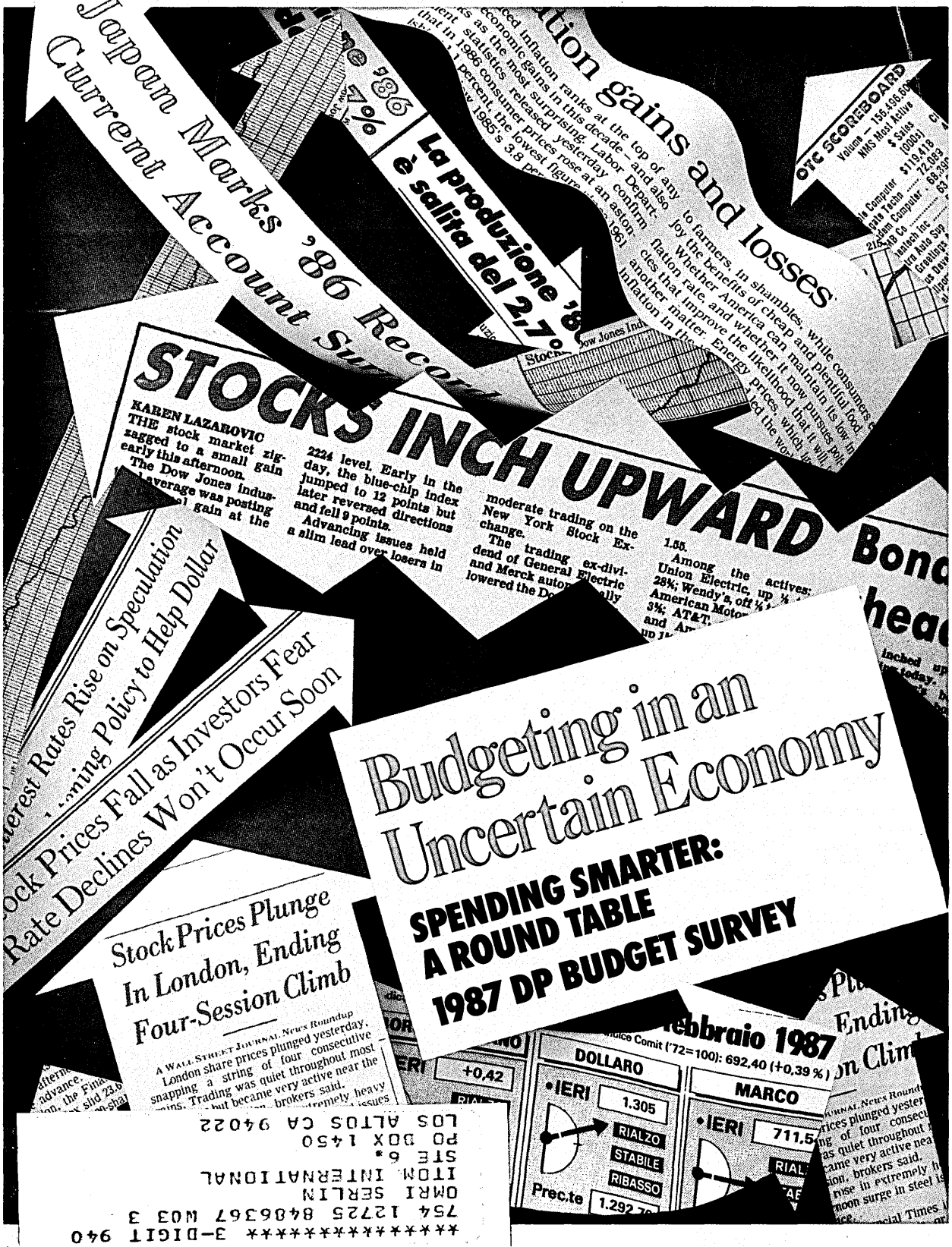
DATAMATION®

APRIL 1, 1987
A CAHNERS PUBLICATION
INTERNATIONAL EDITION



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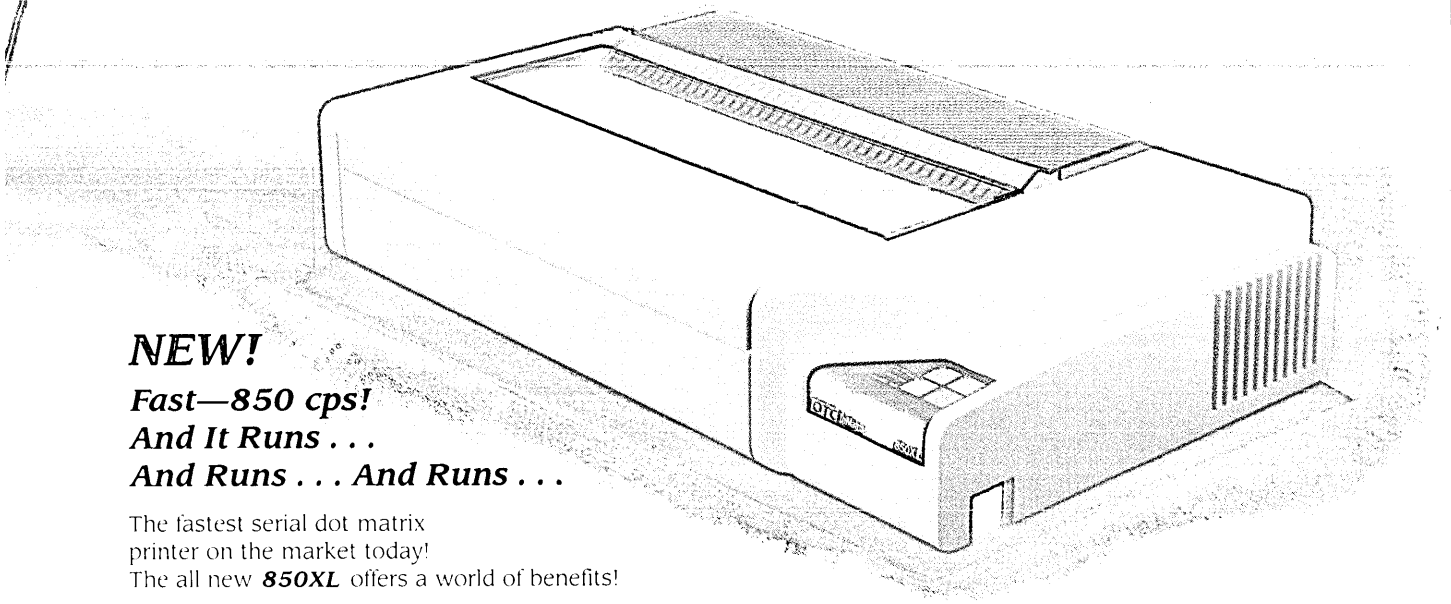

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Fast—850 cps!
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The fastest serial dot matrix printer on the market today!
The all new ***850XL*** offers a world of benefits!

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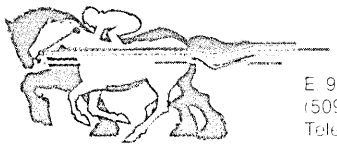

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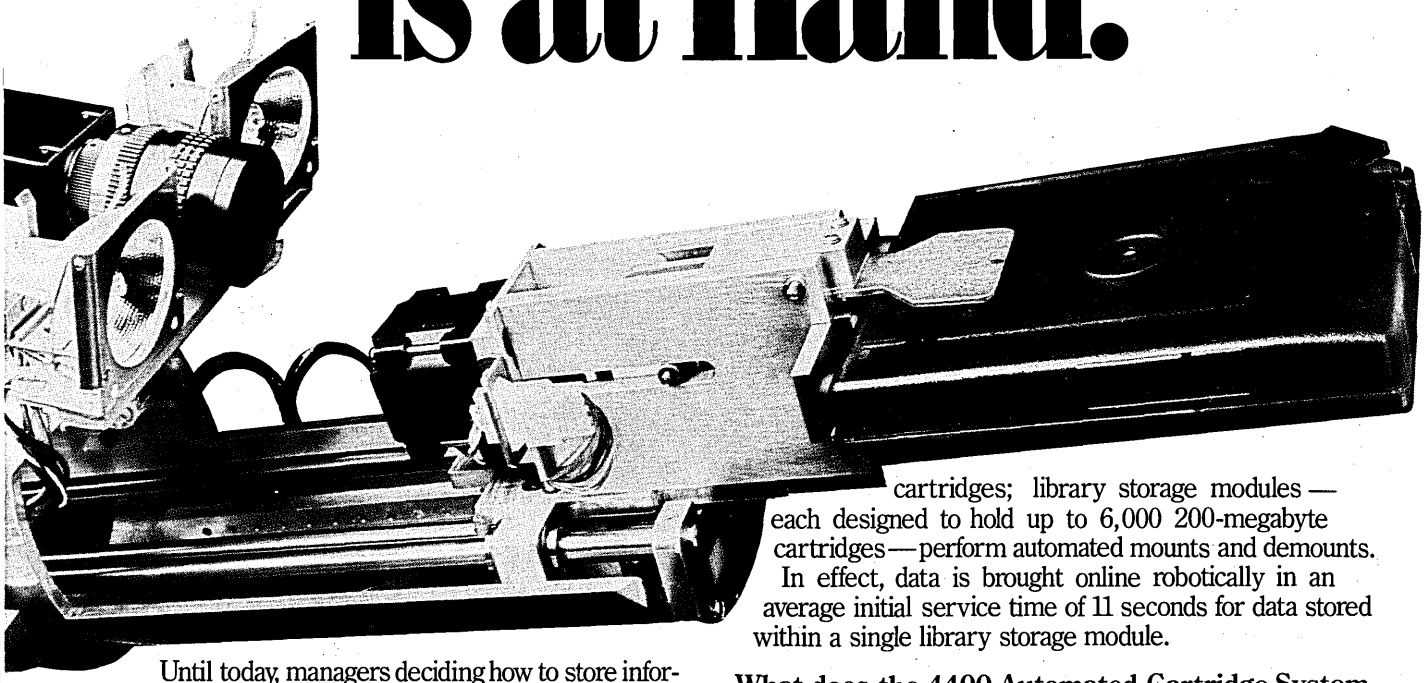
CIRCLE 1 ON READER CARD

Introducing Nearline™...freedom of choice for MVS/XA users.

The Future is at Hand.



Until today, managers deciding how to store information faced uncomfortable compromise rather than real choice. Online storage was fast but relatively expensive. Offline storage was less expensive — but hindered in speed and consistency by such factors as how long it took to locate a reel or schedule a tape mount.

Those, however, were the choices: either performance or economy...online or offline...black or white.

Today there is a new choice — the first true choice — in storing data not only to meet the demands of current applications, but to create new opportunities for applications that were impossible or impractical before. It's not exactly online...it's not offline...it's Nearline.™

Introducing the 4400 Automated Cartridge System...and Nearline.™

The 4400 Automated Cartridge System is a fully-automated, cartridge-based, information storage and retrieval system. The system's control units and transports read and write industry-standard 18-track cartridges; library storage modules — each designed to hold up to 6,000 200-megabyte cartridges — perform automated mounts and demounts. In effect, data is brought online robotically in an average initial service time of 11 seconds for data stored within a single library storage module.

What does the 4400 Automated Cartridge System mean to the future of information management?

It means you can automate your current manual tape operations and dramatically improve performance, costs and floorspace efficiency. It means you can move critical data from expensive online devices and achieve an unprecedented cost breakthrough of about $.50 (U.S.) per megabyte purchased.

It means that a real and strategic architecture is finally available for controlling the growth of DASD.

It means that huge, data-intensive applications (such as CAD/CAM and complete history files) requiring cost efficiencies not possible online...and fast, consistent performance not possible offline...will now find an active place in serving and supporting user needs.

Nearline:™ the 4400 Automated Cartridge System. It means freedom of choice for information management...and a strategic storage solution that puts the future in hand.

StorageTek®

Storage Technology. It's More Than Our Name...It's Our Commitment.

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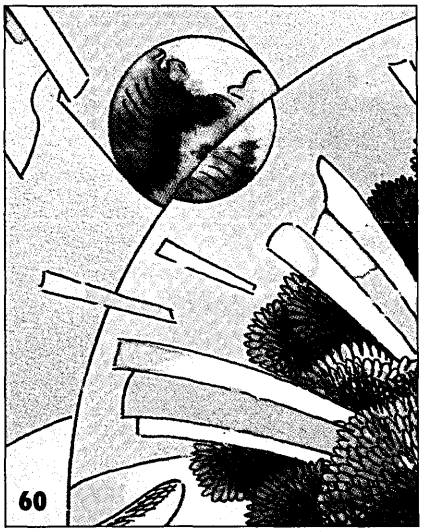
CIRCLE 4 ON READER CARD

DATAMATION

NEWS

FEATURES



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REAL TIME

INTERNATIONAL 64-1

Does not appear in all copies

3-D cover illustration by Ajin

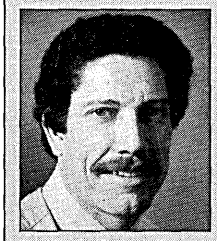
INTERNATIONAL EDITION

APRIL 1, 1987
VOLUME 33
NUMBER 7
THIS ISSUE, 195,090

1987 JESSE H. NEAL AWARD

Editorial

DATAMATION Team Honored

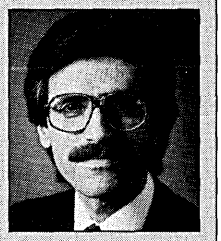

David R. Brousell


Ralph Emmett Carlyle


Karen Gullo


Parker Hodges


Willie Schatz


Kenneth Surabian

On March 18, six DATAMATION staffers received the ultimate award in the business publishing field. Managing editor Parker Hodges, news editor David R. Brousell, associate news editor Karen Gullo, senior writer Ralph Emmett Carlyle, Washington bureau manager Willie Schatz, and art director Kenneth Surabian were each presented with the 1987 Jesse H. Neal Editorial Achievement Award by the Association of Business Publishers.

DATAMATION's team was selected as number one in the hotly contested category of Best Department, Section, or Column for its outstanding work on the magazine's Behind the News section. We have always been very proud of the section and all the contributors to it. We are especially proud that the board of judges has recognized, as you have, the value of the Behind the News section.

Its selection further proves the global importance of information processing and its continuing impact on virtually every aspect of society. A small sampling of stories appearing in Behind the News during the award period (November 1985 through October 1986) covers computers as a target of international terrorism; computer and communications research funds for the Strategic Defense Initiative; mergers' effects on users and suppliers; computers in the Bhopal tragedy; and what MBAs are taught about information processing.

We are honored by our award-winning journalists and art director and honored too that you continue to demand the excellence that sets our goals at the pinnacle of our profession. ■

GEORGE DAVIS
EDITOR-IN-CHIEF

DATAMATION

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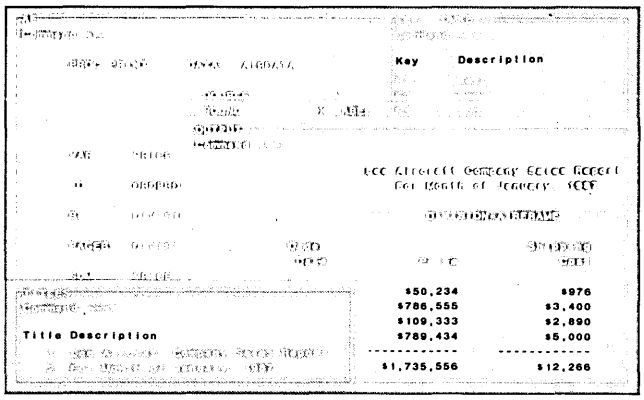
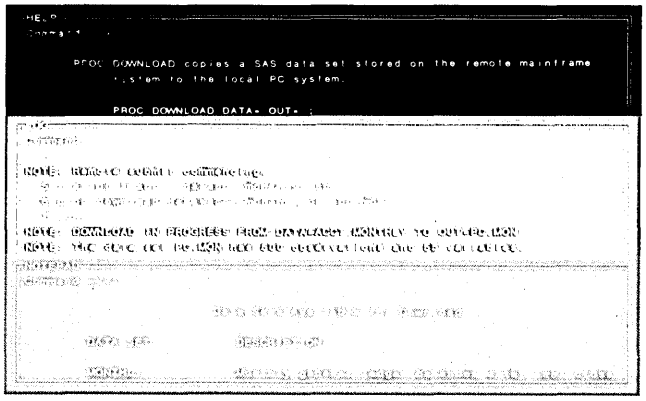
Power Behind Every Window.

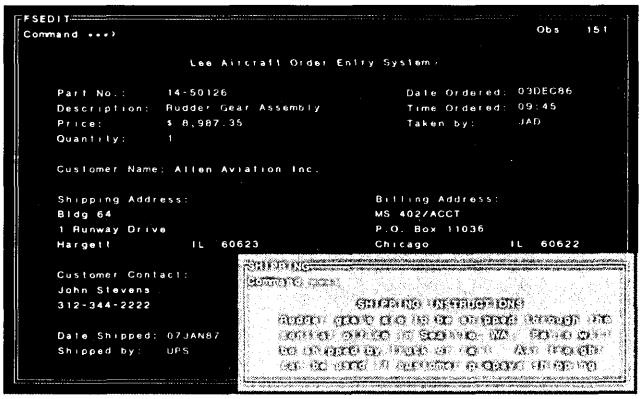
If you've been "window shopping" for software that's both powerful and easy to use, take a look at the SAS® System for Personal Computers. It's got everything you're looking for...and more.



1 Ease of use. The SAS System has ready-to-use procedures for every kind of analysis and report—from simple to advanced, preformatted to customized. A built-in menu system and on-line help guide you through the procedures. Special windows let you define titles and footnotes for reports, check the characteristics of your data, change function key definitions, and keep notes.



2 Connectivity. With the SAS System for personal computers, you get a built-in link to your host SAS System. You can download corporate data; develop, test, and run applications on your PC; or move data and applications back to the host for execution. Plus the SAS System reads data from any kind of file, including dBASEII,® dBASEIII,® and Lotus® 1-2-3.®



3 Integration. The SAS System runs on mainframes, minicomputers, and personal computers so you only have to learn one software system no matter what hardware your company has installed. And as your needs grow, the SAS System grows with you. We're committed to supporting all the capabilities of our mainframe software system for your PC. Whether you license one product or several, you'll enjoy the same high-quality software, training, documentation, and support we've offered for 10 years. It's all part of our site licensing plan.

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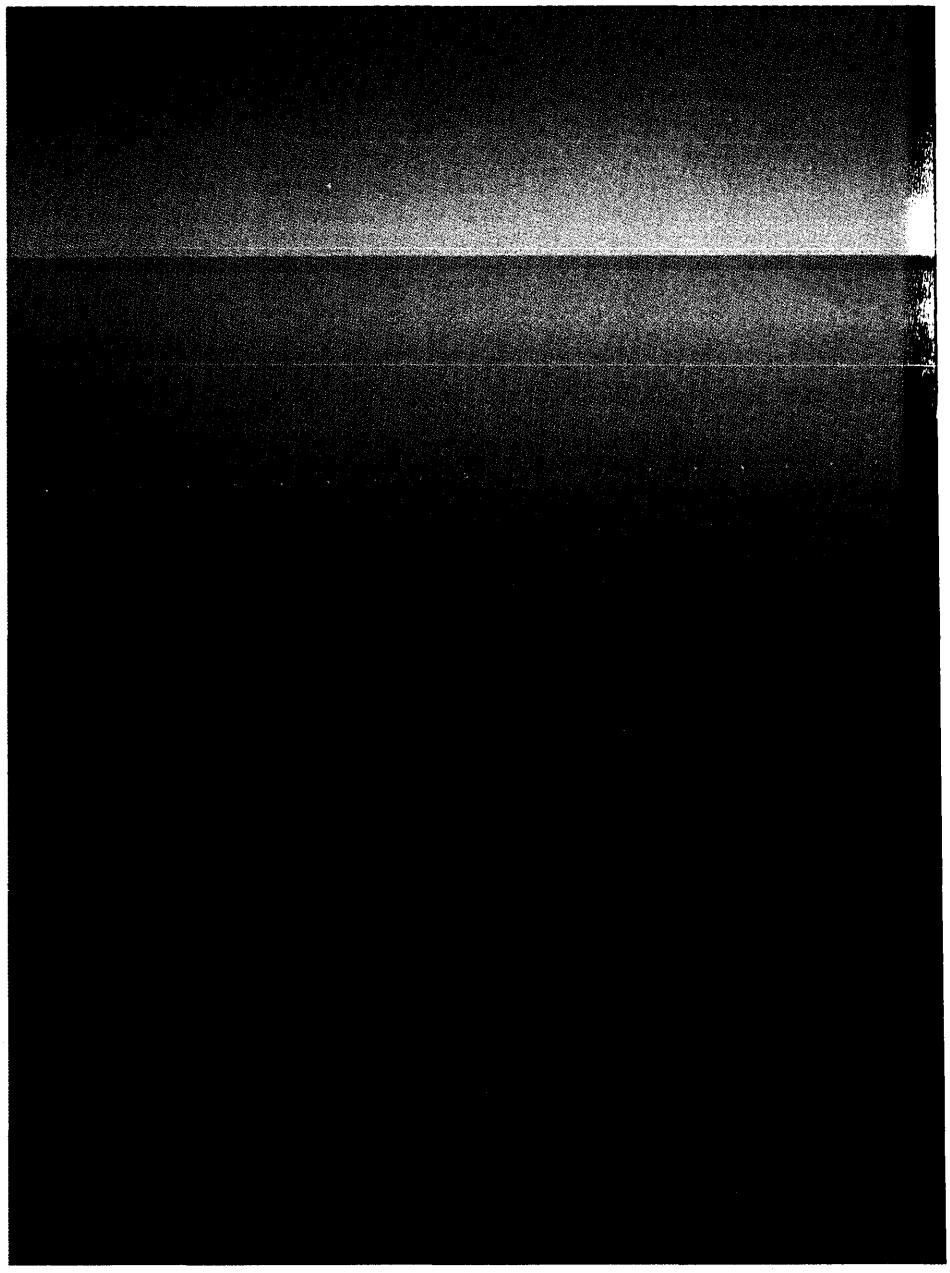
SAS Institute Inc.
Box 8000 ☐ SAS Circle
Cary, NC 27511-8000
Phone (919) 467-8000
Fax (919) 469-3737

The SAS System runs on the IBM PC XT and AT, IBM 370/30xx/43xx and compatible machines, Digital Equipment Corporation's VAX™ and MicroVAX II,™ Data General Corporation's ECLIPSE® MV series, and Prime Computer, Inc.'s 50 series. Not all products are available for all operating systems.

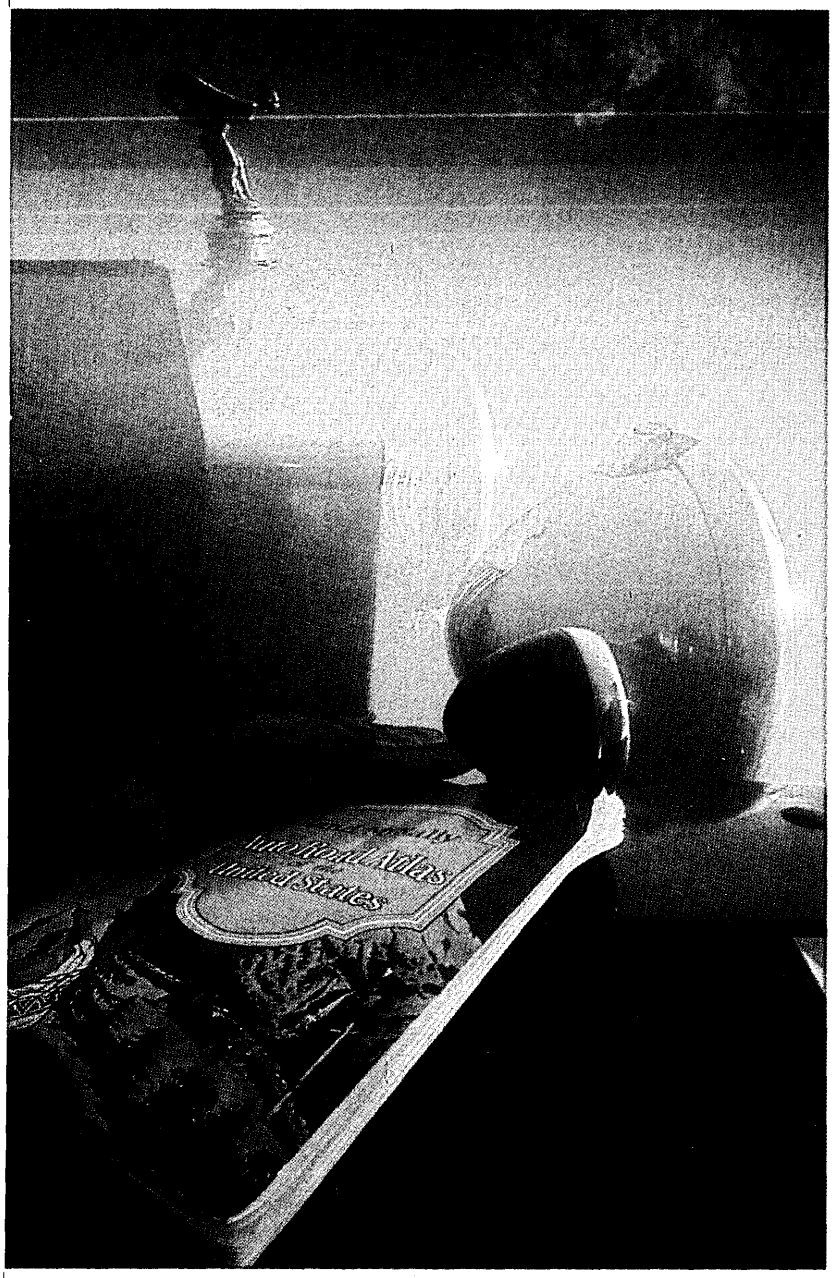
ACCESS
RAND Mc

"We were looking for an information technology that would show us the short cuts. We found it with Cullinet's relational database – IDMS/R. I'm pleased to report that the system has made *all* of our various businesses much more cost-effective operations."

Andrew V. McNally IV
President
Rand McNally & Company



IDMS/R. NALLY DID.



Mapmaker. Book publisher. Printer. Manufacturer. Market Researcher. Rand McNally is all of them. And to succeed as a major diversified corporation, they had to map out an information management strategy that would work both today and down the road.

That's why Rand McNally turned to Cullinet's IDMS/R. Its state-of-the-art, relational architecture allows them to maintain enormous databases. IDMS/R provides an integrated base supporting Cullinet's broad application software – including inventory control, bill of materials, credit and order entry. They have already developed their own custom applications through ADS/OnLine, Cullinet's unique fourth generation programming language.

Cullinet's solution is based on an integrated technology that performs. So companies like Rand McNally can simultaneously check inventory levels, confirm pricing and verify credit history – instantly. It's an information management system that'll keep users on strategy, keep them headed in the right direction.

For more information on how your company can access Cullinet through IDMS/R, call toll-free 1-800-551-4555. In Massachusetts, call 617-329-7700. Or write to Cullinet Software, Inc., 400 Blue Hill Drive, Westwood, MA 02090-2198.

Cullinet

An Information Technology Integrator
For The 80s, 90s And Beyond.

CIRCLE 7 ON READER CARD

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LEASING OPTIONS AVAILABL

TWICE THE POWER PROTECTION. HALF THE SPACE. ONLY FROM EXIDE ELECTRONICS!

Up to 125 kVA in a UPS just six feet tall and about six feet wide. Including the battery! (That's double the capacity and one-half the size of our previous 100 kw UPS.) And best of all, Exide Electronics has it for you today.

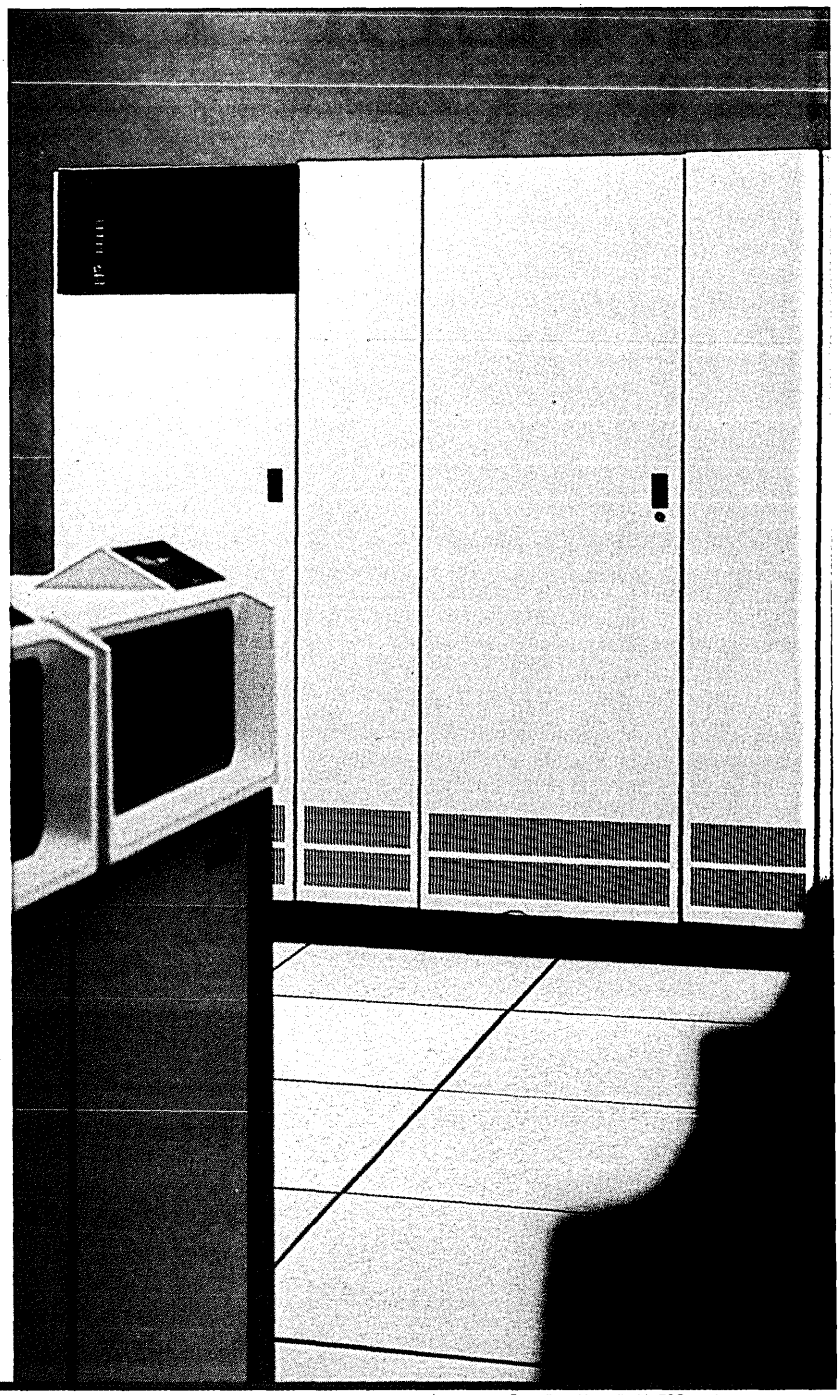
The Exide Electronics Series 6000 uses power transistors and pulse-width modulation to increase capacity, reliability, and efficiency. In fact, it has the most power in the smallest package of any computer room UPS available.

But a lot of power in a small package isn't all the Series 6000 has going for it. Its quiet, automatic operation. Its sealed, maintenance-free batteries in a wide selection of sizes. And the fact that it's UL listed. These are all good reasons to depend on Exide Electronics' Series 6000.

The best reason, however, is that it is from Exide Electronics. We've spent more than twenty years building UPS's and earning a reputation for quality products and power protection leadership.

We're committed to making sure that our products are exactly what we say they are. *Uninterruptible Power Supplies.*

If you want a UPS you can really depend on, buy it from the company you can really depend on. Exide Electronics. Call us today at 1/800/554-3448. In North Carolina, call 1/800/554-3449.



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UL®

CIRCLE 8 ON READER CARD

Look Ahead

MORE WORK ON SPECTRUM

PALO ALTO -- Hewlett-Packard sources maintain that the company is still experiencing considerable difficulty in solving problems with Spectrum's operating system, and as yet is unable to achieve any significant performance boost over the 3000 Series 70 with the entry-level 930 RISC-based Spectrum system. An HP spokesman claims the Spectrum shipment schedule is still on track. But while he says, "We are on schedule with the operating system release," he notes that "some algorithms are being reworked. This is a fairly normal procedure. At first release it isn't going to be everything we want it to be. . . we don't want to minimize the amount of work still to be done."

ORPHANS OF THE PCM STORM

MANNHEIM, WEST GERMANY -- Where do 230 of West Germany's largest mainframe users go from here? When BASF and Siemens set up their pcm joint venture Comparex, it was supposed to take over sales of Siemens' Fujitsu-built machines and BASF's Hitachi systems. But because of the IBM-Fujitsu copyright clash and the need for Comparex to unify its cpu product line, the new company has decided not to offer any Fujitsu machines for this year at least (Siemens will continue to sell Fujitsu hardware to its BS2000 users). That still leaves 230 of Comparex's 650 mainframe users with a big problem. These are the users running MVS and the Fujitsu MSP OS on their Fujitsu machines. They can either continue with Fujitsu by upgrading or switching to Amdahl, or switch to Hitachi machines, which will result in NAS, IBM, and Comparex sales staff beating down their doors. Whatever their choice, the three-month-old Comparex is already sitting on a time bomb.

SIEMENS SLAM DUNKED...

PADERBORN, WEST GERMANY -- Nixdorf has just routed its archrival Siemens in a $165 million contract victory with the West German Bundesanstalt Fur Arbeit (Department of Unemployment) for 100 of its large Targon 32 Unix processors. Two key factors in the decision were the new Nixdorf Reflex RDBMS and Unix.

...AS NIXDORF EYES THE U.S.

HANNOVER, WEST GERMANY -- Speaking of relational DBMSs, a very well placed Nixdorf source whispered in our ear at the recent trade fair here that it is in talks with "major" American DBMS vendors to distribute Reflex in the American market. This source's lips clamped when we inquired about identities, but reopened to say an announcement soon will be forthcoming. So far, we know it's not Cullinet or ADR. Anybody want to place some bets? Reflex is now running on Nixdorf's IBM 4300-compatible 8890 mainframe and is ex-

pected to be available by late this summer. Reflex runs under DOS, VM, and Nixdorf's DIPOS, and is targeted on Unix. Versions for MVS and VMS are under way.

JUST CAN'T GET ENOUGH

NATICK, MASS. -- Less than two weeks after its first Unix workstation entry, Prime Computer Inc. this month will answer demands for more MIPS in its 50 Series with a high-end uniprocessor rated at between 7MIPS and 8MIPS. Under development for some time, the system serves to leapfrog DEC's VAX 8700 in the MIPS race. It also is expected to provide the platform for a future dual-processor version to be released late this year.

MAYBE NOT SO SUPER AFTER ALL

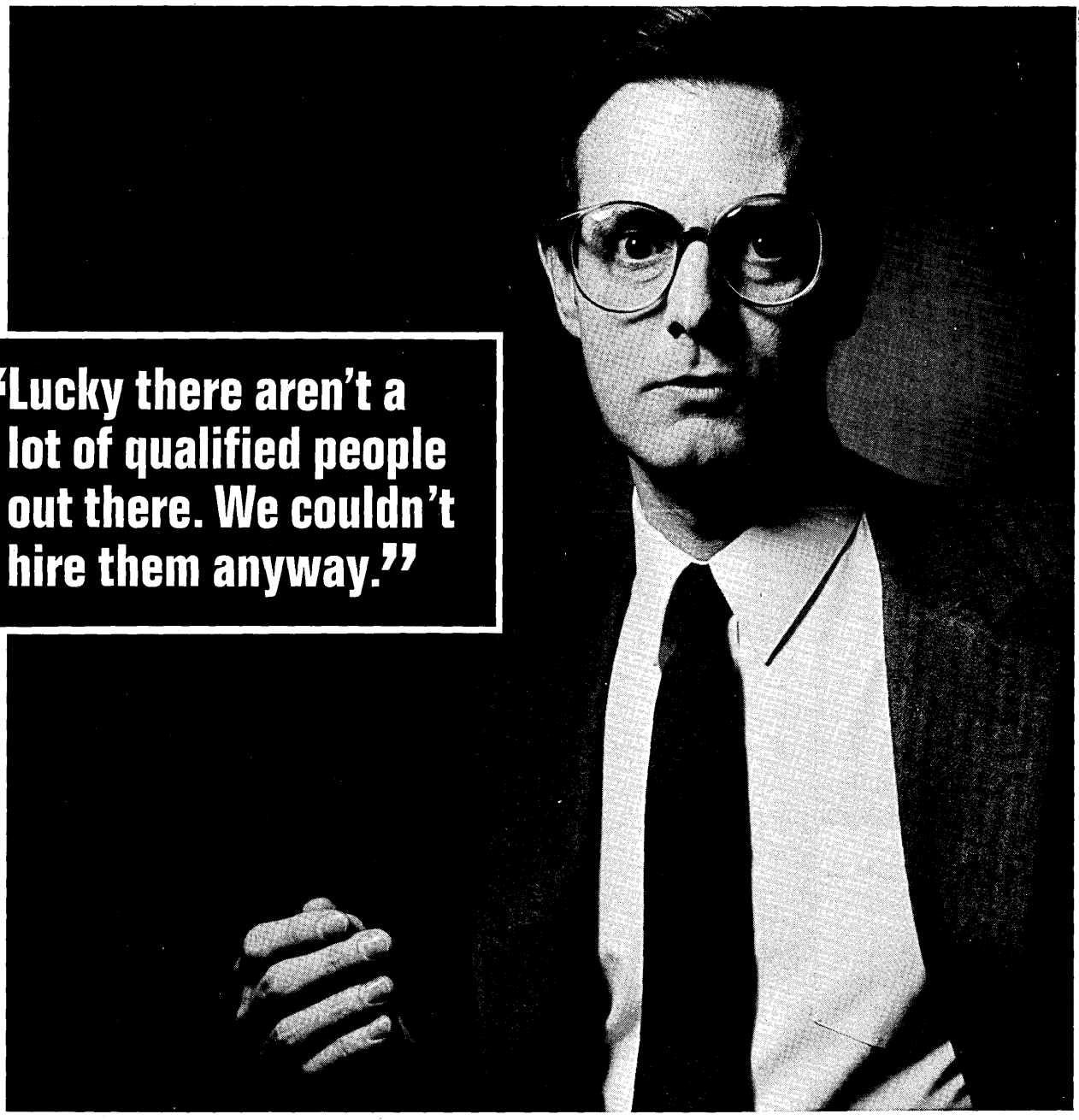
MINNEAPOLIS -- Whither ETA Systems? A company spokesperson denied a report in the Minneapolis Star and Tribune that the supercomputer maker is soon to be absorbed into Control Data Corp., instead of being operated as an independent subsidiary. ETA--89% of which is now owned by CDC--is said to be readying a layoff. Company officials decline to specify the amount. Meanwhile, analysts say the ETA-10 is behind schedule and the market window is "closing rapidly."

KEEP YOUR FINGERS CROSSED

ROME -- The future of the world-renowned International Bureau of Informatics (IBI) will be decided over the next few weeks following the forced resignation in February of its longtime director general Fermin A. Bernasconi and the resulting suspension of operations. Even though the member countries reelected Burnasconi by a massive majority last September, the IBI's main sponsors--Spain and Italy, which provide 40% of the funding--wanted him out and threatened to withdraw their support. The two sponsors are rumored to have objected to Bernasconi's attempts to foster regional groups among the developing nations, which could then negotiate for better deals.

NAS ON THE MOVE

MOUNTAIN VIEW, CALIF. -- Pcm vendor National Advanced Systems is planning this summer to add to its Hitachi-manufactured mainframe lineup three midrange systems to compete with the low end of IBM's 3090 line, the 4381, and the anticipated high-end extensions to the 9370 line. The NAS additions will consist of a dual-processor system with about 15% more performance than the 3090 Model 150E and a pair of uniprocessors. The new systems would replace the upper end of NAS's 8000 mainframe line and, like the 8000, would not be upgradable to the high-end AS/XL series. Olivetti and BASF also are expected to sell the mid-range systems.



"Lucky there aren't a lot of qualified people out there. We couldn't hire them anyway."

Double-digit budget increases are gone. And with them the options of hiring new people or installing a new "box" to meet growing information needs. Today's MIS Directors are challenged to get the most from the people and the computers they have.

And some are. Like the MIS Directors at McGraw-Hill, Inc., The Southland Corp., the Fremont Indemnity Company and the thousands of others who have learned how to unlock the potential with ADR® Performance Software.

Fremont Indemnity has a DP staff with only 13 development people. Yet they're able to support more than 600 users as well as a database of over 50 million records that grows by more than 10 million records each year. They've dramatically increased the effectiveness of their DP staff by installing ADR/DATACOM/DB®, our high performance relational DBMS.

ADR also has the people to help you get the most from your computers. From pre-installation consulting to training to a worldwide support network that solves most problems in less than 15 minutes.

ADR can unlock the potential of your people by unlocking the potential hidden in your computers. To learn how, call 1-800-ADR-WARE.

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CIRCLE 9 ON READER CARD

Look Ahead

TO OEM OR NOT TO OEM?

HANNOVER, WEST GERMANY -- That is the question facing the folks at Siemens over a new line of Intel chip-based machines due soon from Sequent Computer Systems, Beaverton, Ore. You'll remember, no doubt, the $50 million deal Siemens signed with Sequent last year for parallel processing systems. Siemens now sells the Sequent machine, which uses National Semi chips, as its MX 500. But Siemens insiders tell us the company is still trying to decide whether to take the Intel-based line. The worry: switching to a system with a different processor might disturb customers. Siemens also confides that it is watching the market acceptance of the National chip technology itself, and that if National weakens, Siemens might move elsewhere.

SOFTWARE AG READIES NATURAL 2

RESTON, VA. -- Software AG was expected this week to announce what it heralds as a "major" new version of its Natural fourth generation language. Called Natural 2, the new version will have much new functionality, including structured mode programming; new screen handlers, including pop-up windows; full floating point arithmetic; array handling to manipulate occurences within a statement; modular code; and facilities to make prototyping easy, insiders say. AG is also preparing about 10 other product intros this year as well as a new pricing scheme for all products.

THATSA SOME SPICY COMBO

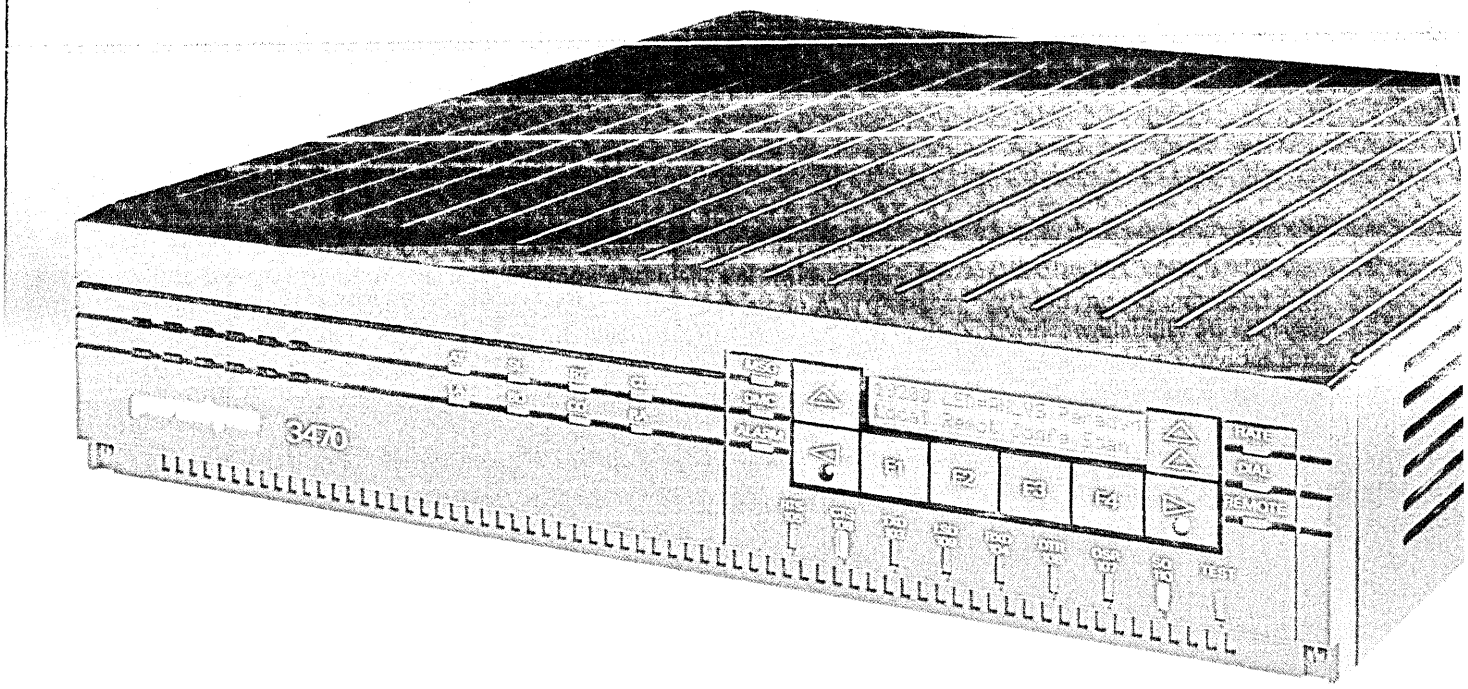
IVREA, ITALY -- Europe's CD-ROM market will get a new player next month when Olivetti opens a joint-venture company with Microsoft and Societa Elenchi Ufficiali Abbonati Al Telefono (SEAT). Rome-based Eikon Corp. will develop and market optical media software applications and complete storage systems based on technology licensed from Microsoft. It will also distribute the U.S. company's CD-ROM products.

RUMORS AND RAW RANDOM DATA

Europe's leading software services group, Cap Gemini Sogeti (CGS), is in an acquisitive mood. Not satisfied with a string of recent takeovers in continental Europe and the U.S., it has set its sights on the U.K. . . . The Arab Industrial Investment Co., Baghdad, Iraq, a venture capital group backed by many Arab countries, is considering setting up two plants to build digital telephone exchanges for the Arab market. Preferred locations are in Egypt and Algeria, and preferred technology partners are AT&T/Philips, the new Alcatel group, and Sweden's Ericsson. . . . Tolerant Systems Inc., San Jose, is said to be hammering out an agreement for Daecom to resell in Korea the Tolerant Unix-based system.

Now, the best 19.2 modem, backed by the best service, brings you the best results.

Guaranteed!



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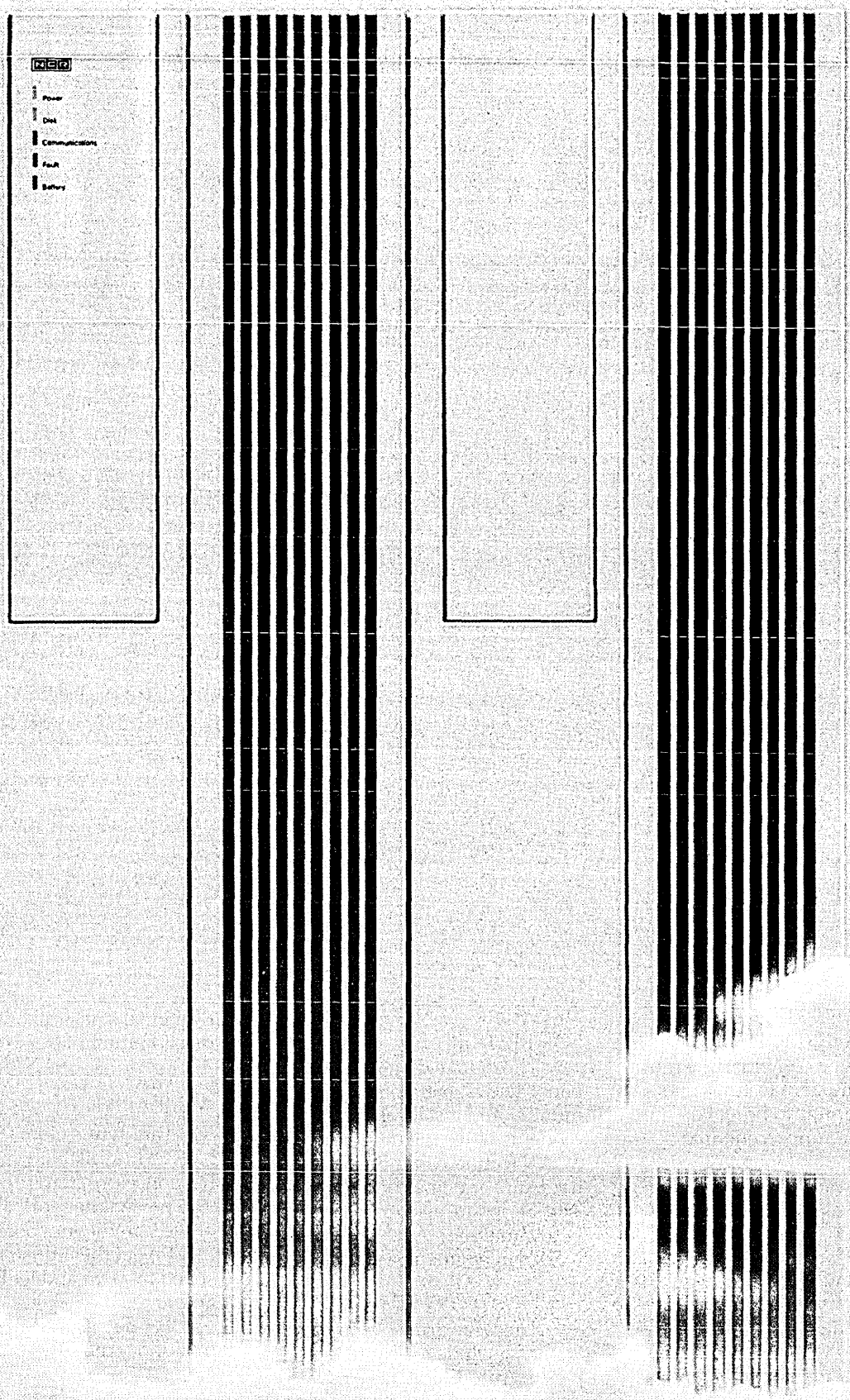

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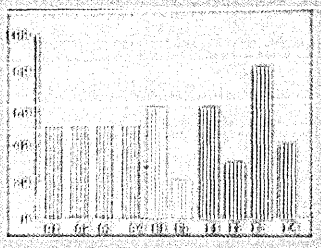

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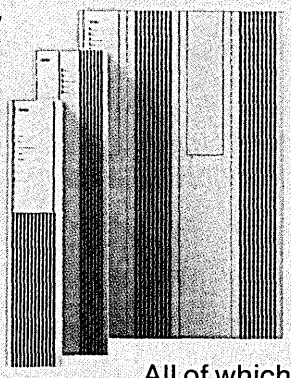

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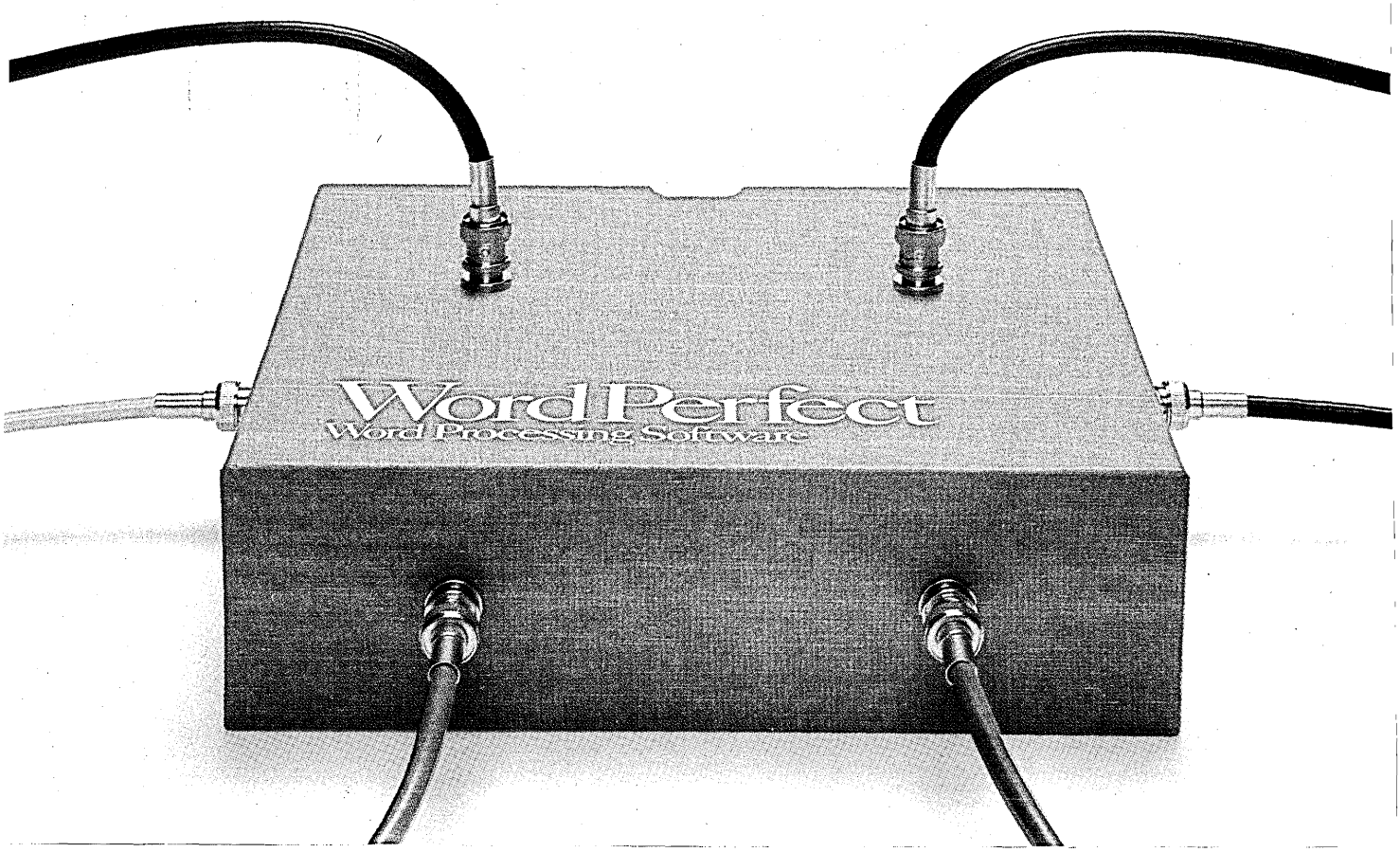


News in Perspective

STORAGE

IBM's Pirouette on a DASD Bottleneck

A bigger strategic loss than gain may explain why Big Blue hasn't yet upgraded 3380 data transfer rates.

BY JEFF MOAD

What are mainframe users supposed to think?

First there was agreement among many analysts and other professional IBM prognosticators toward the end of 1986 that, in addition to boosting 3090 performance in the first quarter of this year, the company would add new large disk storage capacity and performance features in an attempt to boost flagging peripherals revenues and provide much-needed differentiation between the 3090 and the older 308X mainframe line.

In January, however, when IBM improved 3090 price/performance, those expected new 3380 disk storage features were nowhere to be found. While IBM did increase the maximum amount of expanded storage under the 3090's covers to over a gigabyte and did boost the number of channels to 128, the company did not comply with the widespread expectation that it would also announce a new disk controller supporting up to twice the current 3MB per channel data transfer rate. Nor did IBM unveil a new disk storage device capable of supporting a higher data transfer rate and a 7.5GB capacity, three times the capacity of the original, five-year-old 3380.

Now, many of those same analysts are boldly predicting IBM won't make the much-heralded 3380 capacity and performance upgrades until late this year and may not ship them until the first quarter of 1988.

IBM won't say if or when it will make the upgrades. A company spokesperson simply says, "IBM recognizes many users want higher-capacity DASD and higher performance. They also want lower costs per MB and devices that require less floor space." Period.

If analysts' predictions for the revised schedule are correct, it may prove comforting to IBM's pcm competitors and to those customers who made recent decisions to buy double-capacity 3380E model storage devices, but it is frustrating to some very large IBM customers anxious for a solution to what they see as a current 3MBps data transfer rate bottleneck.

The Number One Problem

"Frankly, it [the 3MB data transfer rate] is the biggest single bottleneck we face," says the chief information officer of a large commercial bank who asked not to be identified. "Getting enough disk storage through a channel to respond to all our I/O demands is the number one problem in all our IBM configurations. Putting more data under a head won't solve the problem, and adding channels won't really solve it. We need a faster channel."

Regardless of the calls for faster channels from large users with I/O-intensive applications, most observers now feel that IBM has more to lose than gain by introducing new products right now. First and most important, new DASD products would threaten demand for IBM's 5GB 3380E model drive. A year and a half after it started shipping, the double-capacity E model only now seems to be overcoming initial slow acceptance from users who were reluctant to buy a drive that doubled the amount of data under an actuator without also improving performance.

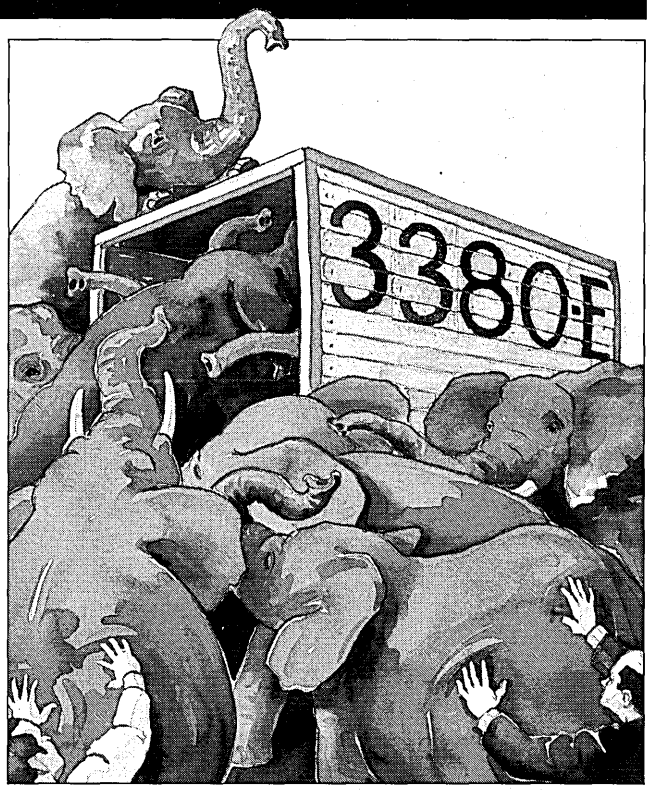


Illustration by Doris Ettlinger

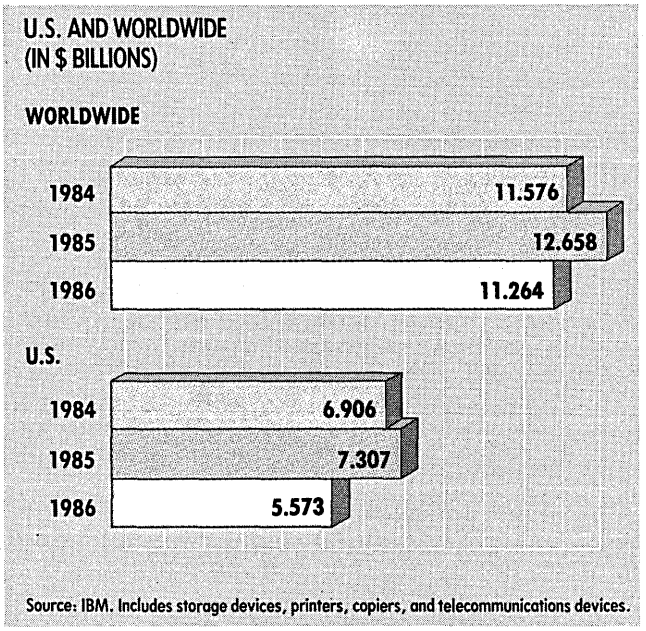
While a DATAMATION/Cowen & Co. study reported that about 41% of users planned to add IBM-compatible storage going into 1986 compared to about 38% the year before, by the end of 1986, widespread estimates had IBM shipping only 40,000 of the 3380-class drives in 1986 compared with about 45,000 in 1985. And IBM's overall peripherals revenues reflected the sluggish 3380 demand, dropping 24% in the U.S. and 11% worldwide from 1985 levels.

"WE NEED A FASTER CHANNEL."

In recent months, IBM has attempted to stimulate migration to the 3380E and to remove some poorly performing original single-capacity drives from the field by offering a $16,000 trade-in for the older models. Analysts say 3380E demand seems to be picking up, although users report that IBM is able to ship new 3380E units almost immediately, indicating a ready, warehoused supply of 3380E units at IBM. The company is unlikely to introduce new DASD products if it has large quantities of the current models still on hand.

"If IBM has a good first half, they will start thinking about a new disk," theorizes Dave Valente, who follows the market for International Data Corp., "but until then, the demand situation doesn't

IBM Peripherals Gross Income



Source: IBM. Includes storage devices, printers, copiers, and telecommunications devices.

seem to require it, and IBM's financial people won't permit it."

So why doesn't IBM just introduce a higher-performance channel that supports the current 3380E model drive? There are a couple of problems with that, observers say. First, IBM would most likely have to increase the bit density of the current 3380 drives to support the faster channel, so users would still face a conversion, and IBM would again be risking the chance that users would resist a migration to the new technology.

Helping Its Competitors

Moreover, by introducing a faster channel that supports the existing storage device, IBM would probably help its plug-compatible competitors more than itself. All four of IBM's pcm DASD competitors currently market semiconductor-based electronic direct access storage devices that would automatically gain up to 35% in performance if IBM increased channel speed from 3MBps to 4.5MBps.

Two pcm vendors, Amdahl of Sunnyvale, Calif., and National Advanced Systems of Mountain View, Calif., already have announced plans to support faster data transfer rates from their cpus to their electronic direct access storage devices in a bid to leapfrog IBM and make gains against Storage Technology Corp., Louisville, Colo., which still controls over 80% of the market for such compatible devices. Amdahl is scheduled to ship 4.5MBps support for its semiconductor disk this quarter, while NAS, also this quarter, will support a 6MBps channel to its 7900 semiconductor disk. Both Amdahl and NAS have announced plans to support expanded storage options on their processors.

Without a similar electronic direct access storage device or a higher-performance disk storage device, observers say, IBM users would realize only a 5% to 9% performance boost from controller cache memory by going to a 4.5MBps channel. Most users say that wouldn't interest them much.

"The transfer rate can be a problem, but if we're talking about an improvement on the order of 5%, that's not going to help much," says Dave Heffler, senior vice president and dp consultant for Los Angeles-based Security Pacific National Bank.

Heffler and other users say that in recent months IBM representatives have been attempting to focus user attention on other ways to improve access to stored data, such as expanded storage and IBM's DS/HSF hierarchical storage management systems software. Security Pacific recently increased expanded storage on some of its 3090 mainframes to 256MB from 128MB. Another large user, Tulsa, Okla.-based Amoco Corp., also has received some relief from the current data transfer rate bottleneck by using extended storage, cached controllers, and DS/HSF, according to computer center manager Bill Kelly. "We're not focusing so much on data transfer rate as on overall capacity performance. We've installed DS/HSF and gone to the 3480 tape drives, which are the cornerstone of the system. Actually, faster data transfer rate for the tape drive may be more important than it is for the disk."

"AN IMPROVEMENT OF 5% IS NOT GOING TO HELP MUCH."

Still, Kelly and other users don't completely discount the possibility that IBM will go ahead and announce higher-capacity and higher-performance DASD also.

Competitors Not Far Behind

If and when IBM does upgrade its 3380 disk and controller, the two Japanese-backed pcm vendors may be in the best position to respond. Amdahl's Fujitsu-built 6380E drive, unlike its competitors', uses sealed 10½-inch thin film platters, which should make it easier for the company to increase track and bit densities without sacrificing reliability. NAS has access to drives made by Hitachi Ltd. that also feature sealed media, but use 8.8-inch platters and thin film heads. Using those drives—currently produced by Hitachi for oem customers—NAS could provide 10GB of storage, and a faster data transfer rate in less space than the 3380. While IBM also is expected to go to smaller, sealed disk-based drives eventually, most observers do not expect the company to do so until 1989.

Both Storage Technology, which started shipping its 8380E drive in the fourth quarter of last year, and Memorex, which has been shipping its comparable 3682 device since the first quarter of this year, say they don't expect IBM to start shipping larger, faster 3380s until early 1988.

If they are correct, IBM runs the risk of continuing to lose ground in large disk market share to its pcm competitors. According to International Data Corp., IBM saw its share of the U.S. compatible large disk market drop to 80.5% in 1986 from 82.5% in 1985. NAS was the largest benefactor, with a 6% share of the market. Observers are now predicting, however, that IBM will risk losing a little more market share to the pcms rather than take the chance of introducing another new 3380 drive before users are ready to migrate to it. ■

MINICOMPUTERS

On the Beach For an OLTP Entry

Digital has been weak in transaction processing, but a series of recent moves may change all that.

BY GARY McWILLIAMS

Scoring big in some financial markets has been easy so far this year for Digital Equipment Corp. Since Jan. 1, its stock has appreciated by about 33%. Money managers without Digital stock in their portfolios are likely to be few this quarter. Yet, the same high regard for the computer maker hasn't been found among MIS managers in the financial community.

It's IBM that pulls the financial computer managers' heartstrings. Digital systems are plentiful in funds transfer and message switching applications, but their use, by and large, is limited to areas where networking has proven an advantage. The larger environments—especially where on-line transaction processing (OLTP) applications take center stage—remain predominantly IBM.

MIS managers and software developers have been expecting a major play from Digital ever since it brought out its loosely coupled VAXcluster scheme in 1983. VAXclusters that could support fault tolerant operation, mirrored disk drives, and dedicated database handling presaged a serious commitment to the estimated $20 billion a year, on-line transaction processing market. It's been nearly four years since those unveilings and Digital's OLTP market presence has been little improved.

"DEC is not a factor today and has no product emphasis," says Omri Serlin, president of ITOM International Co., Los Altos, Calif., a research firm that follows OLTP and fault tolerant processing computer vendors. "It's not surprising they're not a factor because they've never targeted [OLTP]. They need a corporate commitment to go after these applications."

Rethinking Market Strategy

Yet, recent changes suggest a rethinking of its OLTP market strategy is under way. Robert M. Glorioso, vice president of large systems engineering, was named earlier this year to oversee OLTP systems development and marketing. Digital also recently bolstered its relational and CODASYL-compliant database products to address VAXcluster performance. Among traditional IBM customers such as Liberty Mutual Insurance Co., Boston, and Aetna Life and Casualty Co., Hartford, Conn., Digital is taking part in projects employing VAX computers for small-scale transaction and remote processing programs.

"I think they're finally starting to believe there is some business out there that they're going to be missing," says William L. Donner, president of First Technology Corp., a New York transaction software developer. "There's a lot of pressure inside Digital to bring in an outside OLTP package [or] develop one from scratch that uses all of the VAXcluster's features." More recently, the company has been "talking about starting up something fresh and is canvasing the world" for information on user needs, he says.

Work to mesh its transaction processing and VAXcluster software also is rumored among company observers. Reportedly, the project seeks to devise software to distribute a single application among small and large VAX computers without requiring that the application have any built-in knowledge of the network.

Does all this mean Digital is planning a stronger OLTP market offering? "We're not a stranger to high-volume transaction processing in financial service," insists DEC transaction processing marketing manager David Stroll. He cites Citicorp and Bank of New York as users of Digital-based, high-volume OLTP systems. He notes that "there are thousands of FMS [forms management system] products out there that people are using to build lower volume transaction processing."

Stroll says all the talk about improvements misses Digital's current position. "We have a lot of systems installed that people don't call transaction processing because they're doing it in branch offices or warehouses. They are using VAXs to put up small transaction processing jobs with office automation. To them, order processing happens to be filling in forms on a Digital terminal where they're also running word processing."

"DIGITAL DOESN'T DO THAT WELL ON BENCHMARK TESTS."

The company's major software packages for transaction processing—Application Control and Management System (ACMS) and Terminal Data Management System (TDMS)—have little penetration among larger companies, according to financial users.

RICHARD MAIER: DEC's best OLTP systems use third-party software.

Photograph by Andrea Brizzi

"In my experience—and I've used recruitment agencies—I've yet to have a résumé [listing expertise in ACMS and TDMS] cross my desk," says an MIS manager at a New York bank that is a large VAX computer user. Most large financial users of Digital computers such as Bank of America, Bank of New York, Citibank, Irving Trust Co., and Security Pacific Corp. rely on third-party software for volume transaction processing chores.

ACMS, says Richard J. Maier, president of SPC Software Services Inc., a New York-based subsidiary of Security Pacific Corp., provides a friendly programmer interface, but at a cost. "If everything is pushed through ACMS, then that friendliness is a thicker boundary. Consequently, you have less performance. The good examples of Digital-based transaction processing systems are using third-party software," says Maier.

Weak Benchmark Performance

That Digital does not release benchmarks for its OLTP software is seen as indicative of shortcomings. "It's generally recognized they don't do that well on these tests," says David Moschella, vice president of research at market researcher International Data Corp., Framingham, Mass. "In terms of competing on a ratio of dollars per transaction per second, VAX systems don't do very well." Stratus Computer Inc., a Marlboro, Mass.-based supplier of fault tolerant systems, quotes market research surveys that show VAX ET-1 benchmarks of 5.0 and 15, respectively, on a VAX 8500 using ACMS and a VAX 8650 using third-party transaction software. Stratus claims from 14 transactions per second to 47tps on its XA2000 line.

While Digital does not release ACMS test results, independent transaction processing software developers are happy to reveal their testing on VAX computers. First Technology Corp. president Donner claims the company's TMX-32 software produced 26tps on a VAX 8650. Ben Rosenberg, president of Advanced Systems Concepts Inc., Hoboken, N.J., says ET-1 testing using its Integrated Application Control System produced 20tps on a VAX 8700.

While Tandem and Stratus have topped the test results, they also say that Digital is showing up more often as a competitor as they reach into manufacturing markets. "DEC's moved up to a clear number two among our competitors," says William Elliott, Stratus vice president of product marketing. Meanwhile, users with large networks of IBM devices for transaction processing are finding strong cases for the pair's offerings.

Charles Young, president of Dallas-based MTech, says newer Tandem and Stratus unveilings represent strong contenders to Digital's computers. "Are they [Tandem and Stratus] now turning the tables on DEC?" Young wonders. "DEC has been the aggressive one in going after low-end markets, but it looks like they are starting to come into what has been DEC's turf." MTech operates a network of 1,200 ATMs employing IBM and Tandem systems, and resells VAX computers to credit unions.

Digital's Stroll discounts performance benchmarks as measures that do not take into account the company's evolving applications orientation. "Digital focuses its products on integration and distributed systems. We work with office automation as a primary goal; other vendors focus just on transaction processing so [with them] it's hard to do office automation and transaction processing on the same terminal," argues Stroll. The third-party transaction packages also have focused on "specialized niches" rather than mainstream applications, he says.

Jeffrey A. Alperin, Aetna's assistant vice president for corporate technology planning, supports the view of ephemeral price/performance measures: "In the end, these decisions are very fleeting. There are always new systems coming onto the market that negate the last comparison. The question is, what are you looking for? Taking the VAX and DEC's organization as a Gestalt, I'd ask, can you bring up OLTP faster? More efficiently? Or create a system that's more user friendly or easier to maintain?"

"THERE'S A LOT OF PRESSURE INSIDE DIGITAL TO BRING IN AN OUTSIDE OLTP PACKAGE."

Alperin's queries land near to what one Digital manager sees as the company's place in the market. "I'm of the opinion you can skin the cat in more ways than one," notes Jerry Martin, Digital's brokerage and investments marketing manager. "There are other advantages, such as time to market. If you want a time-to-market advantage, you would use our system. If somebody is looking to handle 80 or whatever number of transactions, I contend that is not a system solution requirement because it's asking for a box and not a solution."

Leveraging Its Strengths

Rather than look at transaction processing as a discrete market, Martin says DEC views OLTP as "one of the technologies that applies in the financial market." In that light, the company hopes to concentrate where it can leverage its strengths. Martin says those are instances where networking and ease of software implementation are paramount.

"Where we see the demand for OLTP is at the location of the client," he says. "Financial providers operate globally so they don't just need a mainframe in the basement. They need a system in Tokyo, Hong Kong, Singapore, Los Angeles, London, and Frankfurt. It's where we think we can add value today and in the future."

While Digital is content for now to ignore the questions about its OLTP performance, its recent moves are generating waves of speculation. First Technology Corp. was planning to begin targeting non-Digital accounts in addition to marketing to installed VAX users. That's on hold now, says Donner. "There is some uncertainty as to what to pursue, given that DEC's working on these things. I don't want to sell against them."

And IDC's Moschella says a strong OLTP offering is crucial if Digital is to become more than a niche vendor in the financial arena. "Most of their systems there now are branch or office applications. It's not something that's running the heart of the company's business. They would like to have that role because that's where there are high margins, lots of loyalty, and because that's where IBM has traditionally ruled." ■

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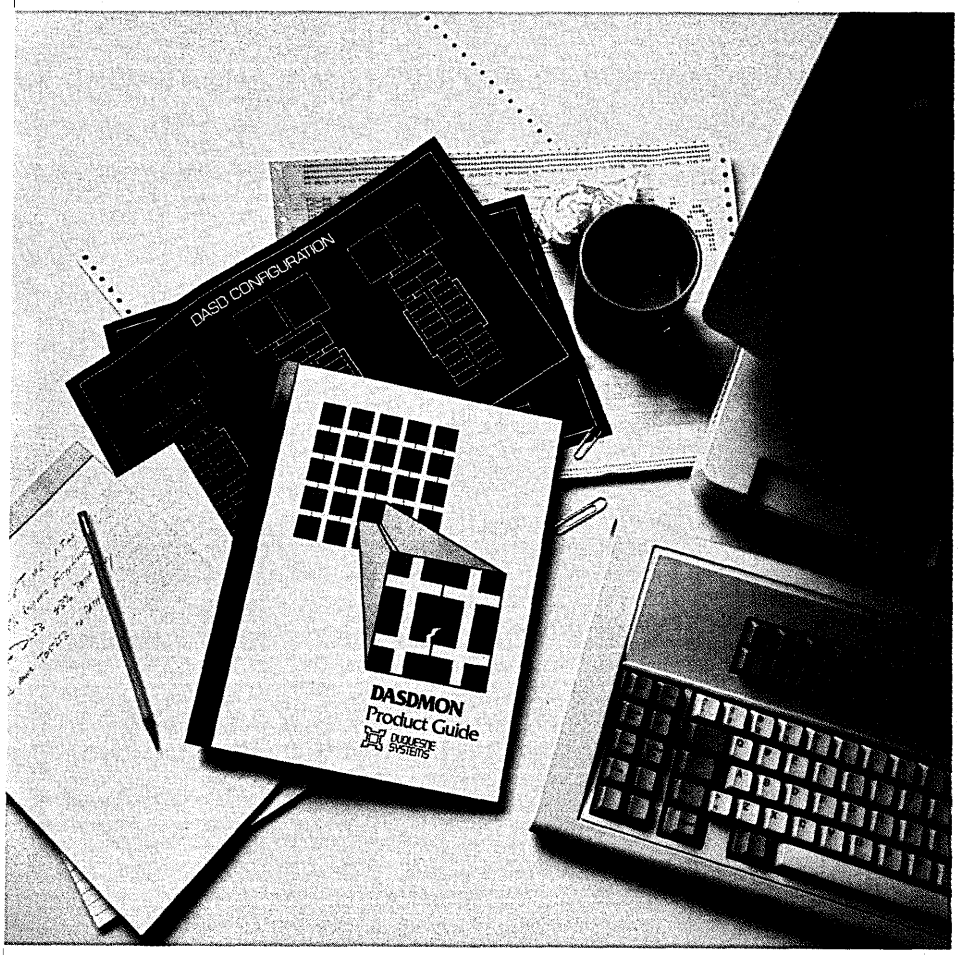

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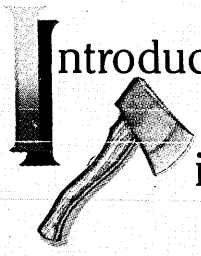
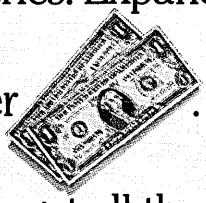
Introducing the QMS SmartWriter® 8/3X laser printer, with twin-  ial, plug-and-play design  instant compatibility with the IBM® System 34/36/38 series. Expand your printing capabilities, with proven QMS technology, for fewer  . It also comes standard with a serial interface for a PC.  you get all the  advantages of laser technology.

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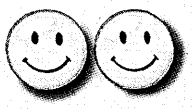
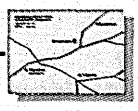
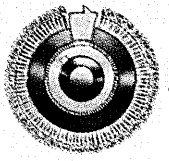
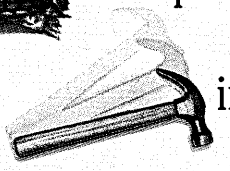
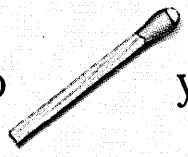
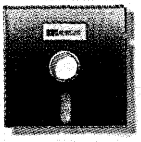
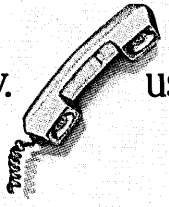
Change any one of the 29 resident portrait or landscape type  on the  . Add more using download cartridges.  them with full-page, bit-  graphics. Print at a  -fast 8 pages per minute, compared to the  -like pace of your  . And spare your  the constant  ing of an impact printer. The end result is near-typeset quality output, greater efficiency and higher productivity. Of course, you get all the emulations you need to  your  . And you get the expert assistance of QMS full-service distributors, applications specialists who will help you every step of the way.  us today at 1-800-631-2692 for the QMS distributor nearest you.

INTERNATIONAL TRADE

Swimming Upstream

The Japanese government attempts to block foreign competition from entering its telecom market.

BY ROBERT POE

A battle for a slice of Japan's international communications market pits that country's Ministry of Posts and Telecommunications (MPT) against a foreign competitor, Cable and Wireless PLC (C&W) of the U.K. C&W is attempting to get into the market, while MPT is doing everything in its power to keep C&W out.

If C&W succeeds, it will set a precedent that surely won't be lost on other telecommunications vendors, including those in the U.S., who are no doubt eyeing Japan's lucrative and fast-growing international communications market. On the other hand, if the Japanese government wins this one, it will certainly send a message ringing around the globe: foreign competitors, keep out!

A Japanese market liberalizing measure, the so-called Telecommunications Business Law of April 1, 1985, set the stage for today's controversy. The law permits the entry of foreign companies into the market. Things stayed quiet in the first year of the law's inception. Kokusai Denshin Denwa (KDD), the former international arm of Nippon Telegraph and Telephone (NTT), remained solid as the only supplier of international telecom services in Japan.

Then suddenly last summer, two new players appeared on the scene wanting to get into the game. The first was International Telecom Japan (ITJ), founded and funded by Japanese trading companies, banks, and 48 major Japanese firms that represent potential customers. ITJ was capitalized at $7.7 million (¥1.2 billion). The second was International Digital Communication (IDC) of Tokyo, whose largest shareholders are C&W and C. Itoh & Co., a major Japanese trading house, with 20% each. The company had an initial capitalization of $2.3 million (¥360 million).

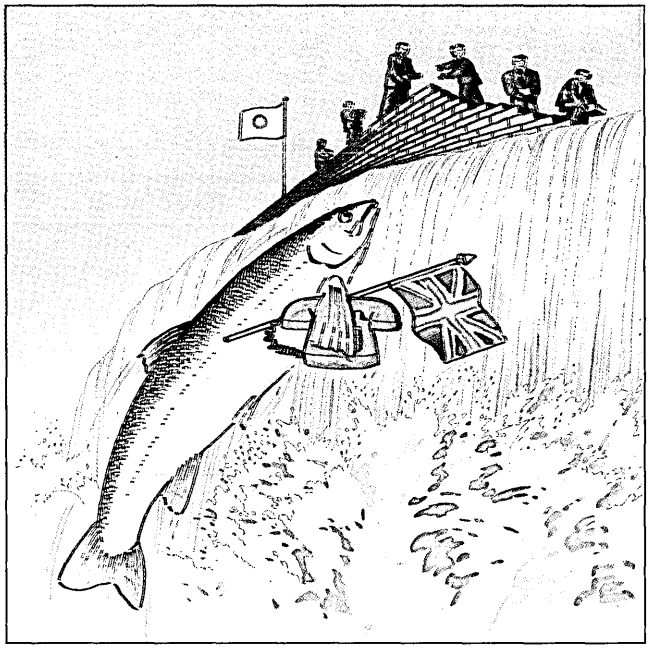
But both IDC and ITJ remain planning companies rather than operating companies (they can make business plans but not offer services). They have not received approval from MPT to begin offering service, and that's where the trouble begins. "We swim in a sea of license approval permits," declares ITJ president Nobuo Ito.

Like most Japanese government organizations, MPT has wide discretion in deciding who gets permits to do business in Japan. And MPT views C&W's presence with some suspicion and disapproval. The agency has been quite candid about the fact that it objects to C&W's participation in IDC.

Japan Justifies Its Position

Why? The crux of MPT's objection seems to be that since no industrialized country allows foreign managing ownership of its international telecom companies, neither should Japan.

Posts and Telecommunications Minister Shunjiro Karasawa has repeatedly stated that barring foreign international telecom firms from participating in the management of domestic businesses in the field is justified, since it is a widely accepted practice in advanced industrialized countries, including



Canada, the U.K., and the U.S.

The problem with that argument is that Japanese laws permit exactly what MPT says it doesn't want to do. As was pointed out to ministry officials by British Secretary of Trade and Industry Paul Channon during a visit last November, Japan's telecommunications laws specifically permit up to one-third foreign ownership of such domestic companies. Observes IDC managing director Shigeru Iijima, "It's very difficult to refuse foreign participation when our law itself allows it."

MPT has another argument, the claim of "excessive competition." MPT may refuse to approve a company offering services if it thinks there is too much competition in the market. Such a claim was successfully used recently to limit Motorola to supplying equipment for only 15% of the Japanese market for cellular telephones.

Explains ITJ president Ito, "In Japan, when the government regulates licenses, they have to give them only to qualified companies. They feel they're responsible to verify the newcomer's business worth and ability to offer reasonable satisfaction to the customer." MPT has not gone into detail about how Japanese customers would suffer from excessive competition in international telecommunications, but it has continually insisted that the market is too small to support the entry of two new competitors—i.e., IDC and ITJ—in competition with KDD.

Some would take exception to that contention. The present Japanese market, all KDD's, is worth approximately $1.4 billion (¥217 billion). KDD itself expects the figure to reach between $3.2 billion (¥500 billion) and $3.9 billion (¥600 billion) in the 1990s; IDC also expects a $3.9 billion market in 1995, and the influential Keidanren, or Federation of Economic Organizations, thinks it could go as high as $8.3 billion (¥1.29 trillion) by then.

Plenty to Go Around

With an expected market in the next decade of 2½ times or more that of KDD's current revenues, few observers believe there would

Illustration by Andrea Baruffi

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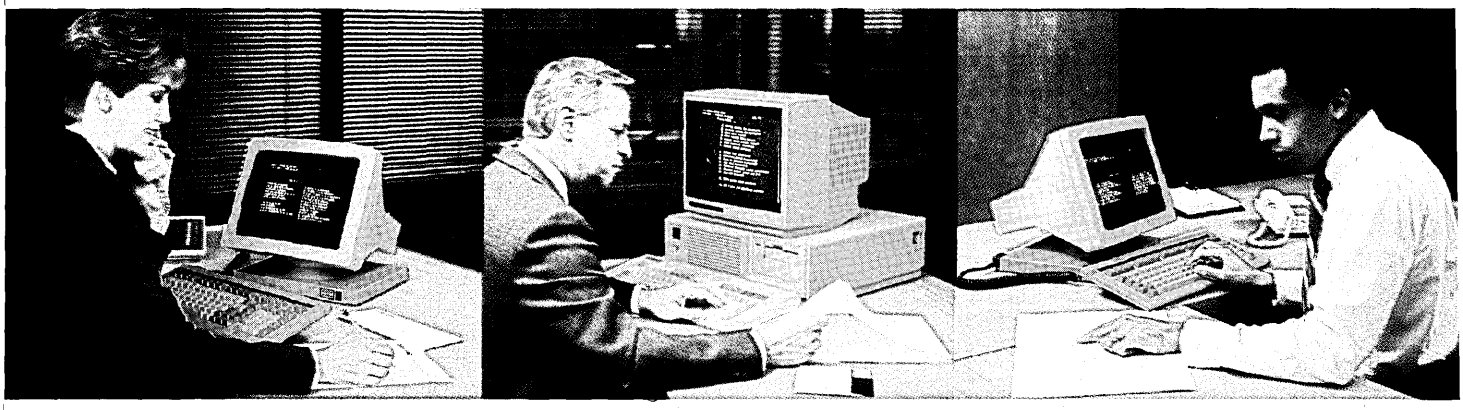

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News in Perspective

be too little business for three companies. Both prospective newcomers have completed feasibility studies that indicate they would be able to make a profit, though they are vague about whether they envision competing only with KDD or with each other as well. ITJ won't reveal its market projection, but "our plan would certainly be valid for the $4.3 billion (¥670 billion) market predicted in press reports," claims president Ito. Boasts IDC managing director Iijima, "Within six years [after the license is granted] we can be in the black, and in eight years we will be able to sweep away all accumulated losses."

Both companies have taken expected KDD rate reductions of 30% or so into account, and expect to get MPT permission to undercut KDD by 20% to 30% to help them overcome its advantage of an established customer base.

"WE SWIM IN A SEA OF LICENSE APPROVAL PERMITS."

In response to such market projections, MPT counters that although the Japanese market for international telecom services will be growing larger, it will still be quite small compared with the domestic telecommunications market, about 4%.

MPT has proposed a solution to the current dilemma of how to deal with two new companies, one with a strong foreign influence, that want a slice of Japan's international telecom pie. MPT wants IDC and ITJ to combine their operations and become a single company, without C&W on the board of directors (it has a single seat on the IDC board). The latter condition would neatly dovetail with ITJ's point of view: one of the company's basic principles from the beginning has been that it would not allow any foreign international telecom companies to join it.

Competitive Rationale

The rationale is that if an international carrier were a partner, international telecom entities based in other countries might hesitate to permit connection to their local networks, since it would in effect give business to their competitors. Therefore, states ITJ's Ito, "a merger would be difficult if IDC remains as they are." IDC will not comment on MPT's merger proposal.

Agreement about C&W's participation is far from being the only point that ITJ and the ministry—and KDD for that matter—have in common. There is also money, for example. A government employees' fund controlled by MPT owns 10.99% of KDD's stock, currently worth about $1.3 billion (¥208 billion). Obviously, the less competition KDD has, the better the fund will do.

There are also things like *amakudari*, or "descent from heaven," which refers to the practice of top government officials' being given high-paying jobs in private industry after retirement. Takazo Ishii, for one, descended from MPT to become the current president of KDD. Not only can ITJ be expected to cooperate with such customary personnel seconding practices, it is in fact already deeply involved, since all of its "core technical people" were supplied by KDD, at MPT's urging.

"This is hard for foreigners to understand," admits ITJ president Ito.

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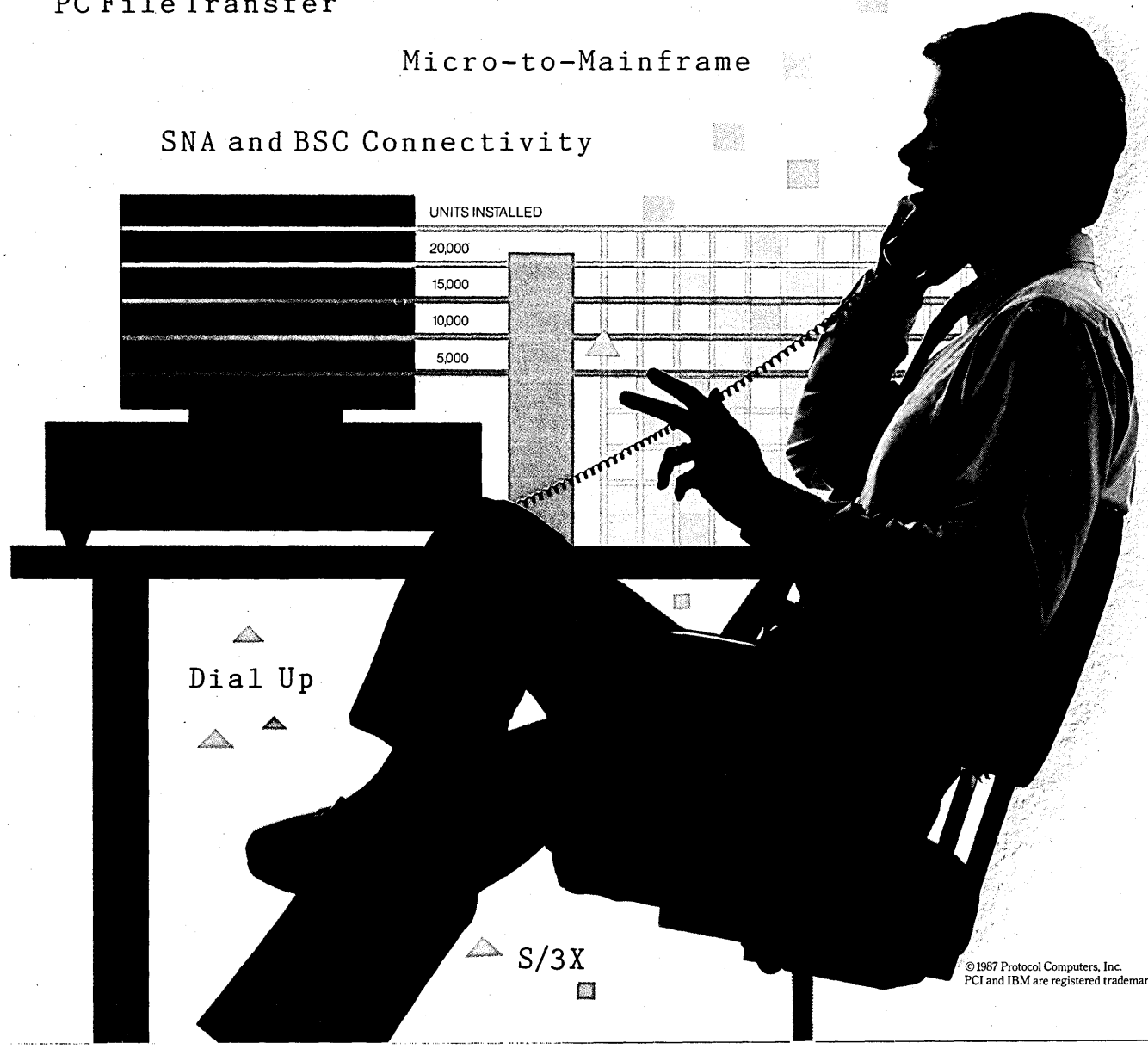

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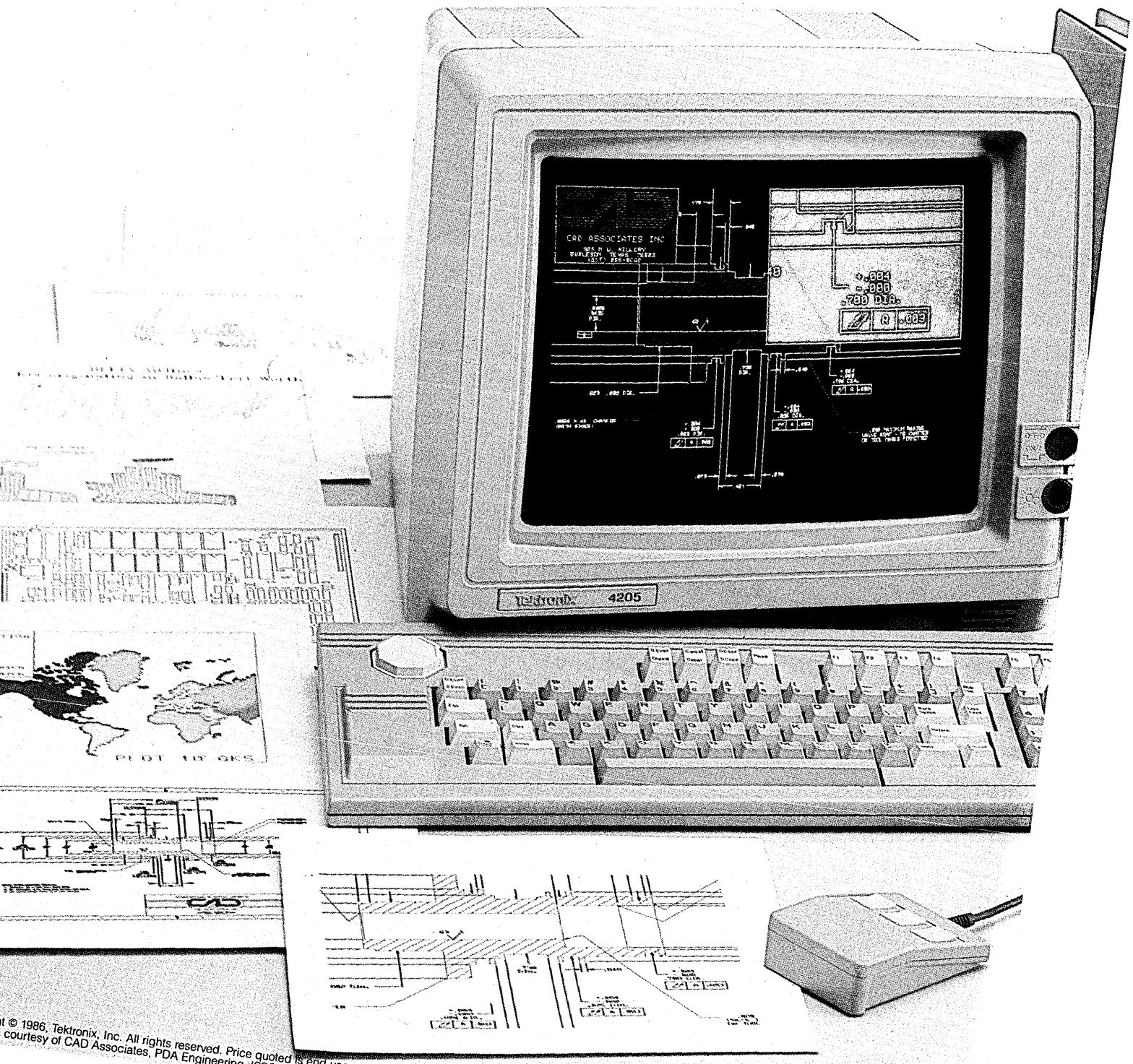
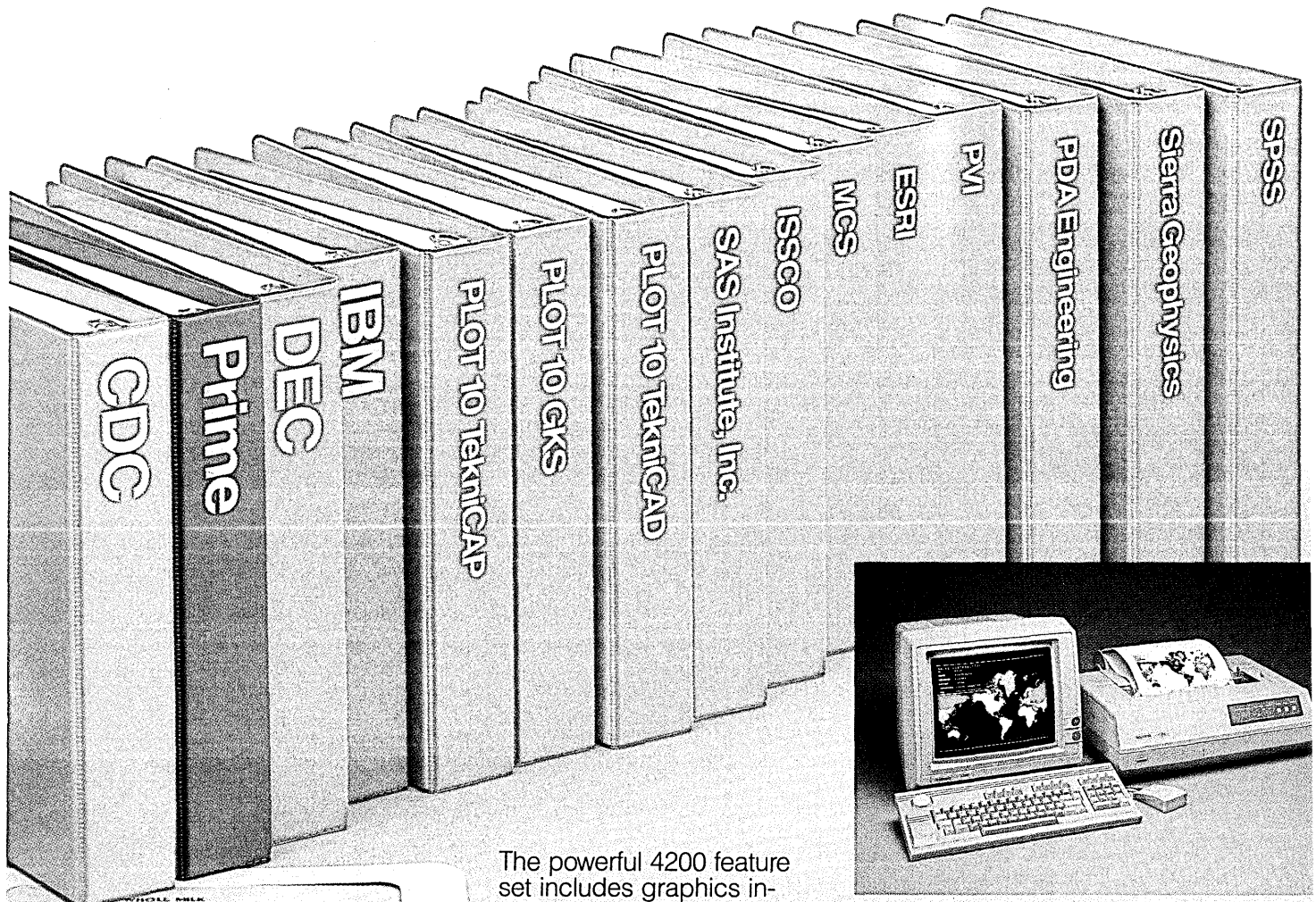


courtesy of CAD Associates, PDA Engineering, ISSCO and SAS Institute, Inc. Mouse shown in photograph is optional. VLT 104



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C&W officials in Tokyo will not talk on the record about the situation as it stands. Meanwhile, the British government "has been watching closely, and any decision strangling IDC will create a political uproar in Britain," according to Melville Guest, commercial counselor at the British embassy in Tokyo. Besides the interest shown by U.K. Trade and Industry Secretary Channon during his November visit, Foreign Secretary Geoffrey Howe also reportedly sent a personal letter in January to MPT head Karasawa requesting that C&W be allowed to participate. Even Japan's foreign ministry has come out in favor of the British position, not so much on the merits of the case but because it wants to avoid a diplomatic row.

Negotiations Going Well

Heavy behind-the-scenes negotiations have been going on as well. IDC stockholder C. Itoh has been unofficially sounded out as to whether it is agreeable to an amalgamation, and an influential member of Keidanren is reportedly trying to mediate by offering his own unofficial proposals to both sides.

Whatever the outcome, MPT probably wishes the telecommunications liberalization law had been written to specifically exclude foreign international carriers from management of domestic entities, instead of granting blanket permission for one-third foreign ownership as it does now.

The apparent mistake can still be put right, since the law can be amended on April 1, 1988, three years after its enactment. The problem with the British isn't going to wait that long, however, and it could get worse before it gets better. As Shigeru Iijima of IDC puts it, "We may have to ask Mr. Nakasone to solve it." ■

COMMUNICATIONS

Is There Life After IBM?

Sytek has hit a few snags in its quest to be a successful LAN competitor since it stopped supplying IBM.

BY SUSAN KERR

Emerging from the shadows of IBM has proved tough going for broadband LAN vendor Sytek Inc.

Layoffs, its first quarterly loss in two years, lower-than-expected sales in its key product lines, and a delayed launch of its first Ethernet baseband LAN offerings are just a few of the Mountain View, Calif., company's concerns since the termination last year of its extensive and profitable agreement with IBM to supply IBM PC Network boards (see "Back to the Roots," March 15, 1986, p. 45).

The fact that Sytek still exists is a testimonial to its instinct for survival. But that instinct shouldn't be repressed quite yet. The next year calls for Sytek to make widespread changes in its product line that will lead it head-on against such tough and ready competitors as Bridge Communications, also in Mountain View, and Ungermann-Bass, in Santa Clara.

One of the changes Sytek will make is the supplement of its proprietary broadband-only LAN products with those supporting industry standards and popular networking approaches including baseband Ethernet, fiber optics, and twisted pair. The company has already voiced a commitment to the ISO Open Systems Interconnection Reference Model as well as MAP protocols.

Whether Sytek can carry off all this work successfully remains to be seen. But many feel it has little choice.

"Two or three years ago, Sytek was the most feared competitor, or let me rephrase that, the company we most often competed with," says Ralph Ungermann, president and chief executive officer of Ungermann-Bass. "In the last couple of years, it [competition with Sytek] has dropped off dramatically."

One reason for that change, Ungermann believes, is that although broadband continues to be popular, particularly in government and factory installations, more and more it is being relegated as a network backbone used in conjunction with other networking schemes. What's more, Ungermann says, customers like to buy all these products from a single source.

That's no surprise to Sytek. In June, it is expected to announce the new System 4000 and System 10000 lines. The System 4000 will be an Ethernet baseband 10Mbps LAN supporting the Department of Defense Transmission Control Protocol/Internet Protocols (TCP/IP). The System 10000, according to sources, will allow subnetworks to connect to a 10Mbps broadband backbone network, a big improvement over Sytek's current 128Kbps capability.

Photograph by Sharon Hall

Sytek president George Klaus says that the company plans to play it safe for now.

Product Delays

All the strategy in the world is useless, however, if these products aren't up to snuff. Sytek is experiencing last-minute problems getting the products out the door. It had originally scheduled product introductions for February and then delayed first until April and now until early summer. Part of the delay has to do with the problems in designing a satisfactory method to connect Sytek's core System 2000 broadband network product family to the System 4000.

While declining to go into specifics, Sytek president George Klaus emphasizes that "part of our strategy is protecting our base of customers. We want to make sure we're not obsoleting our 250,000-plus [installed user connections]. We want to give them a path to connect."

These snags couldn't have come at a worse time, though. For the company's third fiscal quarter, ended Feb. 28, privately held Sytek experienced a loss of more than $1 million, and as a result, laid off 46 of its 500 employees.

"The major reason [for the loss] is the async market," says Klaus. "That's really our strength with our System 2000 line. . . . The market is pretty flat and our business hasn't grown as rapidly as forecasted. More people are moving to pcs. There's no growth in the async terminal business."

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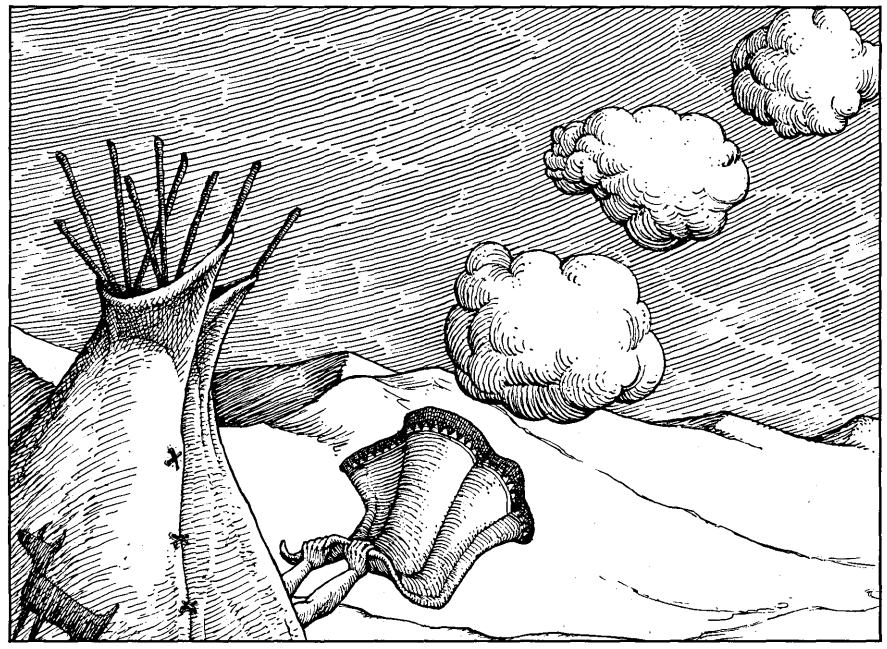

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Yet many see the quarterly loss—Sytek's first in eight quarters—as a delayed reaction to the company's IBM experience. During fiscal 1986 (ended May 31), more than half of Sytek's $91 million in revenues came from IBM. This current fiscal year, revenues will be cut back to $60 million and IBM's contribution to almost zilch as Big Blue shifts its affections to its own token ring network. While that represents a healthy growth when looking at non-IBM business only, Sytek officials maintain that

SYTEK IS HAVING PROBLEMS GETTING THE PRODUCTS OUT THE DOOR.

without the two-year interruption of the IBM contract, revenues and earnings would be even higher.

With the curse of hindsight, Sytek executives point out that for the more than two years Sytek was under contract with IBM, engineering and management attention had little time to focus on end-user business. Nevertheless, competitors and industry analysts also maintain that Sytek, with open arms, reaped roughly $80 million from IBM during the duration of its dealings.

"Sytek put a lot of emphasis on doing business with IBM, and when they did that they lost sight of other goals and opportunities," comments Dataquest Inc. industry analyst Brad Baldwin. "They should have come out with baseband a year ago." Baldwin notes that Sytek today will be joining upwards of 300 Ethernet vendors.

Baldwin and other analysts question whether Sytek can shed its niche market image and become a general purpose network player.

Although he bristles at Sytek being called a niche player, Klaus provides insight into the company's plans. Trying to maintain some element of caution has kept the company going for eight years. While they emphasize the new business an expanded product line could bring, Klaus and Sytek executive vp Roger Ferguson indicate that the company is playing it safe for now.

"We won't set a plan in place that [means] we might have to do in the third quarter next year what we had to do this quarter," Klaus says in reference to the layoffs. "We're setting our base at lower than expected levels."

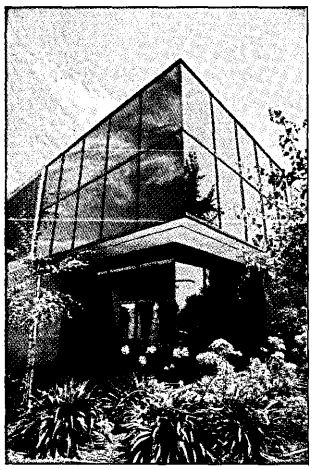
Thus for at least the first year Sytek will concentrate on targeting its installed base. Even so, Klaus predicts that Ethernet-based products will contribute between 10% and 20% of Sytek's estimated $70 million to $80 million in fiscal 1988 revenues.

Company Back on Track

Ferguson says losses should be confined to the most recent quarter and the company is "back on track" to profitability. He adds that Sytek has enough money to support the needed investment in expanding its sales force and manufacturing lines to support the new products.

But while not dismissing the strength of Sytek's installed base, Bob Newton, program director at the Gartner Group, questions whether Sytek has enough momentum to go a step further.

"I think [Sytek] is trying to round out their products in a defensive fashion," he contends. "They may hold on to current business in that broadband market niche but I don't see much chance to expand out of that in a big way."



Sytek headquarters in Mountain View, Calif., the scene of recent layoffs due to losses.

Newton's qualms regarding Sytek focus on the crowded distribution channel. On one hand, he explains, a lot of networking products such as Ethernet enter Fortune 1000 companies at the departmental level, typically through systems integrators that will have little desire to carry another company's products.

And for those companies where network buy decisions are made on the large scale, systems vendors are becoming tough competitors. In particular, Newton points out Digital Equipment Corp. and Hewlett-Packard as two aggressive communications suppliers.

Klaus concurs that "DEC is doing a really good job." But he says room exists for general purpose networking vendors, since "DEC is still primarily interested in selling into markets with their [systems] products."

But in relation to pure networking vendors, Sytek clearly has some catch up work to do. Clearly, that work won't end with an Ethernet introduction.

Ungermann-Bass and Bridge, for example, were busy adding many alternatives to their product lines while Sytek was dealing with IBM. Both already compete with Sytek in the broadband arena but are one step further along. Both also offer token ring.

The Next Round of Competition

Thus, while Sytek is busy getting up to speed with Ethernet, these two and others are now positioned in what looks to be the next round of competition. Sytek has hinted that it will one day offer a token ring bridge but has made no formal product announcement.

According to Bridge president William Carrico and to Ungermann, the longer Sytek delays with token ring, the better it is for their companies. Perhaps 5% of Bridge's business this year will be from token ring products, says Carrico.

"We're seeing a nice steady growth" in token ring sales, he adds. Ungermann maintains that "token ring is on an upswing. I expect token ring to be dominant" in the long term.

So Sytek had better keep the new products flowing. "We need to expand our market," agrees Klaus. Given Sytek's tough hide, some think the company might just make a go of it.

"There is a great deal of market savvy there at Sytek," says Eric Arnum, data communications analyst with International Resource Development Inc. "It would really sound as if this company was done for, but clearly they're not. They keep coming back with new products." He adds, "If they can protect themselves with new products, they have a good idea where the market is." ■

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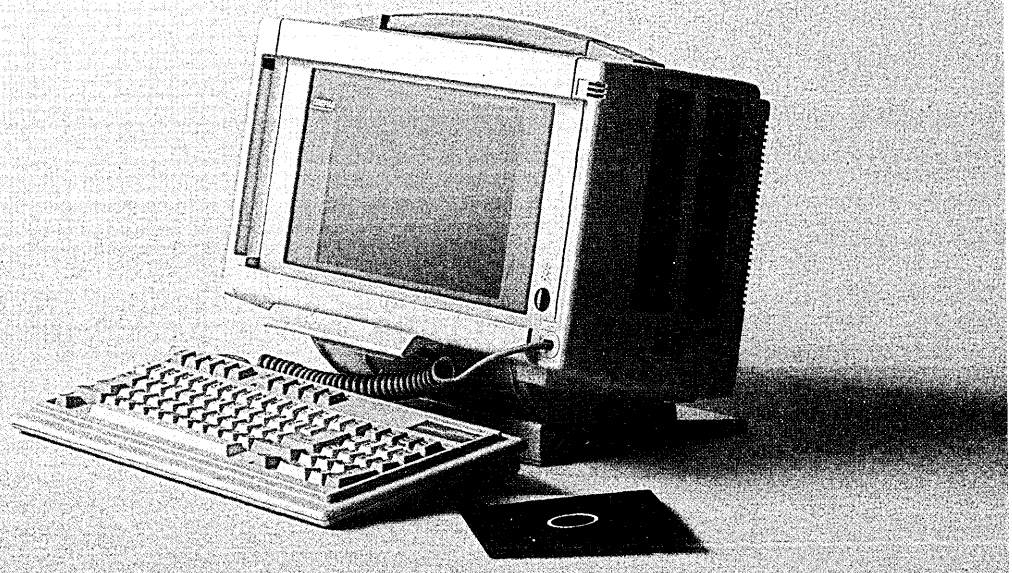


COMPAQ

It simply works better

PORTABLE III™

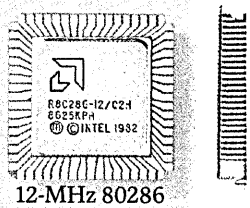
The new COMPAQ PORTABLE III™ represents the most power and performance ever to fit in a package this small. What makes it remarkable is that we sacrificed nothing to accomplish this feat. It's the world's smallest full-function personal computer with *all* the advanced capabilities you'd expect to find in a high-performance desktop computer.

At 18 pounds, and half the size of our original portable, it is clearly the ultimate in portable computing today.

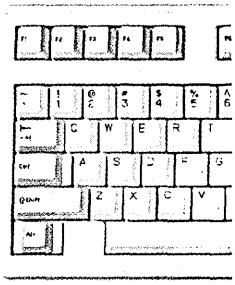
It features advanced 12-MHz 80286 technology that enables you to run programs written for 8-MHz personal computers up to 50% faster without sacrificing compatibility. And it offers enough RAM to satisfy even the most demanding users. It comes with 640 Kbytes standard and is expandable to 6.6 Megabytes without touching one of its two attachable full-size expansion slots. Plus it offers an optional 20- or 40-Megabyte high-speed internal fixed disk drive. So now you don't have to resort to external add-on drives that make portability difficult.

It feels like we left new COMPAQ

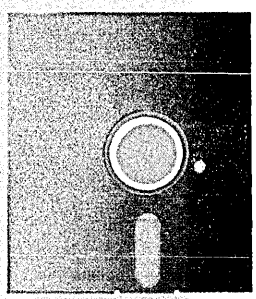
We didn't.



12-MHz 80286 microprocessor



Full-size, detachable

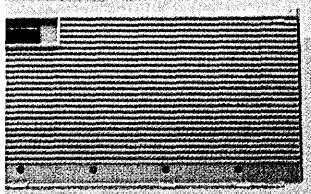


Uses industry-standa 5¼" diskettes

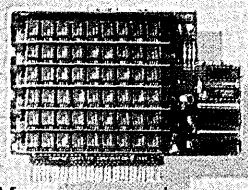
We didn't stop there. Notice the full-size standard keyboard *with* a numeric keypad. The industry-standard 5¼-inch diskette drive compatible with the rest of the business world. The full-size, adjustable 640 × 400 high-resolution plasma display, which conveniently provides text *and* graphics on one screen. Even an optional internal modem.

With the COMPAQ PORTABLE III, there are simply no trade-offs. Using ingenious methods to streamline the technology, like surface-mounting chips on boards, we combined full-functionality with enhanced portability. Which reaffirms the status of Compaq® as the world leader in portable personal computers.

something out of the PORTABLE III.



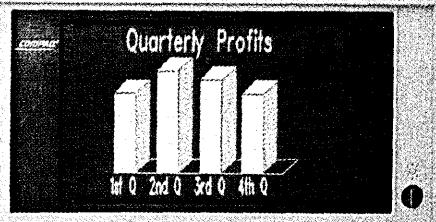
Optional, attachable 2-slot expansion unit



Memory expansion up to 6.6 Mb

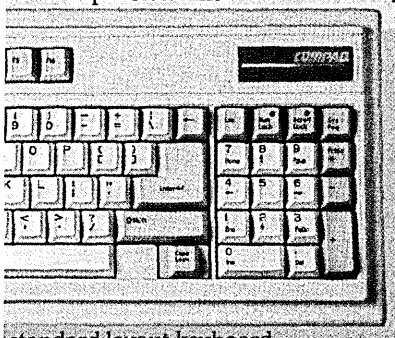
20-Mb or 40-Mb drive

8-MHz 80287 coprocessor

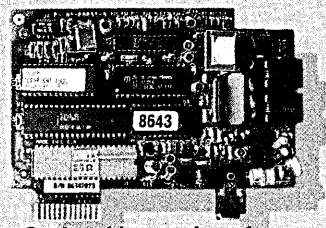


640 × 400 high-resolution plasma display

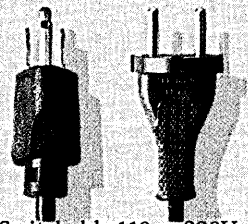
Shock mounts



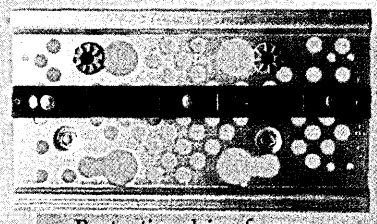
standard layout keyboard



Optional internal modem



Switchable 110 or 220V power

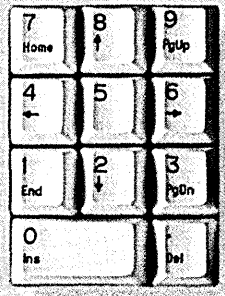


Protective drive frame

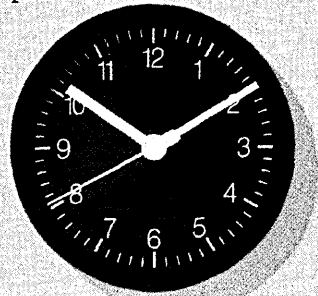
Helpful LED indicators

Optional leather carrying case

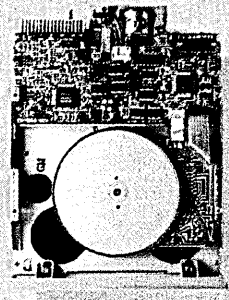
Built-in interfaces for adding peripherals



Numeric keypad



Real-time clock



5¼-inch 1.2-Mb diskette drive

COMPAQ PORTABLE III™

It simply works better

No other portable computer harnesses as much power, speed, readability, memory, storage, and built-in industry-standard features as the new COMPAQ PORTABLE III.

Most other portables and laptops use much slower microprocessors. Most don't offer high-resolution displays or expansion slots. Many don't offer high-capacity fixed disk drives. And not one offers the rugged, patented shock-mounting technology that's so important for the survival of a portable computer.

Their diskette drives are usually 3½" drives which make it impossible to use industry-standard 5¼" diskettes. Compaq, on the other hand, uses industry-standard fixed disk drives. And our drives maximize compatibility with your desktop personal computers, so you don't have to transfer your data. Plus, our detachable full-size keyboard doesn't force you to use one that's small and cramped.

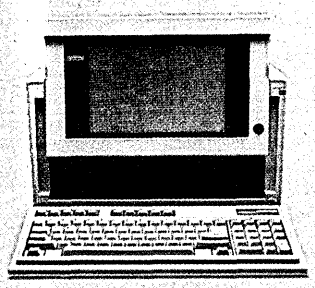
Not one of our competitors can rival our memory and stor-

It feels like the others

They did.

age capacity. The most RAM others offer is 2.6 Megabytes, which looks very small next to our 6.6 Megabytes. Storage is another story. The internal storage capacity of all our major competitors put together can't equal the storage capacity of a single COMPAQ PORTABLE III. We even offer an attachable, portable expansion unit, with two full-size industry-standard slots so you can add features of your own.

It stands to reason that if our competitors had included *some* of the features we offer, chances are they would no longer be portables. This might be why Compaq sells more portable computers than any other company in the world.



left something out.

It simply works better

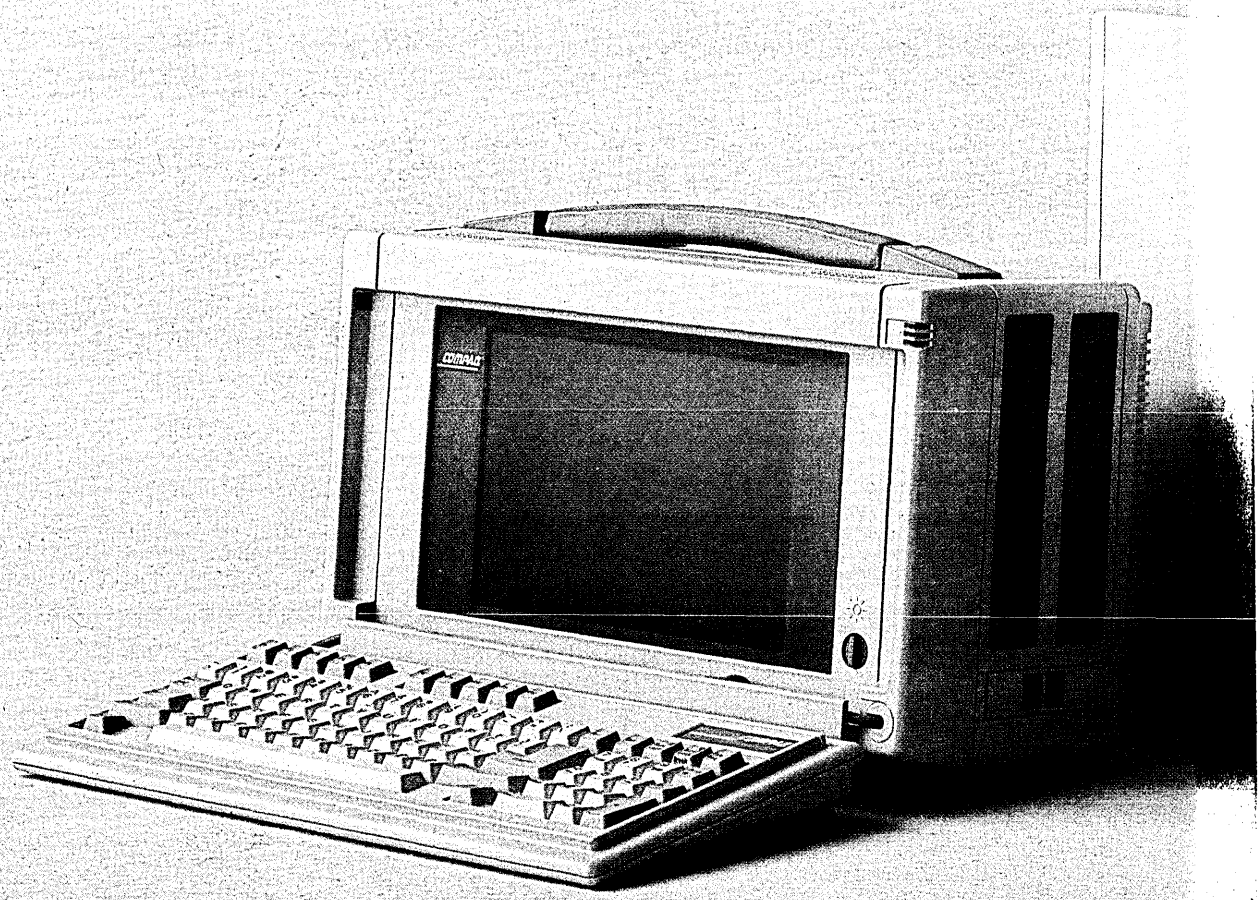
COMPAQ PORTABLE III™

The new COMPAQ PORTABLE III is actually half the size of our first portable. It's also the fastest portable computer in the world today.

With a processing speed of 12 MHz, its 80286 microprocessor is noticeably superior to most advanced-technology desktops. But processing speed, as most serious business users know, is only one facet of high performance.

The greatest limiting factor of total system performance is the speed of disk drives. The fixed disk drives in the COMPAQ PORTABLE III are three times faster than most others, with an average access time of less than 30 milliseconds. We also built in high-speed RAM. Together, these enhancements work with the high-speed processor to avoid system bottlenecks, thereby maximizing information flow. You can even add an 8-MHz 80287 coprocessor to accelerate math-intensive work. So now there's

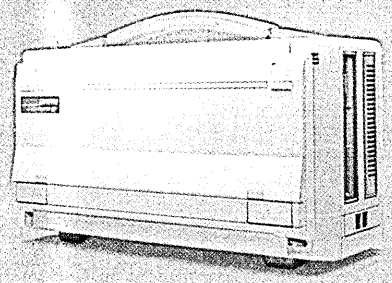
We run even faster since



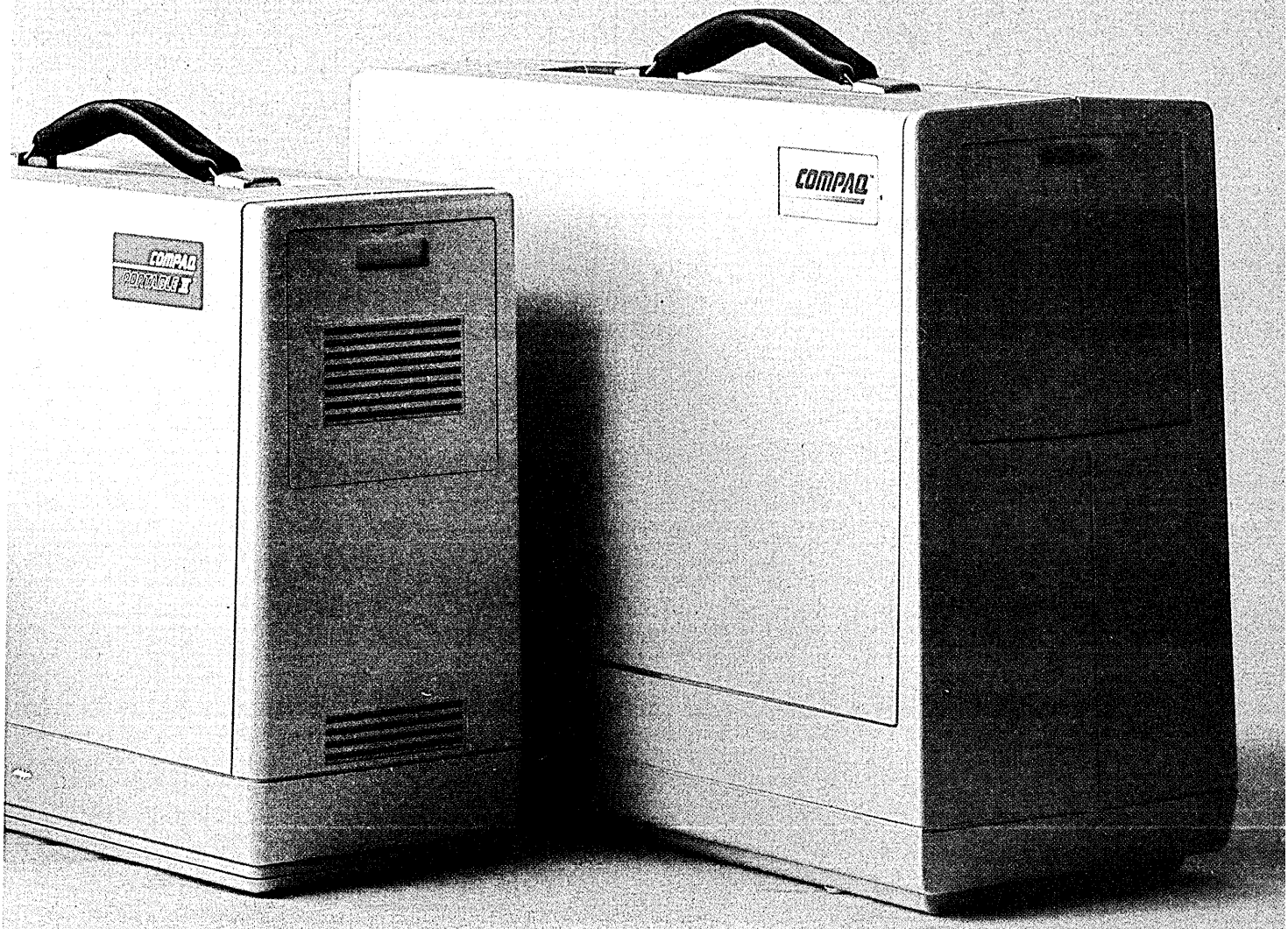
less wait, with less weight.

The COMPAQ PORTABLE III is the most advanced portable in the world and offers the sophisticated user features normally associated with desktops. As with any computer we design, we make your needs our blueprint. Compaq gives you more functionality, versatility, power, memory, storage, and performance to go.

Through innovative design and engineering, we've built even more into an even smaller package. So once again, Compaq has set a precedent, a standard by which all other portable computers will be judged.



we've lost a few pounds.



It simply works better

COMPAQ PORTABLE III

We obviously designed the COMPAQ PORTABLE III for the open road. But what makes it exceptional is that it can also hold its own on a desktop. Its speed, memory, and storage capacity help it outperform most desktop PC's. As an executive power tool, it can handle your biggest spreadsheets and largest data bases. And its ability to network and communicate with mainframes will also surprise you.

So perhaps it's *not* surprising that the COMPAQ PORTABLE III, like all of our portables, isn't just for people who are going places. It's also for those who appreciate a footprint that's nearly 50% smaller than the average desktop computer. This built-in versatility proves Compaq always has a better handle on personal computing.

See the new COMPAQ PORTABLE III on a desktop near you—at one of over 3000 Authorized COMPAQ Computer Dealers worldwide.

For more information or the dealer nearest you, call 1-800-231-0900 and ask for Operator 31. In Canada, call 416-449-8741, Operator 31.

This COMPAQ PORTABLE III is so busy in the office, it doesn't get out much.

COMPAQ PORTABLE III™

It simply works better

SOFTWARE

A Game of Leapfrog

Two RDBMS firms are racing to provide pc-based products, but users say they aren't working fast enough.

BY EDITH D. MYERS

With the intensity of cross-town football rivals, Relational Technology Inc. and Oracle Corp. have hotly competed in relational database management systems (RDBMSs) since the dawn of this decade.

Both firms are attacking microcomputers, the newest frontier for RDBMSs, with a fervor. But their efforts have not come fast enough for users, who say they are tired of waiting for overdue products.

The latest move came from RTI, Alameda, Calif., which in February introduced Ingres for Pcs, a pc version of the Ingres RDBMS the firm has been marketing in the mini and mainframe world since its incorporation in 1980.

On the heels of the announcement, Oracle, Belmont, Calif., was quick to point out to any who would listen that it has had a micro version of its Oracle RDBMS for two years. Now Oracle is promising a new version of the product this month that will contain all of the functionality of the mini version of its product's release 5.1.

Both companies' products were about three months later than their scheduled release dates. Oracle and RTI say the products were delayed because of technical difficulties that needed correcting. Says Larry DeBoever, a consultant with Digital Consulting Associates, Andover, Mass., "Everybody is late, and this is uncharted ground."

Small consolation to users. Les Loomis, a staff engineer with Xerox's Document Systems Business Unit, Sunnyvale, Calif., says of Oracle's promise, "First they told me January, then February, now it's April. I'm real disappointed." Loomis has been using Oracle's pc product for a year and a half and he likes it a lot. "I feel I'm using the Cadillac," he says. Originally, he had planned to use the pc product to develop applications for uploading to a VAX but "I found I could do most of what is needed on the pcs."

Relieving the Pressure

He did find report generation with the pc product limited because of limited RAM. "I'm told the next version will have enhanced extended memory to relieve the pressure on report generation."

Another Oracle user, Larry Byrne, dp manager for E.R. Carpenter Co., Richmond, Va., is luckier than Loomis. As an original beta test site for the pc product, his firm was awaiting delivery of the new version at press time. "The problem now is that it runs in 512K [of memory], but then there's not much left for anybody else."

Greg McCue, president of Tamarisk, a consulting firm headquartered in Mystic, Conn., was eager to get Ingres for the PC and could have done without the wait. "I'd been waiting two years," he says. He's more than happy with what he got as a beta user: "It's a programmer's dream. It has all the functionality of the mainframe version [of Ingres]."

The same functionality as the mainframe version is, of course, what Oracle is promising with its new release. DeBoever of Digital Consulting feels that Oracle, in introducing its pc product two years ago, "did what was sufficient to be able to say they had a product on the pc. They beat RTI, which chose to get it done well before releasing." He says of Ingres for Pcs, "It's superb technology. Now we'll hold our breath to see if they can market it."

Two benchmark comparison studies, one done last fall and one in February of this year, show RTI's Ingres for Pcs a clear number one in performance. One study was conducted by the University of Stuttgart, West Germany, and the other by Palmer & Associates Inc., Duluth, Ga.

RTI and Oracle weren't the only players in the benchmark studies. The Stuttgart study included Informix SQL, from Informix Software Inc., Menlo Park, Calif.; dBase III, from Ashton-Tate, Los Angeles; and R-Base 5000, from Microrim, Bellevue, Wash. Of these, only Informix SQL qualifies as an RDBMS, and it was the only additional product Palmer studied.

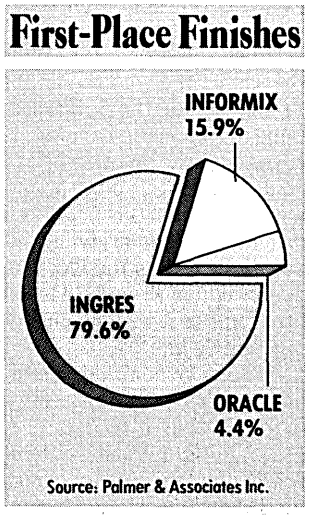
In 10 separate tests at Stuttgart, Ingres earned 10 first places, Oracle five second places, and Informix SQL, five third places. Palmer says he tested 22 queries under five different conditions of indices for a total of 110 queries. He says Ingres took first place 87 times and tied for first with Informix three times. Informix had 15 solo first places and Oracle five.

Informix SQL was introduced in the summer of 1985 and is, in the opinion of Laura King, vice president and a cofounder of Informix Software, a leading contender in the RDBMS-for-micros arena. King feels her company has an edge because "we've built from scratch on the micro whereas they [Oracle and RTI] are coming from the mini and mainframe world with big, ungainly creatures."

"EVERYBODY IS LATE DELIVERING."

Howard Bachrach, president of Bachrach-Woods Inc., Dallas, which develops custom systems for Fortune 1000 companies, has been using Informix SQL since it was first introduced because "I want to position my clients for internal growth on any systems I develop from the pc on up." When he selected Informix SQL, he felt it was the only game in town. "There are others out there now and they're probably all close in function, but I've been with Informix so long and have such confidence in their skills and their strategic direction. Still, if something better comes along...."

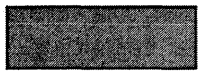
Earl Mott, manager of advanced manufacturing and engineering systems for furniture manufacturer Hayworth Corp., Holland, Mich., chose Oracle for the pc. He was familiar with the minicomputer version of the



A benchmark study shows the three leading relational database management system products for microcomputers.

product from a previous job. "We ordered the pc and mini product and a DEC VAX, all at the same time with the intent to program on the pc applications to run on the VAX," Mott says. "But the VAX was late in coming and we had the pcs so we started on the pcs, both programming and running applications. When the VAX was delivered we literally passed programs to it without changing a single line."

Tom Greenwald, president of Why R+D, a San Antonio developer of claims processing and membership enrollment software for health maintenance organizations, and a beta site for RTI's pc product, decided he wanted to go relational two years ago and chose Ingres because it would work on a variety of



"FIRST THEY TOLD ME JANUARY, THEN FEBRUARY, NOW IT'S APRIL."

machines. He says the pc product "takes the load off the mainframe."

McCue of Tamarisk says he likes the Ingres pc version because "after working with Ingres all day at the office, I can go home and work on my pc in the same environment, and it can do so much more than dBase," which he had been using at home. He says he has seen Oracle at work, but prefers RTI's offering because "I like the style of Ingres." He feels some people choose Oracle "because it's nice to go with somebody who has sold a lot."

Charles Nocera, president of Enhanced Systems and Services, Westminster, Colo., is a value-added reseller for both Ingres and Oracle. He considers Ingres "technically better," but he'll continue offering Oracle because "there are people out there who want it, simply because it's been around longer."

RTI, Oracle, and Informix are hoping the 386 can enhance what their pc products can do. Informix claims to have the first relational database to use the Intel chip. King says both Informix SQL and another product, Informix 4GL, will be available on the Intel 80386 in the middle of the second quarter of this year, "taking advantage of the full 32-bit mode."

Ed Forman, group product marketing manager for Ingres for the PC at RTI, says his company plans to offer a micro version of Ingres that will bring the 386 pc into Ingres Star, the company's distributed relational database offering (see "Distributed DBMSs: In Search of Wonder Glue," Feb. 1, p. 41).

Eugene Shklar, director of marketing, pc product line, for Oracle, says 386 pieces will be part of the version to be announced in April. "It will bring mainframe capability to the desktop," he says.

"It's a competitive field," says Michael Howard, a consultant with the Seybold Group in San Jose, "and Oracle and RTI are highly competitive. They keep leapfrogging each other."

As in any sport, sometimes the players change teams. In January, Oracle announced that Peter R. Tierney, longtime corporate vice president of marketing for RTI, had joined the Menlo Park company as vice president of marketing. Says Tierney when asked how the Oracle pc product stacks up against the competition, "It's an apples and oranges type situation." ■

BENCHMARKS

Markups

IBM has increased equipment rental prices and license charges on about 240 software products by an average of 10% and raised per-call maintenance fees by about 15%. The company says the increases are the result of its normal business review. The 10% increases in one-time software license charges are effective immediately, affecting software across IBM's product line. The increase in hourly maintenance charges to $115 from $100 also is effective immediately. The maintenance charges are increased for magnetic tape products, including the 3510, 3411, 3420, 3422, 8809, and 3803 tape controller. IBM also says that certain information network products, including Information System 2 Sessions, will increase an average of 6%, effective April 1.

Markdowns

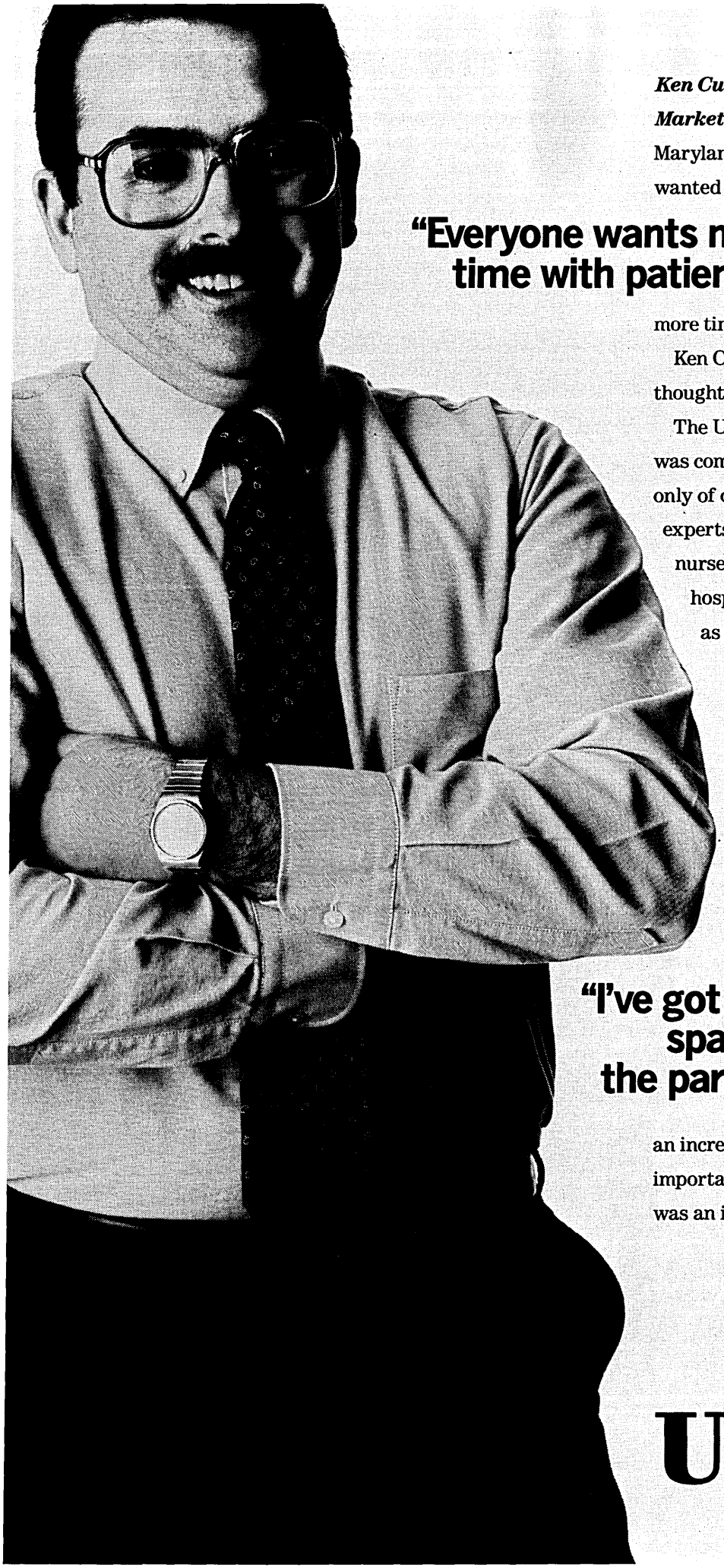
Digital Equipment Corp. is offering a one-year warranty on all hardware products purchased after March 2 as part of a new series of business-practice changes. The warranty includes installation, parts, and labor. A new dollar volume-based discount schedule that gives end-users and resellers equivalent discounts for large system purchases also was disclosed. Offering discounts of up to 16% for up to $10 million annual purchase levels, the schedule replaces separate VAX, MicroVAX, and PDP-11 discounts. The company has also agreed to requests by its Digital Equipment Computer User Society to permit operating system license transfers with used equipment (see "Battling Out of a Pricing Corner," March 15, p. 17). Separately, the company raised certain VAX software prices while lowering memory and disk-drive prices. Taken together, the changes should not raise system prices. They are designed to encourage customers to choose Digital memory and disk drives, says Harvey Weiss, vp of U.S. sales operations. New versions of the VAX 8200 and VAX 8300 that employ faster semiconductor parts and sport a lower price tag also were released. When combined with higher software fees for the multiuser MicroVAX II configurations, the new VAX 8230 and VAX 8330 hope to shift appeal away from the MicroVAX II.

New Unix

AT&T and Microsoft Corp. say they will market an operating system for microcomputers based on the Intel 80386 that will be compatible with both Microsoft's Xenix System V and with AT&T's Unix System V release 3.

The move will eliminate compatibility differences between the two implementations of Unix. The two companies say the combined operating system will be available in early 1988. They say they will continue to market their current Unix versions until the new product is available. The new product, to be called Unix, will support, without modification, applications written for Xenix and Unix V release 3.

At the same time, Microsoft officials say initial availability of the next generation of the company's MS/DOS operating system for 286-based and 386-based microcomputers has been delayed until late summer. The so-called A/DOS version of the operating system standard had been expected to be announced last month. Microsoft says A/DOS will be shipped to software developers in August. Microsoft won't say when the new version of MS/DOS will be generally available. The delayed version reportedly would support protected mode and larger internal memory addressing space. ■



Ken Cunzeman,
Marketing Manager, Unisys.

Maryland's Calvert Memorial Hospital wanted the same things all hospitals want today.

"Everyone wants more time with patients."

Less time spent on paper work and more time spent with patients.

Ken Cunzeman and his crew at Unisys thought they could help.

"We recommended a system that gave them more time and less paperwork."

The Unisys team was composed not only of computer experts; it included nurses and hospital managers as well.

Together with Calvert, they implemented a system that took away mundane chores and replaced them with the most precious commodity of all—time.

Today, a nurse can order a lab test, inform other departments, and make sure charges are recorded automatically.

"I've got my own space in the parking lot."

Needless to say, there was an increase in productivity. Perhaps more importantly for Calvert Memorial, there was an increase in smiles.

UNISYS

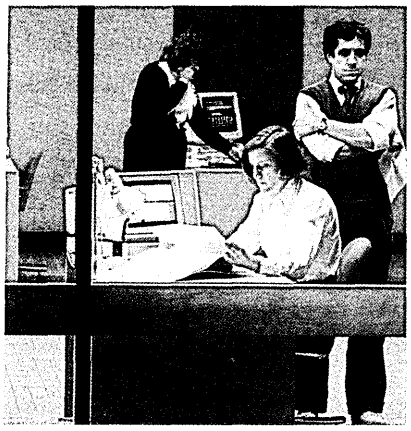
The power of 2

CIRCLE 20 ON READER CARD

Digital has it now.

The one thing departments do with consistency is change. Therefore, the most challenging problem in departmental computing is how to meet needs you can't always predict.

Digital understands. Our solution is a single architecture that is so flexible, it can satisfy your department's computing performance demands from the desktop to the data center. Our VAX™ systems all use the same huge range of applications, the same files, the same friendly commands. Throughout the department, VAX systems, storage devices and applications can be cost-effectively added or reallocated without disrupting users. Systems can even



One Architecture. A consistent approach to computing for all your department's changing needs.

be clustered for greater power, capacity and redundancy. Transparent communications built on the same architecture let you tie our computers to each other and to multi-vendor environments. And because of our superior networking technology, you can also connect peer-to-peer in both local and wide area networks.

Best of all, with one architecture you're always in control–no matter how things change. Call your local Digital sales office. Or write: Digital Equipment Corporation, 200 Baker Ave., West Concord, MA 01742.

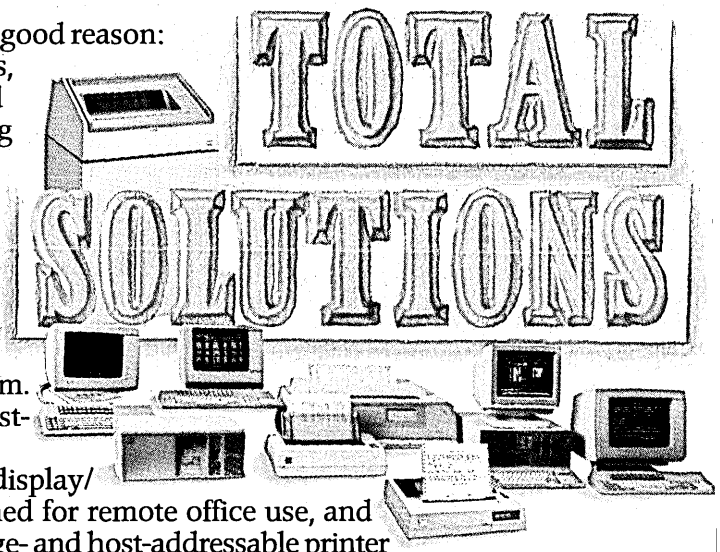
digital™

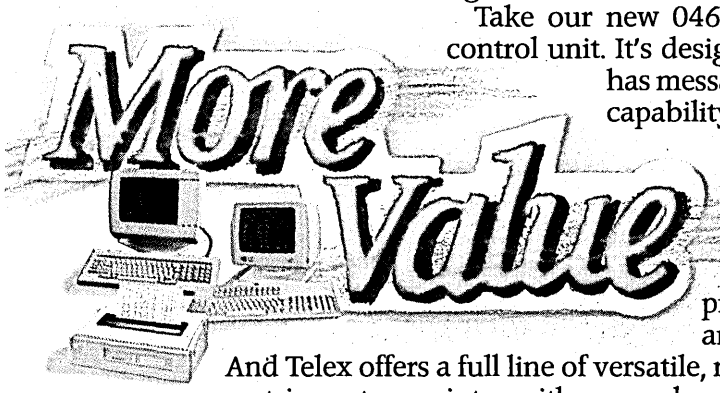
Choose the 3270 alternative that gives you more choices.

Choose Telex. We're the #1 3270 alternative for a very good reason: our choices give you more solutions. Like our displays, with a variety of screen sizes and color options. And faster, quieter printers for all applications, including 3270, S/3X and airline.

Better still, we offer some value-added enhancements that IBM doesn't even offer at all! Like control units with windowing capability.

Big office or small, whatever your business, Telex 3270 compatibles provide more solutions to your problems, whether you need displays, printers, intelligent workstations, control units or an entire system. And Telex upgradeability helps you protect your investment for the long run, too.





Take our new 046 display/control unit. It's designed for remote office use, and has message- and host-addressable printer capability. It's another example of a unique Telex 3270 terminal solution.

Telex 3270 products are competitively priced. But the competition's left in the dust when it comes to features. And that spells value.

Like our new low-cost 191 display. It has a smaller footprint and offers unique options like a message printer port and a light pen.

And Telex offers a full line of versatile, reliable printers. Including the new economical 187 dot matrix system printer with monochrome and color capability. And the new Telex 262 high speed (600LPM) line printer.

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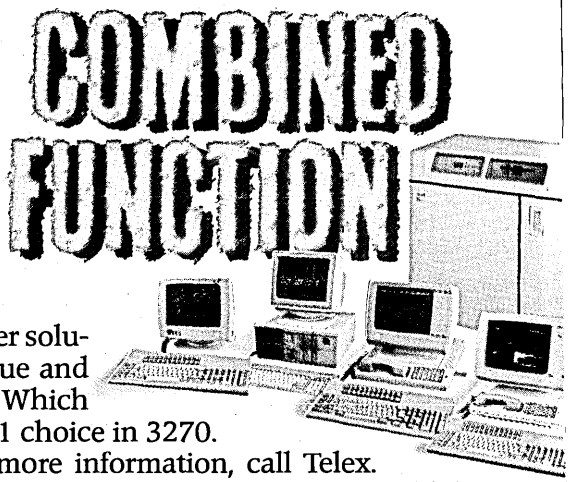

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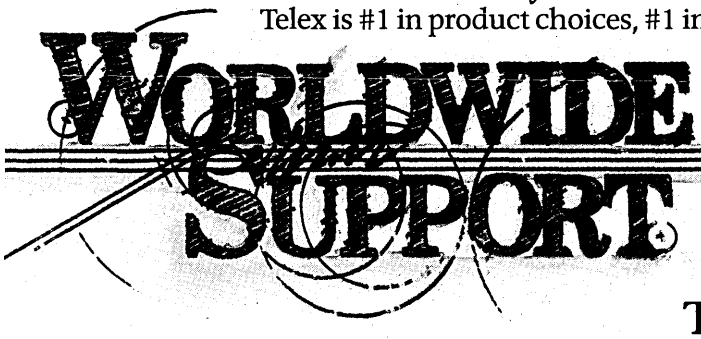

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LANGUAGES

FORTRAN GRAFFITI: Among the 1953-1957 IBM FORTRAN developers were Roy Nutt, Sheldon Best, Lois Haibt, and David Sayre.

Photograph by Brian Kosoff

FORTRAN at 30: Formula for Success

Although it is beginning to give way to other languages in some areas, FORTRAN is still healthy, 30 years after its birth.

BY STEPHEN G. DAVIS

In 1961, Robert W. Bemer, who was then a manager in programming research at IBM, saw just what the computing world needed in the high-level language defined by the international ALGOL 60 committee. "I have enough faith in the eventual future of ALGOL," Bemer wrote in the British Computer Society's *Computer Bulletin*, "to have caused a program to be constructed which converts from FORTRAN source language into a rather stupid ALGOL." As for FORTRAN, an IBM innovation that had begun spreading to other manufacturers' machines, Bemer insisted, "Its purpose has been served."

Thirty years ago this month, IBM delivered its first FORTRAN (formula translation) card deck for the model 704 computer, a binary scientific machine that featured miniaturized vacuum tubes. While slightly past its peak, FORTRAN enters its fourth decade a healthy, vital language, hardly lacking for purposes to serve. Today, FORTRAN is the dominant high-level language in supercomputing and remains the practical standard throughout the scientific and engineering realm. Vendors with significant new FORTRAN releases in the past year range from Cray Research, with its CFT 77, to Microsoft, with MS FORTRAN 4.0.

Meanwhile, the first widely used machine-independent language continues to be modernized. The next, so-called FORTRAN 8X language definition that's due from the American National Standards Institute and the International Standards Organization may enter its public review phase this year. Already, some nonstandard FORTRAN compilers include statements for programming bit-mapped displays and parallel processors—hardware that was barely fathomed in the vacuum tube era.

The reasons FORTRAN first became a de facto standard, according to dp industry veterans and FORTRAN pioneers, were simple and compelling: the language was relatively easy to learn and was available on a variety of machines almost from the start. Above all, FORTRAN compilers typically produced fast code. To this formula for success, today's users add such factors as the wealth of existing programs, the broad base of users who know the language, and—less favorably—inertia.

FORTRAN's broad user base does not come from the business dp side. Only 4% of the IBM mainframe sites polled by

Computer Intelligence, a La Jolla, Calif., research firm, use FORTRAN as a primary language. FORTRAN placed a respectable fourth among all languages in the survey, but far behind COBOL, the choice of 80% of Computer Intelligence's roughly 11,000 IBM mainframe respondents.

Among scientific and engineering users, on the other hand, FORTRAN reigns. Computer Intelligence's latest survey of 9,000 DEC VAX sites, for example, divides fairly evenly between science/engineering and business dp applications; 44% cited FORTRAN as their primary language (COBOL, together with variants like DIBOL, came in second with 16%). Today's public and private sector research centers, which are typically mixed equipment and mixed vendor shops, use FORTRAN in everything from small, ad hoc calculating programs to 100,000-line application systems. Knowledgeable observers have estimated that as much as 25% of the world's available machine cycles run with code generated by some form of FORTRAN.

Alive and Well at Chevron

"FORTRAN is alive and well in the technical area at Chevron," reports Bruce Rosenblatt, manager of information and systems planning at the San Francisco-based oil company. Use of FORTRAN is certainly below 1960s and 1970s levels at Chevron, but still accounts for "probably two thirds" of the firm's engineering-oriented programming, Rosenblatt estimates.

Rosenblatt, a 36-year-veteran in engineering at Chevron who vividly remembers the impact of the first FORTRAN compilers, suggests that FORTRAN remains perfectly suitable for research applications like seismic processing and testing refinery units. The oil firm runs such applications on a variety of IBM mainframes, Crays, and DEC VAXs. "Most of our use of FORTRAN is on one-shot projects of a research nature, not amenable to higher-level languages," he says. The language is ideal for "compute-intensive" projects, Rosenblatt asserts, because it "let's you get down to machine speed if you need to."

The high quality of the machine code generated is precisely what established FORTRAN compilers in the first place. Indeed, the early FORTRANs didn't compete against other languages, but against other programmers. Their success on this score proved that compilers were feasible—a point that makes IBMer

Still Crazy After All These Years

FORTRAN, which introduced the GO TO statement into the computer lexicon, has been called an "infantile disorder" by structured programming advocate Edsger Dijkstra. Despite continuing attempts to overlay FORTRAN with constructs borrowed from ALGOL and its more stylistically elegant descendants, the GO TO statement endures. As disorders go, FORTRAN is at least a mature one, as the following chronology shows.

1953: John Backus, project manager in programming research at IBM, proposes the FORTRAN idea for the 704 computer in a memo to Cuthbert Hurd, director of applied research.

1954: IBM 704 with built-in floating point and indexing capabilities is introduced.

Internal version of FORTRAN compiler is produced.

1956: First FORTRAN programmers' reference manual is published by IBM.

1957: FORTRAN I is released to 704 customers.

First customer-written FORTRAN program is run at Westinghouse-Bettis Atomic Power Laboratory in Pittsburgh.

FORTRAN package for IBM 650 (FORTRANSIT) is released.

1958: FORTRAN II and FORTRAN III are released for 704. FORTRAN II, which enables independent compilations of program modules, subroutines, and COMMON blocks for shared variables, soon becomes the industry's de facto standard.

1960: Various non-IBM FORTRANs become available, including Seymour Cray's implementation for the CDC 1604, ALTAC for the Philco 2000, Honeywell's Algebraic Compiler, and Automath for the H-800.

1961: *A Guide to FORTRAN Programming* by Daniel D. McCracken is published (remains in print until 1986).

IBM releases FORTRAN IV for 7090/4 series.

Other manufacturers begin working on their own FORTRAN IV implementations.

1962: The American Standards Association—forerunner of the American National Standards Institute—forms a committee to develop a standard for FORTRAN.

U.S. space probe *Mariner I,* targeted for Venus, explodes after launch at Cape Canaveral; the mishap is later blamed on a misplaced comma in a FORTRAN DO statement.

1963: The second commercially published book on FORTRAN appears: *A FORTRAN Primer,* by Elliott I. Organick.

1964: IBM announces System/360.

DATAMATION article notes the existence of 43 different FORTRAN compilers for various systems.

1966: Standards for FORTRAN and Basic FORTRAN are released.

IBM FORTRAN H compiler, an optimizing FORTRAN IV for System/360, is released (70% of the compiler itself is written in FORTRAN).

1967: WATFOR, a load-and-go FORTRAN IV implementation, is announced by the University of Waterloo in Ontario.

1978: ANSI publishes revised FORTRAN standard, widely known as FORTRAN 77. It includes free format option that obviates the need for FORMAT statement.

First release of VAX FORTRAN by Digital Equipment Corp.

1982: Twenty-fifth anniversary of FORTRAN celebrated at National Computer Conference Pioneer Day in Houston with Backus and others in attendance.

Other galas and exhibits held at IBM Programming Center at Santa Teresa, Calif., and at SHARE meeting in New Orleans.

1986: IBM announces that support for FORTRAN H compiler will eventually be dropped, prompting many users to begin massive conversion to VS FORTRAN.

Cray releases CFT 77, first full FORTRAN 77 implementation for its supercomputers.

1987: Microsoft releases MS FORTRAN 4.0, its first full FORTRAN 77 for IBM PC-compatible micros.

On-line *Books in Print* database lists over 340 works on FORTRAN—and over 400 on Pascal.

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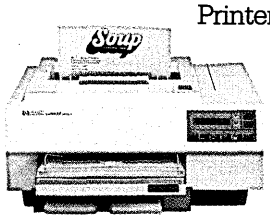

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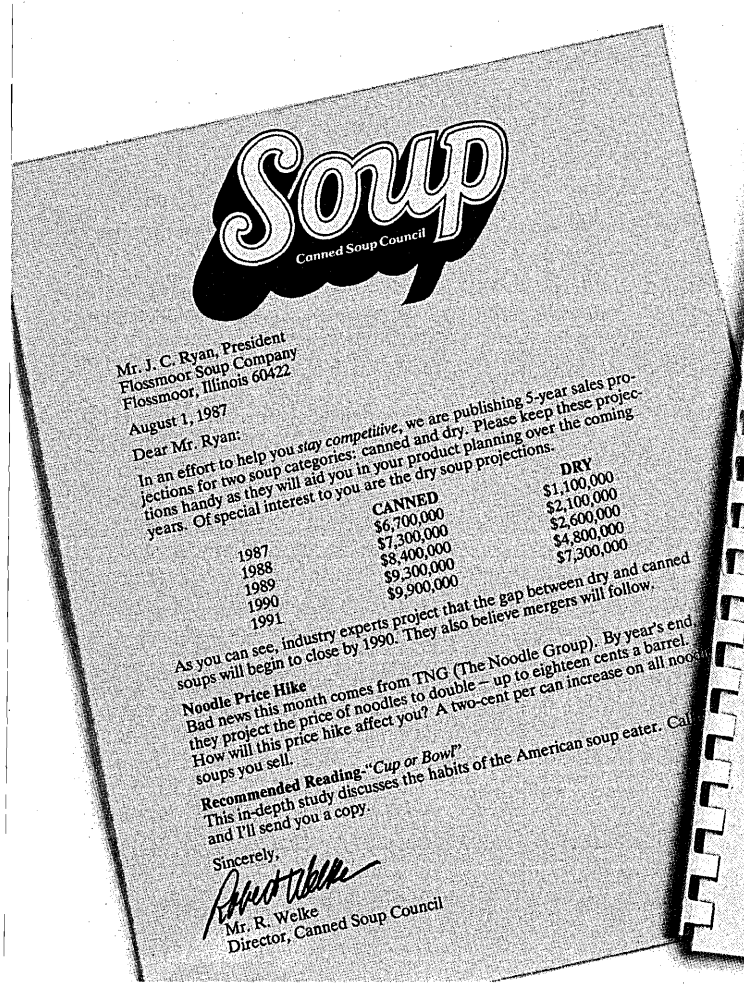
Soup

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August 1, 1987

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1988	$7,300,000	$2,100,000
1989	$8,400,000	$2,600,000
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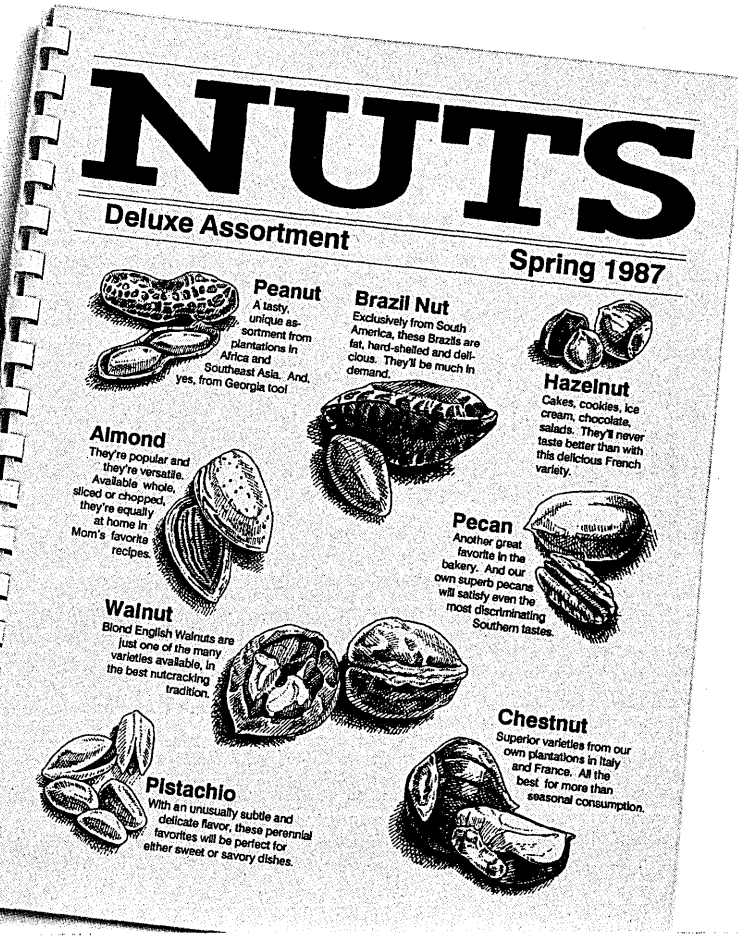
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Bemer's 1961 assessment of FORTRAN absolutely right.

"FORTRAN's primary purpose and achievement was not in being a computer language," Bemer says today from his home in Phoenix, where he runs his own software firm. "The aim was to make an efficient compiler." Compilers existed before an IBM programming researcher named John Backus proposed building one for the IBM 704 in a 1953 memo, but none could compare with what experienced programmers could produce by hand coding.

Dp consultant and DATAMATION advisor Robert Patrick recalls his reaction as a research engineer at General Motors in the late '50s, when IBM sent over an employee to describe a new software package being developed for the 704. "It was John Backus himself, and the package turned out to be FORTRAN," says Patrick. "I was lukewarm. At that time, I wasn't having any trouble getting work done in assembly language."

One reason Patrick and many other users were quickly won over by FORTRAN was because of the kind of code the compiler could produce. In fact, for some source program segments, the original FORTRAN compiler is said to have produced perfect code. Not for all segments, however—like its successors, the original FORTRAN compiler required several hundred fixes after its first release.

Yet, almost a decade later, IBM researchers proved that one of the internal compile algorithms developed by Backus's team was an optimal solution. Designers of IBM's H-level FORTRAN for the System/360, which was first released in 1966, used techniques developed in the original FORTRAN I. The H compiler is only now being displaced by VS FORTRAN as the state-of-the-art compiler of large-system IBM FORTRAN shops.

But the most obvious plus of early FORTRAN was that it saved programming time. In a paper delivered at FORTRAN's 25th anniversary celebration at the National Computer Conference in 1982, the late Herbert S. Bright described the first known commercial release of IBM's 704 FORTRAN compiler. On the very first day that it arrived at Bright's workplace, the Westinghouse-Bettis Atomic Power Laboratory in Pittsburgh, he and his colleagues were able to run a test program that had been written in a single afternoon. This was at a time when comparable programs took weeks to code in assembly language.

"FORTRAN shortened the time it took people to solve problems on a computer dramatically—in some instances, by a factor of 10," says City College of New York professor Daniel D. McCracken. McCracken's 1961 book, *A Guide to FORTRAN Programming,* probably introduced more people to the language than any other single book. The 88-page classic sold more than 300,000 copies before finally going out of print in its 25th year, 1986. McCracken sums up his book and FORTRAN's success this way: "Beginners could read my book over a weekend,

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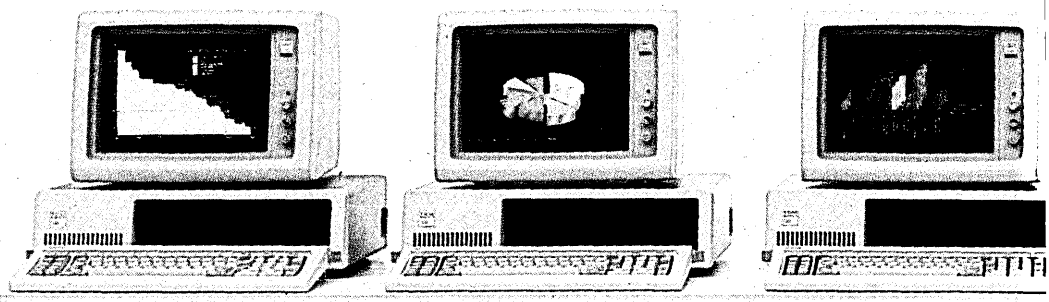

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come in and try to program, and find, usually, that the computer hadn't blown up."

Ease of use remains an important FORTRAN feature today. While computer science majors and engineers usually have been exposed to some FORTRAN as students, the majority of programming courses today use Pascal, C, BASIC, and other languages (McCracken's latest book is on Modula-2). Originally designed with engineering problems in mind, FORTRAN remains easy for technical programmers to learn. "Recent graduates tend to be multilingual," notes Chevron's Rosenblatt, "and with our existing user base, bringing people up to speed in FORTRAN just isn't an issue."

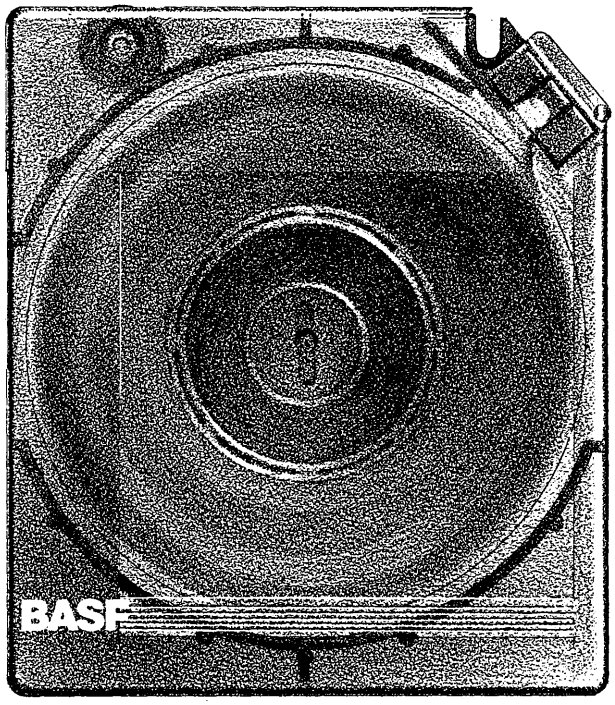
A good thing, too, because today's graduates are bound to find FORTRAN on any machine they use in the technical world. The transportability of FORTRAN began early. Two months after Backus and his team of programmers delivered the first FORTRAN compiler to 704 users, another IBM programming group (led, incidentally, by Bemer) released a version for the IBM 650, an inexpensive commercial machine with a decimal-based architecture. By 1964, a DATAMATION article on "The Various FORTRANs" (August 1964, p. 25) noted the existence of 43 different FORTRAN compilers.

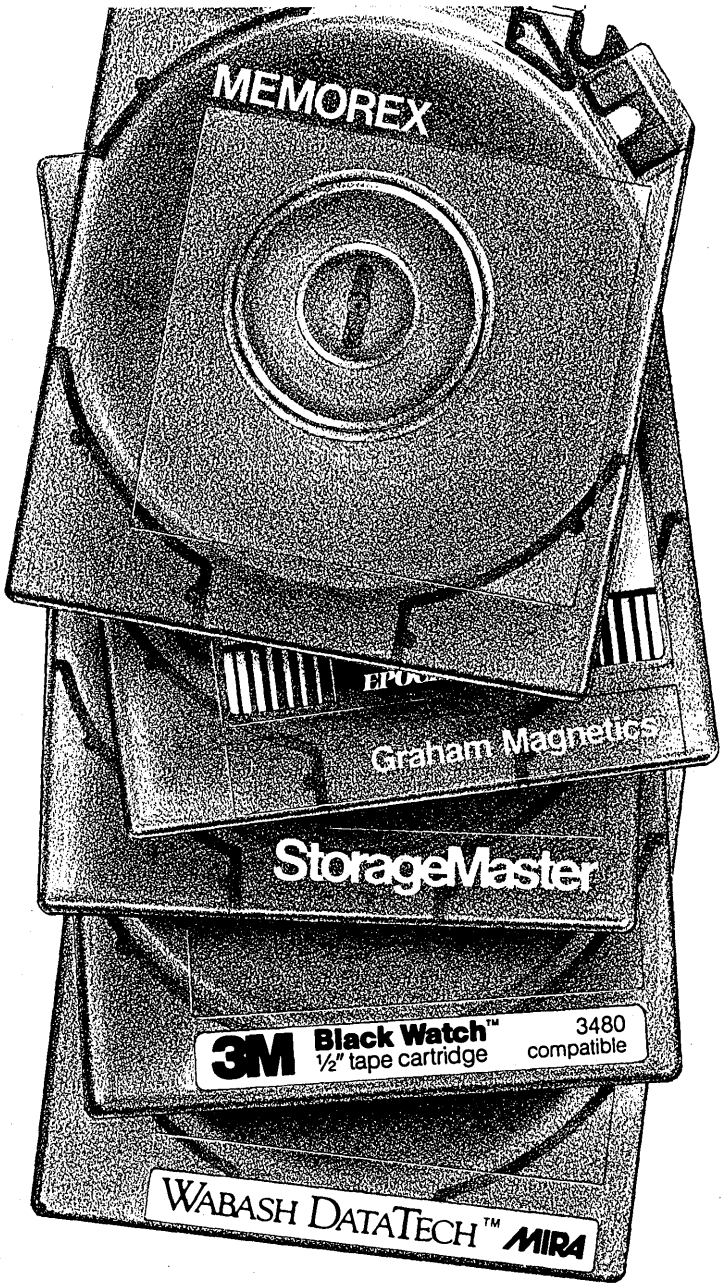
"We use FORTRAN because it's available on most all machines," says Al Williams, manager of computer resources and analysis at the Aerospace Division of GE/RCA, Princeton, N.J. GE/RCA Aerospace, which builds unmanned satellites, boasts a wide range of hardware from IBM, DEC, Prime, Data General, and Hewlett-Packard. "Ninety percent of our ground systems programming [e.g., design and testing of components] is in FORTRAN," Williams explains.

"FORTRAN'S STRENGTH REFLECTS A COMPUTER COMMUNITY WEAKNESS."

One person who doesn't use FORTRAN is John Backus. "I last used FORTRAN 20 years ago on something that it turned out to be unsuitable for," recalls Backus, now an IBM fellow working in the San Francisco Bay area. "I didn't like it then, and I don't like it now."

Backus's objections are not limited to FORTRAN. "Give or take 20%, it's like most other languages," he says, "and they're all lousy. ALGOL, PL/1, C—these are all a terrible way to think about programs." Commenting on FORTRAN's astonishing endurance, Backus says, "While this may be a strength of FOR-





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TRAN, it really reflects one of the weaknesses of the computer community that we haven't come up with a better way."

The motivation behind Backus's current work, in an area he refers to as "functional programming," is that software should let programmers concentrate solely on the logical purpose of a program—and not worry about computing addresses, storage schemes, and the like. "Current languages force you to think at much too low a level," he contends. "What we need is a new proposition."

Insofar as they apply to FORTRAN, Backus's complaints are hardly unique or new. ALGOL adherents noted deficiencies in FORTRAN as early as the '60s. More recent critics, like Cornell University's Kenneth Wilson and Dutch computer scientist Edsger Dijkstra, have likened the constraints of FORTRAN programming to doing higher math with Roman numerals and controlling jumbo jets by whip and spur. Backus himself mounted an influential attack on conventional programming in a 1978 paper entitled, "Can Programming Be Liberated from the von Neumann Style?" published in *Communications of the ACM* (August 1978, vol. 21, no. 8).

Such criticism underlines an irony: the language that has long overshadowed so many others has really had little impact on language design and development. In this sense, ALGOL, which influenced the design of C, Pascal, Modula-2, and Ada, appears to be having the last laugh. While Ada's spread has been slow so far, the government's four-year-old mandate that Ada be used on so-called "mission critical" systems developed after 1984 is beginning to have some effect. For example, while most of the software used on NASA's shuttle project was written in FORTRAN and a customized FORTRAN-like language called GOAL, the space station project is using Ada. As for recent compiler development, Cray's CFT 77 was written in Pascal, while MS FORTRAN 4.0 was written in C.

FORTRAN's true legacy, beyond the latest versions of the language itself, is found in the off-the-shelf FORTRAN application systems that are widely used in engineering and scientific computing. Programs like NASTRAN from MacNeal-Schwendler Corp. (MSC), Los Angeles, and ANSYS from Swanson Analysis Systems, Houston, Pa.—the two leading structural analysis systems for mechanical engineering—are in a sense the logical successors to a language that was originally designed to help scientists and engineers solve problems on a computer. Structural engineering software packages are used to help build mathematical prototypes of large, complex devices. These packages are used by engineers wherever a model can be used to save time or money in testing or design. NASTRAN's heaviest users, according to Don McLean, MSC's vp of advanced projects, are in the automotive and aerospace fields—including the very same industrial companies that in the 1950s owned IBM 704s.

MSC's NASTRAN is over 500,000 lines of code, and—like many such engineering packages—over 95% in FORTRAN. "We use a subset of FORTRAN because of the variety of machines targeted," he says. The program has been customized for 21 different machines, including supers, mainframes, minis, and micros from all major manufacturers.

Should Incorporate Modern Features

MSC is not about to start converting NASTRAN to another source language, but like many users McLean recognizes the appeal of other languages like C and Pascal and is anxious that FORTRAN incorporate modern features. "What FORTRAN needs," he says, "are pointer variables, new data structures, and better graphics; it'd be useful to replace a coded subroutine with a statement like BASIC's DRAW."

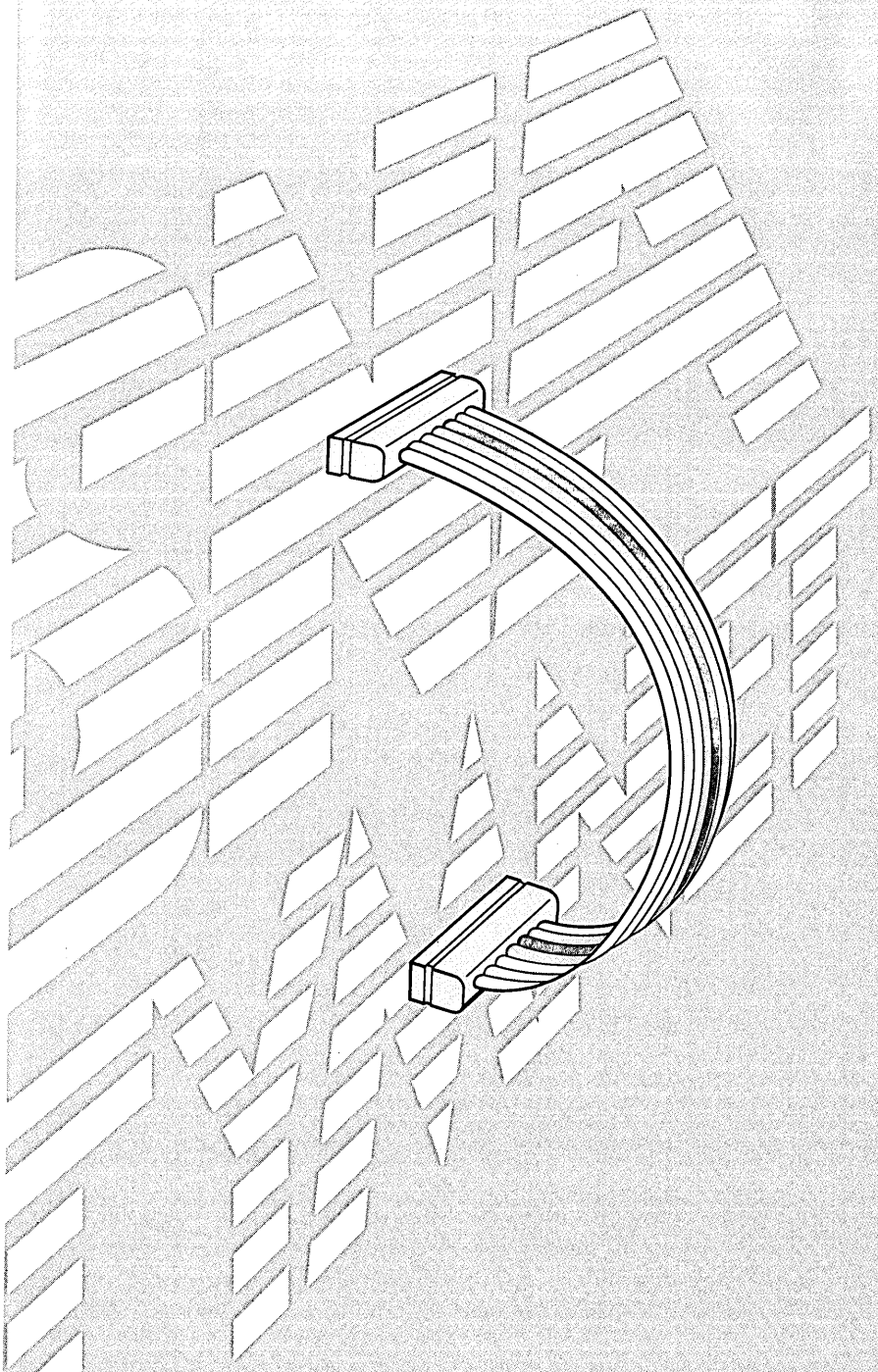
Keeping FORTRAN current is the work of the International Standards Organization's FORTRAN working group 5 and, in the U.S., ANSI's X3J3 subcommittee on FORTRAN. The two groups, which represent users, vendors, and computer scientists, try to coordinate their work on FORTRAN 8X in an effort to maintain a single worldwide standard. "We think FORTRAN's a good language, and we want to keep it modern," says Jeanne Adams, who chairs ANSI's FORTRAN committee.

The 8X draft adds to the standard FORTRAN language specification statements for array operations, permits programmer-defined data types (like those allowed in Pascal), and enhances procedure calls. Unlike the FORTRAN 77 standard, which removed Hollerith data types from the language spec, the current 8X draft proposes no outright deletions. Last December, a letter ballot vote recommended passing the draft on to the next higher parent committee at ANSI, but also elicited some negative comments that must be sorted out. Ultimate acceptance would be "no sooner than 1988 and possibly later," says Adams, who is well aware of how hard it is to satisfy FORTRAN's diverse and ancient constituency. "It's like changing the language you speak," she says.

Until a brave new way of speaking to computers arrives, Adams's subcommittee and their successors will have important work to do. As British computer scientist Tony Hoare remarked several years ago, "I don't know what the language of the year 2000 will look like, but I know it will be called FORTRAN." ■

"But when you said, 'The times they are a-changin',' could you perhaps be a little more specific?"

Cartoon by H.L. Schwadron



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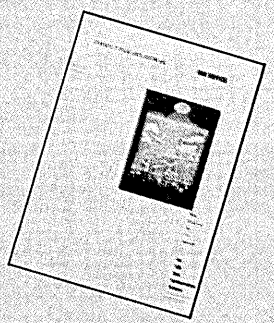

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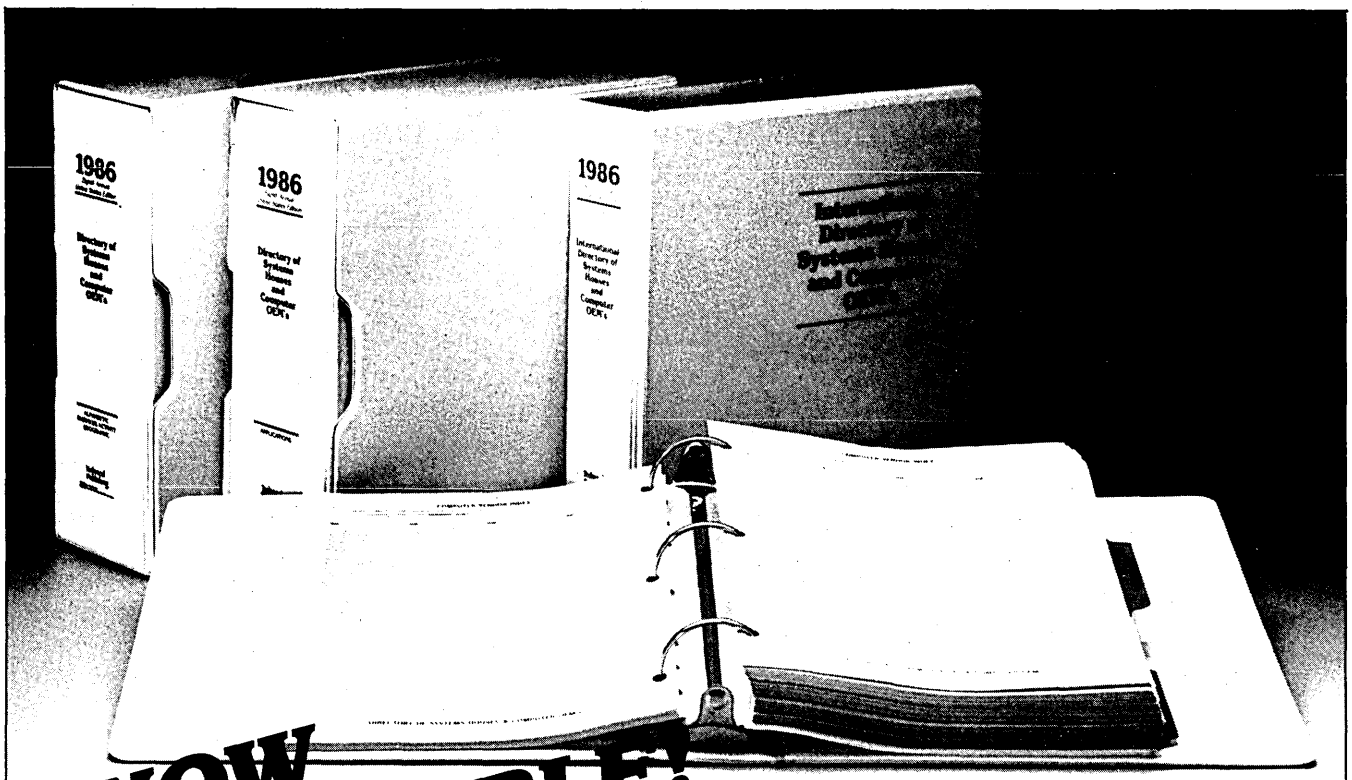

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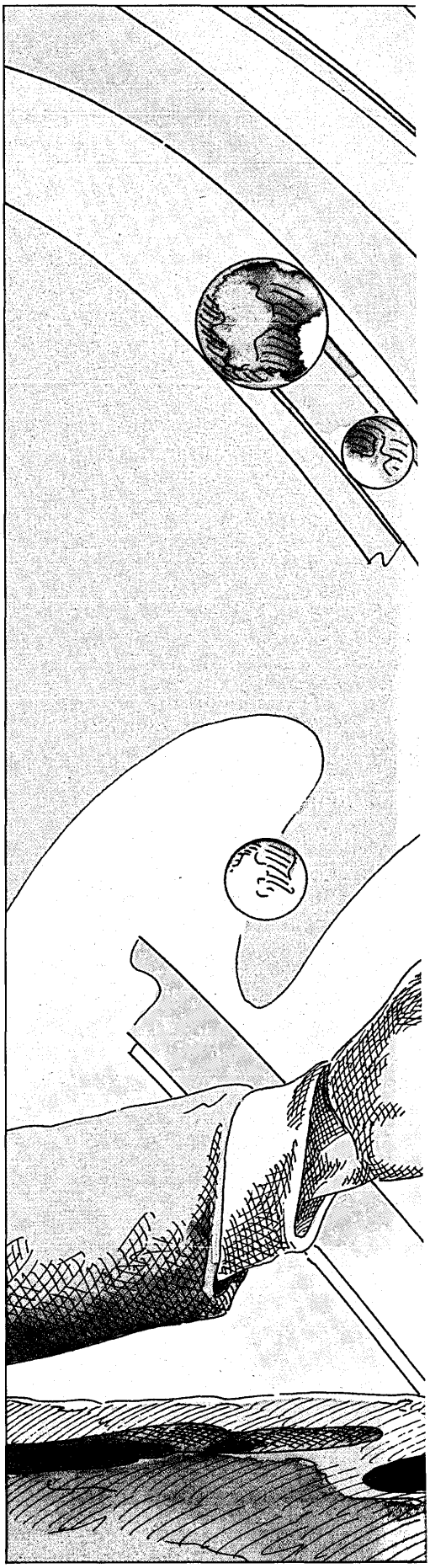
CIRCLE 30 ON READER CARD

The crisis facing software developers, especially those involved in developing large, complex systems, could be averted with the use of an Integrated Project Support Environment (IPSE). This is an extensive and sophisticated package of development tools. Research on IPSEs in Europe, Japan, and the U.S. will start bearing fruit this year and some products are available now. There is still more work to be done on developing international interface standards for IPSEs, but some early users are enthusiastic about their potential.



BY DAVID MORGAN

The world's software engineers, currently beset with escalating software development problems, are being offered some hope. That hope is the result of multimillion-dollar research and development projects in Europe, the U.S., and Japan: the Integrated Project Support Environment (IPSE). IPSE consists of a coordinated set of sophisticated software tools able to help in the design, development, and management of large, complex, software-based projects.

Many software engineers believe that IPSEs are not just important for the future of software development—in some cases they are essential. Developers of yesterday's large software systems argue that some of the projects being undertaken today cannot be completed successfully without an IPSE. The complexity of the technical and management task has become too pronounced to handle with traditional methods.

From the user's point of view, IPSEs offer three major benefits—better management of complex projects, improvements in software quality, and productivity gains in the development process. While IPSEs promise to streamline the design, development, and management of these large projects, the cost of running an IPSE-based development is substantial. Staff must be trained in new methods and organizational changes may be needed to make the best use of an automated project support system. There's also the cost of the hardware to support the IPSE and, last but not least, the investment in the IPSE software itself.

Unfortunately, little is yet known about the cost-effectiveness of IPSEs in projects of different sizes and complexity (see "An IPSE in Action"). Nevertheless, the early indications are that the initial investment costs will be offset by the advantages of better project control, increased productivity, and higher-quality results. Of course, once a company has installed an IPSE, the costs of expanding it to cover further projects are relatively reduced.

Essentially, an IPSE consists of a closely integrated set of software tools mounted on top of a database and interfaced to a variety of users via a common interface package. This high level of integration gives the IPSE its ability to cope, in a coordinated way, with a diverse set of complex tasks.

The key features that differentiate an IPSE from a traditional collection of loosely linked software development tools are the following:

- the high degree and harmony of integration;
- the provision of tools that cover all phases of the project life cycle, from requirements capture to design and development to supply and maintenance;
- the collection of all data concerning the project in a database;

The Imminent IPSE

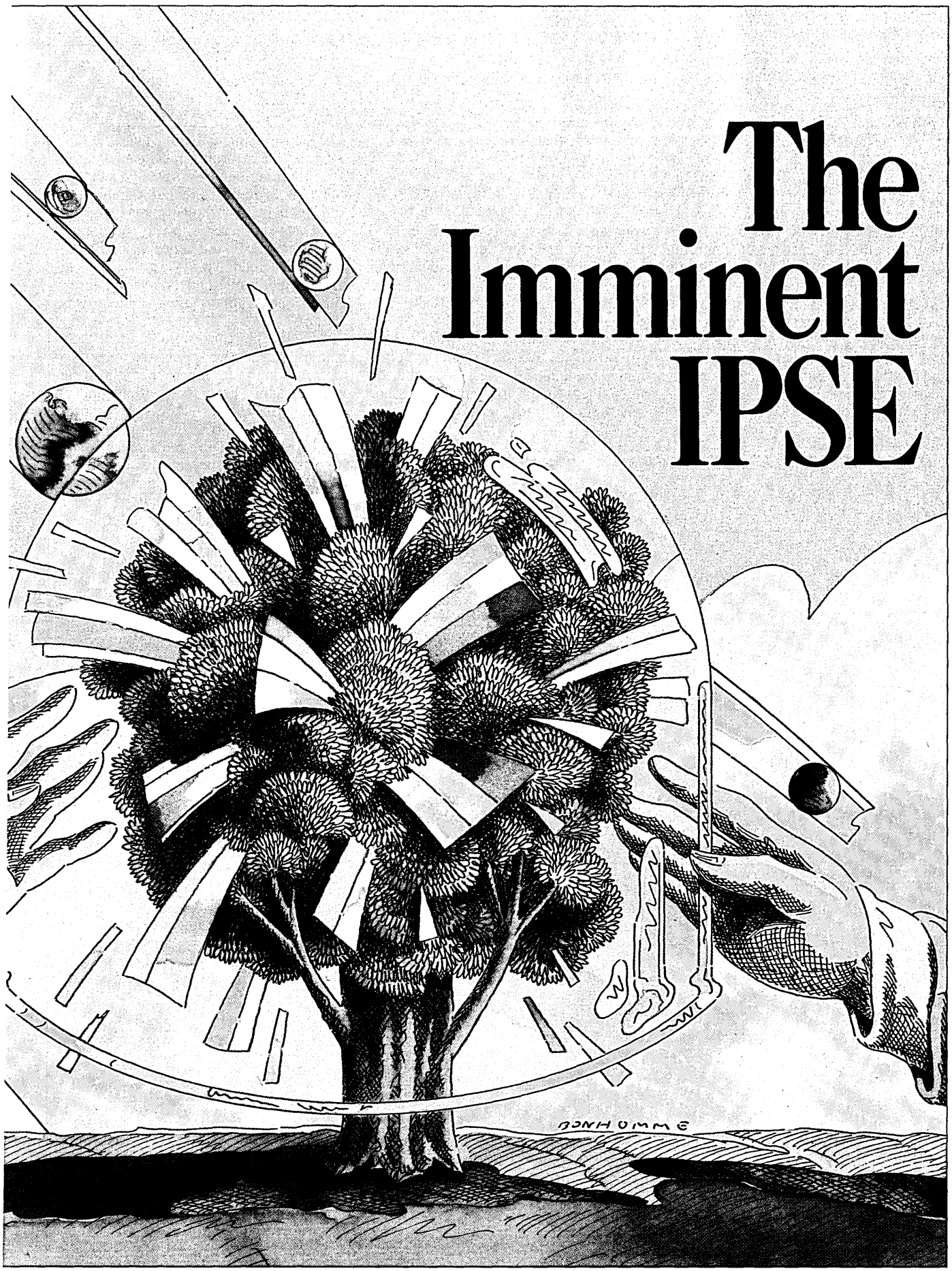
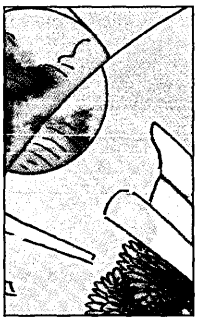


Illustration by Bernard Bonhomme



The Imminent IPSE

• projectwide control mechanisms covering access to the tools and database.

There are varying degrees of sophistication in IPSEs, resulting from the difficulties of developing such complex packages. In November 1983, researchers involved in the U.K.'s Alvey R&D program produced a software engineering strategy document that identified three generations of IPSE (see Figure 1).

In practice, the first generation has been filled by Unix and its associated tools; the second generation—data-based tool sets—is where we are today; and the third generation of IPSEs—incorporating intelligent tools—is not expected to appear until the 1990s.

The first public statement that future developments of large software projects would require support environments was made in the U.S. in 1979. It was then that the Department of Defense published its "Requirements for Ada Language Integrated Computer Environments," commonly called the Stoneman Document.

These requirements were part of the DOD's advanced, real-time programming language, Ada. The document defined the form of a programming support environment, in this case the Ada Programming Support Environment (APSE).

At the same time the Department of Defense was working specifically on the Ada environment, it was recognized that such environments could handle the management of a whole project, from the hardware requirements to personnel management. So the concept was adapted by the industry at large to include these wider issues and the term Integrated Project Support Environment was coined.

Since then the development of IPSEs and their associated tools has become a central theme of both the European Commission's Esprit software engineering scheme and the U.K.'s Alvey program, which has two second generation IPSE projects: Eclipse and Aspect. Many researchers believe this European research is at the leading edge of IPSE development. Other projects are under way in the U.S. and Japan (see "IPSE Development Efforts").

One of the problems yet to be solved by the world's IPSE developers is the definition of a public tools interface that allows independently developed tools to be used in a project.

Most major product vendors recog-

FIGURE 1 The Evolution of the IPSE

First generation: collection of existing tools linked by a file base. In the first instance, Unix is the basis for development.

Second generation: incorporating a data-based tool set and including support for geographically distributed project teams.

Third generation: incorporating a knowledge base and intelligent tools. Tools for computer aided design of VLSI and hardware development will also be included. The concept of an information systems factory is based on the use of these types of facilities.

IPSE Development Efforts

Research projects into IPSEs are under way in Europe, the U.S., and Japan. Japan's Sigma software engineering program, set up in 1985, is based on the concept of a central support environment accessible by developers from all over Japan. This project, however, is not as comprehensive as others in the U.S. and Europe. Both the European Commission's Esprit program and the U.K.'s Alvey scheme are funding leading-edge IPSE projects that have provided a catalyst for commercial activity in Europe.

Within Esprit the major project focuses on the development of the Portable Common Tool Environment and involves a consortium led by France's Honeywell-Bull that includes Britain's ICL, West Germany's Siemens and Nixdorf, Italy's Olivetti, and the U.K.'s GEC Research.

The project has concentrated on one of the major problems in IPSE technology—the Public Tools Interface. An environmental framework based upon the resulting Emeraude PCTE is now being marketed by Honeywell-Bull.

The U.K.'s Alvey program has two second generation projects: Eclipse and Aspect. Eclipse involves a consortium of U.K. software houses and universities—Software Sciences, CAP (U.K.), Learmouth and Burchett Management Systems, along with the Universities of Lancaster and Strathclyde, and the University College of Wales at Aberystwyth. Aspect is the work of a group that includes ICL, software developers Systems Designers and MARI Advanced Microelectronics, and the Universities of York and Newcastle upon Tyne.

U.K. company Systems Designers has also developed an IPSE known as Perspective Kernal, which contains some of the ideas being developed on the Aspect project.

Other commercially available products include the BIS/IPSE from London-based BIS Applied Systems, and GEC Software's Genos IPSE, which Hewlett-Packard has contracted to use in the U.S. A further second generation IPSE, called Istar, has been jointly developed by British Telecom and Imperial Software Technology, without either Alvey or Esprit funding. Motorola has decided to standardize on Istar, and the Software Engineering Institute (SEI) based at Carnegie-Mellon University also installed the product in February.

The SEI, which is part of the DOD-funded STARS (Software Technology for Adaptable Reliable Systems) project, is running one of three major U.S. IPSE development programs. The other two are industry funded and involve work backed by the MCC (Microelectronics and Computer Corp.) in conjunction with the University of Texas in Austin, and projects managed by the Software Productivity Consortium (SPC).

The Software Engineering Institute will become the IPSE showcase of the STARS program. It plans to develop the Showcase Software Factory of the Future (SSFF), which will be used to demonstrate to industrialists the benefits of the latest software engineering techniques. The CAIS 1 software tools interface standard is related to this program.

The MCC has the Leonardo project, which is aimed at improving productivity by two orders of magnitude in eight years for large, distributed, parallel real-time systems.

The SPC's declared intent is to conduct research into knowledge-based processes for system development and rapid prototyping. This wider brief makes the SPC's work similar to that of the Information System Factory studies of Alvey and Esprit.

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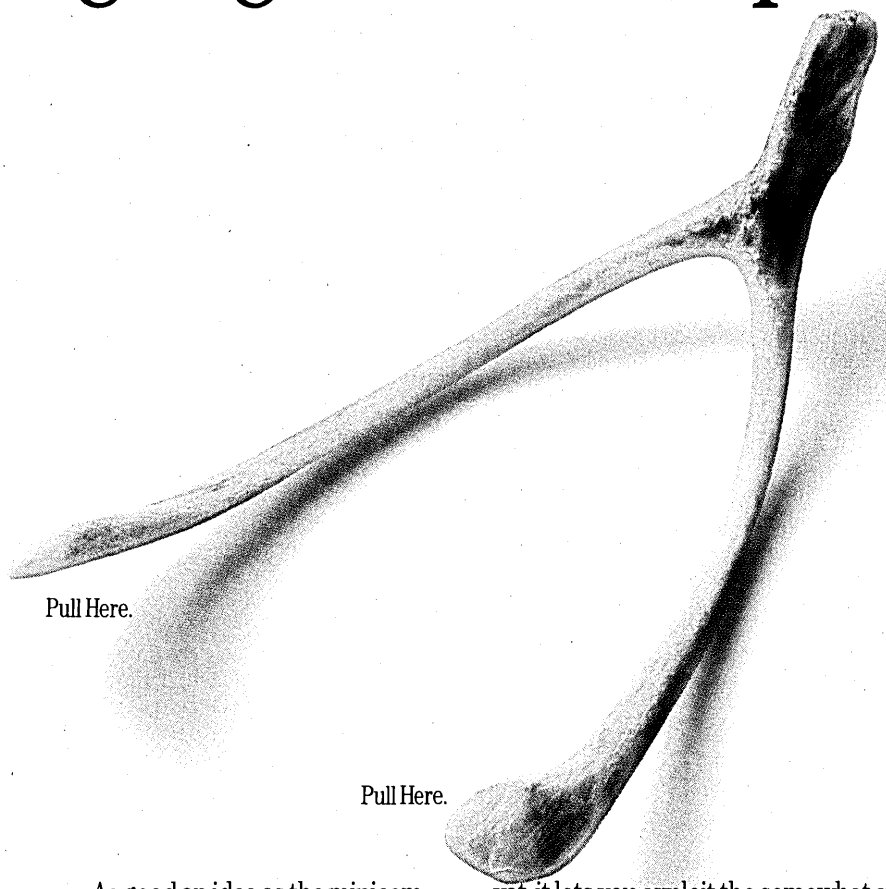

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The Imminent IPSE

nize this problem and provide ways of incorporating these additional tools—with varying degrees of success. It is widely agreed, however, that major advantages could be gained by both suppliers and users if an international standard for interfacing tools to an IPSE could be specified and adopted.

Two contenders currently exist: the European Portable Common Tool Environment (PCTE) and the U.S. DOD development, the Common Ada Interface Standard (CAIS). An international debate is now taking place to determine whether either of these proposals should be adopted and what future tool standards should look like.

The PCTE has already been selected as the standard for the European Commission's Esprit projects. Also in the U.K., the Eclipse project has adopted PCTE as its public tools interface, while the Aspect project has adopted a higher-level interface providing a subset of PCTE functions.

Meanwhile, a commercially available IPSE called Istar, which was developed by Imperial Software Technology and British Telecom, provides a higher-level interface, although its developers are planning to produce a version incorporating PCTE.

The arguments about the complexity of a public tools interface are centered on two main issues—the degree of control a specific tool has over the underlying operating system and database, and what facilities are provided for an effective user interface.

The PCTE was originally designed to be used with the Unix operating system. Work is now under way to remove its Unix dependence. Versions of IPSEs with a PCTE interface are likely to be available later this year for the Digital Equipment Corp. VMS operating system and for the Sun Microsystems Sun 3 workstation.

A PCTE Interface Management Board has been created by the Esprit management team to oversee and rule on all future and proposed changes to PCTE. More important, it will prepare the ground for the adoption of PCTE, or its successor, as an international standard. Although no final decision has been made, PCTE is ahead of comparable work being done in the U.S. and Japan; it is expected to gain status as an international standard.

Research is already under way to work out what form future generations of IPSE will take. Under the Alvey program, there is the IPSE 2.5 project, and studies into third generation IPSEs, which will form the basis of future Information System Factories (ISF), the ultimate goal for the IPSE.

Within Esprit, there are a number of projects working on future IPSEs, and in the relatively new Eureka European development program there are two major ISF projects.

In contrast with current systems, future IPSEs will allow the joint design of hardware and software, and will also incorporate the skills of experienced designers of intelligent knowledge-based systems (IKBS) tools. These IPSEs will support the different styles of system development and prototyping that are now being researched by the world's IKBS community. A much wider range of aids to support secure and reliable systems development will also be provided.

Gleam Becomes Reality

Having been a gleam in the eye of the advanced systems developer for many years, IPSEs will become a reality over the next year or so as the first research projects come to fruition. Their adoption will accelerate the movement of software development away from a purely labor-intensive activity toward a more capital-intensive mode.

Although the exact economies of IPSEs have yet to be established, they are likely to cause a major change in the structure of the software development industry. A talented developer working in the Information System Factory of the future, for example, will find his productivity multiplied many times by the degree of investment in the ISF's facilities.

While software developers will have to adopt IPSE technology if they are to remain competitive, large computer users in industry naturally will be wary of making the initial investment. They too, however, will soon get involved, either because increased system complexity will force them to make the commitment, or because they are convinced by the commercial evidence of the benefits of buying an IPSE.

The next few years should see the emergence of that evidence. ■

David Morgan is director of the Software Engineering team in the U.K.'s Alvey research project. He is on temporary assignment from Plessey Research and Technology, where he set up a software skills research center and introduced a program to improve the engineering design technology used throughout Plessey.

An IPSE in Action

Motorola Israel is among the world's first commercial users of an IPSE. In March 1986 it bought the Istar product, from London-based Imperial Software Technology (IST) and British Telecom, to support its systems software development.

Paul Rogaway, manager of Motorola's systems software development division in Tel Aviv, enthuses, "The IPSE is a winning concept. We were suffering from the software crisis like everyone else and needed a way to improve the productivity of our engineers and the quality of our software."

While not able to quantify improvements as yet—tools and methods for measuring gains are still a weak link in IPSE development—Rogaway notes a qualitative benefit since installing Istar. He reports a fivefold gain over what Motorola calls the "seat of the pants" development method using structured programming techniques. Ultimately, when Istar is pushed to its limits, Rogaway is hoping for a further doubling in productivity and quality.

Motorola selected IST's IPSE because it is integrated and open-ended. "By integrated, we meant something which could address both hardware and software design problems throughout the product life cycle. The IPSE structure also had to let us use our own tools and those from IST," explains Rogaway.

Programming work at the Tel Aviv software development center is primarily done in C, using the Istar C-based work bench. Istar also supports a variety of project management aids, defect-reporting tools, and office automation packages.

But Rogaway underlines the need to invest in hardware as well as software to take full advantage of an IPSE. Each member of his 15-person staff has an Apollo Domain workstation. Add the cost of these machines to the $5,000 per user license fee for Istar and the cost of software engineering is initially high. Nevertheless, counsels Rogaway, "If management is wise, it must realize the need for the software investment."

BY SARAH UNDERWOOD

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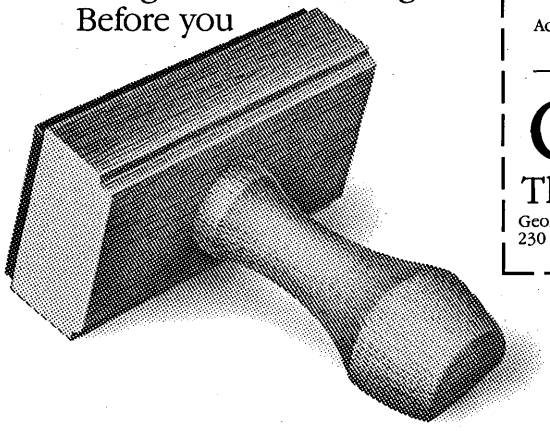

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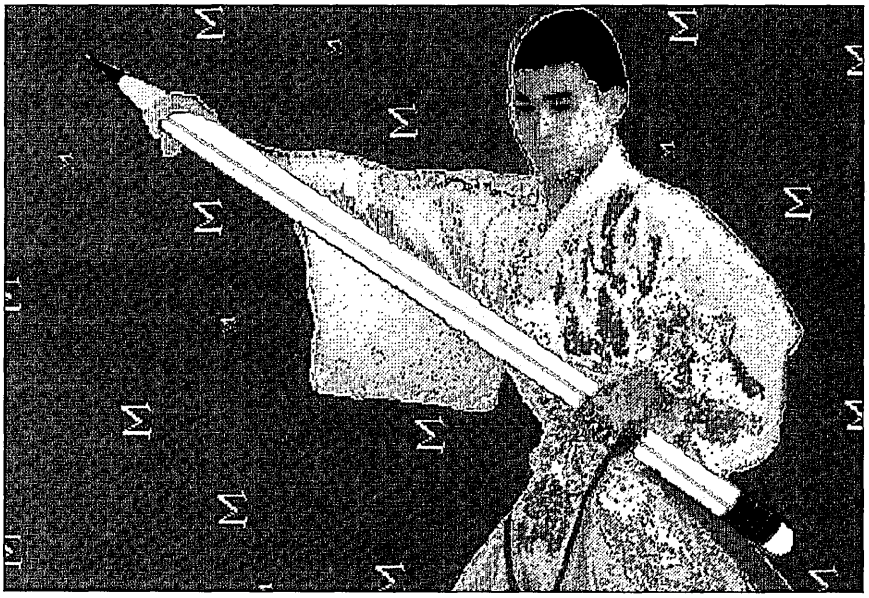
Japan has a software problem. It needs 600,000 more programmers by 1990 and a more effective software industry. The Sigma Project may be the solution. Started in 1985, it now has 150 member firms and well-defined goals for a Unix-based software development environment. The plan is to have Sigma workstations on sale and the Sigma Center housing a range of development tools operational by year's end. The result may improve the local software industry as well as the competitiveness of Japanese software in world markets.

The Sigma Project



BY ROBERT POE

A few years ago the Ministry of International Trade and Industry (MITI) warned that Japan will be short approximately 600,000 computer programmers by 1990. That forecast served as the justification for a five-year project to create an extensive set of software tools that will greatly increase the productivity of Japanese software developers and stimulate the local software industry.

Called the Sigma Project, it was set up in October 1985 with $164 million worth (¥25 billion) of backing from industry and the Japanese government. The joint project now has 150 members, including all the major Japanese dp vendors and a few foreign investors such as DEC, Data General, NCR, AT&T Unix Pacific, Olivetti, Nippon Univac, and Yokogawa-Hewlett-Packard.

Officially, Sigma is Japan's attempt to cope with the expected programmer shortage by creating Unix-based networks, software libraries, development tools, and workstations that can be used to develop application and system software (see "Japan's Rising Sum"). In spirit, however, Sigma also embraces the ambitious goal of making Japanese software more competitive in international markets—quite a different task, and something its government sponsor, the Information Technology Promotion Agency (IPA), has been trying to do since it was established in 1970.

Sigma is at the center of a number of converging trends and influences that could have a substantial impact not only on the Japanese software industry but on its hardware industry as well. Bill Smale, president of JI Consulting of Tokyo, observes: "They've done a lot of things right with Sigma that they did wrong with the fifth generation project. The fifth generation has fallen on its face because it was shooting for the moon." AT&T Unix Pacific president Larry Crume is convinced that "this project will have the most impact of any Unix activity in the world, because they have set their sights on customers. Europe's CAE [Common Applications Environment] has no customers in mind."

Software productivity isn't Japan's big problem. Engineers at some large computer manufacturers are said to write several times as many lines of code per month, with lower bug rates, than their overseas counterparts. Nor, despite MITI's prediction, is the problem merely a shortfall of programmers. "That prediction was MITI speaking to the Ministry of Finance," confides Kohtaro Uchida, assistant general manager for system products planning at office

Illustration by Sandra Filippucci

equipment maker Ricoh of Tokyo, and a member of Sigma's administrative subcommittee. "MITI had to write a proposal to MOF to get the funding for Sigma."

The real bottleneck in Japanese software production results from what are often described as cultural factors.

A Japanese Characteristic

Although these cultural arguments often focus on a basic and allegedly incurable Japanese lack of creativity, less philosophical explanations also fit the facts. "It's a Japanese characteristic that end users don't like to buy general purpose software packages from outside," explains Yuji Yamadori, director of research and international affairs for the nonprofit-making Japan Information Processing Development Center (JIPDEC) in Tokyo. According to JI Consulting's Bill Smale, ready-made products account for only 5% of software sales in Japan,most for personal computers.

End users prefer to maintain large in-house staffs to write their own custom applications. So strong is this tendency that it has dictated the structure of the entire private software industry. The major software houses have traditionally been little more than high-tech temporary help agencies, sending their programmers to client companies and charging on a man-month basis. This has been changing recently, with more jobs being done under project contracts, but the demand is still for custom work.

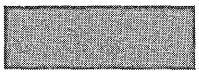
Junkyo Fujieda, general manager of the information systems group of CSK Corp., the largest software company in Japan, feels that determination to provide superior service is the key: "In many fields—like banking—the business is very regulated, so companies try to tailor their own specialized services that are better than the others."

JIPDEC's Yamadori adds that "managers can't imagine paying for something they can't touch. If they considered cost and development time, they would buy packages. But if they develop it within the company, they think it doesn't cost them anything."

Whatever the reasons, the insistence on custom applications and in-house development has had a tremendous impact on Japan's ability to create software. Most readily apparent is the sheer waste of manpower resulting from scores of companies in the same fields developing similar applications. Also, because third-party packaged software is so poorly received, talented programmers who might otherwise create innovative, successful products are discouraged from entering the package software business.

Sigma's most obvious target is the presently neglected third-party commercial program developers. The software libraries, development tools, networks, and workstations the project is expected to produce will be ideal for smaller companies with minimal manpower. Although these won't solve the lack of customers for commercial packages, it may give them the capabilities to offer their services to large end users on a project basis. In fact, at least one observer feels this will lead to problems for the larger houses. Warns JIPDEC's Yamadori, "With the improvement in productivity, the larger companies will have more competition from the smaller houses. Right now [the large companies] have their particular specialties, but in the future everyone will be able to access Sigma and they will all become more even."

CSK's Fujieda vehemently disagrees. "Sigma will only bring the mediocre companies up to a slightly higher level," he retorts. "Everyone won't be disclosing their top-notch know-how to Sigma. If something's good they'll sell it directly." Although CSK is a Sigma participant, "I just send my people to find out what they're doing," Fujieda reveals. "If something nice pops up, I'm going to use it."



THE DEMAND IS FOR CUSTOM WORK.

There are also some very practical reasons why—except for the smaller independent houses—few developers may make much use of Sigma. Ironically, one reason is the very Unix environment that Sigma chose because of its advantages for software development.

Observes Ricoh's Uchida, "If the end user wants to use the Sigma workstation and he is a mainframe user, he will not be familiar with the Unix environment, so he will need training and education." With the sizable staffs large users maintain, such retraining costs could be prohibitive.

Large computer manufacturers offer a little more hope. They too have invested a lot in their current systems, and, as AT&T Unix Pacific's Crume admits, "there is some difficulty in getting people to change their software development environment." But the Japanese are more familiar with Unix than most end users around the world. All three Japanese mainframe makers, for example, are offering at least guest-mode Unix on their large machines as well as native-mode Unix on their smaller machines. In addition, Crume claims he has "seen them using Unix deep inside their companies for things like LSI design." A widespread changeover can't be expected soon, however.

Workstations may hold the key to Sigma's success. Not only the large computer makers, but several others, including Casio, Ricoh, Sharp, and Sony, have introduced Unix-based workstations for engineering or office use, in addition to the models running their proprietary operating systems. These manufacturers appear convinced that this size machine is the next hot growth area, but "they don't know what to do with them or how to sell them," notes Smale of JI Consulting. This opens the door for independent developers, who, using Sigma, will be in a position to do for workstations what they previously did for personal computers, the only Japanese market where packaged software sales are significant.

The manufacturers expect a lot from Sigma, too. Although the full system including development tools won't be completed until 1990, prototypes of the workstations are already in place and version 0 workstations will go on sale in October. It's clear that the manufacturers are expecting them to sell well. The companies producing the prototypes include NEC, Hitachi, Fujitsu, Mitsubishi Electric, Toshiba, Sumitomo Electric, and Tateishi, and many more are expected to come out with the commercial versions.

A General Commercial Product

The vision of software developers creating applications for engineering or office workstations using Unix-based Sigma workstations and tools naturally brings to mind the possibility that the Sigma machine itself can serve as a general commercial product. Sigma specifications, however, will be limited in several ways. First, they will be frozen fairly early, and will not be updated with every incremental technological advance. Also, with so many manufacturers having to agree on the specs, "sometimes the decisions will be based on the

Japan's Rising Sum

The Japanese love symbolism, and though the word Sigma is officially an acronym taken from Software Industrialized Generator and Maintenance Aids, it was also chosen for its mathematical meaning as the "sum"—in the case of the Sigma project, the sum of everyone's efforts.

Sigma is working on three fronts that are supposed to come together by the time the project ends in 1990 to form a comprehensive support system for software developers. At its heart will be a Sigma Center housing large computers running the Unix-based Sigma operating system and located in Harumi, near downtown Tokyo.

One of the center's most important ingredients will be a database system with a software library containing programs, modules, and tools available to developers who wish to use or incorporate them in their own programs. They will then be charged a licensing fee that will go to the products' owners. Sigma will administer these license fee payments. Other databases will include different types of technical, educational, and reference information.

There will also be subsystems for the development environment to handle things like controlling the different versions of software and tools available, as well as for demonstrations. Network management and control for the entire Sigma system will be provided by another system that will in effect be the front-end processor for the whole center. Gateways to external networks, both local and international, and other databases will also be provided.

The second major element is the Sigma workstation. The Sigma team defines the specifications to which manufacturers must build their machines. Minimum hardware requirements are fairly typical of current Unix workstations, including a 32-bit cpu with at least 1MIPS performance, 4MB of main memory, floating point processor, 80MB hard disk drive and 1.6MB floppy disk drive, two-button mouse, and multiwindowing capability.

The spec also includes a 1,000 by 1,000-dot bit map display that differs from the usual standard of 1,024 by 768 dots. Ethernet and X.25 interfaces and 300dpi laser printers are listed as optional. Operating system specs are presently based on Unix System V version 2.0, with extensions for graphics, Japanese language, or communications using what are hoped to be the most widely accepted international standards. These include the Graphics Kernel System, AT&T's international character definitions, and the Transmission Control Protocol/Internet Protocol (TCP/IP). Some communications functions from Berkeley Unix are being included as well.

The specifications are aimed at only one target: the software engineer. There are no specs, for example, for color monitors, which might be a critical feature for engineering workstations but are relatively unimportant to software developers. Declares Sigma planning manager Noboru Akima, "We are proposing a software development environment, so we say to the manufacturers, 'We want this hardware.' There is only one condition: our software development tools that run on the Sigma OS must be portable regardless of the maker." These tools are what, in theory, will allow programmers to sit in their offices, wherever they are, and produce more and better software than they have ever been able to in the past.

What Sigma calls common tools will be used by almost all software engineers and will reside on the workstations. These include documentation tools with Japanese language capability; network tools enabling workstations to interact with each other and the Sigma Center through electronic mail, file transfer, and later remote log-in; and a virtual terminal, which will be able to emulate all widely used terminals on the market. There will also be selected tools, which will only be needed for certain kinds of jobs and will probably reside in the Sigma Center. Such tools are being developed for business, engineering, and microcomputer applications, including a syntax editor for engineering and a symbolic debugger for microprocessor applications.

Work in these three areas is proceeding apace. Prototype workstations have been delivered and, after evaluation and debugging, the first machines will be offered for sale this fall. That is about the same time the 30 or so software tools now in the programming stage will be ready for integration testing. The bare bones of the Sigma Center also are in place, and some companies are already connected to it. By 1990, all three elements are expected to be developed well enough so that the full-scale system can be put into commercial operation under some still undecided profit-making structure.

As with most other aspects of the project, the targets set for that phase are eminently reasonable. Not many observers disagree with planning manager Akima's opinion that Sigma's stated goal of having 10,000 workstations in use by 1990 is "very feasible."

lowest common denominator," explains JIPDEC's Yamadori.

Nevertheless, since Sigma will, as much as possible, limit itself to defining functions needed for software development, its specifications will not be excessively restrictive. Thus the most likely scenario, according to Uchida of Ricoh, is that manufacturers "may use Sigma as a core, and add additional functions that will not be standardized. They will have a war of additional functions." Unfortunately, this will also cut down on the portability of application software.

Price May Be Chief Influence

One of the most influential of the Sigma specifications may be the price—the current prototype machines are required to cost no more than $20,000 (¥3 million), and that figure is expected to decrease by two thirds by 1990. These numbers, combined with manufacturers' competitive instincts, are expected to stimulate them to cut costs as they add hardware features. Declares Ikumune Takahashi, a senior manager in Toshiba's software engineering department, "We anticipate we will have a lot of low-end workstations with a reasonable price and high performance. Currently available workstations are very expensive."

The beneficial effect most often credited to Sigma is intangible. Crume of AT&T Unix Pacific feels that "it will get the Japanese companies lined up on a common base." Agrees CSK's Fujieda, "It will give focus, a nationwide sense of direction."

Where this direction will lead is another question. Masayoshi Son, president of Softbank Corp. of Tokyo, remarks, "I think the Unix market will expand. It offers a good path from micros to mainframes. Eventually it will be for the office, but it will start with engineers." Ricoh's Uchida has a provocative idea that goes even further—he feels the current hodgepodge of Japanese mid-range machines could be replaced by products based on the Sigma-defined operating system, once manufacturers realize the advantages of third-party software development.

Such developments would also have another effect. Explains JI Consulting's Smale, "It's only talked about behind closed doors, so you won't find it in any specs, but one of the unannounced goals of Sigma is to get all the manufacturers to produce Unix workstations until they drive down the price of hardware enough to export to the U.S. There's no doubt about it." ■

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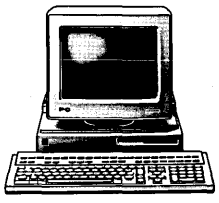

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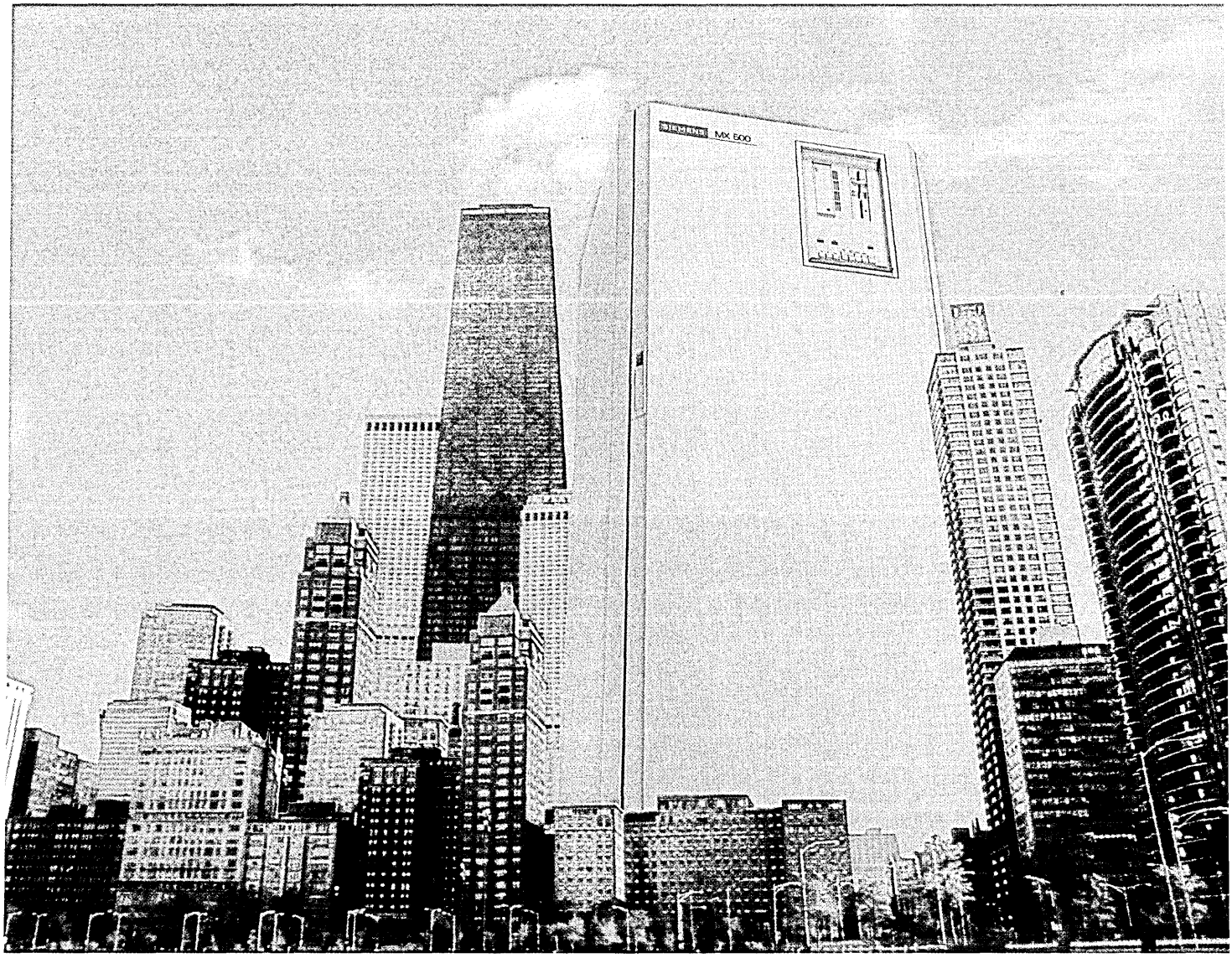
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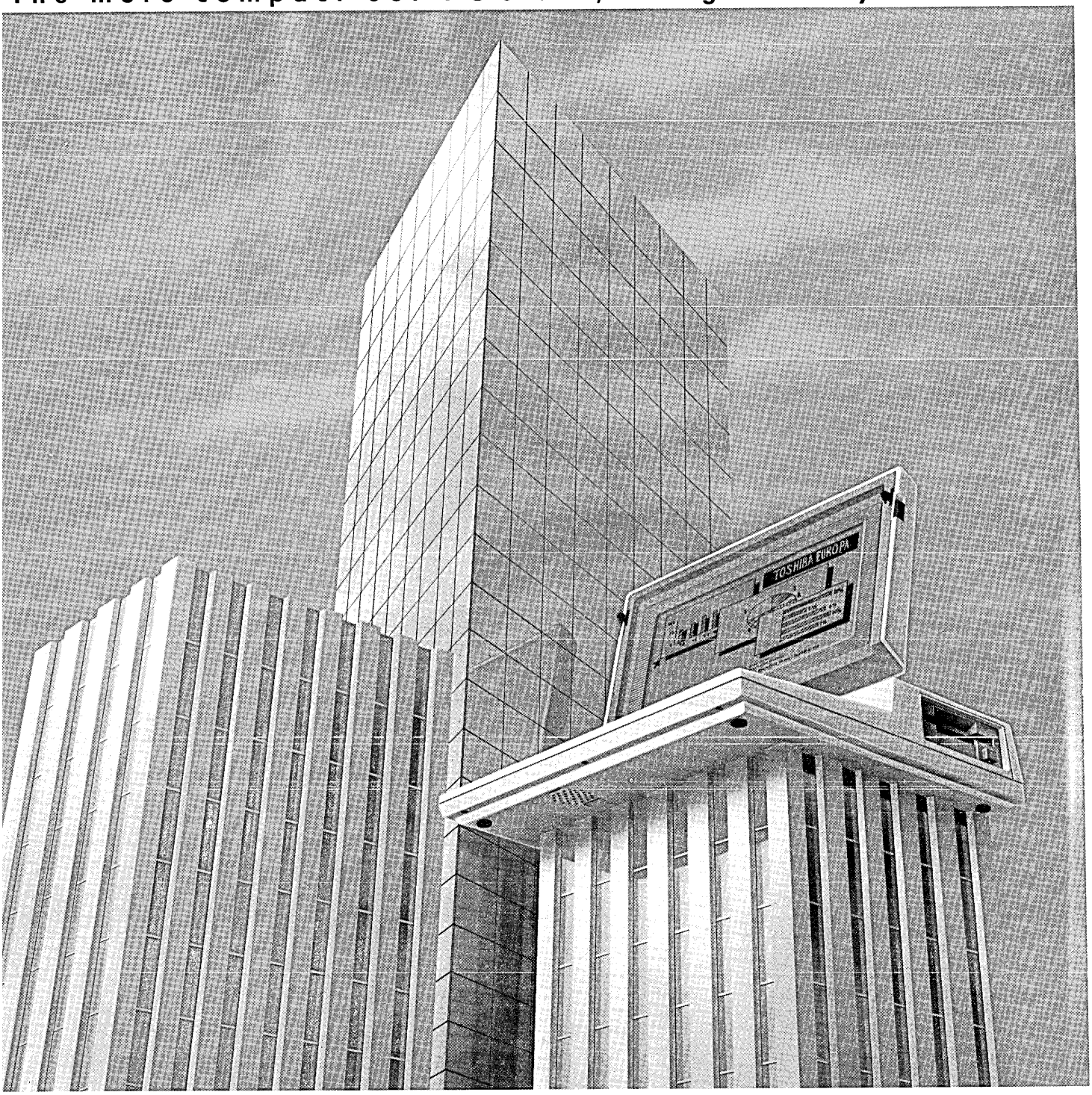

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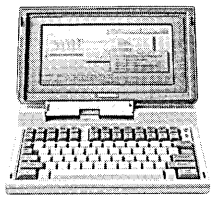

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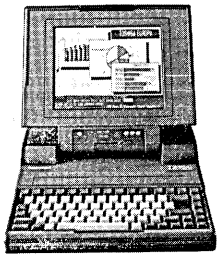

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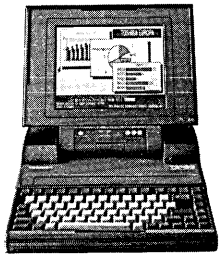

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IN TOUCH WITH TOMORROW.

There's little chance in the near future of an electronic alternative to the ubiquitous postal system. Developing a global electronic mail network is hindered by the variety of messaging technologies now in use. But there is growing support for the X.400 messaging standard.

Getting the E-Mail Message Across

BY JULIAN PATTERSON

When electronic mail became an industry catch phrase at the turn of the 1980s, many people looked forward to a global network that would deliver a variety of messages at the touch of a button. Instead, the term became a catchall for a range of disparate services, none of which lived up to the early expectations.

Enter X.400, a set of recommendations introduced in 1984 by the Comité Consultatif International Télégraphique et Téléphonique (CCITT) in Geneva. X.400 provides the basis of a standard interface for both private and public electronic messaging systems.

Since its introduction, it has won widespread support from standards bodies, telephone authorities, and computer manufacturers around the world. The trickle of products incorporating the protocols began in 1986 and will grow to a flood this year.

USERS ARE DEMANDING A SINGLE SOLUTION.

On paper, X.400 products and services clearly have much to offer. The simplest and most significant gain for the user is the ability to send messages easily, quickly, and in a variety of forms to almost any communicating terminal. So far, though, few real cost savings can be proved, but a saving in staff time is an achievable spin-off.

Corporate users will enjoy further benefits. X.400 protocols could form the basis for private message networks, similar to existing telex or electronic mail networks, but broader in scope and richer in functionality. For large computer users with a variety of incompatible equipment from different vendors, such a standard is long overdue; and for those firms whose competitive strategies hinge on improved intracompany and cross-industry communications, it is essential.

Though X.400 is best known as a foundation for a global electronic mail service, it is much more pervasive. It sets out a basic structure for the development of other applications based on store-and-forward techniques.

The American National Standards Institute (ANSI), for example, has considered X.400 part of its X.12 standard for Electronic Data Interchange. The CCITT interface is also the basis of an ambitious program in the Netherlands to link more than 1,000 computers in local government offices for the exchange and updating of official records.

Much of the need for this development stems from the variety of messaging and electronic mail techniques that now exist. These include telex and its high-speed and more sophisticated successor, teletex, facsimile, and the wide range of public and in-house mailbox systems.

But even telex, the most successful of these, can hardly claim to be universal. Although it has over 1.6 million subscribers, telex has obvious drawbacks when used for anything other than the exchange of simple messages. In Japan, for example, telex is little used because of the problems of reproducing the complex kanji alphabet. It is no coincidence that Japanese manufacturers have done

more than most to produce facsimile equipment that better suits their needs. In the U.S., where time differences between subscribers can stretch several hours, store-and-forward mailbox services have grown rapidly, again to the detriment of telex.

As well as overcoming geographical and linguistic constraints, an organization may have other special requirements for its electronic mail service. Privacy is a prime example, especially in the financial sector, where many firms need a messaging system that is closed to all but authorized subscribers.

There is also the question of cost. Building in-house systems is often more economical than subscribing to public services.

Considerations like these explain the diversity of electronic messaging technologies and why the most fundamental characteristics of the existing postal system—universality and flexibility—have, until recently, eluded the designers of an electronic counterpart.

X.400 May Be a Solution

Many observers now believe that X.400 is a solution to that problem. When the CCITT recommendations emerged in October 1984, the objective was to bring order to the chaos of electronic messaging by providing a universal interconnection standard.

Technically, the protocols form the messaging part of the Open Systems Interconnect model and are based on the Message Handling System (MHS) first described by the International Federation of Information Processing (IFIP) in 1980. This was subsequently adopted—and variously adapted—by a number of standards bodies and industry groups including the International Standards Organization (ISO) and the European Computer Manufacturers' Association (ECMA), both in Geneva, as well as the CCITT.

Today, while there are still some differences in the detailed specifications from each of the groups concerned, these parallel efforts can be considered complementary rather than competing.

The MHS model describes the arrangement of users, processes and, implicitly, the hardware that make up a messaging system. It also distinguishes between public and private systems so that technical differences and administrative tasks can easily be handled. This is important because a universal electronic mail system needs to encompass not only the range of services delivered by the public networks, but also the private systems built for internal use and the value-added services—Dialcom and GEISCO's Quik-Comm for example—that are considered private by the national telephone administrations (PTTs).

In the U.S., there are a number of public electronic mailbox services such as GTE Telemail, MCI Mail, and Western Union Easylink. In Europe, such network-delivered offerings are supplied by both local and U.S. service providers and, more recently, by the PTTs. In addition to these, many users have built their own systems, typically using licensed software. Confusing the picture still further are the electronic mail facilities built into office systems supplied by the big-league computer vendors—IBM's PROFS and DISOSS, Digital Equipment Corp.'s All-in-1, and Data General's Comprehensive Electronic Office are among the leading products.

FOR CORPORATE USERS, INCREASING SUPPLIER COMMITMENT TO X.400 CAN ONLY BE AN ADVANTAGE.

While these systems are largely incompatible, they are all variants of a common technology that uses computers to store messages and relay them to the terminals of end-users. Store-and-forward messaging has several advantages over real-time alternatives, being an efficient transmission medium and fitting well with the nature of office work. Each user has an ID and a file on the system that is his personal mailbox. Users connect to the system using either direct or dial-up X.25 links. Unlike the telephone, electronic mail does not need both parties to be active in the messaging process at once, so users can send or retrieve their correspondence in batches, just as they would send or pick up their mail.

The problem with existing electronic mail systems is that they have grown up in isolation, frequently in the form of closed user groups. Since it's increasingly hard to cost-justify the use of one communications network internally and another one (or more) to reach the outside world, users have begun to demand a single solution. At the very least they want to be able to communicate with other users beyond the in-house system or the particular service to which they subscribe.

The technical similarities between different electronic mail systems were the inspiration for the original MHS model. The subsequent X.400 recommendations attempted to exploit these similarities by finding the highest common denominator. They also describe how access could be provided to the MHS for users connected to other services, such as telex and teletex.

Turn Problem to Advantage

By taking a pragmatic approach and designing X.400 to tie together existing systems and services, the CCITT hopes to turn the interconnection problem to advantage. What was a maze of incompatible systems and services will become one of the largest value-added networks in the world. By building on current technologies the CCITT also gave the protocols a better chance of becoming a standard.

Backed by a welter of statements of direction and commitments from suppliers, X.400 seems to be well on its way to reaching that status. Far more significant than this, however, are the precommercial and commercial developments that have taken place. These include the following:

- Technical enhancements to the CCITT recommendations by the Standards Promotion and Applications Group (SPAG) in Europe, the Corporation for Open Systems (COS) in the U.S., and the European CEN/CENELEC standards organization in Brussels.
- The gradual emergence of X.400 conformance testing and certification facilities in Europe and the U.S.
- Government-backed trials of X.400 protocols, which have provided a testbed for products before they are taken to the market.
- The announcement of messaging services by British Telecom and the French PTT.
- Availability of X.400 interfaces and gateway products from a number of leading software companies.

Systems suppliers are also keen to convince users that X.400 is viable. Re-

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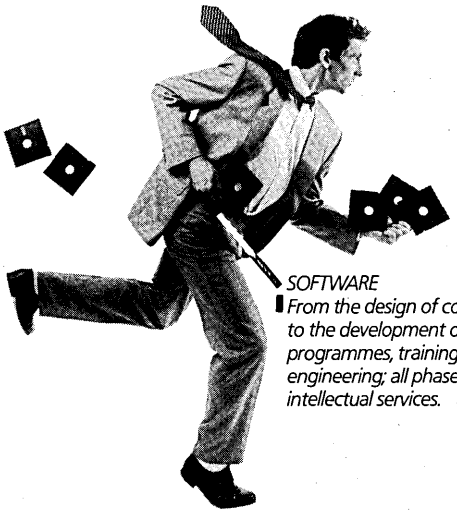

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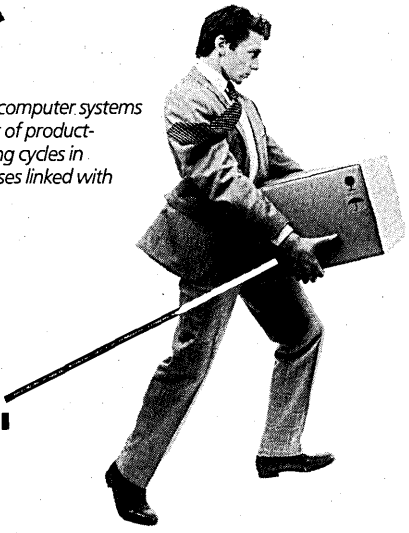

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Getting the E-Mail Message Across

peating last year's event, several SPAG members and IBM demonstrated internetworking at the Hannover Fair last month, this time joined by other companies, including Japan's NTT. A host of product announcements accompanied the demonstration.

The MHS services, which have been undergoing engineering trials in the U.K. and France, were expected to be running on a commercial basis this month. Exactly what facilities will be offered and, more important, what users will have to pay for them, is not yet very clear, despite protests from local users about the lack of solid information. All that can be safely said about public MHS services at this stage is that they will commonly offer the following facilities: subscriber directories; limited document conversion facilities—from telex format to ASCII, for example; several electronic mail service options, such as store and forward, time- and date-stamping, multidestination distribution, and different speeds of delivery; and support for a variety of different terminals, including videotex and teletex devices.

In Europe, PTT messaging services will be positioned as national and international clearing houses for existing electronic mail systems. The PTTs have made no secret of their desire to play a key role in value-added network services markets and the MHS will give them the opportunity to do just that. The success of MHS services will depend, however, on the ability of those PTTs to convince private-sector service providers that they are intent on peaceful coexistence and will not monopolize opportunities to provide new services on the extended network. If the PTTs regard the MHS simply as a way of recapturing lost territory, they will alienate those suppliers whose cooperation they most need and, in the process, may also ring the death knell on public MHS.

Links Being Provided in U.S.

In the U.S., meanwhile, electronic mail service providers have begun to respond to pressure from users for a global system by providing links both to each others' networks and to some of the major office products like PROFS and All-in-1. All show a keen interest in X.400 as the basis of these interconnect strategies, yet none has made a wholesale commitment to the recommendations.

One service supplier, MCI Mail, introduced its Link product to coincide with the ratification of the X.400 recommendations by CCITT in 1984. The package allows users of PROFS, All-in-1, and other proprietary systems to which it is tailored to send messages to MCI Mail users. But it does not use X.400 protocols. Instead, MCI developed proprietary protocols, claiming that while it took three to five man-months to write an interface to a given system, it would have taken up to 10 times as long to have done the same job using X.400.

This example sounds a cautionary note that has been echoed by others in the industry. The simplicity of X.400 from the user point of view is only achieved at a cost to the developer. There are high overhead costs implicit in X.400, both in implementing the protocols initially and in supporting them on a variety of systems. In other words, there will be cases where custom links between systems will be cheaper and simpler to build.

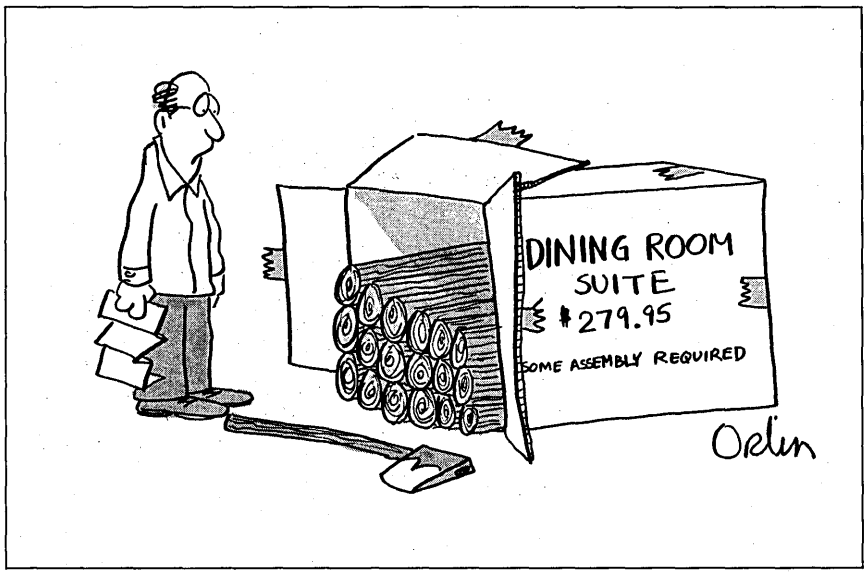
Despite the ambivalent attitude of U.S. electronic mail providers, some X.400 connections are available. Western Union Easylink and MCI Mail have both completed trials of X.400 links with the French Missive service, while Dialcom recently announced its intention to move users over to an X.400 version of its system.

Perhaps the firmest evidence that X.400 is moving out of the realm of fantasy and into reality is provided by the independent software houses. They have a number of products available, often developed with service providers. One of the most prominent firms is Sydney Development of Vancouver, B.C., which has agreed to supply its Messenger 400 package—touted as the first commercial implementation of X.400 in the world—to some formidable oem customers, including AT&T, British Telecom, and Olivetti. The Canadian firm will become an even stronger force in the marketplace when it completes its acquisition of another early implementor of X.400 protocols, LDR Systems of Aldershot, England.

For corporate users, increasing supplier commitment to X.400 can only be an advantage. The general purpose aspect of the protocols will allow users to design their own applications for use with X.400-conformant products and services. Rather than having to design entire systems from scratch, the basic communications functions will already be encapsulated. And, of course, what's good for the users will also be good for the systems and software houses that serve what is increasingly known as the interconnect market.

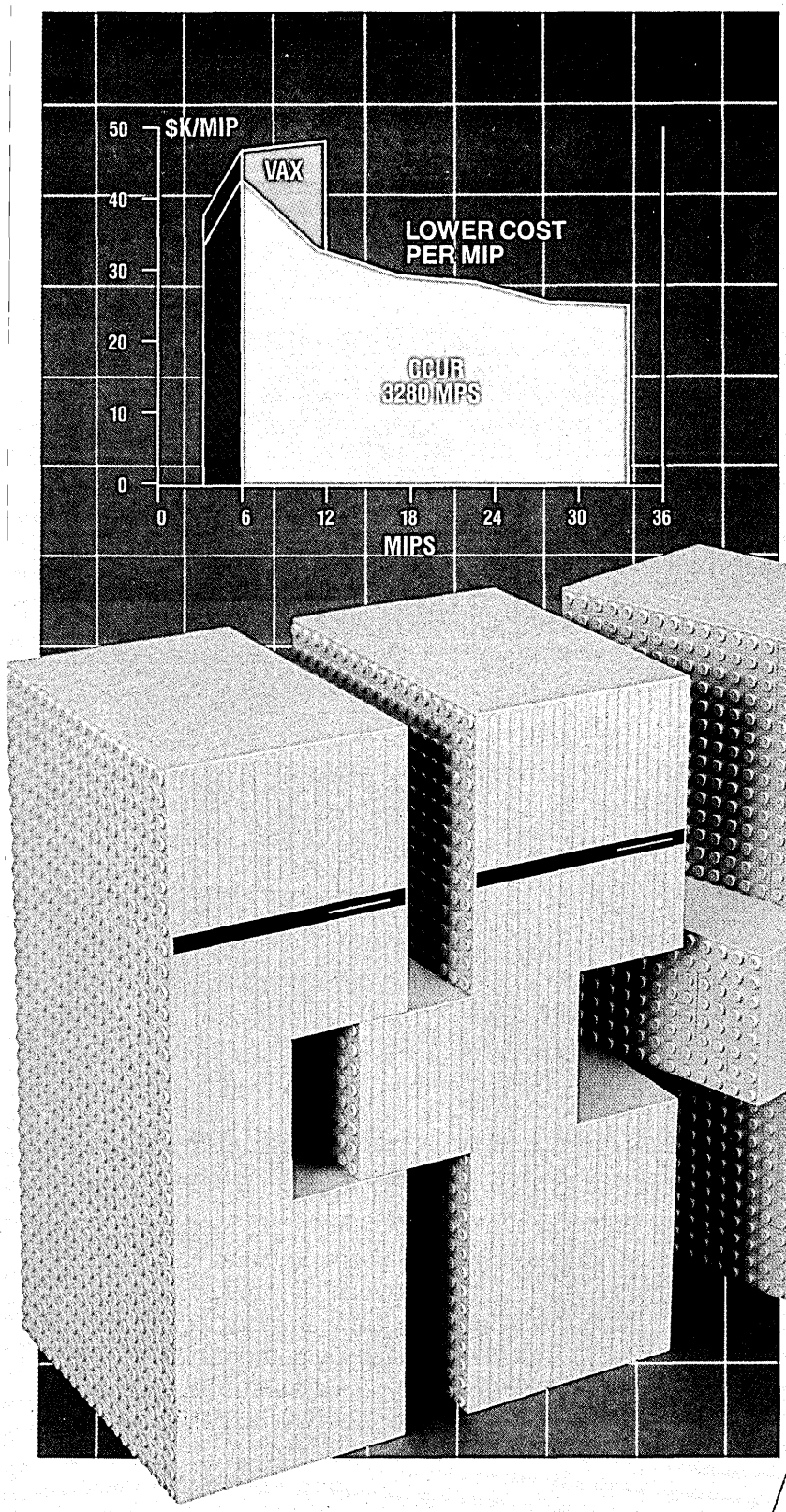
All of this encourages the belief that, far from disintegrating in a cloud of uncertainty and vested interest like some proposed standards, X.400 will succeed in meeting at least some of the objectives set for it.

The universal electronic mail system conceived by the standards visionaries still remains years, perhaps decades, away. But the X.400 recommendations offer a chance to bring order to the current chaos and will allow users to reduce the complexity of their communications problem. For many, if X.400 does nothing else, this would be enough. ■



Cartoon by Richard Orlin

Julian Patterson is a freelance writer based in Watford, England. He was the author of a Yankee Group report entitled "Intercompany Networking: The Role of X.400," published in 1986.



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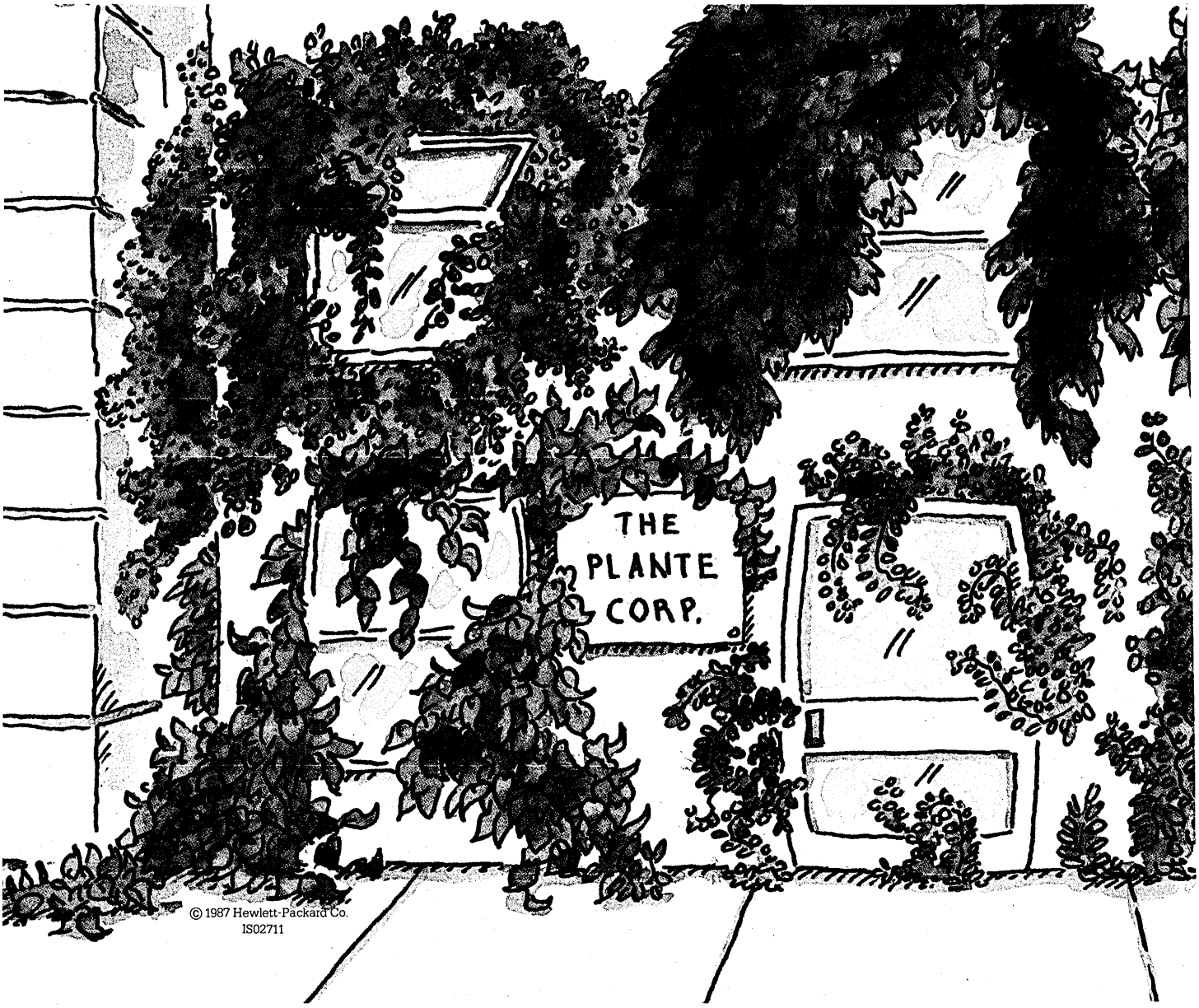
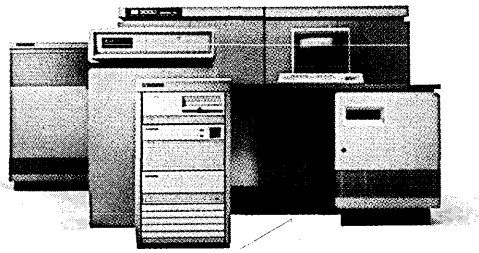


If your business grows, can your

Your data processing needs may be growing faster than your systems can handle. A problem which we at



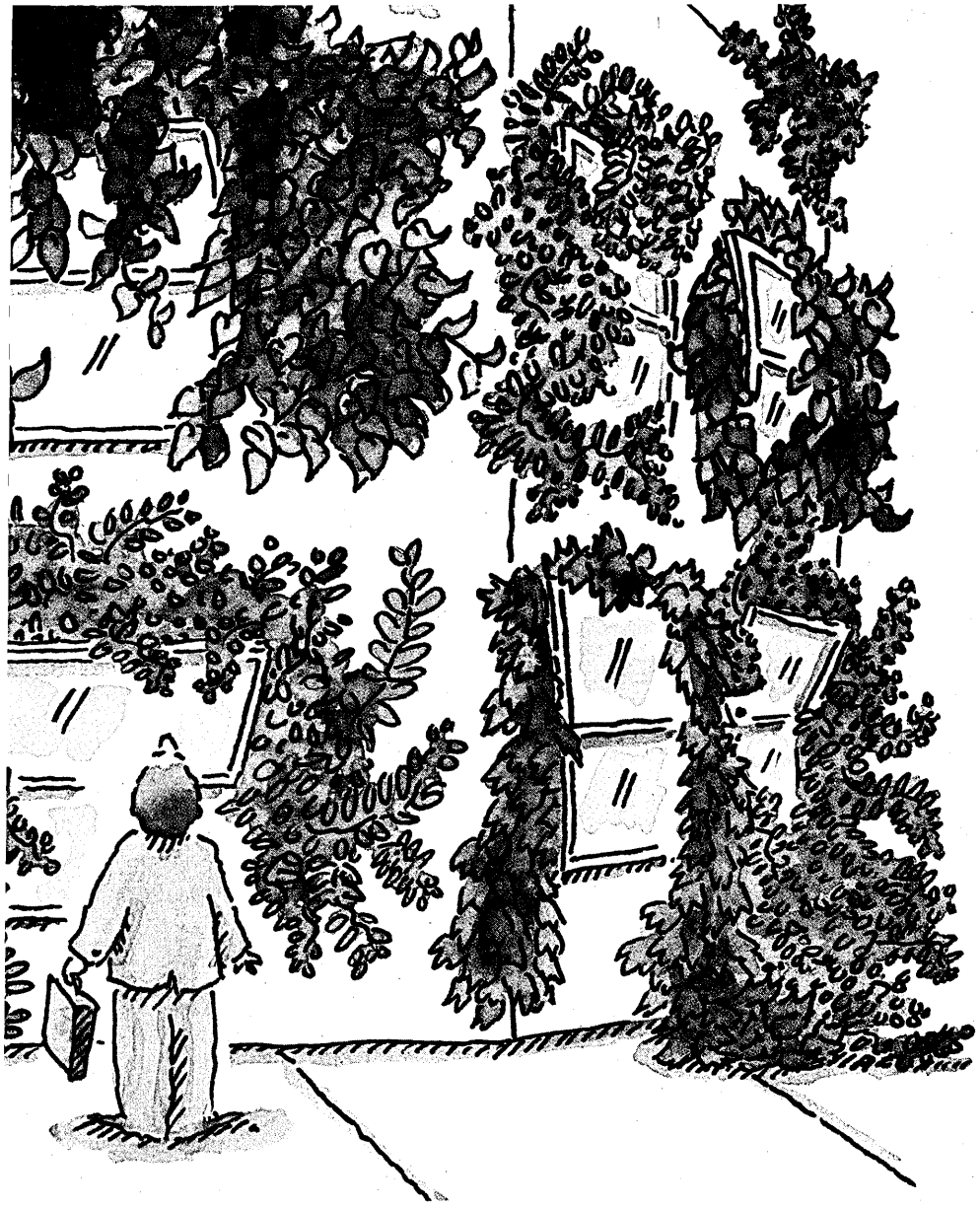
HP 3000 family: Micro 3000 XE, Series 52, 58, 70, 930 and, not shown, Micro 3000 and Series 950.

Hewlett-Packard understand. A problem for which we designed a remarkable solution: the HP 3000 family of business computing systems.

These systems will meet your needs both now and in the future, without costly reinvestment in hardware, software and user training. They're fully compatible. And they give you a dramatic range of performance—both within the models and between them.

Start with any of the seven models: for instance, the just-introduced Micro 3000 XE. It lets you grow from 4 to 56 workstations and still maintain high performance. That's because it uses HP's advanced NMOS III VLSI technology. And, unlike most other micros, it has the same functionality as the rest of the family.

From there, you can expand



we never stop asking "What if..."

computers grow with you?

effortlessly up to the top-of-the-line 900 series, which is based on next-generation HP Precision Architecture to provide mainframe-level performance. And HP can network these systems so you can grow to support thousands of users.

As you grow, you retain use of the same peripherals and terminals. Most upgrades can be accomplished in hours with no software conversion or rewriting. And you don't have to retrain any users.

The bottom line of all this is twofold: downtime is kept to a minimum, and you are making highly effective use of existing resources.

Consider also our record for quality and service; as well as our commitment to always asking "What if..." about your particular needs and problems. It all adds up to a convincing case for the Hewlett-Packard family of business computing systems.

If you'd like to learn more about how easily you and they can grow together, you can begin by calling 1 800 367-4772, Dept. 275N.

HEWLETT PACKARD

Business Computing Systems

CIRCLE 33 ON READER CARD

Develop Better Systems Using Excelerator– Over 8,000 Systems Professionals already do.

Many of the country's largest organizations have eliminated the tedious, manual process of systems specification. Instead they automate their systems analysis and design with Excelerator—the best-selling computer-aided software engineering (CASE) tool.

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Excelerator's highly integrated, automated design environment helps them build accurate, consistent, complete, and successful specifications. Excelerator offers:

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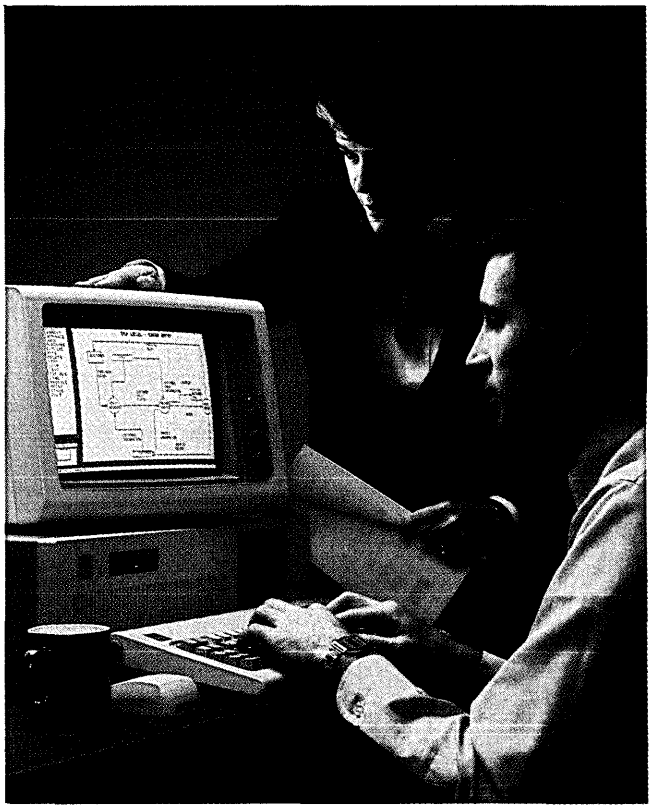
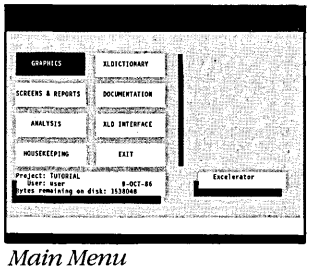
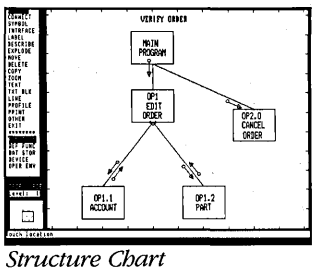
- Excelerator/RTS lets you design time- and control-critical systems. It's being used to develop systems that will fly the next generation of commercial airliners.
- For organizations with specialized development methods, we've developed Customizer which lets you tailor Excelerator and Excelerator/RTS to your own custom development environment.

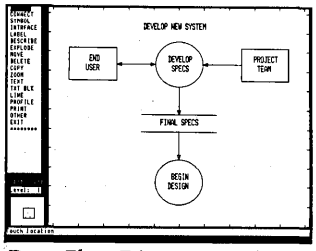




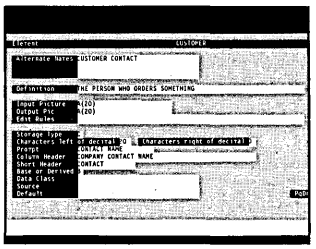
Main Menu



Structure Chart



Data Flow Diagram



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CIRCLE 34 ON READER CARD

This year's budget survey confirms the word from the grapevine: for the first time ever, MIS managers have budgeted more for minicomputers than they have for mainframes. Overall, budgets for 1987 are about what they were for 1986. Everybody is spending more on micros than had been planned, and personnel costs continue to take the biggest budget bites.

1987 Dp Budget Survey

BY PARKER HODGES

For a while now, stock analysts and dp pundits have been high on Digital Equipment Corp. and down on IBM. Habit, however, made many scoff at the trendy talk pitting a "hot" company against the industry's longtime leader. But this year's DATAMATION Data Processing Budget Survey delivers some troubling news for Armonk: for the first time ever, MIS managers are budgeting more money for minis than for mainframes. The visions of the MIS fashion mavens have, for once, been confirmed by the numbers.

Dp managers from shops of all sizes report sizable drops in their mainframe plans for 1987. Respondents report that they've projected 7.4% of their total 1987 dp budget for mainframes, down from 8.3% in 1986. MIS managers from Fortune 1000 companies report the mainframe component of their budgets is down to 10.9% from 1986's 11.9%. Perhaps more telling is a comparison of what

3-D Illustration by Ajin

managers *thought* they would spend on mainframes in 1986 to what they *actually* spent. Responding to last year's survey, managers said they would use 11.9% of their budgets for mainframes; this year they report they actually used 8.3% in 1986. For Fortune users the difference was as dramatic: they planned to spend 15.4% and actually spent 11.9% in 1986.

Pattern Just the Opposite

The pattern for mini money at Fortune 1000 companies was just the opposite: people spent more than they had planned. In response to last year's survey, those big users said they had allocated 8.2% of their budgets for minis. They actually used 10.2%. Managers for all sites surveyed, however, proved to be better forecasters: they forecast they'd spend 10.4% and report that expenditures were just that.

Otherwise, the budget news is fairly flat: it looks like another no-growth year for dp spending. While last year's survey suggested—based on managers' expectations—that there would be a slight rise in MIS expenditures, the truth proved otherwise.

The average dp budget in 1986 actually fell a few thousand dollars from the previous year, ending up at $1.6 million, about $100,000 less than the MIS managers had expected to spend. MIS managers are nevertheless hopeful that 1987 will bring them more cash to manage; they report an average dp budget of $1.7 million for this year.

It is no surprise that MIS managers at Fortune 1000 companies proved better funded. They also bucked the overall spending trend, seeing modest growth. While they reported last year that their average total 1986 budget would be $3.2 million, the actual average 1986 budget rose to $3.3 million from 1985's $3.15 million. In 1987, however, Fortune 1000 users expect to spend no more than the $3.3 million they did last year.

This is obviously not good news for vendors. The so-called slump is beginning to look more permanent. In fact, one dp manager said recently, "What slump? This is no slump—this is reality." As Hari Notowidigdo, vp of information systems at Wendy's International, Dublin, Ohio, notes in "Getting Smarter, Spending Strategically" (p. 76), "If the computer industry is in a slump, it's because we have become better managers."

Still, MIS managers do have money to spend in 1987. Where will the cash end up? Personnel costs will consume most of it, 32.8% of the average budget, up only slightly from 1986's actual 32.7%. Fortune 1000 managers expect to trim their personnel costs, hoping to reduce them to 35% in 1987 from 1986's actual 35.5%.

As noted above, mainframe vendors can take little comfort from the budget numbers. This year, MIS budgeters plan to spend 25% less on mainframes than they do on minicomputers. For the total sample, MIS managers report that mainframes will consume 7.4% of their budget, down more than 10% from 1986's mainframe share of spending. Fortune 1000 managers say that the mainframes' share of their budgets is down sharply from 1986.

Mini makers will do much better than mainframe specialists, but they will also feel selective applications of the budget knife. Big users may make up for some of the overall sample's plans to trim purchases. While the total sample plans to spend a bit less—down to 9.9% from 10.4%—of its budget for minicomputers in 1987, the Fortune 1000 respondents say they will up the mini percentage of their budgets by 8.8%, to 11.1% in 1987.

Budget makers also expect personal computers to consume less of their budgets this year than last, down to 9.7% for all sites, down slightly to 6% for For-

FIGURE 1 The Typical Dp Budget

	ALL SITES AVERAGE %		FORTUNE 1000 SITES AVERAGE%	
	1986	1987	1986	1987
Mainframe computers	8.3	7.4	11.9	10.9
Minicomputers	10.4	9.9	10.2	11.1
Mass storage and memory	2.8	3.2	3.5	4.1
Terminals	4.1	4.0	4.0	3.6
Desktop publishing	0.8	1.0	0.2	0.3
Personal computers	10.0	9.7	6.3	6.0
All printers & other peripherals	4.1	4.3	3.5	3.6
Mainframe and mini applications software	3.8	4.0	3.8	3.6
Mainframe and mini systems software	2.2	2.3	2.9	2.6
Microcomputer software	2.5	2.5	1.1	1.3
Data communications	3.5	4.1	4.6	5.1
Personnel	32.7	32.8	35.5	35.0
Consultants	1.9	1.7	1.5	1.1
Outside services	3.0	3.0	2.4	2.4
Supplies	5.7	6.0	4.7	5.1
Overhead: utilities, rent	3.9	4.1	3.7	4.2

FIGURE 2 Dp Budget Changes by Industry, 1986 vs. 1987

INDUSTRY SECTOR	% ALL SITES	% FORTUNE 1000 SITES
Survey Average	5.1	1.2
Manufacturing, dp	2.3	U
Manufacturing, other	7.4	6.7
Dp services	6.9	NA
Government	0.7	NA
Education	8.2	NA
Finance	7.0	-3.5
Retail/wholesale trade	15.3	2.6
Medical/legal services	12.5	NA
Transportation	4.2	U
Utilities/communications	4.9	0.2
Construction, mining, agriculture	-0.7	5.5
Other business services	-5.3	-6.7

NA: not applicable; U: unavailable

The TeleVideo 955. Seeing is believing.

WYSE WY-50
(Unretouched photo)

TELEVIDEO 955
(Unretouched photo)

SALES ANALYSIS LATEX SPECIALITY PRODUCTS INC. PERIOD: Q3, 1985

SON	ID NUMBER	TERRITORY	CUSTOMER	CUST.NUMBER	PART NUMBER	ITEM	SHIPDATE	WAREHOUSE	SHIPDEST	CARRIER	CUS
	101000000	NEW YORK	APEXINC	333338888899	KL234 87654	200	10/02/85	NWPHILIDE	NEW YORK	ACMETRS	
	102277754	BOSTON	ZINCINC	33388990044	KL234 50987	007	12/01/85	CENTRALLA	BOSTON	AJAXAIR	
	100000456	CHICAGO	AASEWER	98750372378	KL230 90867	999	ONHOLD	WOODLAWN	CHICAGO	DUMAIR	
	109857363	ATLANTA	TVSINC	77493887549	KL239 99999	808	11/19/85	ATLANTANW	AUGUSTA	EWFRT	
	107584948	MINNIAP	XYZCORP				/07/85	MINNSTPAUL	MINNIAP	TRUCKER	
	108958488	SANFRAN	JAKINC				/28/86	SANJOSESE	SANMATEO	SHORTAIR	
	108674637	SANJOSE	ACDCORP				/08/85	SACRAMENTO	SANJOSE	EZHAULER	
	107563848	LOSANGEL	LYNINC				/18/87	IRVINECA	WESTLAWN	LATRUCK	

TELEVIDEO 955 VS. WYSE WY-50		
FEATURES	TVI 955	WY-50
Screen Color	Green or Amber	Green Only
Optional Graphics model	Yes	No
Dynamically allocated non-volatile function key memory	512	128
Maximum non-volatile bytes per function key	256	4
High contrast super dark Matsushita screen	Yes	No
List price	$549	$499

Sure, most $600 terminals can scrunch 132 columns onto a 14" screen. But you need a magnifying glass to read them.

Not so with the TeleVideo® 955. That's because we redesigned the proportion of our characters and put more space between them. And then put them on a high contrast, super dark screen. The result is the most readable 132 column ASCII display available.

But there's more to the 955 than meets the eye.

Take our tilt-and-swivel positioning, for example. The screen rotates through a full 270° right and left, and from −5° to +15° up and down. (Which makes backs and necks feel a lot better.)

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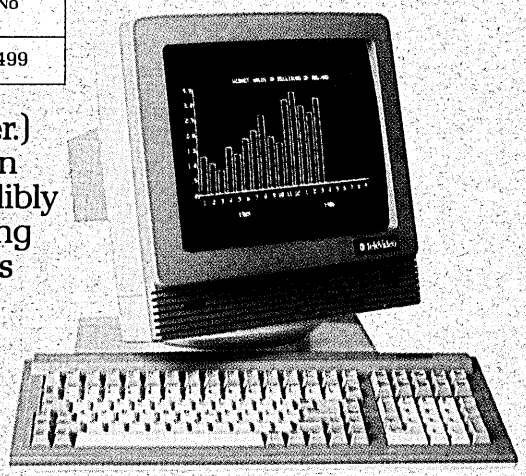
For more information about the TeleVideo 955, call the nearest TeleVideo regional office listed below, and we'll give you the name of your nearest distributor.

The TeleVideo 955. It's a real eye-opener.



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We've got hooks into everything.

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It's more than a relational database system. It's the most complete 4GL available, with hooks into every important data-management product. If you use any of the systems listed below, FOCUS will directly access the data your users need.

Databases		Environments	Networks
DB2	ISAM	MVS/TSO	DECNET
IMS	TOTAL	VM/CMS	IBM Token Ring
VSAM	VAX/RMS	DEC/VMS	Banyan
SQL/DS	VAX/RDB	PC/DOS	Novell
IDMS	DBMS	Wang/VS	AT&T Starlan
ADABAS	VS/DMS	UNIX	IBM PC Net
MODEL 204	DIF	IMS/DC	Nestar
QSAM	Lotus	CICS	
SYSTEM 2000	FOCUS		

FOCUS is a complete system, with its own relational database management facilities, and with important capabilities not found in any comparable product. It includes the most powerful report-writer and data-analysis system on the market.

Simple or Complex

With FOCUS, users can create very simple reports. Or complex, information-intensive applications. Even large, multi-user systems for tracking and analysis. Without resorting to third-generation programming.

At every level, the FOCUS fourth-generation language matches the needs of the user. It has the simplicity to support someone who needs "push one button" response. Yet it has the depth and richness to serve the most demanding professional programmer.

Networking

Today, FOCUS is available for mainframes, and for the most important minicomputers and micros.

And, to communicate in all those worlds, FOCUS has hooks into a growing number of LANs and other network products. This means that a user of FOCUS at an IBM PC, for example, can ask for data from FOCUS in another PC. Or in an IBM mainframe.

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FOCUS is supported by a national network of service offices and regional technical centers, backed up by a central hotline. It has over 300,000 satisfied users —more than any 4GL system on the market today. And it is the only one with an independent and active network of user groups, with chapters in over 38 cities.

Some Recent Applications of FOCUS

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- Personnel Management
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- Profitability Analysis System
- Salary Planning & Analysis
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FOCUS
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CIRCLE 36 ON READER CARD

1987 Dp Budget Survey

tune 1000 companies. But it seems inevitable that people spend more on pcs than they expect to: managers report they actually spent 10% of their 1986 dp budgets for pcs, a share more than 16% higher than they had reported planning for the year.

Microcomputer software's piece of the budget action is up strongly for 1987 at Fortune 1000 companies, rising 18.2%, while in the total sample, managers hope to keep spending flat at 2.5%.

Mainframe and minicomputer software expenditures, however, are headed down slightly at Fortune 1000 companies, say respondents. Budgeters in the total sample expect to spend a bit more this year: applications software costs will rise to 4% of the budget; systems software costs will grow to about 2.3% of the budget.

But dp budgeters don't have a very good record when it comes to forecasting their software expenditures. Comparing what MIS managers actually spent with what they said they had budgeted is instructive.

Last year, Fortune 1000 users reported that they had earmarked 2.3% of their budgets for mainframe and minicomputer applications; the actual share as revealed in this year's survey was 3.8%, fully 65% higher than planned. In every software category, actual share of budget was higher than planned, with most about a third higher. The best record was scored by all sites' estimates of the mainframe and minicomputer systems software share of budget: it was off by only 4.8%.

Data communications will consume more than 4% of the dp budget in 1987, up 17% over its share in 1986. But datacom spending had risen 30% the year before; while growth is still strong, apparently a lot of what needs to be connected is already hooked up.

The biggest percentage increase of budget share in 1987 will be desktop publishing. While the desktop publishing category is still small, only about 1% of total budget for the total sample, it is 25% higher than it was last year. For the Fortune 1000 sample, the share of budget will leap 50%.

The biggest losers? Probably consultants. The overall sample's plans to spend 1.7% of the 1987 budget on consultants will mark a 10.5% drop from 1986's budgets.

The Fortune 1000 reports it will hit the consultants even harder, dropping the freelancers' share of the budget by more than 25%, to 1.1%. But, here too, budgeteers don't have a very good record as forecasters: last year, respondents claimed they were going to cut consultant costs, and actual spending in this category was as much as 36.4% higher than planned.

Dp departments also spent more on peripherals last year than they thought they would, with Fortune 1000 users predicting a 2.9% share and actually using 3.5% of their budgets for the equipment. The average percentage actually spent at all sites was 4.1%, almost a third higher than the 3.1% of the budget that was planned. ■

Methodology

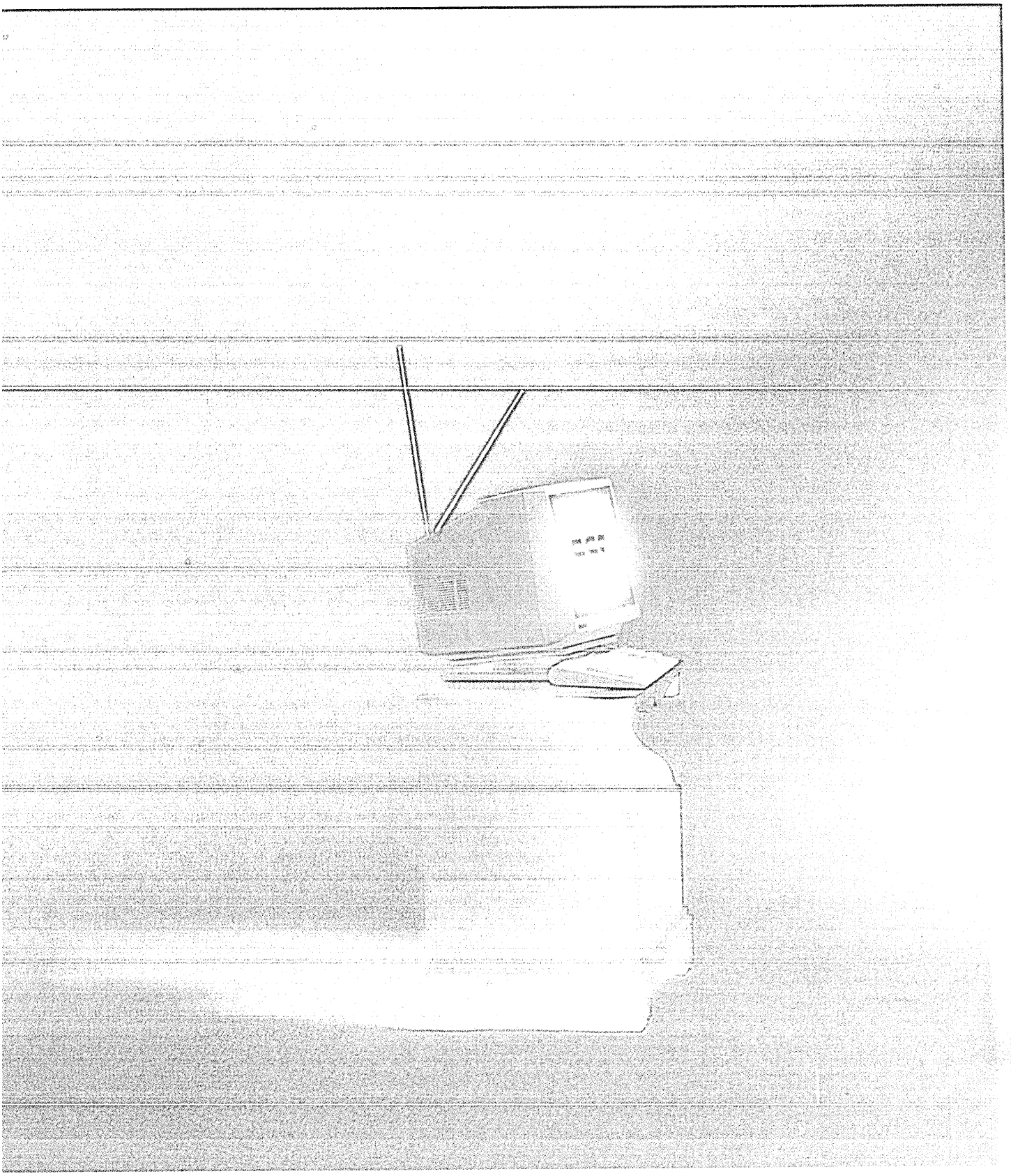
The 1987 DATAMATION Data Processing Budget Survey polled a cross-section of United States users from a variety of industrial sectors. The survey was designed to reflect the magazine's readership: results were tabulated for all sites, including Fortune 1000 sites, which were also tabulated as a separate category.

The survey began in early December when 5,000 questionnaires were mailed to a random sample of DATAMATION subscribers. A total of 517 were received by Jan. 9, a third of them from Fortune 1000 sites.

The industry sector that produced the most responses was computer services (23%), followed by nondp manufacturing (14%). Sixty-nine percent of the responding sites were identified as the headquarters of the organizations.

The respondents reported average 1986 corporate revenues of $325 million and predicted average revenues of $345 million for 1987. The average data processing budget for 1986 was $1.6 million and for 1987 is $1.7 million. Almost 10% of the sample, however, reported annual dp budgets of more than $5 million.

This year, the survey asked respondents to estimate spending on data processing goods and services not on the official data processing budget. The 38% of respondents who replied to this question estimated that in 1986 an average of $1.13 million was spent on off-budget dp; the same respondents expect 1987's off-budget spending to average $1.07 million.



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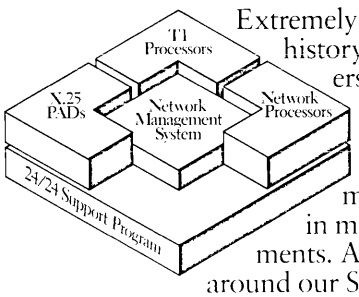
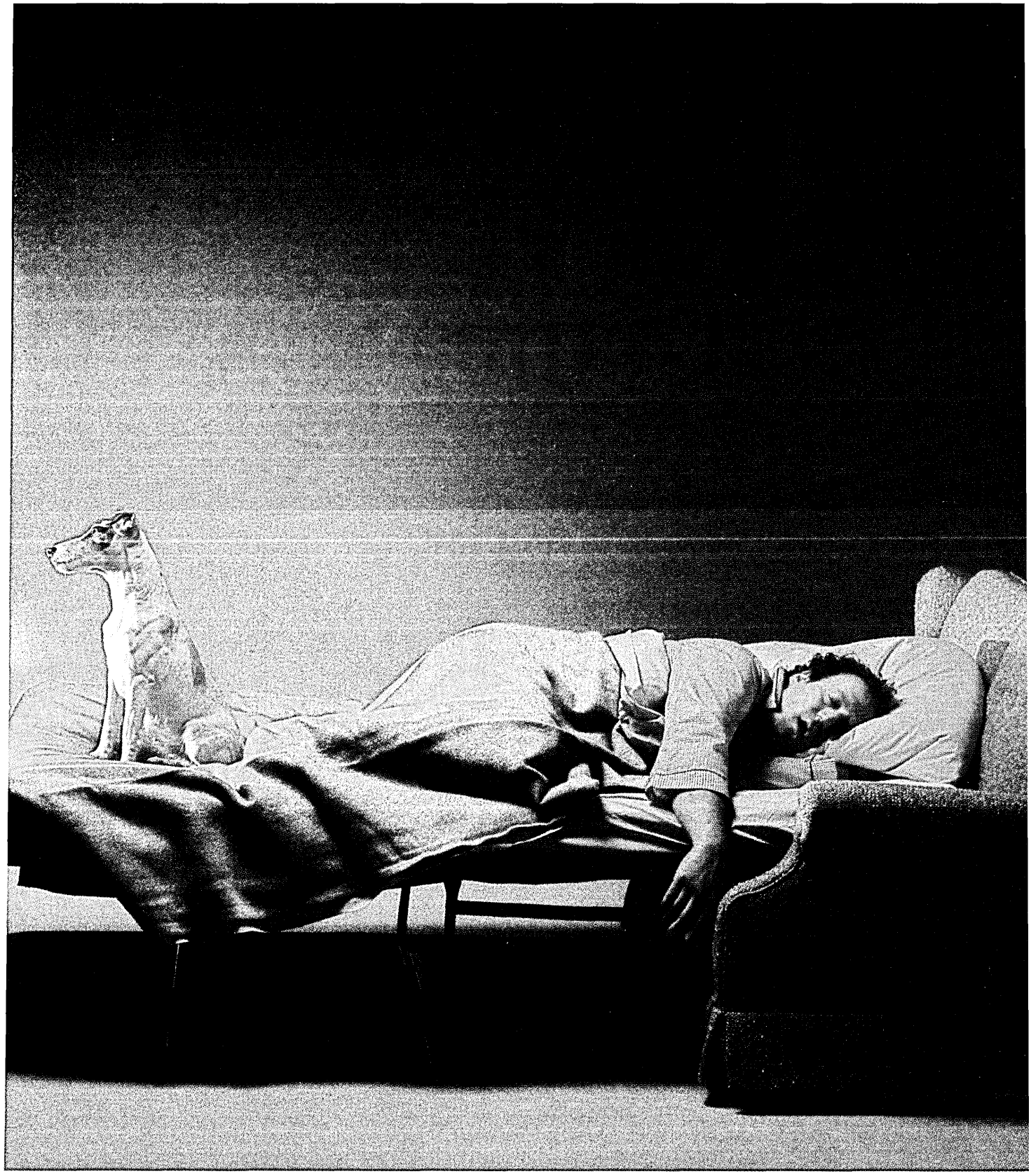


Extremely reliable, with a long history of satisfied customers, DCA's Series 300 Network Processors continue to set new standards for performance and connectivity in multi-vendor environments. A network configured around our Series 300 processors



is flexible when you need to grow, reliable when handling the rare but inevitable problems associated with your long-haul transmissions, and management-oriented when it comes to operational control. And because Series 300 products are designed and built with modular, software-based components, you will never have to worry about obsoleting your initial investment. Put all this under the centralized control of DCA's integrated Network Management System–and under the two-year protection of our unique 24/24 support program–and you'll see why DCA is the network everyone's watching. For the complete picture on DCA's Series 300 solutions and how they fit into our total networking family, call toll-free,

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CIRCLE 37 ON READER CARD

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In an exclusive DATAMATION round table discussion, six top information systems executives explain that competition is the main driving force behind their budgets. How to use technology to gain market share in their companies' main line businesses is what's on their minds, not machines and MIPS. In learning how technology fits into their business, these MIS execs have also learned the technology business and are smarter in dealing with their suppliers.

Getting Smarter,

The information processing business is getting more pragmatic and so are its practitioners. MIS executives and their companies are sharpening their focuses and competitive edges, investing in technology tools that promise strategic opportunities while using their years of experience to make their organizations run more efficiently.

Today's MIS chiefs have more than MIPS on their minds. They have a better perspective of both the technology in business and the technology business. They're spending more time with their users and senior management and less time at computer conferences and vendor briefings. More savvy in dealing with their suppliers, they're setting the pace when it comes to dp purchasing. Those purchasing patterns are reflected in the budgets of these MIS execs, who are "becoming smarter," as one says, and spending more strategically in the information systems arena.

"TREES DON'T GROW TO THE SKY."

In an exclusive DATAMATION round table, six MIS vps shared their spending plans for 1987. Participating in the discussion were George Fugere of Bethlehem Steel Corp., John Hammitt of Pillsbury Co., William Harrison of the Hartford Insurance Group, Richard Koeller of TRW Inc., Hari Notowidigdo of Wendy's International, and Robert Regazzi of Schering-Plough Corp.

Q: Our surveys show minimal increases in expenditures for information systems. Is the current economy, with its mixed results, affecting your plans and budgets?

FUGERE: The reality is that the steel industry has been plummeting for 30 years. That erosion spans every cycle and every economic condition of those 30 years. Yet our management at Bethlehem Steel chose in 1981 to put a massive five-year plan in place to become competitive, with an eye toward a longer-range plan that says we're going to be the best company in the steel business in the U.S. The big effort in that five-year period was head-count reduction and productivity improvement. Now the effort for the next five years is to pyramid on that. It leaves you with a higher level of sophistication in such things as modeling, simulation, and optimization.

Although the budget numbers aren't as great now as they were in that five-year period, and although the steel industry's fortunes don't look any better, we are still planning to spend a fair amount of money on the strategic things we've got to do. Otherwise, we're not going to be around. So I don't think the overall economy per se has affected us. In fact, the decline of the industry has forced us to spend money to get good.

KOELLER: The economy is definitely having an impact in the automotive business, which is struggling worldwide. In this sector, TRW's information systems expenditures are at approximately $45 million and holding. We're focused on reducing costs of the foundation systems. If we're able to do that, funds will go into strategic investments. At the other end of the spectrum is the defense sector. We're the single largest vendor on SDI and Star Wars appears to be taking off. So that business is growing very rapidly. Meanwhile, the business of the information systems group—the credit collection folks—is expanding enormously. Expenditures for systems, their production plant, are going up approximately 20% to 30% a year.

HARRISON: Our cycles in the insurance industry don't relate to the economic cycles as much as they do to other conditions. We tend to make profits on reasonable investment for three years. Then a lot of people come into our market and drive our prices down. When prices and profits come down, a lot of people get out of the business. But throughout those cycles, Hartford Insurance has consistently invested in information management. That's because we

Spending Strategically

have always considered information management to be a strategic weapon that would either bring us more business through products that are fancier or improved through automation, through products that link us to the people with whom we deal, or through products that allow us to make significant staff savings. As a corporation, we have substantially increased the business we write, while not increasing the labor force we have.

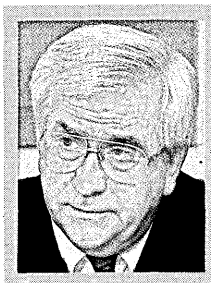
In the last 10 years, I have never seen a year when we didn't invest as much in information management as management felt was realistic. This year our budget growth is at the low end of the financial services industry. Our increases are almost entirely in the area of additional programming staff for some specific projects. Most of the other budget categories are down.

HAMMITT: In our business we compete with everyone else for "share of stomach." Pillsbury lives in a market that's growing at 1% to 2% a year consistent with the population growth. The economy has only modest effects on our overall revenue. In uncertain times, we do cost-containment and refocusing, but we don't make major changes to our plan. Our objective is to double in size in the next five to six years and we're looking at a number of ways in which information technology can help accelerate that growth.

In the last couple of years we have been increasing the amount of money we are putting into systems at a fairly dramatic rate—25% to 30%. We're going to slow that rate of increase down to probably 20% on average. We're currently spending about $75 million to $80 million in the expense budget and $30 million to $35 million in capital.

REGAZZI: In the early '80s we may not have had the sharp focus on our strategies that we have now. We are clearly a research-based pharmaceutical company with strong consumer franchises. There-

Panel Participants



George Fugere

John Hammitt

William Harrison

Richard Koeller

Hari Notowidigdo

Robert Regazzi

George Fugere is vice president of information services at Bethlehem Steel Corp., Bethlehem, Pa. He manages all information services activities at the $5 billion corporation, which in recent years has been restructuring its operations to concentrate on steel manufacturing.

John Hammitt is vice president of information management at the Pillsbury Co., Minneapolis, the $6 billion-plus food products and services company. Pillsbury's operations range from grain handling and packaged products to restaurants.

William Harrison is vice president of the Hartford Insurance Group, Hartford, Conn. He is responsible for operations processing and planning. The Hartford Group, which grossed $6.9 billion in 1986, is one of the largest international insurance and financial services operations in the U.S.

Richard Koeller is vice president for information systems services for TRW Inc., Cleveland. He is responsible for providing information systems support for corporate staff, for the divisions of the former Aircraft Components Group, and for the Automotive Worldwide Sector staff. The highly decentralized $5.9 billion company has a wide range of business interests, from automotive and defense manufacturing to credit collection and software services.

Hari Notowidigdo is vice president of information systems at Wendy's International, Dublin, Ohio. He is responsible for all information system services from the corporate level through the fast-food restaurants and international franchises at the $1.1 billion company.

Robert Regazzi is vice president of information services at Schering-Plough Corp., Madison, N.J. In addition to his information systems responsibilities at the corporate level, he works directly with division information systems units at the $2.4 billion pharmaceutical and consumer products company.

Coordinating this round table was DATAMATION editorial advisor Angeline Pantages. DATAMATION editors participating were Rebecca Barna, Linda Runyan, Ralph Emmett Carlyle, and Mary Kathleen Flynn.

Photographs by Nick Possmore

fore, while our overall budget is flat, the information systems activities in research have been greatly expanded over the past several years. We've greatly increased our funding of research over the last five years, and information systems funding for such things as large-scale computers for molecular modeling has also grown substantially.

On the commercial side of the pharmaceutical business, we've also been funding at a good rate because the business is growing and we've identified opportunities where increased expenditures are justified by the payback. On the other hand, in our consumer businesses, we've had some inefficiencies in the way we organized our information systems functions. We've restructured that organization recently, increasing the ratio of workers to managers. So we've had a considerable decrease in our 1987 plan for consumer products. That budget has been tight for several years.

NOTOWIDIGDO: My personal theory is the fast-food business is countercyclical to the economy. In times of high inflation, we have high growth. A low inflation rate seems to mean slow growth, which is the current situation. In 1987, we'll probably be spending 15% more than in 1986 in expenses, while we retain the '86 level in capital expenditures. Quick services is a $50 billion business; Wendy's is 6% of that. It's a highly competitive and very volatile business, so we put our emphasis on the source of our revenues—the stores.

Q: Many of you are indicating that your expenditures are less affected by the economy and more dependent on long-range considerations. Tell us more about that long-range, strategic planning in your organization.

HAMMITT: We are being driven by the three-to-five-year strategic direction we set for systems. We try to accommodate short-term needs without jeopardizing long-term planning, which is almost sacrosanct. Putting that in place is a difficult job, especially in individual businesses that are under short-term pressures.

We are focusing the increased expenditures on strategic opportunities. There are three layers of investment opportunity. The most basic is foundation systems, the record-keeping things you need just for day-to-day operations. That's where we literally invest to become low-cost operators. If there's any spending, it's to drive those costs down. The second category is tactical investments—those that produce very short-term return results that affect profitability or the performance of the business within a fiscal year. The third category is spending on strategic opportunities—opportunities that are characterized by high investment, long lead times, and very big returns at the end. We have focused most of our increases here, and we have very tight controls on the spending for the less-leveraged opportunities.

HARRISON: What you always have to recognize with forward planning is that along the way you're going to make lots of divergent decisions because of business exigencies. For instance, in the insurance business, we always try to get our labor cost down. But along the way, real business opportunities come up. So we end up saying we're going to slow down that march toward cost reduction and we're going to spend our monies on strategic opportunities.

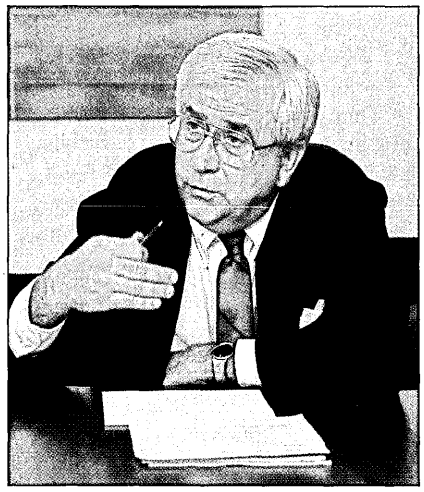
NOTOWIDIGDO: We put our money where our revenues come from—the stores. Like John Hammitt's organization, when it comes to foundation systems, we want to be the low-cost supplier. Our information systems effort here is not quick and dirty, but quick and adequate. On top of that, our management is committing to research and development in information technology for the store. We're probably one of just a few companies that does that in this industry. My compensation is really based on identifying opportunities.

KOELLER: When it comes to strategic planning, there's a big difference between a single product business and a conglomerate manufacturing environment like TRW. Our company is a group of companies that used to sit around separate tables. When you put them all together, suddenly there's supposed to be some strategic plan. I have the responsibility for all companywide systems—systems we are just now putting in because we have been so decentralized. So what we have is just the beginnings of an overall information systems strategy, which is an enormous challenge in such a decentralized environment. We in information systems face a tough problem. We have to find a way to horizontally measure such things as performance, cost, and the adequacy of strategies. I think that has more to do with our planning problems than the economy.

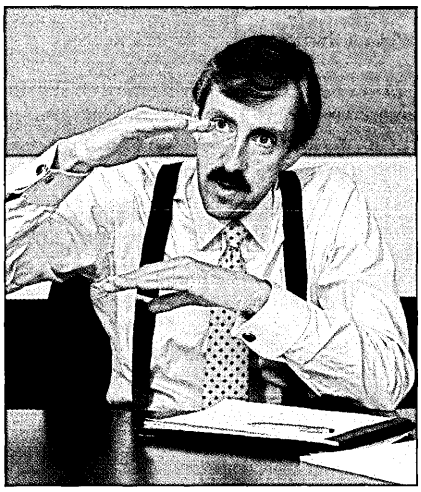
Q: MIS has been under the gun for high expenditures and low return. How do you justify your costs and your strategies?

HARRISON: Our users are the ones that set our budget. We've totally given that responsibility to them. If they want more staff, it's their responsibility to go ask for it. My management team sits on the staff of the appropriate users. They participate in the business decisions. The things we're investing in have nothing to do with data processing. They really have to do with the business.

Conversely, there's always concern about how efficient the information systems organization is. You have to tackle that problem by showing senior management what you are doing in areas of productivity. And if you can deliver the same amount of work for less dollars on a consistent basis every year—something we've been able to do now for the last five or six years—then you have things to say that they can relate to.



FUGERE: "The next big round of expenditures will be in voice-activated technology."



HAMMITT: "Accommodate short-term needs without jeopardizing long-term planning."

HAMMITT: At Pillsbury, all of the strategic investing we've talked about is done with an absolute yardstick for knowing what success looks like and how we're going to measure it when we get there. We didn't begin an aggressive program of investing in systems until we knew precisely what we expected to see differently and what kind of effect it was going to have on all our financial measurements. That was the mind-set change we had to bring about in our businesses. They had to believe that putting a dollar into a systems investment could be as powerful as a dollar into plant expansion or into advertising. They had to be shown that there were ways of measuring that return.

Q: How did you do that?

HAMMITT: Basically, on a project-by-project basis. I'm talking about large efforts. For instance, when we talk about new systems in our manufacturing facilities, this means systems for about 50 manufacturing facilities over a two- to three-year period. But we can take those yardsticks down to an individual plant and to the specific set of goals that plant management is committed to achieve through that new system. With the pragmatic management of Pillsbury, we weren't going to do anything new without having translated it into those kinds of measurable returns. Without that, it is smoke and mirrors and belief in intuition.

Along with that management discipline, we needed marketing to sell the fact that systems are becoming an important area of investment that can show a return. Essentially, we had to make our clients more receptive to taking on aggressive investment. The third important ingredient is delivery, and that's where we are now.

Q: Are MIS executives in other companies doomed to the back office if they don't follow these rules?

HAMMITT: When I joined Pillsbury, there was a set of attitudes and beliefs that made what I have described successful there. I couldn't take that prescription and apply it to any other business here within this context. You've got to understand the characteristics of the organization and solve its unique problems with the right effort and understanding.

REGAZZI: It seems to me that the measurements of contribution that are needed for foundation systems, tactical systems, and strategic systems are very different. We can show you cases where there are specific paybacks, of course, especially at the foundation level where you've displaced clerks, foundry people, and so on. But as you go up the line, say, to systems that support management controls or knowledge workers, there isn't a thing in the world you can measure as a direct correlation between the 500 pcs that are installed and the bottom line.

When you get to strategic systems, the nature of funding for them is different from the other levels because what you're doing there is making bets on a high return for the investment. You need some kind of block funding that follows the strategic efforts. If the effort creates half a billion dollars in sales, your payback is tremendous. One of the keys is to know when to stop the expenditures.

HARRISON: "We have always considered information management a strategic weapon."

KOELLER: "We have an enormous asset and an enormous responsibility."

Q: Is the movement toward strategic systems and greater senior management involvement slowing down expenditures and contributing to the computer industry slump?

NOTOWIDIGDO: If the computer industry is in a slump, it's because we have become better managers.

FUGERE: Over the last three or four years, we've gone from nine data centers down to two, but we're doing more work than ever before. The reality is we had a lot of inefficient practices.

HARRISON: Frankly, I just think we run our business a lot better than we ever did and that's not going to change. If there was an unlimited economy and unlimited budget, I don't know what we would do with that kind of computational capability. We have to give something to the corporation when we add more capability.

KOELLER: There's a faulty premise that the computer business is going to grow forever. I don't think we're in a slump at all. I think this is the normal beginning of the asymptote as it starts to flatten out. And I hate to tell everybody, but maybe we're becoming a mature business.

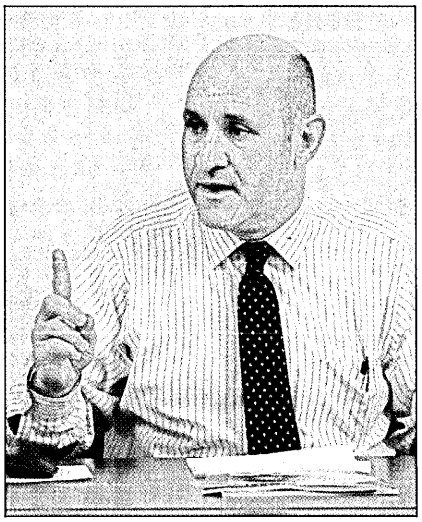
FUGERE: In thinking about the computer industry's performance, you have to keep in mind that trees don't grow to the sky. I think the slump is a natural occurrence, particularly with price/performance in technology coming down the way it has, and with the serious problems this country is facing in its industrial base. I personally think that the whole computer industry believed some of the exponential growth curves they were throwing around. They are not realistic if your industrial base is not growing. We can't just do each other's laundry. We've got to produce something with our hands or out of the ground. Services are not going to carry this country.

Also, the pressures being brought to bear by the automotive companies on suppliers to get their costs down and their quality improved is precluding a lot of companies from spending capital on this kind of technology, because they need it so much more for the manufacturing process.

Q: What technology do you need that isn't available today?

HARRISON: What we haven't got in the industry today is a lot of technology that gives us something we can use in our business that's different from what we had in the past. In our business, if we had

NOTOWIDIGDO: "If the computer business is in a slump, it's because we're better managers."



REGAZZI: "We can't wait for equipment vendors to come up with answers."

really effective image technology, we'd spend a lot of money on it, but it isn't there today.

FUGERE: The next big round of expenditures will be in voice-activated technology. As you trim down the work force, two hands aren't enough. A person has multiple chores now. Some of the work that's going on at Boeing, Bechtel, and Dow to improve the efficiency of the helicopter pilots through visuals, computers, and voice-activated systems is interesting.

Q: What do you think about the soothsayers who claim advances in technology related to such developments as computer-integrated manufacturing and ISDN will accelerate spending in the next decade?

KOELLER: I think we'll get to ISDN, but not necessarily when they say it'll be available—1990 or 1995. It's a matter of the absorption rate. Two years ago, one small division tried to convert from DOS to OS and failed. That technological task was whipped in the '60s. So when you are talking about 64Kbps transmission lines to the desk of a person who can't spell pc, it's not going to have much impact.

On the other hand, there are all kinds of things we can't do in our highly decentralized environment. The central applications that we've got running in Cleveland we can't share with other people. We're in the process of building a backbone network this year. When that network is in place, we're going to have to trust that it's going to enable useful and cost-effective things to be done.

HARRISON: We're less concerned with technology. What we would buy if we could get more of it is talent. For a company that's trying to make a distinction in the way it uses technology, you have to look for exceptionally talented people.

HAMMITT: We've grown up in an industry where computer technology has become an end in itself for hundreds of thousands of professionals. We're dealing with the world very close to the screen. We need people who sit next to the brand manager, discuss the business problem, and then bring technology to the party in the proper perspective. It's a different set of perspectives, skills, and outlooks on the world. The people we've trained for the last 15 years don't automatically have that.

Q: Are the end users generally a roadblock to your plans and, as a result, to your buying more technology?

NOTOWIDIGDO: At Wendy's we have automation experiments and we want to work with the users to reorganize their infrastructures. That takes time. The industry has never solved the big problem. We automate the hell out of the organization and the people are left behind. Our company is trying to solve the human resource problems raised by the new structures. That has the same type of cycle as the system development cycle.

"OUR USERS ARE THE ONES THAT SET OUR BUDGET."

FUGERE: In my organization, the human resource guy has the same problem. He'd like to work with the guy that runs the mill, but the guy at the mill won't let him in. The industrial engineer would like to improve methods, but the operators won't let him into the mill either.

HARRISON: It seems to me you can't team up that way. You have to give more and more power to that user community. You have to work for them and show them the way to solve their problems. Our job is to give them the most effective tools. That's how you're going to get real systems that solve that individual's problem. The easy days are gone.

FUGERE: Years ago we designed a system to computerize the way we always did things. Today, we're trying to change things before we design the system. I think there's more receptivity to change in the insurance business because of the intense competition. It's tough in the steel mills to get a person who's been making steel for 30 years to look at organizational practices and procedures and say, "How could I do it better?"

Q: How can the vendors help solve the problems you're facing? Are they really providing business solutions?

KOELLER: Vendors sell hardware and software. They are not in it to sell solutions. I expect our people to provide those.

REGAZZI: Two things happen when you start to rely on equipment vendors. One is that you are obviously going to get their solutions. But more important, you get their timing on the solution, and we can't wait for them to come up with answers.

HARRISON: In becoming smarter, we have become less captive to the vendors. And we're managing a set of issues that are inconsistent with what the hardware industry would like to see. They'd like to keep pumping more hardware into us. We've gotten to the point where we can assimilate the technology at a rate that makes sense to us, rather than building more than we need and then trying to find problems to solve.

KOELLER: We have to be smarter today. We have built up an enormous asset. We have an enormous responsibility. ■

Just south of the North 40 is the Bottom 100. Despite its geographic deficiencies, the truth about the shapely bottom of the dp industry can make you very, very poor. Muffy, Binky, and Walter have closed up shop—leveraged buy-outs prove difficult when there's no place to stick your lever. Merge isn't just a traffic direction and corruption isn't just a way of life. Questions are raised. Who stole all the copies of Chapter 11? Who is Slim Jim Jones? What is the point? The questions are answered and the answers are questioned in the comprehensive incomprehensibility that is the DATAMATION hallmark.

BY POLLY ESTHER PANTZ

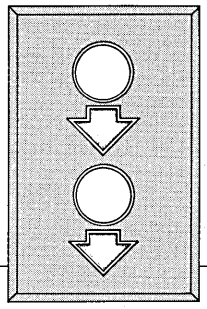
The DATAMATION Top 100 is the most accurate and comprehensive view of the biggest and most powerful of the world's data processing companies. In a year with little excitement generated by a market in the doldrums and innovation at a standstill, DATAMATION has looked under the floor of the dp industry to study the companies on the other side of the profit margin. The DATAMATION Bottom 100, then, is the only comprehensive view of the companies that made the least amount of money in 1986.

Despite a scandal that reverberated throughout the depths of the dp industry, the Bottom 100 companies managed to produce total revenues of $128.47, which DATAMATION estimates to represent .00000000012% of the total worldwide market for data processing. The '86 total is up about 14% from 1985's total of $112.53.

"This is very heartening," says Herman (Herm) Melville, president of trade association ADAPSOWHAT (Association of Data Processing Services or Whatever). "Who would've believed we could have broken last year's record?" Melville also serves as ceo of Pottersville, N.Y.-based Nimfosystems, manufacturer of the system 38/26/36 computer that will "interface with anything, anywhere, anytime," which showed up under many of the companies on this year's list.

ADAPSOWHAT could not, however, put a good face on the brouhaha brewing beneath the dp world. Because few, if any, of the companies on the Bottom 100 actually sell any wares (if, indeed, they make them at all), DATAMATION uses the criterion of *intent to sell.* A company must have some *intent to sell* products in any of a number of categories of equipment—with the aim, at least, of generating revenue—to be included in the survey. This year, several ADAPSOWHAT member firms were accused by the Justice Department of *conspiracy with intent to sell.* While no indictments have been handed down, companies throughout the BOTTOM 100 have been grateful for the attention.

"We haven't gotten so much press since—well, we've never gotten any press," admits Hop Sing, vice president of Marketing and Maintenance for Bonanza Computing, Osaka, which just made it into the Bottom 100, in third place: 100 is the bottom of the bottom



Call-buttons for the executive elevator at Crays 'R' Us Western Samoa.

Illustration by Hovik Dilakian

and one is the top of the bottom, or the best of the worst. Or something like that.

Although the Justice Department probe has not been completed, DATAMATION has obtained a copy of a secret memorandum describing the conspiracy. "While Department investigations normally focus on restraint of trade or conspiracy to monopolize a market," it reads, "we have found these companies have conspired to break *into* a market. While this is not illegal, the potential ease of the investigation, however, is a strong point in its favor."

Specific charges include shipping merchandise to retail outlets, sales calls to dp managers, and even advertisements in DATAMATION.

Jim Morris, publisher of DATAMATION, claims he knows nothing.

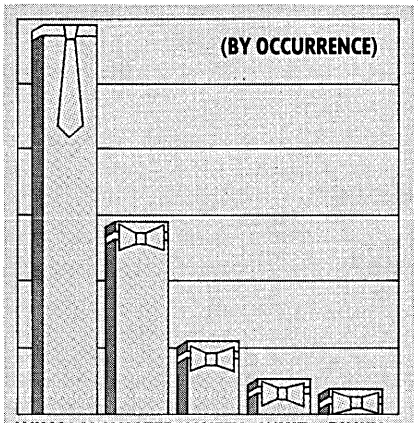
Ranking of the Bottom 100 can be confusing. Only one company had any revenues at all last year (number one, Pick-up Systems of Detroit). Therefore, a company's rank is determined by its *potential* revenues. In other words, a peripherals maker could be counted on to make, oh, some money, while a mainframer could be expected to make, well, a lot of money. This year's big loser, in terms of how many sales it could have made, was Crays 'R' Us, a walk-in retail supercomputer outlet in Western Samoa. Hats off to ya, boys!

Pick-up Systems' revenues were generated when its founder, Slim Jim Jones, sold a box of microchips he found in a truck for $128.47. This accounts for all the revenues for the Bottom 100. An embittered executive of firm number 98, which asked not to be identified, demands to know what Jones was doing in the truck. "Why doesn't the Justice Department investigate *that*?" he shouts.

"Pick-Up Systems helped this association break last year's revenue record," says ADAPSOWHAT president Melville. "And they couldn't have done it without old Slim Jim. If these other companies are griping, why, that's just sour grapes."

Many companies in the Bottom 100 managed to ignore their fellow firms and the dp industry in general. French firm Compagnie Télécommunications et Fromages has been scraping along the bottom of the dp barrel for 17 straight years, finding itself as number 22 in 1986. In response to a stockholder protest, company spokesperson Kermit McDermott stated, "We don't like to think of ourselves as a corporation that makes no profit. We like to think of ourselves as a nonprofit corporation." ■

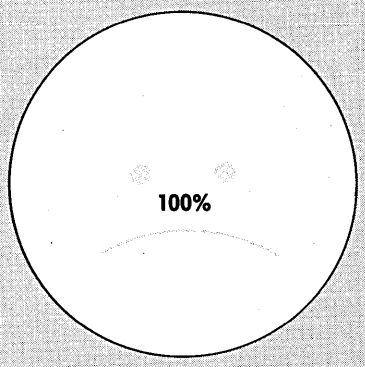
Most Popular Ceo Name



Source: Jane's Guide to Military Vessels

Under the Bottom Line

COMPANIES ESTIMATED TO BE OUT OF BUSINESS BY PUBLICATION DATE



Source: Kenny Rogers—gambler, loner, dreamer, New American Library

Most Popular Day for Declaring Bankruptcy

(BY PERCENTAGE)

SECTOR	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Hardware	50	0	0	0	50
Software	50	0	0	0	50
Frozfruit	0	0	0	0	0

Source: TNA (Technology Not Available)

Methodology

Throughout the year, DATAMATION carefully observes more than 200 of the largest and most influential data processing companies, forming the basis for the annual definitive ranking, the DATAMATION Top 100. For about an hour and a half in February, DATAMATION glances at a handful of the smallest and most anemic dp companies, forming the basis for the insignificant and dubious ranking, the Bottom100.

For purposes of the survey, dp-related revenue is defined as general purpose dp products and services generated by one or more of the following categories of equipment: mainframes, minicomputers, microcomputers, office systems, data communications, peripherals and terminals, software and services, and maintenance and repair. This is all pretty academic, since none of the companies on this year's list actually sold anything anyway: the Bottom 100 uses the sole criterion of *intent to sell.*

During 1986, a number of Bottom 100 companies restated their year-earlier performance figures, citing a reflection of changed accounting methods, mergers, spin-offs. But DATAMATION is too smart for them. It would take a bigger bribe than these companies have revenues to get us to change our figures.

In cases where a company has not explicitly stated dp revenues or where companies did not cooperate fully with the survey, DATAMATION has picked figures at random.

To calculate the dollar value of the results of non-U.S. companies, OECD average exchange rates were deemed too confusing. For calendar 1986, therefore, the equivalents to one dollar in these currencies were the following: Canada, C$1; Finland, MK1; France, FF1; Italy, L1; Japan, ¥1; the Netherlands, G1; Norway, NOK1; Sweden, Skr1; the U.K., £1; and West Germany, DM.50 (because they lost the war).

Illustrations by Cynthia Stoddard

-100

TOTAL DP REVENUES $0

CRAYS 'R' US WESTERN SAMOA

Shore Enough Rd.
Lepa, Western Samoa
(call IOC Operator: say Polly sent you)

MAINFRM $0

Crays 'R' Us Western Samoa's performance in 1986 was about what you'd expect from a company selling multimillion-dollar supercomputer equipment through a walk-in showroom retail outlet. Its $999 million loss on revenues of $10 (a 1,000% increase over 1985's intake) has solidified the uniform confusion among industry analysts over CRUWS's market strategy.

MINI $0

"I'm not one to flinch in the face of a little adversity. I was a hero during World War II here in the South Pacific, you know," explains company owner-president Emile de Becque. "We never expected to turn a profit overnight. The islands have little industry or institutional government, and no research university; most Western Samoans raise their own food, build their own homes, and make their own clothes. Naturally, we expect it to take some time to create among these people the belief in the wisdom of purchasing a piece of equipment they don't need."

MICRO $0

DATACOM $0

Vp Nellie Forbush adds, "While we offer the easiest, most convenient method of buying a supercomputer to be found anywhere in the world, the Western Samoans have yet to display the natural élan we expect to be engendered by 'cash and carry' shopping. When they come of age, technologically speaking, we will be the only firm with an infrastructure in place. As I see it, we're just a supply running slightly ahead of demand. Some enchanted evening," she says dreamily, "we're going to look around and find ourselves the IBM of the Southern Hemisphere."

PERIPH $0

SOFTWARE $0

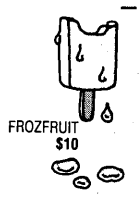
Industry observers were puzzled by CRUWS's decision to attempt to increase consumer awareness by signing former baseball player Bob Uecker to appear in a series of ads for the company. "The country has a 90% literacy rate, so we thought a print ad campaign was the way to go. Apparently, Uecker's appeal is just not cross-cultural. Go figure," de Becque sighs.

SRVICES $0

MAINT $0

Forbush notes the company's optimism about its future, centering around current moves to diversify outside the supercomputer market. To the 10 Crays it has in stock, it recently added a freezer case. "Breadfruit Frozfruits are particularly popular," she says. They account for the $10 revenues in 1986. (The 1985 revenue of $1 was found in the street by de Becque.) Rumors of a corporate move are false, says Forbush. "We couldn't operate as cheaply anywhere else."

SUPERCOM $0



-99

TOTAL DP REVENUES -$45 BILLION

L. "BUTCH" KOWALSKI ENTERPRISES' MINISTRY

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San Jose, Costa Rica
(011-506) 555-5555

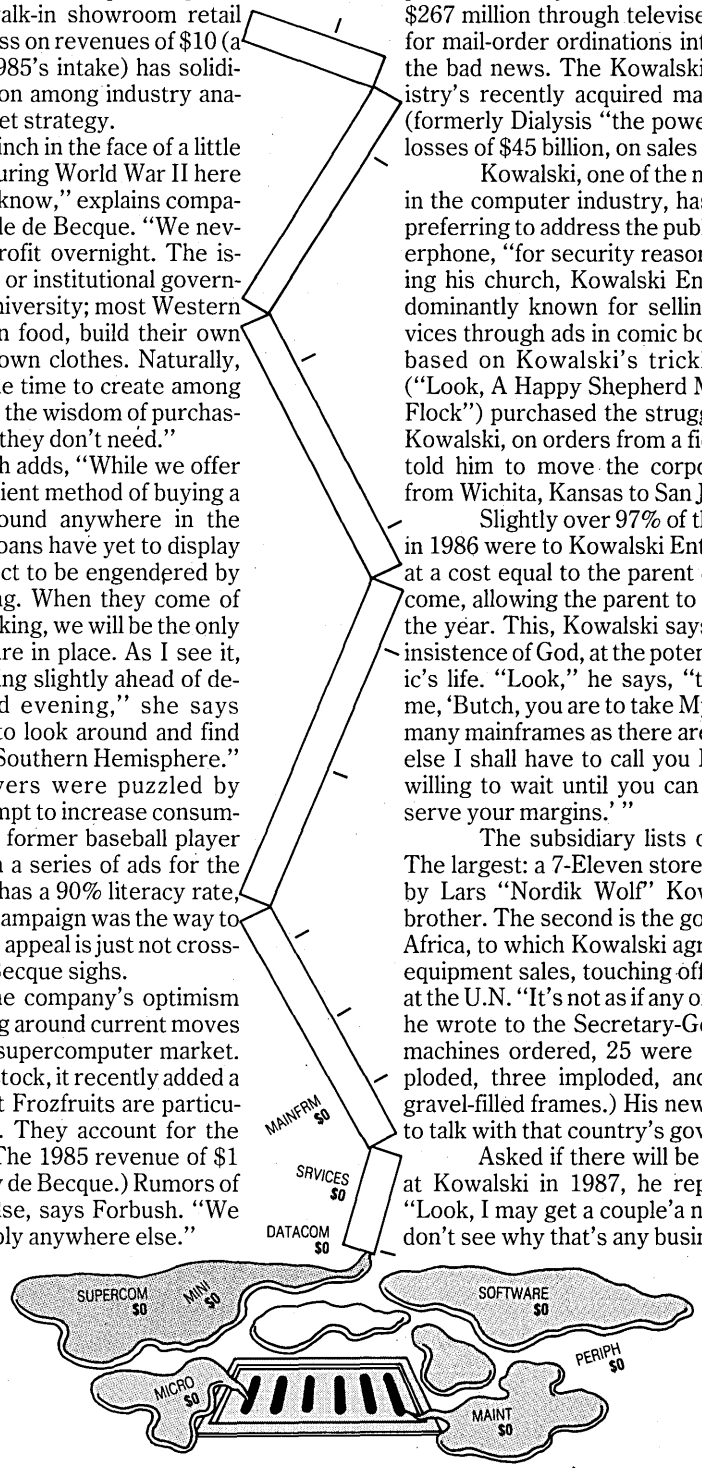
The Rev. Leopold "Butch" Kowalski Enterprises' Ministry had a remarkable 1986, taking in $267 million through televised appeals and fees for mail-order ordinations into his church. Now the bad news. The Kowalski Enterprises' Ministry's recently acquired mainframe subsidiary (formerly Dialysis "the power of π" Corp.) had losses of $45 billion, on sales of $267 million.

Kowalski, one of the most elusive figures in the computer industry, has never been seen, preferring to address the pubiic through a speakerphone, "for security reasons." Prior to founding his church, Kowalski Enterprises was predominantly known for selling UFO-tracking devices through ads in comic books. The ministry, based on Kowalski's trickle-down principle ("Look, A Happy Shepherd Makes For a Happy Flock") purchased the struggling Dialysis, says Kowalski, on orders from a fiery angel, who also told him to move the corporate headquarters from Wichita, Kansas to San Jose, Costa Rica.

Slightly over 97% of the company's sales in 1986 were to Kowalski Enterprises' Ministry, at a cost equal to the parent company's total income, allowing the parent to report no profit for the year. This, Kowalski says, was at the direct insistence of God, at the potential cost of the cleric's life. "Look," he says, "the Lord says unto me, 'Butch, you are to take My money and buy as many mainframes as there are stars in the sky or else I shall have to call you Home, and I'm not willing to wait until you can find a way to preserve your margins.' "

The subsidiary lists only two creditors. The largest: a 7-Eleven store in Chicago, owned by Lars "Nordik Wolf" Kowalski, the cleric's brother. The second is the government of South Africa, to which Kowalski agreed to make major equipment sales, touching off a storm of protest at the U.N. "It's not as if any of the stuff worked," he wrote to the Secretary-General. (Of the 100 machines ordered, 25 were delivered: four exploded, three imploded, and 18 were merely gravel-filled frames.) His new policy is to refuse to talk with that country's government.

Asked if there will be any new hardware at Kowalski in 1987, he replies mysteriously, "Look, I may get a couple'a new hammers, but I don't see why that's any business of yours."



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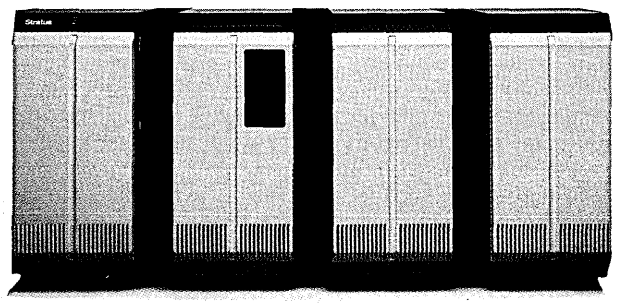

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CIRCLE 38 ON READER CARD

Microcomputers are revolutionizing the world of economic forecasting, as economists shrink their mainframe models to run on pcs. One reason forecasters are taking the pc path is cost. Micros provide an inexpensive and fast way to build and test models of the economy. Because pcs make building models cheaper and more convenient, they could turn econometrics into a cottage industry. How homegrown econometrics will affect the quality of economic forecasts remains to be seen.

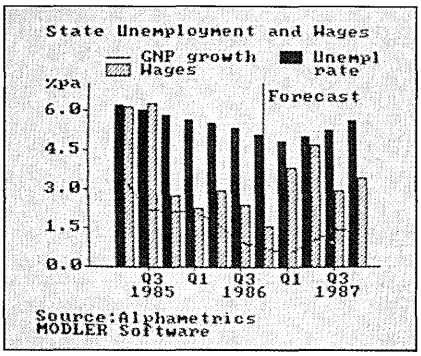
Modeling with Micros

BY DAVID STAMPS

Will microcomputers improve the track record of economic forecasters? Probably not, but it's almost certain they'll increase the number of forecasters.

One of the first mathematical models of the U.S. economy was the Klein-Goldberger model, which consisted of 30 equations. In the precomputer 1940s, it had to be solved by hand, but the model worked well enough to predict that the U.S. economy wouldn't fall into a slump following World War II.

Thus was born the science of econometrics—a science that has come a long way with the help of computers.



Alphametrics' Modeler uses the econometrician's rules to manipulate data from large databases.

Today, a mathematical descendant of the Klein-Goldberger model used by Wharton Econometric Forecasting Associates, Bala Cynwyd, Pa., consists of some 2,000 equations.

If economists had to work through a 2,000-equation model on paper to put out their monthly predictions, then econometrics would be about as widely practiced today as hand illumination of ecclesiastic manuscripts.

In all likelihood, the last forecast of the nation's GNP you read was done on an IBM PC. Even in the arcane field of econometrics—one of the last bastions of user unfriendliness—microcomputers are taking hold.

By now, all of the major economic forecasting firms have shrunk, or are in the process of shrinking, their mainframe models of the U.S. economy to pc size. At Data Resources Inc. (DRI), Lexington, Mass., the nation's largest econometric forecasting firm, the flagship model of the U.S. economy is a 15-year-old set of 1,000 equations. Last year it was compressed into a 150KB program for the IBM PC. Chase Econometrics, Bala Cynwyd, Pa., which has scaled down its model of the U.S. economy to 400 equations, is beta testing a new product that allows clients to have on-line access through a pc to Chase's database.

Even the Commerce Department is planning to convert its model of the United States to run on an IBM PC. It is having some difficulty though, since the model was developed years ago for a Honeywell mainframe.

Too Early to Judge Impact

While it's still too early to judge the overall impact that micros will have on the business of econometrics, it's not too soon to see some of the changes the little powerhouses are bringing to the field.

For one thing, they could fuel the creation of a whole new cottage industry. Today, economists all have their own assumptions. Before long, they could all have their own models. Given a pc, a modem, access to databases, and a hatful of assumptions, we could all be issuing monthly forecasts before very long.

Merrill Lynch Economics, New York, serves as a good case in point. Doling out forecasts to 3,000 of its retail offices worldwide and to some 300 outside clients who access its services over Tymnet, the company is no two-bit operation. In fact, it's a two-person operation.

The main man is Frank Cooper, who develops models that run on an AT. Cooper, who dates back to the Klein-Goldberger days, has designed mainframe-based models of the economy at Wharton, DRI, and the Federal Reserve Bank of Chicago. Cooper's assistant electronically rifles through the large databases at Wharton and DRI, collecting the pieces of data needed to build and test economic models.

The software that allows Cooper and his assistant to build models on the AT is called Modeler and comes from Alphametrics, Bala Cynwyd, Pa. Modeler takes data from huge databases, like DRI's and Wharton's, and manipulates them according to the rules established by the econometrician.

Modeler Program Popular

Modeler was first offered by Wharton in September 1984. Now DRI also offers a micro-based program, which is similar to Modeler and can be used to do forecasting with its model of the U.S. economy. Alphametrics claims there are 600 Modeler users worldwide, about 100 of whom use it to work out their own forecasts with DRI or Wharton data.

Charles Renfro, Modeler inventor and president of Alphametrics, believes mainframes are no longer needed for economic modeling. A former model builder at Chase, Renfro claims he's "getting speeds on the pc that can solve a 400-equation model in two or three minutes." Modeler programs, he notes, offer features like screen graphics and output to laser printers for making charts, which mainframes traditionally don't have.

The keenest incentive to do economic forecasting on a pc, however, is cost. "The limiting factor in doing forecasts has been mainframe computing costs," according to William Hills, director of systems and technology for Chase. Alphametrics' Renfro agrees. "It used to be a daunting experience to pay for a forecasting session on a timesharing service," he recalls. "You could rack up a hefty bill just learning how to use the model. The only cost to learning and using a model on a pc is your own time."

Of course, economists vary in their predictions about pcs spawning a new breed of do-it-yourself econometricians. Not surprisingly, they also disagree about whether homegrown econometrics would be good or bad.

Merrill Lynch's Cooper doubts the wisdom of kitchen-table econometrics. He admits that using pcs offers a fast and inexpensive way to build and test models. "But," he says, "the number of people who have the experience to build and test a model and then figure out if it does what it is supposed to do, is limited—maybe only 500 in the world. Anyone with the software and the data can start, but it may take them 15 years to figure out what they're doing."

Saul Hymans, director of the Research Seminar in Quantitative Economics (RSQE) at the University of Michigan, Ann Arbor, agrees with Cooper, warning that "a lot of qualified people will decide they can do models themselves, but so will a lot of people who have no idea of the substantial requirements to produce a model. And they'll produce far worse results than what they had before."

The possibility that do-it-yourself econometricians may produce "worse results" was not enough to keep RSQE from transferring its own model from an Amdahl mainframe to a pc.

Not everyone thinks more micro forecasters mean poorer results. Stephen K. McNees, an economist at the Federal Reserve Bank of Boston, believes that putting forecasting in the hands of forecast users is a terrific idea. "If you're serious about forecasting, you can't take someone else's forecast," he says. "You have to work out your own, and a pc is a good tool for that."

McNees, who has become something of the unofficial scorekeeper among the major forecasting services, emphasizes that no one prognostication can be taken as economic gospel. Over time, they all have their hits—and misses. He explains, "Most users don't simply accept the figures that a forecaster puts out. They want a story, an explanation of the reasoning that underlies a forecast. Doing one's own forecast with a pc makes the forecast more personalized, which is even better. You can't simply trust the guys with the black box."

Mainframes for Massive Databases

Whether to maintain a database on a mainframe or a micro isn't a tough decision for econometricians. The amount of data determines which machine is more appropriate. One forecasting firm that clearly needs to go the mainframe route is Data Resources Inc. (DRI). Its Lexington, Mass., computer center houses five B7700 and B7800 mainframes and is the largest Burroughs timesharing installation in the world. "We also have an IBM 3083 and a gaggle of other stuff," says vp Jan Prokop.

"As the market shifts, we are becoming more of a data utility," he says. "Though timesharing is still a large part of the business, we're branching into new areas, such as downloading data to pcs. The processing may change. Access to the data may change. What does not change is the huge, monolithic body of data."

That monolithic body of data consists of some 10 million time series—the numerical grist for econometric mills. Though much of that is on magnetic tape, the data stored on on-line disk devices still amount to 85 gigabytes. DASD at DRI is growing by roughly 30% each year, putting DRI in the same ballpark as other large DASD users, such as banks and airlines. For a company in the econometrics business, however, maintaining that data involves some unique problems.

One of those problems crops up every five years, when the Commerce Department's Bureau of Economic Analysis (BEA) issues a "comprehensive revision." The most recent revision came last December, when the BEA changed the GNP constant from 1972 to 1982 dollars. These modifications mean forecasting firms have to change many, if not all, of the time series in their databases.

The job, says DRI's Prokop, is not quite as bad as it sounds. DRI uses a proprietary programming language specifically designed to handle the flat files that are used for time series. The time-consuming job lies in reestimating all the models, and then testing them to see if they do what they're supposed to with the new data. Everyone in the forecasting business agrees it's a big pain, but it's one they have to live with, because the Commerce Department eternally revises its figures.

The initial job of getting data into the database is no piece of cake either. DRI maintains a Data Products Division in Washington, D.C., where 50 people now work, collecting data from 1,000 sources, and putting them into the proper format for DRI's 10 million time series. Government agencies, such as the Bureau of Labor Statistics, the Census Bureau, the Federal Reserve, and Commerce, supply approximately 60% of the data. The rest come from trade associations, other countries, and large banks.

As to what form the source data come in, it's "a mixed bag," says Madeleine Disario, director of the Data Products Division. While some of it comes on mag tape, much of it comes on paper and has to be rekeyed. Canada, however, sends its statistical data to the Lexington computer center via a direct hookup.

"We're at the mercy of how the source agency wants to distribute its data," explains Disario. The U.S. government is starting to push to distribute data on diskette. About one quarter of the agencies offer a choice of hardcopy or computer tape. "With the rest, you take what you get, which generally means hardcopy."

Blame It on Uncle Sam

Sensitive to charges that their forecasts are unreliable, many econometricians blame Uncle Sam. At a time of rapid economic changes, when computers and high-tech industries are causing whirlwind economic expansion, and sometimes even contraction, the U.S. government's system of collecting and classifying economic statistics is outdated. Budget cuts at agencies responsible for gathering economic statistics have exacerbated the problem.

An ironic example of the criticism comes from those in the dp domain. Uncle Sam, they charge, is unable to measure the industry in which econometrics itself belongs—computer services. The Commerce Department's Bureau of Economic Analysis (BEA) publishes the Standard Industrial Classification Manual (SIC), which divides the economy into 12 "divisions," 84 "major groups," and so on. Many newer industries, such as computer services, do not have their own codes. Computer manufacturing has not yet been rewarded with a two-digit major group number; it falls into the SIC hierarchy at the less specific four-digit level, lumped with nonelectrical machinery.

The problem is just simple classification. For years, the Bureau of Labor Statistics (BLS) has been working to come up with a "producer price index" for computers. Given the rapid technological changes in computer equipment, comparing prices of old and new machines is difficult. Without a producer index for computers, which would include a price deflator, forecasters either have to make their best guesses or operate on the assumption that equipment prices have remained constant. Some specialists say it's this assumption that has resulted in a consistent understating of the real GNP each year.

In 1985, impatient with work at BLS, BEA began developing its own index. The agency solicited comments from computer manufacturers, including IBM, which worked on the new BEA index that was produced in December of that year.

The SIC codes were recently revised—for the first time since 1972—to reflect more accurately the existing structure of the economy. Effective in January, the new codes created 79 new industries, including computers, peripherals, and software. Data reflecting the new codes will not be published for two years.

Robert Parker, associate director of the BEA's National Economic Accounts, doubts forecasting will be much improved by the SIC revisions, which are designed to create a big picture of the economy. "The problem is that to measure changes in the structure of the economy, you need both a good classification system and a good data collection system. It's the data collection system that is lacking."

In 1954, the Census Bureau stopped sending data collectors into the field. Recently, it has turned to tax returns as a way of collecting business data—though Parker says this procedure is inadequate.

Despite all these shortcomings, Parker maintains that the data supplied by Uncle Sam is adequate for most of the large economic forecasts. "We do have some problems with data, but I don't think the forecasts suffer from them. Economic forecasters are notoriously poor at picking turning points in the economy. But the problem is not with data."

Econometrics does retain something of a black box aura, but it's the economics involved that is probably more arcane and incomprehensible to laypeople today than the technology.

Big Bang Without Big Boxes

Though dependent upon computers, econometrics has never been constrained by technology. For a midsize mainframe, solving a 2,000-equation model is not that big a job, even though each equation can run anywhere from 15 to 150 lines of code. Econometricians, unlike engineers, do not find themselves forever waiting for faster machines needed to design the next-generation missile or aerodynamic automobile.

Frequently the question arises as to why forecasts aren't more accurate. Some people have put the blame on the data used in models. Others say the problem lies in the assumptions used by the economists. It's never been claimed that a bigger or faster computer or one with a different architecture would give better forecast results.

While no one is suggesting that micros are going to improve the accuracy of forecasting, they do already offer other advantages and more powerful pcs on the horizon hold out the promise of still more benefits. "Microcomputers are not going to improve models per se," according to William Hills of Chase Econometrics. "But the rapidly increasing power of pcs will enable economists to test the validity of models more often. Mainframes will end up as a warehouse for the data. Most of the modeling itself will be done on the pcs."

Micros also have an advantage when it comes to graphics. Steve Zeller, director of model development for Wharton's U.S. services, believes that incorporating graphics into the forecasting program will improve the analytical features of the model. "It certainly makes it easier to look at the forecasts," he notes.

Wharton offers two pc programs that use its data—Alphametrics' Modeler and a program developed at Wharton called Aremos. Wharton, which was recently sold to Wes Associates AG in Basel, Switzerland, has roughly 50 models, including some for states and foreign economies. Once 32-bit pcs become available, it will start converting its models to run on micros, according to Zeller.

New data distribution methods is one pc application area that has already excited the big three forecasting firms. "Giving our clients on-line access to our data is something we'd like to develop," says Chase's Hills.

Chase is beta testing PCDATA 2, a product that allows data to be downloaded to a pc. "Most of our clients now access our mainframe via a terminal," says Hills. "They either do forecasting on the mainframe or download to their own systems. PCDATA 2 is the first step in our efforts to streamline that process."

Another possibility for streamlining the data distributing channel may be read-only memory compact optical disks (CD-ROMs). "A lot of our business is just delivering large amounts of data," says Hills. "Now we rely on telephone links. Mailing out floppy disks eliminates the expense of phone links, but the data required for some models pushes the limits of floppy disk technology. CD-ROMs may be the solution."

Whether or not CD-ROMs are the wave of the future remains to be seen. What's clear now is that pcs are pouring into today's econometrics market, and swimming with those micro currents will be a lot more forecasters. ■

A frequent contributor to DATAMATION, David Stamps is a Minneapolis-based freelance writer.

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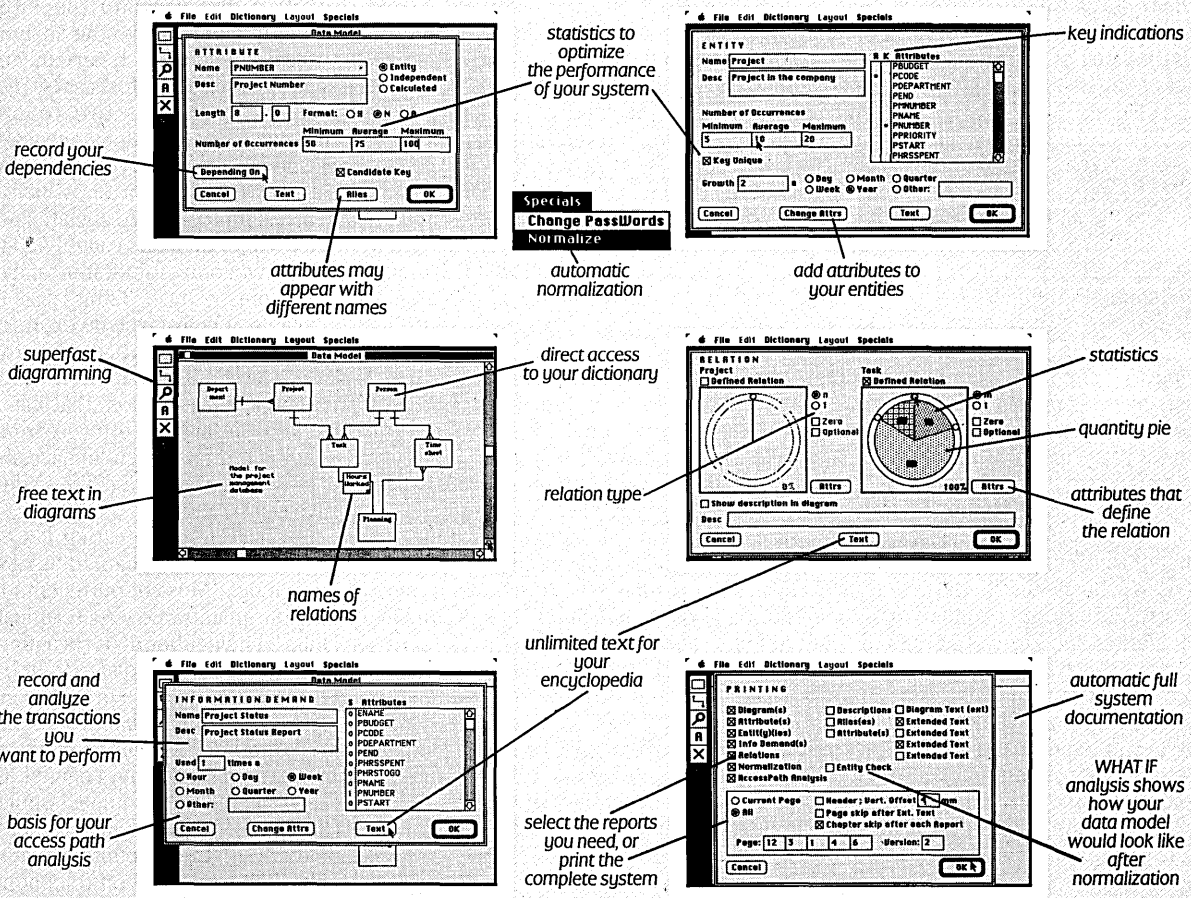

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CIRCLE 39 ON READER CARD

Real Time

OFF-LINE

SUPERCOMPUTER GIANT Cray Research Inc., Minneapolis, recently announced new models of its Cray-2 and Cray X-MP computer systems. As anticipated, the computers are not completely new machines, but repackaged versions of existing Cray models with improved price/performance (see Look Ahead, Feb. 15, p. 10). Most significantly, one of the new X-MPs is an entry-level model with a price tag drastically below other Cray models.

With other supercomputer manufacturers, as well as a growing number of minisupercomputer vendors, offering machines with near-supercomputer power at a fraction of the price, it's not surprising that Cray is reacting with its own machine. Vendors like Alliant Computer Systems, Littleton, Mass.; Convex Computer Corp., Richardson, Texas; Floating Point Systems, Beaverton, Ore.; and Scientific Computer Systems, Wilsonville, Ore., all have offerings in this area, and more vendors are seeing opportunities here.

Cray's entry-level system is the Cray X-MP/14se. It provides one Cray X-MP cpu and 4 million words of memory. The largest X-MP provides four cpus and 16 million words of memory. Cray claims the new system provides about 80% of the performance of the high-end X-MP/14 at less than half the price: the X-MP/14 is $5.5 million, the X-MP/14se is $2.5 million.

Some observers, including Norm Dawson, executive vp of sales and marketing at Chopp, a La Jolla, Calif.-based startup that will introduce its first supercomputer later this year, are surprised at Cray's announcement. "It's a change of strategy for Cray," Dawson says. A few years ago, Cray began to develop and then scrapped a project called Quarter Horse, a machine that would offer one quarter the performance of a Cray-1. It appeared that the company would continue to concentrate on developing high-performance, high-priced supercomputers. Market pressures seem to have altered that strategy.

Cray's entry-level offering comes at a time when the minisupercomputer market seems headed toward a shakeout. Nearly 20 companies are vying for a slice of the pie. Last year, losses at Floating Point Systems prompted layoffs at the company, and two startups—American Supercomputer Inc. and Denelcor Inc.—shut their doors.

HARDWARE

Teradata Unveils Ethernet Attachment

Allows PC users to directly access database computer without going through mainframe

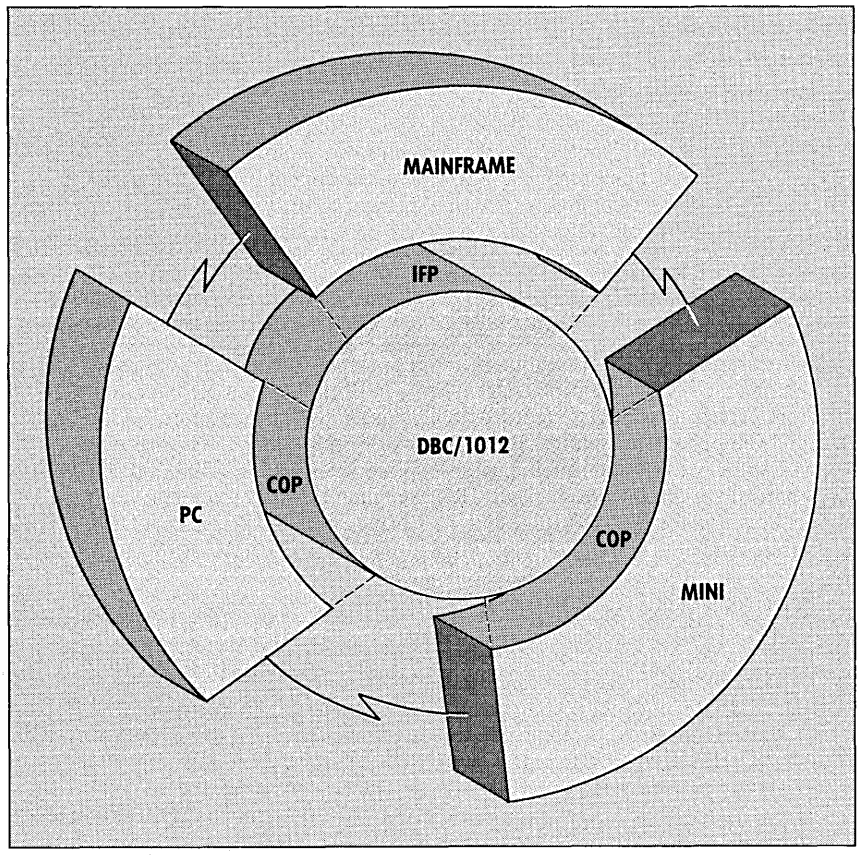
BY THERESA BARRY

The Communications Processor (COP) was recently announced by Teradata. The COP is an open systems interconnect foundation for Teradata's shared information architecture.

Teradata specializes in database computer systems. Its computer, known as the DBC/1012 Data Base Computer System, was introduced in October 1984. It uses a parallel processing architecture and was designed to attach to a variety of existing computers, including mainframes, minis, workstations, and PCs, allowing for the interconnection of diverse processing environments into a common, shared database. Modular in design, the DBC/1012 has a minimum configuration of three processors to over 1,000 processors.

The new COP offering consists of several new hardware and software products designed to support the attachment of Teradata's DBC/1012 to an Ethernet local area network. (Teradata currently has communications adapters to attach its computer to LANs conforming to 802.3, utilizing TCP/IP or ISO OSI network protocols.) The software enables users to directly manipulate data on the DBC/1012 from an IBM PC or compatible running PC/DOS or MS/DOS and from an AT&T 3B2 running Unix System V.

The Ethernet adapter that supports TCP/IP utilizes an Excelan EXOS 201



COP attaches Teradata's database computer to a local area network.

intelligent Ethernet controller board. An Intel iSXM 552A Ethernet controller board supports ISO OSI network protocols. The Intel 80286 microprocessor and 80287 numerics coprocessor are utilized by the COP, which has 2MB of RAM. (A 386-based version is coming, says the company.)

The COP is said to work this way: when a DBC/1012 session is established, it is assigned to the least-busy COP, which balances communications traffic to and from the DBC/1012 across all COPs on the LAN. The DBC can have more than one COP for redundancy and throughput purposes. A LAN can have more than one DBC/1012 connected to it and a DBC can connect to more than one LAN.

Teradata's COP for the DBC/1012-Model 2 is available now. Including the Ethernet adapter for either TCP/IP or ISO OSI, the price is $39,000. The COP software for either protocol is $4,000 per COP. The PC interface license is $5,000 for up to 10 PCs. The AT&T 3B2 interface is $2,000. The company plans to add support for the XNS and MAP protocols by the end of the year. TERADATA CORP., Los Angeles. CIRCLE **262**

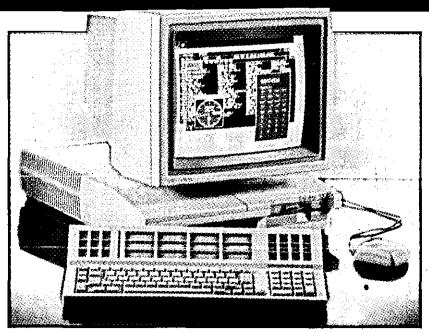
Intergraph Goes Generic

Will sell its 32C engineering workstations as standalone units

In a move aimed at positioning its 32C workstations as direct competitors with other engineering workstations such as those from Digital, Sun Microsystems, Apollo, and IBM, Intergraph is making its products available for the first time out of the turnkey system context.

Intergraph's 32C workstations, in production since November '86, run under Unix. The InterPro 32C features a Fairchild Clipper Unix engine that operates at 5MIPS, 6MB of main memory, an 80MB hard disk, either a 15-inch or 19-inch color monitor with 1,184-by-884 resolution, and IEEE 802.3 networking software. The InterAct 32C features the same electronics and computing capabilities as the InterPro. It's distinguished by its dual 19-inch color monitor and integral digitizing table. Software standards incorporated into both workstations include Unix System V; GKS graphics interface; VT220, 4107, and 3278 terminal emulators; compilers for Fortran, C, and Pascal; and networking capabilities, including Ethernet, XNS, TCP/IP, ISO OSI protocols, and NFS and RFS file access.

The Interpro 32C, fully loaded, is



priced at $25,000; the InterAct 32C in its basic configuration is $40,000. Intergraph is planning some enhancements to the product line next month. INTERGRAPH CORP., Huntsville, Ala. CIRCLE **266**

Two Datacom Products

Doelz introduces a concentrator and a circuit switch.

The Elite One FP from Doelz Networks is a one- to four-port multipoint concentrator switch for data distribution networks. It is an extension of and includes the functionality of the Elite One Series 2800 and 2900 concentrators, which are expandable to 16 ports. Doelz designed the Elite One FP for small sites with four or fewer user devices.

The Esprit One FP is a virtual circuit switch that is said to act as a central concentration point in a small network or as a limited concentration point in a larger network. It supports 1,400 concurrent virtual circuits and serves as the connection between Elite One network links to provide data distribution and to connect local devices through local port interfaces. Doelz says it can connect with 98 Esprit One switches.

Both devices provide fault tolerance, and both incorporate Doelz's network architecture. The Elite One FP is priced between $3,500 and $5,200, depending on the number of ports and internal modems. The Esprit One FP starts at $19,750. DOELZ NETWORKS, Irvine, Calif. CIRCLE **265**

NAS Expands AS/XL Series

Also announces 6MBps channel transfer

National Advanced Systems recently introduced a new model of its AS/XL Series of mainframe computer systems, the AS/XL 70. The company also announced it would support a 6MBps channel on all its AS/XL models.

The AS/XL 70 is a dyadic processor that features maximum main memory of 256KB of dynamic working storage. NAS is positioning the 70 between the model 60, which is a uniprocessor, and the 80, which is a dual processor. It's rated at .6 to .8 times the internal throughput of the AS/XL 80. Other features include 128KB of cache storage and up to 64 channels. It's field upgradable to an AS/XL 80, 90, or 100. The AS/XL 70 with 64MB of memory and 32 channels is priced at $5.28 million.

NAS also announced the availability of 6MBps channels for all AS/XL mainframes. IBM currently supports only 3MBps channels and is expected to announce either a 6MBps or 4.5MBps channel speed soon, industry sources say. In the event IBM announces the 4.5MBps channel speed, NAS says it will support both 6 and 4.5. Amdahl currently has limited 4.5MBps capability on its mainframes.

An Expanded Memory function for all AS/XL systems, NAS's version of IBM's Expanded Storage, will be available later this year. A 64MB version goes for $394,000. NATIONAL ADVANCED SYSTEMS, Mountain View, Calif. CIRCLE **263**

Prime's Midrange Offering

New 32-bit superminicomputer in 50 Series

The 2755 is Prime's fully compatible addition to its 50 Series of superminis, which is said to perform up to 35% faster than its predecessor, the 2655. The 2755 also supports the same peripherals as others in the series.

Features of the new computer include 64KB of cache memory, 16MB of main memory, support for up to 128 directly connected terminals, and 4.3GB of on-line disk storage. The 2755 can accommodate up to 63 remote users connected via Primenet software, Prime's proprietary distributed network for local and wide area networks. The cpu executes at 1.6MIPS, compared with 1.3MIPS for the 2655.

Programming languages supported include COBOL, FORTRAN, as well as Prime's Office Automation System, which provides word processing, electronic mail, and personal computing. As a CAD/CAM platform the 2755 is claimed to support from four to six workstations.

A typical configuration includes the 2755 processor; Revision 20.2.1 of the Primos operating system; a 30-inch-high cabinet with disk and tape controller, diagnostic processor, and 4MB of main memory; a peripheral cabinet with a

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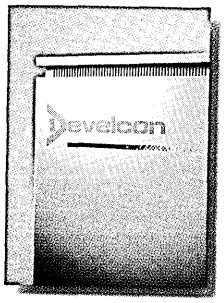

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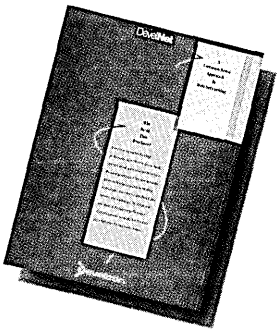

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CIRCLE 40 ON READER CARD

496MB fixed media disk drive and streaming magnetic tape drive; and a crt console. It is priced at $102,700. Other systems range in price from $95,050 to $133,200. In-cabinet upgrades from the 2655 are also available. PRIME COMPUTER INC., Natick, Mass. CIRCLE **269**

Printers and Software

Qume bundles printer with software for the price of a standalone.

Qume recently announced it was bundling some of its laser printers with software packages to create six laser printing systems for the price of a standalone printer. The systems are word processing, enhanced word processing/graphics, dot matrix, enhanced dot matrix/graphics, and two emulations of the HP LaserJet. Each system contains either the Qume LaserTen or LaserTen Plus printer with resident fonts, a snap-in emulation module, an additional font cartridge, and a software package.

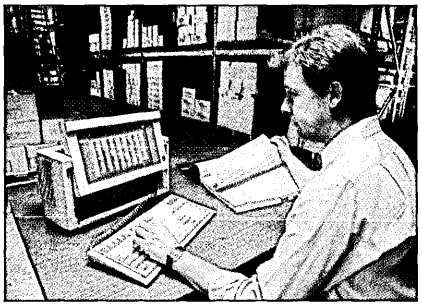
The software in the word processing package is Easy Laser, produced by Acorn Plus Inc., Burbank, Calif., and WordPerfect. This system is based on the LaserTen and it's priced at $2,795. Enhanced word processing adds Harvard Presentation Graphics from Software Publishing Corp., Mountain View, Calif. It's based on the LaserTen Plus and it's priced at $3,395. The dot matrix package, based on the LaserTen, includes Easy Laser and First Choice, an integrated spreadsheet, word processing, and communications package, which is the latest version of PFS: First Choice from Software Publishing Corp. The price is $2,795. The enhanced dot matrix/graphics is based on the LaserTen Plus and adds Harvard Presentation Graphics. It is $3,395. Also being offered are two HP LaserJet emulation systems. QUME, San Jose. CIRCLE **268**

New Portable from Compaq

Portable III incorporates a 12MHz 80286 microprocessor.

Compaq recently introduced its Portable III computer and also announced it would discontinue production of its Compaq Plus, Portable 286, and Portable II, Models 1 and 3. Price reductions on the Portable II, Models 2 and 4, were also announced.

The Portable III weighs 18 pounds at its lightest and includes an Intel 80286 chip, up to 6.6MB of RAM, up to 40MB of



shock-mounted fixed disk storage, a 5¼-inch diskette drive, a dual-mode plasma display, full-size detachable keyboard, and an optional expansion unit that can accommodate two full-size expansion slots.

Compaq says it used surface mount and ASIC (application-specific integrated circuits) technology to attain the reduced size and weight of the unit. Additional options for the Portable III include a memory expansion board, 512KB and 2MB memory option kits, a 360KB diskette drive, a 300/1,200 baud internal Hayes-compatible modem, an 8MHz 80287 math coprocessor, a tilt-and-swivel pedestal, MS/DOS Version 3.2, a color monitor, and an enhanced color graphics board.

The unit is available in three models. The Model 1 is priced at $3,999; the Model 20 is $4,999; the Model 40 is $5,799. The Compaq Portable Model 2 has been reduced in price to $2,999 from $3,599, and the Model 4 has been cut to $4,499 from $4,999. COMPAQ COMPUTER CORP., Houston. CIRCLE **267**

Network Concentrator

Netlink unveils micro-based datacom line concentrator for SNA nets.

Network SNA Hub from Netlink is an SNA network concentrator/router that is microcomputer based. It is said to enable multiple SNA devices to communicate over shared, high-speed host trunks. The system concentrates up to 15 communications lines, including direct, leased, multidrop, or dial-up SNA/SDLC, over host trunks at 64Kbps.

Network SNA Hub performs multihost routing. This includes computers not supporting SNA's Multisystem Network Facility, such as Tandem systems and IBM S/36s and 8100s, and systems that do not support current levels of Network Control Program. Netlink says Network SNA Hub systems can be located at remote network application sites.

The new concentrator is available now. A basic unit is priced at $9,975; a typical eight-port unit is priced at $15,000; and a version that supports multiple host links starts at $12,000. Netlink says it will accommodate IBM's token-ring LAN networks and X.25 communications protocol in the future. NETLINK INC., Raleigh, N.C. CIRCLE **264**

Looking Back

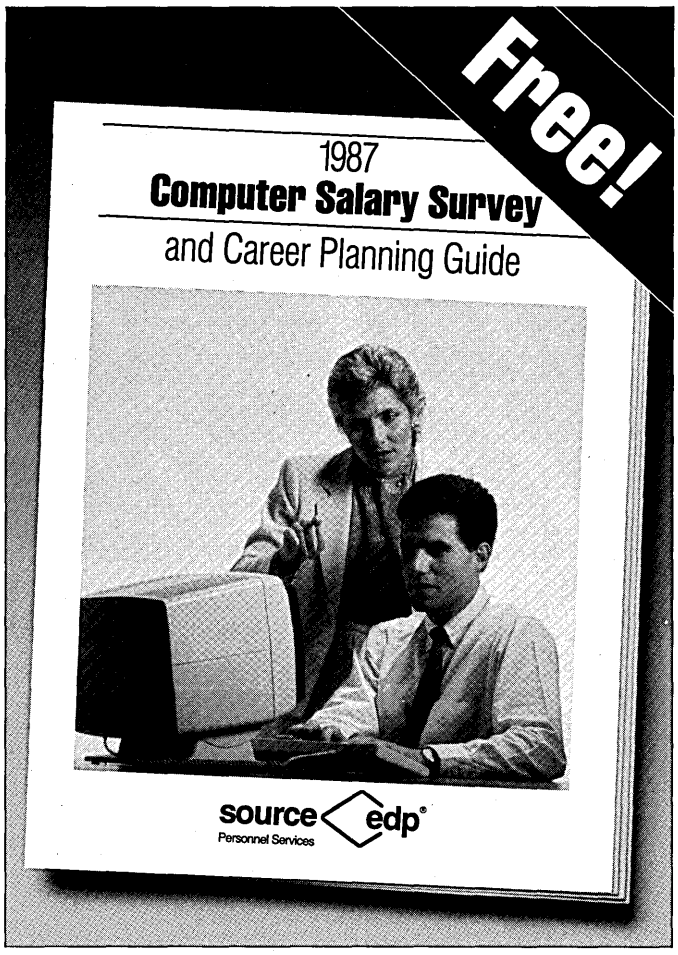
TWENTY YEARS AGO IN DATAMATION: "As far as can be determined, Olivetti-GE is the first to announce a sale of computers by an American-affiliated company specifically for use in the USSR.

"Under three signed contracts, a GE 415 is to go to a parts distribution agency of the Russian government, and two GE 400 series systems and a 115 will go into the auto manufacturing plant being built by Fiat in Russia. Since the computers are produced abroad by Olivetti-GE, U.S. export licenses are not required (and have never yet been given for sale of U.S. computers to Russia). But applications for approval of the contracts must be and have been made to both the Italian government and the Departments of Commerce and Treasury of the U.S.

"Approval of the applications does not seem unlikely in view of the U.S. government's urging of improvements of East-West trade relations and of the recent congressional approval of a $50 million U.S. loan to Italy to buy American equipment for the Fiat auto plant. Other U.S. computers are reportedly in Russia, although all are said to have been sold originally to satellite countries and were exported from overseas, not U.S., plants." (From "Olivetti-GE Closes Deal for Computer Sale to USSR," News Briefs, April 1967, p. 91.)

FIFTEEN YEARS AGO IN DATAMATION: "Competitors of IBM don't want the computer colossus broken up. 'I'd rather compete against one strong IBM than against three strong IBMs,' says the head of one mainframe company. The idea is spreading, too. Watch for IBM competitors to oppose a wholesale breakup of IBM. . . ." (From Look Ahead, April 1972, p. 157.)

Keep yourself up-to-date on salaries and careers in 1987



Understanding which technologies and markets are on the rise and which are on the wane can be important to your long-term career growth. If you keep up with new trends and tailor your professional plans accordingly, you can make sharp gains in your compensation and career.

The new, free **1987 Computer Salary Survey and Career Planning Guide** is based on information from thousands of computer professionals and firms across North America. Over sixty position titles are reviewed including those in programming, systems analysis, software engineering, Edp auditing, office automation, operations, computer sales, marketing, technical support, management and more.

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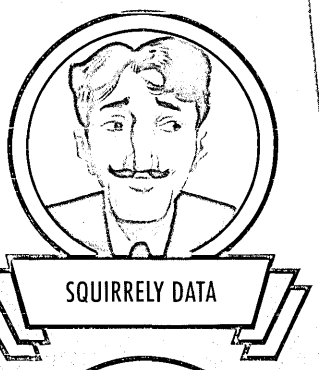

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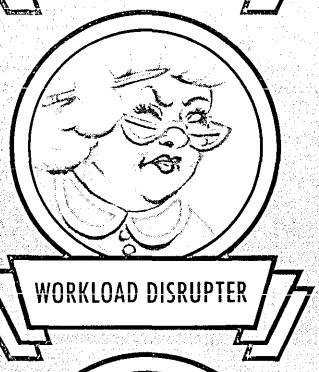

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8:30 a.m.	Registration and coffee
9:00 a.m.	Mayhem stalks the Data Center: Caging the VM Villains
12:30 p.m.	Complimentary lunch

SEMINAR DATES AND LOCATIONS

Albany, NY
April 15

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May 13

Boston, MA
April 16

Calgary, AB
May 8

Chicago, IL (O'Hare Airport)
April 3

Chicago, IL (Downtown)
May 19

Cincinnati, OH
May 21

Dallas, TX
May 12

Detroit, MI
May 20

Hartford, CT
April 27

Kansas City, MO
May 15

Long Beach, CA
April 9

Long Island, NY
April 29

Los Angeles, CA (Burbank)
April 8

Miami, FL
April 21

Milwaukee, WI
April 1

Minneapolis, MN
April 2

Nashville, TN
April 20

New York, NY
April 30

Oakland, CA
April 7

Philadelphia, PA
April 28

Phoenix, AZ
April 10

Saddle Brook, NJ
May 1

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April 14

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CIRCLE 42 ON READER CARD

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UPDATES

WHAT EXACTLY is a text retrieval system (see story this page) and how does it differ from a database management system? The basic difference is that text retrieval systems use inverted file and flexible searching methods to file and access data, while DBMSs file and access data in a hierarchical sequence in free-flowing, unstructured fields. DBMS files are traditionally more numerically oriented, while text retrieval systems are text oriented. Basically, text retrieval systems allow users to get at textual data once they're put into the computer database by allowing for retrieval of designated words, word combinations, sentences, paragraphs, pages, and abbreviations.

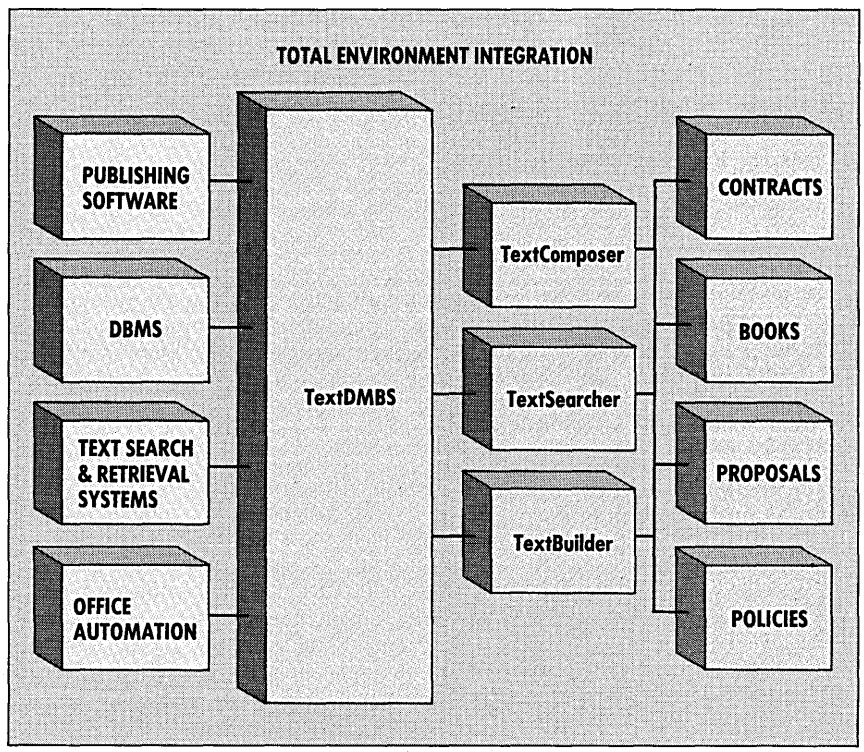
While text management products have been on the market since the late 1960s, analysts at the Gartner Group, Stamford, Conn., think the market is still young and predict the field will experience significant growth over the next five years. The current installed base worldwide is 3,800 licenses; in Gartner's view this base should reach close to 35,000 by 1991, a growth rate of over 55%.

The first applications for text retrieval/management systems were in scientific research and government and service bureau operations (such as Lexis and Nexis), with the tracking of legislation and the compilation of information on specific research areas the predominant applications.

IBM has dominated this market with its Stairs product, having reportedly garnered approximately 1,100 installations, mainly in the business/government sector. Information Dimensions Inc. (a subsidiary of Batelle Institute), Columbus, Ohio, has prevailed in the scientific segment of the market with its product, Basis. According to Gartner, this is because Basis operates on a wide range of minicomputers, including Digital, Wang, Data General, and Prime.

But Wang recently became the market leader with its Office Indexer, with 1,200 licenses. Introduced only last August, Wang has been propelled into the lead, says Gartner, because it has bundled its product with Wang Office, giving it significant market share. And, unlike most of the handful of text retrieval system vendors on the market, Wang has a sizable sales force. Gartner feels, though, that Wang's inroads will prime the market and open up paths for the smaller vendors.

SOFTWARE



TextDBMS provides integration of text environments.

Data Retrieval Corp. Migrates to DEC VAX World

TextDBMS product was previously available only for IBM mainframes.

BY THERESA BARRY

In the field of text management (see Updates), one of the players that's been in the game since the beginning is Data Retrieval Corp.

This company recently announced that its text management product, TextDBMS, available previously for IBM mainframes only, will be available for the DEC/VAX environment.

TextDBMS provides the ability to enter, edit, store, format, search, retrieve, process, update, and publish text to departmental users. Three modules work with this product: TextSearcher has search, retrieval, and on-line updating capabilities; TextBuilder, which is an application language specifically designed for text functions such as contract management, litigation support, marketing management, competitive analysis, complex document management, and policy and procedures management; and TextComposer, for type composition of final output.

With the goal of having TextDBMS operate identically in the DEC and IBM platforms, the company claims it will maintain one set of program modules, since 90% of the code is common. The product is being tested now, and is planned for third quarter general availability.

Data Retrieval says the product will run on all Digital 8200 series and up. The price of the base software system on the 8200 is $30,000 for TextDBMS, $27,000 for TextSearcher, $27,000 for TextBuilder, and $24,000 for TextComposer. DATA RETRIEVAL CORP., Milwaukee, Wis. CIRCLE **251**

Lawson's DB2 Offerings

Application software for accounting, personnel, and distribution

Lawson Associates recently announced the availability of application software packages developed for the IBM DB2 database environment. The Pinstripe DB2-integrated packages include General Ledger/Report Writer, Ratio Analysis, Accounts Payable, Accounts Receivable, Purchase Order, Fixed Assets, Payroll, and Personnel. Prices for the packages range from $115,000 for Pinstripe Purchase Order to $130,000 for Pinstripe General Ledger. LAWSON ASSOCIATES INC., Minneapolis. CIRCLE **250**

Monte Carlo Spreadsheet

Random number techniques are used to simulate data.

Standard electronic spreadsheets are limited in their ability to deal with the "fuzzy," probabalistic data often required for sophisticated statistical analysis. Each cell can only hold a single number, not a distribution of numbers such as needed in real estate appraisal, arbitrage, or marketing and risk analysis.

Unison Technology's answer to this limitation is Predict!, a spreadsheet-like tool whose cells can be defined in terms of such statistical "uncertainties" as normal, triangular, uniform, and even hypergeometric distributions, actual samples of data, and so forth. Once a Predict! model is constructed, it can be recalculated repeatedly using Monte Carlo, random-number techniques to simulate "fuzzy" data. The model's output can therefore include not just fixed numbers, but sets of data that describe probabilities of various outcomes. These sets can be analyzed according to standard statistical measures and graphed for visual comprehension. The software, designed to run on IBM PCs and compatibles, is priced at $795 and is available now from the vendor. UNISON TECHNOLOGY INC., Pittsburgh. CIRCLE **252**

Co-op Processing for PC 370

Allows pcs to be more than terminal emulators

Super-Link is designed to advance the use of IBM-type PCs in 3270-based applications beyond mere terminal emulation. It can help build applications that share work between IBM 370 and Digital Equipment VAX hosts and PC-type machines on a peer-to-peer basis. By offloading to the pc tasks like screen storage, data verification, and communications, Super-Link applications are claimed to save costly host cpu cycles—50% or more in CICS environments—while reducing communications costs, enhancing response times, and shortening the development cycle.

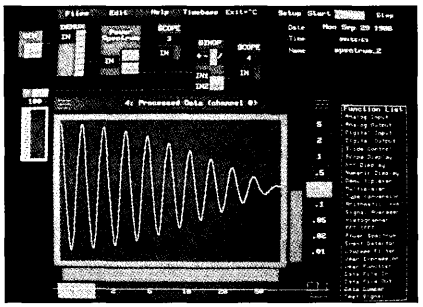
The package provides facilities for, among other tasks, designing and managing interactive screens on the pc, managing communications (in foreground and background) between COBOL and PL/1 host applications and the pc, and distributing software across networks. The software supports SNA/SDLC, BSC, and async connections, and will later support IBM's LU 6.2 protocol.

The base product, running on a single host and supporting up to 100 runtime pcs, carries a license price of $48,000. CPL/1, called a fourth generation development language, goes for an extra $10,000, as does the background communications facility. Deliveries have begun. MULTI SOFT INC., Edison, New Jersey CIRCLE **253**

"No-Programming" Software

Program for data acquisition of Masscomp microsupercomputers

Laboratory Workbench is Masscomp's newest software program, which is said to eliminate the need for programming



data acquisition, signal processing, and display tasks on scientific and engineering computers with Unix operating systems.

The system uses a mouse and menus to set up a dataflow diagram on the screen of a Masscomp graphics terminal. Some of the modules represent and control Masscomp's data acquisition hardware devices, while others represent file I/O operations, dataflow controls, signal processing operations, and display options. The dataflow diagrams and settings can be saved, reused, edited, and merged, Masscomp claims. Other features are a time base menu that provides flexible timing and synchronization options; ASCII and binary data files and file names and headers that tell when and how data was collected and processed; a hardcopy menu to print out displays and diagrams; and real-time oscilloscope, histogram, digital, and x-y plot display of data.

Available now on all Masscomp microsupercomputers, Laboratory Workbench is priced at $3,000 for the MC5300, MC5400, and MC5500 systems, and at $4,900 for the high-end MC5600 and MC5700 systems. MASSCOMP, Westford, Mass. CIRCLE **257**

Disk Cache Module from Unisys

Designed for use with Unisys's A 12 and A 15 mainframes

Unisys has announced a Software Disk Cache Module for its A 12 and A 15 mainframes that it claims improves the system performance by an average of 40%. The unit is said to allow users to designate a complement of main system memory as a disk cache unit, allowing users to access data directly from main memory rather than from the disk.

Users are said to be able to select specific disk units from their disk subsystem according to the volume of data access at the unit level rather than being limited to selecting units from a single string of disk. Also, disk units selected for caching can be dynamically added or removed from disk cache support at any time. Each disk is monitored so users can determine which units are benefiting from Disk Cache.

The Software Disk Cache Module is available under MCP/AS, Release 3.6.4. All disk types qualified on A 12 and A 15 mainframes are supported. The Cache Module requires a minimum of 24MB of system memory on the A 12 and 48MB is required on the A 15. Minimum system memory configuration for the A 12 is 48MB and 72MB for the A 15. Available now, the Software Disk Cache Module is $258,720 for a five-year extended term purchase and $311,640 for the A 15. UNISYS CORP., Detroit. CIRCLE **254**

Forecaster for 1-2-3

Program for IBM PC can also be used on its own.

Wisard Forecaster is Wisard Software's newest forecasting product, and can be

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*International Edition
**Marketplace

used by those with no knowledge of statistics.

The program is said to use artificial intelligence and expert system logic to provide four statisical forecasting techniques, which are combined to create a final forecast. Forecaster is designed to extract data directly from a Lotus 1-2-3 or Symphony spreadsheet without file translations. The resulting forecasts and related data can be placed directly into the same spreadsheet, or a new spreadsheet can be created.

Wisard Forecaster also works independently. Data can be entered directly into it, and full editing capabilities are said to be provided. Results can be written to an ASCII file and printed using the DOS commands. The vendor claims the program is able to determine seasonal values automatically, produce forcasts using as few as six actual values, and handle intermittent zeros. The program runs on IBM PCs, XTs, and ATs, and is priced at $99. WISARD SOFTWARE CO., Green Bay, Wis. CIRCLE **255**

PC-to-Apple Link

Allows PCs and Macintoshes to share information and peripherals

Tangent Technologies recently introduced PC MacBridge/AFP, a software package that allows IBM PCs to access Apple's AppleShare file server. It's said to be fully compatible with the AppleTalk Filing Protocol (AFP).

PC MacBridge/AFP works with Tange's PC MacBridge/ATP, an AppleTalk board for the IBM PC. The board enables the PC to function as a node on an AppleTalk network, allowing it to communicate with other networked PCs, Macintoshes, and PostScript (page description language) laser printers. The software allows the PC to access both PC and Macintosh files.

PC MacBridge/AFP is available now for $150. TANGENT TECHNOLOGIES, Norcross, Ga. CIRCLE **256**

The Librarian, Release 3.6

ADR enhances program for users of IBM's TSO/ISPF.

The Librarian, Release 3.6, is said to allow TSO/ISPF users to utilize the Librarian Change Control Facility (CCF), which provides systematic control over the update cycle of production source modules. A redesigned on-line interface for TSO/ISPF (ELIPS) is claimed to enable programmers to perform multiple Librarian functions from a single ISPF-type panel.

CCF-ISPF uses the Librarian's storage, retrieval, and auditing facilities and ensures that all changes to a program have been completed, tested, and documented before going into production. CCF-ISPF requires TSO/E Version 2 and ISPF/PDF Version 2 or later. Standard copy, replace, and create ISPF edit subfunctions are supported, as are all Librarian member-level functions. Release 3.6 also features a new version of LIB/AM (the Librarian Access Method), which supports VSE Release 2. LIB/AM for MVS now supports a directory read function.

The Librarian, Release 3.6, is available now for IBM 370, 30xx, 43xx computers and compatibiles under VSE, CMS, and MVS. The license starts at $19,000 for DOS and $29,400 for MVS. APPLIED DATA RESEARCH, Princeton, N.J. CIRCLE **258**

Pascal Debugger

French company GSI introduces product to U.S. market.

Générale de Services Informatiques (GSI) recently made one of its products available in the United States. The GSI Pascal Debugger is a source debugger that runs on IBM PCs, XTs, ATs, and compatibles.

The program includes a full-screen editor, built-in help screens, decimal or hexadecimal calculator, file manager, and windows. Features of GSI Pascal Debugger include display of program source during execution, trace option with automatic stop, conditional breakpoints, assignment/display of local and global variables and constants, and display of tree structures for functions and procedures. These features are said to be available for use in the source program.

System requirements are 256KB of memory and two disk drives or a hard disk; 386KB are recommended for large programs. In quantities of less than 10, Pascal Debugger is priced at $99. GSI, Pittsburgh. CIRCLE **259**

Dynasoft for IBM Mainframes

Integrated software package for MVS/TSO and VM/CMS

Dynasoft Corp. has made available its Dynasoft Integrated Software System for IBM mainframe computers using MVS/TSO and VM/CMS. The software package links the spreadsheet, word processing, graphics, and database interface functions. The software features overlay windows that allow users to view and manipulate data in the spreadsheet, graphics display, and word processing documents simultaneously. Dynasoft claims that users need to learn only one set of commands in order to operate all four systems, and all processing is done in one environment. The software includes pop-up menus that prompt the user for commands.

Dynasoft Integrated Software System for MVS/TSO and VM/CMS is priced from $17,500 to $49,000, depending on system size. DYNASOFT CORP., Rosemont, Ill. CIRCLE **260**

Looking Back

TWENTY-FIVE YEARS AGO IN DATAMATION: "It is probably safe to say that today, more computer programs are written in FORTRAN than in any other programming language." (From "ALGOL vs. FORTRAN," by James T. McMahon, April 1962, p. 88.)

TEN YEARS AGO IN DATAMATION: "Texas Instruments is about to come out with a whole series of products incorporating bubble memories, a source who was given a sneak preview of the bubble line says. On tap are intelligent terminals, word processing systems, and minis all aimed at the distributed processing market. TI also will incorporate bubbles in its calculator line before long, the source believes." (From Look Ahead, April 1977, p. 15.)

FIVE YEARS AGO IN DATAMATION: "A group of entrepreneurs from crt maker Delta Data Systems has formed Franklin Computer Corp., in Pennsauken, N.J., to sell microcomputers that are software- and peripheral-compatible with the popular Apple personal computer. Hoping to tap the mail order markets that Apple abandoned in a controversial decision several months ago, Franklin's Ace 100 machine will sell for $1,595 with 64K RAM, compared to Apple's list price of $2,068 for a comparably configured model 2. . . . The company says it's ready if Apple tries to block its actions in court and it doesn't think it will have problems in running the Apple disk operating system." (From Benchmarks, April 1982, p. 100.)

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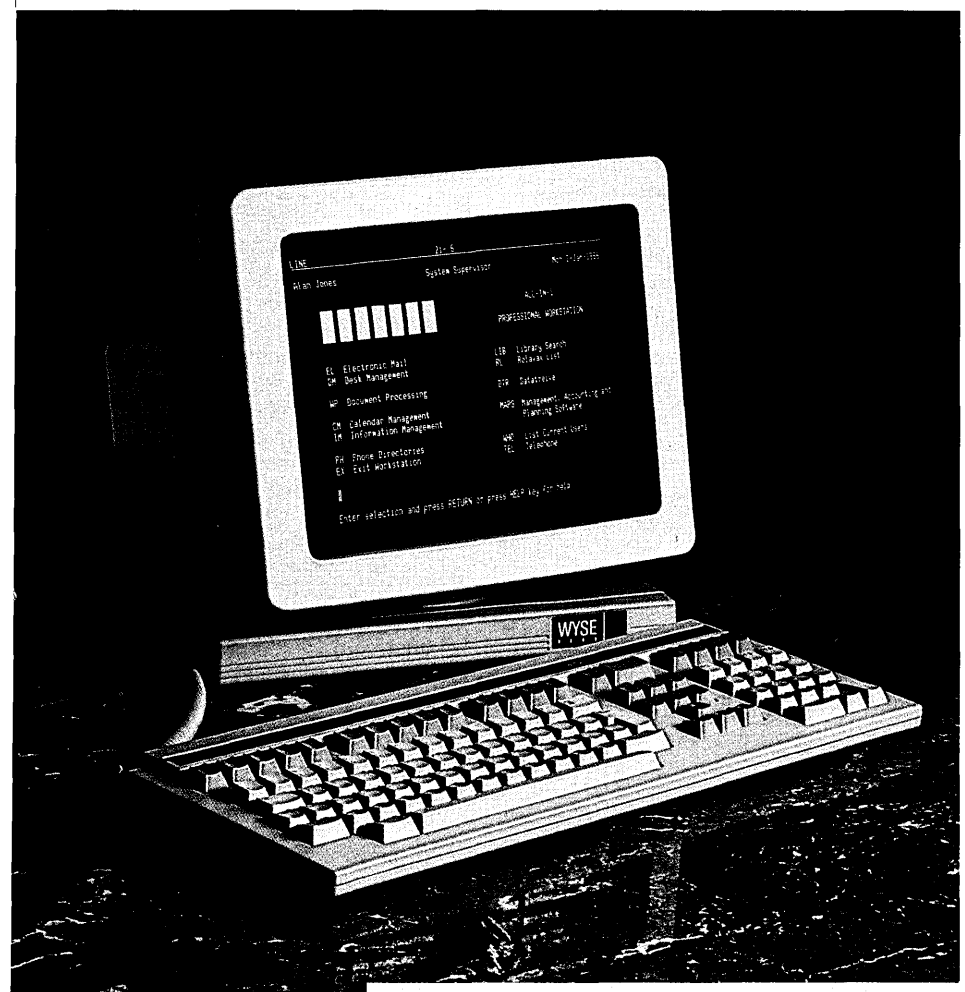

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**Dataquest 1985 mid-year terminal shipment update.*

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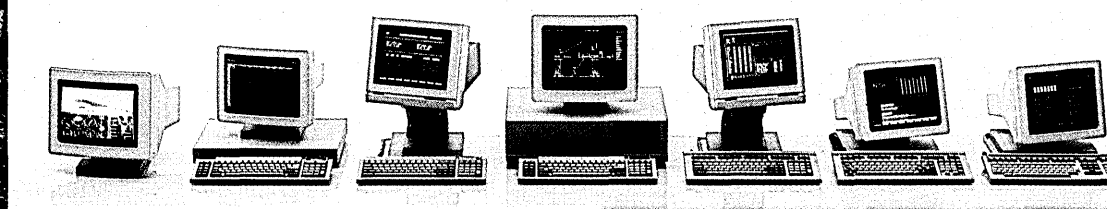

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BOOKS

Law Review for Dp

THE LAW OF COMPUTER TECHNOLOGY
by Raymond T. Nimmer, Warren, Gorham & Lamont Inc., New York (1985, 688 pp., $79.50).

BERNACCHI ON COMPUTER LAW: A GUIDE TO THE LEGAL AND MANAGEMENT ASPECTS OF COMPUTER TECHNOLOGY
by Richard L. Bernacchi, Peter B. Frank, and Norman Statland, Little, Brown and Co., Boston (1986, 2 vols., looseleaf, $160).

THE SOFTWARE LEGAL BOOK
by Paul S. Hoffman, Shafer Books, Croton-on-Hudson, N.Y. (1981, rev. 1986, 400 pp., looseleaf with index, $95).

BY THOMAS R. MYLOTT III

To cope with computer law problems, many dp/MIS managers must walk blindfolded through a legal mine field. Conversations between computer professionals and attorneys often resemble a United Nations meeting without any translators. To some extent, the three books under review here—which are representative of recent offerings on this increasingly important subject—can help improve communication.

None of these books is essential reading for data processing managers, of course, but any one of them would make a handy reference tool at a high-tech company. The books are all expensive and require a significant amount of study to be fully utilized. But each would make useful background reading for a manager faced with, say, a tricky software licensing decision.

The Law of Computer Technology is aimed at practicing attorneys and is a comprehensive legal treatise on computer law. This is an excellent book to educate an attorney, yet its usefulness to a manager is questionable. Since it is a law book, full appreciation requires a legal background, and unless a manager desires an exhaustive knowledge of computer law, the book goes into too much depth. For those people who enjoy reading legal texts, this one will be easier to understand than most. To use this book most effectively, wrap it up and give it as a birthday present to the company attorney.

Bernacchi on Computer Law concentrates on the acquisition of computer resources. It is quite expensive and is inappropriately titled, but these are its only shortcomings. This is not a book about computer law in general, but rather is a complete treatment of computer contracts. With the exception of software protection issues, there is very little discussion of the other areas of computer law. Computer contracts are an important concern for a manager, but contracts are not the only area of computer law that cause managers problems. However misleading the title, the book will likely become the definitive work in contracting for computer resources.

Still, another consideration is how much knowledge of computer contracts a manager needs. The Bernacchi book gives an intimate knowledge of computer contract issues when all most managers with responsibility for acquisitions need is some familiarity in the area. Those managers who are frequently negotiating, drafting, and administering data processing contracts will find the Bernacchi book extremely useful; anyone who has become that involved in the contract process, however, should go to law school.

The Software Legal Book concentrates exclusively on software issues. It is well written, free of legal jargon, and contains much information. This book, too, must be considered an in-depth work, and thus may contain more information than a manager wants or really needs.

For those who are willing to pay the price in dollars and time, all three books offer much. But before spending so much money and devoting so much time to learning about computer law, a manager should decide how much the investment is worth. Would hiring an expert be a more efficient and safe approach to dealing with computer law problems?

There will always be people who would prefer to be their own physicians, but there is an important difference between being an informed patient and learning to perform brain surgery. ■

Dallas attorney Thomas R. Mylott III has been involved with computers since 1967, holds a CDP, and is the author of Computer Law for Computer Professionals *(Prentice-Hall Inc., Englewood Cliffs, N.J., 1984).*

CALENDAR

MAY

Scientific Computing and Automation Europe.
May 13-15, Amsterdam. Contact Elsevier Science Publishing Co. Inc., 52 Vanderbilt Ave., New York, NY 10017.

International Symposium on the Enterprise of Tomorrow.
May 14-16, Marseilles. Contact la Société des Ingénieurs et Scientifiques de France (ISF), Francine Laborie, 19, rue Blanche, 75009 Paris, France.

E&M'87 (Engineering and Manufacturing Software/Computing Conference).
May 19-21, Rosemont, Ill. Tower Conference Management, 331 W. Wesley St., Wheaton, IL 60187, (312) 668-8100.

IBERICOM'87 (International Conference on Data Communications).
May 19-21, Lisbon. Contact IBERICOM Secretariat, Associacao Portuguesa de Informatica, Av. Almirante Reis 127, 1 Esq. 1100, Lisbon, Portugal.

International Conference Communication and Data Communication.
May 25-27, Brussels. Contact Université Libre de Bruxelles, Section Informatique et Sciences Humaines, 39 rue de Bruxelles, B-1400 Nivelles, Belgium, (067) 21 85 29.

ACM SIGMOD-87 (Association for Computing Machinery's Special Interest Group on Management of Data).
May 27-29, San Francisco. Contact ACM, 11 W. 42nd St., New York, NY 10036, (212) 869-7440.

ISDN (Integrated Service Digital Network) '87.
May 31-June 4, Monterey, Calif. Contact IEEE Communications Society, 345 E. 47th St., New York, NY 10017-2394, (212) 705-7018.

JUNE

COMDEX Spring.
June 1-4, Atlanta. Contact the Interface Group Inc., 300 First Ave., Needham, MA 02194, (617) 449-6600.

NCC '87.
June 15-18, Chicago. Contact NCC '87, American Federation of Information Processing Soc., 1899 Preston White Dr., Reston, VA 22091, (800) NCC-1987.

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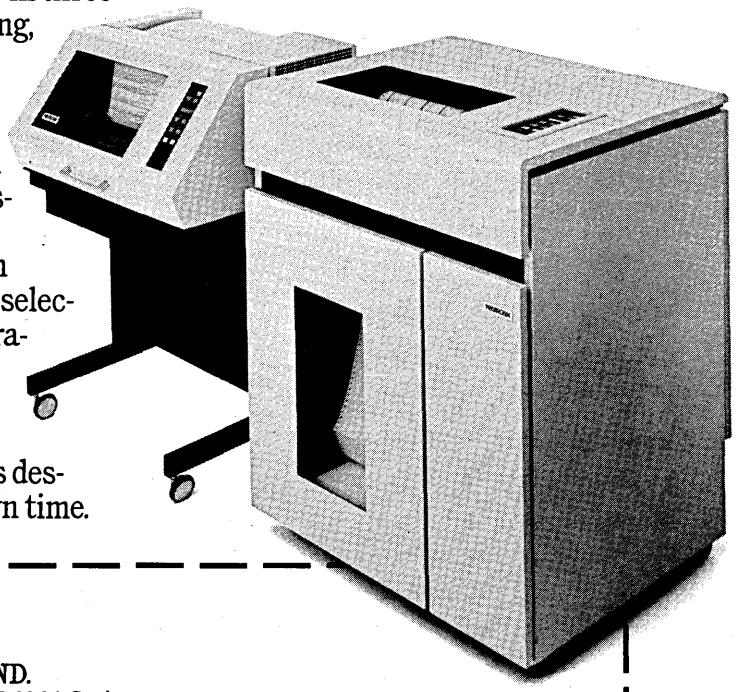

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PEOPLE

A Troubleshooter Learns to Ski

Steve Jerritts' background at GE and Honeywell helped prepare him for the struggle at StorageTek, which he vows to turn around.

BY JEFF MOAD

Stephen G. Jerritts probably wouldn't be the first person you'd think of if you needed someone to rescue a struggling computer peripherals company on the brink of bankruptcy and rebuild it into a viable vendor. After all, the computer industry veteran has spent most of his long career managing the computer operations of large, established corporations, not turning around once-proud but fallen companies such as Storage Technology Corp.

But the avuncular, 60-year-old Jerritts, who was selected two years ago to be StorageTek's number two executive, says his previous management experiences—first at IBM, then at GE and Honeywell—trained him well for his corporate rescue mission. "There's no school for learning how to manage under Chapter 11 [bankruptcy protection]. But, although I was not involved in turnaround situations before coming to StorageTek, if you look at where I've been, you'll see I have been asked to undertake a couple of troubled businesses."

Jerritts was contacted by members of StorageTek's board of directors in December of 1984 after a 22-month stint as chief executive officer and member of the board of directors of Lee Data Corp. in Minneapolis. The StorageTek board was looking for a ceo to replace the company's founder, Jesse Aweida, who had resigned in the wake of massive losses that drove StorageTek to a Chapter 11 filing on Halloween day in 1984. By January 1985, the list of 13 candidates for the StorageTek ceo job was down to two names, Jerritts' and that of Ryal Poppa, then ceo of St. Paul-based BMC Industries Inc. When the board selected Poppa, Jerritts called to congratulate him. "That's when Ryal asked me if I'd be interested in the chief operating officer slot," says Jerritts. "By then I'd spent enough time looking at it to know we could turn the company around. So I took it.

"It was pretty hectic," recalls Jerritts. "The old management was leaving in droves, and the creditors wanted to liquidate the company and sell off the assets. But the first few days confirmed what we had anticipated, that the company's principal problems were caused by some of the new product adventures it had gotten into."

STEPHEN JERRITTS: "There's no school for learning how to manage under Chapter 11."

Jerritts and Poppa have promised creditors and investors StorageTek will return to $1 billion in annual sales and will be comfortably profitable by 1989.

If Jerritts is successful and the StorageTek turnaround continues on track, Jerritts should find his decision to relocate to Colorado from Minnesota to try his hand as a turnaround artist rewarding. In addition to pulling down a $466,000 annual salary, Jerritts received options totaling .05% of StorageTek's stock when he joined the company. At current StorageTek prices, that puts Jerritts' stock value at well over $5 million. Jerritts says he misses Minnesota's lake country, but, in light of the potential rewards at StorageTek, he's learning to ski. ■

LETTERS

Pyramid Fans

"Currents Gone Awry," (Dec. 1, p. 24) states that Pyramid Technology Corp., "in order to avoid losing one of its largest end-user customers . . . was forced to ship a preproduction version of the 98X to New York law firm Davis Polk & Wardwell." The quote was attributed to an "MIS official" at Davis Polk. That statement is not correct. At no time did we ever force Pyramid to ship us a preproduction system. In fact, our original order with Pyramid contemplated expansion of our systems from 90X to 98X systems and our recent upgrade of equipment was in accordance with that contract. Our firm is extremely pleased not only with the hardware performance of our 10 98X superminicomputers, but also with Pyramid's support of both hardware and software. We continue to have confidence in the future of Pyramid and regret the inaccuracy attributed to us in the article about Pyramid.

GREGORY J. CROWE
Information Systems Manager
Davis Polk & Wardwell
1 Chase Manhattan Plaza
New York, New York

I am writing to correct at least one error in your recent article about Pyramid Technology.

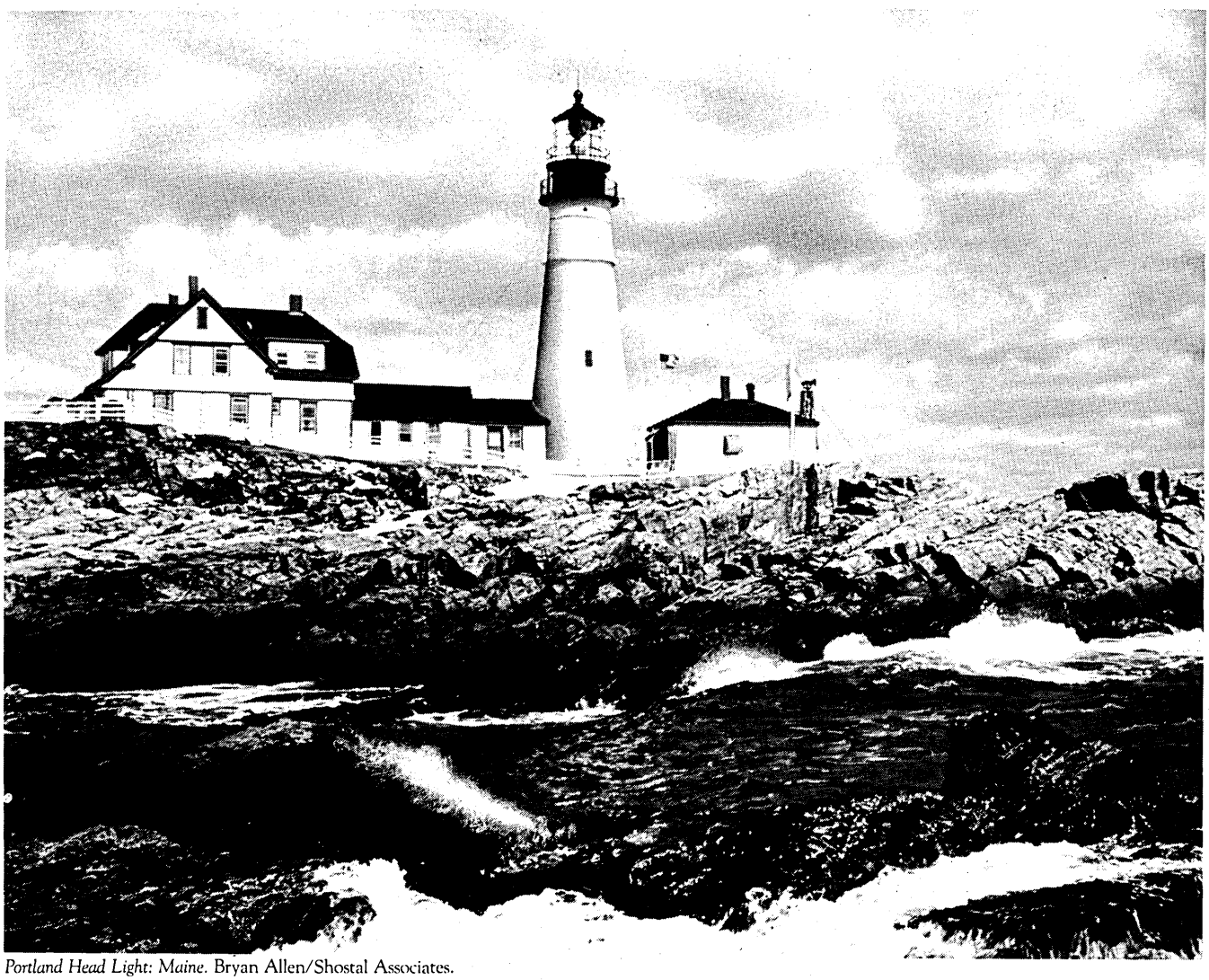
This article stated that Johns Hopkins University (JHU) was using a Pyramid as a database machine. The article also suggested that customers—such as ourselves—were dissatisfied with the vendor. This is not quite true.

The Johns Hopkins Hospital (JHH) is not part of the JHU. The JHH selected Pyramid after a quite thorough evaluation of offerings from several vendors. This evaluation was done by a very experienced team of engineers, computer scientists, and dp personnel with over 50 years of aggregate experience and over 30 years of Unix experience.

The JHH currently operates four Pyramid 98X computers to support online, transaction-based clinical information systems. We require extremely high availability, excellent performance, and impeccable field service and support. Pyramid met—and continues to meet—these requirements. Recently, we ordered a new 12MIPS Pyramid 9820 machine and upgrades of two of our 98X systems to 9820s. This expresses our satisfaction with, and confidence in, Pyramid Technology.

We do use one machine primarily as

Photograph by Brian Payne



Portland Head Light: Maine. Bryan Allen/Shostal Associates.

SOME OF THE GREATEST THINGS IN AMERICA NEVER CHANGE. SOME DO.

Portland Head Light has been a beacon to ships approaching Maine's rugged coast for as long as anyone can remember. And for many, its weatherworn setting is the picture of beauty.

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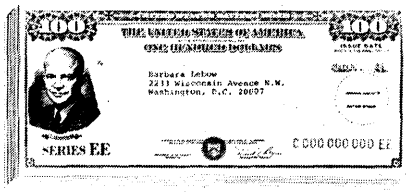

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a networked database server—this system holds data on 2.5 million patients and is accessed in transaction mode from an IBM 3081, many DEC PDP 11/70s, and the other Pyramids that function as applications processors. This machine is the heart of on-line patient information throughout the hospital.

The JHU Applied Physics Laboratory has completely independently selected Pyramid Technology in two recent competitive procurements. These machines are not used as database servers, contrary to your article.

We have full confidence in Pyramid products and in the viability and continued success of Pyramid Technology as a quality vendor of high-performance Unix superminis. We feel Pyramid is well positioned to continue its technology advances and to increase its base of satisfied customers. Our impression is that Pyramid has not "hit the skids"; rather, it has had the courage to continue investing heavily in R&D and in field operations excellence during a slow period in the capital goods sector of the economy.

Frankly, we are surprised at the inaccuracies and negative biases in your article. We certainly were not contacted by DATAMATION to check the accuracy of statements about Johns Hopkins' use of Pyramids, of our level of satisfaction, or for our comments on the other points discussed in the article. A trade magazine of your stature and influence has a responsibility to print accurate, clear, unbiased information. This article does not do justice to your usual reporting standards.

STEPHEN TOLCHIN
Technical Director
Operational and Clinical Systems Div.
The Johns Hopkins Hospital
Baltimore, Maryland

Correction

In the Hardware section, Jan. 15, p. 80, the photograph caption should have stated that the computer on the right was a Pyramid Technology Corp. 9810 superminicomputer.

Subject Index

The Subject Index to articles published in DATAMATION in 1986, which lists articles by title and author, is now available. If you would like a copy, please write to the Subject Index Editor, DATAMATION, 875 Third Ave., 12th floor, New York, NY 10022.

READERS' FORUM

The Systems Development Cycle

There are six stages in the systems development cycle. These are sequential and inflexible. Note that the term cycle is used to show that if properly implemented, this approach will bring you right back to where you started. Here are the stages.

User request. This is the inevitable result of a user who gets a bright idea to do something on the computer. The systems analyst should respond to the request with the observation that "this sounds like a 'user computing' application." (Since user computing never works, this tactic should ensure that the project finds its way to never-never land.) If the user doesn't bite, you will have to settle for making him or her rewrite the request on the complicated forms that MIS has adopted.

Business systems review. This document, the meat and potatoes of systems analysis, examines the problem, alternatives, and risks of the proposed solution. A large document—the larger the better—is perceived to contain more rigorous analysis. This is a great opportunity for dataflow diagrams, systems flowcharts, decision tables, matrixes, and other graphic arts.

The weight of the evidence is skewed toward the economic unfeasibility of the project in light of scarce MIS resources. Always recommend an automated solution, but show clearly that it will cost millions and take hundreds of man-years to do.

Nonfeasibility report. The systems analyst's job is nearly done when he or she gets a highly respected database designer or software guru to evaluate the business systems review and write a report on how ridiculous it would be to go ahead with the project. (This protects everyone in MIS later on, when the project fails. You can always say user management made you do it, despite the expert testimony that it wouldn't work.)

Systems design. Often, for political reasons, it becomes necessary to go ahead with the project against all advice. Left with little choice, you will need to design a system and get some programmers working on it. A few sketchy specifications will be enough to get them started. It's a good idea to send them to classes or seminars at the beginning of a project. Otherwise, everything will look like Adventure or Flight Simulator.

Coding. This is an early sign that the project is beginning to "go south." Despite best efforts, scarce programming resources must be expended. The good news is that the systems analyst will now be relatively free to work on another project. Occasional status meetings with the user should be orchestrated with the project leader, who should do all the talking. If you want to confuse the user, bring in a programmer to talk about what he or she has been doing for the past month.

Testing. If successful, this stage can be called "Phase 1 Implementation." Although it is rare that programs actually work as designed, there are occasional anomalies. During this time, someone inevitably brings up the subject of user documentation and training.

These topics should be given serious lip service, but should never materialize into anything more involved than a time line on a Gannt chart. By this time, the user will have resigned, been promoted, or fired. Or you will have found a better position. Or the company will have gone under. Not to worry, things seldom get this far.

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Powers

Burroughs bought Sperry; the two have
been mixed.
We're told that the weak points of each
have been fixed.
By stirring the pieces of both in a brew,
Each has been raised to the power of
two.

Honeywell sold out to NEC and to Bull.
They've promised the user a product line
full.
I suppose we should figure the outcome
to be
Honeywell raised to the power of three.

What's coming next? Will AT&T,
With its friends Olivetti and NT&T,
Seek yet another? By adding one more
Will they say they've been raised to the
power of four?

But the customer's only impressed by
the deeds
Of a marketing rep who can bring to his
needs
Full system support: when all's said and
done,
The power that matters is the power of
one!

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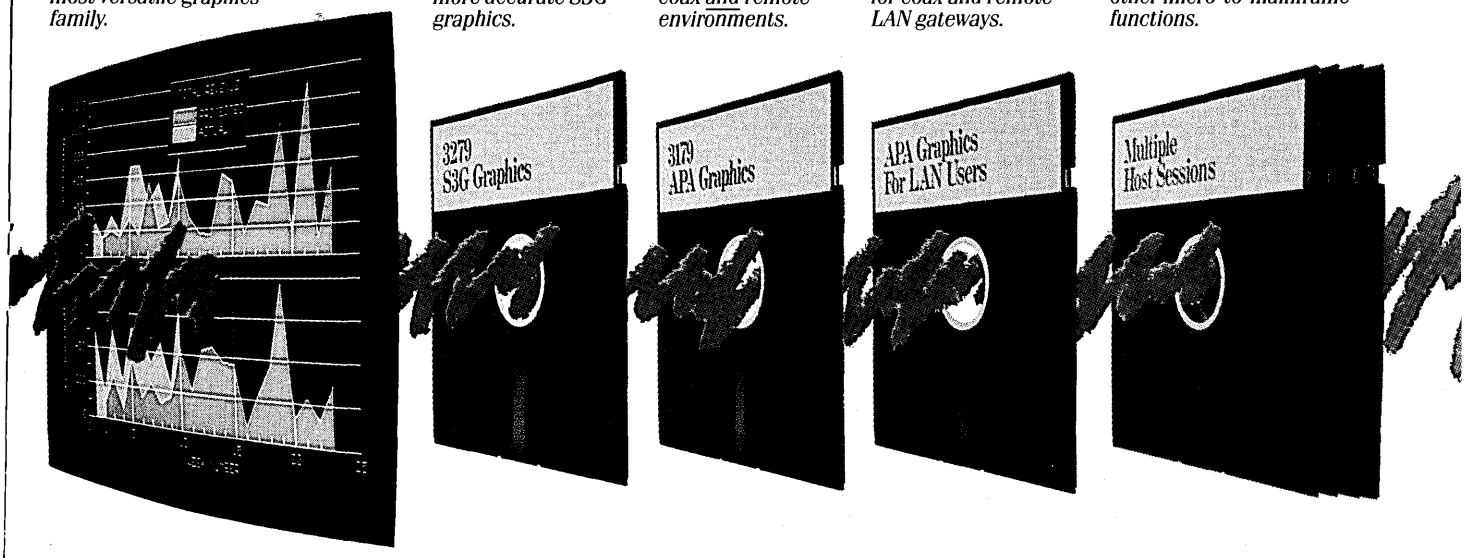

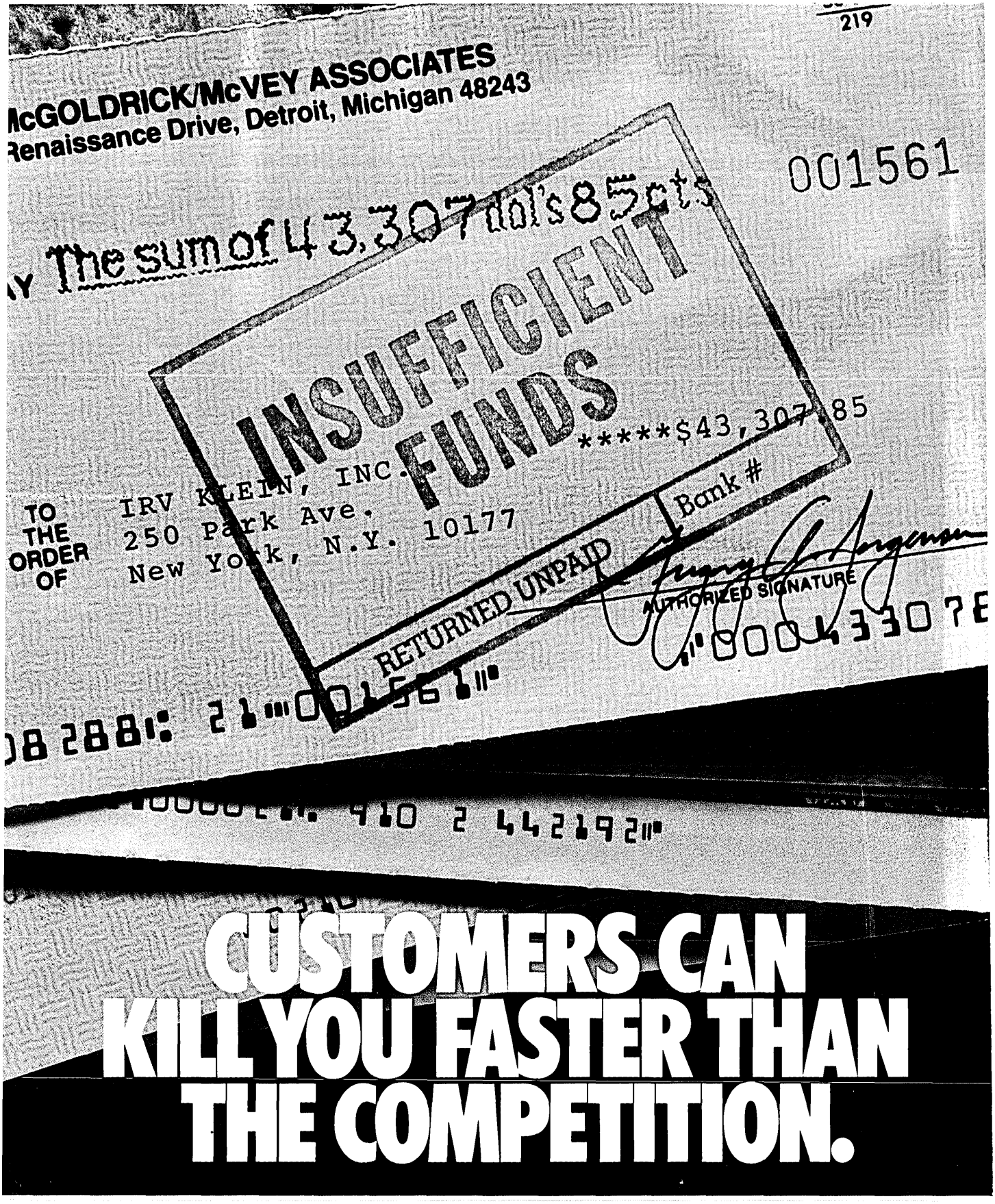

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