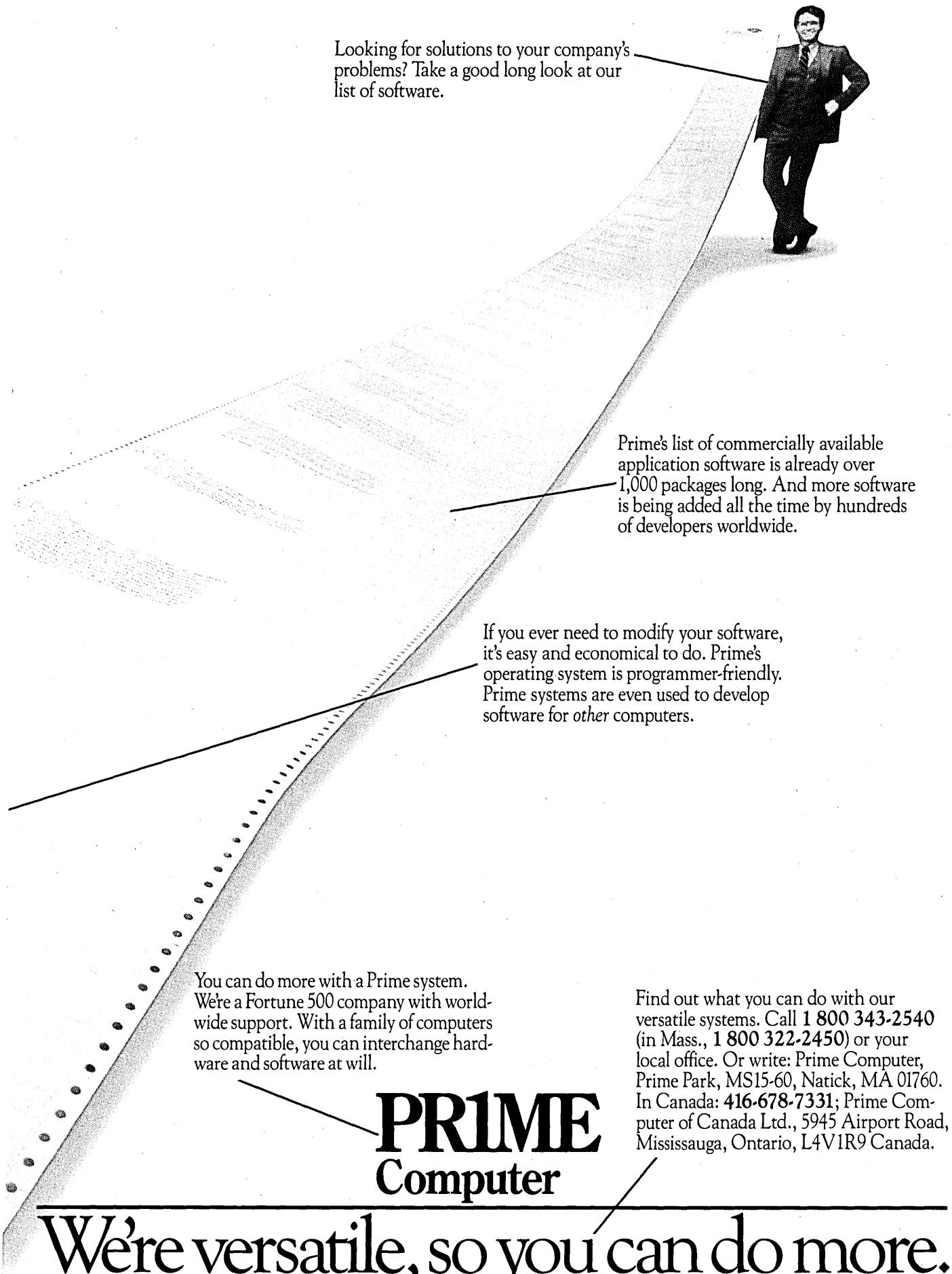

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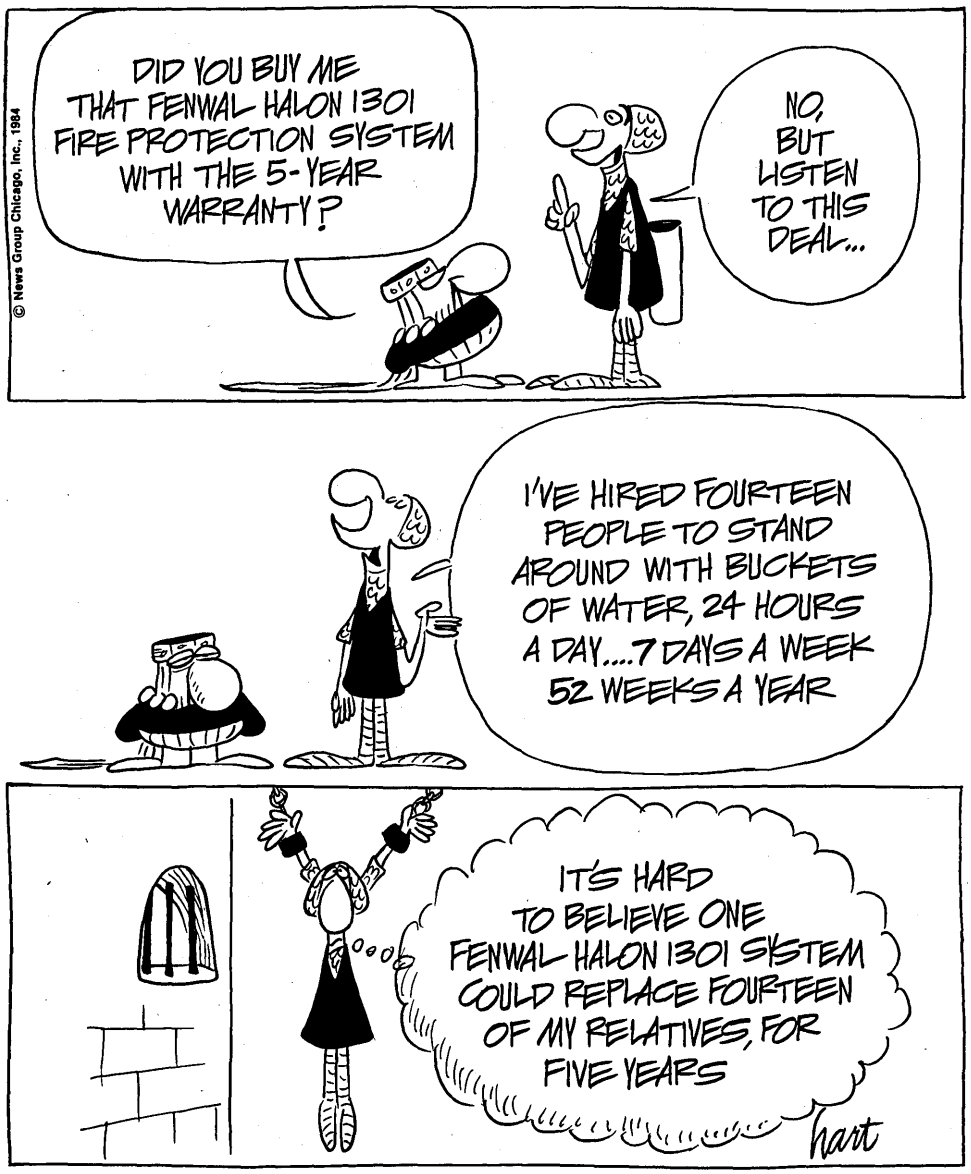

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Apart from revealing that he intends to develop systems for professional use in fields like CAD/CAM, Sir Clive is reluctant to be specific about his plans. In addition to computers, his company is working on a flat-screen color television (it has already produced a similar black-and-white set), further conventional personal computers, and a small terminal in conjuction with ICL, the British mainframe maker. Sir Clive also has his own pet project, developing electric vehicles.

So where will the money come from? On paper, Sinclair Research is worth around $190 million and is 10% owned by outside investors. To date, it has had to invest little in plant since all production of its home computers is subcontracted.

Cash for the company will be forthcoming when it goes public, probably next year, but just how much will be raised then depends on the company's financial results this year.

City of London pundits predict profits will be static at around $19.5 million. Institutional investors are said to be jittery about bad publicity over the delay in deliveries of the QL 32-bit professional and home computer earlier this year.

"We will be plowing back profits next year and we expect the semiconductor investment to give us an early return," says Sir Clive.

To date, Sinclair Research has not availed itself of one source of finance, the government-backed Alvey Program of research into fifth generation computing. "Sinclair tends to take the Freddie Laker, buccaneering approach and say, 'I've got the money and I'm going to do it,' " comments Lea, referring to the entrepreneur of cut-rate air travel.

"Alvey is virtually the only source of funds for university research, so those who have been left out would be very pleased to have someone like Sinclair come along with funds," he adds.

Among those who have hitched their wagons to the Sinclair star is Prof. Donald Michie, whose Turing Institute in Glasgow, Scotland, is designing a program for teaching MicroProlog, an artificial intelligence-oriented language, on the Sinclair Spectrum, a popular home computer sold in the U.S. under the Timex label. Up to 10 Spectrums will be linked to an IBM PC XT to train staff in so-called rule-based programming.

"Sinclair is talking about fifth generation projects and I have no doubt he means what he says," opines Professor Michie. "He has substantial resources."

Others are not so sure. Sir Clive has gained a reputation in Britain for promising more than he can deliver. The Advertising Standards Authority, a watchdog organization, has rapped Sinclair Research on several occasions for promising delivery dates that the company could not keep. This was the case with the $500 QL machine, which ran into design flaws after a delivery date had been announced. Sinclair Research now maintains the faults are fixed and the machine is in full production. An October launch was scheduled for the U.S.

Wafer research and plant could cost Sinclair Research a cool $70 million.

Sir Clive has no doubts that the future of his company lies in a broad assault on fifth generation technology. And few people in Britain, despite the size of the task ahead, doubt his determination to have a go. In the past, he has proved himself adept at making products like calculators, digital watches, and computers that are both technically advanced and low-priced.

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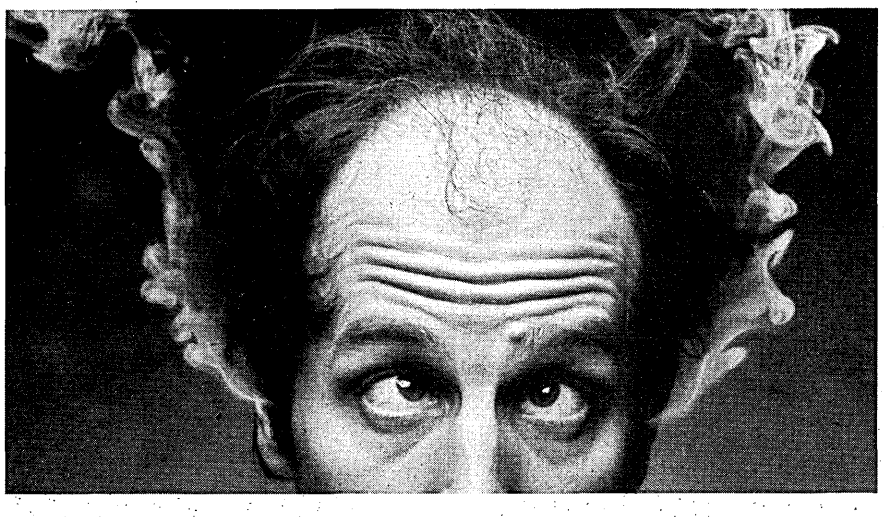

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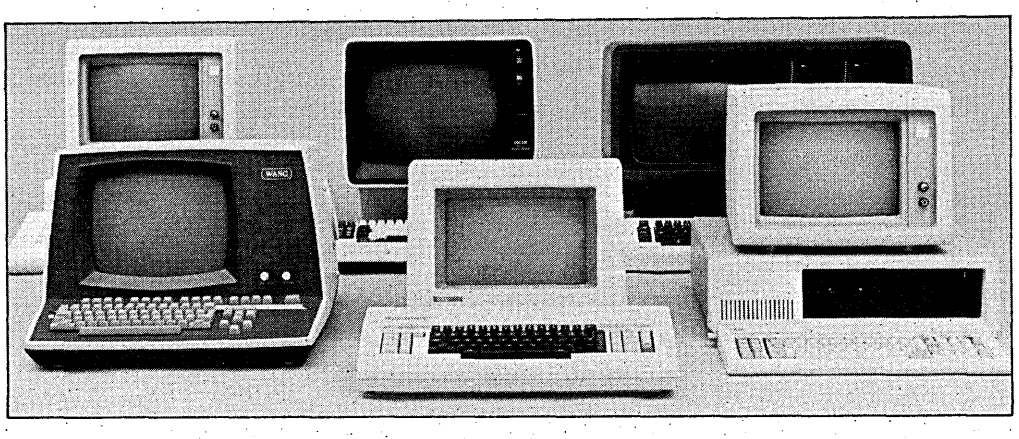

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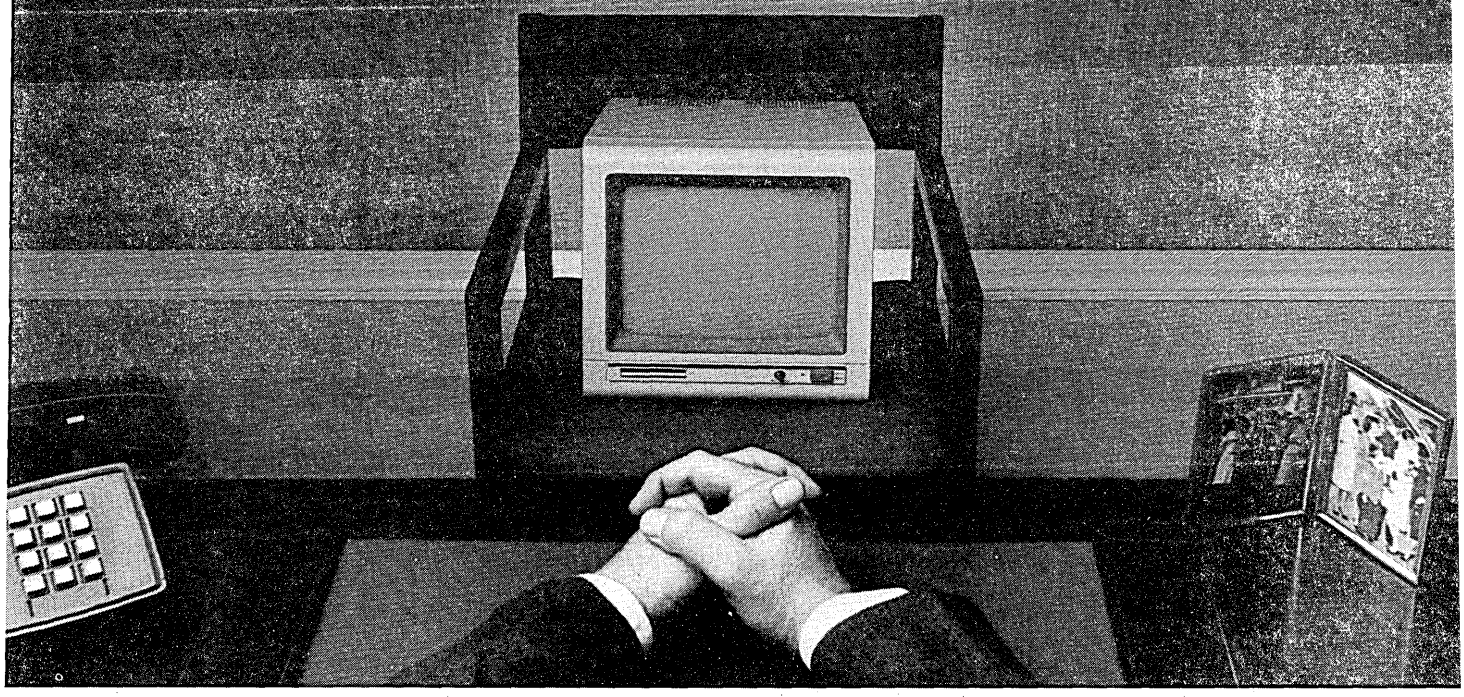

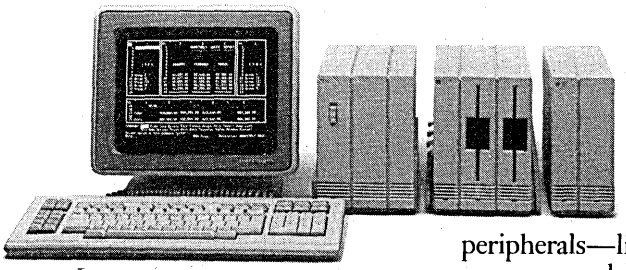

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CIRCLE 47 ON READER CARD

SECURITY

SHOULD DATA BE INSURED?

Some underwriters think so, but users aren't totally convinced.

by Edith Myers

Do companies whose business depends on masses of data stored in computers need special kinds of insurance?

There are those in the insurance business who would answer emphatically yes. Others aren't so sure.

Since Lloyds of London introduced the first computer crime policy back in 1981, insurance companies in the U.S. have been studying the advisability of insuring computer-stored data and ways of doing it. Lloyds' policy, originally developed for banks, has been extended to other financial businesses and probably will be extended to other industries in the near future.

Alan Butko, president of Wood, Butko, Kemp & Partners, Fairfax, Va., which advises banks on security matters and which helped Lloyds formulate its early policy, says "there's a lot of interest among insurers," and policies are evolving. Lloyds' initial policy didn't cover voice-activated transactions, Butko notes, but that coverage has now been added.

Companies in the U.S. that in some way offer protection against computer abuse include Shand, Morahan & Co., Evanston, Ill.; Aetna Life & Casualty Co., Hartford, Conn.; St. Paul Fire & Marine Co., St. Paul, Minn.; Fireman's Fund Insurance Cos., Novato, Calif.; Chubb & Sons Inc., New York; and American International Insurance Group, New York.

Coverage for electronic funds transfer systems predominates among banks.

David Newman, an underwriter with Lloyds, says his company's work on a computer fraud policy, begun in December 1980, stemmed from the fact the company was "inundated with requests to broaden the Bankers Blanket Bond" to cover assets represented in electronic data. The bond, developed by Lloyds more than 70 years ago, covered the financial crime risks of a financial institution and was essentially unchanged in late 1980 from its original form.

"It was questionable whether an insurance policy that evolved over 70 years from a wording designed to cater to a banking environment composed entirely of written documents, paper entries, and paper money still protected assets represented as electronic data and computer instructions," Newman states. "Insurance policies talk of theft, burglary, fidelity, and forged checks, but how many mention computers, electronic data, or fraudulent input?"

In late 1980, none did. Now, quite a few do. In some cases, underwriters have, like Lloyds, developed special policies to handle computer-related risks, while in other cases they have offered extensions to existing policies.

Users aren't exactly gobbling up the new policies. The American Bankers Association estimates in its 1983 bank insurance survey that slightly less than one bank out of three maintains any kind of computer systems rider. Among these, coverage for losses in electronic funds transfer (EFT) systems predominates. The second most frequent coverage category is for automated teller machine (ATM) systems.

Newman says most of Lloyds' policies are aimed at EFT systems. "Companies tend to ignore their own dp environment and concentrate on global transfers."

Newman employs outside consultants to assess a potential client's security standards. "My standards are high. I only want residual risk tranferred to insurance."

Robert L. Patrick, a computer specialist in Rosamond, Calif., who has performed security audits for a number of large computer installations, feels security standards in general are not high. "They [big installations] are still employing tactics [for security] they used 10 years ago and vulnerability is way up," he states.

Patrick notes that most of the large installations he works with are self-insured. "That's a dodge in itself, a cop-out. They're simply taking the risk."

He feels the wrong people are talking to each other when it comes to insurance and data processing. "The insurance guys talk to the administrative departments and they don't know what the risks are."

Grant Hubbard, an underwriting executive with Shand, Morahan, takes a somewhat different view. "Too many corporations listen to their dp managers and they feel they never have exposure [to risks]," he says.

Hubbard thinks his company's computer-related insurance coverage "is the broadest in the world." He adds that most companies that insure against outside tampering have a manifest intent clause, which means that the insured must prove an intruder into a database really meant to cause damage. Shand, Morahan doesn't require such proof, says Hubbard.

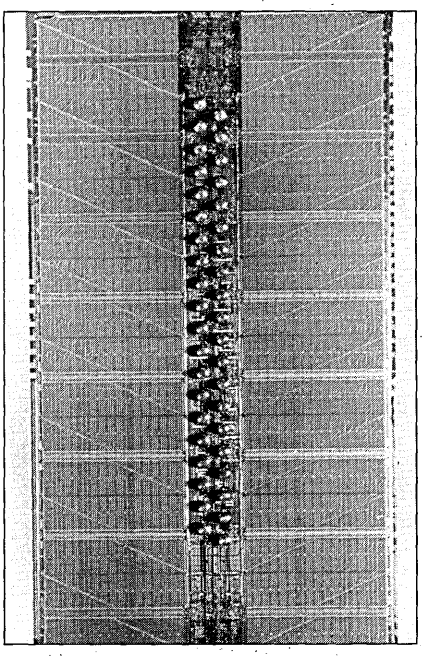
"This doesn't protect against the mountain climbers—and I call them mountain climbers, not hackers. They're only out to prove something and in the process they do damage." His company provides insurance against such mountain climbers.

Less than one bank in three has a computer systems rider. Of these, coverage for losses in EFT systems predominates.

It also provides liability insurance against data tampering that might be used to damage a third party. This would cover, for instance, a hospital where data tampering results in a wrong drug dosage with damaging consequences. Hubbard believes his company is the only insurance company to offer this.

He won't say exactly how much computer-related insurance Shan, Morahan has written, only that it's been "quite a lot and the premiums total in excess of $7 million. He says his firm's business is split evenly between financial and non-financial organizations.

What kinds of companies need the kind of insurance he offers? Hubbard



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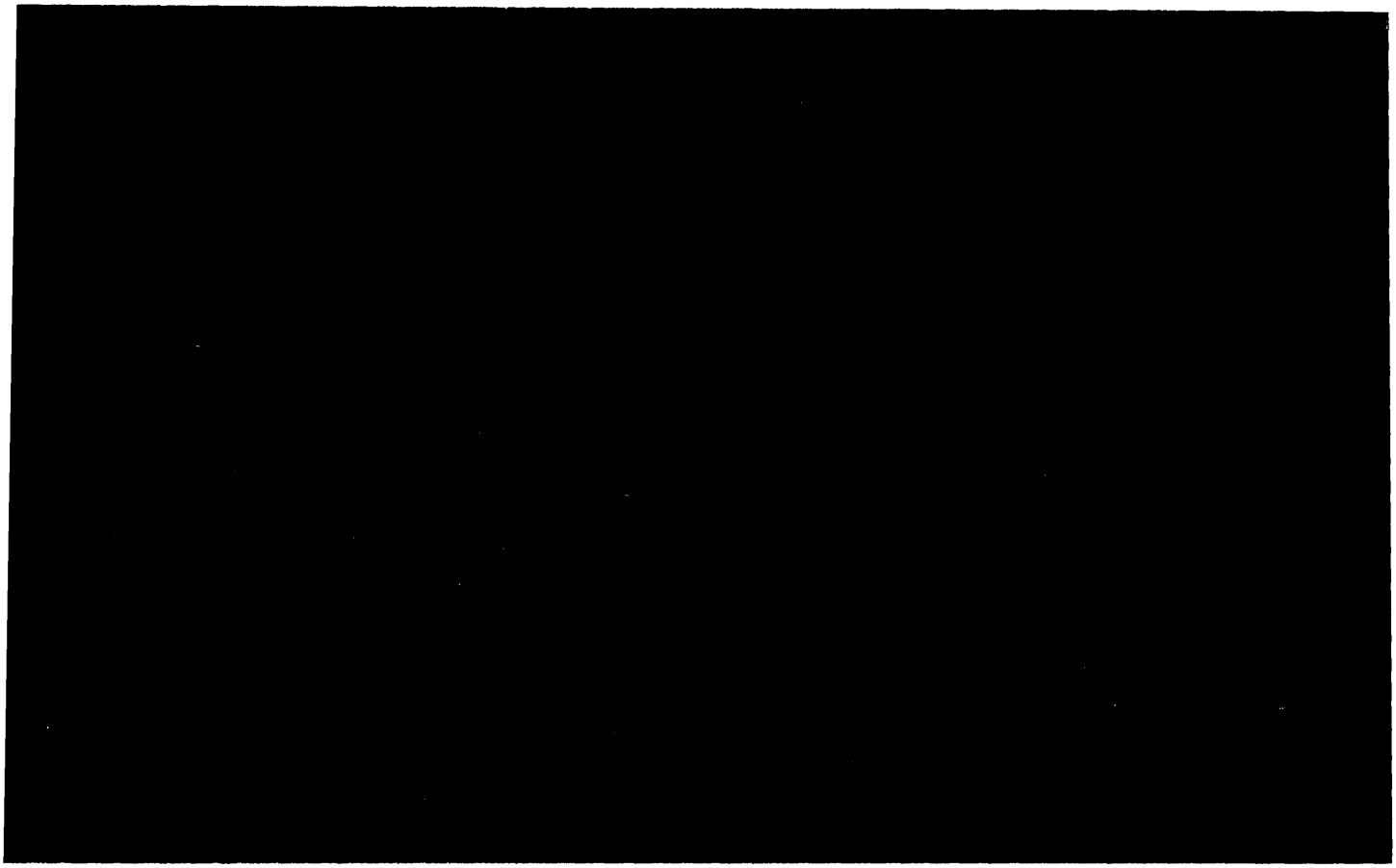

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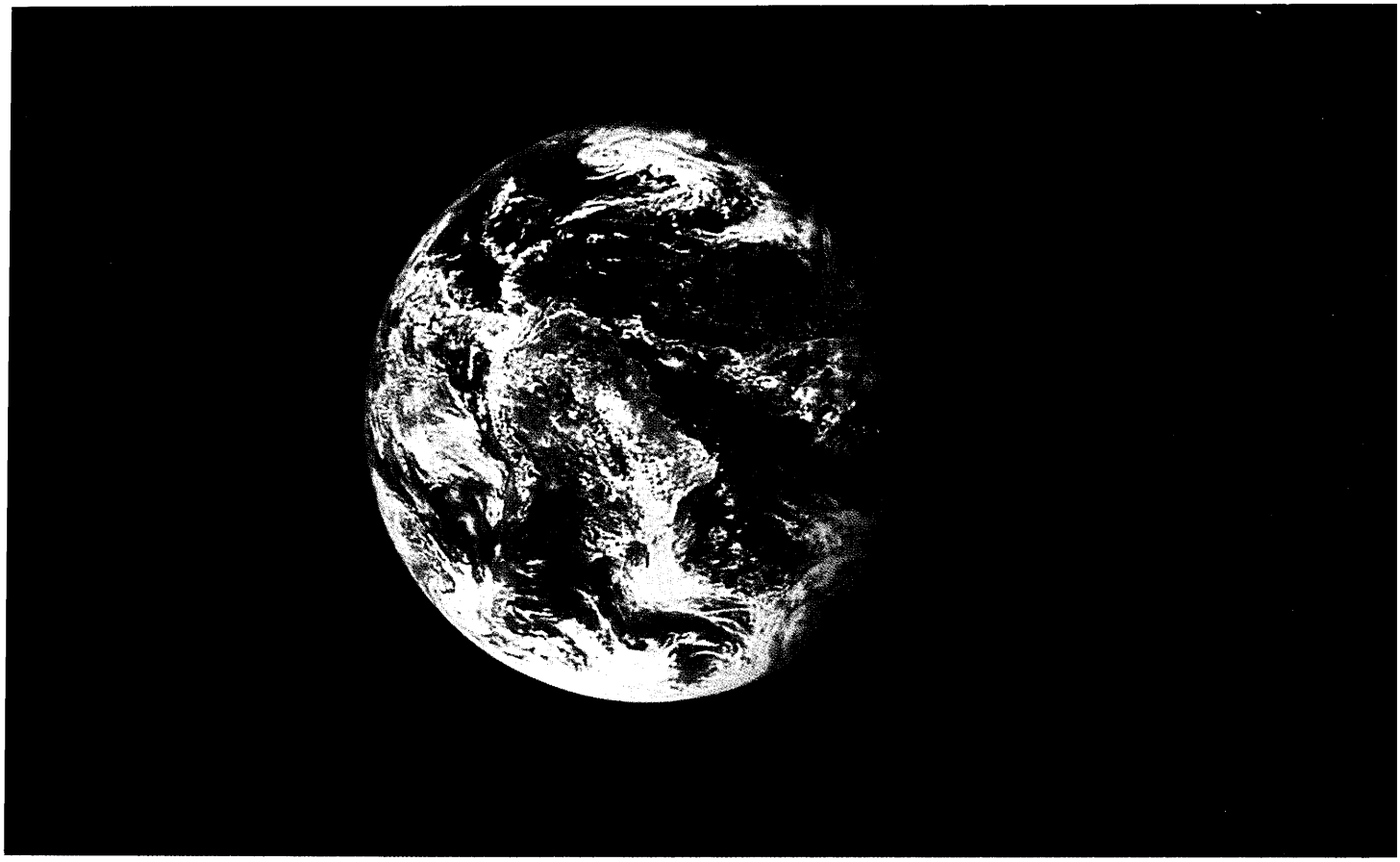

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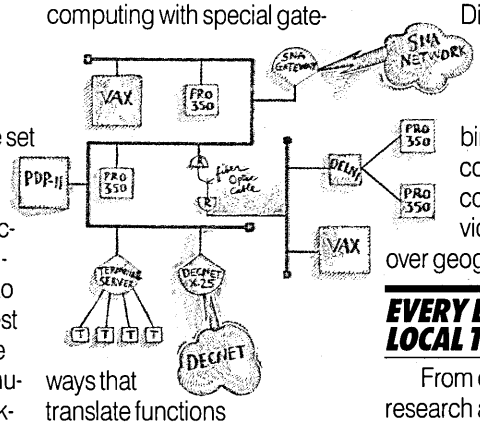

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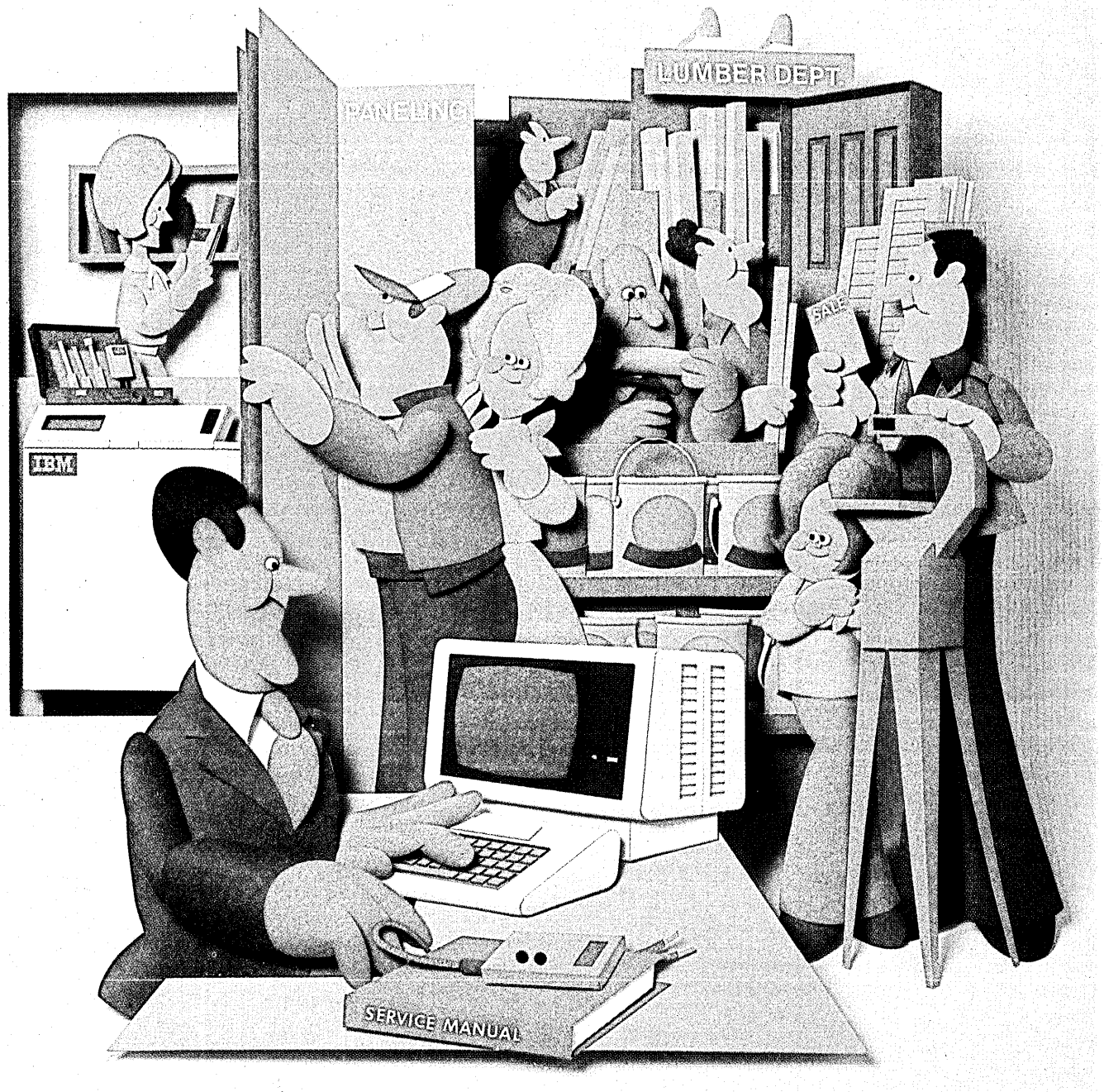

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CIRCLE 49 ON READER CARD

ticks off "power companies, automakers, airlines, banks, grocery wholesalers, data processing centers, insurance companies, stockbrokers, and anyone else who maintains data that someone from outside can access." Shand, Morahan itself, he adds, carries computer data insurance "with an outside carrier."

Like Newman of Lloyds, Hubbard wants the companies he insures to have good security measures in place. "Many applicants have been turned down because their security shows up as poor just on their applications. Sometimes we send in internal auditors. We advocate risk management to go along with insurance."

Roger Huss, a vice president of Marsh & McLennan Inc., a New York insurance brokerage that finds insurance

"I call them mountain climbers, not hackers," says one underwriting executive.

for clients from a number of providers, is one who is not so sure special insurance is needed to cover computer-based activities. "There's really nothing new under the sun. There were trade secret thefts, thefts of customer lists, even before computers," Huss notes.

His company did begin finding insurance for clients who wanted the addition of the term "fraudulent use of computer systems" included in their policies three years ago, but these only affect losses to which a specific dollar amount can be attached, such as loss of money and securities.

He doesn't think insurance companies are reluctant to provide coverage for other losses. It's just "how do you value them? It's a question of indemnity that should be close to the whole and no more than the whole and how do you determine what is the whole."

Huss actually believes controls are better in doing business by computer, and that incidents of tampering have gone down.

Joe Kiernan, assistant vice president of Aetna Life & Casualty, claims his company offers computer fraud extensions to existing coverage but says there "hasn't been a ground swell for it in terms of customer requests." He says Aetna, like other U.S. companies, began offering extensions in response to the Lloyds' announcement in 1981 and were some six to nine months behind Lloyds.

Jim Talley, an underwriter in the executive protection department of Chubb & Son, says his company began adding computer wording to policies two years ago "because we recognized a market need." He says Chubb also has issued a few policies protecting data for industrial concerns but notes there has been "much more curiosity than active interest in these."

The few policies Chubb has issued have been individually tailored. "It's extremely difficult to put a value on data. Say an automobile design is supposedly

Some say doing business by computer has reduced the number of tampering incidents.

stolen. All cars have two taillights. The laws of physics always prevail. Both value and proof can be almost insurmountable barriers. It would be hard to come up with an off-the-shelf product."

Lloyds, the originator, is forging ahead, however. Newman claims the company is looking at such risks as altering data on an information service or a newswire and then taking advantage of improved trading conditions, tapping a database of a credit card company to obtain a record of a key individual's movements, and software piracy.

"Potentially," he concludes, "the greatest problem for users is the lack of any established legal framework." ◉

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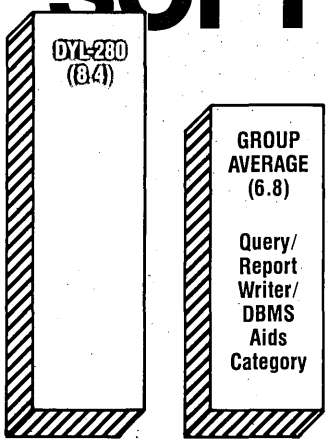

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CIRCLE 50 ON READER CARD

SECURING SOFTWARE SECRETS

A new service allows software developers to document and deposit proprietary design information.

by Edith Myers

Software developers seeking to establish clear title to their creations have long been uncomfortable with the options open to them.

They could copyright programs or apply for patents, but that involves publishing information they would often prefer to keep private. Alternatively, they could try to protect their efforts as trade secrets, but that often angered customers and offered little legal recourse if they believed their secrets were being stolen. Now they have a third option: POSTing.

Data Securities International Inc. (DSI) announced POST, for Protect Ownership of Software through Time-stamping, last month at the National Software Show in Anaheim, Calif. POST is an outgrowth of a proprietary deposit service the San Diego company has been offering for more than a year. "It answers a need most of our customers had," says John Noerr, DSI's president and cofounder.

Like the proprietary deposit service, which establishes trade secret protection for a software product, POST establishes this protection through all stages of program design, development, marketing, and sales. "It really is a case of trade secrets," Noerr says, "but trade secret protection by itself flies in the face of a licensee's need to have access to source code."

With POST, a software developer establishes an account and gets a number, which it affixes to its software. DSI provides physical protection in an environmentally controlled repository for all proprietary information associated with the software program. The three-year-old company also initiates and maintains an audit trail that documents all transactions that occur during a program's life span. When an update is "POSTed," a new POST number is issued.

Noerr says that an audit trail is vital in establishing what is legally called "due care" on the author's part. That means the software developer has taken all reasonable steps to protect its trade secrets or proprietary information. He says a developer's ability to demonstrate due care in court would thus be a key factor in litigation challenging ownership of a software program.

"As you look around the software industry," Noerr says, "it's both surprising and disturbing how many program developers, ranging from the individual working in his home to the large corporation, lack standards and guidelines to protect their software investments against such calamities as unauthorized alteration or theft."

The onetime president of the IBM user group SHARE tells of visiting a large user site in Los Angeles. "They knew to the penny what the value of their hardware was. When I asked about the software, they didn't know diddly about what they had."

Noerr argues not only that a completed software product has value as an asset, but also that software development efforts have financial value. He applauds a proposed Financial Accounting Standards Board rule that would require companies to treat certain parts of software development as assets rather than as expenses. The proposal is open to public comment until Nov. 30. A final ruling probably will not come for six months, Noerr says, "but I wish it would happen in six days. Corporate officers and directors would see the need to protect themselves from liability for failure to protect corporate assets."

Susan H. Nycum, a partner in the Palo Alto, Calif., law firm of Gaston Snow & Ely Bartlett, which provides legal counsel to DSI, described DSI's proprietary deposit as a method of meeting "the fundamentally inconsistent requirements" of the software licensor on the one hand and the licensee on the other.

"Licensors typically claim that the source code and maintenance material contain trade secrets," she says, "and consequently they are quite reluctant to disclose the code, even to a well-known licensee. Licensees require assurance, however, that they have access to the source code if, for example, the software program needs to be debugged. Proprietary deposit offers a way to reconcile the conflicting requirements of both parties."

Noerr argues that proprietary deposit protects the developer, the investor, the end user, and the distributor/dealer. "Proprietary deposit helps a developer maintain his trade secrets by consistently protecting proprietary materials associated with his program. A developer can lose his special marketing position as well as ownership value through compromise of that software asset."

Moreover, Noerr says, "POST provides a mechanism to help ensure product delivery while concurrently documenting the software development cycle. This can be invaluable to the investor if the author is no longer able to work on the program."

POSTing assures end users controlled access to source code and other materials so they can revise or update their programs, Noerr explains. "This guards against the program becoming obsolete and worthless to the end user, who may have invested significant resources in the program. Without the ability to change software, the end user could incur high costs in system redesign and development. Also, while end users may want limited access to the proprietary information, they do not usually want responsibility for protecting someone else's trade secrets."

Software distributor/dealers, says Noerr, are in the most vulnerable business positions in software transactions. "They have the least control of the product, but face the same risks as the investor and developer. They generally want some assurance that critical material for a software program is secure and accessible. This assurance can be provided by proprietary deposit."

Some risks, he says, relate to all parties. "For instance, because of the computer software industry's rapid growth, an independent company today can be someone else's subsidiary tomorrow. People and the commitments they make can change as well, thus increasing the need for third-party protection of a software asset. It's like term insurance."◉

TECHNOLOGY

BUBBLES LOOKING BETTER

For those still in the market, bubble memory may yet become a big moneymaker.

by Edith Myers

Deserted early in this decade by three major players, the bubble memory market is looking better than ever to those who remain.

The survivors—Intel and Motorola in the U.S., Fujitsu and Hitachi in Japan, and SAGEM in France—are all rushing to expand their product ranges to include high-density memories. Intel has already begun sample deliveries of a 4-megabit bubble memory, and its competitors are expected to follow suit by the end

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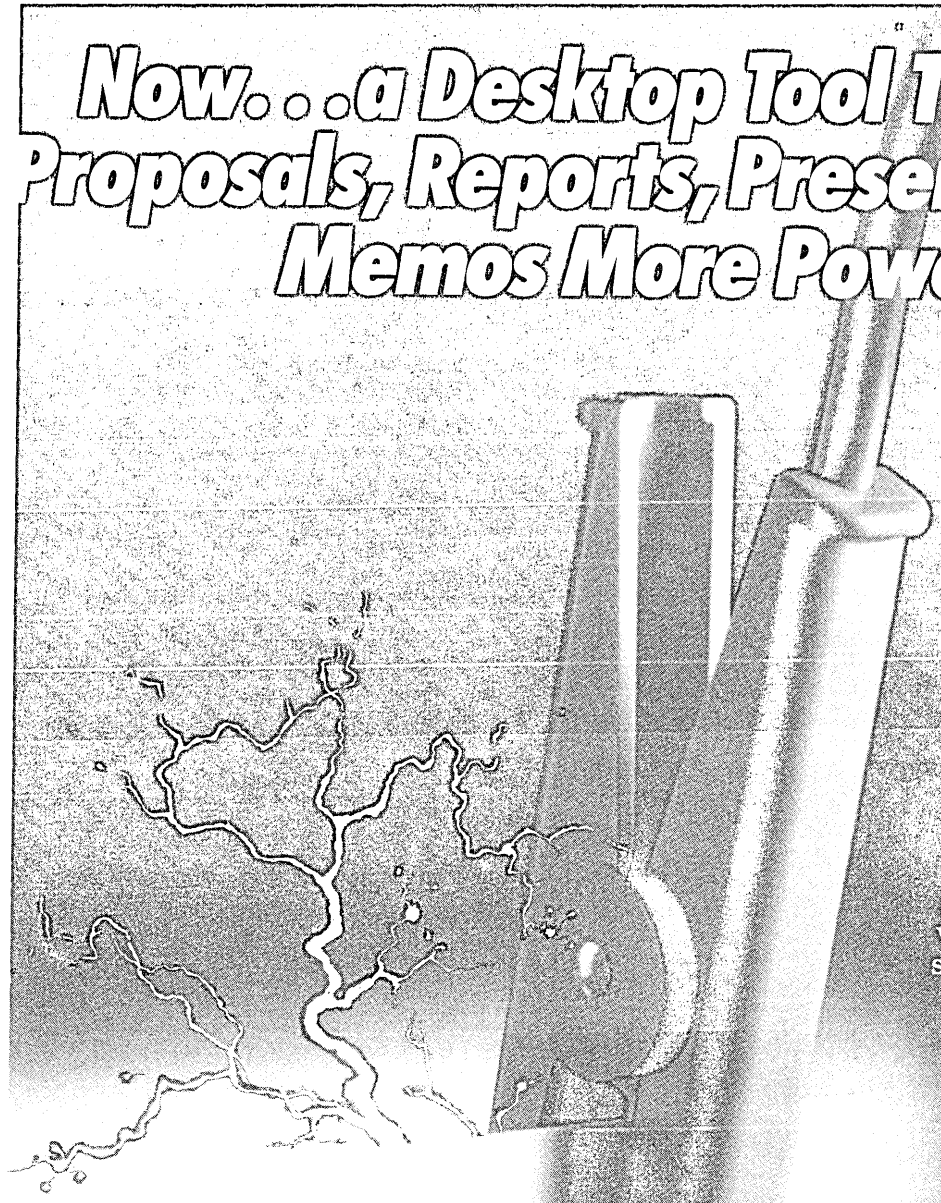

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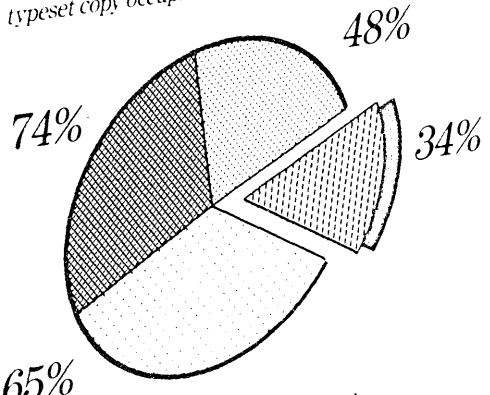

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of the year.

With all the interest surrounding the 32-bit microprocessors these vendors are also producing, the rise of bubble memory has been little noticed. Yet Fujitsu expects the bubble memory market to reach $208 million this year, and says the market is ballooning at a 50% annual growth rate.

Intel pegged the market at $110 million in 1983 and also expects 50% annual growth, according to Mike Eisele, Intel's bubble memory product manager.

The bubble, invented by A.H. Bobeck of Bell Laboratories in 1966, probably will never live up to its early promise. Its high reliability—due to no moving parts—was not sufficient in the 1970s to compete against RAMs and disk drives, which were cheaper and had higher capacities.

As a result, National Semiconductor, Texas Instruments, and Rockwell all dropped out of the market, and industry observers predicted that bubbles would be relegated to ruggedized applications. Indeed, the compact, nonvolatile devices are well suited to harsh environments, their makers claim. "They allow computers to work on a factory floor and in military applications where shock and vibration are factors," Eisele says.

Much of bubble memory's growth, however, is due to expansion into new markets. "We're moving more and more into commercial applications, particularly POS [point of sale] and banking. In those areas, the need for data integrity and no downtime is a very important consideration. We're concentrating on using bubbles as high-density mass storage for microprocessors, for things like working storage for portable computers."

Similarly, Fujitsu sees new market niches for its bubble products in measuring instruments, medical equipment, building control and hotel systems, POS and banking terminals, and office automation equipment. OA applications include personal computers, portable word processors, and facsimile machines, Fujitsu says.

Fujitsu sees new markets in measuring instruments, medical equipment, building control and hotel systems, POS and banking terminals, and office automation equipment.

Bubble chips, Eisele notes, are packaged with a controller and integrated circuits to provide timing and control functions. "We're looking for ways to reduce the complexity as well as to achieve higher density," he says, adding that Intel will have a 16Mb bubble memory by "the 1988 time frame."

Fujitsu also says it is developing 16Mb parts, and claims that such products will compete against magnetic drum and disk units with storage capacities of up to 100MB.

Such storage requirements are typical of mainframe systems more than of micro systems or of ruggedized terminals, however. Eisele of Intel notes that bubble memories failed in the 1970s because they were built for mainframes rather than more modest applications. "They will never be fast enough or low enough in cost for mainframe use," he says. The access time for bubble memories is in the same range as for floppy disk drives.

Magnetic bubble memory is a solid-state, read-write, nonvolatile technology that features high density, ruggedness, small size, light weight, and limited power dissipation. The memories store data in magnetic domains, or bubbles, in a thin film on a garnet chip. Because garnet is the base material, bubble memories will always be more expensive than Winchester disks, where the base material is coated plastic, Eisele says. ◉

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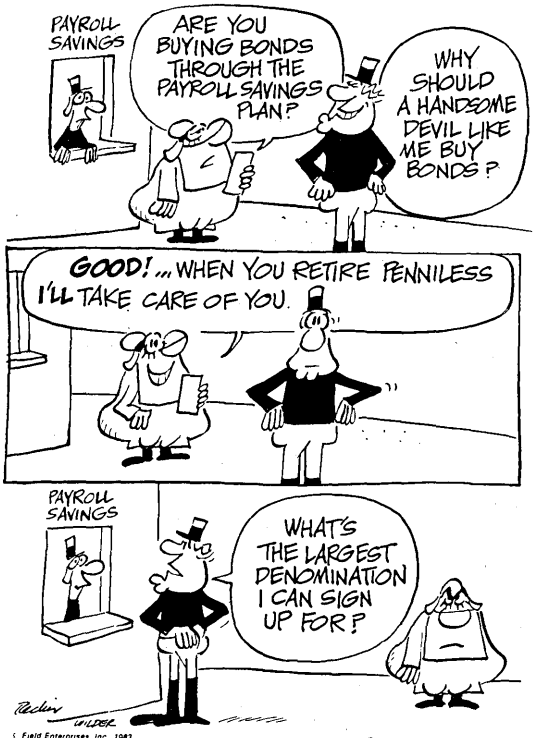

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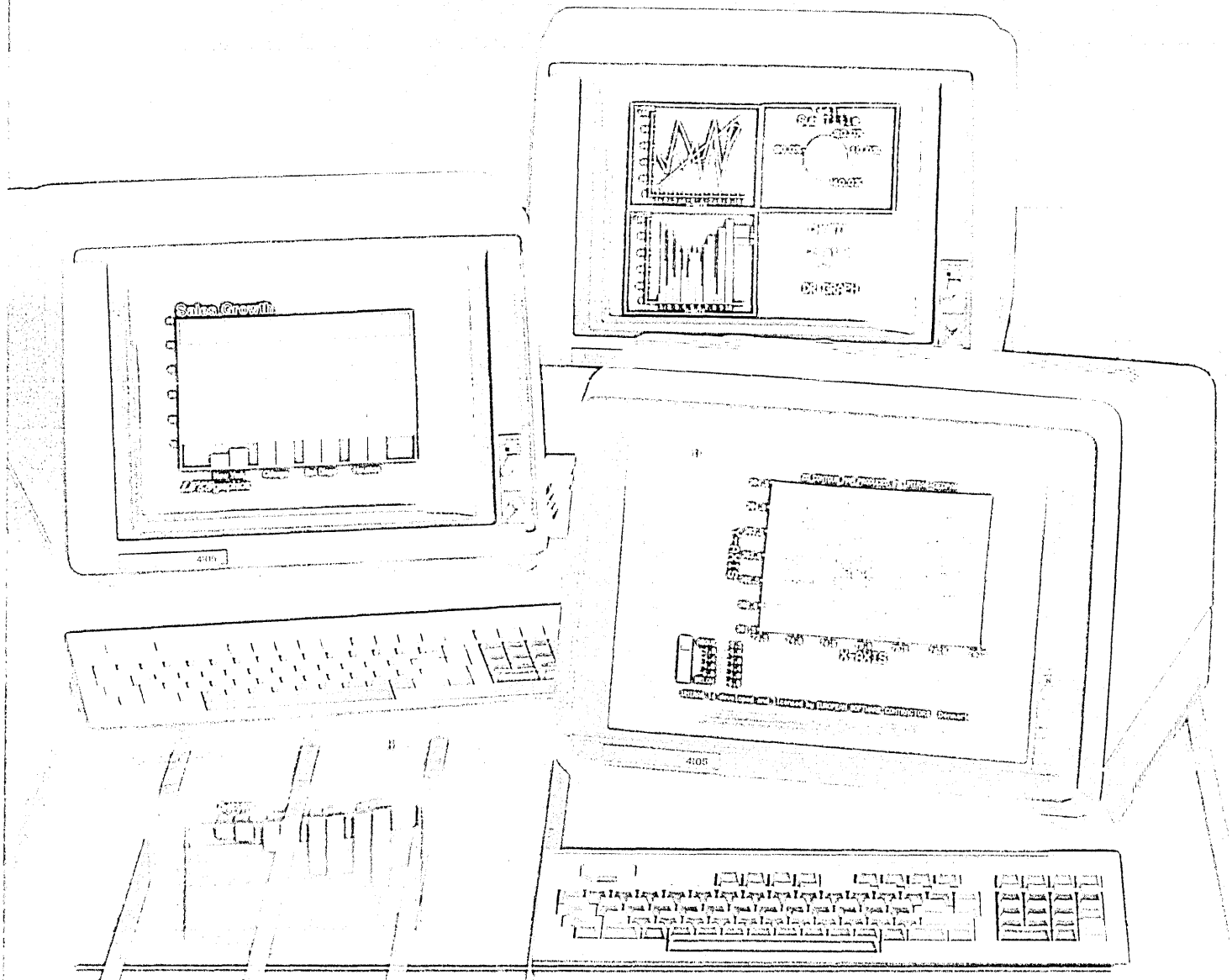

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NEWS IN PERSPECTIVE

PERSONNEL

HEAD-HUNTERS' LAMENT

The rash of startups has created both new business and new problems.

by Edith Myers

The rash of startup companies to which the microcomputer has given birth has created both business and headaches for high technology executive search firms.

Gary Kaplan, managing vice president of Korn/Ferry International, Los Angeles, has identified one malady he calls "equity fever." This, he said, "can make our job really tricky." Many startups are short of funds and offer equity positions which, he says, some placement candidates find more attractive than the higher salaries and perks offered by established firms. This can make it harder to fill jobs for big companies where equity is not part of the package.

Another fallout of the lack of funds in some startups is that while they need key people, they can't afford the services of a search firm. So, Korn/Ferry has started a service it calls VenSearch, "where we take up to 50% of our fee in stock."

Joel Rice, a consultant with Sales Consultants International, working out of its Encino office, shies away from most startups because "three out of four go out of business. Sure, they offer high salaries, great guarantees, and great perks, but what have you got if they go out of business?"

Rice says he looks for uniqueness in a startup. "If they've got a me-too product, I stay away. I'd rather go to a major corporation." He doesn't however, like the real biggies like IBM and DEC. "I'd rather steal from them. Guys who work for companies like that often go for the equity bit. They like the idea of risk."

William T. Mangum of Thomas-Mangum Co., Los Angeles, says his firm is suffering a lead-time crunch. "The calls that we are getting now demand an immediate response. Let's do, not let's talk."

He says this is a sharp departure from the way business has been conducted in the past. "Normally, when an organization asks a search firm to find personnel, there is considerable time for discussion. Even searches involving key replacements have been delayed by the hiring firm for a substantial period of time while qualifications, job description, benefits packages, and sundry terms are discussed. Now firms want immediate replacements. The calls we are receiving literally say find me a vice president of marketing today, locally if you can, and . . . get me an operations manager tomorrow."

In the last two months, says Mangum, he has noticed a surge in requests for regional sales directors, business development directors, and other marketing management positions. "This flurry of marketing requests follows a period of two years during which there has been virtually no demand."

Kaplan of Korn/Ferry says the "equity fever" phenomenon is particularly prevalent in California and New England and, to some extent, Texas. He says much of his company's business in those areas comes from venture capital companies that are funding startups.

Like Rice, he worries about me-tooism. "One company comes up with a concept and 80 others jump in."

"One of the biggest problems facing many small high-tech companies," says Kaplan, "is that they have outgrown current management. There is a strong need for general managers, including the ceo with technical experience in product planning, strategic marketing and sales, corportate strategy, productivity improvement, and operational and cost controls."

He doesn't think bringing in management from consumer-oriented companies is the answer. "High technology changes rapidly. Soap doesn't change that fast."

"If they've got a me-too product, I stay away. I'd rather go to a major corporation."

Nevertheless, a company like Apple Computer, surely a fairy tale of high-tech capitalism, has reached into the ranks of consumer marketing for a chief executive. The company last year hired John Sculley, formerly a top executive with Pepsico, to bring it a measure of marketing savvy that seems absent in more traditional computer companies. So far Sculley's leadership has brought success, as seen in the healthy sales of the Macintosh. Analysts wonder, however, if the company's image is perhaps *too* consumer-oriented and might not benefit from more steak and less sizzle.

Kaplan doesn't find young entrepreneurs reluctant to turn over management of their fledgling enterprises. "They are increasingly aware that proven operating and marketing executives are critical to the success of their products."

This is a fortunate fact in an era when entrepreneurs seem to be getting younger every day, as exemplified by the fact that a brochure for SofCon, a big software show held in New Orleans early this year, contained this admonition: "Persons under the age of 16 are not permitted on the exhibit floor unless they are principal officers of an exhibiting

SOFTWARE

MNEMODEX GOES ON-LINE

Pacific Data has picked up the package that indexes and organizes user data, but changed the name.

by Edith Myers

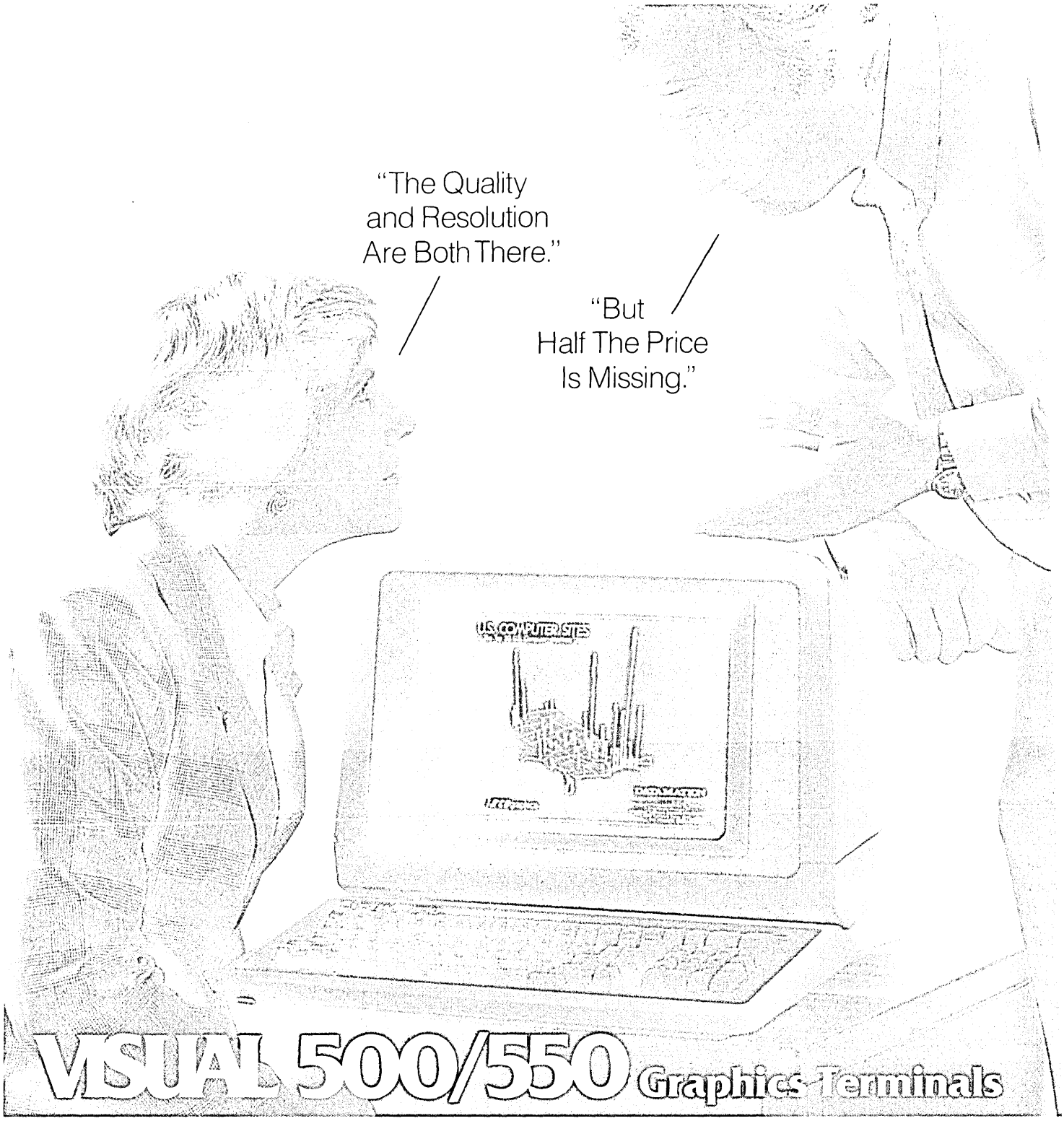
For several years now, Robert Gordon has moonlighted by peddling his MnemoDex information organizing system to local corporations. It's a paper-based method of recording and retrieving information—a paper DBMS of sorts.

The information systems professor at the University of California at Irvine called his sideline the MnemoDex Group. Recently he has been working quietly to convert the manual system into a microcomputer software program.

Several of Gordon's large customers are about to see the fruits of his labor. Gordon sold the package to Pacific Data Systems, a software house in Culver City, Calif., and that firm will start marketing the program late this year under the name QuickTrack.

Pacific Data is billing the product as "software to organize, index, and retrieve information in any form that remembers where your information is, even when you don't." At the moment, the product may not remember anything, let alone its proper name. Gordon notes that he is still working out some bugs, in some cases with the help of users who learned the system when it existed only in a paper and pencil format.

Gordon says that the product will be ready for distribution by year-end. It resembles a personal librarian or research assistant more than a computer tool, he claims, because it remembers what is being sought and associates related materials. QuickTrack will be most useful for people who have a massive variety of information that must be organized and who need to retrieve specific data easily,



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Gordon adds. The program provides cross-references and synonyms so that users can find the same information filed under different names. Its self-generated index works even if a word is misspelled, Pacific Data says.

One of the features Gordon likes best about the system is that "the documentation is in the system, so the user can change it any way he wants. For years I was a user of large systems, and I fought, never successfully, to be able to get documentation the way I wanted it."

Gordon also expects the system's color capability to be popular among users. "Everyone sees things differently, and different color combinations please different people," he says. Users can choose the color combination of the display from nine colors.

Product literature and training materials for QuickTrack are in the process of being developed and should be ready this month. At that point, Gordon plans to work with users and the developers of the training materials in order to determine their quality and to improve them before the product is distributed.

QuickTrack will run on PC/DOS or MS/DOS micros with 128KB of RAM and either dual diskette drives or a Winchester and a floppy drive. It joins MoneyTrack in the Pacific Data stable. MoneyTrack is designed to manage financial information for small businesses, farms, investors, accounting firms, financial advisers, business managers, and professionals. ◉

NATIONAL POLICIES

STAKING THEIR CLAIMS

The Australian government wants a piece of the action in building a domestic computer industry.

by Norman Kemp

The Australian commonwealth's Labour government is leaving no ambiguity in signaling its intention not only to participate actively in developing local hardware and software manufacturing and research, but also to own a considerable equity in it.

The extent of government support aimed at rapidly raising Australia from a cottage industry country into a leading producer of international software is comparable in recent years only to Japan and the United Kingdom. Japan has strongly backed its hardware manufacturers in competing in world markets against United States and European computer makers, and in the U.K. the Thatcher government is supporting British private enterprise in ventures from school microcomputers to fifth generation research and development.

No other Western government has so directly wanted to own part of the fruits of the companies it has supported. The benefit for Australian private industry—in exchange for some government ownership—is that selected small firms with limited financial resources will now be able to look for openings in world commerce with the assistance of government departments such as science and technology in domestic arenas and trade and industry in foreign markets. The Labour government has specifically designated two regions for emphasis: the United States, where the government hopes to build upon several Australian technological companies that have already secured a foothold; and Asia, where collaborations are being proposed with Japanese hardware manufacturers.

Although there are sectors of Australian private industry wary of paternalism from a socialist government, most are willing to give it a try. Foreign-owned companies have little option, as the big-spending commonwealth government has recently upgraded its demands in the levels of skills, services, and quality of products produced by local resources as a result of tenders and contracts signed by overseas companies.

In the first seven months of this year, the commonwealth government has taken significant steps to promote its computing industry. It has cut tariffs on imported software to reduce the price of computing in Australia and endorsed amendments to the copyright act to protect domestic software. It has licensed several companies to operate in high-tech areas and raise public funds with fewer constraints than common venture capital requirements. Correspondingly, it has increased the competitiveness of existing computer companies vying for government tenders by setting higher standards for local content and offset, and increasing the bounties for local manufacturing of both software and hardware.

The government has also assisted in the formation of a technology park in Canberra, the nation's capital. It will open in 1985 and directly involve itself with two privately held firms. First, it has become a customer of a new company, Austek Microsystems, which had its origins in the government's Commonwealth Scientific and Industrial Research Organization, and will now operate independently in Australia, California, and Singapore in the commercial development of VSLI design software and the fabrication of chips. Second, it has, through the state-owned Australian Industry Development Corporation (AIDC), paid $420,000 ($A500,000) to acquire 47% of Fawnray PTY Ltd., a privately held firm that specializes in Unix operating systems, and hopes to open new outlets in the North American and Asian/Pacific regions.

The general design of future government policy was promulgated at the annual policy-making conference of the Australian Labour Party in July, when an overwhelming majority of delegates gave the federal government a mandate to provide incentives for industrial research, and to develop mechanisms that encourage a higher level of technology transfer.

The government cut tariffs on imported software and endorsed amendments to the copyright act to protect domestic software.

Prime Mininster Robert Hawke asserted that future government purchases will require offset work of a type that will result in the improvement of Australian technology, with special attention to the development of state-of-the-art science, technology, and engineering sectors to increase the rate of product and process development throughout the rest of the economy. "The task of social reform has been made an integral part of the task of economic recovery," he said. "I don't think that it is yet fully realized how unique and radical a transformation this new concept represents."

Fawnray was started three years ago by its present directors, John O'Brien, Allan Moore, and Greg Rose, and from its inception has concentrated on developing Unix systems to run on various computers. It recently won a contract to port Unix to the large and complex 64-bit Tata-Elxsi supercomputer, a joint venture among American, Indian, and Singapore interests. It has also received royalty income from systems provided for the Sage IV computer, which last year sold several thousand units.

The AIDC had evaluated the company following presentations by about a dozen Australian software houses lobbying for a combined government venture, O'Brien says. None of those firms, however, will be shareholders in the new company, which will be renamed the Australian Software Development Corporation. Work will begin on support for Unix version 5.2 for Motorola 68000 microprocessors, under a license from AT&T Technologies in conjuction with AT&T Australia and Olivetti Australia.

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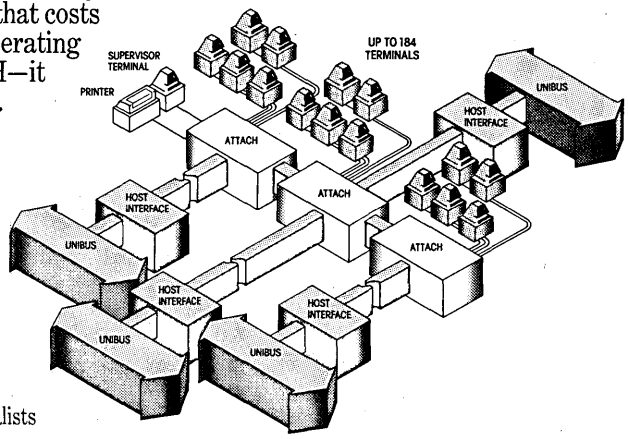

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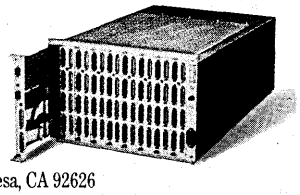

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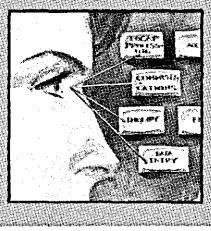

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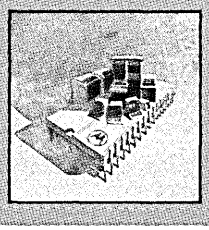

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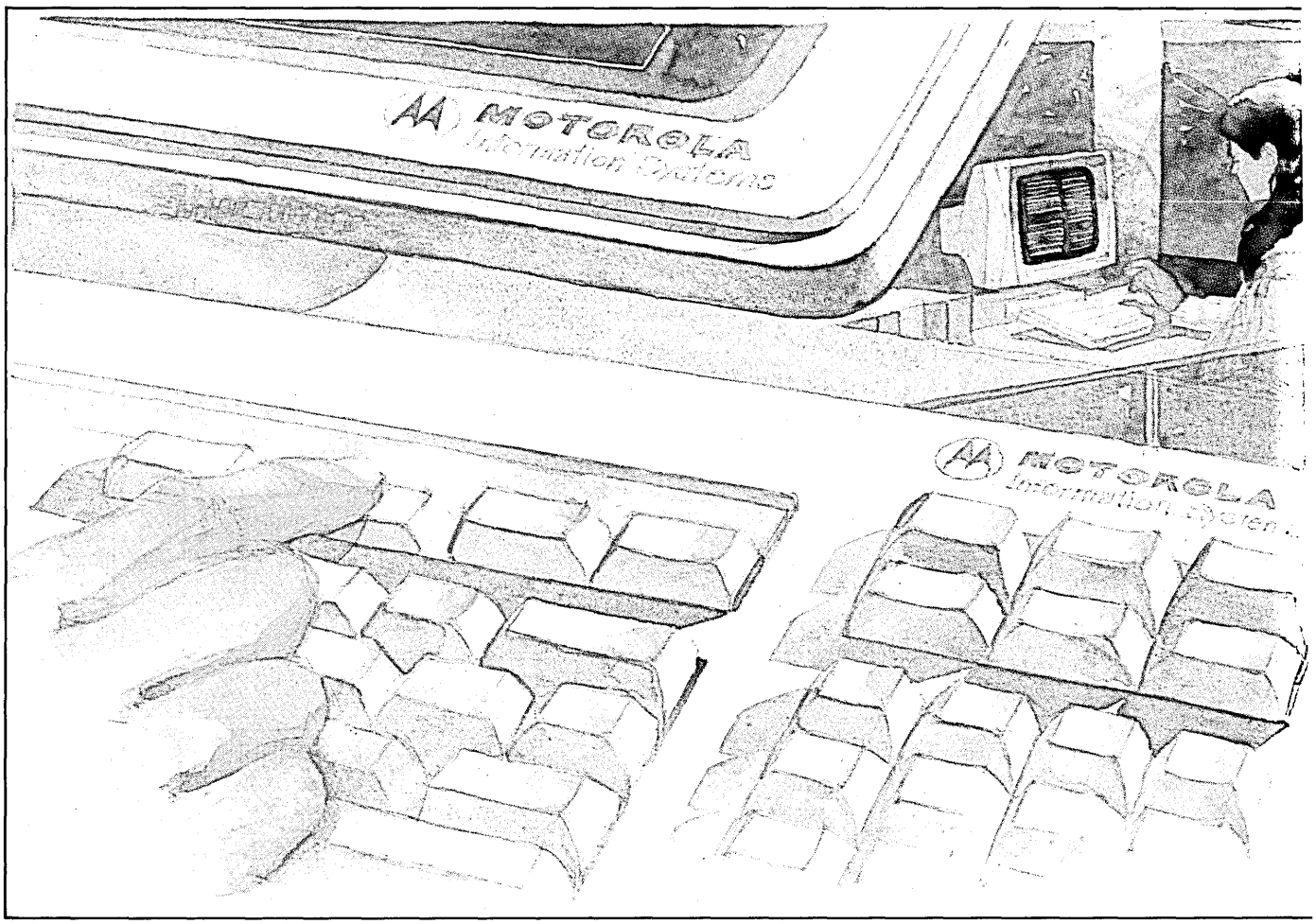

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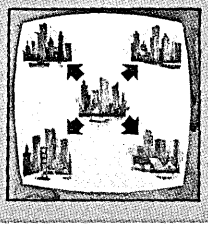

1984 Motorola/Four-Phase continues to provide hardware/software advances with enhancements to the 2000 Series of communicating desktop computers. The Series now features UNIX, the 68010 MPU, SNA and new high-capacity Winchester disks, making it ideal for large companies with data networks at remote office sites.

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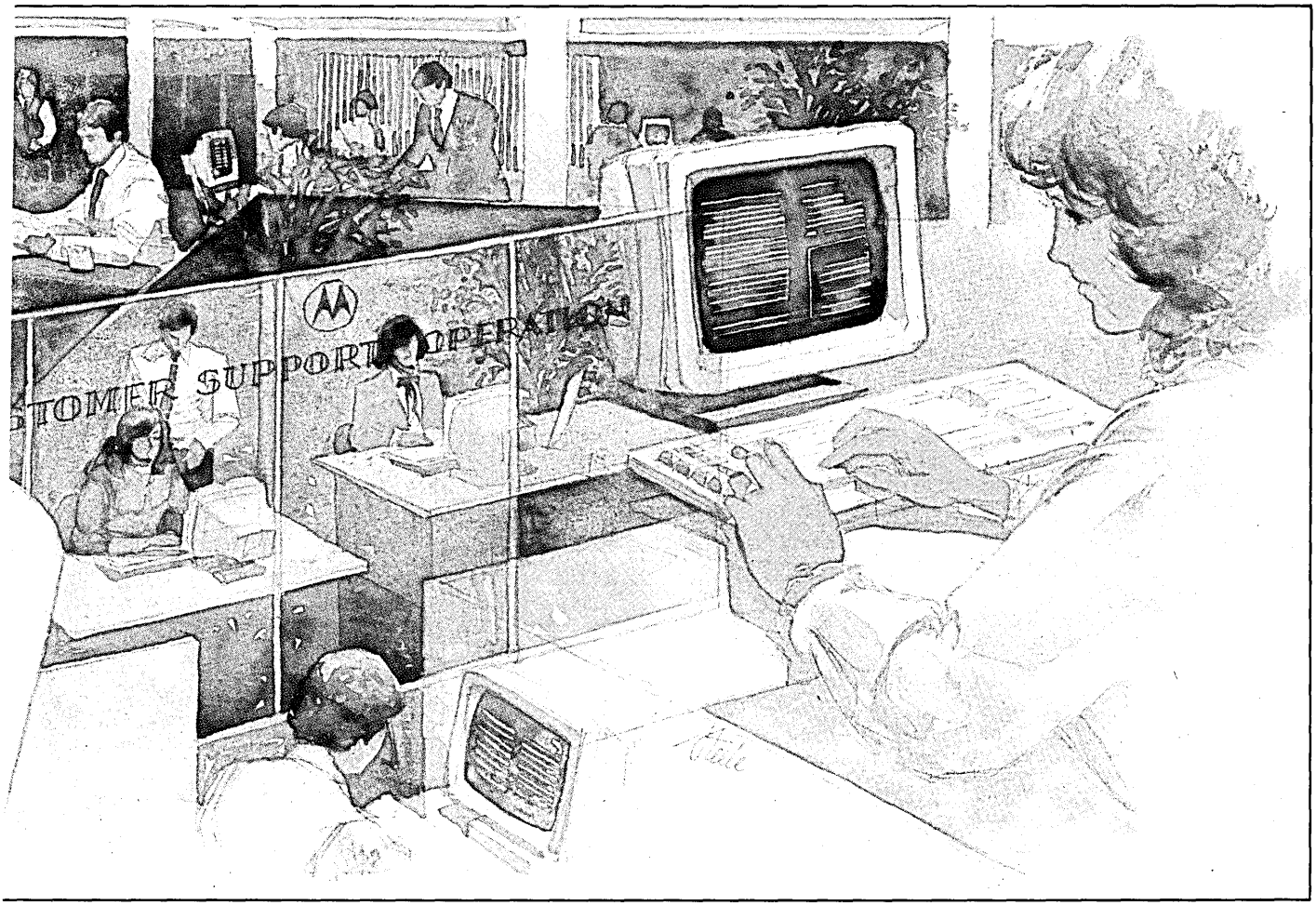

CIRCLE 60 ON READER CARD

"At this stage there will be a multiprocessing attack beginning with operating systems, and providing some of the tools for building databases, COBOL generation programs, and other applications," O'Brien says. "Next will come a series of application tools for larger systems that the company will publish for other developers."

In addition to the corporation's investment, AIDC will provide management support and will work to build the software company into the kind of operation it believes can succeed in global markets, says Barry Hilson, AIDC's senior manager for industry development. AIDC would also lend capital to buy source codes and to develop particular expertise in the area, he adds.

AIDC also has plans for assisting other locally developed software to reach wider markets, including providing information and advice regarding opportunities, product specifications, standards, packaging, documentation and pricing. "We expect to establish links with selected overseas companies to encourage technology transfer and for cooperative marketing purposes," Hilson says. The industry development concern plans to maintain close contacts within Australian academic circles as well as with specialists in the industry. Australia already has a solid base of Unix technical experts largely because of the use of the operating system in tertiary institutions. Hilson says that Fawnray will have additional capital requirements in the future, and would be looking for other investors. "We expect our equity to reduce from the 47% we have now to about 35% as new investors come in."

The federal government's policy of supporting Australian industry is supported by the leaders of the four Labour-held Australian states, especially in New South Wales and Victoria, which are the most heavily populated. New South Wales premier Neville Wran recently led a software trade mission to Tokyo that included discussions with six leading manufacturers. Several contracts are expected to be signed soon as a result of that mission. In Victoria, premier John Cain and the federal government were instrumental in convincing IBM Australia to transform its Selectric typewriter factory into a plant producing PCs and XTs for Australian and Asian markets.

South Australia has a technology park, where one of the leading activities continues to be terminal manufacturing despite the withdrawal of the founding company, Raytheon Data Systems. In Western Australia, a $2.1 million ($A2.5 million) technology park is scheduled. In Canberra, Prime Computer and Storage Technology have advanced software units, Wang is manufacturing color terminals, and Hewlett-Packard has signed as first tenant of the new technology park. More companies are joining in, among them Sperry, which is planning to spend about $33.6 million ($A40 million) on local offset projects.

One such project now in advanced discussions with the Victorian Economic Development Corporation, says Sperry marketing director Greg Pope, will be the production of world airline reservations systems, which are currently produced at Sperry's Minneapolis facility. Another venture is being coordinated with the computing science division of Queensland University to provide database material and other programs for Sperry's Mapper software system. Several ideas are on the drawing board for the software research institute that Sperry and the Western Australia government helped to found four years ago in Perth. The institute has been instrumental in designing packages for oil and gas exploration and production of minerals. ◉

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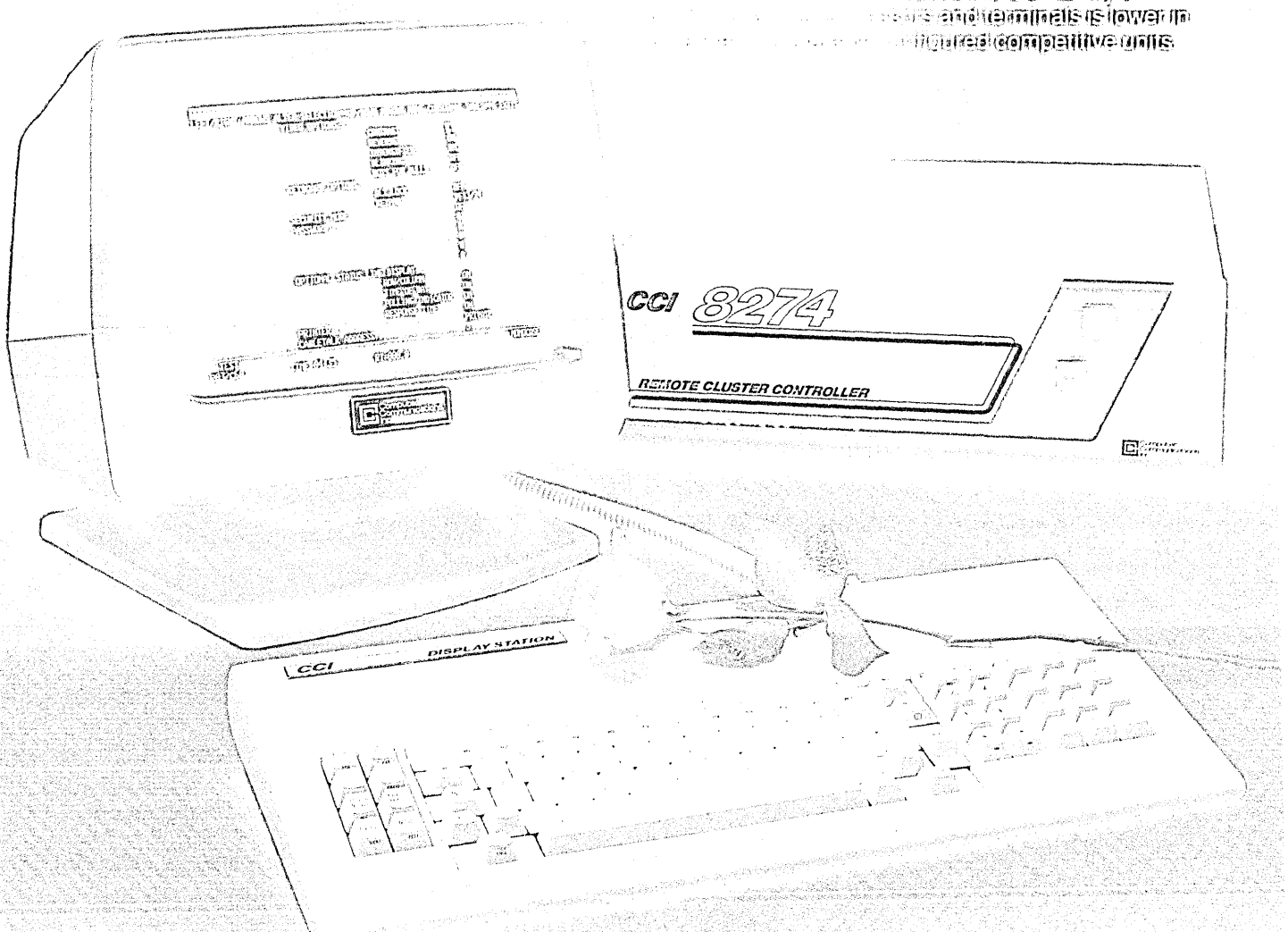

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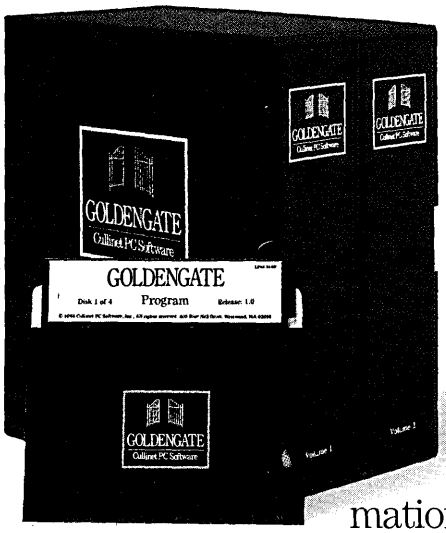

At last count, there were more than 50 integrated personal computer software packages. But for companies with IDMS/R, we'd like to suggest that only one really makes sense.

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

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

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

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

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

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NEWS IN PERSPECTIVE

BENCHMARKS

PROPOSED MITI LAW: Japan's Ministry of International Trade and Industry (MITI) claims a proposed "Program Rights Law" is a better approach to the legal protection of software than the present Japanese copyright laws. MITI had planned to submit the law to the Japanese Diet last spring but backed down under unified opposition from U.S. industry and government and Japan's own Agency of Cultural Affairs in the Ministry of Education, Science and Culture, which currently administers copyright protection in Japan.

Although MITI admits groundwork was inadequate prior to the initial introduction of the bill, it has regrouped to push the proposal next year after elections in Tokyo and the U.S. The bill aims to promote the use of software, under the jurisdiction of MITI, as well as to protect program rights. Essential to MITI's argument is the premise that software should be protected by an industrial property rights approach because it is a financial asset rather than a cultural asset like literature or music.

According to Katsuya Okada of MITI's Machinery and Information Industries Bureau and one of the authors of the MITI proposal, "Two main components of the bill, the time length of the protection period and the arbitration system to authorize the use of already existing software, are still undecided."

Industry observers consider MITI's willingness to compromise on these two points to be a smoke screen. A main concern is that MITI has the ulterior motives of protectionism and expropriation of foreign software technology to bolster the less advanced Japanese software industry. The vague language of the proposal could be used to compel registered software to be licensed in a variety of circumstances, especially when a Japanese competitor desires to develop "new software" from existing code. Although such cases would require a "proper" royalty payment, MITI historically has been successful in obtaining outrageously low prices or next to nothing for foreign technology with considerable commercial value.

The American side connects IBM disputes with Hitachi over compensation for the use of systems software with MITI's move to usurp the Agency of Cultural Affairs' jurisdiction over software. MITI's Okada claims the juxtaposition of events to be "bad timing" and denies any connection.

John Stern, senior representative of the American Electronics Association in Tokyo criticizes the proposal: "This law would in essence say that piracy is cognizable so long as it is for the good of local industry. If passed, it would cause many foreign firms to put the brakes on the transfer of technology to Japan. Such a law would come back to haunt Japan, which has clear plans to develop software as an export commodity."

The U.S. government is gravely concerned. Last March, Clyde Prestowitz, counselor to the Secretary of Commerce for Japan Affairs, informed the Japanese government that MITI's program rights bill would breach the Universal Copyright Convention and the Berne Treaty. U.S. negotiators have stated that enactment of the legislation would cause retaliatory action.

Timothy Dwyer, president of Prime Computer Japan Inc. and chair of the subcommittee on computers and telecommunications of the Japanese branch of the American Chamber of Commerce, says, "We have a united and unshakable position that the MITI proposal would be inimical to the U.S. computer and software industry."

The controversy is likely to continue simmering this fall with the post-election lulls in the U.S. and Japan being viewed as opportune time for MITI to muster support for a vote in Tokyo next spring.

NEW CHAIRMAN: David C. Cole succeeded the late George Tate as chairman of Ashton-Tate Inc., the Culver City, Calif., software publisher. Tate, 40, died in August of a heart attack. Cole, 31, joined the company in March 1982 as chief executive officer and later added the title of president. Under his tenure, Ashton-Tate marketed the widely popular dBase II microcomputer database management system, and introduced dBase III and the Framework integrated application package. Cole will step down as president but continue as chief executive of the firm. Edward M. Esber, 32, was named president and chief operating officer. He had been executive vice president of marketing and sales. Tate cofounded the firm in 1980 with partner Hal Lashlee and a $7,500 investment. Ashton-Tate recorded $39.8 million in revenues in 1983.

REVISED EXPORT RULES: When the Department of Commerce (DOC) last January proposed new export regulations, the industry found them not to its liking. It told DOC exactly that—about 250 times. DOC apparently got the message. Its newly proposed regulations go a long way toward alleviating the industry's objections and improving the existing program of distribution licenses (DLs). The new rules shift the burden of proving compliance from the government to exporters. That's as close to a 180° turn as any agency has ever done. "We would like to think they came to their senses and saw the light," says Vico Henriques, president of the Computer and Business Equipment Manufacturers Association (CBEMA).

It would have been hard for DOC to miss the handwriting on the wall after the response to its January proposals. Industry contended that tightening the DL procedure, which permits exporters to ship products to several destinations under one permit and accounts for $20 billion in exports annually, would hurt it badly in overseas competition. The previous proposals required the 780 DL holders to submit a list of actual or anticipated customers and distributors to obtain written certifications against unauthorized re-exports from their customers to prohibited countries. They also called for applicants to have received at least 50 individual licenses in the previous year and have had a minimum one-year written relationship with consignees other than subsidiaries.The new proposals don't require revealing the names of customers, delete the written certification requirement for distributors, and require the DL to replace only 25 individual licenses. They also note that records of both exporters and approved consignees will be audited by the Office of Export Administration (OEA) at "reasonable intervals." Fifty licensees will be audited in FY '85, which began Oct. 1, and 100 annually in subsequent years. Most companies and trade associations applauded the move while reserving the right to file further comments before the Nov. 13 closing date. "Our hunch is that they're much closer to something doable than anything we've seen before," said William Krist, international trade director of the American Electronics Association.

MAIL ORDER: IBM's Entry Systems Division has issued its first catalog of publicly available software programs written by IBM employees. The catalog lists 37 products for the IBM PC created under the Boca Raton, Fla., division's Employee Submission Program. Half the packages cost under $30, and all can be ordered by mail or telephone. The employee who created the program gets a cut of all sales. "The programs run the gamut from games to portfolio management," says Robert A. Markell, vice president of software development for the division. "This program will result in competition for products out there." Lest any traditional PC software vendors object to the catalog, Markell adds, "We are re-emphasizing our traditional sense of fair play as reflected in the open architecture of the PC. We are bending over backwards to provide products for our environment." ◉

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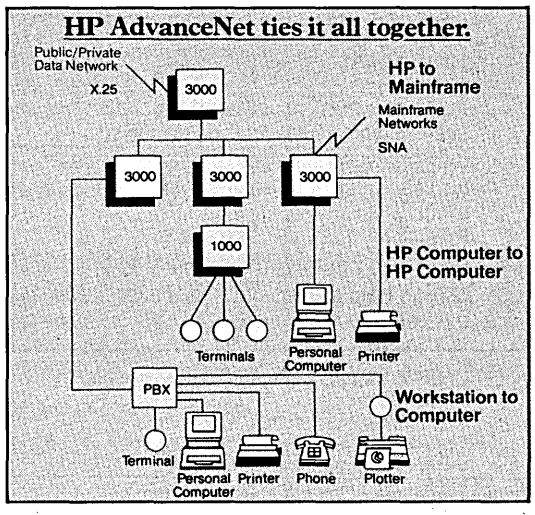

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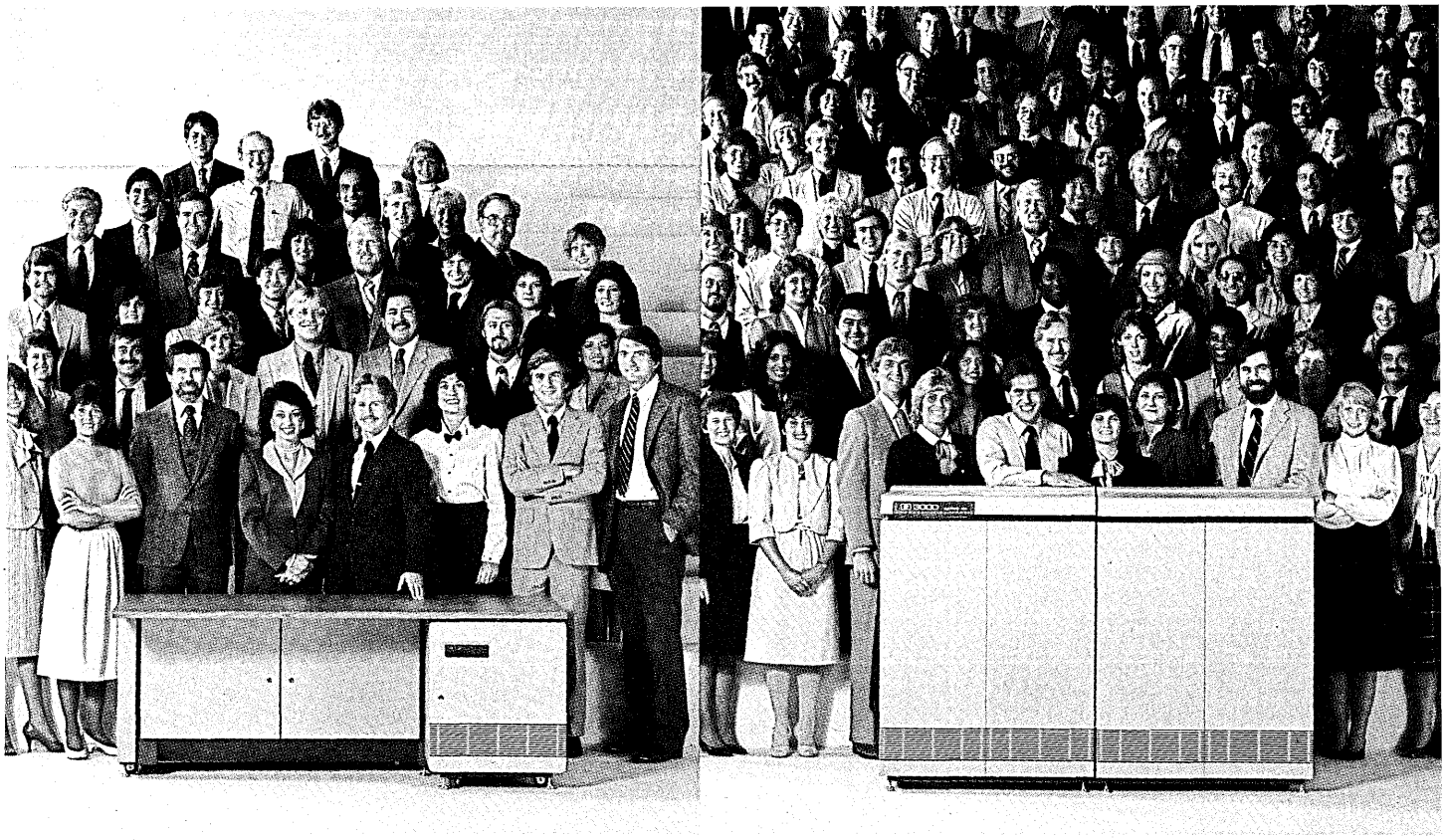

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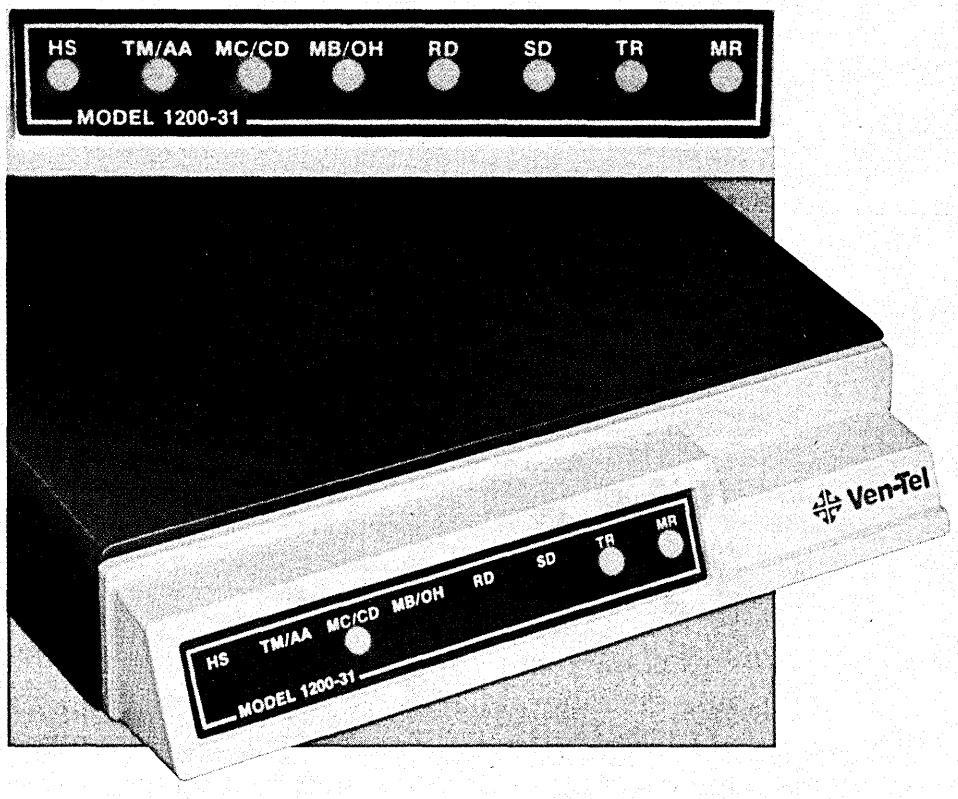

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Challenged by the mighty micro, remote computing companies are responding by moving into software, communication—and microcomputing.

HERE COME THE SUPER SERVICE BUREAUS

by Edith Myers

Service bureaus go back a long way in the data processing business—as far back, in fact, as do punched cards. IBM and Remington Rand started the ball rolling when they set up centers to demonstrate their tabulating equipment, allowing customers to test it before purchasing.

DATAMATION's March 1970 issue had service bureaus as its theme. An overview article stated, "The service bureau industry has a radically different appearance today than it did at the beginning of the 1960s." So change in the business is nothing new. The same article worried about pressures from such "low-priced" hardware as the IBM System/3 and minicomputers.

Since then, the industry has moved from simmering waters into a pressure cooker. Cheap micros have enabled service bureau customers to move many applications in-house. Market expectations have changed as a result of the micro. "Service bureaus are beleaguered by the onset of micros," says Ken Churilla, an analyst with Creative Strategies International, a San Jose, Calif., research firm.

Churilla is a veteran of the service bureau wars, having spent five years with IBM's Service Bureau Corp. (before its transfer to Control Data) and five years with Tymshare. He points out that users who have become accustomed to 9600-baud response on a pc aren't going to be happy with a service bureau's typical 300- to 1200-baud response, or even with a 2400-baud transfer rate, which is the highest the bureaus offer.

Churilla says bureaus also have lost software economy as a selling tool because mass distribution has brought the cost of software down. The remaining cost factor, he says, is communication—and that's getting more expensive.

Gloomy statistics abound in the bureau business. Input, a Mountain View, Calif., research firm, says, "Microcomputer revenue will claim an increasing share of RCS [remote computer services] revenue. In 1983, the share was 3%; by 1988 the share will be 25%."

Some firms are already feeling the pinch. Tymshare Inc., the Cupertino, Calif., service firm recently acquired by McDonnell Douglas Corp., reported a net loss in 1983 of about $1.6 million. Revenues were down 3% from 1982, to $289 million from $297 million. The Information Network Services Group of Computer Sciences Corp. (CSC), El Segundo, Calif., reported fiscal 1984 revenues of $93 million, down from $135 million in 1983. One of the reasons for the drop cited in the firm's annual report was "the continuing impact of new technology on traditional remote computing services."

Where is all this leading? The Yankee Group, a Boston-based research and consulting firm, discerns a trend toward a "new generation of super service bureaus" (see "Yankee Ingenuity," p. 117). The firm says such bureaus will offer a combination of access to processing power; applications-specific software, standalone, on-line, and hybrid; value-added services; intercompany computer facilities; micro-to-mainframe links; variable bandwidth services; on-site hardware; and customized communication software.

Peter Lowber, a Yankee Group senior market analyst, says it's a matter of service firms providing what users want. "They want a number of services they can't develop for themselves, things like intercompany billing services and intercompany network services, and connection to a variety of public databases."

The term super as applied to service bureaus isn't new. Dallas-based University Computing (now UCCEL) used it back in 1972 when it consolidated service centers in 13 cities into what it called "super centers" in five cities.

To UCC, super meant bigger. To the Yankee Group it means bigger and more. Using the second definition, Creative Strategies' Churilla agrees that super service bureaus are the wave of the future. "It's an

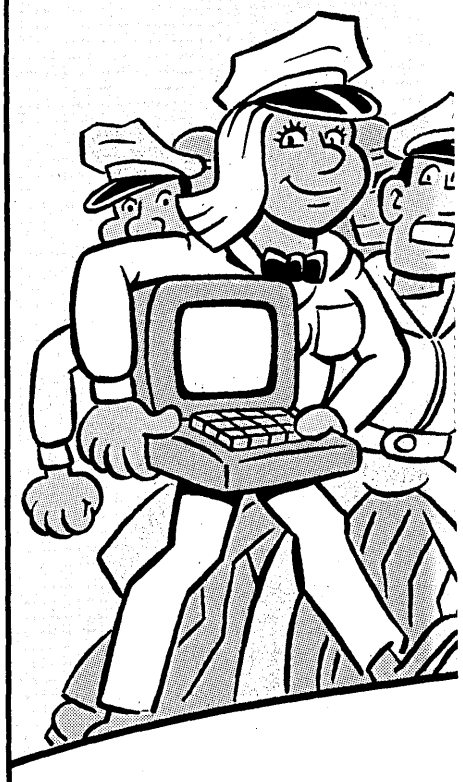

ILLUSTRATION BY DAVID COULSON

GM BUYS A SUPER SERVICE BUREAU

"I think you can work for GM and still be a human being," says Tom Lawton, editor and publisher of *Computer Services Report.* "It's much more difficult at EDS."

Lawton doesn't find much good news for GM's data processing people in the auto giant's high-priced purchase of Electronic Data Systems. In fact, Lawton suggests that the big buy may indeed convince data processing workers to welcome union attempts to organize computer rooms.

But Yankee Group's Howard Anderson says that GM's motive for buying EDS isn't just to tidy up the carmaker's own dp operation. "They didn't have to spend $2.3 billion to do that," he says.

GM's military business may play a big part, says Bernie Goldstein of Broadview Associates in Fort Lee, N.J. "GM realizes that software is going to be an increasingly important component of the military business. EDS gives them resources they'd have had a hard time building from scratch."

While there is still much to learn about General Motors' motives for acquiring EDS, some things are already clear. For one thing, the buy gave an inside glimpse at the auto giant's huge dp operations. For another, it invented a new way for high-tech companies to be acquired by companies outside the dp industry. It also shows how important the super service bureaus are becoming.

The dp industry has been relatively immune to the merger mania that has been transforming corporate America. The main reason: most corporations have been reluctant to acquire dp companies for fear their entrepreneurial founders would take the money and run, leaving the acquirer to manage a business of which it had little knowledge. The other main drawback to acquiring a dp operation was paying for it. While dp companies currently enjoy investor favor, and have price/earnings ratios to prove it, many companies in more mature industries are selling at bargain prices. Consequently, paying for a dp acquisition with stock in a mature company can be an expensive proposition.

The GM/EDS deal approaches these problems in new and exciting ways. General Motors will acquire all of EDS's stock and issue GM Class E shares. These shares will be geared to EDS's performance, not the rest of GM. EDS's books will be kept separately, and EDS will continue to issue its own financial statements. Because the Class E shares will trade on EDS's performance, GM figures that stock options can convince EDS's creative employees to remain on board.

The actual deal is quite generous to EDS's shareholders. General Motors offers either $44 per share or $35.20 plus one fifth of a new Class E share. (In other words, the owner of five EDS shares can either get $220 or $176 plus one Class E share.) The deal also protects EDS's shareholders with a special seven-year contingent promissory note, which guarantees prepayment of $69 after three years and $125 after seven years for each Class E share. In other words, if the shares have not reached these prices under their own steam, GM will pay these values to buy back the stock. GM also promised to issue another 22 million Class E shares over the next two years (without the promissory note attached); this is meant to create enough Class E shares to maintain trading.

Apparently willing to do almost anything to get EDS, GM also promised that EDS can retain all its current officers and keep its headquarters in Dallas. The scope of what GM is willing to give raises a question: why did GM want EDS so badly?

GM Chairman Roger Smith wanted to make a merger, and he asked the investment banking firm of Salomon Brothers to come up with some possibilities. Salomon prepared a menu of options, and Smith chose EDS. Smith then personally approached Ross Perot of EDS. Most observers of the deal think that Perot would have said no to almost any other deal, but joining GM was too tempting to refuse.

GM has traditionally maintained a discreet silence about its dp operations, but since this deal was announced the auto giant has been letting little pieces of information drop. For example, GM treasurer Courtney Jones recently told DATAMATION that GM's dp budget is about $6 billion a year. With that figure in hand, GM's desire to purchase EDS becomes much clearer. It also explains what Jones means when he says that data processing systems have become the basic fiber of GM's business. Obviously, GM hopes that EDS will be able to cut these costs while increasing efficiency.

But when EDS does dp work for GM, how will GM pay EDS? The possibility that GM may demand price concessions is very important because if EDS has to do cut-rate work for GM, then its own shareholders will be hurt.

According to GM's Jones, "There will be an arms-length relationship, much like GM currently has with GMAC and Delco." A number of Wall Street auto analysts have long suspected that GM was paying its dp personnel salaries much higher than dp industry standards, and EDS is expected to remedy that situation. On the other hand, these same auto analysts know that GM drives a hard bargain with its auto part suppliers, and point out that this is an area of potential conflict.

But conflict has never bothered EDS founder Ross Perot. EDS was founded in 1962, when the IBM hierachy decided that Perot, an IBM salesman, couldn't sell any more that year: by January he had already surpassed his yearly sales quota. During the Vietnam War, Perot received international attention when he tried to send Christmas presents to American soldiers being held prisoner in North Vietnam. The State Department's attempts to discourage this plan fell on deaf ears. Only Hanoi's refusal to grant landing rights dissuaded Perot. Perot's second foray into foreign policy came when two EDS employees were taken prisoner during the Iranian revolution, and Perot hired mercenaries to free them. In his most recent crusade, Perot has been attempting to upgrade the Texas educational system. In the process, Perot inspired the ire of almost the entire state when he declared that high school football was interfering with education. The Texas legislature eventually saw Perot's point and voted some reforms.

These episodes paint Perot as a maverick who follows whatever path he chooses. Nevertheless, Perot demands strict conformity within his company, and requires that all male employees have no facial hair, wear suits, and generally look neat as a pin. Those who don't, don't last long. How's this going to fit in with GM's operation?

Perot likes conflict, so he's likely to feel right at home, and after paying $2.5 billion for his company, GM doesn't have much choice but to go along.

—Pamela Archbold

obvious direction. There'll be a lot of consolidation like McAuto and Tymshare. We'll see more of that. I also see industrial or Fortune 500 companies acquiring timesharing companies, companies like American Express and Citibank doing this to enhance and expand services they already have."

Thomas Lawton, editor of the *Computer Services Report,* a monthly newsletter, also anticipates the trend. "There will be some supers," he says, "and EDS will provide the model. They'll have enormous amounts of capital and large accounts. Look at the way they [EDS] went after Medicare and Medicaid. Then there is their agreement with Hogan Systems [the Dallas-based banking software firm] that gets them in banking. The supers will seek business segments where large accounts are available, and the bigger they get to be the more segments like that they'll go after. But they won't be spread all over the map."

The emerging super bureaus will emphasize information management as opposed to processing. Their managers "will be getting smarter about business as opposed to technology," says one observer. "The super service bureau delivers a valuable corporate information resource," says

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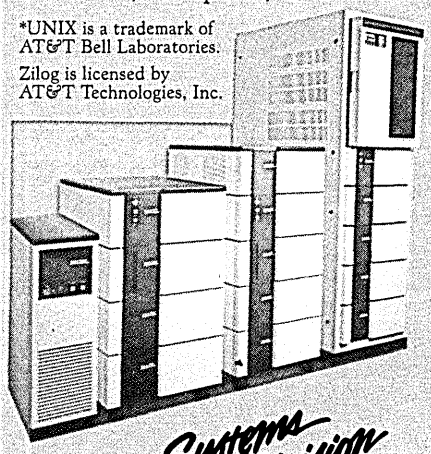

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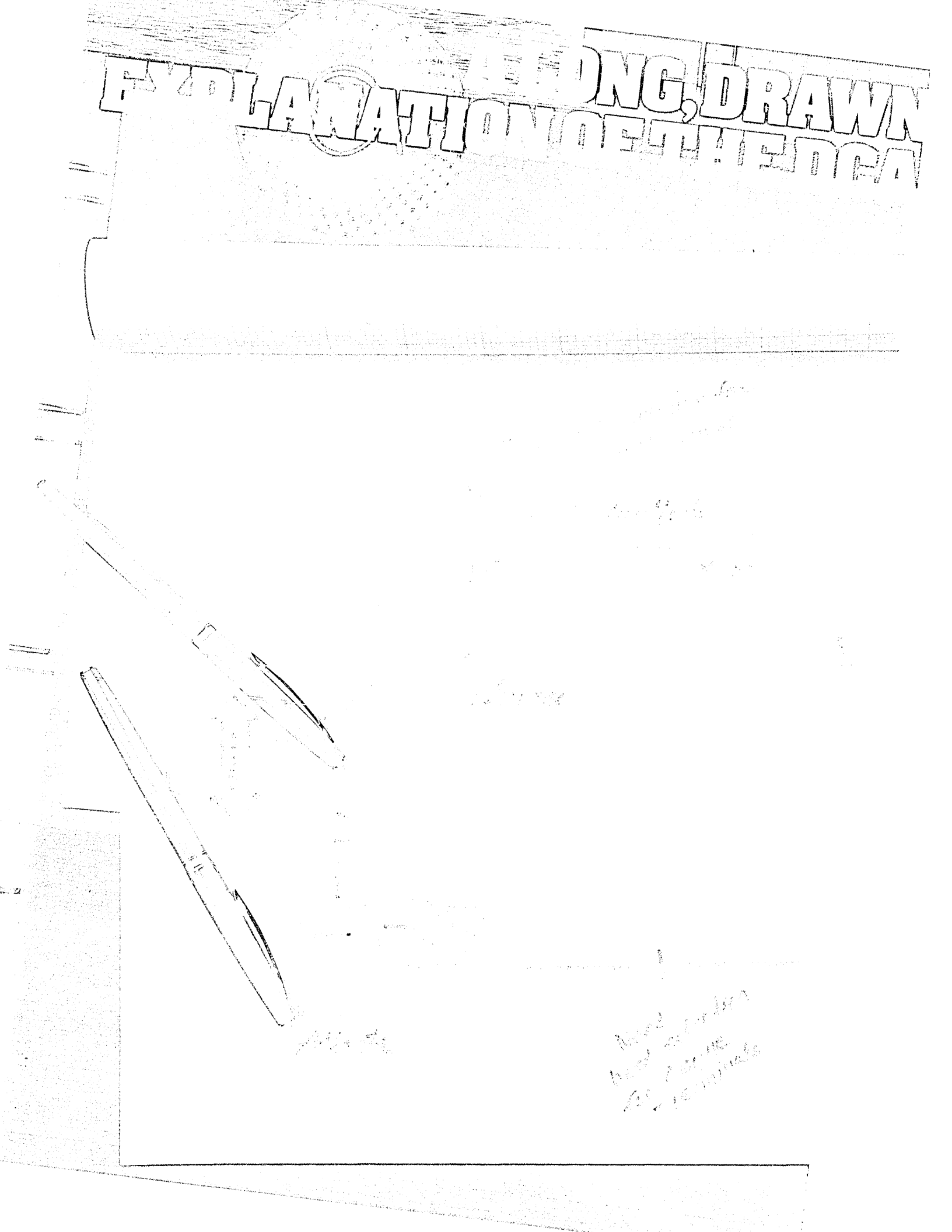
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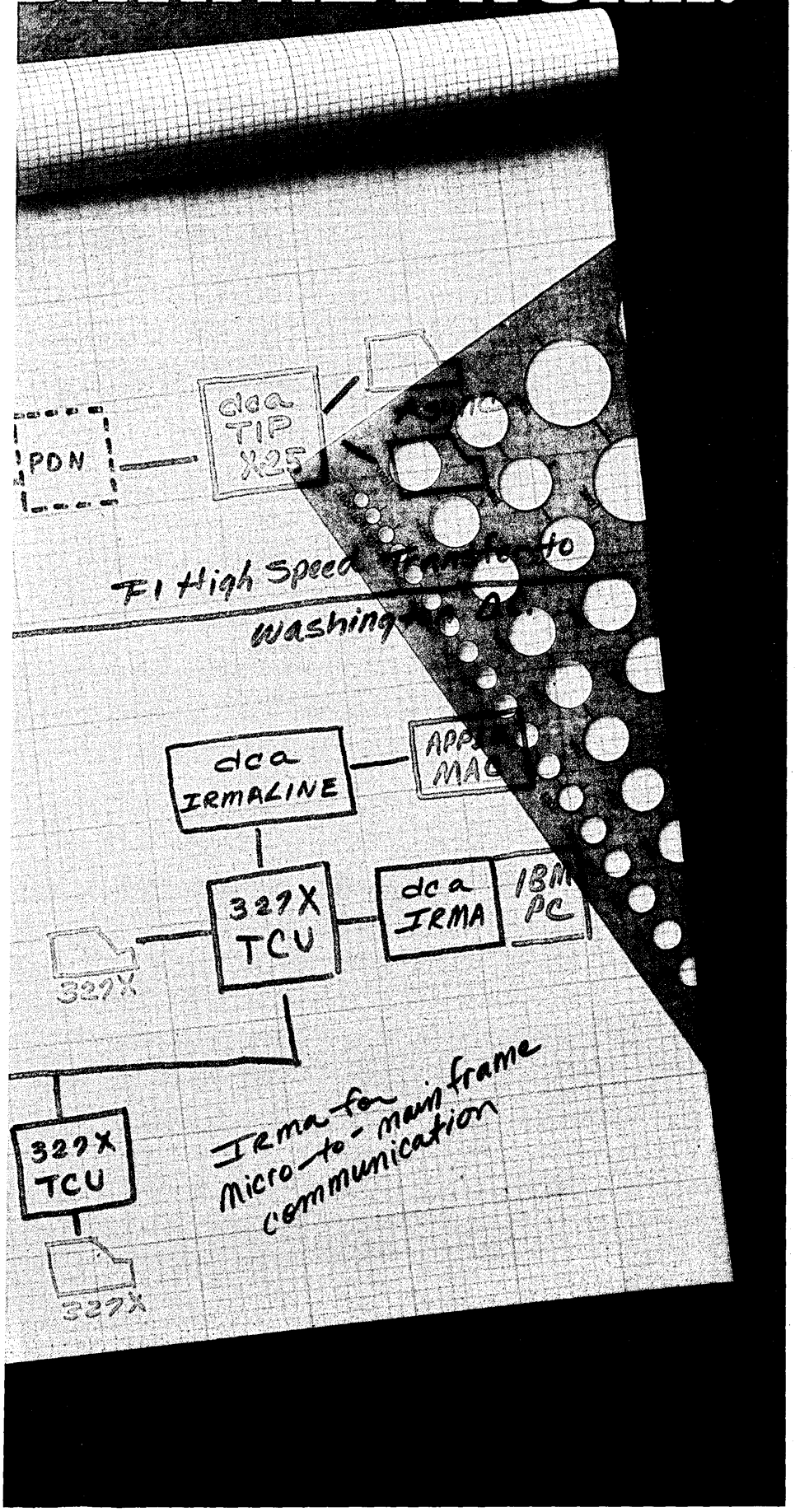

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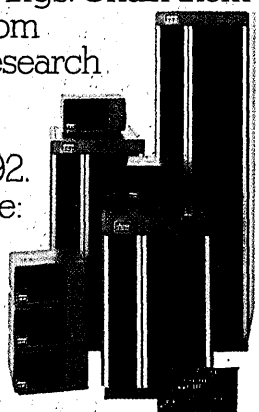

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CIRCLE 69 ON READER CARD

"The super service bureau delivers a valuable corporate information resource."

the Yankee Group.

At a summer Yankee Group seminar entitled "The Next Generation of Super Service Bureaus," W. James McNerney Jr., senior vice president of General Electric Information Services Co. (GEISCO), described his firm as "a successful information management company," and defined information management as "the intersection of communications and computing."

At the same seminar Allen F. Rehert, director of customized services, Product Management Center, AT&T Information Systems, described AT&T's Net 1000 as "part of the overall AT&T information systems architecture" and as "addressing business needs through networking solutions."

W. Bradford Rigdon, vice president, MDC Services, McDonnell Douglas Corp., looked at the "future information industry" and divided it into two sectors. The first consists of the full-line information systems manufacturing and sales companies, of which he sees five to seven—including IBM, AT&T, and Japan Inc. These companies are vertically integrated and worldwide in scope. The second sector consists of specialized information systems suppliers and service companies. Here, Rigdon foresees 20 to 30 market segment leaders—including General Electric, Wang, Control Data Corp., Automatic Data Processing (ADP), and EDS—oriented toward specific industries and offering proprietary solutions. He sees his company's opportunity in the second group.

"We're awakening to the idea that we are in the information business," says a spokesman for Boeing Computer Services. Boeing is gradually merging its computer services, network services, and office services into an integrated information services offering.

"It's essentially a matter of expanding delivery modes," says Jack Keen, a vice president of Input. He believes that for RCS vendors to even survive, much less grow, they will have to offer timesharing, on-site pcs, and turnkey systems, and that they'll have to beef up installation support and education.

"The biggest challenge is management," says Keen. "The whole RCS arena is changing rapidly, and the organizations have to change with it. If they have the management that can make that happen, it will. But it won't happen overnight."

Keen looks for more consolidation by 1990, leading to "a few gigantic, billion-dollar-plus-type RCS companies," but he doesn't see the population dramatically decreasing. "There'll always be room for smaller speciality offerings." The Yankee Group's Lowber looks for "a continuing shakeout" in the RCS business and "more acquisitions and mergers."

The Cerberus Group, a Frenchtown, N.J., consulting company, reports that net acquisition and merger announcements for the computer services industry in the first six months of 1984 totaled 104, up 62.5% from 64 in the first half of 1983.

MERGERS AND TAKEOVERS

An index produced by Broadview Associates, Fort Lee, N.J., in conjunction with the Association of Data Processing Service Organizations (ADAPSO), reports 55 mergers and acquisitions in the services industry between January and June of 1984, and values those transactions (including the GM-EDS deal) at over $3 billion. The index for the same period in 1983 shows 60 transactions valued at about $409 million.

George Grodahl, a Broadview partner, said the acquisition of EDS by General Motors for $2.5 billion and of Tymshare by McDonnell Douglas for $307 million, the largest and second largest purchases in the history of the services industry, "show that the nation's largest firms are evaluating the leading companies in the computer services industry as a way of diversifying and gaining entry into software and information processing." (See "GM Buys a Super Service Bureau," p. 112.)

Grodahl looks for a "massive migration of the smokestack industries" into computer services. "They like it because it's high growth, high tech, and not capital intensive." Grodahl says Broadview estimates there are at least 500 companies looking to acquire services firms.

On the other side, he says, there are service companies that have reached a point where they have a developed product and a nice market niche and need capital, credibility, market outreach, and management expertise, among other things. And, he says, "it's now culturally acceptable to sell your company."

Grodahl believes every major independent services company is a potential target for big companies who "are looking at the industry with deep pockets. They want a significant position; their targets will be billion-dollar companies. That's CSC, EDS, and ADP; and EDS is gone."

Grodahl says the potential buyers include aerospace companies, oil companies, telephone companies, banks, insurance companies, and some foreign firms. He doesn't look for any unfriendly takeovers. "We've never had an unfriendly takeover in this industry. People are a big part of what's being acquired."

Bob Knight, president of the Information Network Services Group of CSC, says his company "is nicely positioned for the next 10 years and does not want to be acquired. But you never know."

Knight says that in the commercial and international segment of its services business, CSC is "putting much more focus on networking as opposed to computing." He sees this as a natural evolution for CSC's Infonet value-added network (VAN).

Churilla of Creative Strategies sees RCS firms emphasizing VANs as "a diversification strategy." He feels VANs are a means rather than an end. That outlook appears to be shared by ADP, which has indicated that its VAN, Autonet, is a temporary answer to the inadequacies of today's telecommunication offerings.

Howard Anderson, managing director of the Yankee Group, sees VANs as a resource and a strategic weapon for super service bureaus. Keen of Input sees them as "a definite plus" for the full service approach to the services business.

Keen sees joint ventures as another important trend in the services business, primarily because they can get service firms more firmly entrenched in software. As an example he cites an arrangement between Computer Task Group, a Buffalo service firm, and Boston-based Cullinet Corp., a software company, under which each sells the other's product offerings.

Comshare Inc., Ann Arbor, Mich., has a joint marketing agreement with IBM for its System W decision-support software. And Control Data is marketing VisiCorp's VisiOn.

Services companies are moving into software in other ways, too. Both CompuServe, Columbus, Ohio, and GEISCO are downloading software to customer pcs, thereby acting as distributors for small software developers who can't afford the cost of selling. The Yankee Group's Lowber sees downloading of software by service bureaus as "a trend to watch out for."

SERVICE & SOFTWARE COMBINED

Lowber believes the combining of services and software offerings is essential to the emerging super bureaus. He says Informatics General, which sold its cross-industry remote computing business to Litton Industries last spring, "didn't really do this well, and the same goes for UCC [now UCCEL]."

Keen of Input notes that both Boeing and GEISCO "are putting more and more emphasis on software-related consulting services, which will lead to more and more package offerings."

YANKEE INGENUITY

Howard Anderson of the Yankee Group called the shots for the future of the computer services industry when he described the birth of the super service bureaus last year. It isn't the first trend to be spotted by Anderson. He got his start in 1976 by predicting the reshaping of the Bell System, and in 1979 he predicted the coming of the advanced workstation, which arrived in the guise of the pc.

DATAMATION caught up with Anderson in a hotel ballroom where New York society gets married. He was preaching the Yankee Group gospel of super service bureaus at a Yankee Group seminar in the Terrace Room of New York's Plaza Hotel. Seventy-six seminarians from both vendors and users listened to executives from GEISCO, McAuto, Bolt, Baranek & Newman, Boeing, AT&T Information Systems, IBM, MCI, and ADP. They talked about the super service bureau, the transformation by telecommunication and other market forces of the computer services business. When a speaker wasn't forthcoming enough to suit Anderson, he took over the question session to demand more information. Timidity is as foreign to Anderson as it is to the research firm he founded almost a decade ago.

The Yankee Group watches the dp industry from the top floor of an art deco tower overlooking the Boston Harbor. Working in offices that range from paneled propriety to editorial squalor, about 80 people gather, mull, and publish the data for which clients around the world will pay $8 million in 1984 and $11 million in 1985.

Of his staff Anderson boasts, "You'll never find everyone in the office at the same time." And, from the evidence of a recent visit to the Yankee Group headquarters in Boston, Anderson is right. IBM watcher Frank Gens, for example, is just back from advising a Midwest user-client just how to update its organization. Dale Kutnick, an ex-journalist from Yale, isn't around: he's off to Australia to appear at a seminar organized by the Yankee Group's outpost in the antipodes. Several other researchers and consultants are on the road as well, running seminars, visiting clients.

As recently as 1978, the Yankee Group was composed of Howard Anderson, two secretaries, an idea, a post office box, and a phone number. With the hiring in the late '70s of Dale Kutnick, now Anderson's right-hand man and head of the Communications and Information Systems (C/IS) piece of the business, the Yankee Group began to expand. Kutnick, a self-described "information junkie," was an ex-English major from Yale, a free-lance photojournalist who had been working for a Boston-area consulting firm. To describe the kind of staff that Anderson and Kutnick have assembled, a template might be cut from Kutnick's own resumé: the researchers in particular are liable to have Ivy League credentials, with English majors and science minors or vice versa. "The primary skill we look for in researchers," says Kutnick, "is writing ability. We want people who can explain things, people with an intense desire to learn."

Each month, two or three questionnaires are sent to between 5,000 and 10,000 users of particular equipment, asking what the users are doing, what they are planning, and what functions they want to see on new equipment. Most important, perhaps, the questionnaires seek to discover what the users "are willing to pay for." The results of these inquiries are then compared to what the Yankee Group hears from its user and network councils, groups Kutnick describes as made up of representatives of the "150 top users and 150 top network users in the country." In addition, the individual researchers function something like journalists: their phones might as well be surgically implanted. Don Gooding, director of telecommunications research, says, for example, "My Rolodex is my fortune." (Anderson estimates that the Yankee Group pays a yearly phone bill of about $250,000, despite least-cost routing on its Rolm CBX-2, dial-up Sprint lines, and direct SBS bypass of the local loop.)

The Yankee Group has clients from both the vendor and user communities, with vendors currently holding the edge. Sixty U.S. users and more than 100 U.S. vendors are signed up with the C/IS piece of the business. In Australia, there are about 50 clients, and about 45 European clients are served by Yankee Group's U.K. branch. The Yankee Group also offers home of the future and factory of the future services for which there are a total of about 100 clients.

All of this has meant explosive growth for the Yankee Group. Early on it was posting annual increases that neared 100%, but this has settled down to a merely incendiary 30% to 40% annual increase. "The company is profitable," adds Kutnick, perhaps unnecessarily.

According to both Anderson and Kutnick, the Yankee Group carefully avoids the conflicts that selling advice to both vendors and users could produce. But a new venture of the Yankee Group suggests that the path before it may be dotted with land mines: a recently formed venture capital fund that will put money into high-tech startups. While the venture capital fund is being operated at what Anderson calls "arms-length distance"—and a dozen floors below the main Yankee Group offices—there is potential for conflict of interest. True, the Yankee Group is not the only high-tech research/consultant firm to seek the big payoff of venturing, and Anderson says he's cleared the idea with his clients, but, given the current climate, it's probably a good thing Anderson doesn't have any relatives running for vice president.

—Parker Hodges

CSC's Knight says CSC acquired its DARTS (Distributed Automated Real Time System) software for distribution industries when it acquired a company called CMS four years ago. In July of this year, CSC got manufacturing software by acquiring Compufact of Santa Ana, Calif., which sells Pick-based software and turnkey systems for discrete manufacturers, primarily in electronics. Since the Compufact systems are based on Prime computers, that acquisition also got CSC into the business of being a Prime distributor. The company is also a value-added reseller for Texas Instruments and IBM.

Knight says CSC is focusing on manufacturing and distribution for its commercial and international services offerings and is considering acquisitions that would move it into other vertical markets. "You have to pick your spots," he says.

Computer Services Report editor Lawton agrees. "The key thing now [for service companies] is to pick those segments you can attack and in which you can become number one or number two." He believes there is room for more than one big service provider in most vertical markets. "Clearly EDS, with GM, will become a large supplier in manufacturing, but there's a lot of room there for other people."

Lawton also feels that the need to grow will eventually require a specialized service offerer to move into more than one vertical segment. "Shared Medical [Shared Medical Systems, Malvern, Pa.] has done very, very well in the medical market but it can't grow at an enormous rate just there. It has to be looking at other sectors."

As it was in the beginning, the hardware vendors want to use services to sell more hardware.

Policy Management Systems, Columbia, S.C., has done well in the casualty insurance business since its creation in 1981, says Lawton. "It had sales of $62 million in 1983 and income of $10 million. It isn't at the point where it needs to consider another segment. But in a few years . . . ."

Companies entrenched in vertical markets are constantly trying to get in deeper. "You have to continue to offer existing clients new services," says Keen of Input. "If you're into banks, add trust processing."

Endata Inc., Nashville, Tenn., which has a division specializing in electrical distribution services, has added an excess inventory pool through which users can offer and find needed parts.

WAY FOR BUREAUS TO EXPAND

Keen sees application of fourth generation languages as a way for bureaus to expand the number of their users. Nomad2, the fourth generation language offered by D&B Computing Services, Wilton, Conn., (formerly National CSS) has certainly changed the nature of that company's business. Andrew Abraham, vice president of marketing and development for the Dun & Bradstreet sudsidiary, says, "We've changed from a remote computing service to a software company." Nomad, an eight-year-old product, was offered only on a service basis until two years ago when D&B began installing it at customer premises bundled with its own proprietary operating system, VPCSS. Last January, the company began offering Nomad2 for IBM VM/VMS and MVS/TSO environments and that's when the big shift in emphasis really began.

"We help customers set up information centers and use Nomad for their own applications development," Abraham says. He says his firm continues to maintain a "remote information center," which customers can use while waiting for their own.

Electronic data interchange (EDI) is a technology Knight hopes will get CSC into new markets. This concept, linking the cpus of buyers and suppliers, is something CSC is just getting into with "two small operations for distributors." Similar EDI offerings come from Informatics, which retains a service center for distributors in Riverdale, Md.

CSC also has a small group looking at developments in artificial intelligence. "There's been a resurgence of interest in AI," said Knight, "and we feel we have to look at it. But it's not a major niche for CSC yet."

Tymshare does have a product that could be described as AI-based—a financial modeling system called Reveal, which the firm describes as an "expert system."

Most contenders for "super bureau" niches are looking into voice recognition, but nothing major is available yet. GEISCO does offer an audio response service for order entry.

The Yankee Group's Lowber views both artificial intelligence and voice recognition as important technological directions for super bureaus, along with truly distributed databases and integration of document transfer and office applications.

But for now at least, Xerox Computer Services, Los Angeles, is placing its bet on communication, specifically KU-band satellite disks. "Most of what you see today is C band," says Bill Fello, XCS president. "What we do with four-foot disks at a $6,000 price wouldn't be economical with the $20,000, 10-foot disks required for C band. We think satellite transmission is going to revitalize the services industry." KU-band satellite transmission is not regulated by the FCC.

Fello says XCS is going to "totally move away from telephone lines." Currently, the company uses 300,000 miles of leased lines. It has its satellite service in at five beta test sites and, if these go well, will convert the bulk of its customers during 1985.

XCS does use 10-foot disks at its data centers. Data are beamed from the centers up to a General Telephone satellite for transmission to four-foot customer disks. "A user can decode only what's his," explains Fello, "and this is transmitted over a local area network to pcs."

UNCLE SAM BEST CUSTOMER

For the more traditional forms of computer services, the government remains the best customer. Gay Adams of Input's Washington, D.C., office says that in FY '83, the federal government spent about $730 million on services, including remote processing, remote batch, and facilities management. She expects that figure to reach $1.3 billion by 1990. An earlier Input estimate, however, has the $1.3 billion figure being reached by 1988. This was revised because of the increasing use of micros in government agencies.

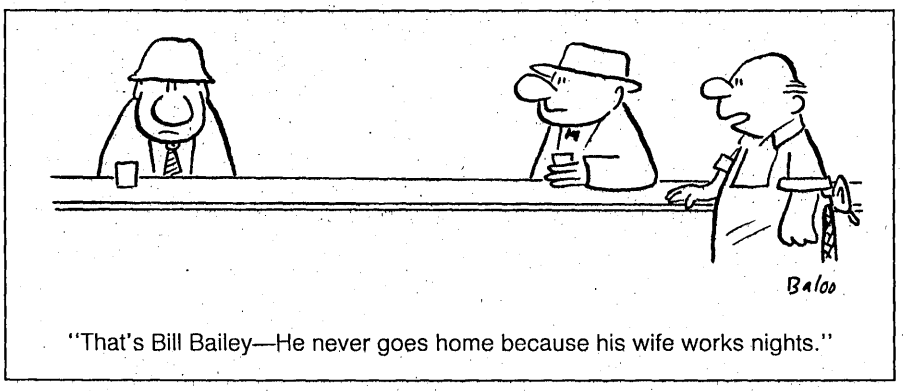
CSC's Knight says the government accounts for 30% of his company's business. He adds that CSC will "continue to focus on remote computing services and facilities management for that segment for the foreseeable future."

Lawton of *Computer Services Report* feels facilities management is in for a resurgence in other markets. He thinks the growing number of hospitals that want their dp operations in-house will "give facilities management a new lease on life" in that field. He cites CompuCare of McLean, Va., which provides facilities management for hospitals. "They just went public this year, and in the year ended Dec. 31, 1983, they had sales of $40 million. Shared Medical and McAuto, which have the lion's share of the medical market, will have to make some decisions, to place their bets."

Knight of CSC is placing at least one bet on what he sees as a large market created by the AT&T divestiture. "Western Electric used to provide services to the operating companies and other AT&T entities, and it can't do that any more."

And, just as service bureaus started with hardware vendors, they're coming back in that part of the industry. "Hardware vendors are a natural to offer services," says Lowber of the Yankee Group. "It's a natural migration." As it was in the beginning, the hardware vendors want to use services to sell more hardware. "It's a bait and switch routine," says Lowber. As yet, AT&T's Net 1000 and IBM's IN haven't severely affected the service companies. Some feel they never will.

"They have other priorities," says Keen of Input. Knight of CSC says he doesn't see either giant as a force right now, but for the future—"They have huge, deep pockets." ◉



"That's Bill Bailey—He never goes home because his wife works nights."

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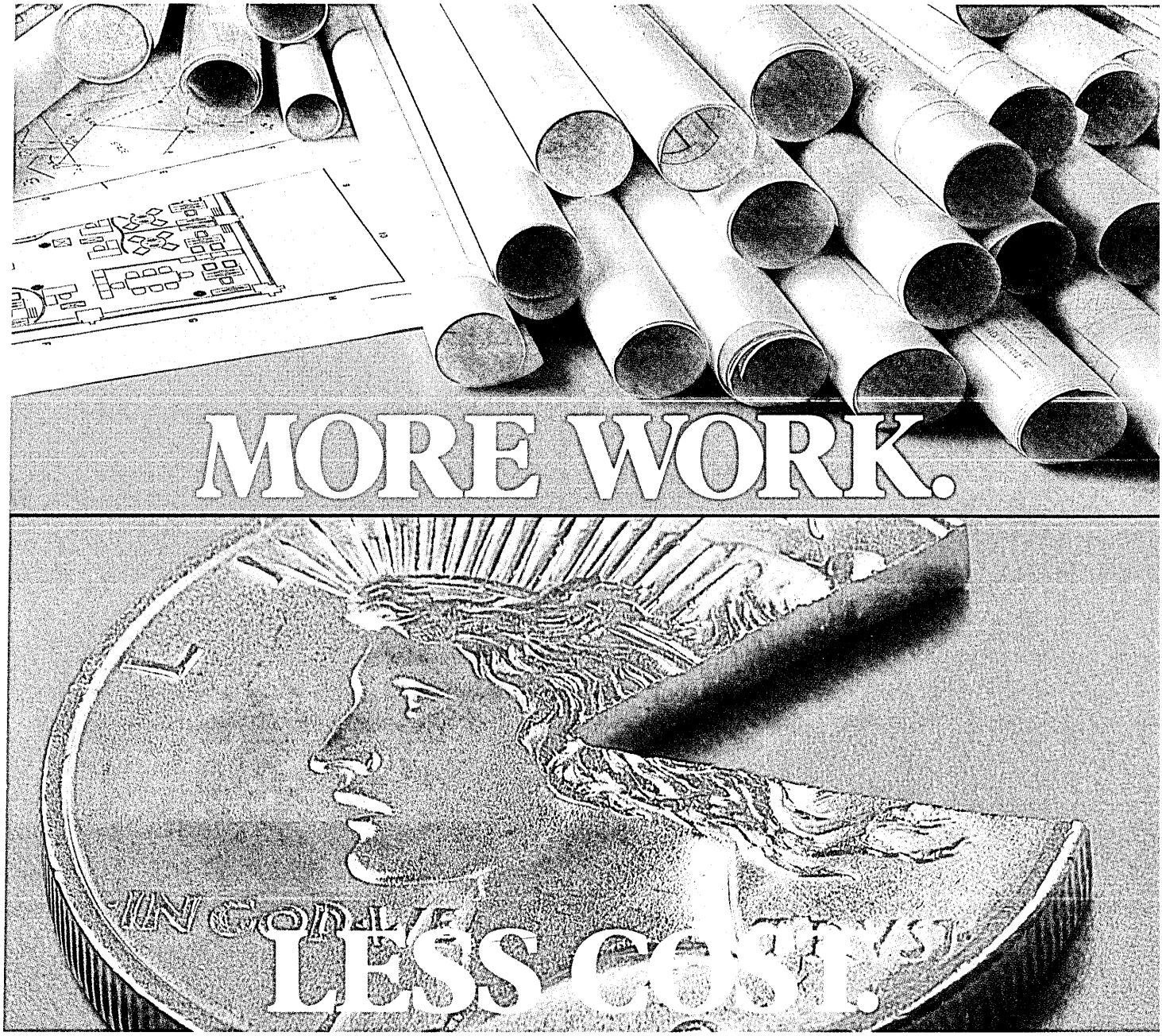

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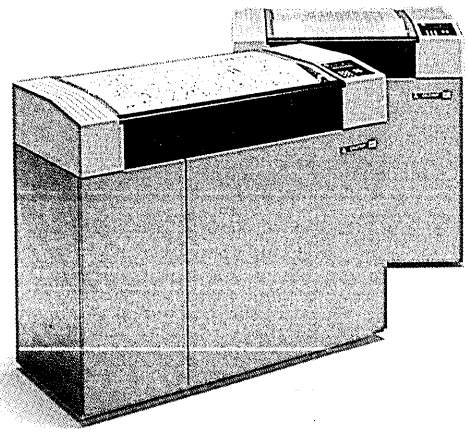


With CalComp 5700 Series electrostatic plotters, there's no need to compromise productivity, image quality, or your budget. And a choice of four models assures a precise match with your needs.

Discover how CalComp's electrostatic plotters can do more work and cost you less. **Call toll-free today, 1-800-CALCOMP, ext. 156,** or write CalComp, 2411 W. La Palma Ave., P.O. Box 3250, Anaheim, CA 92803.

CALCOMP 25 1959 1984 CALCOMP
A Sanders Company

CIRCLE 70 ON READER CARD

Since 1977, some of the most significant software developments have taken place in a small town in Illinois.

Urbana, Illinois does not readily come to mind as a wellspring of advanced software development. Yet here, in what many might call a "think-tank" atmosphere, a cohesive group of software engineers and computer scientists is producing the software that will set standards far into the future.

These people, whose roots go back to the very beginning of the computer industry, are the nucleus of the Gould Software Division. They are immensely talented, and possessed of the vision which has allowed them to recognize both the challenge and the opportunity inherent in an emerging Information Age: to create portable software products that deliver productivity improvements for software development and decision making processes in an increasingly distributed computing environment.

They have met the challenge with a set of unique software products that closely integrate distributed capabilities, support heterogeneous computing environments, provide distributed system security, and allow for the transparent sharing of resources.

Man must continually seek ways to make computer systems more productive. The Gould Software Division, a pioneer in the development of advanced software, is already well on its way toward making that goal a reality. See how far we've come. Contact Gould Software Division, 1101 East University Avenue, Urbana, Illinois, 61801. (800) 952-8888 or (217) 384-8500.

GOULD
Electronics

CIRCLE 71 ON READER CARD

There are now over a dozen firms that offer or plan to offer on-line software guides.

ELECTRONIC DIRECTORIES

by Mick O'Leary

Twenty thousand? Thirty? Forty? No one can honestly claim to know exactly how many software packages are on the market. Everyone does know that the number has been exploding in the past few years, especially in the wake of the micro invasion. Whatever the numbers, they must make the serious software shopper ambivalent. It is nice to have many products to choose from, but this very abundance has made selection and evaluation an enormous problem. For many applications there may be hundreds of packages, and new ones are appearing almost every day. Some are heavily advertised, but many are brought out by fledgling or underground producers and may escape notice by even the most conscientious shopper.

The software market does, of course, have its guidebooks. There are any number of software information sources, from large, well-established publishers like Datapro, Auerbach, and International Computer Programs (ICP), to paperback directories that continually appear on the shelves of computer retailers and bookstores. Many of these provide responsible and thorough coverage, but as printed books they face two objections, one minor and the other insurmountable. First, many people dislike the sometimes laborious process of using a large directory, leafing through pages of listings or back and forth through indexes to find what they want. This may be only a matter of taste. More serious is the certainty that any printed work is out of date even before it reaches its readers' hands.

The solution to these shortcomings has been in place at least since the early '70s, when several producers of financial data and technical literature set up mechanisms through which subscribers could conduct direct, on-line searches of their databases. Using sophisticated search software to query a rapidly updated database solved both problems related to the printed directory. Since then, finding many applications on-line has become commonplace. Information producers regularly announce on-line counterparts to their publications, or even bypass that stage entirely with so-called electronic publishing.

In this context, it was only a matter of time until the on-line solution was applied to software information. There are now over a dozen firms that offer or are planning to bring out on-line software databases. Some are small entrepreneurs while others are well known throughout the computer industry; some are aiming at a special market niche while others strive to be comprehensive. Despite much overlap, each has distinctive features that make it unique.

The first on-line database to seek comprehensive coverage was the International Software Database, recently renamed .Menu. .Menu has been available since December 1982, on DIALOG, one of the largest and most diverse of the on-line database vendors. .Menu contains over 21,000 distinct software packages, with particularly strong representation for mini and micro programs, and, according to vice president Bill Louden, the number of mainframe listings will be increasing. This total, while very high, is not the 50,000 that sometimes appears in their advertising. This difference arises from whether "packages" or "products" are being counted, and it has caused confusion throughout the industry. A single program in different versions or configurations can be several products, so that there can be three times as many "products" as there are "programs." The inflation of totals by using "product" figures is partly an advertising ploy and partly a legitimate indication of the size of the database. It will cause no problems for anyone who takes the trouble to ask which number is being used.

AIMING AT VERTICAL MARKET

.Menu has all kinds of programs, including entertainment. In addition to the common business programs, says Louden, .Menu is "aiming at the vertical market," with listings of programs of narrow interest that might not appear elsewhere.

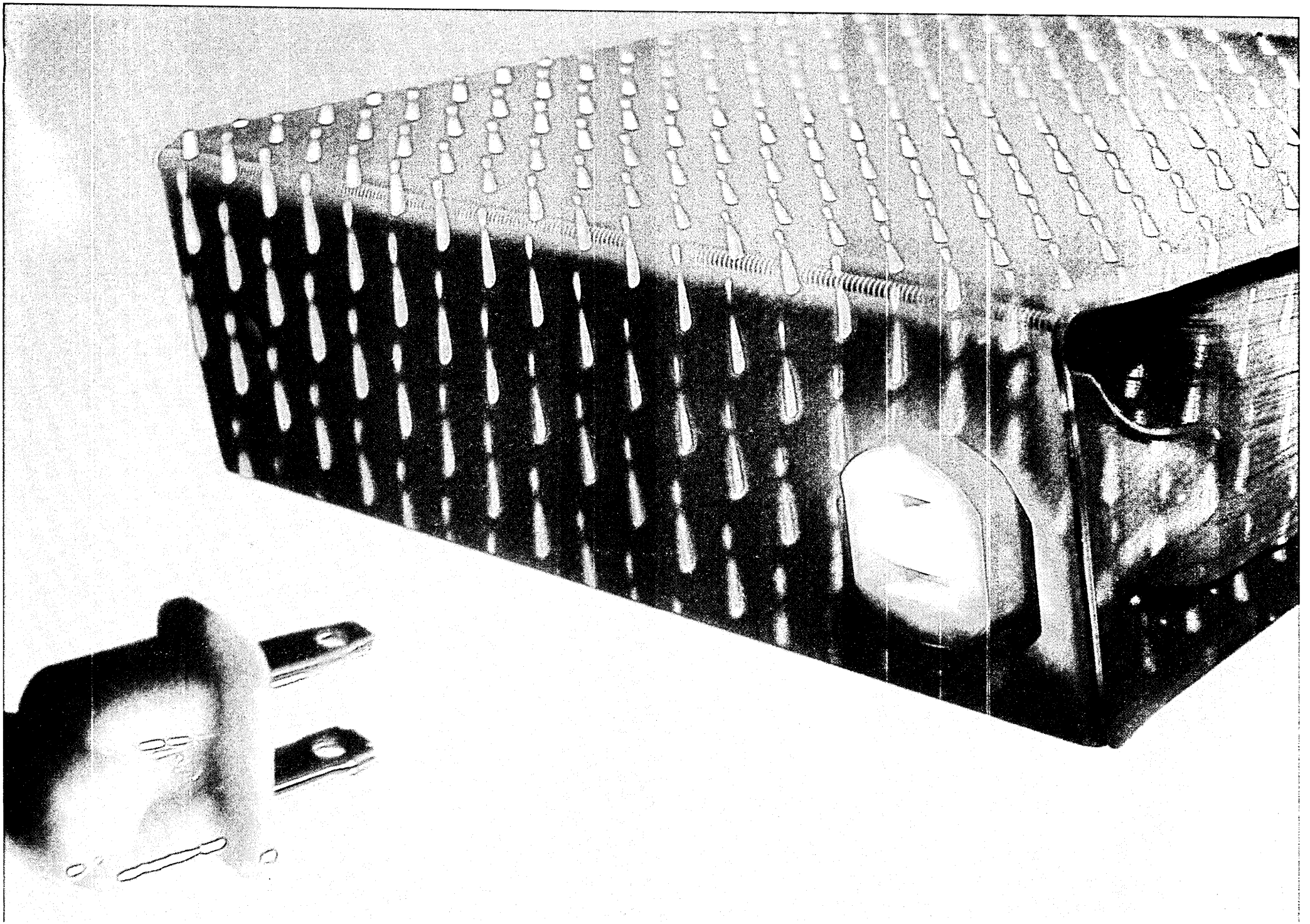
.Menu is an entrepreneurial startup still supported by venture capital. Yet, Louden observes, it is ahead of schedule. He refers to a DIALOG survey placing .Menu among the most frequently searched files during a recent survey period, a strong performance on a heavily used system. Future plans for .Menu include adding review information from in-house files and reaching a foreign market through ESA-Quest, a European database vendor.

.Menu was recently joined on DIALOG by the Business/Professional Software Database, a joint venture of two established information firms, Data Courier and Information Sources Inc. The latter publishes the *Sourcebook*, a directory of small systems software, while Data Courier produces ABI/Inform, a heavily used business database. Unlike .Menu, this database does not attempt to be comprehensive, according to Data Courier computer services manager David Bond, but rather will concentrate on business and technical programs, with carefully screened and edited records. Bond predicts that the prominence of Data Courier's other products in the on-line field has created a "good client base that is used to our products," and which provides an already established market for the new database.

Bond also describes major enhancements planned for program records in the form of review information. Plans call for initially adding citations to reviews, including those appearing in the Auerbach and Datapro directories, and later, the full text of reviews themselves. Review data is an element that many of the software databases either have or are planning to add, attempting to serve the buyer who, having found a package, wants some sort of an evaluation. Because tracking down published reviews can be extremely time consuming, several databases are betting that having this kind of information right beside the program specs will be very attractive to users.

By going up on DIALOG, the Business/Professional Software Database will be available on one of the most heavily subscribed on-line vendors, but, observes Vic-

PHOTOGRAPH BY PETER ANGELO SIMON



NAME	PRODUCER	DATE BEGAN	PRINT VERSION[1]	RECORD ELEMENTS[2]	REVIEWS	SUBJECTS
.MENU The International Software Data Base	.MENU 1520 S. College Ave. Ft. Collins, CO 80524 (303) 482-5000	12/82	*Software Catalog*	TI,SO,SA,RD,AP, OS,HW,LA,MM,AB, PR,WS,UD,IP,ME, DI,PN,GA	In-house for many packages	All
Datapro Online	Datapro Res. Corp. 1805 Underwood Blvd. Delran, NJ 08075 (609) 764-0100	5/83	Several product review services	TI,SO,SA,RD,AP, OS,HW,LA,MM,AB, PR,LE,WS,UD,ME, DC	User surveys for all products	All
Soft	Online Inc. 11 Tannery La. Weston, CO 06883 (203) 227-8466	10/83	*Micro-computer Software Guide*	TI,SO,SA,RD,AP, OS,HW,LA,MM,DS, AB,PR,DC,DI	Citations to reviews for many packages	All, no games
PC Telemart	PC Telemart 11781 Lee-Jackson Hwy. Fairfax, VA 22033 (703) 352-0721	fall, 83	*Software Directory*	TI,SO,AP,OS,HW, LA,MM,DS,AB,PR	*Infoworld* full text reviews for 200 packages	All, no games
One Point Electronic Catalog	One Point 2835 Mitchell Dr. Walnut Creek, CA 94598 (415) 947-0850	12/83	none	TI,SO,AP,OS,HW, LA,MM,DS,AB,PR, WS,UD,PE	In-house, end-user, & mag. being added on-line	Almost all IBM PC & compatibles
Computer Specs	GML Corp. 594 Marrett Rd. Lexington, MA 02173 (617) 861-0515	5/84	Software, hardware directories	TI,SO,SA,RD,AP, OS,HW,LA,MM,AB, PR,LE,PE,BU	none	All, no games
Microsearch	Information Inc. 1725 K St. N.W. Washington, D.C. 20006 (202) 833-1174	5/84	none	TI,SO,SA,OS,HW, MM,DS,PR,AB	Abstracts of mag. reviews & product literature	All
Online Software Library	Searchmart Corp. 745 U.S. Hwy. 1 N. Palm Beach, FL 33408 (305) 845-2996	6/84	none	TI,SO,SA,AP,OS, HW,LA,MM,DS,AB, PR,LE,ME,DM	none	All
(Not determined as of 7/84)	Micro Information Pub. 15420 Eagle Creek Ave. Prior Lake, MI 55372 (612) 447-6959	9/84	Machine; industry specific dirs.	TI,SO,SA,AP,OS, HW,LA,MM,AB, Template	Online for 7K packages	All
Business Professional Software Database	Data Courier Inc. 620 S. Fifth Ave. Louisville, KY 40202 (502) 582-4111	10/84	*Sourcebook*	TI,SO,SA,RD,AP, OS,HW,AB,PR	Planned	Business, Professional
The following firms have described plans to offer software information online; this information should be considered tentative until publicly announced.						
*	Technique Learning 40 Cedar St. Dobbs Ferry, NY 10522 (914) 693-8100	early 85	Several directories	TI,SO,SA,RD,AP, OS,HW,LA,MM,DS, AB,PR,UD,ME,PE, CO,DC,USMI	NA	All
*	*List* Magazine 3407 Ocean Dr. Vero Beach, FL 32960 (305) 231-6904	84/85	*List*	(Drawn from *List* reviews)	*List* reviews & user comments	Business, professional
Software in Print	R. R. Bowker 205 E. 42nd St. New York, NY 10017 (212) 916-1688	85?	*Software in Print*	TI,SO,SA,AP,HW, OS,LA,MM,PR	none	All
Quicksearch	ICP 9000 Keystone Crossing Indianapolis, IN 46240 (317) 844-7461	85?	ICP software directories	TI,SO,SA,AP,OS, HW,LA,AB,PR,IN, GA	none	Business, professional
Sofsearch	Sofsearch Intl. Inc. Rt. 20, #3572 Gladiolus Dr. Ft. Myers, FL 33908 (813) 481-4994	85?	none	TI,SO,SA,AP,OS, HW,LA,MM,PR,IN, GA	none	All

KEY:

AB	Abstract: descriptive paragraph	DM	Demo: availability of demo	LA	Language	PN	International Standard Program Number		
AP	Application: short phrase	DS	Disk requirements	LE	Lease information	PR	Price		
BU	Bundled with hardware	GA	Geographic area served by source	ME	Medium: product format	RD	Release date	UD	Update information
CO	Compatible software	HW	Hardware requirements	MM	Minimum memory	SA	Source address	WS	Warranty/support from source
DC	Documentation	IN	Installations: number in place	OS	Operating system	SO	Source of product		
DI	Distributors besides source	IP	Integrated packaging	PE	Peripherals required	TI	Title		

MAIN-FRAME	MINI	MICRO[3]	ACCESS	RATES	UPDATES	REMARKS
1.8K	6.4K	12K	Dialog, Knowledge Index	$60/hr. + 15¢/full record Kn. Ind: $24/hr.	In-house daily; Dialog also monthly	On-line ordering; in-house locator service; plans for online reviews
6K		4K	Data Resources Inc.	$250/yr + $120/hr. & DRI base fee: $100 + $12/mo.	Varies	DRI software provides extensive interactive graphic capabilities
NA	NA	4K	BRS, BRS After Dark	$75/hr. + 84¢/full record; After Dark: $75 + $20/hr.	In-house month or less; BRS, monthly	Adding producer comments on-line to records
NA	NA	5.3K	Direct to PC Telemart	Ind. $400/yr., Corp. $1,500/yr. + $20/hr.	Two weeks or less	Companion services: software library; discount sales, consulting
NA	NA	5.6K	Direct to One Point (Tymnet)	$35 + $36/hr. daytime & $24/hr. evenings	Daily	On-line ordering with discounts; also has support hardware: modems, drives, cables, etc.
NA	NA	2K	Data Resources Inc.	$2,500/yr. + $95/hr. or $165/hr. & DRI base fee: $100 + $12/mo.	In-house, daily; DRI monthly or more	Will grow to cover all important packages; ten major hardware databases also on-line
NA	NA	16K	The Source	$49.95 + $10/mo. + $20.75/hr. daytime & $7.75 evenings	In-house, two wks or less; Source: every 10 days	Abstracts predominantly of software, but hardware, books, instructional articles also; on-line manufacturers' dir.
2.1K		4.9K	Direct to Searchmart	No charges	(Daily)	Company profile on-line; developing online ordering, demo downloading, electronic mail modules
NA	NA	26K	Direct to Micro Info. Pub.	($55/mo.)	(Daily)	Template for each package—15 to 30 extra fields, which vary with the package's application
NA	800	3.2K	Dialog	($50 to $75/hr)	Quarterly on Dialog	Joint venture with publisher Information Sources Inc.; to add review citations, then text; cite Datapro & Auerbach
NA	NA	NA	Major on-line vendor	*	*	Record includes Universal Software Market Identifier (USMI)
NA	NA	5K	Major on-line vendor	*	*	Plan to include on-line demos and tutorials
NA	NA	23K	*	*	*	Plans may include eventual coverage of large machine software
11K	5.4K	7.5K	Major on-line vendor	*	*	In-house locator service
11K	22K	Direct, or with vendor	*	*	Software locator service	Software locator service

NOTES:

[1]The online database is not necessarily the direct equivalent of the printed publication.

[2]Fields are not always exact equivalents across all databases. In one file the ABSTRACT field may contain information that in another might occur in a separate field. See key.

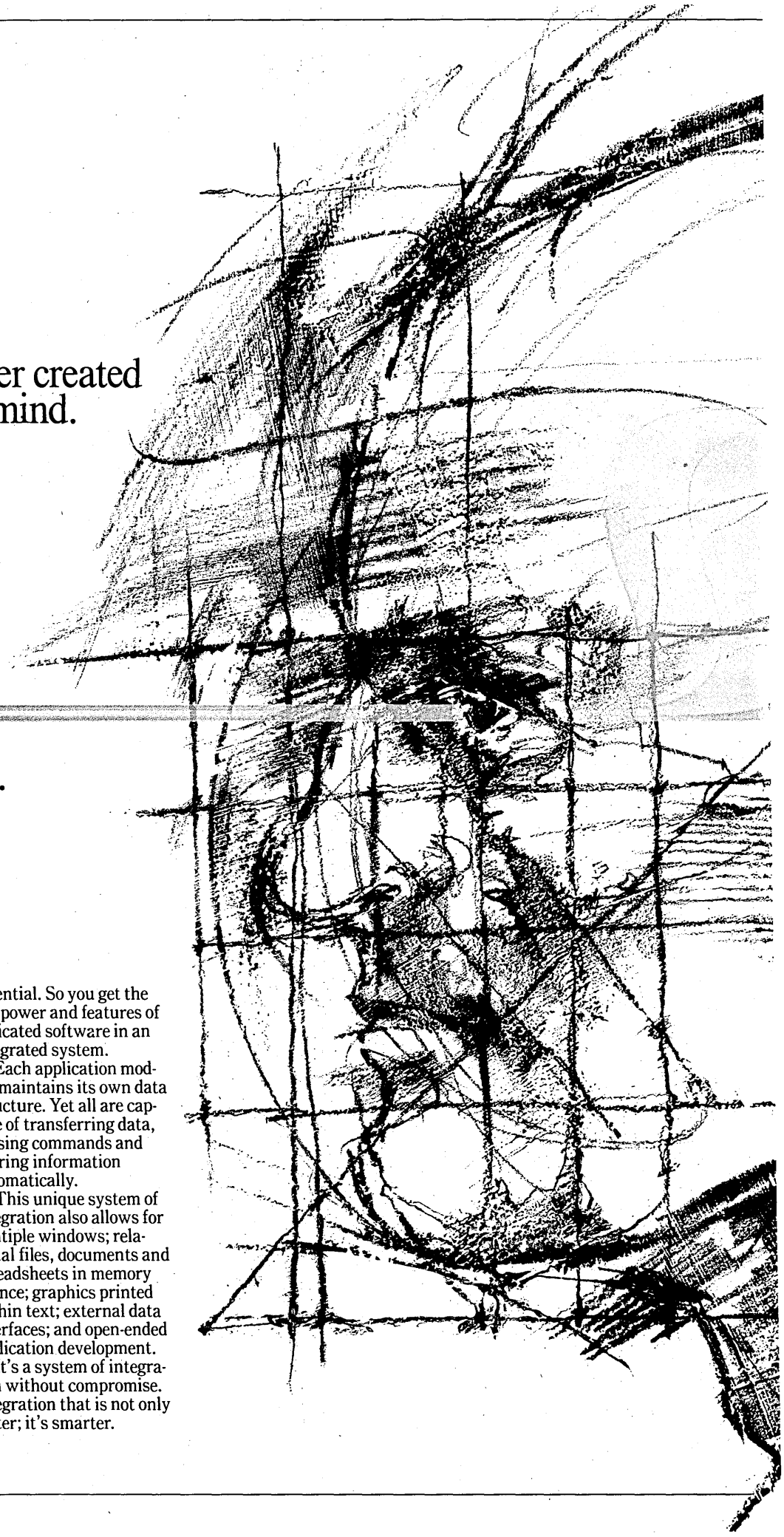
[3]Numbers are those of "packages," rather than of "versions," "configurations," or "products." Some advertising emphasizes the inflated figure to suggest a larger database. In each listing the number is that of programs, not the expanded figure.

NA: not applicable

*Information not yet available

Information in parentheses was uncertain when information was gathered in July 1984.

Introducing the smartest tools ever created for the business mind.



The Smart Software System.

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

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

ACHIEVING FULL INTEGRATION WITHOUT COMPROMISE

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

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

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

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

SETTLING THE EASE OF USE VERSUS POWER DILEMMA

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

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

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

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

CREATING CUSTOM APPLICATIONS BY SIMPLE MENU SELECTION

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

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

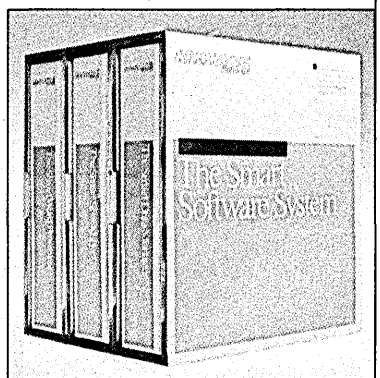
No other integrated system has a capability that even comes close to Smart Software's project processing.

HELPING PEOPLE TO WORK SMARTER, NOT HARDER

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

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

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



The Smart Software System

INNOVATIVE™ Software

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

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

CIRCLE 72 ON READER CARD

© 1984 Innovative Software, Inc.

Searchmart's president says the company's Software Library is "frankly an advertising medium."

tor Gruneau, president of Searchmart Corp., the sign-up negotiations and costs associated with such firms can be a roadblock. Gruneau's solution is the on-line Software Library, which requires no application procedure and is absolutely free. All a user need do is call in and begin searching. The costs are met by software producers who pay to have their products listed. A vendor's first entry costs $375 per year; the cost of subsequent entries drops sharply. Gruneau states that the Library is "frankly an advertising medium," attractive to advertisers because shoppers can get into it immediately, providing an on-line version of impulse buying.

The Library is Searchmart's first product, and while it has been available only a few months, Gruneau is encouraged by its initial reception. He cites over 3,000 users, including many major corporations that have logged themselves in as system "members," and several times that many that have accessed the database without listing themselves. Besides the basic, vendor-supplied product information, several companion files are being developed, Gruneau says, including a new product section, a locator service for retailers, a program demo capability, and an electronic mailbox for ordering and message exchanges.

TARGETING DIFFERENT AUDIENCE

Datapro, with its Datapro Online databases, has an approach completely different from that of Searchmart. It is targeting the audience that knows it for its print services, expecting that those users will find Datapro's listings and surveys—accessed with sophisticated interactive software—to be worth a premium price. Datapro Online consists of directory entries and user survey data on software, hardware, and on-line databases. It is provided on-line by Data Resources Inc. (DRI), a large information firm specializing in financial and economic data and used primarily by large corporate clients. DRI's software makes it possible to retrieve and combine the data in a variety of ways, producing product comparisons, user rankings, and hardware-software matches—all accompanied by sophisticated graphics.

Datapro Online is not the only software database on DRI. In May of this year Computer Specs, a series of computer product files produced by GML Corp., was added. GML's software file covers micro programs, with current emphasis on MS/DOS machines. While the database does not now have a large number of entries, Computer Specs editor-in-chief Amy Sommerfeld notes that "the main focus of our database is to be complete," and that it will eventually cover everything except games.

GML has been providing computer product data since 1971 and may be better known for its hardware coverage, being, as Sommerfeld notes, "a complete database for any kind of computer equipment," including mainframes, minis, micros, disk drives, tape units, cassettes, display and printing terminals, and line and serial printers. Although it has been up only a short while, DRI product consultant Tina Huston expects Computer Specs to do well, not only for its software, but also because among hardware files it is "the only one that has this number of hardware products."

Computer Specs is one of six databases that cover only micro software. There are several reasons for so much coverage of the small machines, even though mainframe and mini programs account for larger market shares in terms of revenue. Despite the micro's status as the newest machine, it is probably safe to say there are more micro programs on the market than there are mainframe and mini programs combined. Most have appeared within the past few years, of course, as the little machines have taken off. The appearance of the IBM PC helped make the micro respectable for business, and IBM's decision to let anyone write for it has resulted in a flood of business and technical programs. This is a key point for the software database vendors, because it is difficult to see how the home market alone could support this kind of information service. Finally, the whole micro environment is so fluid and diverse that its customers are in particular need of help.

Information Inc.'s Microsearch,

SOME BUYERS DO IT ON-LINE

Selecting and buying software is much easier and quicker for Bob Mazer, of the A-Z International Tool Co., with the One Point Electronic Catalog. Mazer, MIS director for the Houston-based tool maker, oversees 19 micros and has been using the Catalog since it was introduced. He turns to it as "a great initial search tool" that provides "a capsule overview of packages we might be interested in." Mazer tracks packages by name, publisher, and subject, and finds the reviews that accompany product descriptions helpful in making a choice. If there are many to consider, he may capture the output on disk for later study. Once he has selected an item, the Catalog's on-line ordering service is a "quick, easy way to place orders." Mazer says the Electronic Catalog is a "tremendous timesaver that has brought a return on its investment many times over."

Using command-driven search software, like that of Bibliographic Retrieval Services, takes practice, but for an experienced searcher like Ann Van Camp, it makes using SOFT both fast and efficient. Van Camp is the director of information and on-line services at the library of Indiana University's school of medicine and uses SOFT to spot software for her Apple IIes and IBM PCs. With SOFT, she says, it's "easy to go in and find a specific application," because BRS's system permits her to specify several criteria in a single command. Thus, she can search on virtually every field in the package's description, and in a few seconds retrieve only those programs that meet her precise requirements.

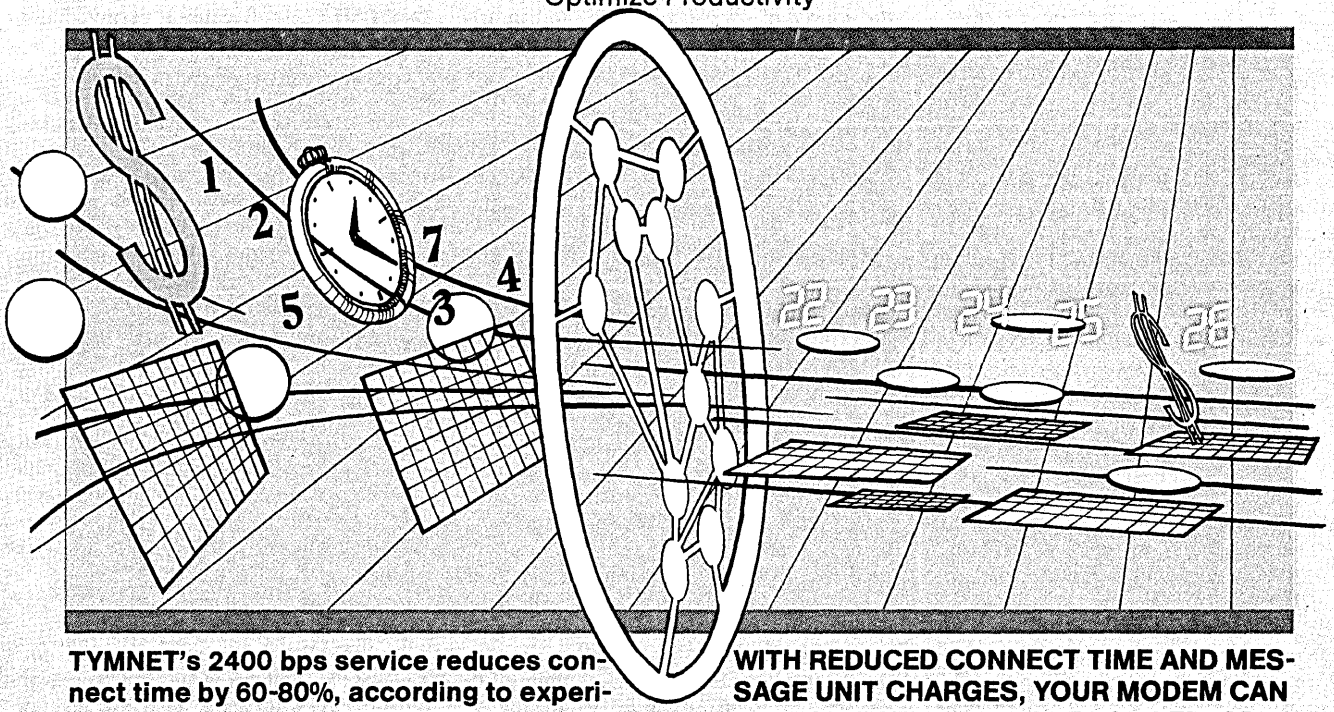
Several of the software databases cover micro programs only, and micro managers and owners do seem to predominate among users of these systems. Sam Dechario, a consultant at Software Control International, however, uses .Menu for a variety of machines. This Hempstead, N.Y., firm provides software for federal agencies and their suppliers, and Dechario has located all kinds of programs on .Menu, including all the spreadsheets that run on the IBM System/34. He has also located communication packages, code generators, a Pascal compiler, text editors, and word processors.

Most users find the software databases a convenient way to identify software packages and reviews, but Mark Williams has learned that he can do quite a bit more with Microsearch than just look up programs. Williams is the Washington representative of Fortune Systems Corp., a Redwood City, Calif., maker of supermicros for small area networks. He discovered Microsearch by accident while browsing through The Source and quickly found its abstracts to be useful on the job and for spotting software for his home computer as well. But Williams also uses Microsearch as a current awareness service for the whole micro environment, enabling him to "keep in touch with the marketplace." Because the database has abstracts and product literature for both hardware and software, Williams can spot new products, follow competitors, and save himself "a tremendous amount of hassle" by using Microsearch in ways even its producers may not have anticipated.

—M.O'L.

The 2400 bps Difference

Reduce Costs and Optimize Productivity



TYMNET's 2400 bps service reduces connect time by 60-80%, according to experiments conducted by NEWSNET, the world's largest on-line database of business newsletters. And the longer the session, the greater the proportional savings in time.

Since time is money... REDUCED CONNECT TIME MEANS REDUCED EXPENSE.

And that's not all.

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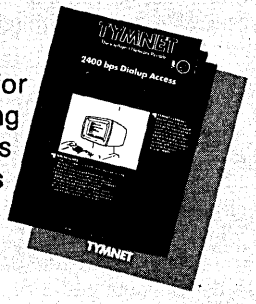

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Custom and Public Data Networks

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A McDonnell Douglas Company

CIRCLE 73 ON READER CARD

Online's micro software database is "definitely in the black," says the company's president.

like Computer Specs, covers both software and hardware and has, in addition to the usual product facts, descriptive and evaluative data from suppliers and reviewers. There are three basic sections to Microsearch. The first contains abstracts of reviews and analytical articles from over 150 publications. Each abstract contains the program specs, a detailed summary of the review, and its citation. The product literature section has the maker's own comments. Finally, there is a directory of 3,500 manufacturers and software publishers.

Approximately two thirds of Microsearch's abstracts deal with software; the other third covers hardware, firmware, book reviews, and instructional articles; the product literature section has over 4,000 software entries. According to managing editor Ann Weathersby, by fall there will be complete correlation between the two sections, making it possible to get both points of view on each product. Weathersby characterizes Microsearch as incorporating the elements of a directory, vendor's catalog, and review journal into an eclectic information source that covers the whole micro market.

Microsearch is available on The Source, an information utility that has business, financial, news, and entertainment databases at very low rates. Information Inc. is also working on plans to make Microsearch available through other major on-line vendors.

AIM IS TO FILL OUT SPECS

Complementing basic program specs with additional information is also the goal of SOFT, a database of micro software produced by Online Inc., which puts out several major publications covering the on-line database industry. Helen Gordon, editor of SOFT, remarks that citations to reviews and descriptive comments prepared by the product's producer are being added to SOFT's already full program descriptions.

SOFT is available from Bibliographic Retrieval Services (BRS), a large database vendor with particularly strong collections in medicine and education. Up less than a year, SOFT already has 13,000 regular users and, notes president Jeffrey Pemberton, it is "definitely in the black." Gordon comments that SOFT has several kinds of users, from professional searchers in corporate libraries to home computer users, many of whom access it on BRS After Dark, a companion service that makes many of BRS's most popular databases available during evening hours at discount rates.

Micro Information Publishers (MIP), unlike Microsearch or SOFT, provides its database directly to users, rather than going through a vendor. MIP is a market research and publishing firm whose very large database of micro programs is the source of several machine- and industry-specific directories. The company also provides consulting and software locating services to its clients, and publishes *Softrends,* an industry newsletter.

The database's records have very full descriptions, including what president Gerald Van Diver calls "template" data. These are fields that contain additional descriptive information based on the general characteristics of the program. Thus, a database management program would have different template fields from a spreadsheet program. There are also on-line review data for many packages prepared by the members of the National Software Review Board, a body of several hundred experts that works with MIP in evaluating software.

One Point Corp. distributes software information as well as software. Users of its Electronic Catalog can get product descriptions and evaluations, then order the package itself at discount. Unlike the other software databases, the Electronic Catalog concentrates on programs written for the IBM PC and compatibles. Ninety-five percent of the software is written for the PC, notes public relations director Mike Burke. This emphasis shows One Point is looking toward its corporate clientele, for whom the IBM machine is rapidly becoming an industry standard. The Catalog's descriptions are being supplemented by several kinds of supportive information, including magazine extracts, user comments, and reviews from One Point's own staff. This information is already in place for the most popular programs and will eventually reach throughout the database. The result, Burke remarks, is a "tightly focused database with things of value to the corporate user." The database also covers supporting hardware, such as modems, disk drives, cables, and more.

Supplying both product and product information is what PC Telemart hopes to continue doing. This firm is more widely known than the others because of an ambitious marketing plan announced in late 1983. It intended to place terminals in thousands of retail computer stores through which customers could search Telemart's database, spot packages, and then order them from the retailer. The collapse of this plan last spring led to a major realignment, in which the company abandoned the broad retail market to aim at a corporate clientele. Telemart is unusual in having a strong regional orientation, due to its unique Software Resource Center, where members can actually use the packages they have identified on-line. These can then be ordered at discount rates.

THE ONLY HANDS-ON FACILITY

Because it permits hands-on evaluation of the products, the Software Resource Center is, according to director Chris Doss, the "only facility of its kind." But it does impose a geographic limitation, and most of the firm's 400 individual and 100 corporate subscribers are not far from its Fairfax, Va., location. Nonresident memberships are available, but these members would find it inconvenient to use the center. So, Doss says, there are plans to set up similar centers in several large cities.

PC Telemart's survival was still in question when, in midyear, president Howard Morrison announced a major deal with R.R. Bowker Co. Bowker, the principal publisher of book trade information, purchased the firm's database and will take over its maintenance. The deal should be advantageous to Telemart, which retains full access to the database, while being relieved of the expense of keeping it up.

On Bowker's part, acquiring PC Telemart's database is just one of several steps the giant publisher of reference books is taking to become a dominant force in the whole microcomputer information field. With *Books in Print, Ulrich's International Periodicals Directory, Publisher's Trade List Annual, Publisher's Weekly,* and several other more specialized book trade titles, Bowker exercises a near monopoly in recording the book trade. It also has *Books in Print* and other major directories on-line with DIALOG and BRS.

The firm has already established itself as a micro publisher with the *Complete Sourcebook of Personal Computing,* the *Microcomputer Market Place,* and several reference books for vertical markets. This fall it announced *Software in Print,* a directory of 23,000 micro programs. Bowker's goal, as described by Database Services Group director Peter Simon, is to become "a leader in the pc information field by bringing out a wide array of reference tools and services." This includes an on-line database, which Simon remarks might be seen in the not too distant future.

Two other micro databases may be brought on-line by early next year. *List* magazine publisher Ted Leonsis plans to offer an on-line complement to the magazine's published reviews. Comprised of 5,000 programs, it will emphasize business and professional packages, with thousands of the principal ones reviewed. User comments, on-line demos, and tutorials may

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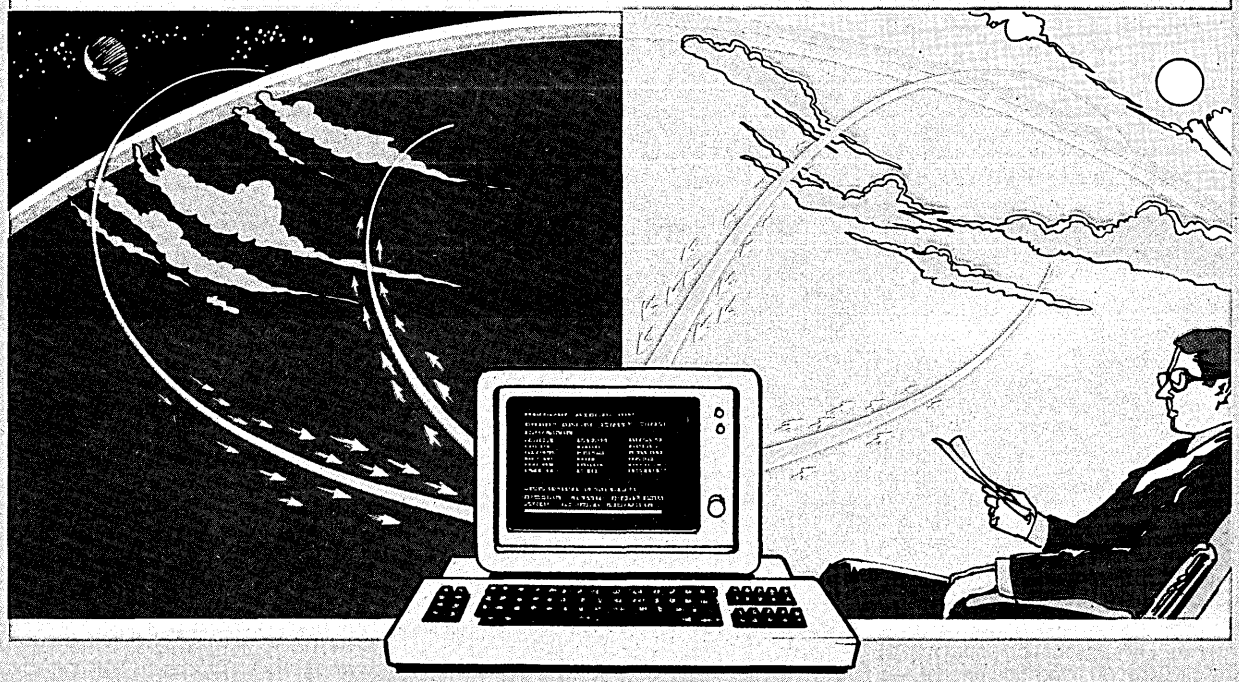

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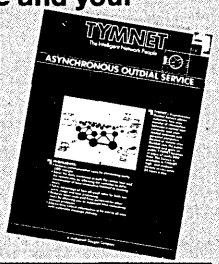

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Sofsearch says its database is the largest software listing in the world, with over 36,000 programs.

also be part of the database, which Leonsis says may be available through a major on-line vendor.

Technique Learning, developer of a software registration system called the Universal Software Market Identifier, is also looking at early 1985 as the startup point for an on-line product. The company already publishes several program directories and the *USMI Market Directory*. Editor John Downey notes that the proposed database will strive to cover "everything that is commonly available," and that it too may be offered by one of the big database suppliers.

Increased coverage of big machine software will also be available if ICP and Sofsearch International Inc. proceed with plans to make their databases directly accessible. ICP has been providing software information since 1966, and now issues several prominent directories and magazines. Its database is particularly strong in mainframe listings, with some 11,000 entries that cover, according to editor-in-chief Dennis Hamilton, 97% of those in existence, with the other 3% soon to come. Hamilton also mentions coverage of 85% of all mini programs and all the important packages from the major micro publishers.

ICP has offered immediate access to its database for the past two years with Quicksearch, a locator service that Hamilton explains was offered in response to customer demands for specific information. Putting Quicksearch on-line is only one of several plans that ICP has for reaching market segments, including smaller printed directories, micro information on disks, and even a directory on a disk customized for an individual client.

LARGEST SOFTWARE LISTINGS

Sofsearch describes its database as the largest collection of software listings in the world, with over 36,000 programs. The firm is actually a software locator service, mailing out package descriptions in response to customer queries. As of mid-July, Sofsearch was having considerable financial difficulties, but company officials are confident it will survive. In discussing Sofsearch's plans, marketing director Tom Rountree observes that "customers demand on-line access" and states that the database may be on-line directly or through a vendor within a year or less.

With so many services—many of which are not currently profitable—offering similar products, the obvious question is who will survive. The nearest model to this market may be the on-line information industry itself. There, numerous database producers and vendors, many of which resemble competitors, have long passed the startup stage and are thriving on the basis of some distinctive feature and because their customers' appetites for instant information show no signs of being sated. There may be room, if not for all, then for many software information firms that, through depth or quantity of data, through related services, or through reaching a particular niche, can establish themselves. Certainly, the market they all serve will continue to grow and diversify beyond anybody's predictions. ◉

Mick O'Leary is a writer and is director of The Data Brokers, a research and consulting service in Frederick, Md.

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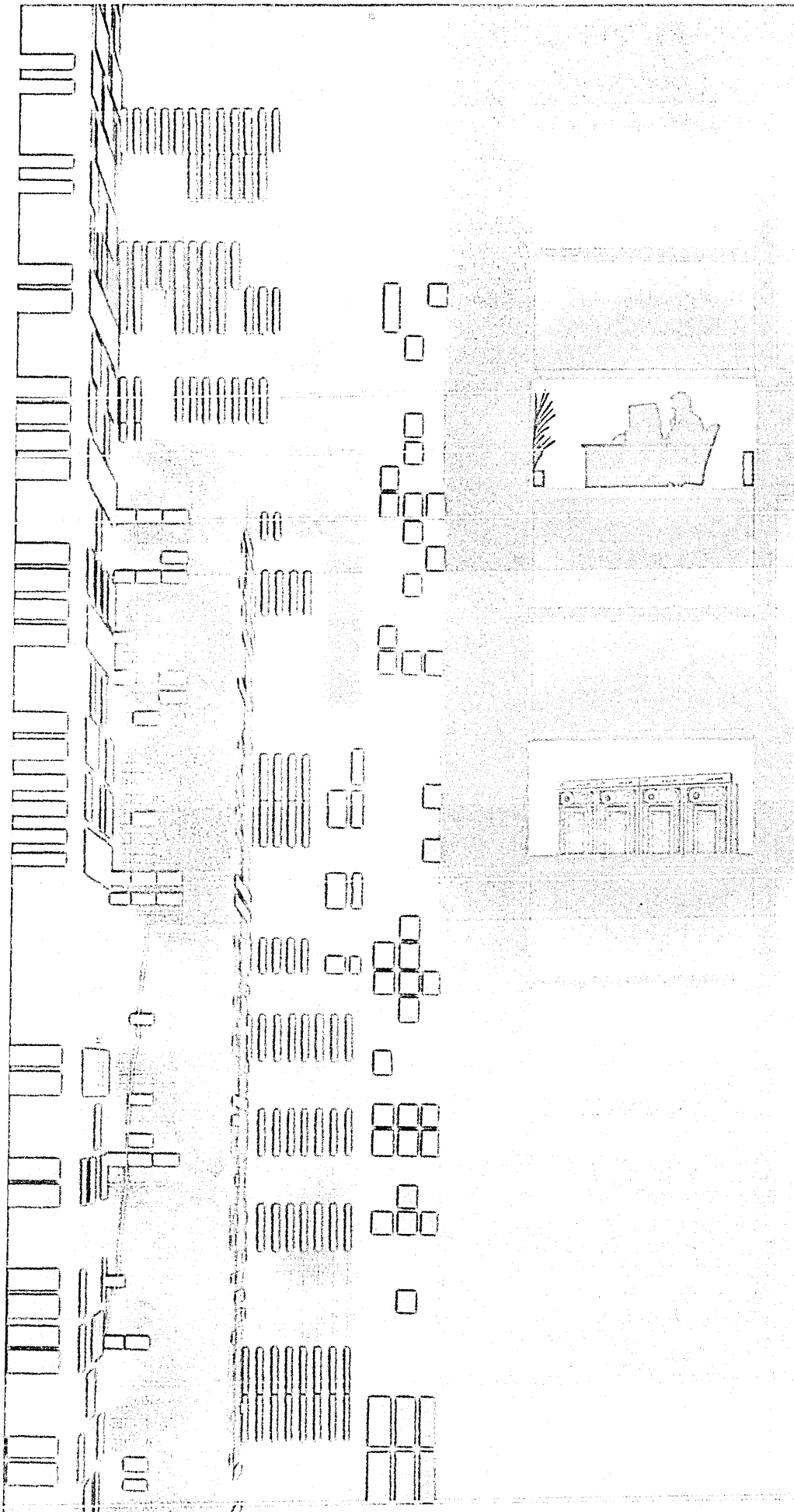

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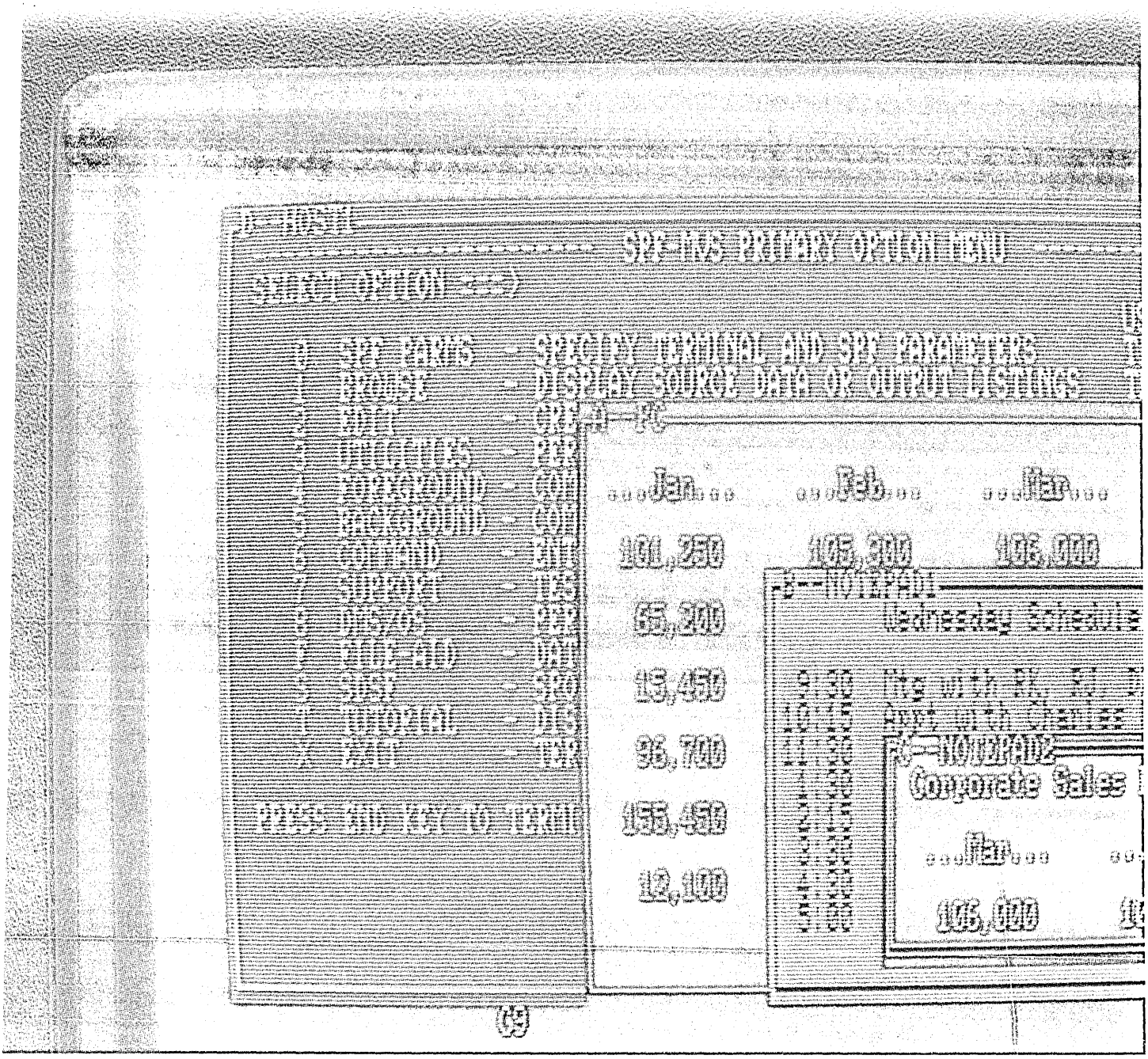

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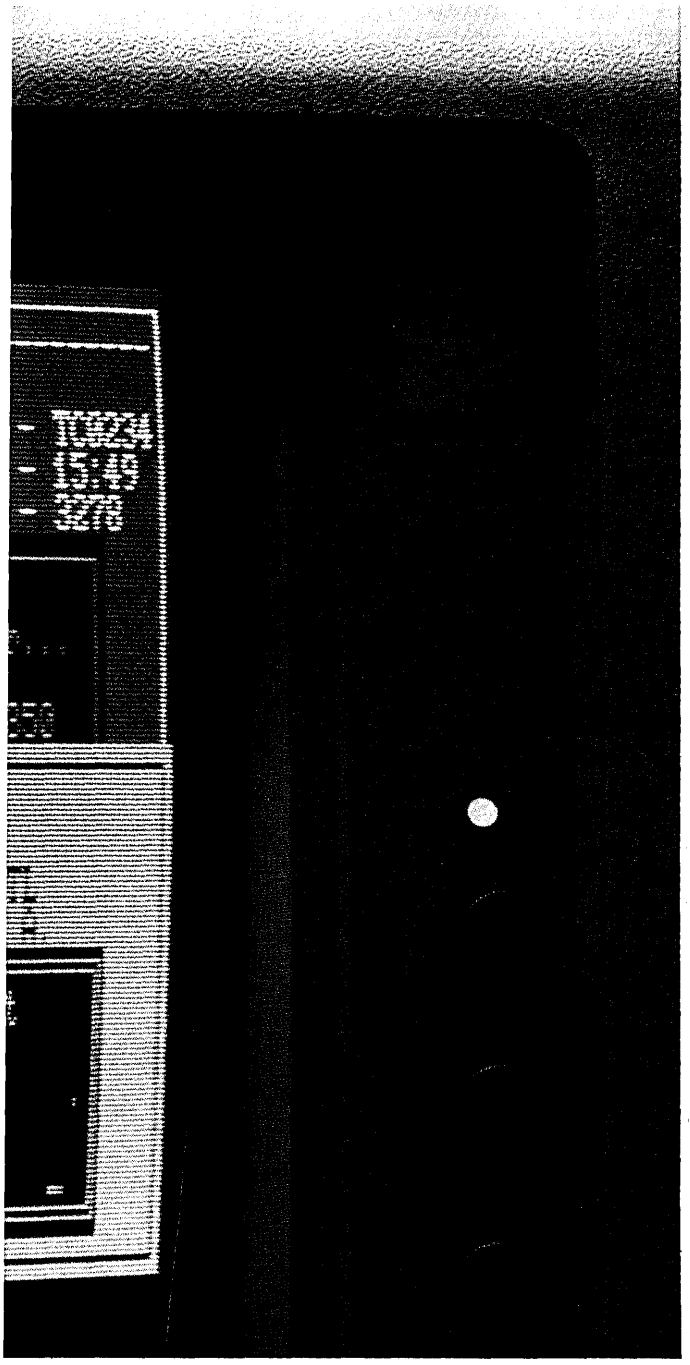

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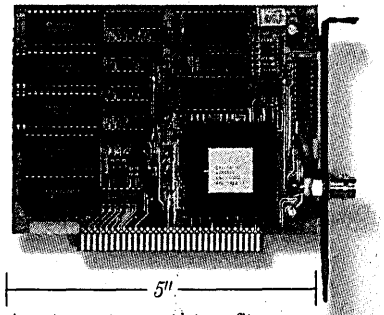

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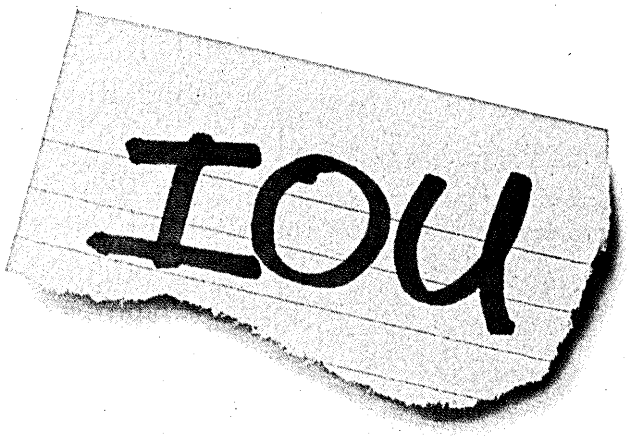

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THE INTUITIVE COMPUTER PROGRAMMER

by Sarah Sitton and Gerard Chmelir

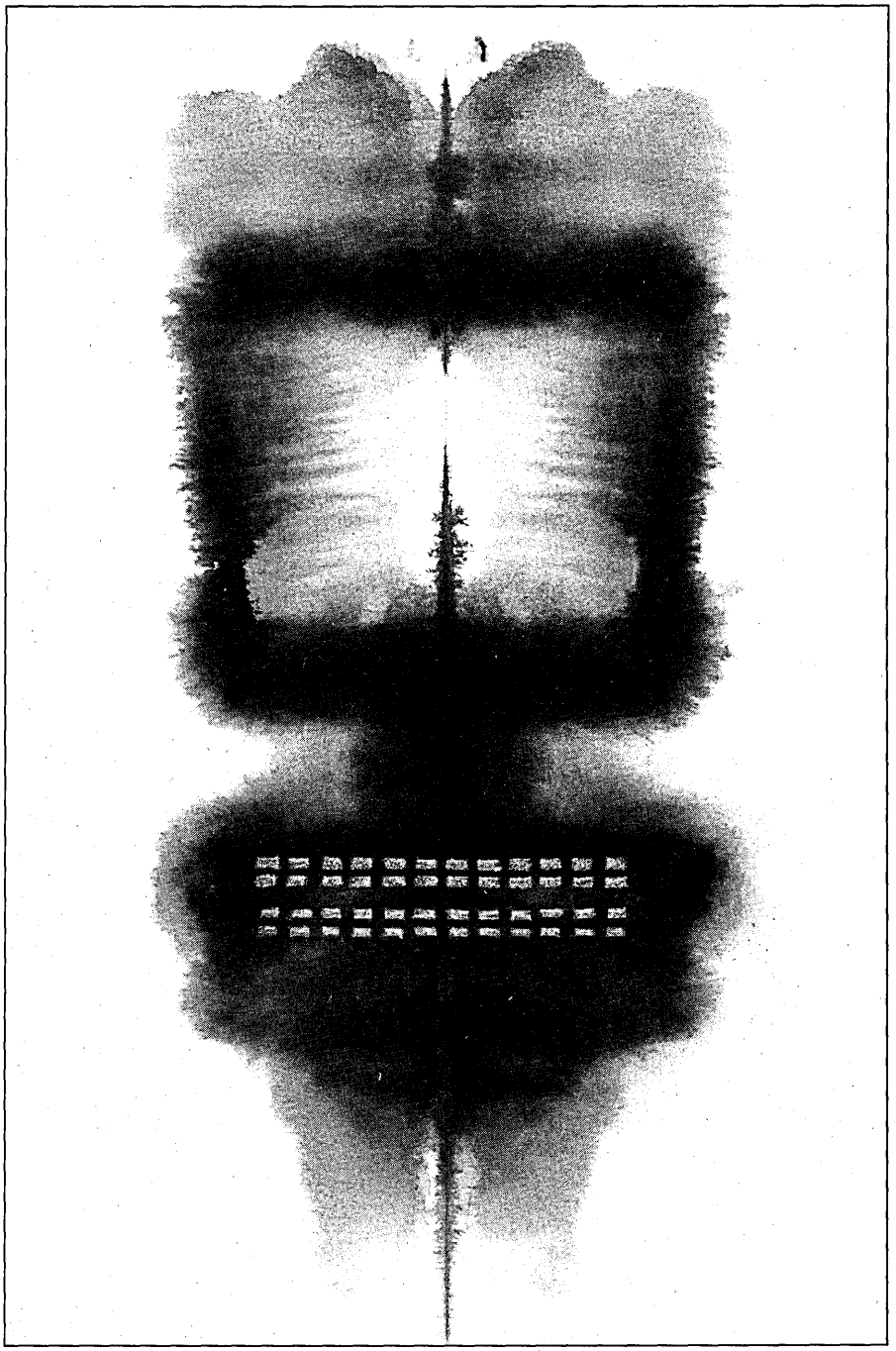


ILLUSTRATION BY CYNTHIA STODDARD

Most occupations evoke some kind of stereotype: the prim librarian, the surly taxi driver, the compulsive accountant, or the devious used-car salesman (by the way, a recent poll showed politics replacing used-car sales as the nation's least trusted occupation). While stereotypes of any kind are notoriously inaccurate, there can be a relation between occupational stereotypes and a persons' decision to enter a particular field. The process is circular. A stereotype develops based on some individuals within the field. People then choose to enter that field partially on the basis of the fit between the stereotype and their self-perceptions. Being aware of society's stereotype of accountants, a compulsive individual may decide it's the field of choice.

Similarly, once committed to a particular job, a person may deliberately conform to the image of workers in that field. There's a story that says in the thirties, the Hollywood sets of gangster movies were often visited by members of the Mafia who were checking out the latest gangster styles.

Occasionally, an employer will manipulate the stereotype of a certain job to attract desirable employees. Several years ago the U.S. Army advertised for nurses by showing beautiful nurses in exotic locations. Once enlisted, the crop of nurses who responded to these ads became very dissatisfied. The Army then changed the ads to picture somewhat-less-than-beautiful nurses in mundane surroundings. Nurses who responded to these ads tended to like the Army and to reenlist.

To see if a stereotype of data processors might contribute to entry into this occupation as well, we decided to test the image of computer programmers held by those in the field. We also wanted to see how closely data processors' personalities fit this stereotype and how they compared to the general population.

The personality test we used is a short form of the Myers-Briggs Type Indicator, the Keirsey Temperament Sorter.

As might be expected, common profiles emerged for members of certain occupations.

The Myers-Briggs test, developed in the 1950s, is based on C.G. Jung's psychological type theory of personality, which classifies people according to their preferred modes of thinking and perceiving. Jung was a student of Freud, but broke with him over Freud's emphasis on sexual motives to the exclusion of all others. Jung's theory of personality relies heavily on the concept of opposition, maintaining that this polarity is the source of psychic energy. He is perhaps best known for coining the terms "extrovert" and "introvert" to refer to what he considered to be the central opposing characteristics of personality.

This shortened version of the Myers-Briggs test reduces the number of items to 70 and takes only about 15 minutes to administer. Respondents choose one of two statements that they feel best describes them. For example, "Do you prefer to work: a. to deadlines, or, b. just whenever." Questions relate to Jung's four personality categories, each of which has two opposing types. The categories are:

- extroverted (E) vs. introverted (I)
- sensing (S) vs. intuitive (N)
- thinking (T) vs. feeling (F)
- judging (J) vs. perceiving (P)

The extrovert focuses on the outer world of people and things rather than on the inner world of thoughts and ideas. This personality type enjoys interacting with others and may avoid solitary activities. Extroverts appear to draw energy from being around others. The impression they create is that of a fun-loving, outgoing, friendly, and active personality.

The opposing type, the introvert, prefers the world of ideas and may find socializing very tiring. They tend to prefer space to people. Crowding makes them very uneasy. Traffic jams or just a crowded movie theater or restaurant may cause the shy introvert to become anxious or even hostile. They also tend to dislike adventure and to avoid physical risk. They are not likely to become test pilots.

SENSING TYPE MOST COMMON

The sensing person draws conclusions on the basis of sensory information rather than from mental associations or imagination. Most people (75%) fall into the sensing category. Sensing persons see themselves as practical above all else. This personality type is very fact-oriented, firmly grounded in reality. They are very good observers. They notice and remember small details that the intuitive personality will miss. If not careful, however, they may antagonize others by zeroing in on small flaws while ignoring an overall successful project. They tend to like jobs that require the use of well-learned knowledge, not the development of new solutions.

In contrast, the intuitive person thinks in terms of possibilities and relationships rather than facts. This personality enjoys abstract, symbolic, and theoretical relationships. As a consequence, they like work that requires finding patterns in complex systems rather than dealing with details. They prefer to create new knowledge rather than to apply existing information. They also tend to be nonconforming and may prefer to work odd hours rather than the usual 8 to 5.

The next type, the thinking personality, analyzes situations and weighs facts and potential outcomes before choosing a course of action. They tend to be objective and scrupulously fair in dealing with others. They are attracted to careers that reward their analytical powers and their technical skills.

While the thinking person is logical rather than emotional, basing decisions on analysis rather than personal values, the feeling person is more subjective, considering personal values and the impact of decisions on others. The feeling type exhibits a highly developed sense of values and standards. They understand others easily and genuinely like dealing with people. They gravitate toward areas that require good interpersonal skills.

Finally, the judging person evaluates situations and draws conclusions in a controlled manner, rather than simply becoming aware of something in a passive, receptive way. This type is happiest once solutions to problems have been found and a course of action decided upon. Unlike the perceiving personality who relishes the decision-making process, the judging type seeks closure and feels uneasy until a decision has been made. This personality desires order above all else, preferring deadlines and the structure they impose.

In contrast, the perceiving person is spontaneous, flexible, and uncritical of others. This type likes to keep all options open and may feel apprehensive when a decision has been reached. They sometimes even change their minds after a decision, returning purchases or shifting plans at the last moment. If a potential decision is irrevocable or very hard to change, they may feel trapped. This personality type has been known to back out of a contract at the last minute and to leave a future spouse waiting at the altar. People in whom this trait predominates to an extreme degree may even abdicate responsibility for decision-making entirely, leaving choices up to others.

These four independent categories combine to form 16 different psychological types. Originally, the test was given to thousands of people to find typical patterns of response, or norms, with which to compare subsequent scores. The criteria used to validate the test include scores on other personality tests, teachers' grades and ratings of students, job performance and turnover, and creative achievement.

As might be expected, common profiles emerged for members of certain occupations. For example, engineers, mathematicians, and scientists had high scores on the thinking scale. Research scientists had high scores for judging and intuition, as well. On the other hand, those engaged in creative pursuits scored higher on the intuitive, perceptive, and feeling categories than the rest of the population. For instance, 90% of creative writers and 100% of the architects were classified as intuitive compared to only 25% of the general population. Creative individuals' high scores on intuition, perception, and feeling were constant, regardless of sex or occupation.

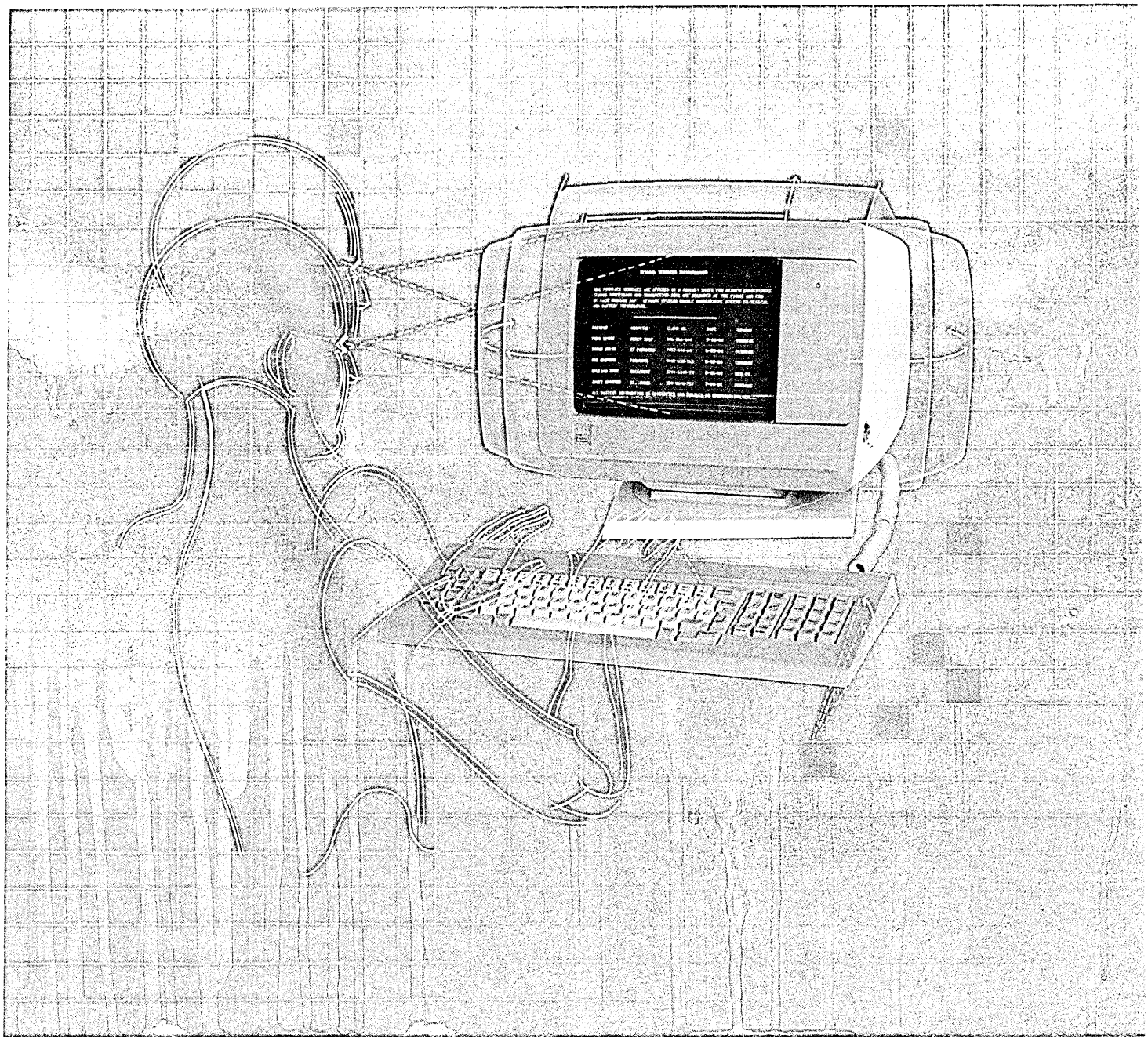
The stereotype of the introverted scholar was supported. Students who made good grades tended to be introverted, as well as intuitive and judging. This personality type does not do well in sales, a field in which extroverted, feeling types excel.

MISMATCH LEADS TO DISLIKE

Not surprisingly, a mismatch between personality type and occupation leads to dissatisfaction. Introverts quickly leave active jobs requiring a lot of interpersonal interaction. Nor do extroverts last in solitary, clerical jobs. Perhaps the most rapid turnover of all occurs when thinking types enter sales. The match between personality type and occupation is not simple, however. Sometimes members of what appear to be very different occupations score very similarly. For example, elementary school teachers and successful salesmen share the same personality type. Even more surprising, medical doctors and career airplane pilots, as different as they may first appear, are the same type. Both express a strong need to be in control. This may explain why so many physicians take up flying.

To get some idea of the personality type of data processors, we gave the test to 27 volunteers from four Texas computer installations: the State Treasury, the College Coordinating Board, the Education Agency, and the Internal Revenue Service. Volunteers were also asked to predict how other computer programmers would respond.

The stereotype that respondents



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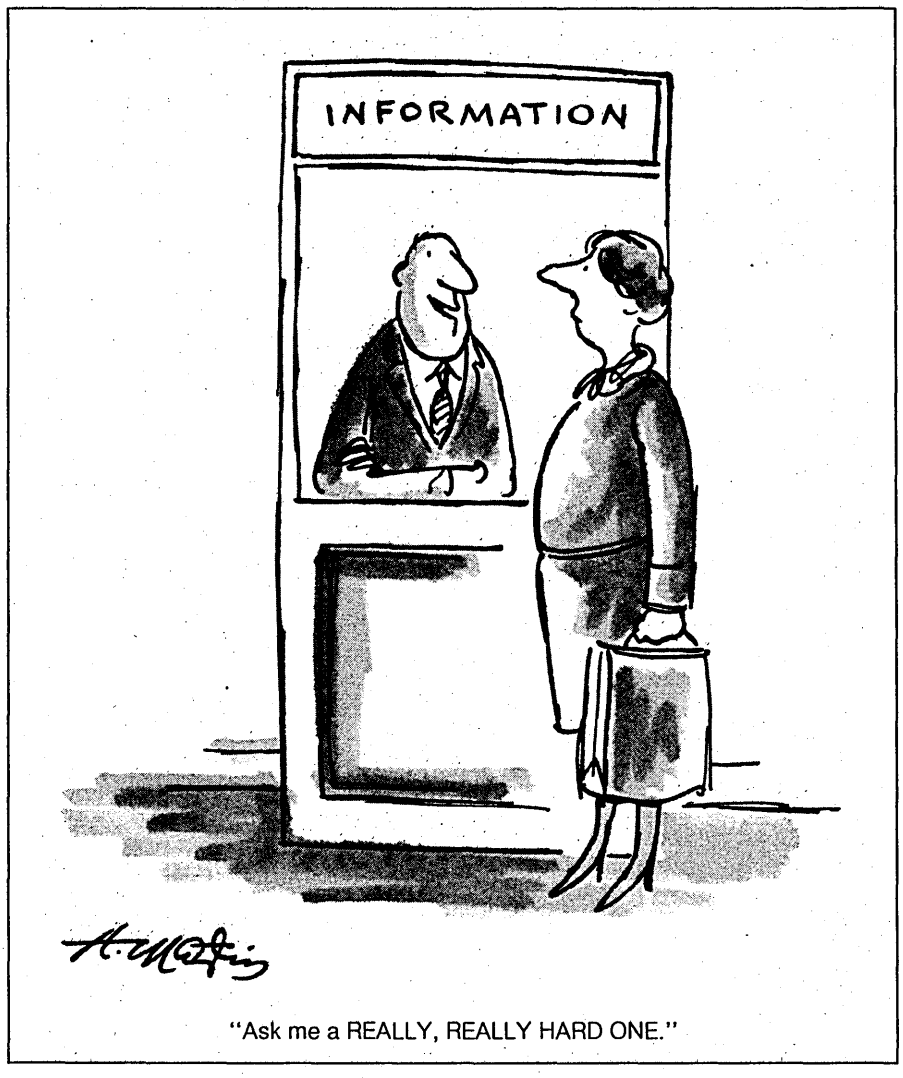
The most rapid job turnover of all occurs when thinking types enter sales.

held about the personality type of other data processors was very inaccurate. They predicted that the most common type would be ESTJ (extroverted, sensing, thinking, and judging). This personality type is very responsible and has been characterized as the administrator. Data processors picked a type for their peers that is very organized, oriented toward traditional values, thrives on routine, is something of a perfectionist, and can be impatient with inefficiency. This type is also dependable, consistent, and product oriented.

In reality, the most common personality type for the data processor was ENTP (extroverted, intuitive, thinking, and perceiving). This type is analytical, independent, competitive, and nonconformist. According to Keirsey, the occupation best suited to this type is inventor. He characterizes the ENTP, which occurs in only 5% of the general population, as "good at analysis, especially functional analysis, with a tolerance for and enjoyment of the complex . . . always looking for new projects, new activities, new procedures . . . . They ignore the standard, the traditional, and the authoritative."

This personality type places a high value on innovation and may rely on ingenuity to carry the day, sometimes neglecting necessary preparation. As soon as a problem is solved they may lose interest—unless they are very self-disciplined—and simply walk away from the project. They can be argumentative and may argue either side of an issue just for the fun of it. They enjoy one-upmanship and especially like to beat the system by using the system's own rules and regulations.

Isabel Myers, who developed the Myers-Briggs test, describes ENTPs as enthusiastic innovators who hate routine. She says, "They are happiest and most effective in jobs that permit one project after another, with someone else seeing the projects to completion after the problems are solved." She believes that without self-discipline, this personality type may leave projects unfinished and become unstable, undependable, fickle, and easily discouraged.



"Ask me a REALLY, REALLY HARD ONE."

CARTOON BY HENRY MARTIN

DPERS NOT COOL BUT INTUITIVE

The stereotype of data processors held by members of the occupation emphasized organization and cool, logical thought processes. In reality, the data processors were much more imaginative, intuitive, and creative than they thought.

In comparison to the general population, they were more than twice as likely to score in the intuitive category. With regard to extraversion, while it was true that a majority of the data processors were extroverts, they were significantly less extroverted than the general population, 70% of which falls into this category.

The discrepancy between the stereotypical programmer's personality and the reality may mean that a person who enters the profession expecting that his peers will be realistic, logical, and judgmental will be dissatisfied. Similarly, someone who tries to manage data processors on these assumptions may be unsuccessful.

As J.D. Cougar and R.A. Zawacki found in their nationwide survey of data processing personnel (*Motivating and Managing Computer Personnel,* John Wiley & Sons, 1980), salaries are not the most effective motivation for this field. The job itself is the major inducement.

Perhaps an advertising campaign similar to the Army's is needed to help bring the stereotype in line with reality. An ad showing creative programmers merrily and irreverently solving complicated problems, untrammeled by routine and humdrum details might do the trick. ◉

Sarah Sitton has a PhD in Experimental Psychology from the University of Texas at Austin. She has taught psychology and management courses at St. Edwards University and at the University of Texas at Austin. She has also worked as a Research Psychologist for the Texas Transportation Institute of Texas A&M University and for the Office of Institutional Research at St. Edward's. Her scholarly publications include articles in the fields of human learning, social psychology, and traffic safety.

Gerard Chmelir is a student majoring in psychology at St. Edward's University. He is employed as a Field Service Engineer for Honeywell, Austin, Texas, in charge of computer installation.

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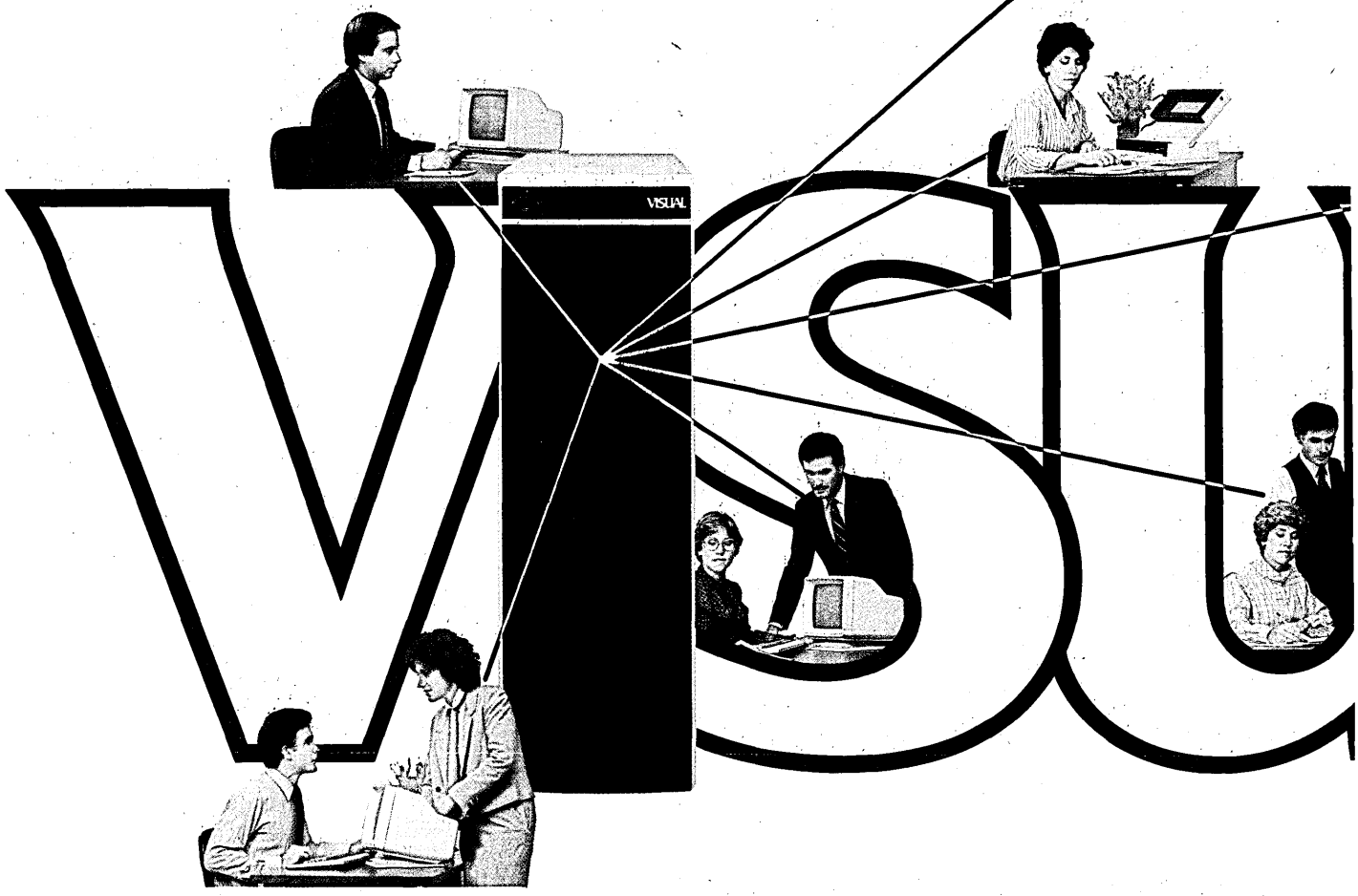
The Power of a Mini, The Cost of a Micro, The Clout of UNIX.



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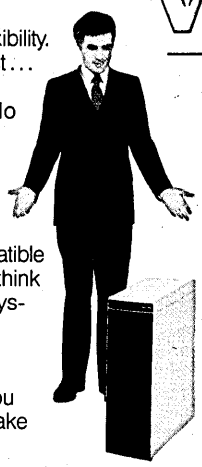

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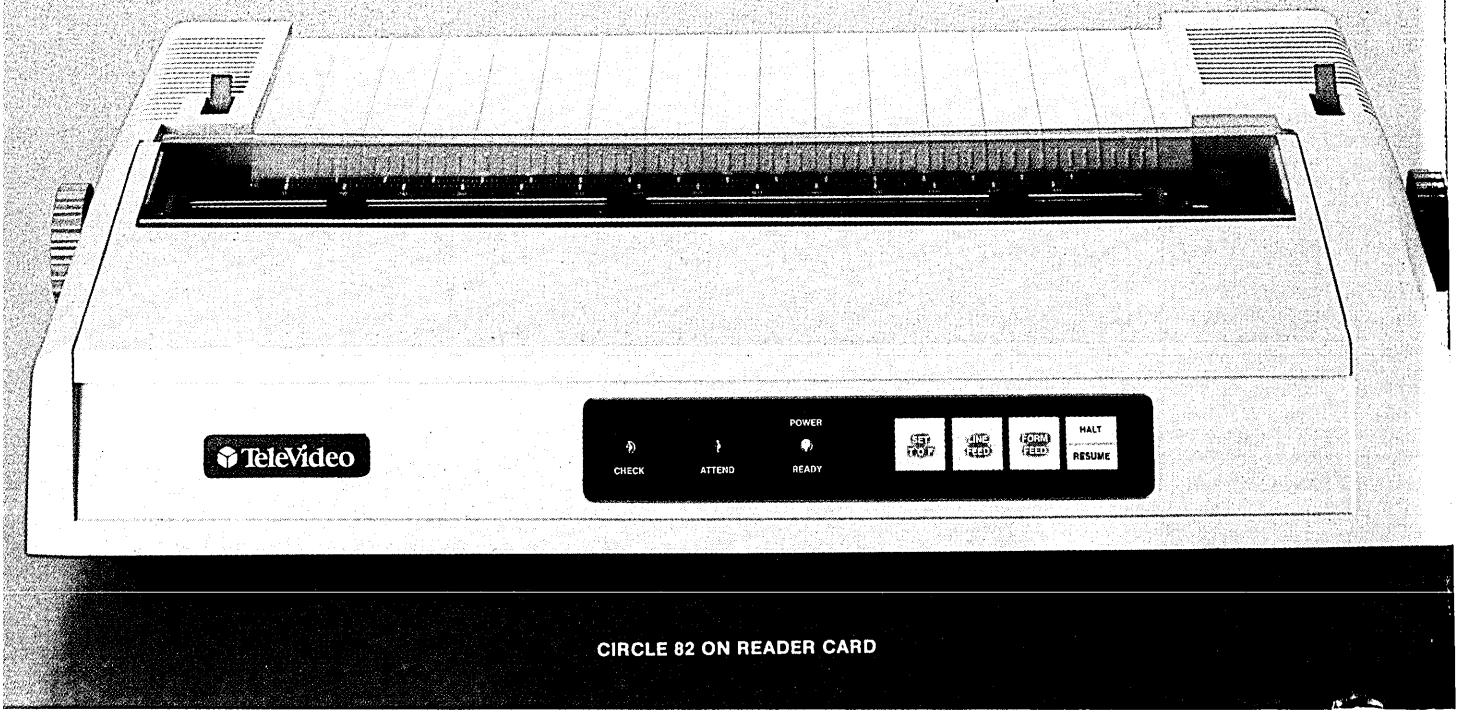


CIRCLE 82 ON READER CARD

Most businesses use inconsistent rules to control their data. That's why they suffer from information pollution.

BUSINESS RULES: THE MISSING LINK

by Daniel S. Appleton

Within an enterprise, each organization, activity, process, person, function, and system has its own dynamic view of the world. It has its own vocabulary, its own concept of reality, of what is important. The typical enterprise is a chaos of these views. What follows is a typical (and true) tale of chaos.

Once upon a time, there were three organizations that had been asked to build a new process called inventory control. The organizations were Supply, Engineering, and Finance.

Now, the reason for the process was that it had become evident to management that inventory was out of control—i.e., they had too much or too little, too early or too late, and it was too expensive or not expensive enough. No one was quite sure which, or why. So, obviously, someone's view of the world was not right. The command came down: "Change things—but not too much."

In the meantime, Engineering had been asked to introduce a new product technology that required it to change its approach to product definition. Because the new technology was electronic (the old was mechanical), Engineering had to think in terms of assemblies and subassemblies, with indentured bills of materials. Also, it was introducing, for for the sake of productivity improvements, a new technique for managing engineering changes, necessitated by the elimination of drawings. Further, its prior management had decided (on the advice of a consultant) to change from a significant part numbering system to a nonsignificant one, which used 10 numeric (instead of 23 alphanumeric) digits for the part number.

Finance, meanwhile, was also going high tech. Accounts payable was being changed so that each division could control its own cash flow. This was critical because all division managers had learned (in a "financial management for nonfinancial managers" course) how much impact accounts payable had on the balance sheet, and then were given MBOs related to better cash management. Further, to accommodate Marketing, Finance had just set up a new product coding structure so it could report performance against the new business structure, not just the traditional business structure. The new business structure had evolved, of course, because top management had just finished building its new five-year strategic business plan and defining seven new strategic business units (SBUs).

It was Finance, by the way, that had blown the whistle on inventory control. Supply had been perfectly happy with the old way. It had finally managed to phase out all engineering part numbers, replacing them with its own material codes. To Supply, part numbers appeared to change based on the whims of Engineering. These changes confused Supply, which was content with its own concept of substitutions, which was far more reasonable than Engineering's replacements. The new technology gave Supply some early heartburn, but after it had invented the notion of serialized equipment—which had its own special codes—everything was okay.

To make a long story short, after three years the inventory system crashed. Why? To no one's amazement, one critical reason was that there had evolved inconsistent sets of rules for defining and relating the ideas listed in Fig 1. The rules that defined and related these things were inconsistent. For example, work order line items were used by Engineering to order parts by part number. Purchase orders were used to purchase many parts from the same vendor, but with only one part per purchase order line item, identified by material code. Many vendors supplied parts that were substitutable by material code, but not replaceable by part number. And so forth.

Not only were the basic rules inconsistent, they were also changing. And the packaged computer program that Supply had bought—which had an accounts payable and a product definition module—would not accept the logic that one purchase order could be referenced by many work order line items, or that one material code encompassed many different part numbers. The package would have to be completely changed around—or else the logic of the business would have to be changed to fit the package. Fat chance.

GROUPS DON'T INTERFACE

The problem is that most businesses assume that the rules controlling their data are consistent, when in fact they aren't. This is why management gets inconsistent, unreliable, conflicting, and contradictory information. Sadly, most organizations have no concept of how to identify the rules that control their data, or of how to test these rules for consistency. Each group goes off on its own, rarely concerned about its interfaces, and never concerned with any efficiency but its own.

Happily, by developing the capability to define, coordinate, and manage such rules, an enterprise can ultimately solve these miscommunication problems. In the balance of this article, I examine the concept of information and the role of what I call Business Rules. I will also examine how to define Business Rules, how to apply them, how to automate them, and, finally, how to get them started.

To understand Business Rules, we first need a brief tutorial on what data are. To understand data, we have got to start with information.

An information can be defined as "an aggregation of data needed for a specific purpose." This implies three important ideas. First, an information cannot exist if there is no purpose (demand) for it. Second, an information and a datum are different ideas. Third, one information, if you will, is made up of at least one datum, but probably several data (Fig. 2). This means that from 400 data we could create 10,869 informations. Thus, by managing a few data directly, we indirectly manage a bunch of informations.

But what is a datum? This question is even more difficult than the first. Some people believe that 12345 is a datum. It is

The problem for data management is not managing facts. It is managing meanings.

not. It is a fact. Also, M is a fact, and so is 10.

The problem with these facts is that we do not know what they mean. The numeral combination 12345 is a part number. It is also the zip code of Schenectady, New York. M stands for male; it is also a letter of the alphabet. The symbol 10 could be an age, or it could be a pseudonym for Bo Derek.

To have a datum then, we must have two things: a fact and a meaning. A fact alone is nonsense. But, as shown in the model, for each meaning we can have zero, one, or many facts.

Therefore, the problem for data management is not managing facts. It is managing meanings. This is because for each meaning, we can have many facts. The meanings (not the facts) define an organization's (or a person's) concept of reality.

These meanings are interdependent; they are a fabric. No one meaning stands on its own. For example, the notion of a part can only be defined within a specific context of other notions such as a drawing, a change, a material type, etc. What we mean when we talk about a part depends on what we mean when we talk about other things, because we use them to describe it. For example, a part is defined by a drawing. These fabrics of meanings are not cosmically defined. They are defined by convention.

I call a set of interdependent meanings an ontology. (I have also heard it called a conceptual schema or a universe of discourse.) An ontology is required before facts can either be perceived (input) or understood (stored). Without an ontology, facts do not make sense, nor can they be assembled to create information.

Today's fundamental information management question is, "Which ontology (fabric of data meanings) is being represented on our computers?" In the early 1970s, it was the ontology of an individual, represented in his computer program. In the late 1970s, it was the ontology of an organization, represented in its application system (e.g., payroll, general ledger, etc.). In the early 1980s, it has become the ontology of a process, e.g., marketing and product design. And in the next decade, it will become the ontology of an enterprise, or business.

The key to managing information, then, lies in managing the enterprise or business ontology. This is a role played by Business Rules. Without them, it is impossible to describe or understand, much less manage, the enterprise ontology; ergo, without them, today's problems of inconsistent, inaccurate, untimely, and inappropriate information, i.e., information pollution, will continue.

BUSINESS RULE DEFINED

A Business Rule is an explicit statement of a constraint that exists within a business's ontology. For example, in a manufacturing business, the following might be viable Business Rules:

- "A purchase order may be issued to one and only one vendor."
- "Each purchase order will have at least one purchase order line item, but it may have a maximum of 30 line items."
- "Each purchase order line item may order one and only one part type."
- "No purchase order may be placed that orders parts for more than one customer order."

Obviously, any one business could have thousands of Business Rules comprising a whole that is constantly changing. The problem is not in the number. It lies in ensuring that all of a business's Business Rules are consistent. This is the only way to ensure ontological consistency, which in turn ensures that the meanings of data stored on and manipulated by different computers are consistent.

Business Rules do not stand alone. After all, each is part of the business ontology. One Business Rule is only meaningful in the context of other Business Rules. Therefore, a business must have at least two Business Rules. The maximum number of Business Rules is a function of how adamant the business is about its ontological consistency. However, once a new Business Rule is validated against existing Business Rules, it becomes part of the ontology, and all subsequent Business Rules must conform to it (and the other Business Rules).

Business Rules exist, whether explicitly documented or not. They are not invented by computer people. They are, in effect, statements about the basic structure of data in a business. Generally, they are described in terms of: 1. the things in a business that people need to know information about; 2. the descriptors of those things; and 3. the relationships among those things. The things themselves are generally called entities. The descriptors are generally called attributes of entities. And the relationships among those entities (and their attributes) are generally called relationships.

A procedure for discovering Business Rules follows:

1. Identify a set of entities; e.g., employees, departments, accounts, purchase orders, parts, etc.
2. Identify the single attribute of each entity that allows for the identification of a unique instance of an entity, e.g., employee name, department code, account number, etc.
3. Build an information model to validate and document the relationships that exist between entities, e.g., employee works for a department, parts are ordered by purchase orders.
4. Identify additional attributes of interest about each entity, e.g., employee age, address, start date, stock ownership code, social security number, etc.

This procedure can be followed in interviews or brainstorming sessions, or with analytical techniques or any other procedure; but, it must be followed in an orderly manner. Once the information model has been constructed, Business Rules can be read directly from the model (Fig. 3).

The concept of an entity is difficult

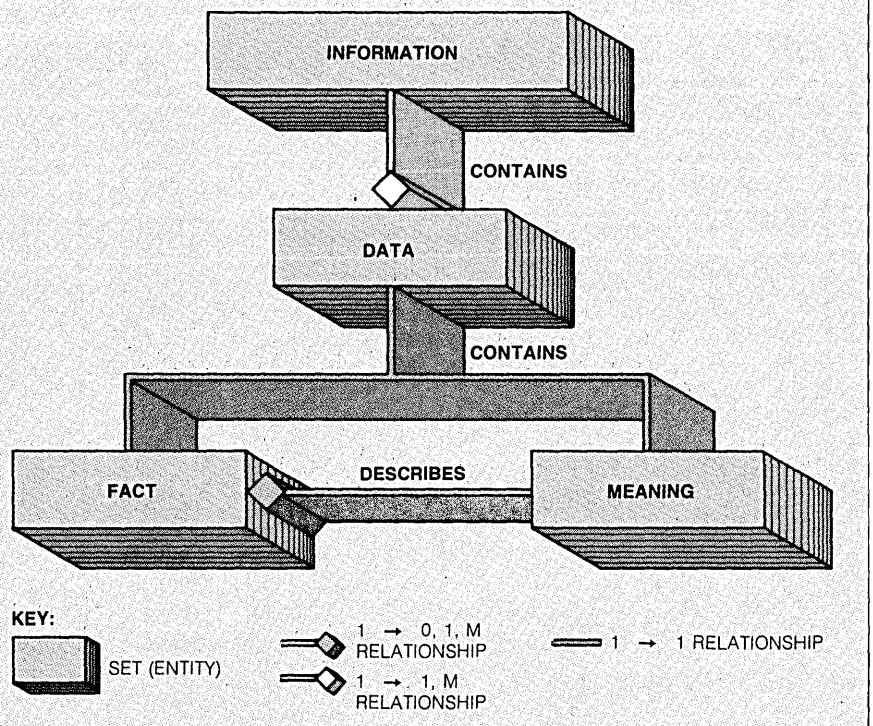
FIG. 1

CONSISTENCY COUNTS

Material	
Material code	Inventory account
Part	
Part number	Change-replacement
Drawing	
Work order	Change-substitution
Work order line item	Bin
Purchase order	Invoice
Purchase order line item	Cost
Serialized equipment	

FIG. 2

WHAT'S A DATUM?



to grasp for many people. This is because it has a double meaning. It refers to things in both their singular and their plural, e.g., employee and employees are both entities. Employees is a set of uniquely identifiable individual entities, each of which is an employee. Generally, we use the word entity to refer to the set, not the members. This is only valid if the set has uniquely identifiable members (i.e., if it is a real set).

Each entity should be provided with a natural language definition, e.g., "An employee is an individual who is paid via the company payroll system." It must have at least one specific identifying attribute, e.g., employee name. It may have other attributes, even though they may not be specifically described in the Business Rule.

Only valid entities can be linked together through relationships. A business can establish a list of acceptable relationships, or it can be less exacting, but generally relationships describe how members of one entity can relate to members of another entity. For example, an employee may be assigned a parking space.

There are only three generic relationships that can exist among members of entities:

1. A member of one entity can relate to zero or one member of another entity, e.g., one employee may be assigned one parking place.

2. A member of one entity can relate to zero, one, or many members of another entity, e.g., one purchase order can order many parts.

3. A member of one entity must relate to one, but may relate to many members of another entity, e.g., a part must be purchased by a purchase order.

In some cases, it may be important to be even more specific about a relationship between two entities. This means giving the relationship cardinality. For example, "There cannot be more than 10 students per instructor," or "Each class must have at least five students." The concept of cardinality further refines a relationship, making it even more constraining.

It must be remembered that Business Rules define constraints that must be enforced to ensure consistency and completeness of the meanings of the data that constitute a business ontology. The more rules there are, the tighter the constraints, and vice versa.

It would be very difficult for a single person to know, much less enforce, the total set of a company's Business Rules. Most people (and organizations) see only subsets of the Business Rules, i.e., those rules that directly affect them. Business Rule management is not a problem of individually validating subsets of Business Rules. The totality of Business Rules must be consistent to ensure consistency in the business ontology.

No business process should be performed if it is inconsistent with the Business Rules. For example, purchase orders should not be issued that cover several vendors or that supply parts to several customer orders. Also, no purchase order line item should order both nuts and bolts (two different parts) even if from the same vendor.

If Business Rules are changed to facilitate (or enable) a business process that they had previously inhibited, the whole ontology is affected, and it too must be changed. For example, if several part numbers are ordered by the same purchase order line item, then inventory management must be modified because there was undoubtedly a Business Rule that aligns inventory account replenishment to single purchase order line items, which in turn affected standard costs.

The problem, however, is that business activities are constantly changing. Business Rules should not get in the way unless the company wants them to. As a result, Business Rule change management is a very serious issue, since Business Rules should control what facts are stored on computers and, consequently, what information can be generated from those facts.

CHANGES MUST BE EVALUATED

If a business's activities need to be changed, then the changes must be evaluated with respect to how the existing set of Business Rules will be affected. Changes to a company's Business Rules can be extremely traumatic, and expensive. Therefore, if they must be made, they should be made with careful planning.

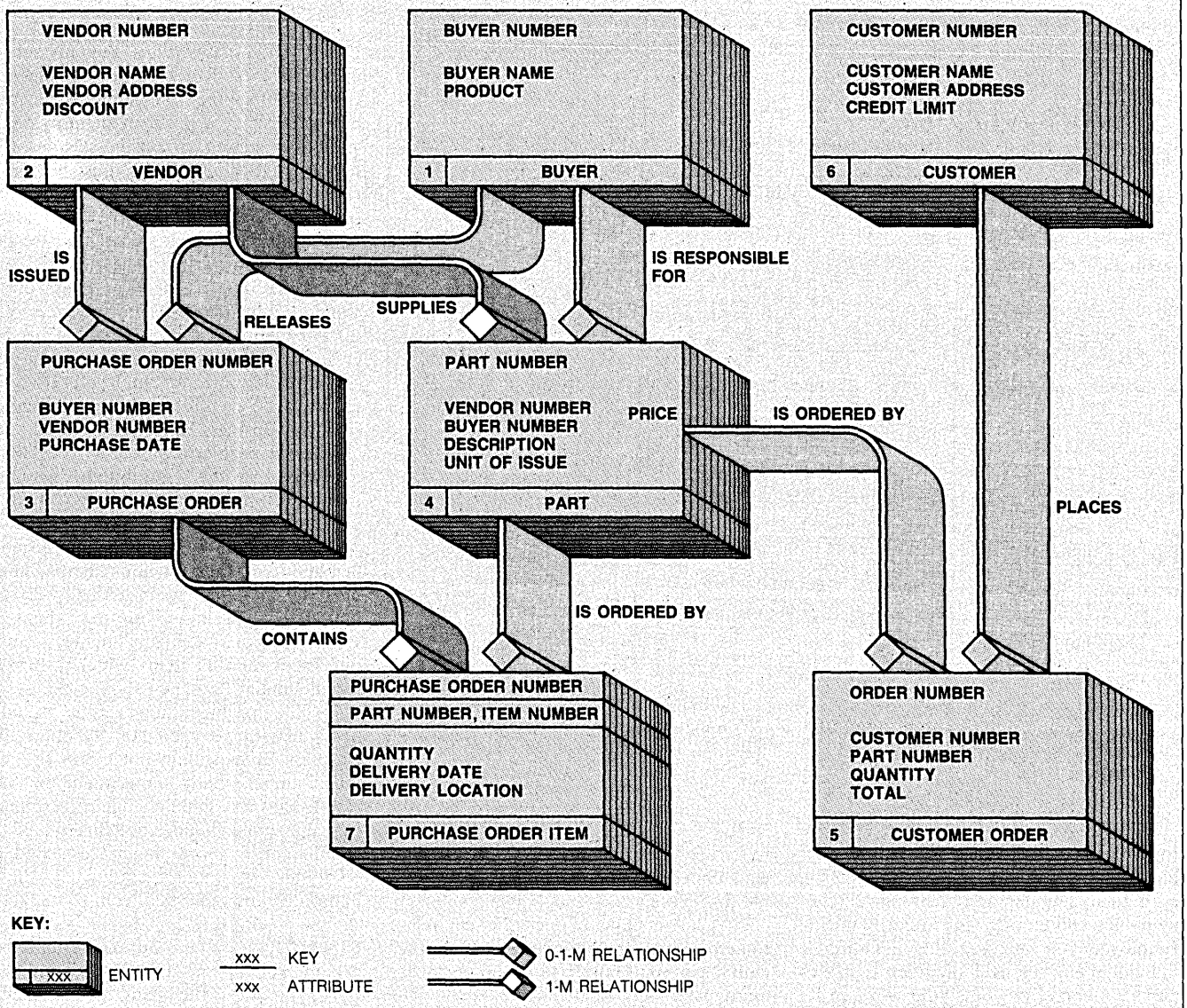
New business activities must be evaluated to determine if they can be performed within the existing set of Business Rules. If not, the business activities must be challenged. Only if they are valid activities should the Business Rules be changed to enable the new business activities.

A business may not have a choice in its activity changes. For example, American Airlines could not choose whether to be deregulated. But, it cannot tell the true cost of deregulation until it knows the impact on its Business Rules. Ultimately, the structure of many of its computerized databases will have to be changed.

Business Rules can be stored in and managed by computers. This can be done

FIG. 3

BUSINESS RULES



by building a Business Rule database. Such a database can then be used to ensure consistency in Business Rules implemented by individual computer systems. In a sense, a Business Rule database is the way of ensuring that the data meanings supporting individually developed (or purchased) applications are consistent.

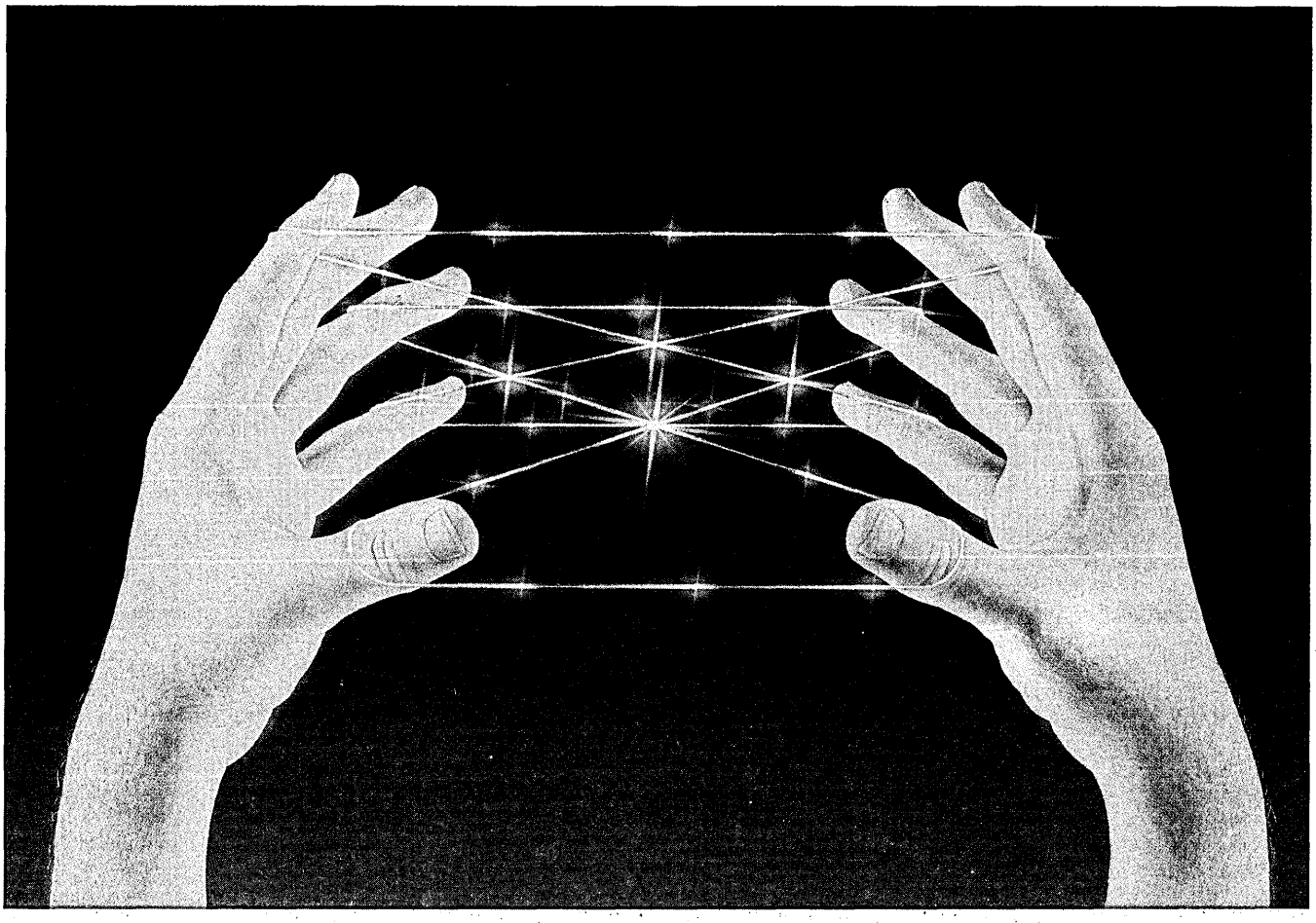
A Business Rule database is an automated, precise model of the various Business Rules in an organization. Each profit center can have only one official Business Rule database, which it uses for managing its Business Rules.

Each time a new Business Rule is added to the database, or an existing rule is modified, the database verifies that consistency is being maintained among all the rules. If an inconsistent rule is proposed, the rule is rejected from the database, with appropriate information about what must be done to get it accepted. Once a rule is accepted, however, it becomes part of the database, and new additions and changes are verified against it.

The database is an important tool for verifying and validating Business Rules. It is concerned with the meaning of a set of Business Rules. It validates the relationships between entities: for example, part, material, and inventory. It is not concerned with how many inventory accounts there are (except that there is more than one) or with what those accounts are.

The Business Rule database is responsible for ensuring consistency and completeness among the various Business Rules. To perform its task, the database both edits potential additions or changes, and searches for potential problems between old and new (proposed) rules.

The whole notion of Business Rules is to define an eye within the information hurricane, and to bring some sanity to the integration of information technology into a business environment. Business Rules obviously have a role in planning, but their most important role is in managing the implementation of information and data technology. They are a very important implementation tool. They can be introduced into an ongoing project environment, thereby using existing projects to provide momentum toward an integrated data resource management environment. They can also be introduced into information centers and end-user computing environments, thereby providing a bridge between user-developed prototypes and shared databases managed by the data processing department. This bridge can be turned into a conduit enabling user-developed (private) data to be gradually merged



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CIRCLE 84 ON READER CARD

The database is an important tool for verifying and validating Business Rules.

into shared data resources on a continuing, evolutionary basis (see "Law of the Data Jungle," October 1983, p. 225).

RULES CAN MANAGE SHARING

Additionally, Business Rules can manage the development and evolution of shared data. Not all data are destined to be shared. But those that are valuable enough to be shared must come under some kind of management scheme. They must somehow be integrated into the environment of other shared data. Business Rules are an excellent tool for managing this ongoing integration process.

Another important role for Business Rules is the identification and validation of requirements to guide the procurement of application software packages. Packages that do not directly implement a company's Business Rules will simply not be implementable. They may run on the computer, but they will not be accepted into the business environment.

Obviously, there are choices here. First, the package could be modified to accommodate the Business Rules. If this path is chosen, the cost of such changes must be evaluated and the flexibility of the changed package must be determined, because future Business Rule changes will undoubtedly also affect the package. Because Business Rules reflect fundamental information architectures, changes to purchased software to accommodate them can be quite devastating both to development costs and operating costs. Without Business Rules, however, it is extremely difficult to even determine that such changes need to be made. (Note: Business Rules should be developed before packages are evaluated. They reflect the company's sense of shared data, not a vendor's).

The other alternative, of course, is to change the Business Rules to reflect what the package thinks is best. This can be a desirable alternative. But without first identifying what the company's real Business Rules are, and second, what changes need to be made to use the package, it is almost impossible to estimate the overall organizational impact of implementing the package.

The final—and most prevalent—alternative is to change both what the package does and how the organization works. Without Business Rules, it is difficult to decide how much of which to do, much less when you are finished.

The most important step on the road to Business Rules is to define the scope of the ontology they are to represent. There are several alternatives here, each setting the stage for slightly different implementation concepts. The ontological scope of Business Rules can be almost anything, but the most common are:

- The enterprise
- A profit center
- An independent functional area (for example, international operations, logistics, retail products)
- A major program, product, or business area (e.g., government services, the F-16, petroleum products)

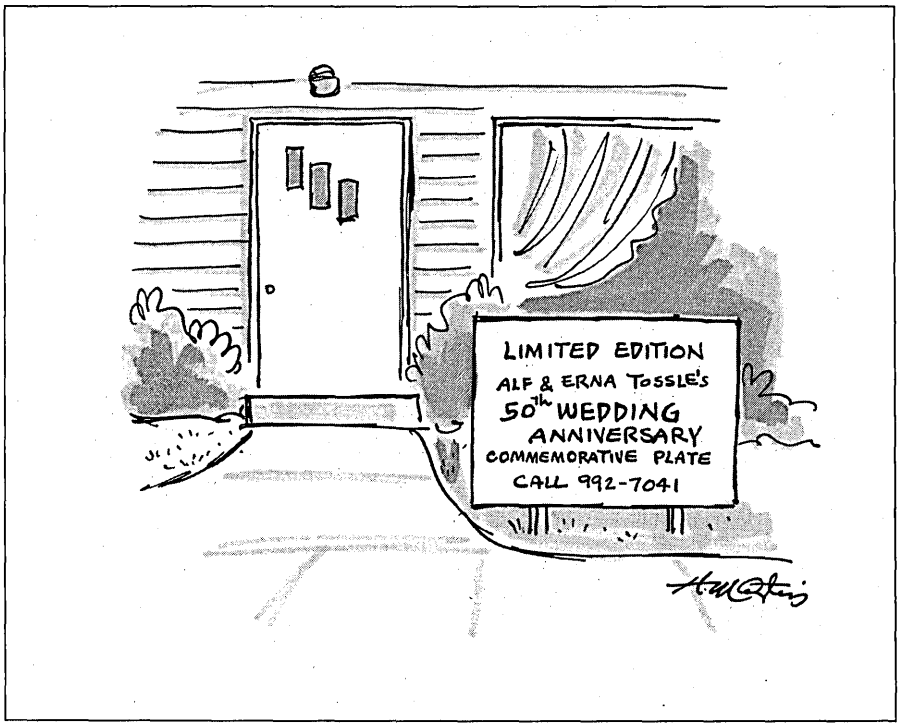
Since a major role of Business Rules is to manage shared data, it is self-defeating to define Business Rules for business, organization, or systems units at levels lower than those described above unless the unit is extremely large, complicated, and independent.

The next step is to identify the Business Rule Manager function and its organizational position and responsibilities. The first responsibility to be assigned should be to produce an implementation plan, as follows:

- Validate the ontological scope with all management personnel.
- Confirm critical success factors for Business Rules.
- Select an information modeling methodology (i.e., Database Design Group's Database Design Technique, or DACOM's INFO-Model-er appropriate for characterizing Business Rules.
- Train Business Rule managers in the methodology.
- Establish a procedure for identifying, validating, and changing Business Rules.
- Train users in Business Rule development and analysis.
- Train in Business Rule transformation to physical database structures.
- Select and implement software tools to support the above.

It is difficult to understand how data integration or data resource management can be accomplished without a concept such as Business Rules. It certainly will never be accomplished by foraging COBOL data divisions and IMS PCBs for data elements and loading them into a data dictionary. It will not be accomplished bottom-up by normalizing data and throwing normalized relations into a community data trough. Nor will it be accomplished top-down by functionally decomposing subject databases into physical data files, application by application, or by populating subject databases with normalized relations, project by project.

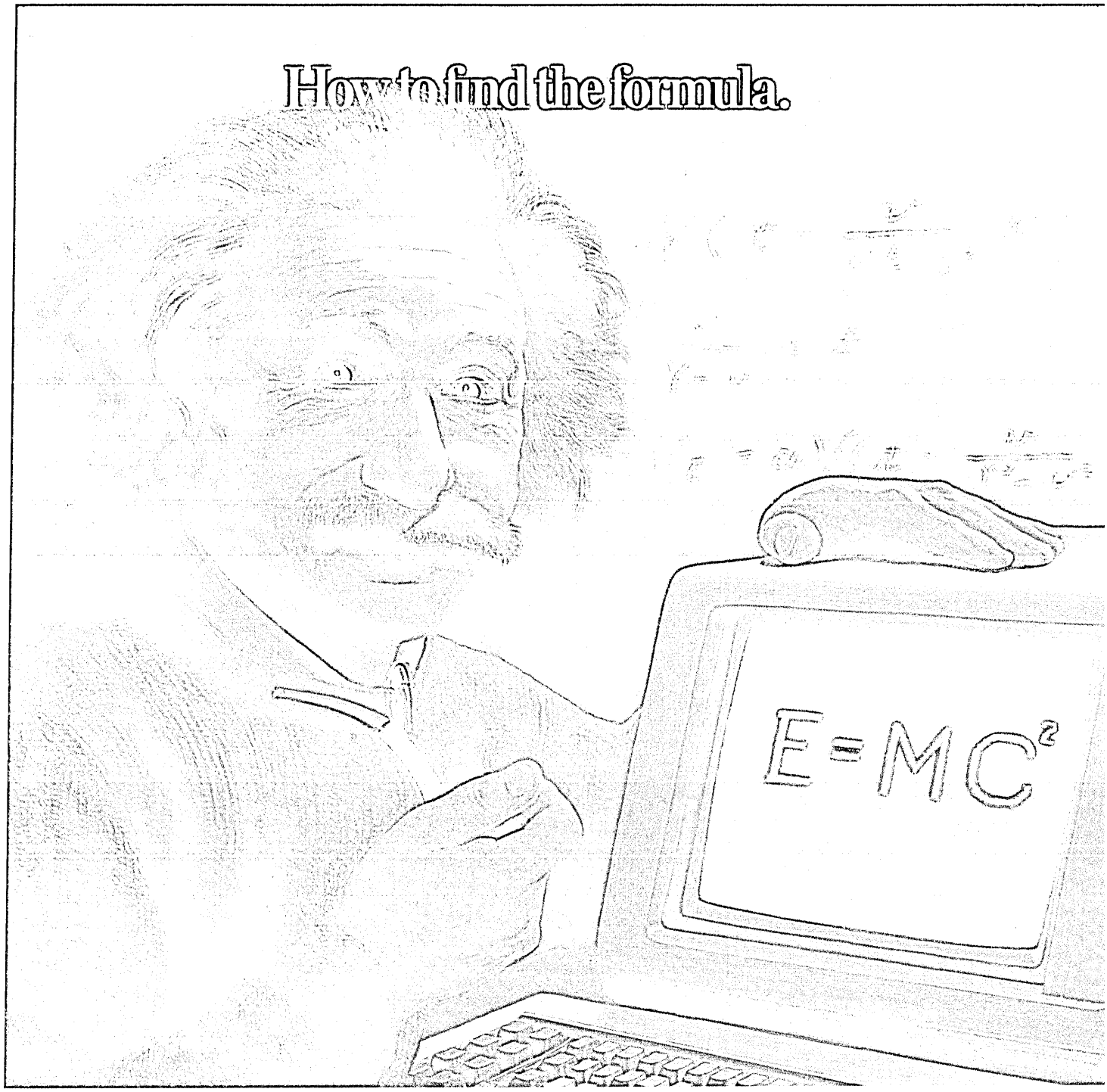
Business Rules are the missing link. They provide the link between high-level data architectures and project-level physical database designs; they provide the link between data structuring and data processing; and they provide the links among shared data. What more can you ask for?◉



CARTOON BY HENRY MARTIN

Dan Appleton is president of D. Appleton Co. Inc. (DACOM), Manhattan Beach, Calif. He is an internationally recognized expert on data management and database design.

How to find the formula.



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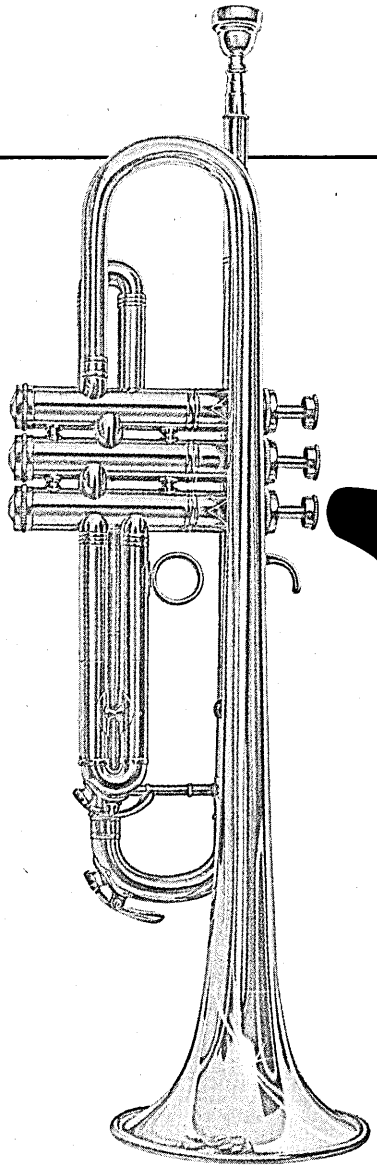

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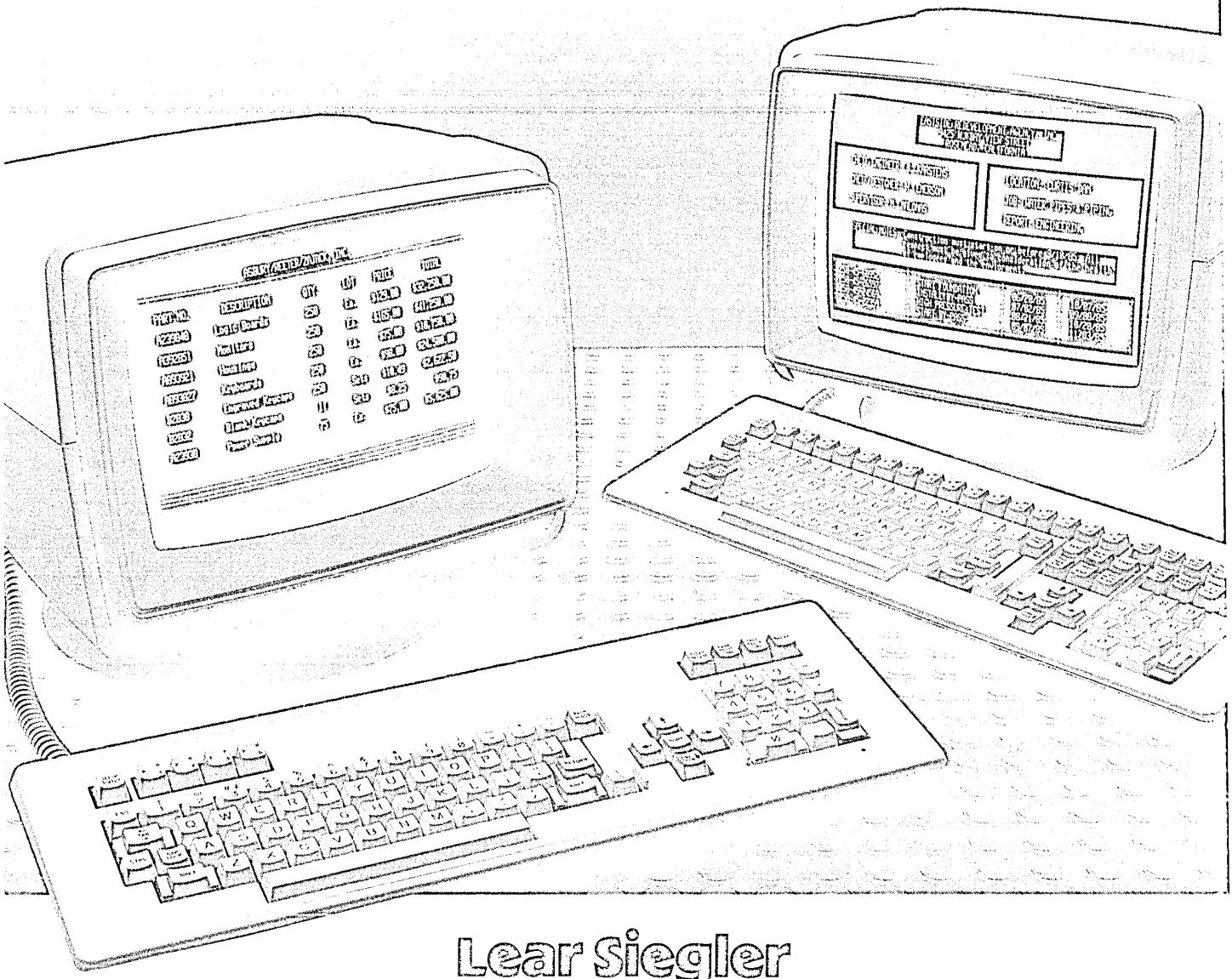

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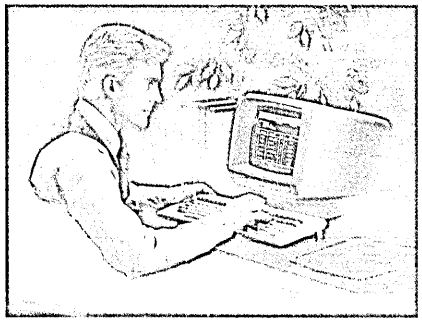

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An island city-state hopes that software development will make it the Silicon Valley of the Far East.

SINGAPORE'S 21ST CENTURY DREAM

by Daniel Burstein

There is a satisfied hum of conversation in Singapore's plush Tanglin Club as Johnny Moo, the island nation's most celebrated computer industry entrepreneur, sits back to contemplate. Formally attired waiters slice and cut from glittering trolleys laden with saddles of perfectly pink roast beef flown in from the U.S. The aromas of aged cognac and Havana cigars waft up toward the high, vaulted ceilings in this club where any Victorian English gentleman would be at home.

The questions being asked at the Tanglin Club are anything but Victorian, however. Will Singapore achieve its aim of becoming the software center of Asia in the 1990s? Will its ambitious leaders succeed in their goal of ending dependence on brawn power by making a shift to a 21st century economy based on brain power and high technology?

Johnny Moo is cautiously optimistic. He won't predict success with 100% certitude. But clearly he's a believer. More than that, as a member of the country's National Computer Board (NCB) and as managing director of one of Southeast Asia's most successful systems integrators—a venture known as Computer Systems Advisers—Moo is one of the people who may help make that dream for 2.5 million Singaporeans a reality.

"I wouldn't recommend a national computer plan for every country," Moo says, "but in Singapore, the government has a tendency to act—fast, efficiently, and with vision. The book *In Search of Excellence* profiled companies—it should have included the Singapore government as well. This government shares the characteristics of well-managed companies: a bias toward action, lean operations, close to the customer, and so on."

As Moo talks, several top government ministers walk by on their way to a table. In shirt-sleeves, they are friendly and seem without pretense.

Moo smiles at them and continues, "The average Singaporean is naturally entrepreneurial. We're not self-sufficent in anything—even our drinking water has to be imported. So there is a mania here about relying on our wits to make up for our lack of resources. Even our government people are more like entrepreneurs than bureaucrats."

That entrepreneurial drive has made Singapore one of the great economic success stories of modern times. Singapore emerged from British colonial rule in 1959 as a shabby city awash with poor and unemployed laborers. Prime Minister Lee Kuan Yew steered the country through political and economic crises to make it an island of stability, prosperity, and cleanliness in the midst of the chaotic third world.

The prime minister's development strategy originally hinged on attracting light industries from abroad. It worked. They came, eager to exploit Singapore's cheap labor. Later, Singapore emerged as an important service center for multinational corporations, featuring outstanding oil services, shipping, banking, regional corporate headquarters, and hotel facilities.

Now Prime Minister Lee wants to go a step further. His vision is of Singapore as a world class center for the development of high technology. This strategy seems to be working as well. Projects are under way involving biotechnology, robotics, fiber optics, solar energy, medical engineering, and other technologies of the future. But the most important target for development is information technology. Once again, Singapore's entrepreneurs are being asked to create a whole new industry where none existed just a few short years ago. Launched in 1980, Singapore's national computerization plan is already achieving considerable results.

"Singapore owes its economic success to its role as a trading center," observes NCB officer Sushil Chatterji. "If the world's future lies in information products rather than traditional commodities, then it makes sense for us to use our role as a trading center to export computer and information services."

LONG-TERM GOAL FOR SINGAPORE

Long term, the dream is to make Singapore the focal point for the delivery of computer services throughout Asia. Software development has been identified as the key element in this strategy. It is the growth sector of the computer industry where Singaporeans perceive the most opportunity for their know-how to play a significant role. Singaporeans don't discount hardware—in fact, foreign firms from Otrona to Data General have important manufacturing facilities in the island's industrial parks. Singapore has even become known as the microcomputer disk drive capital of the world with companies like Tandon doing much of its world production there. But, says NCB's Chatterji, "We don't want to beat our heads against giants. We just don't have the chemistry to create a Silicon Valley environment for hardware."

Instead, Singaporean visionaries see their countrymen supplying software and integrated systems to banks, stock exchanges, government ministries, ports, railroads, hospitals, factories, construction companies, and other large institutions all over Asia. There is talk that natural language and voice recognition systems in Asian languages may also become Singapore specialties.

If there is a model for that scenario, it is Johnny Moo's Computer Systems Advisers, already recognized as a world leader in supplying turnkey computerized wager-

Singapore has become known as the microcomputer disk drive capital of the world.

ing systems to racetracks. Earlier this year, CSA completed the computerization of the Royal Hong Kong Jockey Club. When on- and off-track betting are combined, the Jockey Club sees more dollars wagered per horse than any other track in the world. CSA's Jockey Club installation is the largest configuration of DEC equipment anywhere in Southeast Asia, but the cornerstone of the system is CSA's specially developed software and integration of computers and telephone systems. Hong Kong's nearly 300,000 "telebettors" can now wager instantaneously by phone without having to go to the track.

In trying to create more CSA-type computer service companies and enlarge their scope of activities to all the data-intensive sectors of Asian economic and social life, the architects of Singapore's software development plans are betting that a number of critical factors will give them the edge they will need to succeed. Singapore, for example, lies geographically at the crossroads of Asia. Most of its population is of Chinese descent, important not only because of the growing market for computer services in mainland China, but also because many of Southeast Asia's business communities are dominated by ethnic Chinese. At the same time, Indian, Malayan, and other minorities give Singapore direct cultural ties to several other major Asian nations.

Add to all that a virtually duty-free import-export economy, numerous incentives for foreign investment, a telecommunications infrastructure second in Asia only to Japan, and an international financial community that is closing in on Hong Kong for leadership in the Far East—and the idea of this little city-state developing a major business in supplying Asia with computer services starts to sound a lot less far-fetched.

Yet it is not exactly a wide-open market. American firms dominate the distribution of computer systems in Asia, and are highly respected for technological leadership. Japanese companies penetrate more and more markets, offering the same kind of "systems integration with an Asian touch" that Singapore will be trying to sell. Australians boast the benefits of Yankee-like ingenuity without the American tendency to look down on Asians. Hong Kong and Taiwan have well-developed computer industries and would also like to export their expertise. India wants to build home-grown industry to make better use of its outstanding engineers, an industry that will stem the brain drain that has sent Indian engineers flooding to the U.S. and elsewhere.

NATIONAL COMPUTER CULTURE

By zealously proceeding with an all-encompassing national plan focused on establishing its preeminence in Asian software development by the 1990s, Singapore believes it can create a critical mass of talent that will outclass the competition. "We must create a computer culture that captures the imagination of the whole country," observes Tan Chin Nam, general manager of the NCB. Some elements of that culture are already apparent:

- A massive educational program seeks to train 8,000 new computer professionals—10 times the number that existed in 1980. Over a five-year period that began last year, the government will spend nearly $80 million (U.S.) on a computer education program that includes high schools, universities, postgraduate institutes, and retraining of the existing work force.
- To speed the learning curve, the government is actively encouraging foreign companies to establish Singapore-based software development centers for their Asian operations. Sperry, Hewlett-Packard, DEC, and IBM have already agreed to open software development facilities. A Software Technology Center—scheduled for occupancy in early 1986—will be an integral part of the Singapore Science Park now under construction, offering ready-to-use workspace for software developers. Numerous tax incentives—from full depreciation of all computer hardware in one year to tax holidays for software development businesses—sweeten the scheme.
- The government itself will be used as a catalyst for promoting computerization. Ten government ministries are being computerized and each will have its own corps of data processing professionals. By "coincidence," major Singapore government contracts for computer hardware have recently been awarded to companies already committed to participate in the country's software development plans.
- Partnership projects with foreign companies and governments are being designed to enhance education and bring about greater technology transfer from the Western countries and Japan. For example, an Institute for Systems Science has been set up in partnership with IBM at the National University of Singapore. The Japanese government has helped create the Japan-Singapore Institute of Software Technology, and ICL of the U.K. is involved in the Center for Computer Studies at a local polytechnic college. Other partnership projects in related areas include a robotics partnership with the Swedish company ASEA and a CAD/CAM partnership with Computervision. Singapore pays for its participation in all these programs, but the foreign partners frequently donate equipment or sponsor Singaporeans who travel to the companies' home countries for further study.
- Anxious to avoid the mistakes made by the computer industry when it developed elsewhere, Singapore is trying to achieve an unprecedented degree of standardization in its nascent industry. The Singapore Federation of the Computer Industry, (an organization made up of hardware and software vendors, professionals, academics, and government representatives) has recently published standardized educational and job-description guidelines spelling out exactly what qualifications a person must have to get a job as a programmer or systems analyst or other frequently vague job title. Singapore has also adopted the British Computer Society certification exams to ensure international recognition for its skilled people, and has now become the largest overseas chapter of the BCS.
- The microcomputer revolution is being strongly encouraged. Although much of the information technology Singapore hopes to export in the future will be based on large systems architecture, Singaporean planners believe that the wide distribution of micros can quickly help create computer literacy. In 1983, 13,000 micros were sold in Singapore—a staggering number considering the small population. Home use is surprisingly high and, like Americans, Singaporeans seem to believe their children will be failures if they don't buy a micro for the home. All 140 secondary schools have computer labs, each with a minimum of three computers, and many have more. Every 13- and 14-year-old is required to take at least some extracurricular activity demanding computer literacy. The powerful trade union movement sponsors evening neighborhood classes at minimal cost for workers who want to learn basic computer skills.
- Computer "heroes" are being created by the strongly progovernment press. Lam Chih Chao, a 17-year-old student who bested top Australian teenagers in a competition sponsored by Perkin-Elmer at an Australian computer camp last summer, became an instant media hero. Two computer educators, Dr. Wang Kai-Yuen and Dr. Ho Tat Kin, were recently nominated by Prime Minister Lee's ruling People's Action Party to become members of parliament. Front-page stories in Singapore's major dailies featured party leaders praising the educators' work in promoting Singapore's push into the computer age.

There is little doubt that Singapore will be successful in introducing information technologies throughout its domestic

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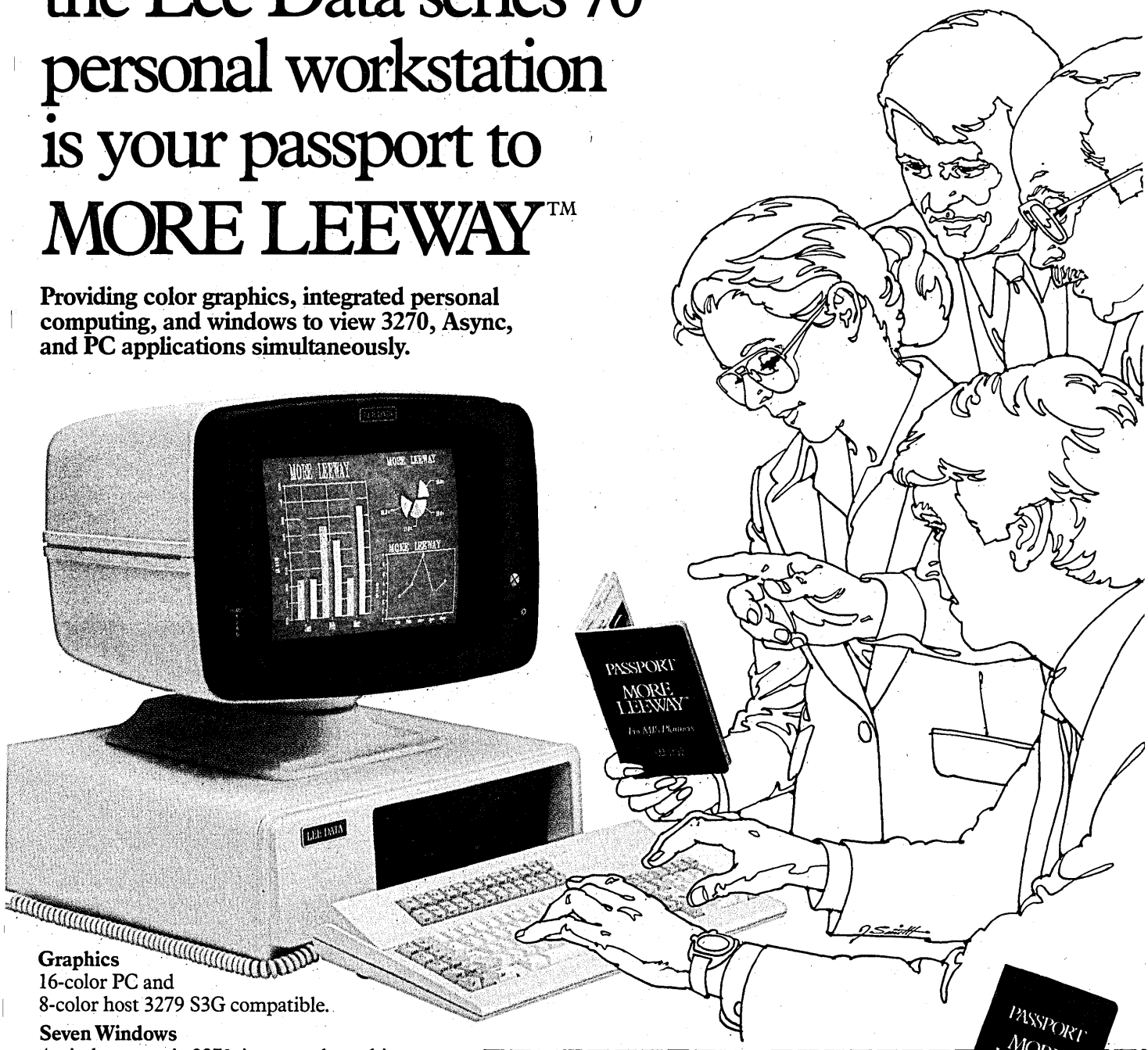

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Singaporeans are not only catching up to the West, in some instances they are ahead.

environment. Singaporeans are not only catching up to the West, in some instances they are ahead. Home banking, for example, is probably more popular in Singapore than it is in the U.S. Every single telephone in Singapore is touch-tone and a wide variety of telephone-accessed services are now offered by the state-run telephone company. Singapore has the world's most efficient computerized traffic control program. The 73-story Westin Stamford hotel, now under construction (it will be the world's tallest hotel and the highest building in Asia), will have a computer system that spokesmen boast will be the world's most sophisticated hotel package.

But can Singapore really become an exporter of computer services on a large scale? Dr. Juzar Motiwalla, who directs the Institute for Systems Science at the National University, is one of Singapore's most cogent thinkers on the subject.

"The goal of becoming an exporter of software and computer services is a bit vague right now. Certainly there will be a big market for the skills we are developing here because we are a step ahead of many others in Asia. Software in areas where we have strong expertise—banking, shipping, and hotel management, for instance—may be exportable. Whether we can play a role in developing software in areas where we lack experience remains to be seen."

Motiwalla's assessment is not pessimistic, however. "The key thing is the investment in manpower. Once we have trained so many computer professionals, we will be able to tap those resources to do many things. The goal of becoming a software development center helps focus our energies right now, but we may find many other directions for our talents in the future."

In the meantime, with the help of foreign companies, Singapore's software writers are increasingly able to turn ideas into realities. Hewlett-Packard, which has established a $5 million software development center in Singapore, issued an open invitation this spring asking would-be software writers to use the center's facilities or loaned HP equipment. In addition to making an HP 3000 and some 150 microcomputers available for the needs of software writers, the company is also ready to help debug programs and write documentation. Announcing the plan, HP's local general manager, Victor Ang, said he hoped such assistance to "budding software entrepreneurs will help to uncover the next writer of VisiCalc right here in Singapore!"

Lunch is over at the Tanglin Club and the waiters are whisking the last crumbs from the table. Johnny Moo is talking about his need to deal more directly with his hardware suppliers, and mentions that he plans to open an office in Silicon Valley soon.

Will he use the office to sell Singapore-developed software packages to American customers? Is it possible that Singaporeans will not only contribute to Asia's software development needs, but also be competitive right in the American software heartland?

"I wouldn't rule out the possibility," he says with a wry smile. ◉

Daniel Burstein is a New York-based free-lance writer who frequently reports on business and technology in Asia.

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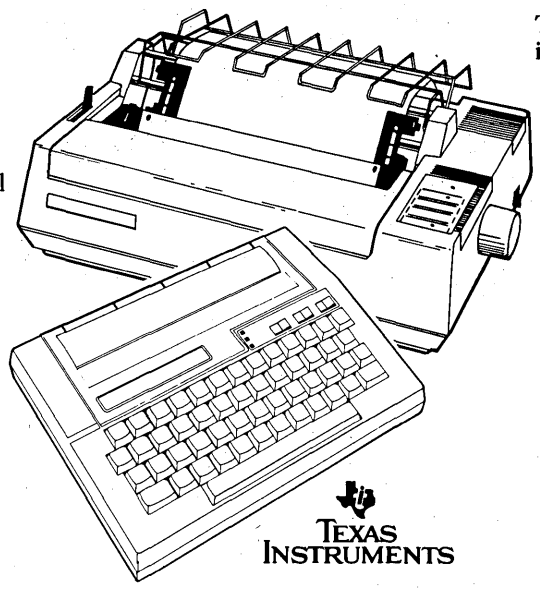

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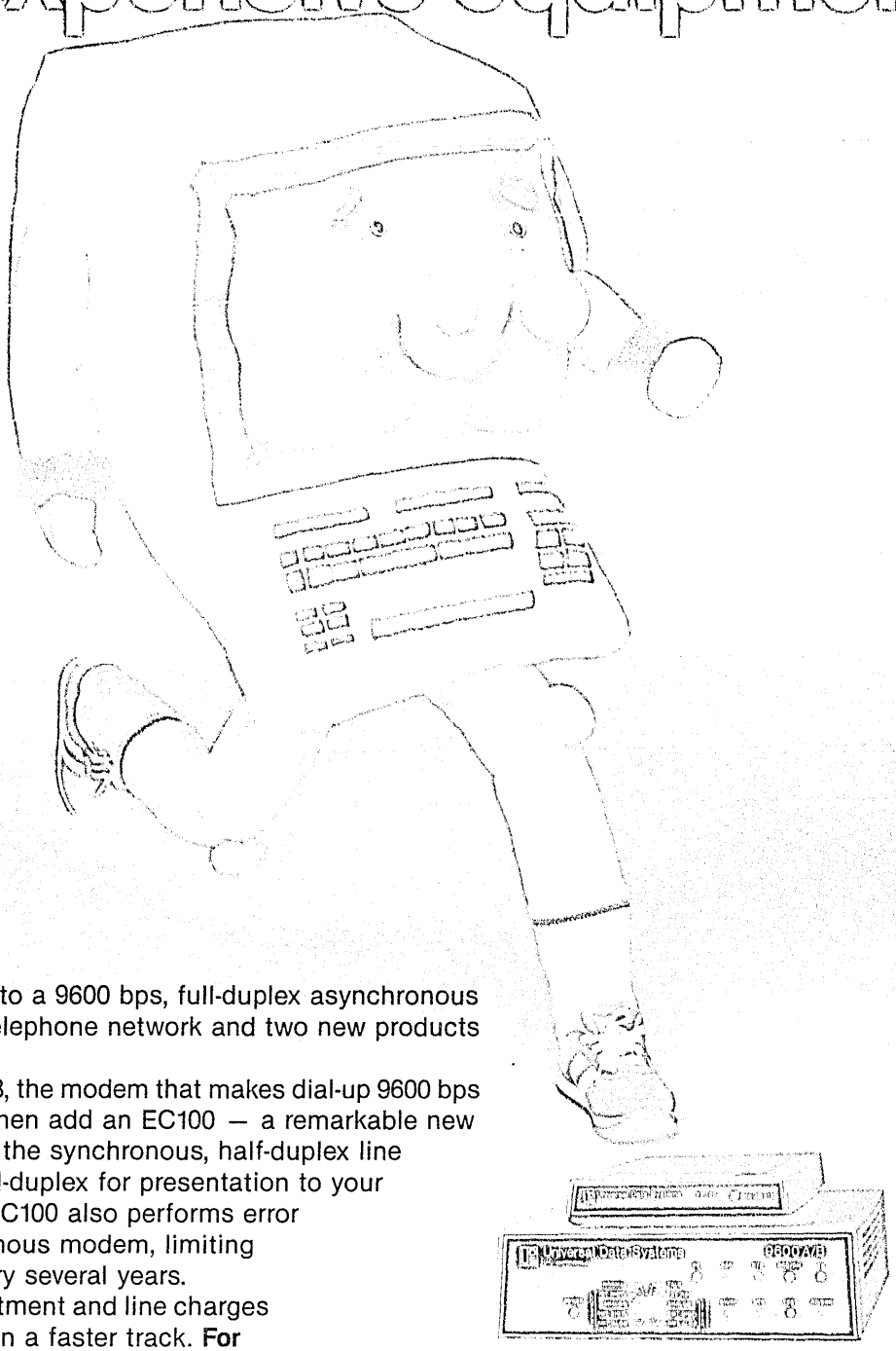

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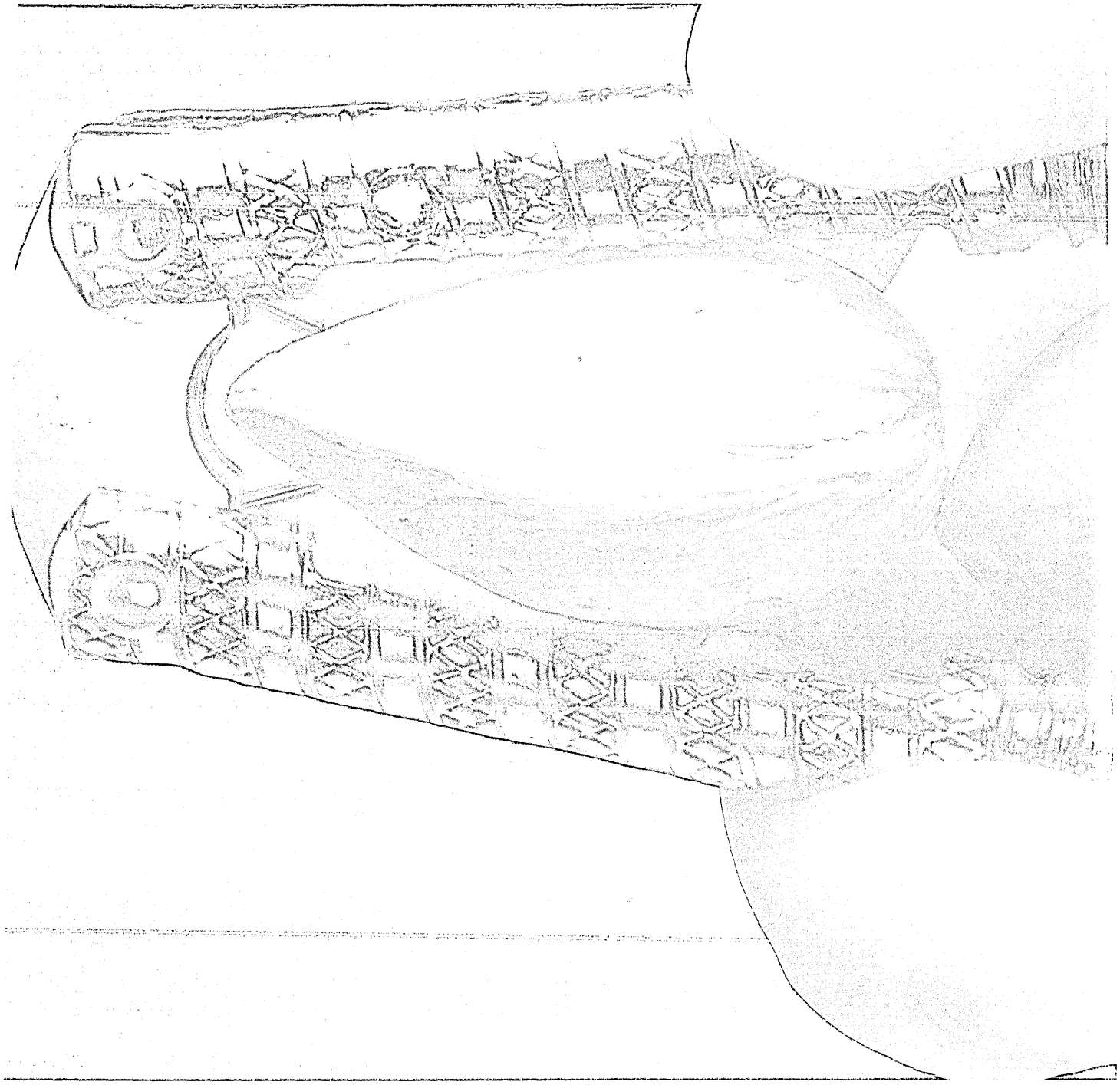

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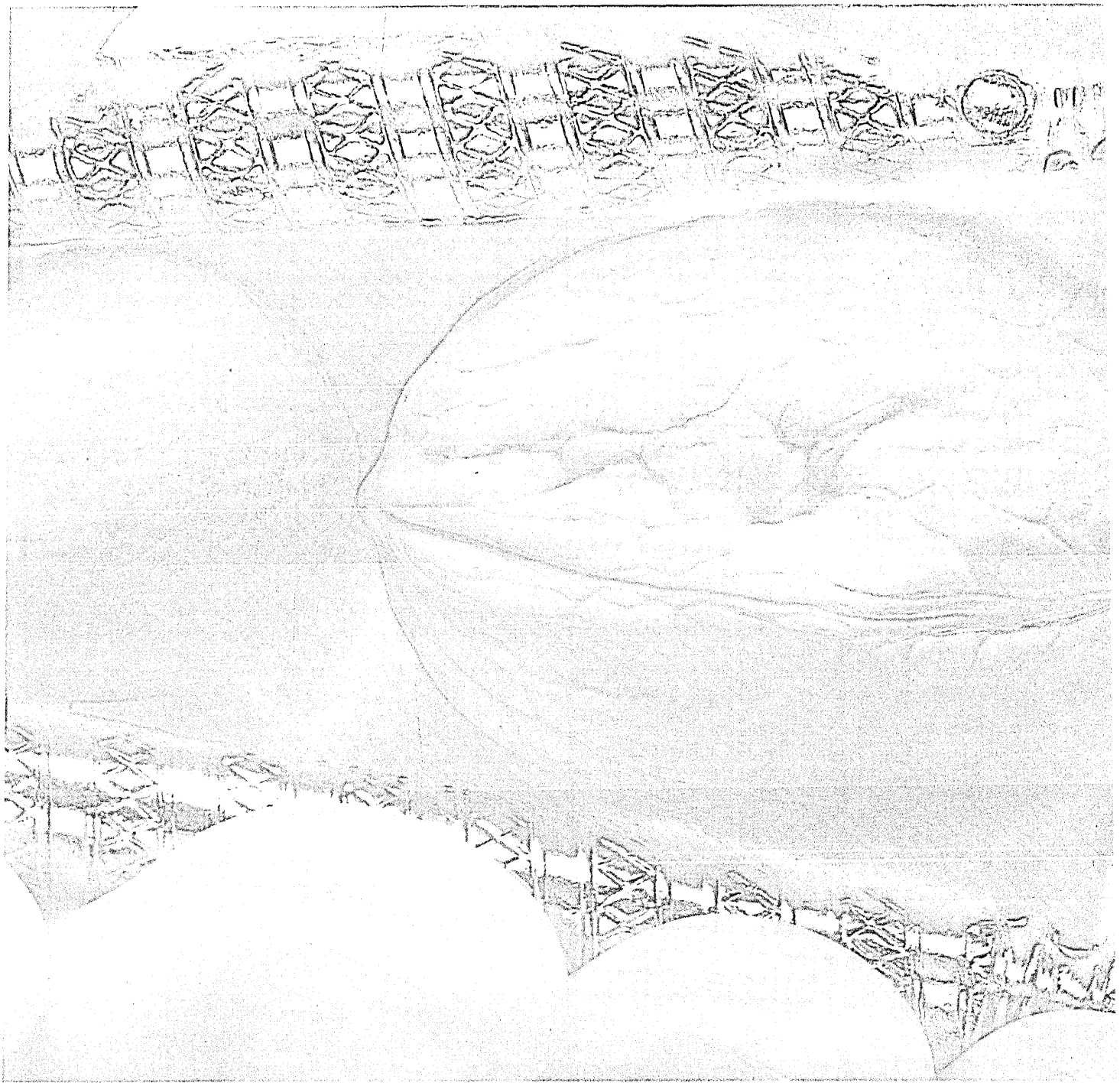

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Ambitious new projects won't succeed if this vital function remains out of sight and mind.

MOVING OPERATIONS OUT OF THE CELLAR

by Robert O. Peterson

In the past several years MIS philosophy has been undergoing a basic and predictable transition. The technology we work with has changed, and so has the way we define the products we deliver to users. The trend now is to put the burden of control in the hands of the end users—where, incidentally, it always belonged. But even as corporations are working to widen their use of MIS facilities, they are neglecting to broaden the computer operations base on which those facilities rest. Operations departments are feeling the strain.

Dp managers have worked hard to spread computing power throughout their organizations. They have given much thought to applications development, software products, and technical monitoring facilities to optimize and balance computer use. Lost in the shuffle, however, is a basic fact: Everything ultimately depends on a well-run production computer system, the responsibility for which lies with computer operations. User-controlled development tools may ease the demand for development resources, but the operations department still has to provide support. Inquiry subsystems and report generators substantially alter the delivery mechanisms maintained by operations.

Computer operations has generally been treated as the stepchild of the dp department. Too often, operations personnel have received the blame for ineptly built, ill-conceived application systems. They've suffered unacceptable turnover rates, and dp management has barely blinked. Many members of the development/tech services elite look down upon operations people as nonprofessionals.

There was a time when entry-level computer operators were required to have little more than the ability to walk and trade school was considered useful, but very few trade schools taught computer operations. They still don't. What they do teach is programming, systems analysis, and a variety of engineering or business courses. This course of study doesn't qualify people to work in operations, but at least it gives them some knowledge of dp.

Operations typically serves as a port of entry into MIS. An employee may begin as a junior operator and then work up to a job as a shift supervisor. Then, if a person is good, and treats the programmers nicely, he or she may be given the golden opportunity to become a programmer trainee. Job applicants who don't express a desire to move into programming/analysis are viewed with suspicion. We tend to think they are lacking in ambition or, at best, ignorant of the MIS ladder. We discourage intelligent, motivated people from spending much time in operations, and as a result we undermine MIS's ability to grow and improve.

To make matters worse, printed material on operations is nearly nonexistent. (This probably has something to do with the fact that most operations managers work 12-hour days just to stay even, and consequently are too busy to write.) If you're a member of an MIS book club, you may have noticed the dearth of titles dealing with operations. There's not much available in the way of seminars, either; few educational firms have more than a smattering of related offerings.

Is it any wonder then that operations is perpetually in trouble? Or that when problems arise, the typical reaction is to move the troubled function out of operations and into another area of the organization?

The desire to computerize more and more corporate functions has quickly outstripped the typical development group's ability to deliver products promptly. Packaged software offers a partial solution, particularly for clerically oriented applications. But the more complex, specialized business functions pose a more difficult problem. Neither the software houses nor MIS can offer customized computer support for such functions within a reasonable length of time.

SOME EMERGING TRENDS

Two trends are helping to alleviate the problem. The first is the inclusion of the users themselves in the development process. Many of the software products now coming to market consist of a core system plus tools that enable the user to refine and enhance. Thus, the ability to solve complex application problems is placed in the hands of the people who best understand those problems. This is a major step forward—at least in concept.

The second trend is the development of the business analyst. This job category has arisen because computer specialists are unlikely to recognize (let alone solve) the subtle problems of doing business that have been exacerbated as much as helped by computerization. To be of real help, a business analyst must "live" with the user—that is, understand the purpose of the department, its inner workings, and its relationship to other departments.

Inevitably, the analyst thereby loses both the desire and the ability to function as a computer specialist. When management demands a genuine shift in emphasis, it's currency in computing that goes by the board. The problem here is that much of the expertise that has already been shifted out of operations is possessed by that very analyst. And when difficulties are created by this thinning of expertise, the operations department generally gets the blame.

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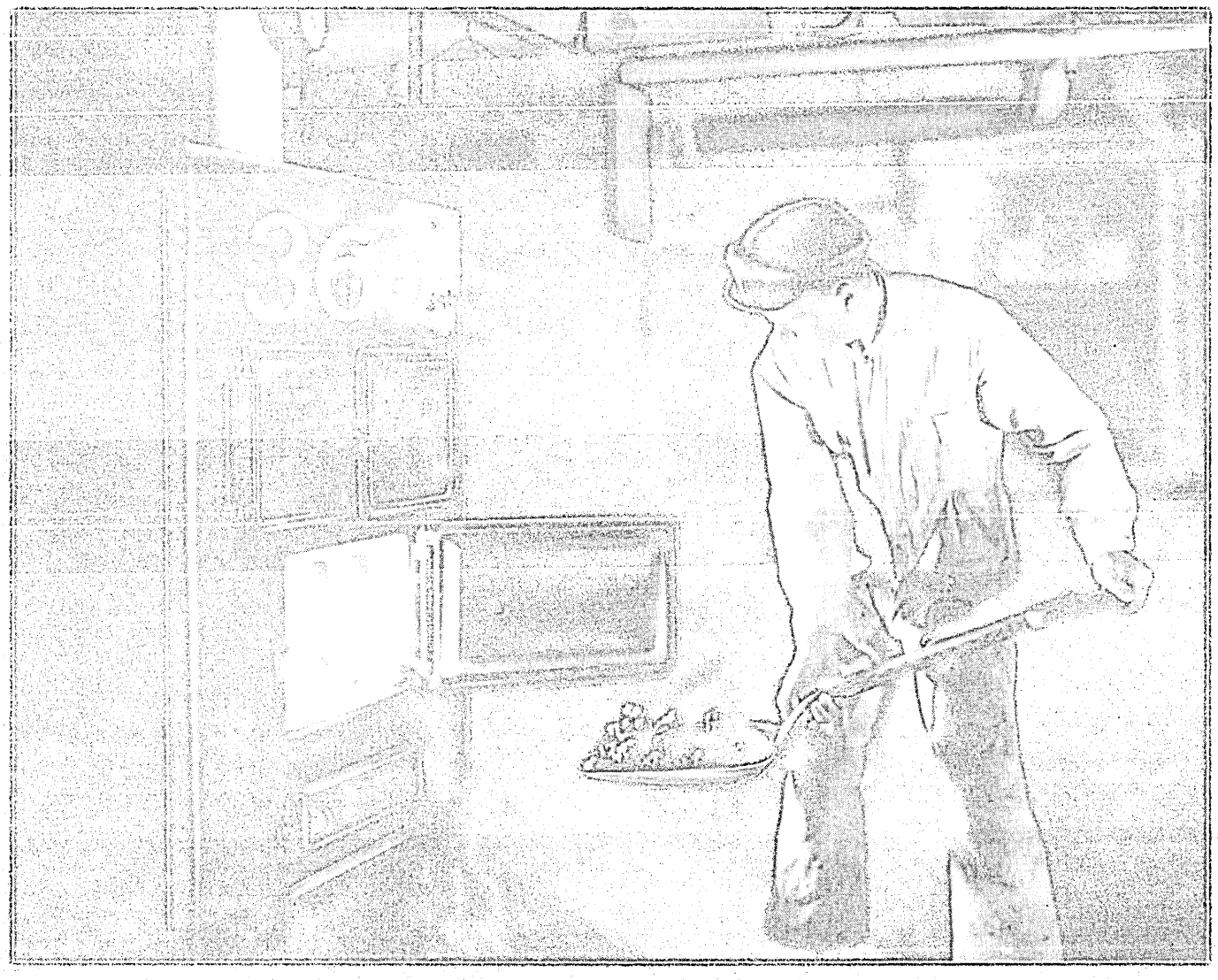

Unless we change our basic approach, we will be unable to meet the information needs of the organizations we serve.

It's time to move computer operations out of the cellar. Unless we change our basic approach to the delivery and support of computer-based systems, we will be unable to meet the information needs of the organizations we serve. The base upon which any strategic development rests is a disciplined, effective operations group.

Following are some suggestions for redefining operations to create that solid base. Your organization may already have implemented some of them. Others may not be feasible because they involve moving responsibilities and people into the operations department. All of them, however, are worth considering. Let's begin by dividing operational responsibilities into four functional groups: production support, production delivery, production control, and production planning.

Production support. Production support consists of those activities that aid and enhance the production-oriented functions of the user community and of other MIS groups. It involves only systems and applications that are truly operational, not those in development. This group also functions as the information portal to the organization. It should have three main components:

- The service center—This highly reactive part of the group deals with all problems involving production hardware or software. The service center either resolves these problems, or routes them elsewhere.

Resolution is handled within the group and revolves around those activities controlled within operations itself. Typical controlling functions would be network management; end-user hardware problems; failures in the normal delivery process that require expediting; and support at the systems, program, and execution levels for all operational systems. Routing is handled by a help-desk, which is usually a number (you're in trouble if you need a switchboard) that users inside or outside the department call when questions arise.

Since it's part of production support, the service center will deal with a large number of internal problems. Many other problems, however, will require the attention of external groups like tech services, development, database, and others. When this is the case, it's the responsibility of the help-desk to route the problem to the group that can best resolve it. The logging and tracking of problems is inherent to the service center's ability to remain useful to the outside world. Callers must feel confident that once a problem is reported there will be an acceptable response.

- The information center—With the movement to user-controlled and programmed applications, the future of MIS lies in the information center concept. The responsibilities of this group include selecting application development products, consulting on their use, monitoring their environmental impact, and selectively certifying their correctness for management usage.

MIS'S BASIC DUTIES

The reason for certification is quite simple. MIS, regardless of the sophistication of its users or products, still retains its basic responsibility to certify the correctness and viability of the information under its control. It has an equal responsibility to de-certify usage that is not effective for the entire organization. MIS meets these responsibilities through the info center.

Since the "problem" of personal computers is primarily one of certification, the info center is the appropriate place to handle this function as well. The real issue with pcs is the misuse and misrepresentation of information. By acting as a clearing house for independently produced analysis, and by being the sole certification point for that information usage, MIS can control the pc-engendered spread of faulty information.

- Program/system maintenance—By maintenance I mean the correction of errors that prevent a production system from producing the results guaranteed at implementation signoff. One of those guarantees was a predictable availability based upon resource use. Maintenance must therefore include mechanical alterations that assure adequate delivery (i.e., changing of JCL streams, implementing new sorting techniques, increasing table sizes). Maintenance does not include minor enhancements, adding new total breaks, or providing alternate inquiries. Those are development functions and should be handled outside the scope of support.

Maintenance should report to computer operations because it directly affects operations' ability to meet its responsibilities. It should be staffed by the same caliber personnel found in the conventional systems development group. If your shop runs around the clock, maintenance should be staffed around the clock, not staffed via telephone. If the operations staff is responsible for the production and delivery of application systems, they must have the authority to correct faults. By direction and personality they have the best view of problem severity in a production environment and are best equipped to deal with those problems.

Production delivery. This functional group performs the tasks most commonly associated with the conventional operations department. It manages all activities directly related to running, balancing, and delivering the output of production systems. While this remains the most critical part of the operations task, we need to improve both the facilities and philosophy of production delivery.

The first step is to upgrade the functional job descriptions of computer operators and shift clerical tasks back to clerical personnel. Mounting tapes, changing paper, and marking check-off sheets are clerical activities. If you have operators performing only these tasks, you have miscategorized a number of your people. A true computer operator is a console operator who maintains and balances computer loads, validates the proper sequencing of jobs, handles and verifies recoveries, and acts as the first line of analysis in failure situations. He or she is an analyst who is every bit as important to MIS as an application system analyst, and should be recognized and compensated as such.

Report evaluation, balancing, and distribution are, by and large, also clerical functions. However, we should not forget two important aspects of this function. First, the proper distribution of certified reports is really what operations is all about. Secondly, evaluation and balancing are analytical functions and should be treated as such. We would be well advised to make operations analysts responsible for defining requirements in these areas, rather than leaving them to the creativity and vagaries of an applications development group.

Operations should be capable of setting standards with a statement something like this: "Since operations is responsible for the delivery of certified reports, all implemented outputs must be balanceable or they will not be accepted into production." Every report produced should be balanced, at least as a subset, to some controlled macro group. This should be automatic and integral to all systems. It's fairly simple to define an internal balancing data set and have all reports verify themselves (programatically) to that controlled set. The balancing group then verifies that balance daily and performs periodic, cyclic audits on the balances as well as the processes.

ASSURING ADEQUACY, STABILITY

Production control. This component of operations assures the adequacy and environmental stability of products. Success in operations is based upon an ability to maintain a state of stability. It is essential to provide an environment in which the expectations of the users toward delivery and resource allocation

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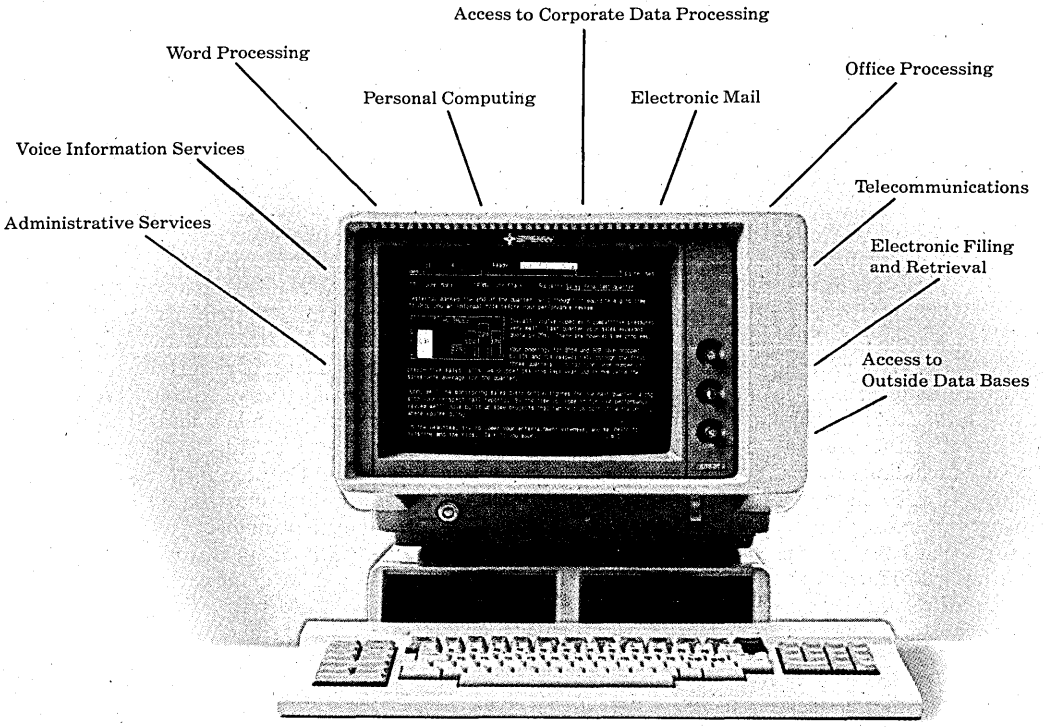

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If you have operators performing clerical tasks, you have miscategorized a number of your people.

can be met. This can be accomplished only when the jobs run and the normal resources utilized can be adequately anticipated.

The only effective means to assure a stable environment is to screen alterations to a previously steady state. All changes can be expected to have some negative effect upon a stable situation; only adequate review of those unstable introductions can minimize their impact. The management of such changes is the main mission of this group. It represents the turnover step from outside areas such as development, the users, and technical services, as well as its own sister groups within operations.

This type of change management has been implemented in many forward-looking MIS groups with significant success. Essentially, the user (all nonoperations groups, including systems development, are users) is responsible for verifying all changes in hardware, software, and applications that have an impact upon the service level. Production control assures that all requisite standards have been met before accepting any change. It tracks those changes for historical purposes and in order to anticipate future needs.

Production planning. This last component of operations is charged with anticipating future requirements, investigating alternative solutions, and assuring that operations is equipped to meet its demands. Capacity planning is typically the main concern here, and should be directly tied to any MIS department's strategic plans.

The operations department should be charged with providing a certain resource availability for anticipated production growth and for new loads created by new system implementations. System proposals should contain an anticipated resource load, and a certain level of available resource should be kept in reserve so that no chronic delay takes place while waiting for hardware delivery. To assure this, management must understand the need for the reserve level, and operations must be directly involved in strategic planning.

I once worked with an MIS director who told me that he was de-emphasizing the role of operations in order to put his money into development and technical services. That's an extreme example, but he was expressing an attitude that's all too common, and altogether out of step with the future of MIS.

No new activities in any field can succeed without a firm and stable base in the present. Computer operations is our base, and it cannot be treated cavalierly or pushed into the cellar and ignored. Development is generally what garners a pat on the back for MIS directors. Failure in operations is what gets them fired.

The trend in MIS today is away from conventional, protracted development projects. The future lies in providing the end-user community with the tools to do the bulk of their own development. The wise course is to manage resources for those end users and to upgrade the capabilities of those who do that managing. ◉

Robert O. Peterson is an independent MIS consultant living in Cary, N.C. He has published several related articles, and his recently completed book on the information center will be published in early 1985. He has 18 years' experience in MIS in a variety of functional areas.

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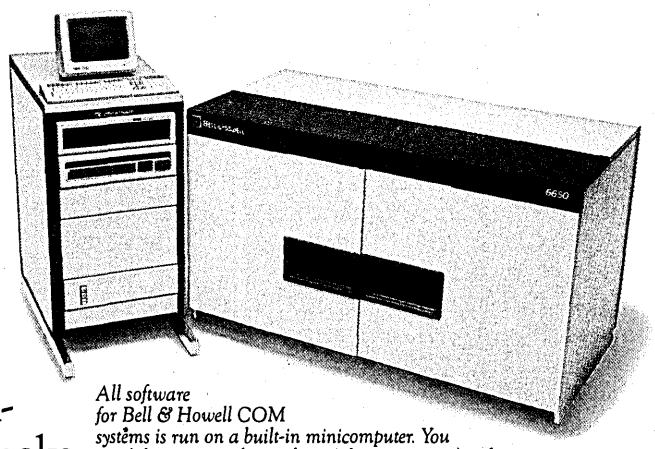

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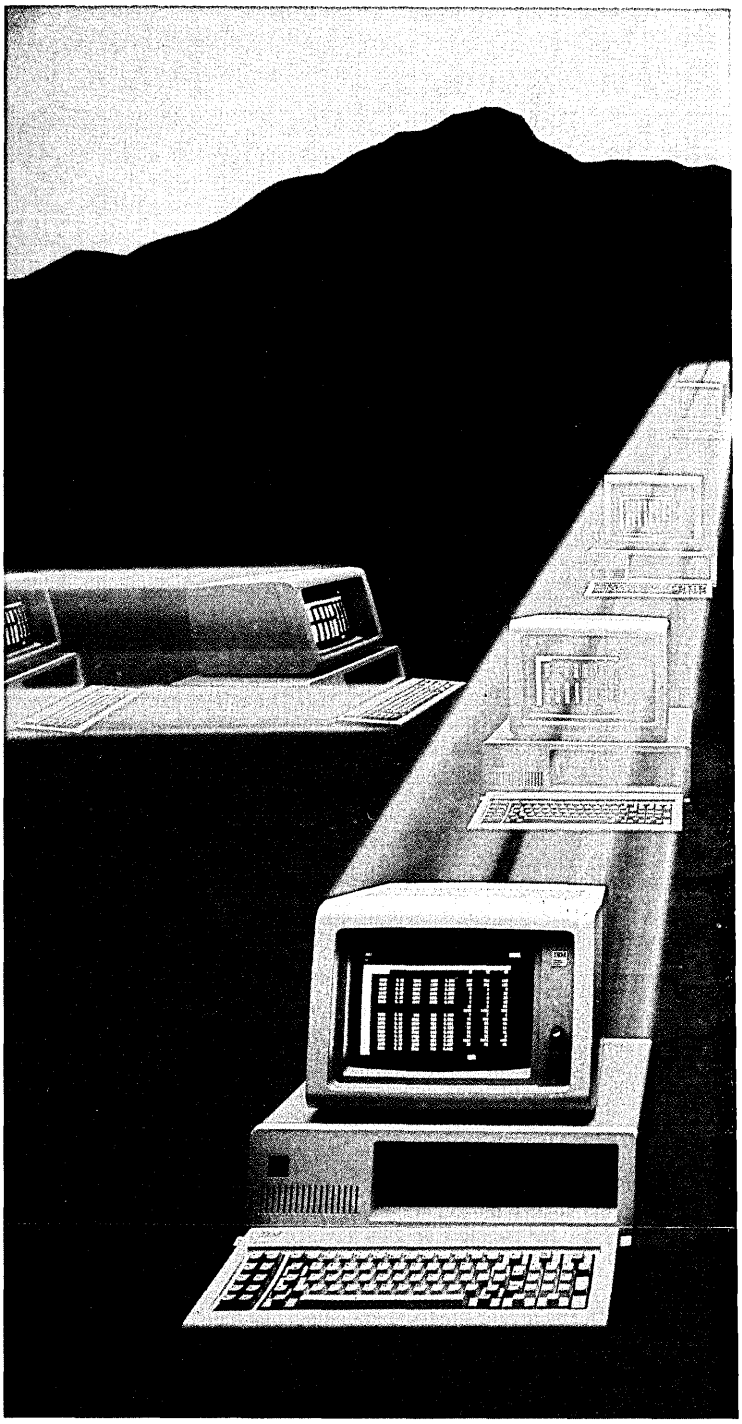

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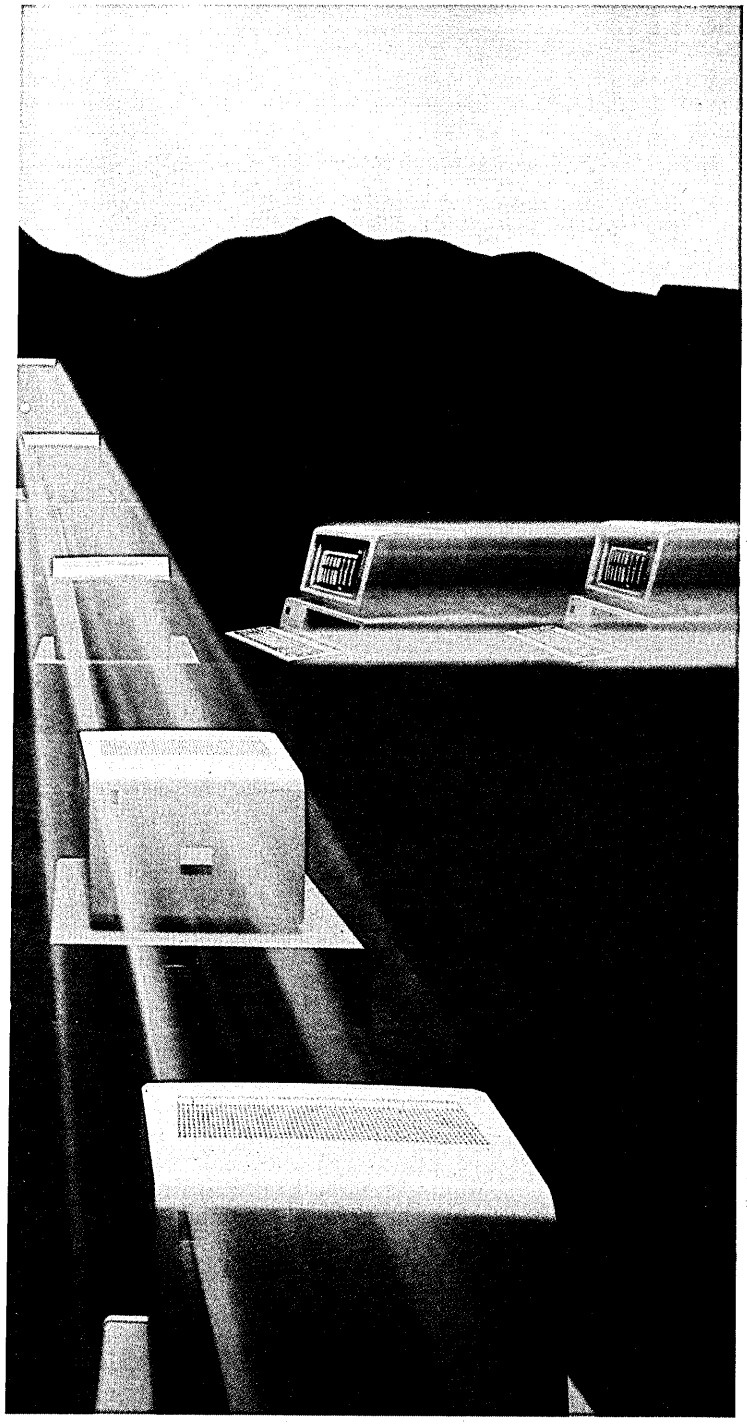

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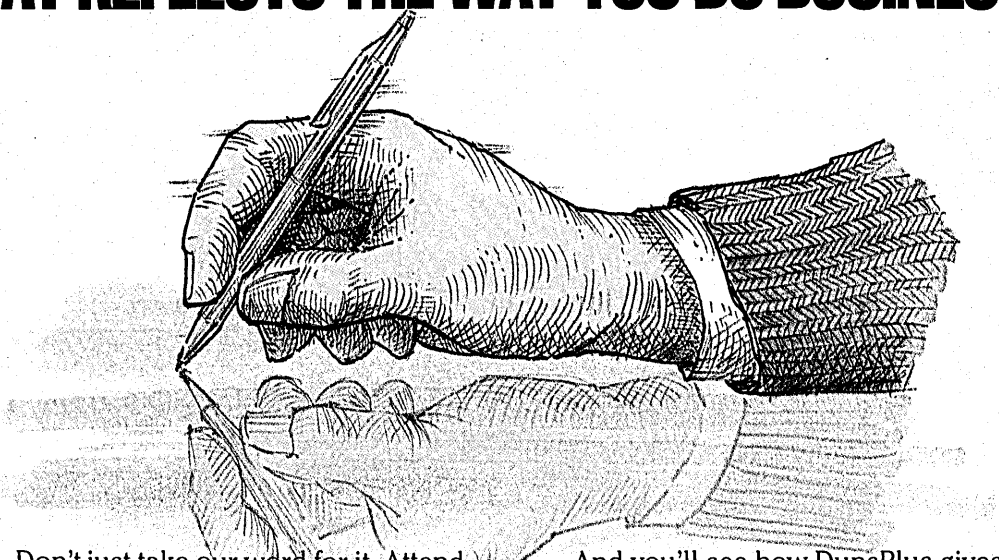

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CIRCLE 95 ON READER CARD

Standard checklists are not enough; selecting a DSS package requires deeper investigation.

EVALUATING DECISION SUPPORT SOFTWARE

by Philip N. Sussman

Many aids and checklists are available to individuals who wish to evaluate standard software packages. Typically, these checklists remind the individual to review the documentation carefully, speak with existing users, and test the package with a real application.

When it comes to evaluating decision support software, however, these checklists are usually inadequate because they implicitly assume the software evaluator will act in only two or three organizational roles. In reality, the evaluator must perform five roles to properly evaluate and successfully implement decision support software. The five roles are:

- Report user
- Model operator
- Model builder
- Hardware manager
- Software manager

In any given organization, there may be one person who assumes all these roles, one person per role, or more than one person in each role (see S.L. Alter's book, *Decision Support Systems—Current Practice and Continuing Challenges,* Addison-Wesley, 1980). Many different combinations are possible. The key point is that these distinct roles need to be filled by people from within the organization who have either a business or systems background.

The software evaluator has to act in all five roles when choosing decision support software because the individuals in each role use different criteria to evaluate software.

The report user, the person who uses information from the report to make a decision, is not concerned with the mechanics of report production or the syntax of the computer language. This individual couldn't care less which computer is used. The report user is interested in:

- Output. The report user wants a familiar format. Typically, the report user will say, "This is how the report has been for the last 15 years and I don't care what you do on the computer as long as it comes out like this." The report user also needs control over the format, high-quality printing for presentations, and graphics ability.
- Turnaround time. The elapsed time from specification of new data assumptions to production of the results has to be very short. Entirely new analyses should also be done quickly.
- Remote access. Both domestic and international remote access may be important.
- Reliability. The hardware and software should be reliable, and the model used for the analysis should be bug free.
- Cost. Both capital and operating cost may be of concern to the report user who is selecting a software package. After installation, only the operating cost matters.

The model operator, the person who sits at a terminal and runs the model, can have a wide range of backgrounds. He or she can be highly sophisticated in computers and decision support applications, have a clerical or secretarial background, or be an administrator whose skills lie somewhere in between. The model operator is concerned with:

- User friendly software. The software package should have an easy to remember syntax, provide specific error messages, have a help facility, allow KILL TYPE and KILL EXECUTION commands at any time, prevent the operator from getting trapped when entering incorrect syntax, and offer advanced calculation options like goal-seeking.
- Fast response. Data input, calculation, and report generation should be quick.
- Data entry. The model operator should be prompted for data entry with titles; prompting should occur when an incomplete line is entered; data should be entered by name and date without reference to row and column numbers; and high-level commands for creating input data (including matrix manipulations) should be available.
- Documentation. The documentation must have an overview, an instruction section, a technical section, and an index. If the package is complicated, a primer should be available as well as teaching materials geared to model operators. The documentation ought to be written for a user—not a programmer—be complete, have many examples, and be well organized. A section on error messages and suggested corrective actions is a must. Added pluses are newsletters that contain information on other companies using the same package, and all the latest software enhancements.
- Recovery. The package and operating system should not lose data when the system crashes. A complete file recovery and account backup procedure ought to be part of the package.
- File handling. Accounts should be capable of storing large numbers of files. Global commands such as PRINT, ARCHIVE, and DELETE must be available. A model operator should be able to check the existence of a file in an account or archive.
- Accessing data in other systems. The package ought to be designed to allow easy access of data in other systems.
- Statistical analysis tools. The model operator should be able to run statistical analysis routines without having to write a program.
- VisiCalc data entry emulation. The package should be designed for a crt screen, taking full advantage of full screen editing and data entry.

MODEL BUILDER'S ROLES

The model builder is expected to know how to build models using a software package and to have a business, not systems, orientation. When developing a decision support system, the model builder acts as the traditional MIS project manager, system analyst, and computer programmer. The model builder needs to know about:

- Capability to efficiently handle large models. No matter what the original specifications, the model will grow larger. Packages often handle models up to one size in a certain way and larger models in a different way. The model builder needs to find out where the breakpoint is and to try to stay below it.
- Logic syntax. The model builder requires easy to remember logic syntax, concise ma-

MIS professionals are very forgiving when learning the idiosyncracies of a software package.

trix and loop calculations, English-like language, forward referencing, the ability to handle simultaneity and if-then-else conditions, syntax checking on entry, a full range of functions, NA valid as a data entry, and complete debugging tools.

- Consolidation. The package should be able to handle multidimensional files with reporting across any dimension, and must easily accomodate currency translation and inflation calculations.
- Database. When more than three dimensions are required, it is best to use a database approach. The package should have a database module that can interface to a variety of analytical tools and models.
- Report writer. The report writer should have calculation ability, with one command that can define the characteristics of several rows. The user must be able to choose the report to be printed when several are available.
- Command files. Command files should have logic branching and be able to start anywhere in the file.
- The program. In the case of a "canned" application package, the model builder should look for a menu-driven program, automatic defaults, integration with other packages, rapid sorting, an audit trail, and the ability to be modified. These features are needed in addition to the ones the model builder would expect in a decision software package.

The hardware manager needs to know what effect the software will have on the hardware. The hardware manager is concerned with:

- Technical issues. What is the effect of the package on system performance at both high- and low-usage levels? Will there be additional peak loading or demand for more dial-up capability?
- Organizational issues. The package under consideration may require longer hours of system availability, give more visability to the system's reliability, raise security questions, and increase the demand for technical service by creating a population of unsophisticated model operators. These organizational issues are largely due to the on-line requirements of a decision support system.

LOOKS AT OVERALL PICTURE

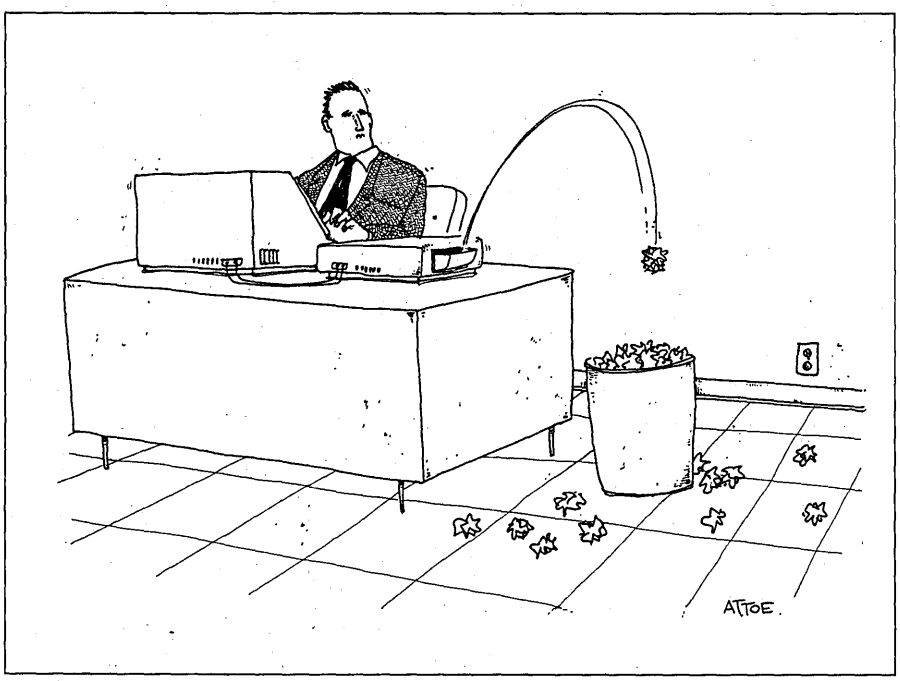
The software manager looks at the package on an overall basis. He or she is concerned with:

- Organization behind the package. How experienced are the authors? How many years has the package been available? How many installations and users are there? Are the other users happy with the package? What is the product reliability and service record of the company offering the package? What is the level of technical service? Is a local service representative available? Does the company have a commitment to package enhancements? Are they responsive to requests for enhancements?
- Comparison of package to others available. Who are the target customers? An understanding of the target market can help explain the structure of many programs. How do the features of the proposed package compare with other packages? What are the results of benchmark tests? If a test application has been converted to the package, how has it performed? How do the company's users like it? Is the package transportable to other computers?
- Level of in-house support required. Successful installations will require dedicated in-house support for both user assistance and system development.
- Training time for staff. Different training programs need to be developed for model builders and model users.
- Warranties. Is there a money-back guarantee? Is there a written guarantee that the program will run on your particular hardware and operating system? What is the software company's commitment to fix bugs, upgrade the package, provide support, and offer a toll-free hot line?
- Cost. How does the package compare in cost with other packages? Are the yearly maintenance and support fees comparable?

The specifications and checklists used to evaluate decision support software packages are often impossible to satisfy completely. This situation exists because in addition to the roles (hardware manager, software manager, and report user) played by the software evaluator in a standard MIS software evaluation, there are two more roles in decision software evaluation, model operator and model builder, who have very different and often contradictory requirements.

Traditional MIS professionals are very forgiving when learning the idiosyncracies of a software package. They tend to regard it as a challenge to make the package work and they become entrenched as technical experts with knowledge of both documented and undocumented programming tricks and shortcuts. Model operators and model builders, on the other hand, are impatient when learning a new software package, and if they find a package hard to operate, they are likely to blame its design and to criticize the software evaluator for choosing it in the first place.

Unless software evaluators fully understand the needs of model operators and builders, they will be blindsided by the charges that the chosen software is inadequate. They can avoid this only by acting in all five organizational roles as part of the software evaluation process. ◉



CARTOON BY STEVE ATTOE

Philip N. Sussman is project manager, business development, at International Paper Co., New York. His department starts new businesses and spins them off when they become viable. He has held part-time faculty positions at Columbia University and at the State University of New York at Stony Brook.

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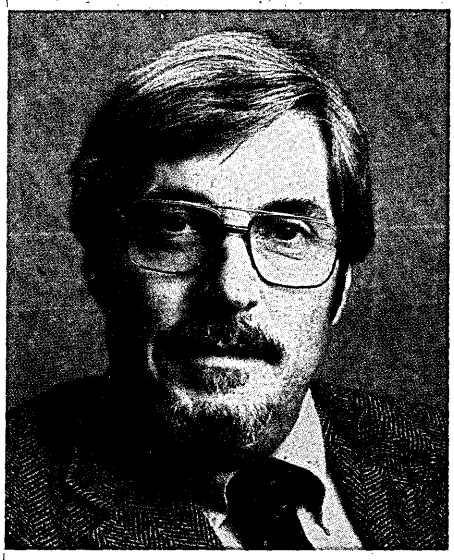

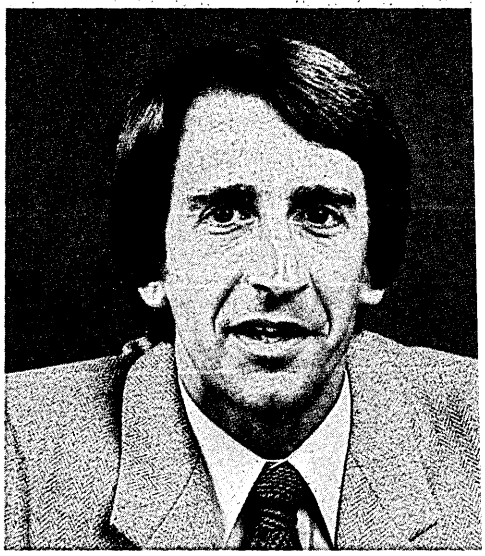

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INCYTE, Fairchild/A Schlumberger Co.

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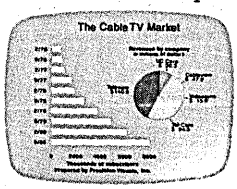
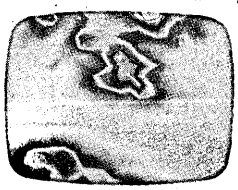
CIRCLE 103 ON READER CARD

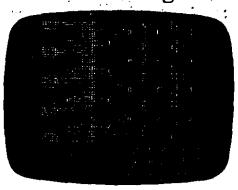
Presentation Graphics



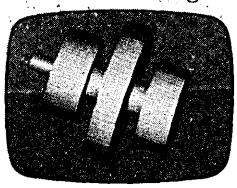
Enhanced Contouring



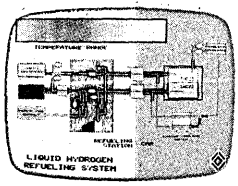
VLSI Design



Solids Modeling



Process Control



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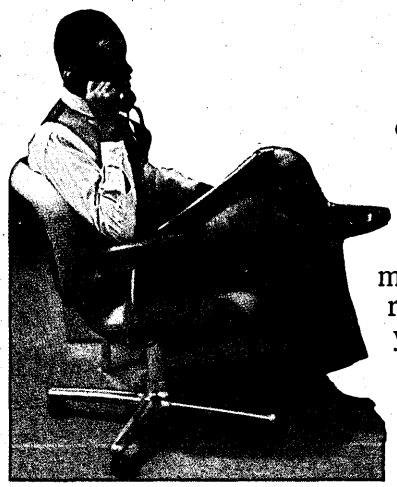

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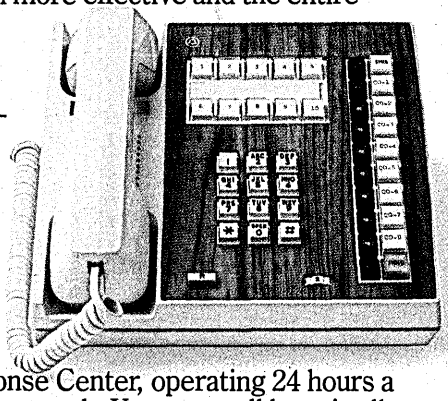

The Honeywell service program includes varied resources to assist your representative in meeting every eventuality. Like our National Response Center, operating 24 hours a day, seven days a week. Your one call here is all it takes to trigger action. All of the historic data on your system is at their fingertips, all resources at their disposal.

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CIRCLE 97 ON READER CARD

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DATAPOINT is a specialist in integrating state-of-the-art local area networks and office systems. We sparked a revolution in business communications with ARC, the first and most thoroughly proven local area network in existence and today we continue to lead that revolution. If you're ready to join the DATAPOINT revolution, talk to our worldwide sales and service force about the VISTA-PC professional color computer.

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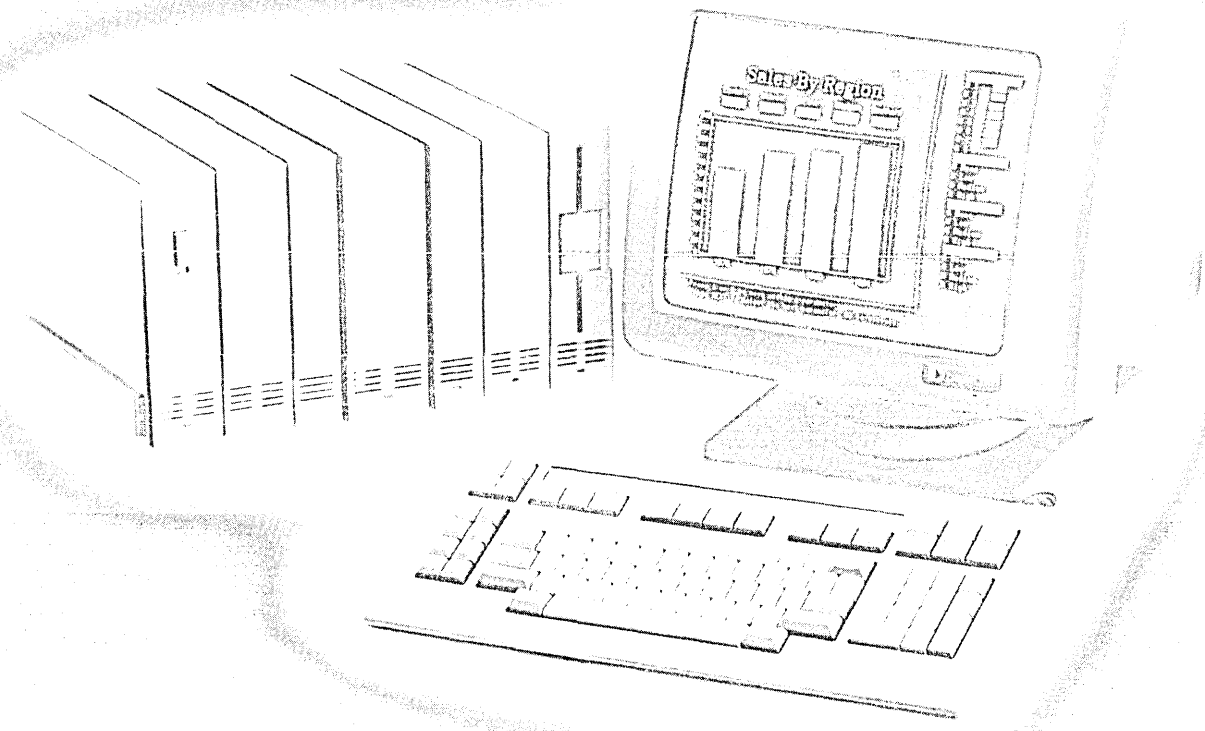


DATAPOINT

We sparked the revolution.

HARDWARE

OFF-LINE

Anyone who has done military service surely remembers standing in formation in the hot sun or cold weather to be paid. Those lines may go the way of the draft and the Colt .45, if a new test system is successful. The U.S. Army and the Treasury Department are sponsoring a five-month project at Fort Benjamin Harrison, Ind., to evaluate paying soldiers by automated teller machines (ATMs). It involves 3,000 Army trainees at the post's Soldier Support Center, and will gauge the feasibility of this high-tech way to pay soldiers whose short stays during training typically discourage them from opening bank accounts. The system is based on NCR's 5070 ATMs.

Unlike similar units at commercial or savings banks, which require identification numbers for customer access, the Army's machines will compare recorded hand characteristic data with actual hand readings whenever a soldier wishes to withdraw cash. "This pilot project is another indication of the Government Financial Operations' commitment to applying state-of-the-art technology to government-wide payments and collections systems," says GFO commissioner William Douglas. Captain John Herko, project officer for the Army, sees numerous benefits for paying "unbanked" soldiers through ATMs. "Instead of having to cash their entire paychecks on payday, soldiers can withdraw their pay throughout a month."

The Army will also reap some benefits from the system. The machines are expected to reduce the time taken off from training by soldiers who have to take care of banking needs, since the ATMs will be open around the clock. So, after a hectic day on the rifle range, KP, or police call, soldiers can then go to one of these handy machines to withdraw cash. Moreover, according to a New York City Army recruiter, they can withdraw much more money from "today's Army" than from yesterday's Army -- the starting pay is now well over $500 a month (not year). Will this system once and for all eliminate the drudgery of mustering for pay in a training situation? It just might.

Would you buy a car from this computer? That is a question Ford Motor Co. dealers are about to ask. Ford dealers in four test cities around the country will soon discover whether customers take a liking to the Ford Selection Center, a computer system that tells consumers "everything they ever wanted to know about buying a new car." Everything? The turnkey presentation system was designed by Cubic Corp., and users don't need any computer knowledge. The system provides pertinent information such as model-to-model comparisons, pricing, financing arrangements, and availability. It also provides the prospective buyer with a printout of the information. Ford says the system will enable the firm and its dealers to convey a host of new car information quickly and easily, using natural language software that will translate customers' English-language queries into computer instructions. Data also can be called up by use of a menu on a touch screen. The selection center uses a 16-bit micro with 256KB of RAM. It also uses dual 800KB 5¼-inch floppy disk drives and a 10MB fixed disk. If the test works, you may see the centers popping up at Ford dealerships nationally in the near future. At press time, it was not known whether this "better idea" would be available with AM/FM radio, air conditioning, power steering, whitewalls, and power brakes. It was also not known whether the center would be tied into Ford's touted computerized design system so that customers could design their own cars.

CYBER PRINTER

The 5870 is a nonimpact printer that combines computer, xerographic, and laser technologies to produce text and graphics. It is designed for use with Cyber 170 and 180 computer systems.

According to the vendor, this printer eliminates many steps associated with offset printing and document storage while providing quick turnaround and easier revision of materials.

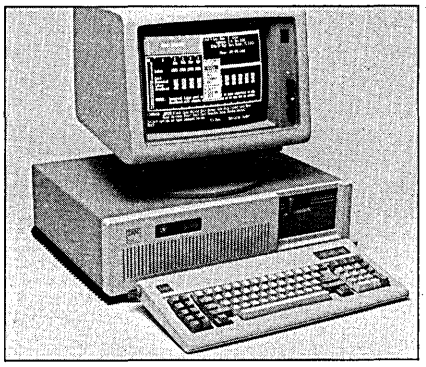
Major features include numerous type sizes and styles that can be combined to highlight document information, printing speeds up to 70 pages per minute, capacity to handle 16-pound bond to 110-pound index cut paper, including predrilled and preperforated, and instant conversion between horizontal and vertical printing characters.

Other features of the printer include production of virtually any image from a digital source, prints on one or both sides of paper, and clear registration of valuable data. The 5870 printer operates under CDC Network Operating System software. The price for the 5870 printer is set at $240,000. Graphics capability is an additional $21,000 and includes two megabits of memory. A maintenance contract is also available. CONTROL DATA CORP., Minneapolis.

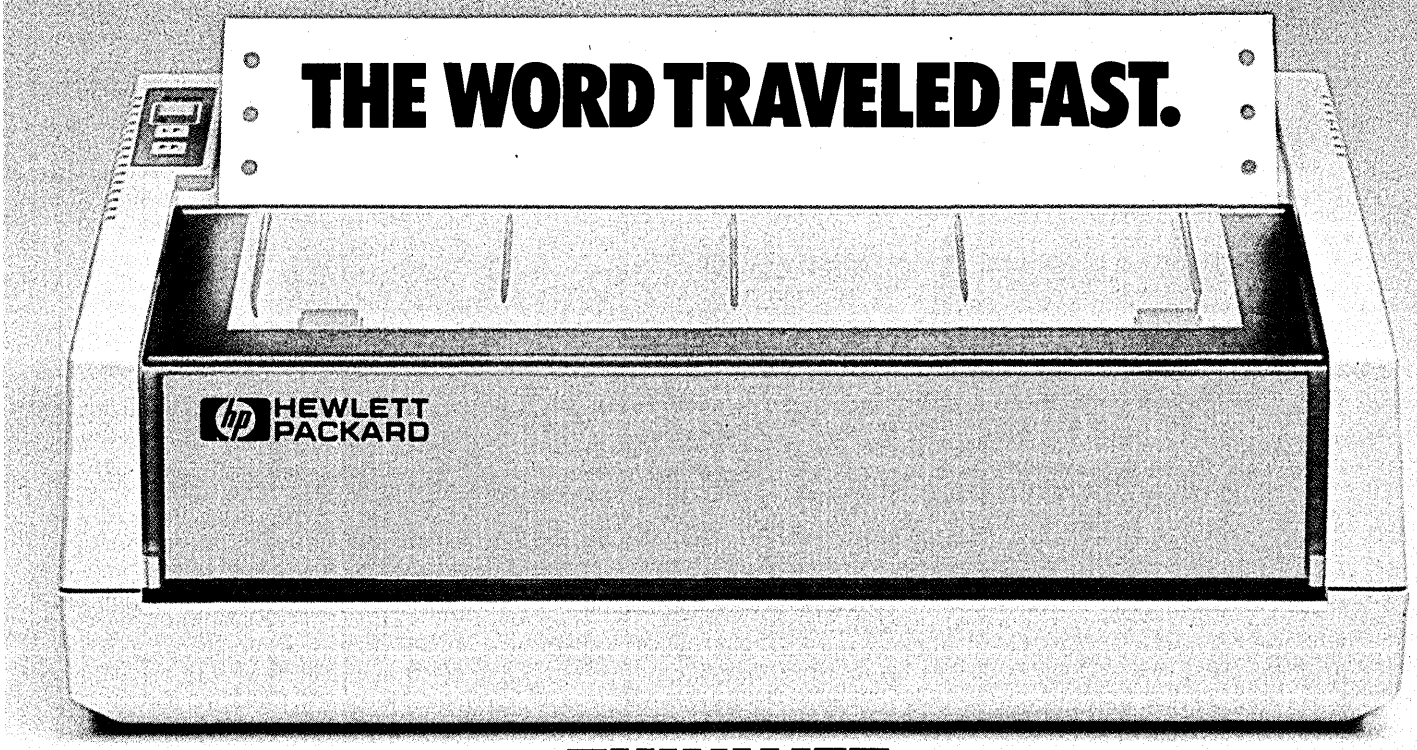
FOR DATA CIRCLE 301 ON READER CARD

IBM PC AT

The Personal Computer AT is IBM's latest addition to its PC line. It features the Intel 80286 microprocessor, a high-capacity diskette drive, and expanded fixed disk



WHEN HEWLETT-PACKARD DEVELOPED A PERSONAL COMPUTER PRINTER THAT USES A QUIET JET OF INK, PRINTS 150 CHARACTERS PER SECOND AND COSTS ONLY $495,



THINKJET.

Hewlett-Packard research has used inkjet technology to make the ThinkJet personal computer printer surprisingly quiet while printing 150 high quality, dot-matrix characters per second for text or graphics. The ThinkJet printer weighs only 6½ pounds and it takes up just a bit more room than your telephone. So, it can work right on your desk. There's even a battery-powered model that lets you print anywhere. And, the ThinkJet printer's ink supply and printhead are designed in one neat disposable unit that simply clicks out when it's time to change.

The ThinkJet printer will work with most popular personal computers, including Hewlett-Packard, IBM,® COMPAQ,™ TI,® or Apple IIe.®

Finally, as quiet, fast and compact as the ThinkJet printer is, it still has one more feature that's going to cause a commotion; its price... $495.00.*

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drive options. The vendor also put LED indicators on the number lock and shift keys. In addition, the return key has been enlarged.

This vendor's top-of-the-line PC delivers almost five times the user memory and more than twice the information storage capacity previously available on its PCs. The AT is compatible with most existing PC hardware and software.

The unit can be used as a single-user system or shared by up to three users. It comes in two models. One has 256KB of RAM and a 1.2MB diskette. The other has 512KB of RAM and a 20MB fixed disk drive. In addition, both models can be expanded. The units each have an 84-key keyboard and eight expansion slots. Both also can be expanded with options to more than 3MB of user memory and up to 41.2MB of disk storage.

The vendor also announced version 3.0 of PC/DOS. This version has added function to support PC AT hardware and is compatible with all its PCs. This product also supports IBM PC Xenix, which enables two additional terminals to share the computer. In either a multi-user or single-user environment, PC Xenix allows more than one task to be handled at a time. Also introduced was software development, text formatting, and programming aids for use with Xenix. Prices for the PC AT start at $4,000. IBM CORP., Boca Raton, Fla.

FOR DATA CIRCLE 302 ON READER CARD

PROCESS CONTROL

The Computer Highway Interface Package (CHIP) provides access for DEC VAX and HP A-Series computers to the vendor's PROVOX database on the mainframe. It also supervises controllers and enables users to customize PROVOX instrumentation to process or management needs.

The product aids in processes, performs statistical analyses, does cost accounting, schedules batches, and creates reports. According to the vendor, CHIP makes a computer network practical for process plants. For example, the mainframe computer used for MIS functions can calculate production needs based on orders and send that information to the PROVOX system through the CHIP-connected computer, which can automatically schedule or adjust production. Billing and orders for raw materials could then be handled at the same time.

It can also tie in off-line processing analyzers on other intelligent lab equipment. This is done by the VAX or A-Series computers through an interface.

Software includes a database. Programs can be written in FORTRAN or Pascal as applications arise. High-level functions such as optimization or scheduling reside in the mine while control remains with the controller equipment. Prices for the CHIP system start at $50,000. FISHER CONTROL INTERNATIONAL INC., Marshalltown, Iowa.

FOR DATA CIRCLE 303 ON READER CARD

GRAPHICS WORKSTATIONS

The 6000 line of intelligent graphics workstations are designed to meet the needs of scientists and engineers with an open-ended architecture that allows system expansion so the workstations can be upgraded. The line is made up of two distinct software-compatible groups, the 6100 and 6200 series.

The products can be configured for a variety of applications, ranging from a satellite unit for instrument and process control to a CAE workstation that supports multiple cpus, multiple users, and multiple displays per user for mechanical or electronic engineering design. The workstations can be used as standalone systems, networked together with standard interfaces, or linked with a mainframe.

The workstations support a variety of displays. These displays feature window management, fast vector performance, text scrolling, multiple fonts, variable cursors, and area fill. Multiple, active windows, pop-up menus, and a three-button mouse take advantage of bit-blt charasterics. The 6100 series supports a 15-inch monochrome display with 640-by-480 resolution, as well as a 16-color, 13-inch display with the same resolution.

The 6200 series supports a 19-inch monochrome display with 640-by-480 resolution or a 19-inch, 16-color, or 256-color display (from a pallette of 16 million), each screen with a resolution of 1,024 by 768.

The 6000 displays feature 60Hz, noninterlaced refresh rate, tilt and swivel, detached keyboard with integral keypad, and VT-102 emulation. A modular user input bus expands the number and type of input devices. This product line supports the vendor's existing line of 4010, 4100, and 4110 series computer display terminals.

The workstations employ the NS32000 microprocessors. The 6100 series uses the NS32016 32-bit processor with an external 16-bit bus. This series has three basic products, the 6110 instrument controller and two 6120 intelligent graphics workstation models. The 6200 series is based on the NS32032 with a 32-

HARDWARE SPOTLIGHT

MULTI-USER MICRO

The Mega PC is a multiprocessor, multi-user microcomputer system offering both standalone processing compatible with the IBM PC XT and shared integrated system processing. It supports up to eight user workstations.

System architecture is designed to be compatible with the vendor's PB400 desktop and the PC XT computers. The design concept constitutes "a local area network in one enclosure," says the vendor.

The central system of the unit houses a main file server board incorporating an 8088 microprocessor and 256KB of RAM expandable to 512KB on the main board for controlling all I/O activity. It runs at 8MHz. This master processor is dedicated to performing all the system housekeeping or overhead work. For example, disk drive or printer services, file selection or file saving functions, and directory calls are all performed or controlled by the master processor.

The central system unit also houses an additional board containing 11 IBM PC-compatible bus expansion slots. Up to eight slots can be used for applications processor cards (APCs), each incorporating an 8MHz 8088-2 microprocessor. Each APC (with more power than a PC XT, according to the vendor) is free to concentrate on doing the work actually requested by the user while the main file server manages all peripheral I/O tasks. Provided with its own internal 256KB RAM (expandable to 512KB), each APC is, in effect, a separate computer.

The unit can handle any combination of the two modes—with password and read/write protection—while sharing the hard disk resources among all users. In addition to the master processor with its own memory system, the main file server incorporates a hard disk controller with clock/calendar, choice of 10MB, 20MB, or 40MB Winchester disk drive, a 16KB ROM BIOS that boots to hard disk, floppy disk drive, one serial port, and one Centronics-type parallel port. Options include additional disk drives and streaming tape drive. In conjunction with the hard disk controller/clock/calendar card (which accommodates the second optional Winchester disk drive), the remaining 10 expansion slots may be used for any IBM bus-compatible card when not used for APC workstation cards.

Each workstation terminal consists of a 14-inch green phosphor 640-by-640 monitor, detachable keyboard, and bundled software including MS/DOS, GW BASIC, and an integrated productivity package. A two-user (256KB RAM per user) Corona Mega PC with a 10MB hard disk drive sells for $7,805. Additional workstations, including the APC, are priced at $1,500 each. CORONA DATA SYSTEMS INC., Thousand Oaks, Calif.

FOR DATA CIRCLE 300 ON READER CARD

bit data bus and consists of two basic models. The entire 6000 line is object code compatible and runs an enhanced version of the Unix operating system (except the 6110 instrument controller, which runs its own real-time operating system and executes object programs generated by other members in the line). Prices for the 6100 series range from $5,000 to $32,000. The 6200 series models cost from $18,000 to $36,000. Prices are without displays. TEKTRONIX INC., Beaverton, Ore.

FOR DATA CIRCLE 304 ON READER CARD

DOUBLES MEMORY

Pyramid Technology has introduced a 4MB memory board that doubles the memory capacity of its 90x supermini, a 32-bit, Unix-based machine.

The 4MB board uses 256KB DRAM chips. The vendor is also offering a 2MB board with the same chip technology. Both the 2MB and 4MB boards are easily installed in new or existing 90x systems and use the present memory control unit without modification. The 4MB board coats $22,000 and the 2MB board sells for $11,500. PYRAMID TECHNOLOGY CORP., Mountain View, Calif.

FOR DATA CIRCLE 305 ON READER CARD

3270 DISPLAY

The Telex 078 and 079 are part of a new line of 3270 displays for IBM 3270 users. Both models are plug compatible with IBM's 3178 and 3179 respectively.

The terminals feature a two-piece design, with complete tilt and swivel capabilities, and a coil-cable keyboard. Both models display 1,920 characters, and attach directly to either an IBM 3274/3276 controller or a Telex 174/274C/276 control unit.

Also, both products will accommodate a choice of keyboard layouts, including many for the international market. In the near future, both models will support a low-cost screen printer and extended seven-color capability on the 079. The 078 display is priced at $1,550, and includes a choice of typewriter keyboards with either a numeric or program function pad, along with a tilt and swivel stand. The 079 color display costs $2,200. TELEX COMPUTER PRODUCTS INC., Tulsa, Okla.

FOR DATA CIRCLE 306 ON READER CARD

FLOPPY DISK SYSTEMS

The 2000 series of intelligent floppy disk data storage subsystems offers data file management of up to 1,600KB of storage and an RS232C interface. The series includes a dual-drive master module (Model 2000), a dual-drive expansion module (Model 2200), and a complete quad drive subsystem (Model 2240).

Additional system features include directory-controlled file allocation, file and disk copy capability in the subsystem, interchangeable 5¼-inch double-sided disk, 25 system and maintenance commands to facilitate data transfer, eight baud rates up to 19.2KB, and optional 20 mA current loop interface.

The 2000 dual-drive master module contains two disk drives, a microprocessor controller, and DC power supplies. The 2200 dual drive expansion slave unit contains two 400KB drives and DC power supplies. The 2240 quad drive subsystem combines the master and slave modules in an integrated system capable of storing up to 1,600KB of data. The 2000 costs $3,300, the 2200 is priced at $2,600, and the 2240 sells for $5,500. DA-TECH CORP., Ivyland, Pa.

FOR DATA CIRCLE 307 ON READER CARD

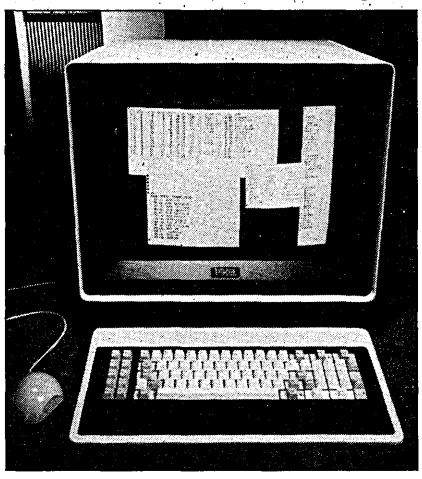
UNIX WORKSTATION

The 80/G is a Unix-based graphics workstation with a raster display. It is designed for a variety of applications including graphic design, document composition, scientific modeling, and CAE.

The display resolution at 200 lines per inch (2,180 by 1,728 pixels) in the 15-inch portrait mode, and 150 lines per inch (2,340 by 1,728 pixels) in the 19-inch landscape mode, provides almost 4 million displayable pixels.

The interactive composition of the images is supported by the 80/G writing speed, at less than one half a second, and by the raster image processing subsystem, for which a patent application has been made, according to the vendor. The design of the system allows images to be constructed in off-screen memory and moved to the visible portion of memory very rapidly. Up to 2MB of dedicated video memory, or frame buffer, is available to allow the storage of as many as 30 font/point size combinations.

The proprietary graphics hardware enables the product to display symbols at a rate of almost 10 million pixels per second. According to the vendor, the graphics and computing provide a complete package for interactive composition and processing. It has the ability to replicate clearly and accurately textures, very small type styles, and very fine scientific and engineering symbols. The unit may also accept input from digitizing optical scanners, and can drive bit-mapped output devices such as thermal transfer and lasar imaging printers. Prices range from $30,000 to $50,000. PIXEL COMPUTER INC., Wilmington, Mass.



FOR DATA CIRCLE 308 ON READER CARD

DUAL-PERSONALITY TERMINAL

The CIT-414a is a dual-personality monochrome graphics terminal combining Tektronix 4010/4014 emulation and major DEC editors.

The unit's Tektronix personality offers variable line types, vector/point/incremental plotting, and, using standard 4014 commands, up to four character sizes. Compatibility with the Tektronix GIN mode is enhanced by the unit's keyboard-controlled, eight-direction, crosshair cursor. Line, arc, circle, and box generation capabilities are provided. In ANSI mode, the terminal features include DEC editors EDT, KED, and TICO, tutorial setup mode, and reverse video. The terminal has a standard printer port for LA100, C. Itoh 8510, and Epson MX-80 compatibility, a detachable keyboard, and nonreflecting screen.

The CIT-414a has a flicker-free 640-dot by 480-dot resolution display with an addressable plot area of 4,096 by 4,096. It costs $1,500. A color graphics model providing DEC alphanumeric software commands and Tektronix 4010/4014 emulation is priced at $3,000. CIE TERMINALS, Irvine, Calif.

FOR DATA CIRCLE 309 ON READER CARD

TELLER STATION

The Series 7900 is a branch automation system for the financial industry. In one network, it ties together teller automation, platform banking, back office automation, and personal computing.

The teller station includes a 5-inch monitor, a keyboard, and a receipt journal printer. A document passbook printer can also be used with the system. The system can connect to Omninet, the local area network for the 7900. Software includes the Cash Control Application System, which is written in COBOL and driven by MP/M 86. CCAS is designed to meet a wide range of cash management needs. The Series 7900, in a five-terminal teller station system, is priced from $23,000 to $28,000, depending on configuration. HONEYWELL INC., Billerica, Mass.

FOR DATA CIRCLE 310 ON READER CARD

—Robert J. Crutchfield

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CIRCLE 98 ON READER CARD

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CIRCLE 108 ON READER CARD

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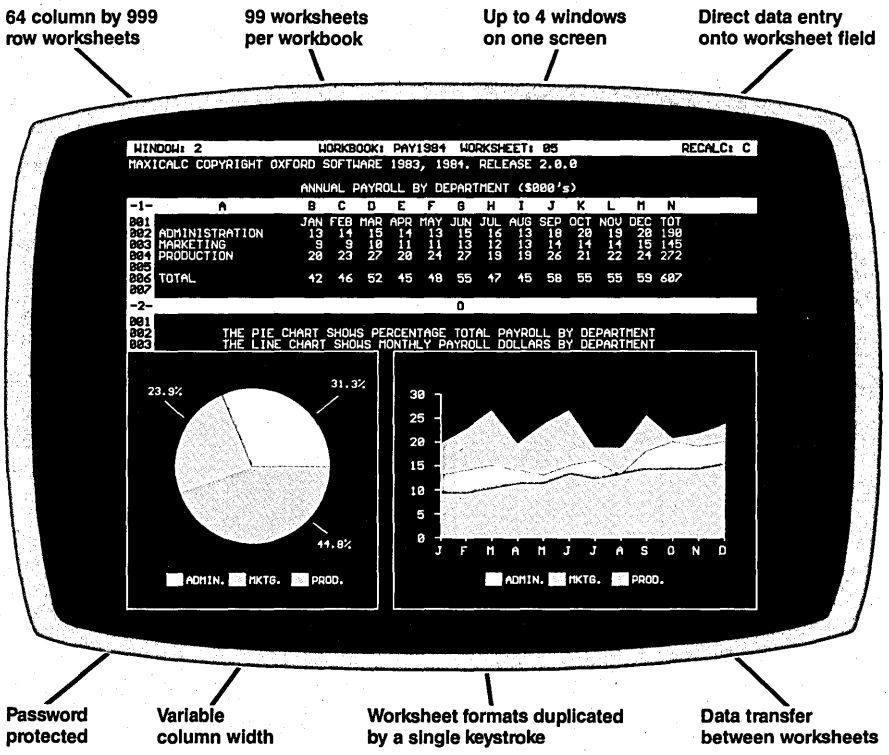

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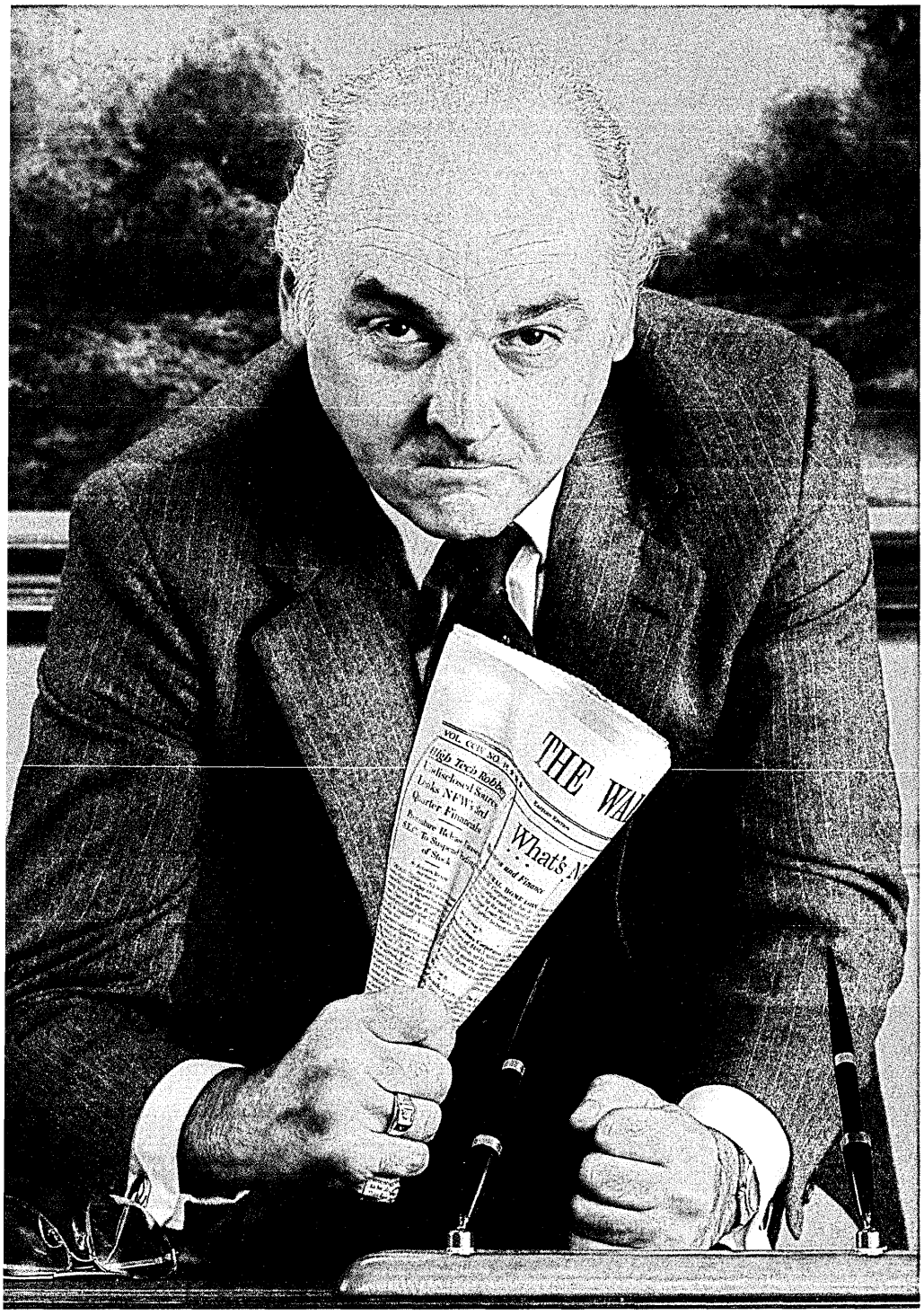

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SOFTWARE AND SERVICES

UPDATES

The U.S. market for computer software and services expanded at a 22% clip in 1983 to reach $33.5 billion, according to a survey performed by Input, a market research and consulting firm in Mountain View, Calif. The study also says the market for software products has tripled since 1980. Input forecasts a 35% annual growth rate for this industry "for the next several years." The growth, according to the study, will come primarily from the applications software market, which is growing at 50% a year. As applications become larger and more complex, companies are more likely to go outside to build them, accounting for the high growth rate.

Facilities management, systems integration, network services, on-line databases, and other specialized services are also growth areas, the report says. The professional services industry grew at a 20% rate in 1983. Moreover, "the demand for custom software will continue to expand," says Input president Peter Cunningham, partly because the federal government and larger companies are finding that the cost of training their own employees in these areas is greater than contracting with outside firms. In addition, the education, training, and the professional services markets are accelerating, the survey says. "The overall need for systems change throughout U.S. business, industry, and government will be the prime reason for continued growth of the industry," Cunningham says. Because of the continued strong demand for software and services, Input expects the computer services industry to top $100 billion a year in the U.S. by 1989.

While the software industry poises for continued growth, Strategic Inc. warns that in some areas competition will still grow fiercer and the power of market leaders will still grow stronger. The industry is, in fact, in the early stages of an "unusual" shakeout among microcomputer software vendors, the Cupertino, Calif., firm says. Previously thriving vendors have been hurt by products and sales that are now considered lackluster, even though they would have been considered outstanding a year earlier, the market research firm says. Consequently, even though the micro software industry is not experiencing the classical shakeout that mature manufacturing industries undergo, the effect is nonetheless "real and devastating to companies concerned." And, as the software industry continues, many products and companies "are falling by the wayside." The report cites Digital Research and VisiCorp as examples of companies that have suffered "major setbacks while smaller companies are coming and going by the dozens."

The major problem affecting the software vendors is the growing cost of entry into the market. Strategic estimates that it costs at least $2 million for any firm to make itself known, and cites the $8 million that Ashton-Tate, already a successful software company, spent to launch its Framework product. Of course, the entry barrier in software is still nothing like that for hardware, where Apple is spending $100 million this year on Macintosh.

Lotus Development Corp. has filed a $1 million lawsuit in U.S. District Court against the Health Group Inc., of Nashville, for allegedly making and disseminating unauthorized copies of the popular 1-2-3 software package. Lotus is asking both for a permanent injunction against such copying and for undisclosed damages. At press time a court date had not been set.

INTERFACE TO RS/1

This vendor introduces the Host Language Interface. It is an interface to RS/1, the computer aided analysis software used by engineers and scientists. RS/1 is a fully integrated software system that includes data management and analysis, statistics, graphics, modeling, and report generation.

The host interface should enable engineers and scientists using FORTRAN, COBOL, Pascal, or other programming languages to access RS/1 from within the language. The interface allows users to combine programs with data from RS/1 tables easily and effectively, providing increased flexibility in developing solutions to computing problems in research, development, and manufacturing environments.

The option is available to users of RS/1 on DEC VAX computers. The price of the Host Language Interface is $5,000. BBN SOFTWARE PRODUCTS CORP., Cambridge, Mass.

FOR DATA CIRCLE 326 ON READER CARD

PROJECT MANAGEMENT

Project planning and management are said to be made easier with this software package for the IBM PC. Taking advantage of the PC's color screen, the mouse-driven Qwiknet system features critical path scheduling, resource allocation, and progress reporting facilities. Up to 250 activities per network, with as many as 12 resources per activity, can be handled at once. Different variables and graphics are displayed in separate windows. Qwiknet requires a minimum of 320KB of memory, two floppy disk drives (or floppy/hard disk combination), and a three-button mouse, which the vendor sells separately. Deliveries of the $800 package have begun. PROJECT SOFTWARE & DEVELOPMENT INC., Cambridge, Mass.

FOR DATA CIRCLE 327 ON READER CARD

DSS GRAPHICS SYSTEM

Analect DSS Graphics combines graphics technology with decision support system

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TSI is part of Dun & Bradstreet's ongoing commitment to design and deliver innovative software and services. As your needs evolve, so do our products. Along with NOMAD2, the premier 4th-Generation-Language/DBMS from D&B Computing Services, and DunPlus, the PC that reflects the way you do business, you can trust TSI for service and innovation in helping you manage end-user computing.

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CIRCLE 101 ON READER CARD

(DSS) capabilities. It gives users the interactive ability to sort, select, and analyze large amounts of data and distill it into clean presentation-quality charts.

The software is comprised of two standalone systems: Analect Business Graphics for standard business charts; and Analect Custom Graphics, which combines Analect's business graphics with advanced features for maps, corporate logos, line and polygon drawings, structures and segments, and metafiles.

The vendor says the software can help track sales, financial operating statistics, and production performance measures. The system is available on IBM under TSO and CMS, Prime, VAX, and DEC-system-20 computers. Analect DSS Graphics range from $9,500 to $28,000. DIALOGUE INC., New York.

FOR DATA CIRCLE 328 ON READER CARD

SOFTWARE DEMO DATABASE

First Access is an on-line software information database that allows computer and software retailers to demonstrate software packages, order hardware and software products, and review vendor advertising and distributor specials.

The system uses the dealer's own hardware to tie into the vendor's host computer, which contains passive software demonstrations and information on a variety of software, hardware, and related products. Subscribers to the service can gain immediate access during extended business hours via GTE Telenet and a modem.

According to the vendor, passive demonstrations, which do not require live interaction with the software product, allow salespeople to define the product's limitations and capabilities without having prior knowledge of how it actually works. In addition to demonstrating various software packages, the service provides dealers with marketing information. Each time the dealer gives a software demonstration, the customer is taken through a series of screens designed to capture demographic and marketing profile information. Questions cover age, income bracket, types of hardware and software products already owned, and preferences in product features and benefits.

The vendor has a three-tier pricing structure. Software companies pay this vendor a monthly advertising fee based on a sliding scale of the number of dealers subscribing to the service. Distributors will be permitted to advertise their products and special offerings via the service and will be charged a monthly advertising fee based on whether the advertisement is accessible by subscribing dealers nationally or regionally. Dealers will be billed an annual subscription fee of $500 plus monthly charges for all computer and communication costs. Up to 20 salespeople will be provided with a personal access code number for entry to the system. Additional code numbers will cost the dealer $2.50 each. OCEAN DATA SYSTEMS INC., Rockville, Md.

FOR DATA CIRCLE 329 ON READER CARD

QUALITY CONTROL

The Plot procedure on SPSS/PC allows line managers to print statistical quality control reports. The software produces two-dimensional scatter plots, regression plots, contour plots, and overlay plots, which can be used to build quality control reports for manufacturing sample data.

The software will produce run charts, or a measure taken over time. A manufacturer wishing to measure line productivity would use a run chart to plot the number of items made each day of the month. The X bar chart plots the average measurement of a sample over time. Measurements can be made of a small number of pieces taken from a large batch in production at a given time.

With this product, data can be entered in several ways: as raw data, as a matrix, or as a portable import/export file. SPSS-X mainframe software is compatible with IBM, Digital Equipment, Data General, Sperry 1100, Honeywell, and other systems. SPSS/PC procedures will list cases, build formatted reports of cases, break groups of cases, and list summary statistics for those groups.

SPSS runs on IBM PCs or IBM-compatibles. It has an on-line tutorial and a help command that produces full explanations of the syntax. SPSS/PC costs $800. SPSS INC., Chicago.

FOR DATA CIRCLE 330 ON READER CARD

UNIX OFFICE SOFTWARE

Alis is a Unix-based office software system targeted for resale by large oems. The package combines the advantages of integrated PC applications with information-sharing benefits of communication-based OA systems.

The product introduces a concept called Active Integration. This allows users to combine different types of information such as text, drawings and business graphics, spreadsheets, and database information into a single document, while retaining the ability to edit each kind of information in its original form. The package also has an intelligent document composer with multiple font support.

Another feature is universal graphics editing, or the ability to edit all graphics in a consistent graphical way. It combines a freestyle drawing capability with the ability to draw standard business charts automatically, and provides a consistent way to edit graphical information. The spreadsheet has a built-in equation-solving capability and automatic inter-spreadsheet references. The database allows for the management of office information. The system also features information sharing and electronic mail.

The product has a feature called automatic office assistants. It monitors information within the office network. If

SOFTWARE SPOTLIGHT

INTEGRATED PACKAGE

ARIS (Action Resource Information System) is a program that combines databases, word processor, diary, telephone dialer, spreadsheet link, and operating system manager to offer time/work management techniques in the context of the desktop personal computer.

The package is menu driven, uses prompts to interact with users, and accomplishes numerous tasks automatically. The program translates assignments into effective action, offering users the appropriate tool necessary to accomplish an assignment. For instance, if a meeting report is due two days following an appointment, Aris calls up the word processor at the scheduled time and automatically fills in the correct time/client information. The user may then choose whether or not to complete the assignment at the time. Users have the benefits of an automated assistant and at the same time are in control of the system, the vendor says.

The vendor categorizes this product as a "work processor," adding that the software displays on-line use instructions, and comprehensive help messages may be called up at any point. Another feature is that changes in database information are automatically updated throughout the system and the product prevents scheduling conflicts. Revisions in appointments may be printed out at any time in a fanfold pocket diary format. Daily, weekly, or monthly schedules, and other information, can be inserted into a specially designed personal executive diary included with the package.

A novice can use this software productively with little training, says the vendor. Designed for the IBM PC, PC XT, or PC compatible, Aris runs on systems with 192KB of RAM, PC/DOS 2.0 or better, and a single floppy disk drive. The program may be installed for either autodialing or manual telephone dialing. Other word processors, such as WordStar, can be substituted by the user in place of the word processing package provided with the integrated software package. ARIS has an introductory price of $400. EXCEL SYSTEMS CORP., Mill Valley, Calif.

FOR DATA CIRCLE 325 ON READER CARD

information is changed in a shared filing cabinet all users, if desired, will be automatically notified of the change. The user interface is consistent across all applications. The software also has a multiwindow environment.

Alis is priced at $1,350 per user for bit-mapped workstations and $900 per user for terminal-based systems. APPLIX INC., Southboro, Mass.

FOR DATA CIRCLE 331 ON READER CARD

INFECTION CONTROL

The Infection Control Program reports on the numbers of infections by causative organism, by site, by service, and by physician. It produces a variety of reports required by hospital infection-control personnel. Drug sensitivities may also be reported. Data entry is accomplished through menus and on-screen forms. The program accepts data on each hospital infection, including patient demographic information, site of infection, infecting organism, hospital unit, hospital service, and physician. Users may enter the respective hospital's unit names, services, and physicians without customizing.

The software keeps track of multiple admissions as well as multiple infections in the same patient. It has an unlimited list of organisms and antibiotics, and produces 17 different reports automatically. This program is written in dBase II and is designed to operate on the IBM PC or compatibles. Purchase price is $1,400. MEDICAL INFORMATION PROCESSING SYSTEMS INC., Wausau, Wis.

FOR DATA CIRCLE 332 ON READER CARD

LANGUAGES UNDER MS/DOS

This vendor has released new verions of Microsoft Pascal, FORTRAN, and C Compiler for its MS/DOS operating systems. The vendor has added two new math libraries to Pascal, supplementing the existing 8087 coprocessor and the 8087 emulation support. The first math package offers high-speed performace without an 8087 chip. With support for both single-precision and double-precision numbers, it is faster than the emulation software with only slightly less accuracy, the vendor says.

A second optional math package offers programmers of business applications more accurate dollars and cents calculations with the use of BCD floating-point arithmetic. The 14-digit decimal format eliminates many of the rounding problems of binary math. Pascal 3.2 also includes MS/DOS 2.0 run-time support.

This release of FORTRAN includes all the new floating-point math and MS/DOS 2.0 file and overlay linking options, as well as support for large arrays of complete numbers. This version of FORTRAN can handle almost unlimited data arrays.

The language enhancements have overcome the 64KB segment restrictions for arrays and common blocks, allowing manipulation of extremely large matrices. When used in conjunction with module linking, a single program can now exploit the entire 8086 memory up to 1MB. It also supports complex number calculations in addition to specific and generic conversion intrinsics conforming to the ANSI 77 standard.

This version of C supports use of path names to take advantage of the DOS directory structure as well as I/O redirection. With expanded addressing capabilities, programs compiled in this vendor's C can now make use of the full memory of the system. A programmer may choose the small, medium, compact, or large memory model, based on the needs of a particular application.

All versions include MS/DOS 2.0. Pascal 3.2 costs $300, FORTRAN 3.2 lists for $350, and C 2.0 sells for $500. MICROSOFT CORP., Bellevue, Wash.

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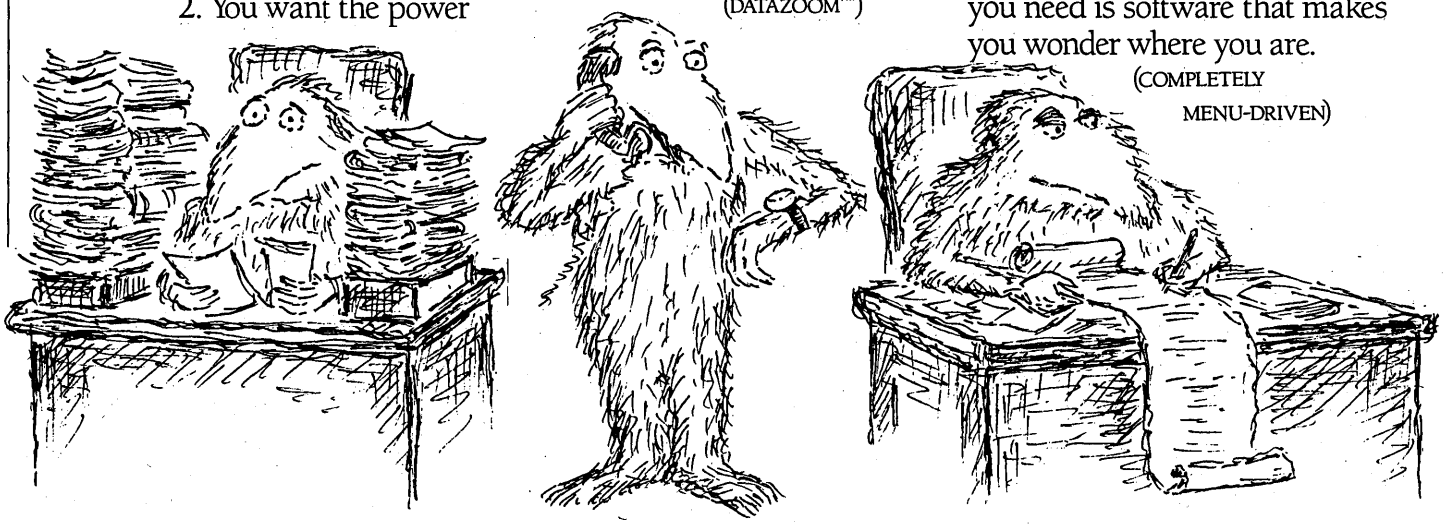

SOFTWARE AND SERVICES

ARCHIVAL SOFTWARE

Disk FARMER (Disk File Archival Method with Easy Retrieval) is designed to be a highly productive addition to disk system maintenance on the Honeywell Level 66, DPS8, and DPS88 computers.

According to the vendor, it is capable of restoring disk storage capacity valued in the thousands of dollars, even on smaller systems. Its approach to both file archival and retrieval allows these savings to be attained with minimal effort, the vendor adds.

The software eliminates the waste of space on storage computer systems caused by the presence of infrequently used or unused files. These files originate as legitimate work files, distribution files for new or updated software releases, and as convenience or test files created by the programming staff and users of the computer system. According to the vendor, files that are not referenced for long periods of time tend to accumulate, leaving significant amounts of valuable disk storage space occupied by insignificant data.

The use of this product, in such circumstances, can initially recover extensive amounts of wasted disk space, and afterwards will provide additional returns when used on a scheduled basis. It will archive noncurrent files to tape. The occasional retrieval of archival files is a fully supported feature of the product, with the retrieval process typically requiring less than five minutes.

Through an on-line command that references a small archival database, the status of archived files and requests to return the file to permanent disk space may be entered and acted on without intervention by technical support or administrative personnel. Disk FARMER is available for a license fee of $8,000 per cpu. EXECUTIVE SUPPORT PRODUCTS INC., Newport Beach, Calif.

FOR DATA CIRCLE 334 ON READER CARD

APPLICATION GENERATOR

Factory is an application generator that is integrated with the vendor's fourth generation language and allows DEC VAX users to automate their business application development process. The software contains an RMS interface that supports sequential and indexed file handling of other VAX applications and products such as Datatrieve and DECnet. Users can also access common data elements from other existing files and other Factory files.

According to the vendor, MIS centers upgrading their dp capabilities with the addition of this product can realize productivity gains immediately because existing files need not be re-created. Systems analysts and programmers can begin to translate end user requirements directly into working prototypes and generate final applications code and documentation automatically.

The product includes a menu-driven system for infrequent or inexperienced users. Additional modules are also available including an accelerator for faster run time and greater machine efficiency. A Targetor allows this software to run on PDP-11 or Professional 350 computers. A run-time system enables users to run applications on VAXs not used for the applications development.

An end-user facility enables users to use English commands for ad hoc queries, reports, and statistical analysis. Future versions will include a graphics editor for custom builder codes, a three-dimensional painter, the ability to paint interactively on the screen, and a help facility. Making this package available on 4300 and 30XX mainframes is also under consideration. Prices for the Factory applications generator range from $10,000 to $25,000, depending on the VAX model that is used. CORTEX CORP., Wellesley, Mass.

FOR DATA CIRCLE 335 ON READER CARD

—Robert J. Crutchfield

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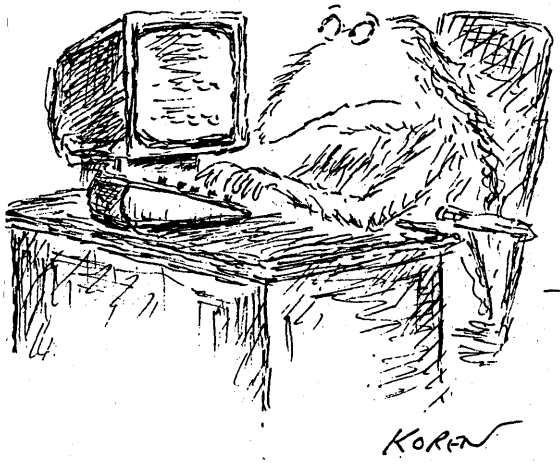

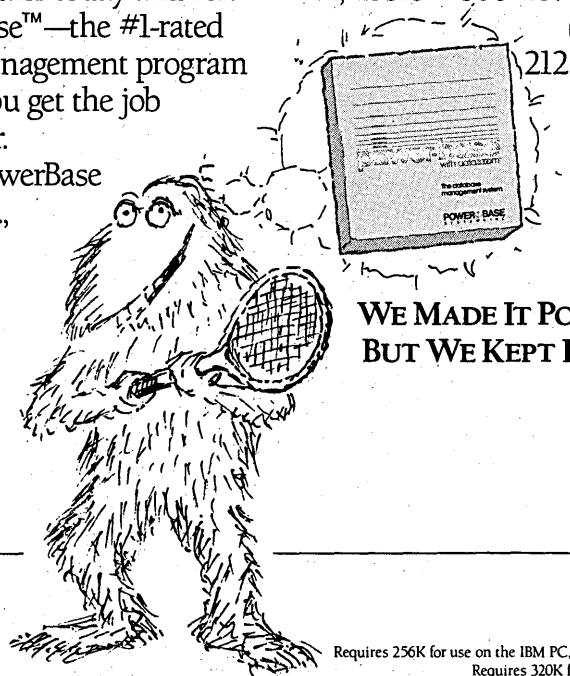

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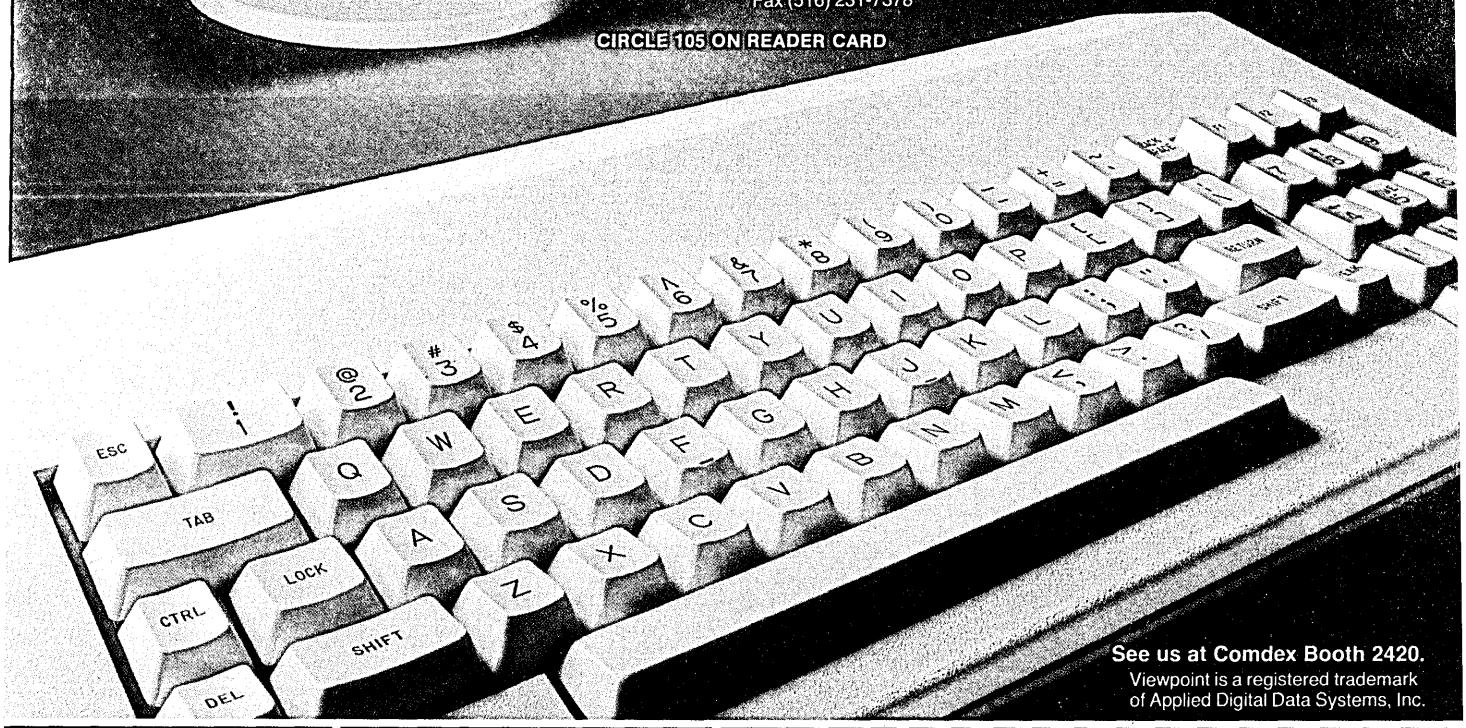

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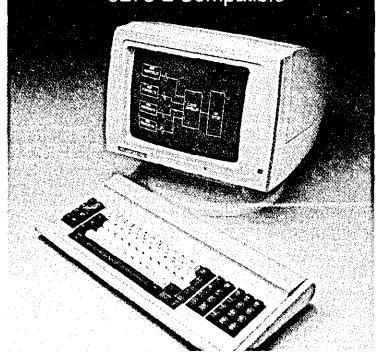

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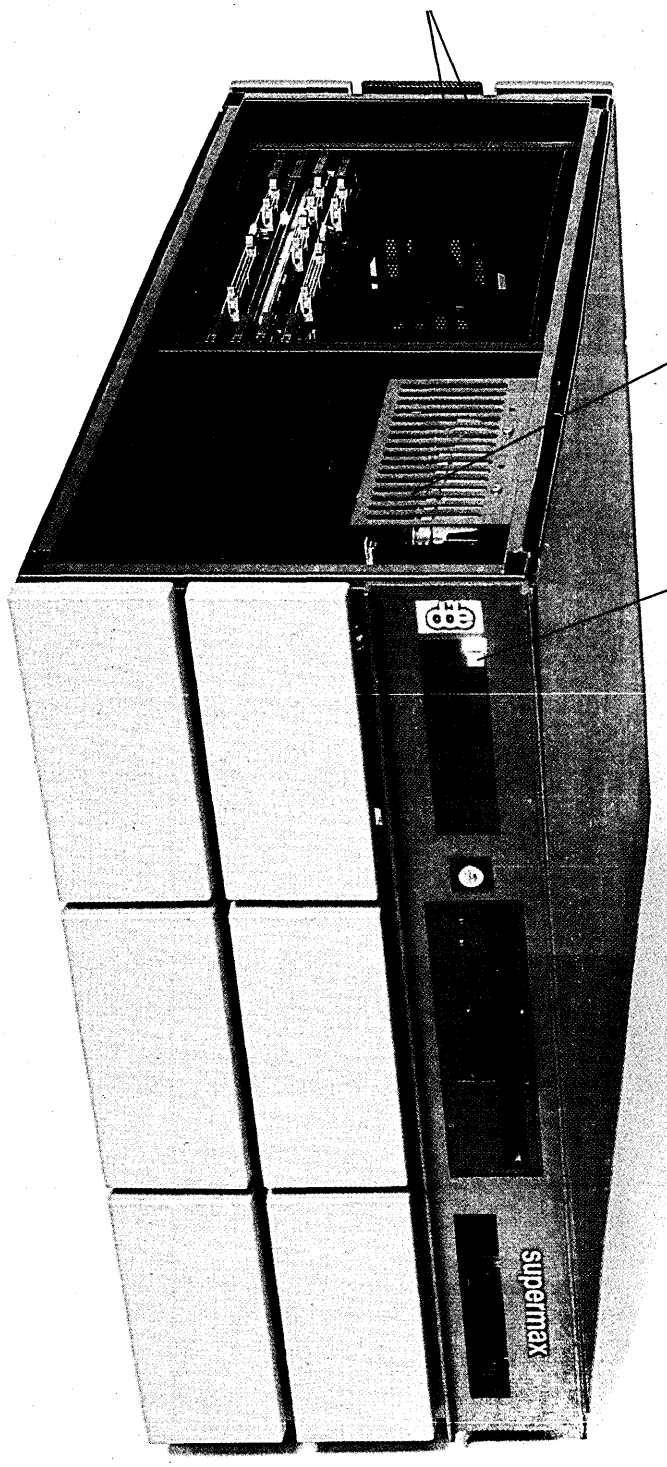

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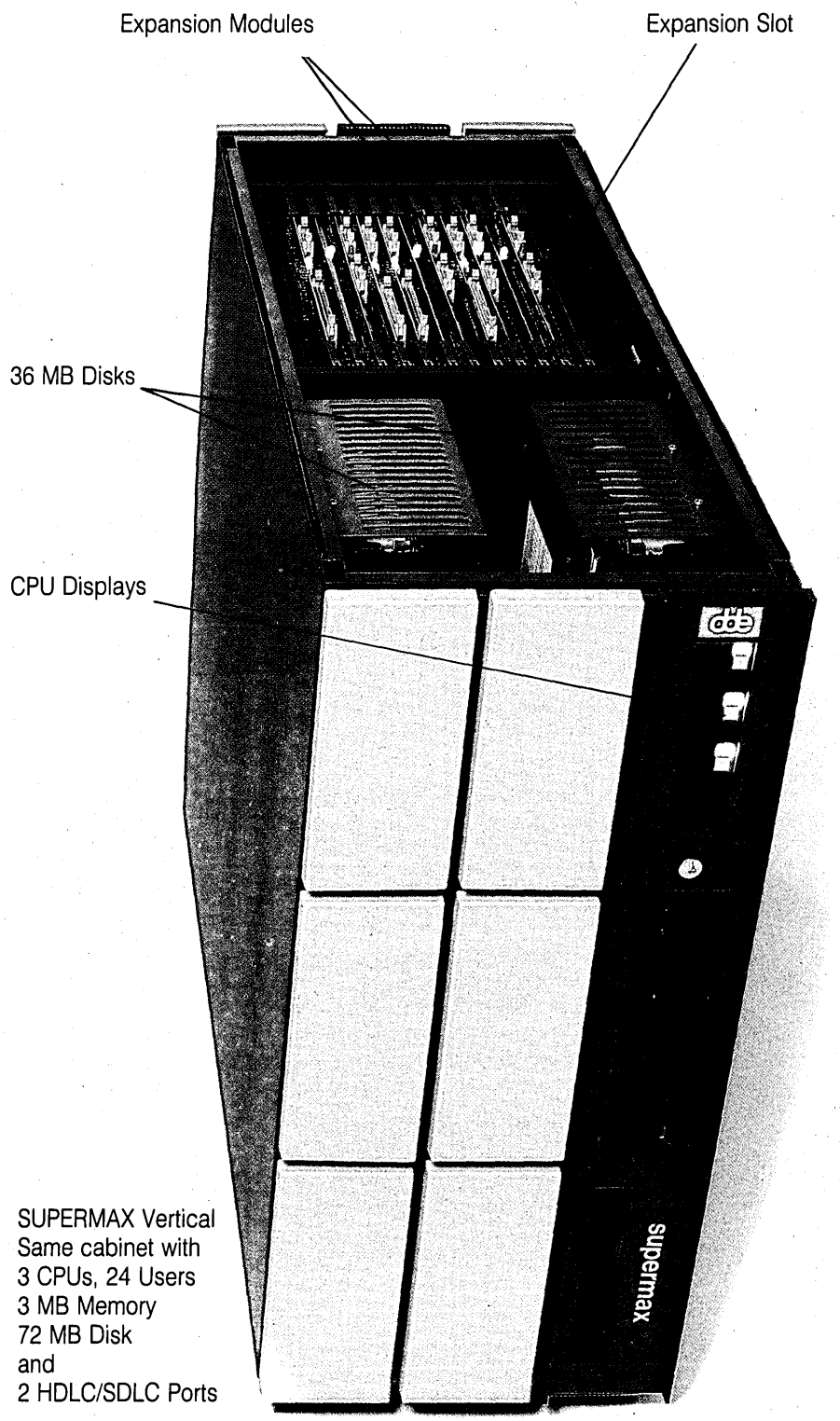

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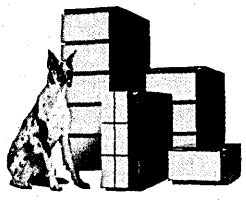

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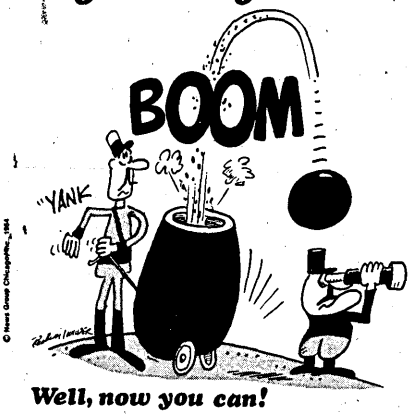

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Applications are invited from candidates of either sex—applications from women are encouraged. Qualified candidates should send their detailed curriculum vitae as soon as possible quoting ISS/84 to:

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ON THE JOB

SOME THINGS ARE BETTER LEFT UNSAID

Robert Half, of Robert Half International—the financial, executive, accounting, and dp recruitment firm—has an ever-growing collection of the inappropriate, unintentionally humorous, and self-defeating material that people have actually included in their résumés. In an effort to put an end to what he calls "résumania," Half has opened his collection of résumé goofs for our perusal.

Where can we reach you?

"Please call me after 5:30 p.m.," one man requested on his résumé, "because I am self-employed and my employer does not know I am looking for another job."

Any physical disabilities?

"Minor allergies to house cats and Mongolian sheep."

The ideal job.

One Pittsburgh woman offered this concise definition of her ultimate employer: "Perfect would be an organization beset with a variety of problems while simultaneously beginning to stir with the fever of acquisitions and diversification. As the nature of the job declines in the hierarchy of preferences, so obviously would come into play the decisiveness of compensating subordinating factors." Bet she works in government now.

A Chicago assistant treasurer made it clear he was only in it for the money. "If there were two jobs available, one as corporate treasurer, and the other shoveling horse manure . . . I'll pick up the shovel if it pays more."

"While I am open to the initial nature of an assignment, I am decidedly disposed that it be so oriented as to at least partially incorporate the experience enjoyed heretofore and that it be configured so as to ultimately lead to the application of more rarefied facets of financial management as the major sphere of responsibility." This New York credit manager should switch to public relations.

What are your qualifications?

"I am the best-qualified candidate for any positions that may be available," wrote a St. Louis financial analyst. "I have no reservations about stating this."

"I am very conscientius and accurite," said a Salt Lake City bookkeeper.

"One of my former employers said about me: He's the hardest working son of a gun I've ever seen—and a cockeyed genius to boot." This from a Detroit dp manager.

An Omaha bank officer claimed, "I can type, pitch hay, and shear sheep. I am also skilled at groundhog hunting and ballroom dancing."

"I was proud to win the Gregg

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. . . the expected increase in dp spending in 1984 for other companies in your industry?

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The 1984 **DATAMATION** Salary Survey, including 160 pages of tables covering 43 dp job categories in 18 geographic areas and 11 different industry categories, is available for $100. The 1984 **DATAMATION** Budget Survey report and executive summary, including 77 pages of tables cross tabulated by 11 industry categories and 13 line items of the typical DP budget, is only $100. For further information contact Laurie Schnepf, director of research, Technical Publishing Co., 875 Third Ave., New York, NY 10022.

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Typting Award," typed a Philadelphia computer operator.

A Seattle financial analyst's self-description: "I am impatient with quibbling over minor details. I am stubborn on matters of principle and major objectives. I dislike routine thinking, unnecessary jobs, inefficient systems, and Republicans."

Will you relocate?

"My consideration will be given to relocation anywhere in the English-speaking world and/or Washington, D.C.," answered a Boston accountant.

"Will relocate anywhere—except Russia, Red China, Vietnam, or New York City," wrote a Cleveland computer programmer.

"I am interested in Florida mostly," stated a Miami tax accountant. "I would consider another area in the lower part of the U.S. I definitely do not want North Carolina, Virginia, or anywhere else in the North."

Reason for leaving last job.

"No special reason."

"The sales manager was a dummy."

"Responsibility makes me nervous."

"The company made me a scapegoat—just like my three previous employers."

"They insisted that all employees get to work by 8:45 every morning. Couldn't work under those conditions." Aha! A programmer?

Here are a few beauties from Half's "I Really Don't Think They Meant That" file:

"Hobbies include golf and bride."

"I am also a notary republic."

"My work encompassed profit and loss entrees."

"The firm currently employs 20 odd people." Sounds like *our* staff.

All humor aside, Half notes that "while résumania may be amusing, it is likely to have some not-so-funny consequences for the job candidate." His advice? "Make sure that you put your best foot forward—not in your mouth."

VIET VETS LAUD HONEYWELL

On Aug. 27, Honeywell received an award from the Disabled American Veterans (DAV) association. Honeywell was cited by DAV for assessing the needs of Vietnam veteran employees and their families, and implementing a support program to meet those needs.

In 1981, a committee of Honeywell employees was formed to address the needs of the vets in the workplace and at home. It was directed to draw up a plan that would assist the company in helping veterans reduce the incidence and effects of delayed, war-related stress on the family; increase employment and advancement opportunities for the vets; assist the company's veterans in making better use of applicable benefits; and recognize their service to the country and the contributions they've made to family, job, and community.

In addition, the committee was given the task of assisting the company in establishing and maintaining solid Vietnam veteran hiring and promotion policies; assuring that Honeywell received appropriate affirmative action tax credits for hiring these vets; recommending policies for disabled veterans who need time off to receive VA medical treatment; and developing a policy for identifying and using Vietnam-era veteran vendors through the company's procurement office.

The reward was accepted by Fosten A. Boyle, vp of corporate human resources. He was accompanied by Reed Welke, administrator of Honeywell's veteran program, and a Vietnam veteran himself.

—Lauren D'Attilo

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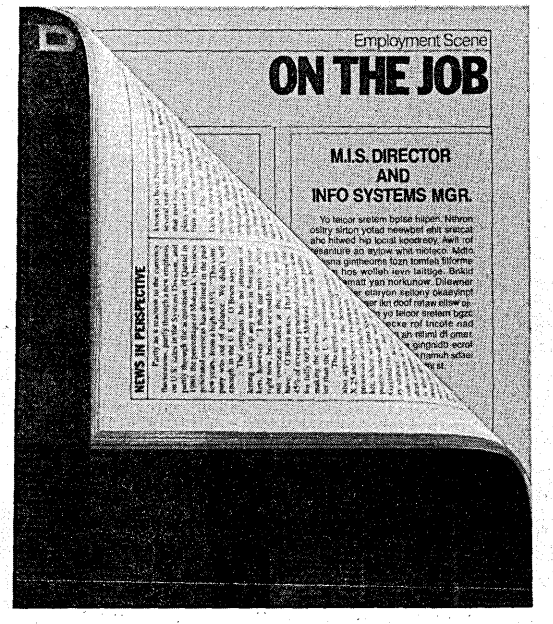

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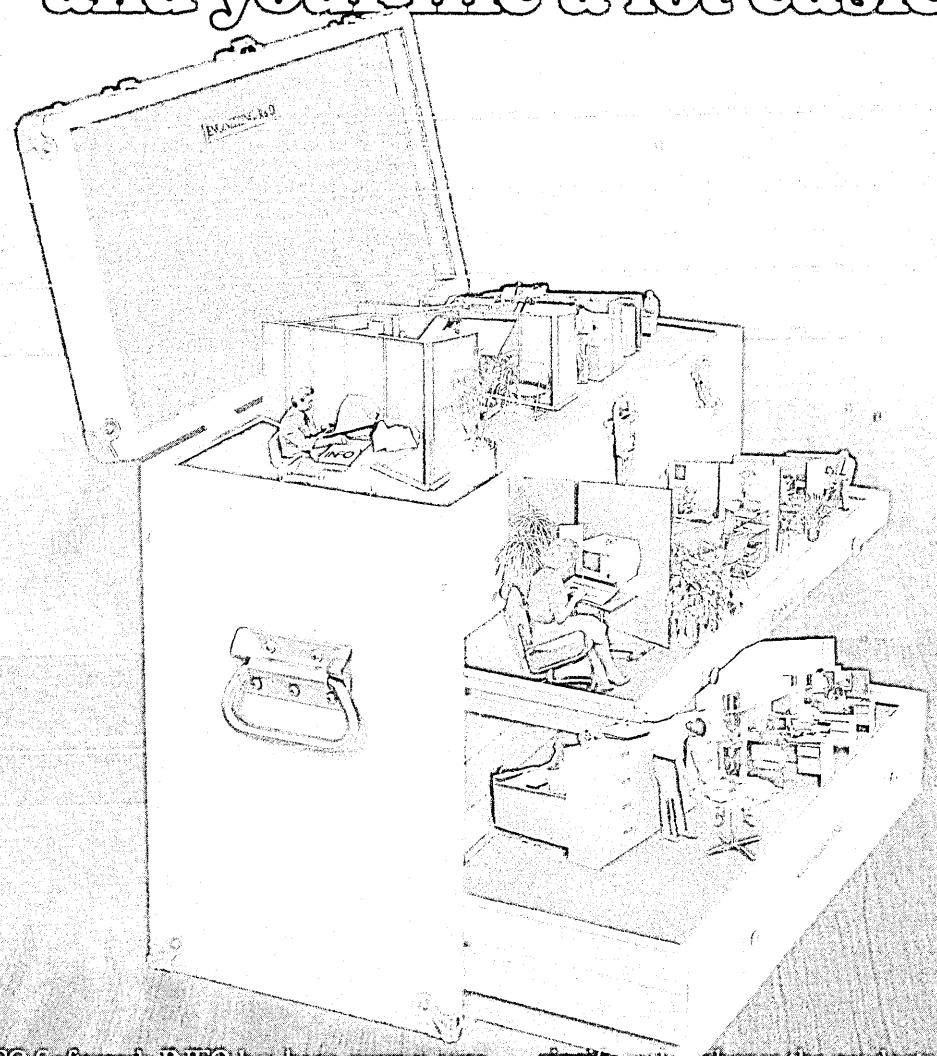

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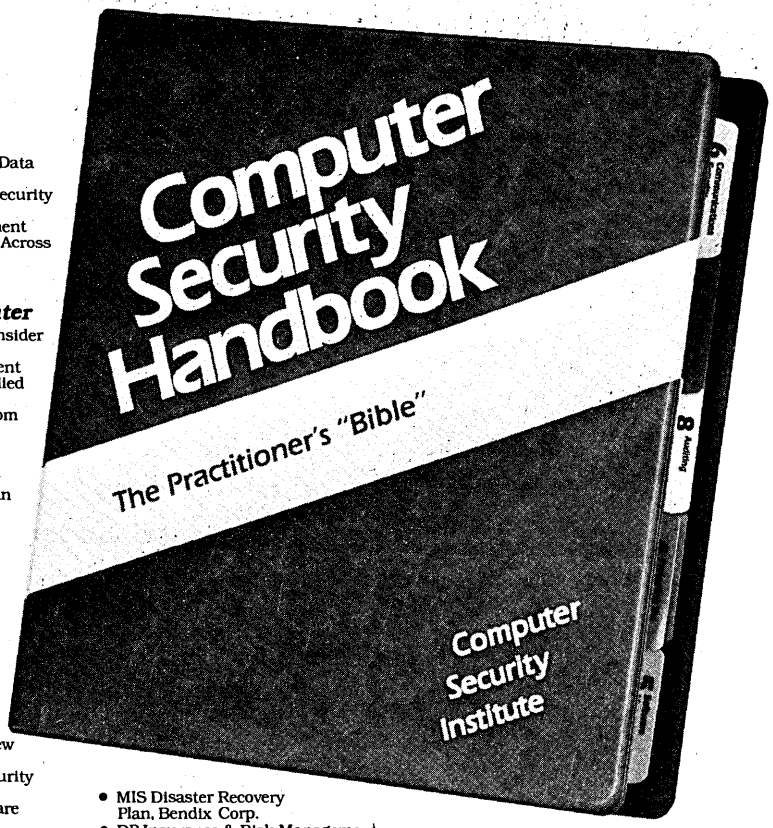

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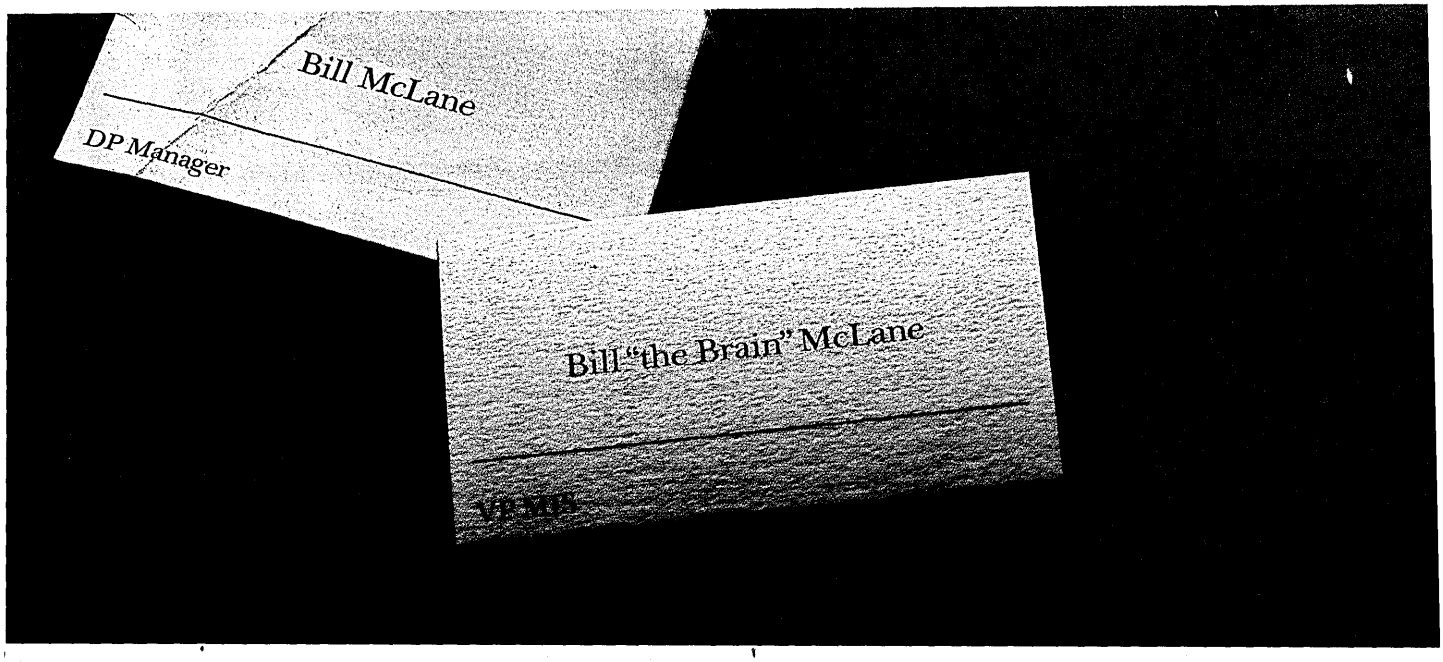

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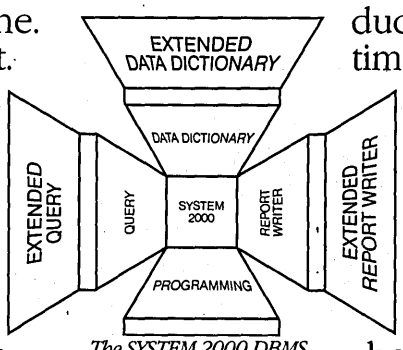

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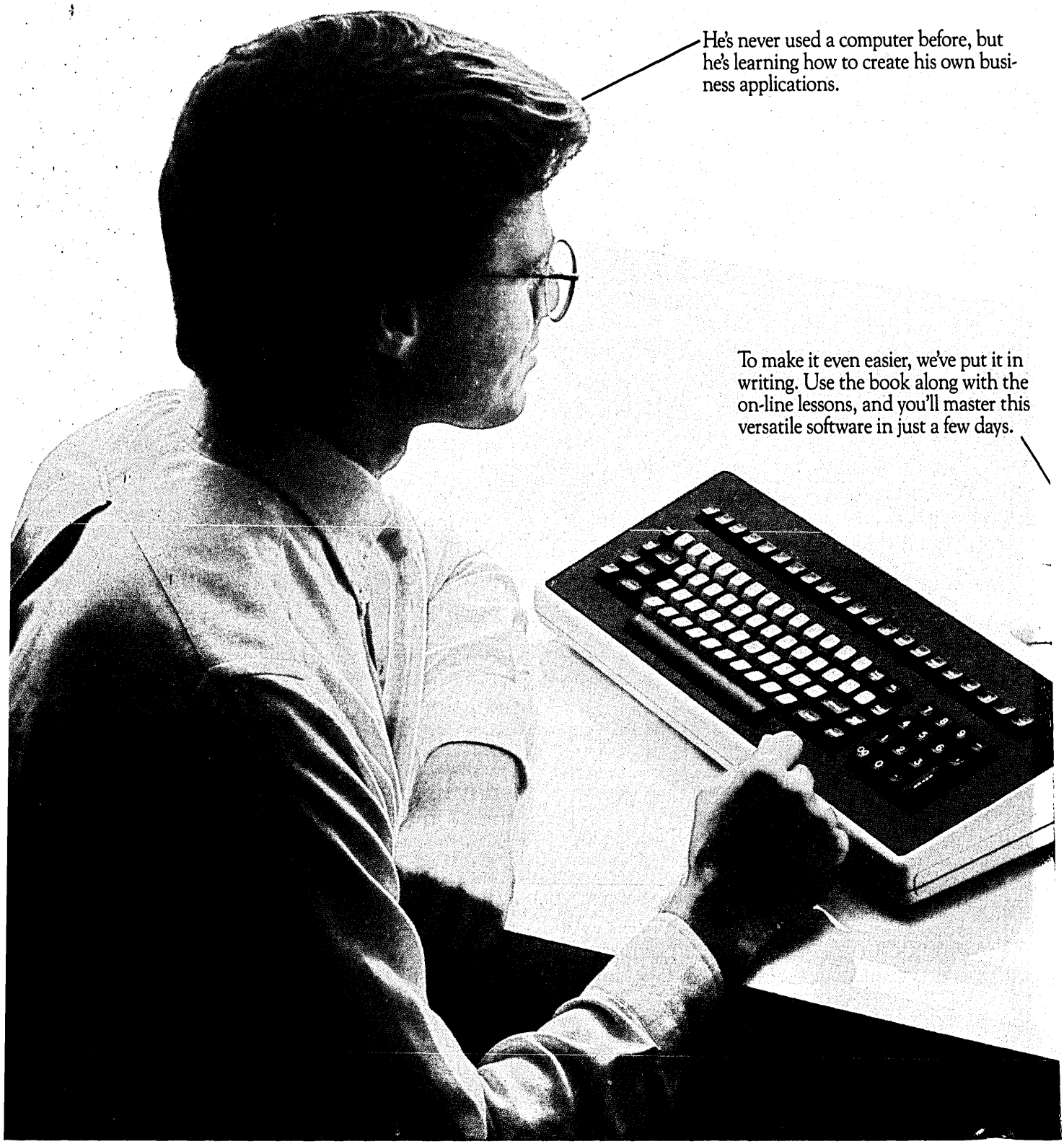

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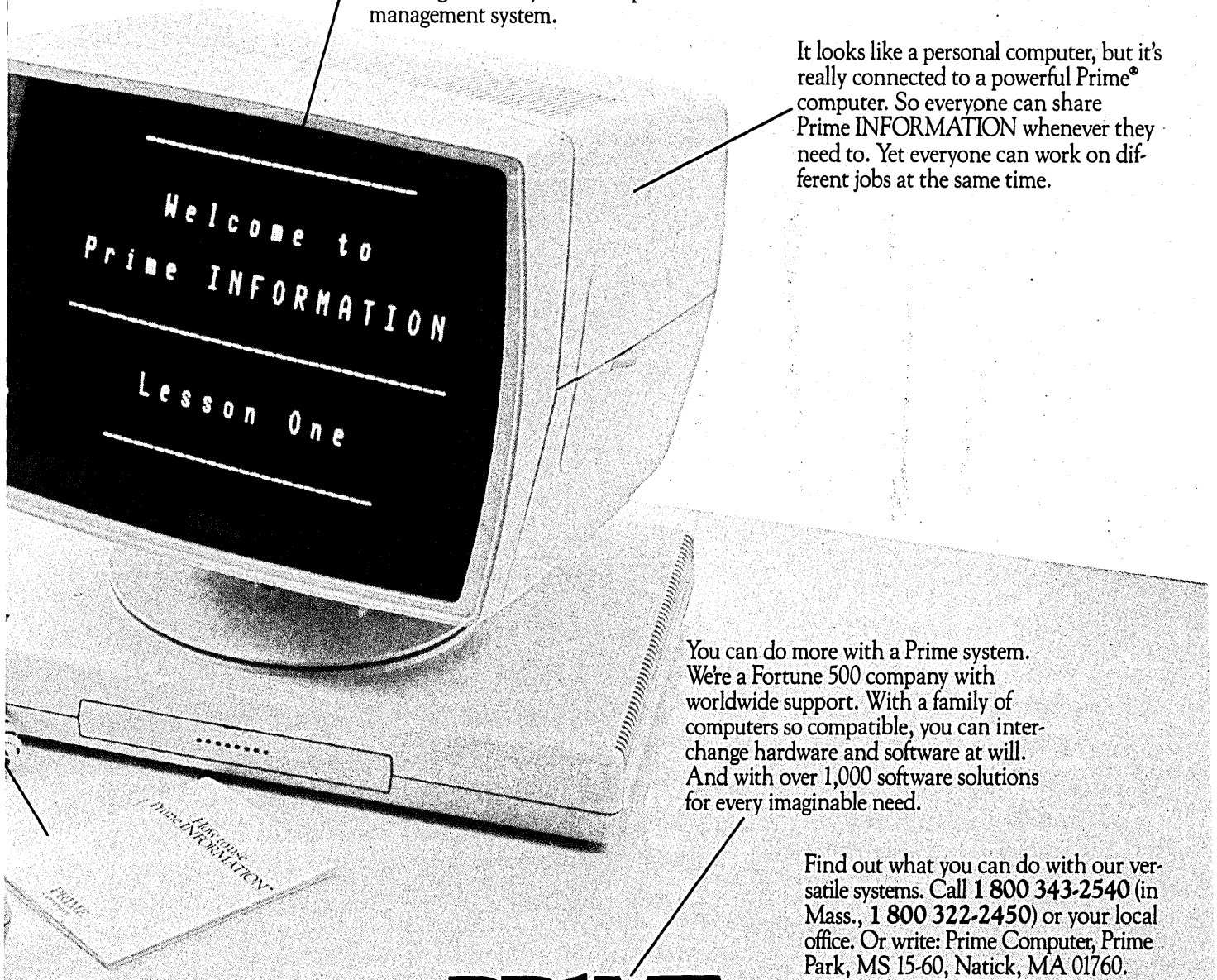

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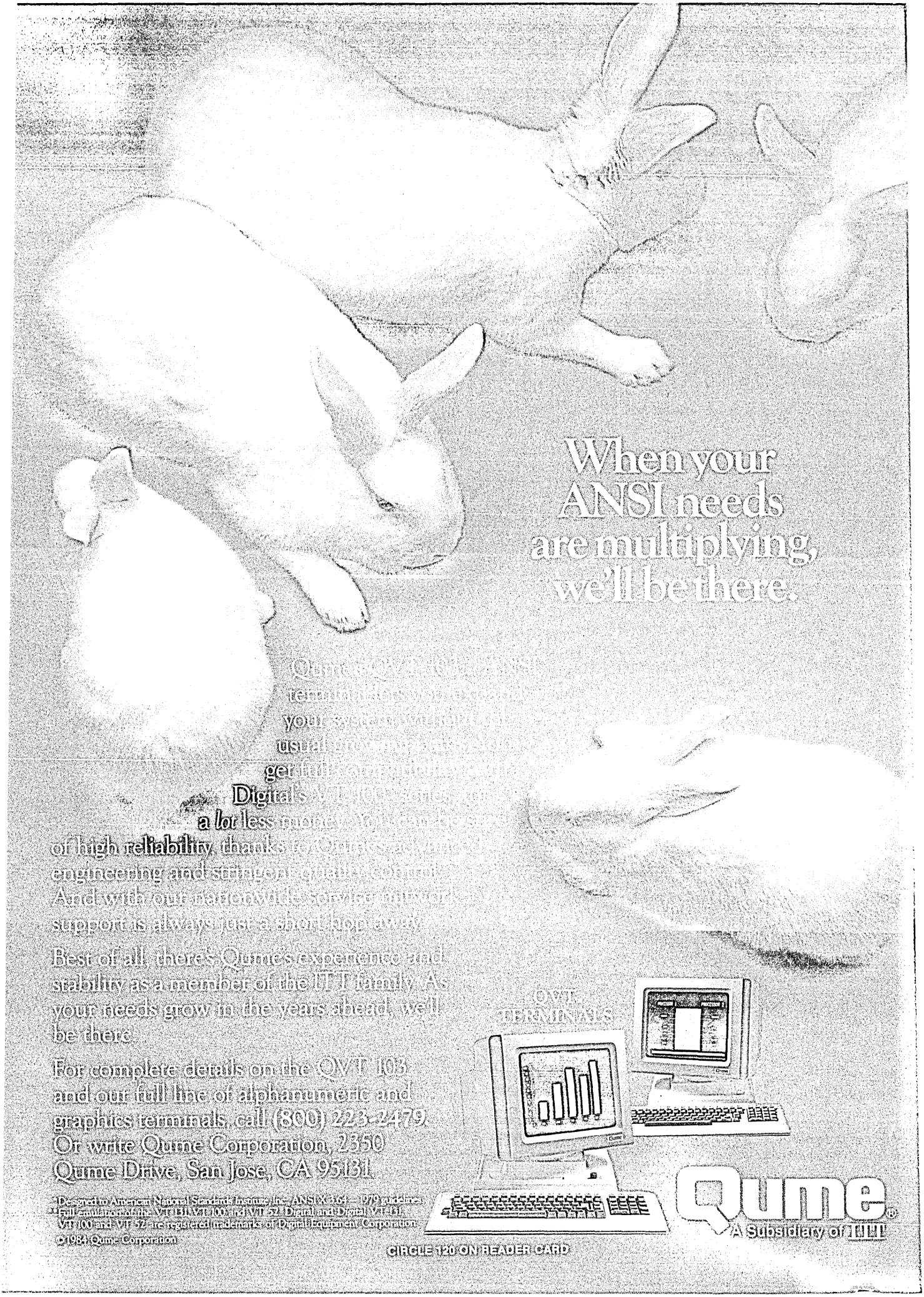
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READERS' FORUM

THE EVOLUTION OF END USERS

In 1979 Richard Nolan wrote one of the dp industry's most widely read articles—"Managing the Crisis in Data Processing," in the *Harvard Business Review.* Nolan suggested that there were different evolutionary stages through which a data processing organization passed. These stages were distilled from observations of many dp shops. The fundamental truths observed by Nolan have long since gained wide acceptance.

In his famous article Nolan states the phases of evolution:

- Initiation
- Contagion
- Control
- Integration
- Data administration
- Maturity

As the dp world turns into a dp/user world with the advent of fourth generation technology, there is suspicion that users are embarking on the same evolutionary path dp spent the last three decades treading. By demanding control of their own destiny, users appear to be turning back the clock and recreating the data processing environment of a much earlier stage.

The forces that will drive the user through the stages of evolution will most likely be:

- The need for rapid system development;
- The costs associated with system development and operation;
- The need for data consistency in a varied and dispersed user environment.

Is it true then that the user is reverting back to the early stages as described by Nolan? The answer is, probably yes. Today's users appear to be entering the stages of initiation and contagion. But there are some major differences between today's user-controlled environment and the infant world of dp that emerged in the 1950s and 1960s.

One important difference between the current user-controlled environment and the dp world of yesterday lies in their technologies.

In terms of power, there is no comparison between assembler languages and fourth generation languages, yet there was a day when the world was primarily assembler oriented. In terms of capabilities, you can't compare the 64K machine of 1965 (a wonder in its time) and the multimegabyte machine of today. In terms of capacity and cost, there is no comparison between a stack of punched 80-column cards and photo-optical storage. And so the comparison goes.

What does this difference in power mean to the users' evolutionary stages? They'll be greatly accelerated. The real forces of evolution will become apparent to the end user much more quickly than they ever were to early dp shops. These early shops had quite a bit of struggle with their tools, so much so that the forces of evolution were not obvious and often took extended periods of time for their manifestations to materialize.

A second major difference between today's emerging user environment and yesterday's dp environment is in the type of needs users have. The end user purportedly faces a need for decision support-type systems. End-user systems are generally small, quick to construct, and easy to change.

Today's end-user systems are designed to manage the company, while yesterday's dp systems are designed to run the company. The difference is the classical one between decision-support systems and operational systems. This major difference in the functions performed by the user today and those performed by dp yesterday is relevant to the user passing through the stages of evolution.

The relevancy is complicated by the fact that at the micro level, the forces of evolution are decelerated, but at the macro level they are accelerated. For example (at the micro level), assume that there is a single user developing decision-support systems. Since the decision-support systems built by the user are not sensitive to the company's operations, there is minimal pressure to build the system quickly. For instance, suppose this year's account activity is being compared to last year's. As important as the comparison is, the company will not cease to operate if the decision-support system is not created this week. But in an operational environment the pressures for quick development are commonplace. So there will be a less sharply defined pressure for fast systems development from the perspective of a given user department, thus easing one of the pressures of evolution.

But from a macro level (given all departments building decision-support systems) the pressure to evolve into higher stages—such as data administration— will be even greater than that placed on dp. When upper management asks three or four related departments for information on which to make a decision, and three or four very disjointed answers are returned, there will be a great demand by upper management to resolve the differences between departments. This pressure for integrated decision-support systems will come very early and will force the users to evolve.

Another major difference between the user's environment of today and the dp environment of yesterday is in their orientation toward technology, i.e., how technical is the environment? The dp world of yesterday was (and still is) very technician oriented. At the heart of the dp department are operating

system technicians, network technicians, database technicians, operations technicians, and the like. Without these technicians the world of dp probably would not turn. But today's user environment is different.

Today's user's environment has been shaped by user friendliness. Even in the cases where user friendliness is more fancy than fact, there is no doubt that the current environment is much simpler, cleaner, and easier to manage then yesterday's dp environment. The move away from the technician means there are fewer obstacles between the user and the systems the user wishes to create. There is no doubt that this will greatly accelerate the user's progression through Nolan's phases.

Another major difference (in fact, probably the most profound difference) between the two environments is in budgetary control. In the old dp environment, dp bought the equipment and software and operated as a service organization. In most shops the user considered dp services and equipment to be a free resource. To this day, many users still have not made the connection between the bottom line of company profitability and the dp resources they consume.

But as control of systems is passed to the user, the responsibility for the budget is passed along as well. Most micro processors and fourth generation software is being sold to the user, not dp. At long last the dollar is coming directly out of the user's pocket. The user now makes a connection between the purchase of a pc and upgrading the carpet in the office. This budgetary shift will greatly help accelerate the user through Nolan's stages.

In the shops where dp is still paying for the user-controlled environment, there will definitely be a move toward retarding the acceleration of the phases. In fact, the dp strategy of funding a user-controlled environment is probably a very negative force for all parties concerned.

There is a final difference between the new user environment and the old dp environment, and that is the backlog of experience available. In yesterday's dp world, there simply was no previous experience on which managers, technicians, or anyone else could rely. Everything was brand new. Patterns were hard to recognize, trends were not apparent, and sound practices often could not be distinguished from unsound ones. The criteria for success were not yet recognized and the result was a very strange set of priorities in many cases.

But in today's world, for the user and dp alike, there is a basis for comparison. The experiences of the past three decades have not been lost. The availability of this backlog should only accelerate the user through the different stages of evolution. With a little luck, users will be steered away from grossly incorrect decisions, without having to learn by actually committing the mistakes first.

Today's user-friendly tools and the lessening dependence on technicians will greatly help to accelerate the user through Nolan's stages of initiation and contagion. But it is doubtful whether these advances will accelerate the user's journey through Nolan's stages of control and integration. These are primarily issues of organizational discipline, not stages that strongly relate to technology. Today's technology may bring that realization into focus much more quickly than in yesterday's dp evolution, but the fact remains that control and integration are political problems.

The issue of control is complicated by the fact that dp is usually centralized to some degree, and the different user departments are not. Control, which is difficult in any case, becomes even more difficult when systems are decentralized. To make matters worse, the decentralization of the users is along political lines, and political boundaries have traditionally been the most difficult over which to exert discipline. But there is at least one relevant change—the user can no longer blame dp for not producing systems. When upper management begins to address the problems of control and integration among several end-user departments, those end users will no longer be able to point to dp as the culprit.

The speed at which the user goes through Nolan's stages of evolution is also affected by how far the dp department has evolved. If dp is still evolving into the early days of control, then it is unlikely the end user can evolve any further than dp. (In this case, dp may well be the culprit holding up the end user's evolution.) The nature of the end user system is decision support, and those systems normally depend on operational data. If the operational data is uncontrolled and unintegrated, then the end user may have a very shaky foundation on which to operate. In such situations, the end user may well be a significant factor in causing the evolution of dp. Most dp shops, however, should have evolved beyond these early stages.

Today's dp shop will not cease to exist nor cease to evolve. In fact, the need for dp services will continue to increase. But dp will be doing primarily operational activities. The line between operational and dss systems will become clearly delineated over time—dp manages the operational aspects of the business and the end user manages the decision-support activities. The departure of decision-support systems from dp's domain will cause but a momentary relaxation of the evolutionary forces at work in the dp environment.

A second issue arises concerning the shift of budget control from the dp department to the user department. It is natural for users to assume responsibility of the budget as they take control. But if dp is still saddled with buying the user's hardware and software while the user controls the environment, dp will be placed in an even more untenable position than it was before. For the user to mature, there must be a realization that services and equipment have a price tag attached. As long as dp is paying that price the user will not make the connection.

A third issue arises when the end user attempts to use fourth generation tools to build operational systems. In every case the result has been an unparalleled spiraling of hardware costs. When users try to build operational systems with inappropriate tools, the associated hardware costs very quickly cause them to change their focus on the type of system being built.

An interesting question is whether the stages of evolution appropriate to dp are also appropriate to the end user. If the end user were literally creating a new dp department, then Nolan's stages probably are appropriate. But the very nature of what the end user is doing is different from what dp does. So it is entirely possible that the end user will go through a somewhat modified set of stages. Today, users are experiencing the initiation and contagion stages, and they're making rapid progress. But at the control stage, users will most likely have different experiences than dp did. And, as the user approaches the stages of integration and data administration, it is highly likely that those stages, too, will differ significantly from those experienced by dp.

A final issue raised by the user entering Nolan's stages of evolution concerns the nature of the evolution itself. Is the end-user evolution necessary? Can the end user leapfrog from one stage to another? Is the evolution simply a change in control within the organization or is it symptomatic of a more profound change? Does the end-user evolution herald a clear delineation in the roles of dp and the user? Will all users experience the evolution? What lies beyond maturity? How will the dp and end-user evolutions affect each other? Here the questions can merely be raised, because only time can determine the answers.

—W. H. Inmon
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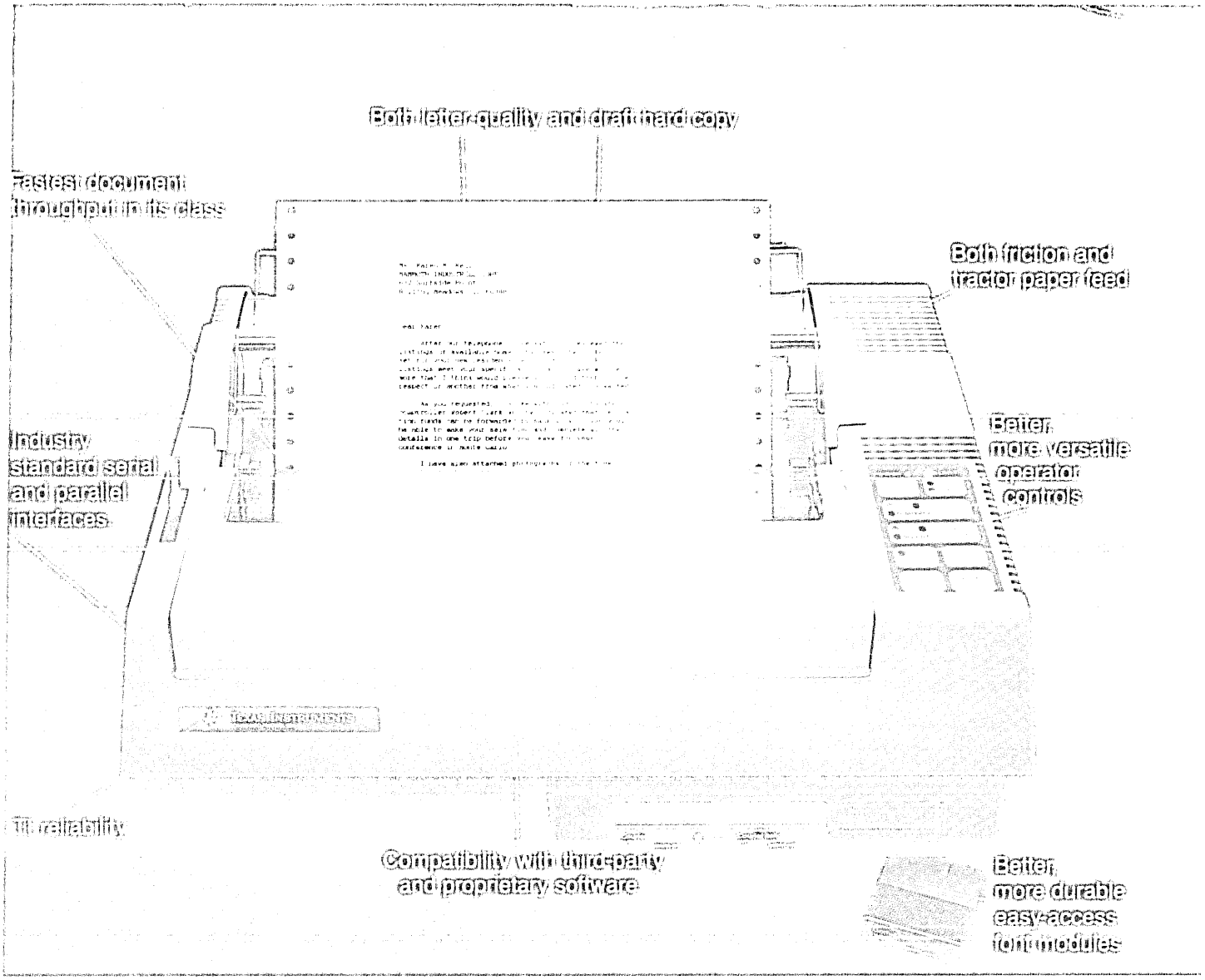

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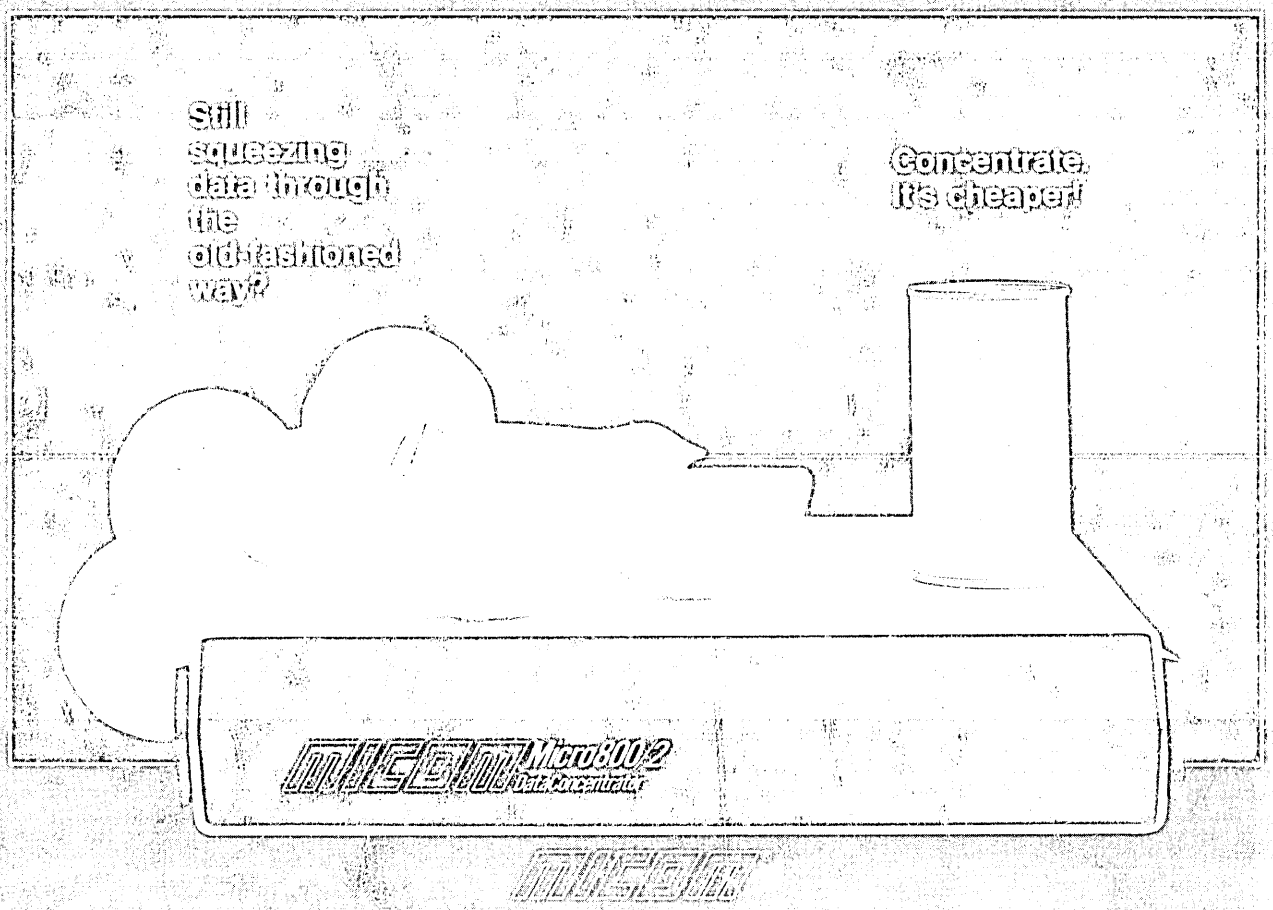

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