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Bright Ideas: Companies You Should Watch

PLUS:

THE CRASH OF 3380

THE OOPS REVOLUTION

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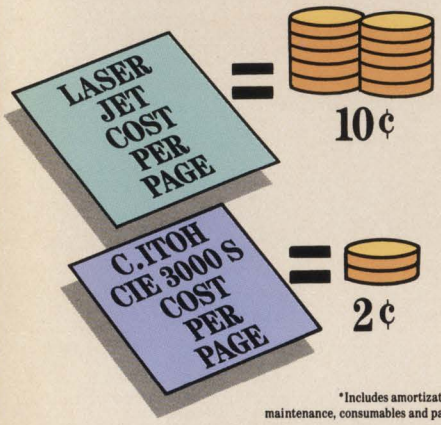

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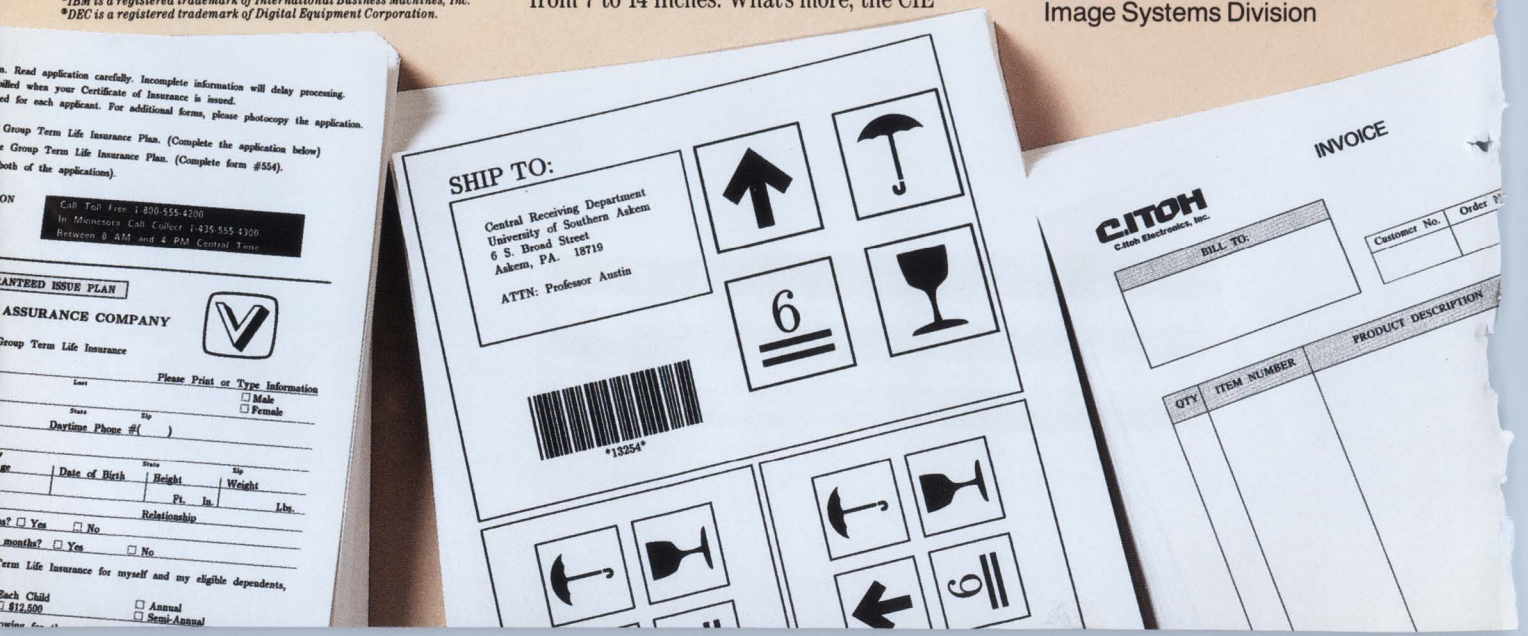

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DATAMATION

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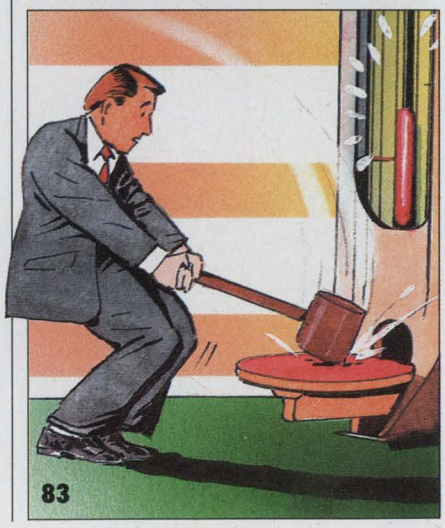

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BY BOB WHITEHOUSE
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Cover photograph by Walter Wick

INTERNATIONAL EDITION

MAY 1, 1987
VOLUME 33
NUMBER 9
THIS ISSUE, 191,760

1987 JESSE H. NEAL AWARD

Editorial

ADAPSO's Information Age Commission is Needed

The idea of an Information Age Commission in the United States has been merely an idea for too long. The IAC would provide a forum for informed discussion of the impact of computerization on our present—and future—society. In the past two years, its chances have passed from the point of an interesting discussion to that of a proposal that appeared subject to imminent realization. But as Washington bureau manager Willie Schatz points out in "Information Age Panel Runs Aground" (p. 32), that realization may now be in jeopardy.

Late in its second legislative go-round, the Information Age Commission's onetime biggest supporters—some of the data processing industry's best-known trade associations and largest companies—now either oppose the commission or want it drastically modified.

Alone in a sea of nay sayers is ADAPSO. It is fighting to keep the Information Age Commission alive and unaltered from its original concept. It is a fight worth continuing: ADAPSO's vision of the commission is the one that makes the most sense for the industry, the government, and for society in general. It would be a great service to the U.S. and to the information processing industry if the IAC were chartered under the open and cooperative conditions ADAPSO supports.

Providing the opportunity for an informed and concerned group of industry experts, labor leaders, legislators, educators, and Cabinet officials to pose questions about the future role of computerization in society is right and proper. Their collective conclusions could at the very least warn the industry of possible future problems.

It would also be a refreshing change for a major industry to take the lead in examining its role and its relationship to society before an unforeseen tragedy forces the Congress to form one of its famous "investigative committees." The industry and its members have nothing to hide. It is time to support, rather than thwart, ADAPSO's forward-thinking concept. ■

GEORGE DAVIS
EDITOR-IN-CHIEF

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EDITORIAL OFFICES
Headquarters: 875 Third Ave., New York, NY 10022. Phone (212) 605-9400; telex 429073. **New England:** 199 Wells Ave., Newton, MA 02159, (617) 964-3730; **Washington, D.C.:** 4451 Albemarle St. NW, Washington, DC 20016, (202) 966-7100; **Central:** 9330 LBJ Freeway, Suite 1060, Dallas, TX 75243, (214) 644-3683; **Western:** 12233 West Olympic, Los Angeles, CA 90064, (213) 826-5818; 2680 Bayshore Frontage Rd., Suite 401, Mountain View, CA 94043, (415) 965-8222. **International:** 27 Paul St., London EC2A 4JU, England, 44-1-628-7030, telex 914911; 3-46-10 Sekimachi-Kita, Nerima-ku,Tokyo 177, Japan, 81-3-929-3239.

DATAMATION (ISSN 0011-6963) Magazine is issued twice monthly on the 1st and 15th of every month by The Cahners Publishing Company, A Division of Reed Publishing USA, 275 Washington St., Newton, MA 02158-1630. William M. Platt, President; Terrence M. McDermott, Executive Vice President; E.V. Burkholder, Group Vice President; Jerry D. Neth, Vice President/Publishing Operations; J.J. Walsh, Financial Vice President/Magazine Division; Thomas J. Dellamaria, Vice President/Production and Manufacturing. Editorial offices, advertising and subscription departments, 875 Third Ave., New York, NY 10022. Published at East Greenville, Pa. Annual subscription rates: U.S. and possessions: $55; Canada: $75; Japan, Australia, New Zealand: $145 air freight; Europe: $130 air freight, $235 air mail. All other countries: $130 surface, $235 air mail. Reduced rate for qualified U.S. students, public and school libraries: $40. Single copy: $3 in U.S. Sole agent for all subscriptions outside the U.S. and Canada is J.B. Tratsart, Ltd. 154 A Greenford Road, Harrow, Middlesex HA13QT, England, (01)422-8295 or 422-2456. No subscription agency is authorized by us to solicit or take orders for subscriptions. Second-class postage paid at New York, NY 10001 and at additional mailing office.

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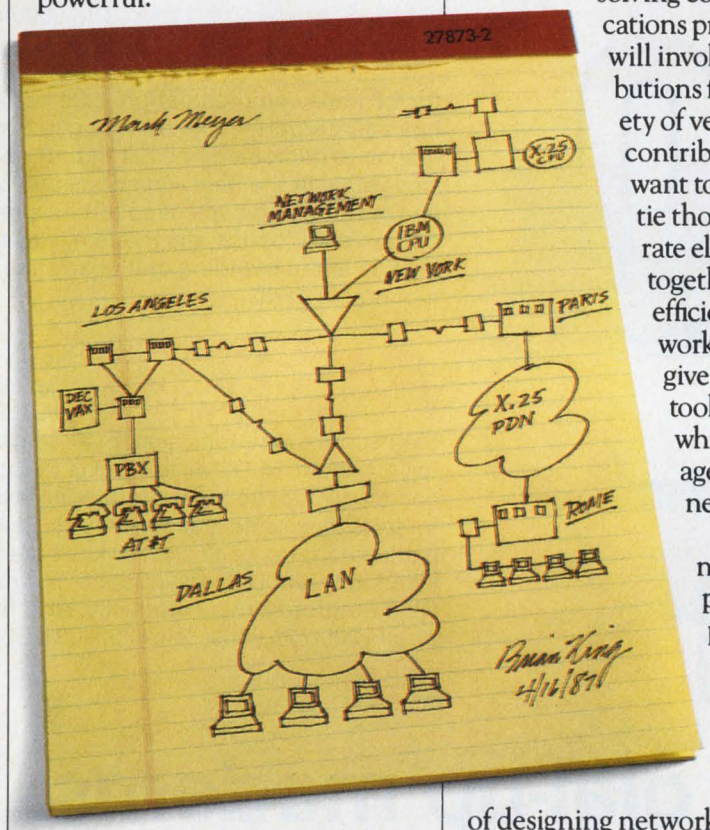

At Codex, we don't have set solutions – we work with your current environment. Which is why we spend a lot of time drawing diagrams like this.

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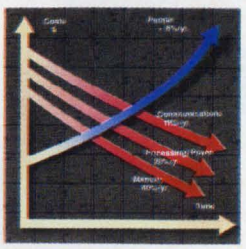

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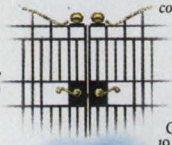

1985 — *Codex introduces the first 19,200 bps modem with built in network control as a standard feature to optimize throughput and minimize downtime.*

Codex hasn't just developed a lot of networking solutions. We've practically developed the whole business of networking.

our networks so that they can spark growth within your company – helping to drive it by being a vital and powerful corporate resource.

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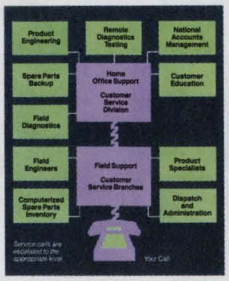
And to help us further accommodate your company's future growth, Codex is very active in industry standards committees, helping to create the kind of "open architecture" that will allow you to link equipment from many vendors in a more productive way.



When you call Customer Service, you've got the whole company on the line.

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For years, we've worked with some of the best-known companies in business. Isn't it time we worked with you?

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In fact, in a recent *Data Communications* survey, many of these and other companies consistently ranked Codex first as the networking vendor they preferred in categories ranging from best price/performance to technology to customer support.

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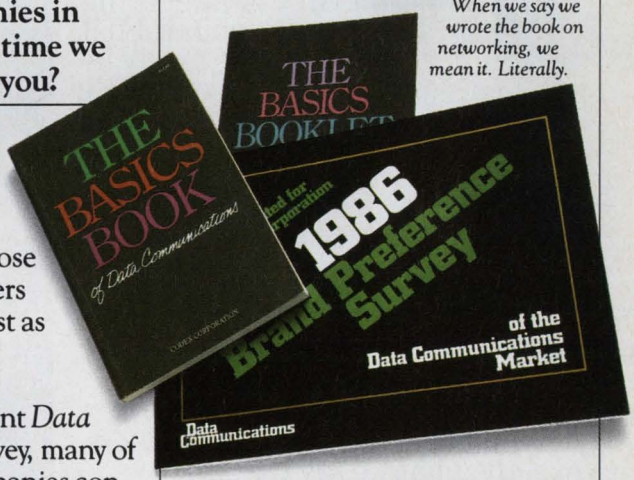

Of course, the book should be informative. After all, it took 25 years to write.

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Look Ahead

IBM USERS UNITING

TOKYO -- The Asian SHARE IBM user group will join the six-month-old International User Group Council (IUGC) in the next few weeks. The IUGC, which was set up by five of the world's largest IBM user groups in the U.S., Europe, and Australia, represents the interests of over 7,000 IBM users. It is made up of the presidents of SHARE/USA, GUIDE International, GUIDE (Europe), Australian SHARE/GUIDE, and the SHARE European Association. Its aim is to coordinate user concerns worldwide. It is now trying to attract other groups, including the new Asia GUIDE and GUIDE Latin America.

ANOTHER CASE OF BUNDLING?

PRINCETON, N.J. -- ADAPSO may soon find itself with a new controversy over alleged IBM bundling on its hands. Martin Goetz, Applied Data Research Inc.'s senior vp, plans to present a formal complaint to ADAPSO as well as to IBM concerning IBM's alleged plans to "bundle" an SQL subsystem in the extended edition of its new Operating System/2. "This is a classic case of bundling," charges Goetz. "Since the end of the Justice Department suit, IBM believes it can do anything it wants." Lee Reiswig, IBM systems manager of communications and data management systems, says this is the first charge he's heard implying bundling. He counters Goetz's allegations by remarking: "Number one, nobody is required to buy it from us. And number two, it does not preclude any other data management system from running on the operating system."

BROKERAGE PACK BY APOLLO

CHELMSFORD, MASS. -- Apollo Computer Inc. will broaden a move into financial markets with software for financial traders and stockbrokers developed by Prophesy Development Corp., Boston. Prophesy's Contextual Expert System, an expert system shell, and Profit Tool, a sales package for retail stockbrokers, will be released on the Apollo Domain 3000 workstation later this month.

DEC TARGETS KEY MARKETS

MAYNARD, MASS. -- Digital Equipment Corp. is mounting what insiders call a "last big push" to grab market share at IBM's expense before the giant may resolve its integration and networking problems. One DEC source says the company has targeted three industry sectors in particular: food and beverages, pharmaceuticals, and health care--all IBM strongholds, and all virgin territory for the minimaker. DEC has been hiring talent from major corporations in these areas--particularly food and beverages. So far, most of DEC's gains at IBM's expense have come in the banking, insurance, and financial services sector.

Look Ahead

VSAT USE PICKING UP

MOUNTAIN VIEW, CALIF. -- A slow but steady rate of customers are signing up to use VSAT (very small aperture terminal) satellite technology for corporate data networking, according to two key suppliers. A GTE executive reveals that the company's customer list now includes Prudential Bache, Caterpillar, and Chrysler, while a Harris Corp. official reports that it has just received a $2.7 million order from Inverlat, a big Mexico City-based brokerage house. Additionally, GTE will launch two more satellites this year "just for data networks," says the official. Big price drops are still the name of the game, these vendors say. While the standard cost is roughly $300 a month per station, one vendor reports customers are trying to drive prices down to as low as $175 a month.

RESIGNATION AT HP RAISES EYEBROWS

PALO ALTO -- Some Hewlett-Packard insiders are reading much into the recent resignation of Chuck Tyler, a research and development heavyweight who had run the company's Silicon Systems Research Center. The speculation is that Tyler's departure is tied to reports that HP is planning reductions in semiconductor R&D, which could affect a CMOS implementation of Spectrum. An HP spokeswoman, however, says the company plans no R&D cutbacks. Tyler will join biotechnology startup Applied Biosystems, Foster City, Calif., which has attracted other former HPers.

McDONNELL DOUGLAS TO GO DIRECT

MELBOURNE, AUSTRALIA -- McDonnell Douglas Information Systems will not renew its agreement with its Australian distributor when the agreement expires at the end of June. Instead, the company plans to start direct sales of its Pick-based 6000 and 9000 series machines, sold in the U.S. under the Sequel name. Its soon-to-be-former agent is Amalgamated Wireless Australia (AWA), in Sydney. McDonnell Douglas spent 18 months assessing the market for direct sales by selling Sequel systems direct to the health market. The group's networking and manufacturing divisions already have their own operations in Australia.

ETA READIES LOW-END SUPER

ST. PAUL -- ETA Systems has installed in-house its first Piper system, a low-end, air-cooled version of the yet-to-be released ETA-10. The two-processor Piper is being used for software development, and is performing around 45MIPS, which is slightly less than the performance level of the Cyber 205. An ETA spokesperson says the performance for the Piper was deliberately set at a lower level than was anticipated to ensure

(continued on p. 12)

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its exportability. The government has stringent export laws that restrict selling certain high-performance, supercomputer, and near supercomputer-level systems abroad. A two-processor system is $2.4 million, while a four-unit system is $3.4 million.

MOVING TO UNIX

ISTANBUL, TURKEY -- Ekdata, the software subsidiary of one of Turkey's leading industrial groups, is moving its financial and local government packages to ICL's Clan Unix and DRS 300 distributed systems. The software house has signed a sole distributorship agreement with ICL, giving the U.K. manufacturer a presence in what it describes as Europe's last high-growth information systems market. Ekdata previously supplied its software for NCR equipment only, but has now placed an initial order worth $4.3 million for ICL hardware. Ekdata's parent, Ekinciler, will replace NCR processors with the ICL Clan 7 this year.

APPLE EYES MAC II ADA

CUPERTINO, CALIF. -- Apple Computer Inc. is rumored to be planning a version of the Ada programming language for its recently unveiled Macintosh II in conjunction with Ada developer Alsys Inc., Waltham, Mass. Alsys already has versions of the DOD-backed language running on Unix workstations from Apollo and Sun Microsystems Inc., Mountain View, Calif.

BOOLE SAYS NO TALKS WITH FUJITSU

TOKYO -- Boole and Babbage Inc., Sunnyvale, Calif., says rumors that it is talking with Fujitsu about adapting some of B&B products to run on the Japanese maker's machines are not true. Dennis White, vp of marketing, says B&B president and ceo Bruce Coleman did indeed visit Fujitsu when he was in Tokyo recently, but it was to "renew an old acquaintance" and not to discuss migrating products.

RUMORS AND RAW RANDOM DATA

Visa International, San Francisco, which this month begins field tests of a personal computer-based data capture service it expects to offer merchants in August, has under development a data capture service based on an IBM Series/1, which it plans to test in October and make available to members early next year. Visa also is talking to merchants willing to make a massive capital outlay on mag stripe-reading terminals and says it is close to agreement with one of the top 10 retailers in the U.S. . . . Sybase Inc., Berkeley, Calif., formed in 1984 to develop relational DBMS software specifically for on-line applications, later this month will introduce a version for the VAX. It will also announce a new RDBMS architecture.

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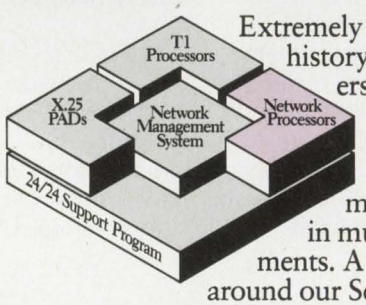

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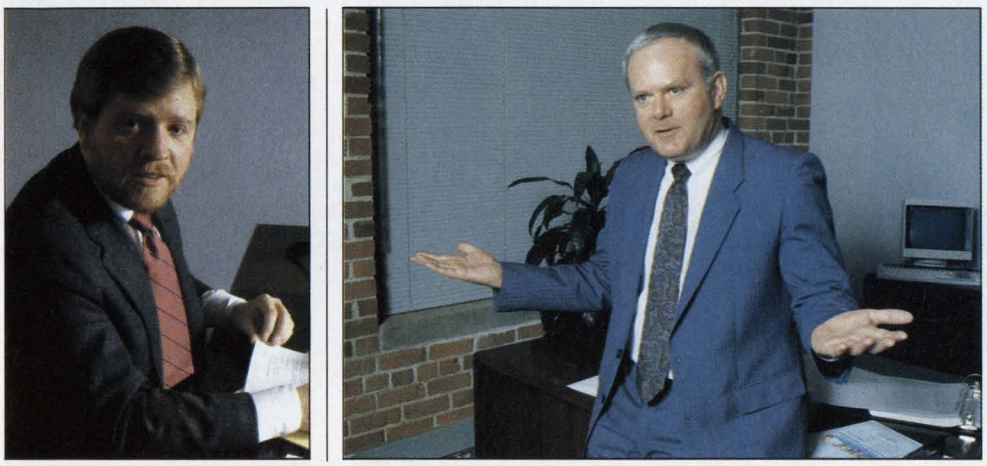
CIRCLE 12 ON READER CARD

MANAGEMENT

UniSoft Chief Quits As Firm Branches Out Into New Arenas

Ex-Amdahl exec O'Shea takes the reins to guide the Unix house into end-user and mainframe markets.



SEA CHANGE: Former president Robert Ackerman (left) and new chief Donal O'Shea.

Photographs by Gregg Mancuso/Black Star

BY SUSAN KERR

During its brief six years of existence, UniSoft Corp. has been chugging along, busily providing Unix porting services for the masses. Its success in tailoring Unix for 130 computer vendors and systems integrators has brought UniSoft a steady paycheck, but little notice outside its niche.

Now, however, UniSoft is showing signs of what could be called the seven-year itch.

The symptoms are easy to spot. This month, the company will change its top management and undertake a radically new marketing thrust. While it will continue to offer porting services, the Emeryville, Calif., concern now is looking at end-user Unix products as the path to building revenues and recognition.

As it undertakes this new direction, UniSoft will be without the man who recently nailed down the company's biggest contract to date: providing Apple Computer with Unix for the new Macintosh II. Robert Ackerman Jr., the 30-year-old president and chief executive officer, is leaving after three years with the company. He is being replaced by Donal O'Shea, a former Amdahl and IBM executive, who joined UniSoft last year as engineering vice president.

Sources claim that Ackerman was asked by UniSoft's board of directors to look for employment elsewhere. Ackerman denies those reports categorically, saying he "absolutely" is leaving voluntarily.

But these sources point out that since November 1985, 60% of UniSoft has been owned by Root Computers Ltd., a U.K. porting house that also acts as a European representative of UniSoft's UniPlus+, an enhanced implementation of Unix System V release 2. Three of UniSoft's five board members are associated with Root. One of them, Robin Schlee, a former Root financial controller and current Root board member, joined UniSoft in 1986 as chief operating officer, indicating what some feel is the tightening of Root's grip.

"It's not fair to say he [Ackerman] was pushed out," claims O'Shea. "But the company is changing and the board wants it to grow." Indeed, O'Shea emphasizes that Ackerman was the one who convinced him to join UniSoft last October.

According to Ackerman and O'Shea, UniSoft is profitable, with revenues in excess of $10 million. Breaking down its revenue base, roughly 35% comes from international operations, and 50% of the total is derived from royalties from previous work.

While those numbers indicate a reasonably healthy entity, there's certainly room for improvement. Ironically, the Apple pact—Unisoft's biggest porting job ever—presents UniSoft with the opportunity to move on to other businesses. The company has never taken venture capital and has no desire to start now, but with cash in the bank from Apple, UniSoft has the luxury of spending money to make the company grow. That's where new products and new management come into play.

O'Shea's background is crucial if UniSoft plans to make a go of it with a soon-to-be-announced line of products. Currently the premier Unix porting house when it comes to Motorola 680X0-based systems, Unisoft will branch out later this month via an oem arrangement with Intel Corp.'s Phoenix-based Systems Interconnect Operation. According to O'Shea, UniSoft will offer terminal control and connectivity products for users of Amdahl and IBM Unix-based mainframes. These products will be sold directly into data processing shops, a first for the company.

Although it's strictly an oem agreement at this time, there is the "potential for us to look at joint marketing the product," says Intel general manager Roger Thomas. He adds that "UniSoft is looking at channel-connected solutions which use the connect capability of our Fastpast [interface between mainframes and Ethernet controllers]." The line of terminal control and connectivity products will be followed by other, as yet unidentified, products from UniSoft.

Closer Link With Root

Moreover, UniSoft has plans to become more closely coupled with Root by offering its products in the U.S. First on the drawing board is said to be a Root-developed CICS emulator for Unix, slated to be made available by UniSoft during this calendar year.

UniSoft, with little to no experience with large-system end users, has a shot at this mainframe market, argues O'Shea. First, in addition to

Interactive Systems Corp., Others Also Planning to Expand

Along with UniSoft of Emeryville, Calif., other porting houses are supplementing their business with more solutions-oriented products.

The granddaddy of Unix porting houses, Interactive Systems Corp., Santa Monica, Calif., is also hoping to beef up its solutions business, particularly in the Intel 286 and 386 markets, according to senior vice president Heinz Lycklama. Although the firm has offered end-user products for years, currently 70% of its $20 million business comes from big-time oem deals. Its blue-chip background includes at least nine Unix porting jobs for IBM, as well as work for systems by Wang, Hitachi Ltd., and Digital Equipment Corp., among others.

Added to the 10-year-old company's credits are its work on behalf of Intel and AT&T to develop the AT&T certified port of Unix V.3 for the Intel 80386 chip, and its position in the so-called Gang of Four. The Gang, which consists of Interactive, AT&T, Microsoft (Redmond, Wash.), and the Santa Cruz Operation (Santa Cruz, Calif.), is helping to develop and promote the merger between V.3 and Microsoft's Xenix. "We'll continue to use porting as a base, but more and more we'll be active in adding functions to Unix," Lycklama comments.

While Interactive is a key reason for the existence of IBM's IX/370 (the guest Unix operating system running under VM), the firm hardly seems as convinced as UniSoft that a mainframe Unix market is dying to be served by third parties. "I don't see any discussion of interest [in solutions] at the mainframe level," states Interactive vp Bernard Hill.

But the potential of solutions in the micro markets is another matter. Chuck Hickey, president of startup Microport Systems Inc., Scotts Valley, Calif., is confident of the possibilities, claiming that his company will have sales of around $6 million this year. Microport is well known inside the Unix community for its aggressive pricing of its System V/AT product for the 80286 and now for its equally aggressive plans for the 80386. Hickey boasts, "We're developing a layer of software integrating networking, windowing, and graphics that will turn an 80386-based AT system into an equivalent of a Sun workstation." Microport plans to customize the product for oems as well as selling direct. It should be available by the end of the year.

"We'll shrink-wrap the product so anybody can buy it. That's where the market is. It's not in oem deals," asserts Hickey.

himself, he has brought on board two key Amdahl development managers who worked on Amdahl's UTS Unix operating system. Second, the number of mainframe Unix users is "relatively small . . . probably there's $200 million worth of mainframe hardware running Unix," thus making it an easy group to target. Yet, O'Shea continues, the potential lies "not [in] the number of customers, but who they are—the cream of the crop. This market is ill-served by add-on products."

Amdahl Corp.'s experience in the Unix market, which began in 1981, has not been an overwhelming success. A company spokesman puts the Sunnyvale, Calif.-based firm's Unix licensees at just "over 200."

UniSoft also plans to get closer to the micro user community by directly offering a group of new optimizing compilers for FORTRAN 77, Pascal, and C for the Macintosh II. "We always wanted to be closer to the end user because that's where the money is," Ackerman said in an interview with DATAMATION just prior to his departure. "The Apple product is a good opportunity because we think it will be a very successful product with an established distribution channel."

A Trend Toward Standards

Analysts agree that if UniSoft wants to achieve any significant growth, this is the route it will have to take.

"Porting is a commodity," asserts Brian Boyle, director of research for Novon Research Corp., Berkeley, Calif. Many of the porting houses "were used to having a special version of Unix," Boyle explains. "Now, they find themselves instead in the position of needing to add to" a standard.

A good indication of this trend toward standards is the upcoming convergence of AT&T's Unix System V release 3 and Microsoft Corp.'s Xenix operating systems. In February, these two powerhouses announced that along with help from Santa Monica, Calif.-based Interactive Systems Corp. and the Santa Cruz Operation, Santa Cruz, Calif., they will develop one Unix version for Intel Corp.'s 32-bit 80386 microprocessor.

"The whole business of where dollars are in the Unix business is shifting," says O'Shea. "The dollars are shifting out of the Unix kernel, which is becoming a commodity." Instead, business comes from value-added elements such as reworking Apple's proprietary Macintosh user interface so that it can run on top of Unix.

A FORAY INTO THE INTEL WORLD IS PLANNED.

The switch to a broader business base comes at a good time for another reason. Oem business is tightening up, industry participants say, although a few big jobs do come along every once in a while. "Shops are picking up Unix expertise in-house. UniSoft realizes they have to muscle" into new areas, says Paul Cubbage, an analyst with San Jose's Dataquest Inc.

UniSoft officials warn that they are hardly abandoning the old line, but they are projecting a fairly significant revenue stream for the Unix products next year. For fiscal 1988, ending June 30, mainframe Unix products are expected to contribute $4 million, or less than one third of UniSoft's revenues.

To cope with the new projects, UniSoft will adopt a divisional structure in July and will hire more executives; none are expected to be from Amdahl, promises O'Shea.

By that time, UniSoft expects to have most of the pieces in place to make a go of its strategy. The company has deliberately chosen a small—but it hopes lucrative—segment of the Unix market. Given Amdahl's experience and the always debatable IBM position in the Unix mainframe market, it remains to be seen how big an impact UniSoft can make. ■

IBM's SAA: Is It Fact or Is It FUD?

Limited details spur user skepticism even as software makers begin posturing with product plans.

BY JEFF MOAD

IBM's recently announced Systems Application Architecture is:

A. A sincere if overdue effort by IBM to make the lives of users and software developers easier by providing a consistent, portable applications development environment across hardware architectures.

B. A devious attempt by IBM to stall user buying decisions while it tries to bring order to the chaotic workstation and midrange segments of its product line and move aggressively into the value-added applications software markets.

C. Both of the above.

Users and software developers have been trying to answer that tricky multiple choice question ever since IBM announced its SAA "framework" on March 17, but so far they haven't had much information on which to base an opinion. In fact, as one observer says, IBM's presentation of SAA to date closely resembles the offensive line of the Indianapolis Colts in pass protection formation—the holes are much more noticeable than the substance.

So, while some users say they are encouraged by SAA and some software vendors say they already are working to support it, other third parties and most users say they will remain skeptical until there are SAA products to back up the promises. Those products probably will not start hitting the market until late next year, however. In the meantime, IBM is hoping user patience holds out.

IBM says that eventually SAA will form an environment with common user and programming interfaces, plus common communications support; there would be a common, more productive applications development environment across IBM PC, S/3X, and S/370 architectures and a common user interface across IBM systems. It also means there would be a common way for applications to access and communicate data between hardware architectures.

So far so good, say users and software developers. "This should be a big step forward," says Martin Goetz, ADR vice president, Princeton, N.J. "IBM should have done it years ago. With SAA we will all know what standards and what interfaces to work with."

But How Will OS/2 Figure In?

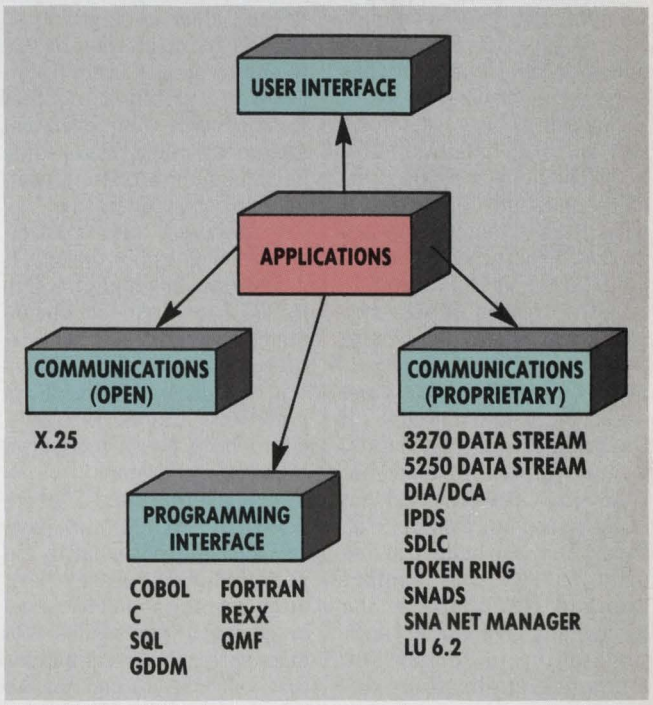
The problem is that IBM hasn't said much about how it will get from here to there. For example, starting at the low end, IBM has said its recently announced PC operating system, OS/2, will be "a participant" in SAA. According to IBM, "Operating System/2 is the common base for development of portable applications across IBM architectures." IBM says that base will include a new graphics- and windows-oriented presentation manager or user interface based on Microsoft Corp.'s Windows, an SQL-based relational database management system, terminal emulation, new application development facilities, remote LAN and SNA gateway support, and support for the Enhanced Connectivity Facility. But none of those facilities will be supported in the initial release of OS/2, and IBM won't be able to say when they will be supported in the operating system's so-called Extended Edition until the fourth quarter of this year.

Until then, IBM won't publicly describe OS/2's RDBMS support or its presentation manager for end users or third parties who might want to write SAA-compatible applications now. IBM has, however, promised to issue publications explaining SAA's common programming application generator, query, database, presentation, and dialog interfaces in the third quarter.

Similar gaps exist throughout SAA. For example, third-party software developers are wondering what local area network protocols SAA will support and whether or how IBM's current ISPF user interface will mesh with the new SAA presentation and dialog managers. "IBM said SAA would support Token Ring at the data link level, but there was nothing in the announcement about software support," says ADR product planning director Tony Percy. "IBM was pushing us all last year to write to Netbios. Now we have to wonder if they'll be replacing it."

Users and developers also are wondering what became of the Distributed Data Manager (DDM) data transmission vehicle for S/3X systems and, more significantly, if and how IBM will provide a standard interface from applications to CICS, TSO, and IMS/DC. Says ADR's Percy, "In SAA, IBM needs to create a new high-level interface that supports these standards transparently. So far, what IBM's done for the most part is to highlight standards at the

FIGURE 1 How the SAA is Supposed to Work



FRAMEWORK: IBM's plan for consistent interfaces among applications, communications, and users.

data link control level, and that is really missing the point."

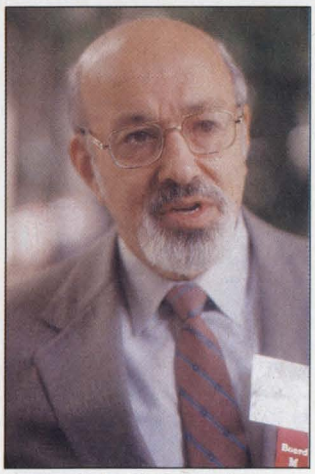
While IBM officially declines to elaborate on its initial SAA announcement, company officials acknowledge that, as it currently stands, SAA is not much more than a statement of direction. "There's not a lot that [users and third-party] people can do with what we've said so far until we fill in the pieces," admitted Mary Patterson, IBM director of cooperative processing, at a recent ADAPSO meeting.

So why announce SAA now? "We wanted to get across the concept of what we are doing without muddying things up by describing in detail every single protocol or data link we will support and how we'll support it," Patterson said. "We will break out those pieces later."

Why IBM Announced

There are different views on why IBM went public with an SAA statement of direction, however. "It's a strategic defense against Digital Equipment Corp.," contends DEC competitive analysis manager Neil Houtz. "IBM has been losing market share in the midrange because, for the last 12 to 15 months, DEC's been selling a consistent architecture and connecting it with IBM's products. SAA is a marketing ploy by IBM, but it's not really an architecture."

Regardless of whether SAA so far is anything more than marketing, some software vendors fear that large corporate users may put off their purchasing decisions, waiting for IBM to flesh out SAA. Stuart Miller, president of Software AG, Reston, Va., says, "I have to believe at this point that SAA is just another effort by IBM to freeze the market and give IBM a chance to catch up in certain key areas like applications development tools where they have fallen behind [with



OVERDUE: ADR's Martin Goetz says SAA is welcome.

Cross System Product]. Some users will see through that, but I am concerned that SAA is bound to create uncertainty and fear among some users who will wonder if their applications or tools will be compatible with this new architecture."

William Casey, vp for micro software development at Cullinet Software, Westwood, Mass., agrees. "SAA doesn't clear up anything so far. It's just an attempt by IBM to say to people, 'Don't worry. We're getting it together in connectivity.' But even that statement might have some impact among MIS users waiting to be satisfied by IBM."

Delayed buying decisions could be good for IBM. It is just now beginning to ship its 9370 and is expected to announce Silverlake as early as June. Silverlake, an S/38 system that also will run S/36 applications and tie into SAA, could help clear confusion over IBM's midrange.

If the reactions of users polled by DATAMATION give any indication of what to expect, Miller and Casey have little to worry about. Most users seem to view SAA like SNA in its early days—a good idea that will take a long time to come about. "After an informed evaluation of SAA, we decided not to factor it into our software acquisition program," says John F. Link, information systems services director at Sun Company Inc., Radnor, Pa. "SAA seems too far out and too ill-defined to have much immediate impact." His company spends about $200,000 annually on new central host software.

"Absurd" Schedule

Similarly unimpressed is Jeffrey A. Alperin, assistant vice president for corporate technology planning at Aetna Life & Casualty, Hartford, Conn. "We don't expect SAA to be implemented until the end of this decade at the earliest," he says, adding that while it's nice to see IBM addressing the problems raised by its multiple-architecture product lines, "that schedule for implementing it is absurd. It does nothing for those of us needing to solve cross-environment problems now. We'll just have to continue looking at other solutions such as VMS or open solutions like Unix."

Alperin describes IBM's software-based SAA as a "bureaucratic approach based on the fact that they haven't been able to control the individual product development groups in the company. If IBM was really interested in product consistency, they should have gotten all their hardware developers together in a room and pounded on them to bring the hardware together. That's what [DEC ceo] Ken Olsen did."

While users are taking a wait-and-see approach to SAA, some software developers already have jumped on the bandwagon, announcing active development projects to support the SAA database and communications subsystem features in the Extended version of OS/2 even before IBM has publicly described how it will implement those features. Garden City, N.Y.-based Computer Associates International Inc., for example, already has demonstrated a version of its SuperProject PC program for the initial version of OS/2, and Computer Associates officials say the company will support the SAA features in the Extended Edition as soon as they are available. "We are working very closely with IBM," says development vp David Montagna. "It helps to be one of those companies considered to be important by IBM."

Other developers, however, admit that they don't know how IBM will implement SAA and that they may end up waiting for the company to spell out the new standard before they go ahead with some new products.

At San Jose-based Data Design Associates, work has been under way for a year and a half on a new cooperative processing product that would tie low-end systems to IBM mainframes via the Advanced Peer-to-Peer Communications protocol. While Data Design had hoped to finish coding its APPC interface

SAA PRODUCTS WON'T EMERGE UNTIL LATE NEXT YEAR.

late this summer, Ken Kaiser, the company's research director, says it may be forced to wait for IBM to release more details on how APPC will be used under SAA. "We could very quickly go ahead and finish it, but we'd feel safer waiting for IBM," says Kaiser. "I'm sure a lot of other people are in the same boat." ■

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TAXATION

The Battle Over 1706 Enters a New Phase

Independent contractors spar with ADAPSO and take legal and other actions to block the new tax law.

BY WILLIE SCHATZ

While the verbal foreplay continues about Section 1706 of the Tax Reform Act of 1986, the pros and cons are getting down and dirty with statistics, lawsuits, and mass mailings to Congress.

You remember Section 1706; it made it more difficult for independent contractors such as programmers and systems analysts to qualify for write-offs that they had previously enjoyed when engaged in a three-party arrangement with a technical services broker and the client who hired them (see "Putting Their Heads on the Tax Block," March 15, p. 32).

Ever since 1706 went through, there has been a storm of controversy between ADAPSO, which supports the bill, and independent contractor groups, which do not. More than 50 Congressmen have lined up in support of a moratorium on 1706, even as the independents have filed suit against the Reagan administration over it.

The debate between ADAPSO on one side and the Independent Computer Consultants Association (ICCA) and the Resource Technical Consultants Association (TECNA) on the other, has become rather heated.

"We think we've been getting beat up in the press," says John Puhala, president of AGS/Genesis, Rockville, Md., and president of ADAPSO's professional services section. "The other side has been very effective."

ADAPSO claims that using independent contractors is unfair to firms that use full-time employees because of the additional taxation, cost, benefits, and record-keeping they require. ADAPSO also cites discrimination against full-time employees, since they're subject to withholding and must pay taxes as individuals, not as closely held corporations as independents are alleged to do.

Opposing Views

Diane Wood, a Metuchen, N.J., independent consultant who has been in the business for 20 years and is chairwoman of the N.Y.-N.J. ICCA industry committee, says, "The real issue is competition. We can go from client to client and do the job at a lower price than a company can. ADAPSO companies bill out consultants at 300% of salaries and benefits. That's two to three times what I charge my clients. We're only targets because we're successful." She adds, "The '86 tax act increased our taxes 1%."

"The perception is that ADAPSO speaks for the dp industry," says Nick Cvetkovic, president of NBC Associates, Cherry Hill, N.J., and a member of the ICCA board of directors. "They're beating us in every possible way. They've got much more money, much more clout, and they've got a unified position. We're all in business for ourselves. We have trouble presenting a unified front."

Not according to ADAPSO. The Software and Services Industry Association claims that mail to Congress has "been running very heavily in opposition to 1706." ICCA would like to know the last time these guys took math. The consultants organization says its position is getting outmailed by at least four to one.

Then maybe the recipients aren't reading their mail, because there's some evidence that ICCA and TECNA are doing something right. At press time, there were 56 cosponsors of H.R. 792, a resolution that would impose a two-year moratorium on Section 1706. Rep. Judd Gregg (R-N.H.) was alone in introducing the bill in January. To further show it's not kidding around, TECNA has sued Treasury Secretary James Baker and Internal Revenue Service Commissioner Lawrence Gibbs. The plaintiffs say the defendants have wrongfully caused the publication and wide dissemination of Publication 15 (Circular E, Employers Tax Guide).

TECNA cites a portion of Circular E, which says that anyone who performs services is an employee whom the employer can control.

No problem, right? Unless the provider of the service is an engineer, computer programmer, or systems analyst. Then the employer is liable for employment taxes.

REAL ISSUE: Wood says competition is key to the debate.

Photograph by Tom Sobolik/Black Star

TECNA says that Circular E, in effect, tends to misinform the clients to whom its members provide services, resulting in irreparable injury to TECNA and its members.

The suit asks the court to compel the IRS to publish and distribute a correction to Circular E stating that independents may qualify under existing legal standards.

In the mean time, independent consultants are taking other actions individually as well as collectively.

Brokers Asked to Cooperate

"There are still a lot of brokers and consulting firms asking independent contractors to become employees," says Jonathan Wallace, a New York attorney and member of the ICCA board. "The level of panic has decreased since January, but there are a large number of clients asking broker firms to sign letters saying they will send only employees to a job, not independent consultants.

"There really hasn't been a change in the legal status. Anyone who passed the 20 common-law questions [which the IRS uses as a guide to determine if a worker is an employee or an independent consultant] remains the same. Section 1706 withdrew the safe harbor, which was the second line of defense."

The safe harbor provision of Section 530 of the Internal Revenue Code protected the client from treating an independent contractor as an employee in both a direct and indirect relationship unless the independent contractor would clearly be an employee under the common-law rules. That protection was removed by Section 1706 for three-party transactions, though not for two-party transactions.

"I think the situation is improving a little," Wallace says. Anyone who's willing to fight has maintained their independence." ■

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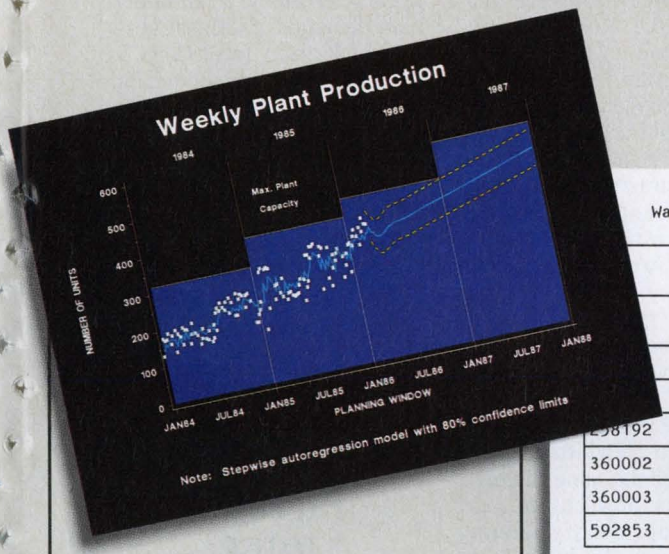

Warehouse Inventory Report - 16JAN87

	Quantity on Hand	Quantity on Order	Projected Reorder Date
	123980	10000	THU, FEB 12, 87
	89450	5000	FRI, FEB 20, 87
258192	20110	1000	MON, MAR 30, 87
360002	8585	0	TUE, FEB 10, 87
360003	15985	500	TUE, FEB 10, 87
592853	469120	20000	WED, FEB 18, 87

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OPERATING SYSTEMS

Prime's Unix Gamble

The mini maker hopes a native mode Unix will spur growth, but will the move entice users?

BY GARY McWILLIAMS

Through successive generations of its 50 Series product line and over 15 years, Prime Computer Inc., Natick, Mass., never let go of what became a credo espoused by every midrange computer maker: one architecture, one operating system.

Like its brethren in the 32-bit computer market, Prime's adherence to that credo was a solemn promise that users would never lose software investments due to hardware obsolescence. As a result of companies keeping that belief alive, the market for midrange computers has grown to be the most lively and competitive in information processing today.

Within Prime, the rule grew to become such a part of the company's philosophy that to suggest otherwise was heresy. In company lore, cofounder J. William Poduska resigned because his idea for a new architecture did not sit well with other executives. The concept became Poduska's starting point for Apollo Computer Inc., headquartered in Chelmsford, Mass.

Prime, however, is now preparing to take a step in the operating system arena beyond anything it has done in the past. Although the company has branched into the Pick operating system and last year brought out an implementation of Unix coresident with its bread-and-butter Primos OS, the company will now make a major departure from the one-architecture tenet based on its 50 Series computers and Primos, and will embrace a native mode Unix on a new, independent hardware platform.

What's more, Prime proposes to use Ethernet—bypassing its own token passing ring network—as the medium connecting the 50 Series to the newly arriving Unix systems.

Prime's reasons for breaking away from a single architecture say a lot about its place in the midrange market and the role it hopes to play. While other computer makers with proprietary architectures have added Unix lines, Prime's move is all the more dramatic because the others have embraced Unix without a dedicated hardware platform for the OS.

"Prime is in that in-between realm," says Kimball Brown, an industry analyst at Dataquest Inc., San Jose. "It's too big to hop on someone else's infrastructure and it's too small to provide a consistent infrastructure countrywide or worldwide. Long-term, they have to do something to stand out. [If they don't] they'll either be acquired or end up as another Unisys."

Like Prime, others, from Apollo to Hewlett-Packard, have faced the same dilemma. Unable or unwilling to push their proprietary operating systems as de facto standards, they seek to penetrate new markets by taking on Unix as a second operating system. Just as often, this dilemma has produced challenges to the customer bases of these companies and even challenges to their strategies.

Architectural Variety

For its part, Prime plans to enter the Unix realm with systems employing a variety of architectures, and derived from external and internal developments. The Prime PXCL 5500 engineering workstation and a new 64-bit scientific computer, for instance, are supplied by young startups. Capping the shift to Unix, the company is planning to release later this year an internally designed, multiuser system built from Intel Corp.'s 80386 microprocessor and its own Unix operating system implementation.

Requests for interviews with company executives on the Unix strategy were declined. A spokesman says there could be no interviews for fear of divulging product plans. CAD/CAM and workstations group president Robert A. Fischer, however, agreed to discuss the role Unix will play within the company's engineering and scientific markets.

PRIME ALSO PROPOSES TO USE ETHERNET.

Unix, says Fischer, "will be more and more important within the engineering and scientific markets. We have to coexist in large accounts with people like IBM and DEC. Standards like Ethernet, TCP/IP, and MAP are the way to do that."

In addition to technical markets, Unix also has become the preferred operating system in many government and education offices—two of Prime's key early markets. The company's belated embrace of Unix on the 50 Series—it introduced only last year a coresident version that sits on top of Primos—suggests the strategy has not been long in gestation. But what is clear is that Prime customers have gone to other suppliers for Unix systems they could not get from Prime.

Carrier Corp., Syracuse,

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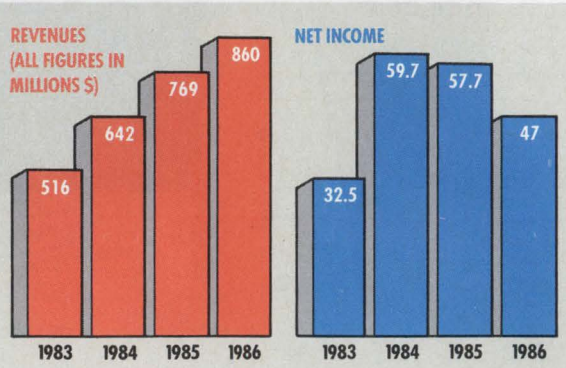
CHAIRMAN: David J. Dunn

PRESIDENT & CEO: Joe M. Henson

NUMBER OF EMPLOYEES ON DEC. 31, 1986: 8,621



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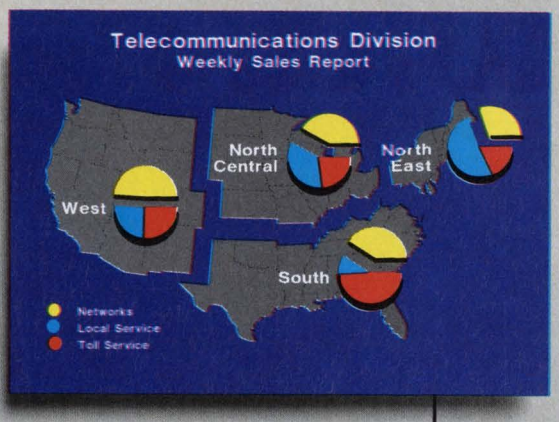

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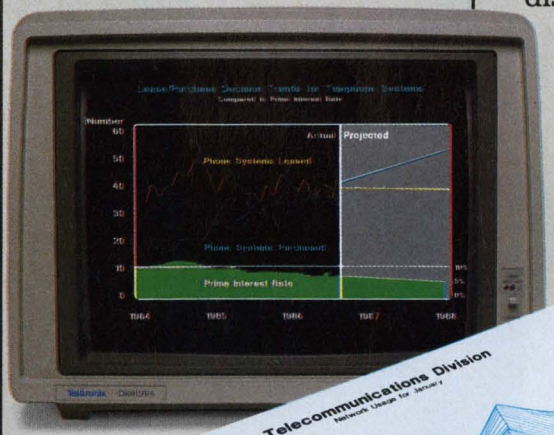

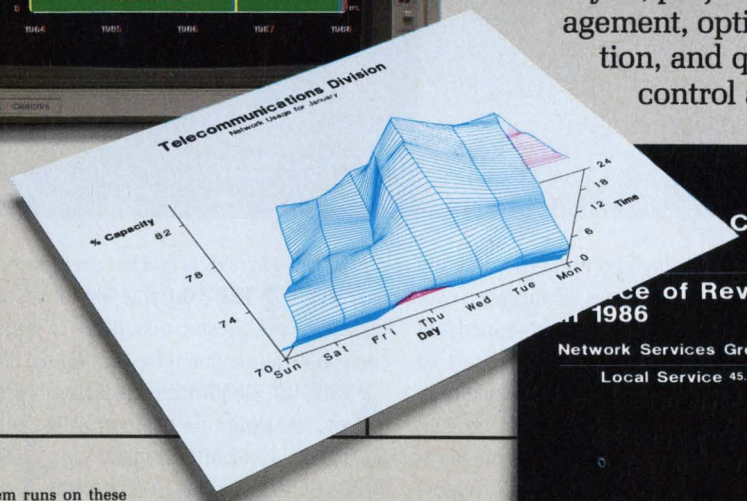

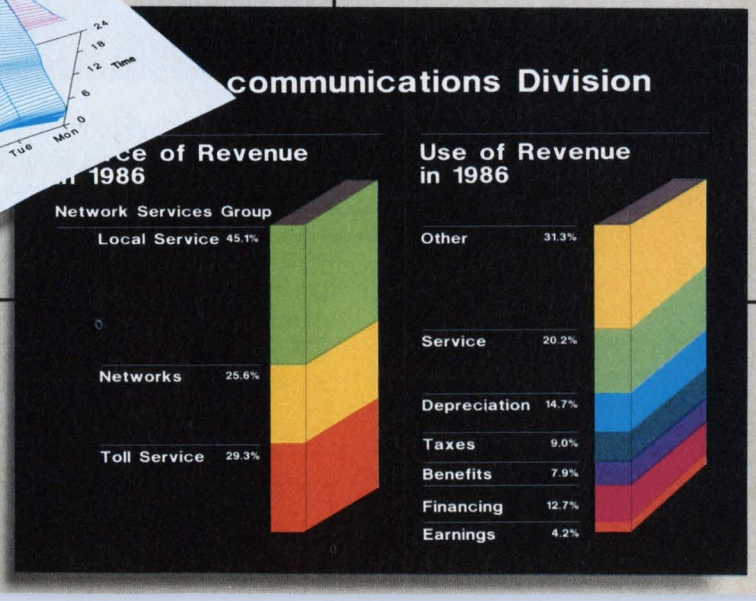

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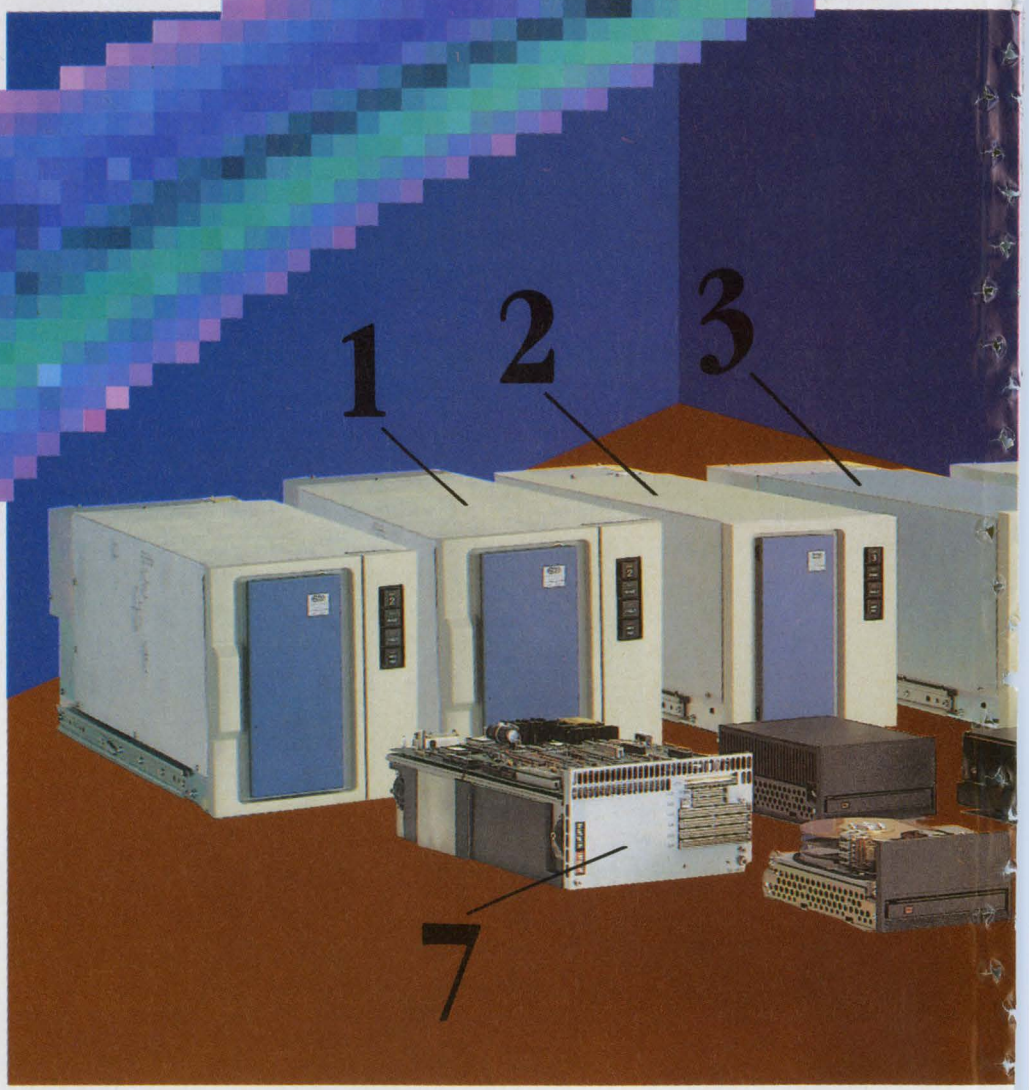

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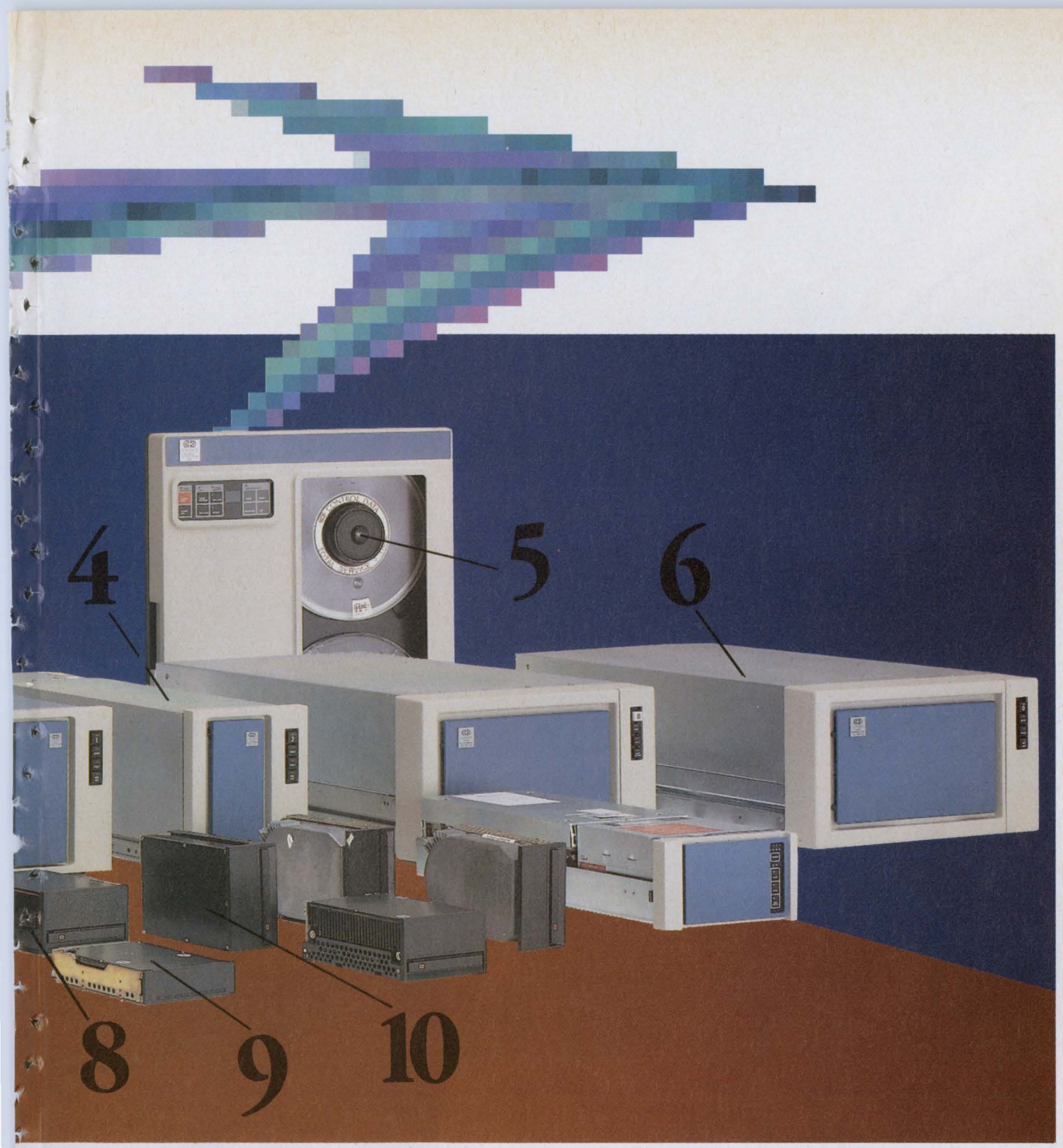

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N.Y., a 50 Series computer aided design user, chose to expand its engineering systems with Unix workstations acquired from Sun Microsystems Inc., Mountain View, Calif., and from IBM. "We went looking for certain applications and they happened to run on those workstations," says Bruce Buchholz, manager of engineering computer systems at Carrier. "The workstations happened to be Unix."

W. Owen Walker, director of MIS at Glengarry Transport Ltd., Alexandria, Ont., also says the lack of a native Unix has a rippling effect. "Prime is finding itself restricted from a lot of [government] tenders by their lack of Unix," he says. The poor showing in Canadian government bids has the MIS director concerned about Prime's future in Canada. In recent months, the branch and sales managers in Prime's Ottawa office left and were not replaced, he says. "Ottawa's our capital; it'd be like moving out of Washington, D.C. A bell went off in my head."

Fischer acknowledges Prime's need for a native Unix on its 50 Series both to satisfy demand and to better connect with its emerging Unix product line. The lack of a native Unix operating system on the 50 Series "is an opportunity we've recognized," he adds. Even when that issue is solved, Prime faces the problem of making its various Unix implementations work together. "We've examined all these different implementations and believe they can be made to effectively work together," he says.

Users Confident in Primos

The larger question of what will happen to existing users and their software investments when a new architecture is introduced isn't lost on Prime or its users. Buchholz and Walker say they are satisfied there won't be any lessening of Primos support. Fischer insists Primos support will remain strong and notes that R&D expenditures related to the 50 Series and Primos—even with the Unix developments—constitute about 80% of the company's total R&D spending.

PRIME MOVER: Robert A. Fischer of Prime Computer acknowledges the company's need for a native mode Unix on its 50 Series computers.

The driving force behind Prime's move to Unix is what it sees as the limits to growth imposed by an exclusively proprietary architecture. "Proprietary architectures . . . will be more difficult to get the growth from than was the case in the past," says Fischer. With $860 million in revenues for the 12 months ended in December, Prime is the smallest by far of the traditional midrange vendors.

John McCarthy, research director at Forrester Research Inc., a Cambridge, Mass., consulting company, believes Prime is hoping to avoid the fate that befell many in the mainframe business. "We're talking about a second BUNCH in this world: the minicomputer has-beens. If Prime cannot grow, it will be a small niche player."

Prime, meanwhile, has organized to attack fast-growing market niches. Through Unix, it plans to enter new markets growing faster than the industry norm. In January, it raised $350 million in a debt offering to add a second growth element: acquisitions. The company is willing to spend double that sum for the right companies, technology, or distribution channels, says Fischer. "We are looking at ways the money could be used to fill gaps in the overall strategy, and to give us the critical mass to be a significant player in such areas as CIM [computer integrated manufacturing]."

There is the question of whether the commitment to growth would be better served by filling product gaps that exist currently, such as a once promised chip set version of the 50 Series or stronger network links. "Why the hell do they want to get into the minisupercomputer business?" asks Forrester's McCarthy. "I don't know how they justify it when there are product deficiencies more important to solve, like IBM mainframe and LAN connectivity."

Fischer, who joined the company last year from McDonnell Douglas, says he is unaware of any 50 Series chip set developments. While refusing to consign the 50 Series exclusively to the high end of the product line, he acknowledges its role in engineering markets "will be where databases are connected and managed."

Through its new Unix systems, Prime will address intersystem communications. "Whether it's Unix or Primos is not the issue. The user base wants all of these to communicate with one another," says Fischer. "We think the advantage of supporting the standards and having the workstation and other products we've introduced gives us the best of both worlds."

With the integration still to be achieved, users are left to wait and see just how seamlessly Prime will be able to mix Unix, Primos, and its Pick-like operating environment called Prime Information. Analysts suggest Prime is likely to target Ultimate Corp., Clark, N.J., and NCR with its multiuser Unix and a Prime Information interface. But many Prime users say they'd prefer a low-cost Primos system to a Unix-based computer.

Whither Price/Performance?

The appearance of low-cost systems such as the MicroVAX 2000 has some people asking why Prime isn't preparing a Primos equivalent. "I'm sitting here as a Prime user . . . and I almost wish that I were over there being able to take advantage of that. I'm beginning to get the feeling the last six or eight months that the price/performance of Prime is not as good as it might be," says Glengarry Transport's Walker.

Stephen Dudgeon, vice president of information services at Bramalea Ltd., Toronto, also raps the existing low ends as unsuited for small branch offices. Bramalea would prefer a low-end product to replace remote terminals linking its Denver office to a 50 Series installation in Dallas. "With the current [Primos] machines," Dudgeon says, "it doesn't make sense economically to try and support a five- or six-user environment. For the kinds of

Photograph by Sal DiMarco/Black Star

systems we run, I'd rather have a small, reasonably priced Primos system" than a Unix multiuser computer.

Dudgeon, Walker, and others recognize that if Prime were to gain size through a Unix line, the result could be a larger company with greater support and service facilities. "I sort of look at it from two perspectives," says Dudgeon. "When people ask, 'Where's their machine that can put up a lot of Unix users?' they've no answer." Walker says, "There's the side of me that says it will provide Prime with a broader base. That should tend to stabilize their market effort."

Still, the departure from the one architecture, one operating system camp also leaves Prime vulnerable on

"LONG-TERM, PRIME HAS TO DO SOMETHING TO STAND OUT."

several fronts. The company must balance its Primos support with its new market entries and provide the links between the two environments. "One of the problems I've had all along with Prime, and I've been a user since 1979, is it's tried to be all things to all people," says Linda Philipps, MIS vice president at World Book Inc., Chicago. "I don't think Prime as a company is big enough to play that role."

Others also question the direction. "How long will it be," Forrester's McCarthy asks, "before their customers are saying, 'If we wanted these problems we'd go to IBM?' " Even IBM, long the target of such jibes, is gearing up to tie up its disparate mid-range with a unifying software interface. Prime, which similarly plans to enable Unix and 50 Series systems to share data and files but not applications, wouldn't need an interface if it stayed only with Primos, says McCarthy.

Unix as 'Escape Hatch'

The ambivalence some users have toward the Unix move masks other worries. "When I look at Prime, I'm asking the question: 'Should I begin to lay off some bets?' " says Walker. "If things within Prime don't go the way I like I don't want to be locked in by things they do. If they go this route, Unix may provide me an escape hatch. It may not be intended to provide me that."

Users are not one-sided about the impact of the company's new direction. World Book's Philipps says that if the Unix multiuser computer, as rumored, uses a software interface to execute Prime Information applications, it could fill the present gap in Prime's low end. "Their low-end products are simply not price competitive," she says. "I could spend considerably less on an ADDS/Mentor system."

Dataquest's Brown says employing a Unix multiuser system to attack the low end of the Pick world could prove the least risky gamble for Prime in the long run. "Pick is where they think they can be a major player . . . [and] it's undominated by IBM." A leap directly into Unix poses a far greater risk. "Why would anyone go to Prime for Unix applications?"

To achieve the growth and critical mass it feels it needs, Prime will have to convince users it has sketched more than a product strategy to achieve those goals. The test of Prime's new credo is about to begin. ■

INDUSTRY

Information Age Panel Runs Aground

At the 11th hour, a battle breaks out over whose views the commission should represent.

BY WILLIE SCHATZ

In a town where someone's always making war over some obscure provision of a proposed law, it was notable that peace reigned during the initial introduction in Congress of the Information Age Commission Act.

The peace, however, recently gave way to havoc.

The commission, designed to serve as a forum for discussion and research about the impact of computers on society, was passed by the Senate last year, but failed to be considered by the House of Representatives prior to the session's adjournment. When it came up for approval this year, the bill, known as S.786, the Information Age Commission Act (IAC) of 1985 and 1986, triggered a loud controversy. Suddenly, every industry trade association in Washington, D.C., and a number of very large companies are putting down the idea at every opportunity. Except ADAPSO.

Battle lines are being drawn, and a trade association war may be just a shot away.

CBEMA and other groups don't think the world needs an Information Age Commission as proposed in the bill. Many of the trade groups and major companies, such as Digital Equipment Corp., IBM, and AT&T, feel that such a commission should represent the views of industry only. ADAPSO, however, had wanted to open the commission membership well beyond its dues payers and the computer industry itself to include labor, academia, and government.

"There's really strong opposition among the trade associations," George DeBakey, ADAPSO's executive director, conceded at the group's recent management conference in Orlando, Fla. "It's going to be a difficult fight to take on our colleagues."

ADAPSO, which has been trying to get the IAC off the ground for five years, never dreamed it would cause such a stir. Having come so close in 1986 with the 99th Congress, ADAPSO figured it would be no sweat with the 100th. The association had it all mapped out. The IAC's sponsors, Sen. Sam Nunn (D-Ga.) and Sen. Frank R. Lautenberg (D-N.J.), former board chairman of ADP, and an ADAPSO pioneer, would introduce the same exact bill early in 1987, then steer the legislation through the Senate just as they had in 1986.

Forget it.

The plethora of written correspondence to DeBakey has ranged from simply negative to downright hostile. In addition to CBEMA, trade associations opposing the commission include the American Electronics Association (AEA), the Electronics Industries Association (EIA), and the Electronic Mail Association (EMA).

Delayed Objections

The objections surfaced at the eleventh hour. ADAPSO sources say the other trade organizations and companies had not immediately spoken

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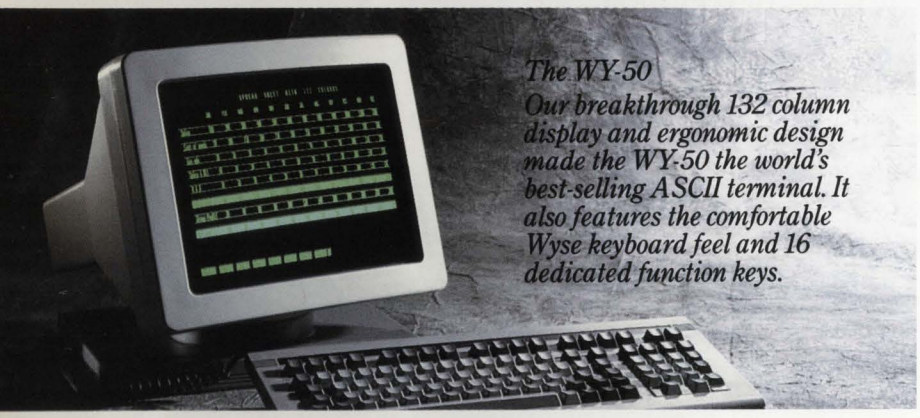

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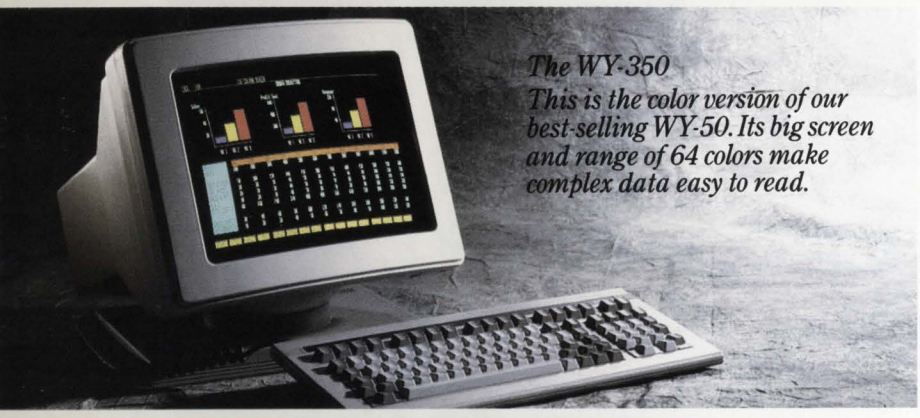

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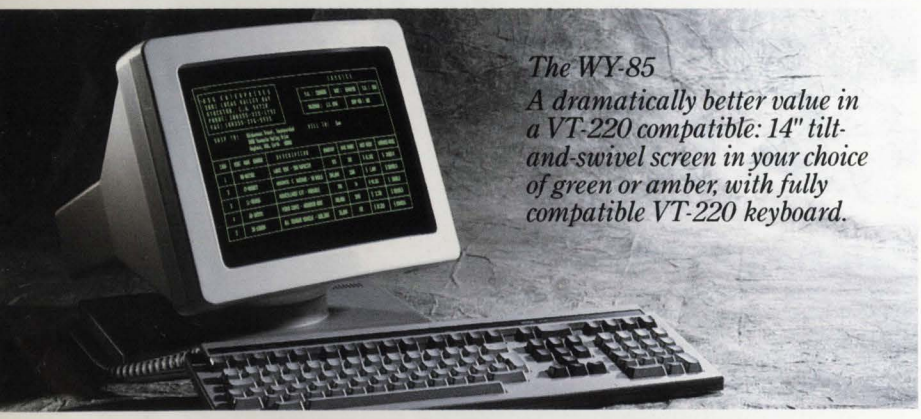

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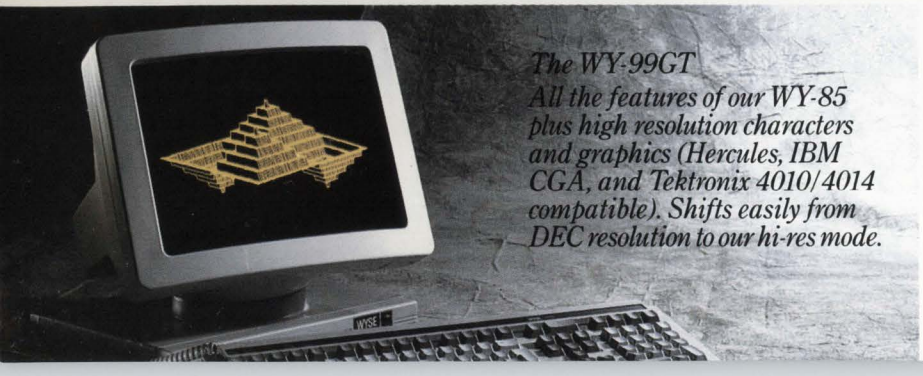

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SQUARING OFF: DEC's Michael Aisenberg (left) debates the Information Age Commission with MSA chief John Imlay at recent ADAPSO meeting.

in opposition to the IAC because of two factors. One, they say, was because the IAC had not been a high priority. The other was that trade associations are reluctant to oppose their colleagues in other associations unless they absolutely have to.

"The formatting of the IAC, as presented during the 99th Congress in S.786, may not be the best approach," says a letter to DeBakey signed by Ted Heydinger, vice president of CBEMA, Ken Allen, senior vice president of government relations of the Information Industry Association (IIA), Michael Cavanagh, executive director of the Electronic Mail Association, and George Moses, vice president of government relations for the Electronics Industries Association. "A highly visible, unfocused IAC would quickly become the arena for attacks on the industry, not reasoned debate. As it has been for such events in the past, the press coverage tends to be on the sensational accusations, not the facts."

A CBEMA issue paper is even more blunt, saying there is no specific or identifiable need, purpose, or focus for this commission, that it would be a government commission in search of a mission. The paper also contends that the commission could become a forum for "promoting sensational but unfounded allegations about the societal effects of modern information technology. The commission would needlessly provide a highly visible forum for those who retard the information age." CBEMA is worried about the public airing of such sensitive topics as vdt radiation.

Proponents and opponents can't even agree on the seemingly innocuous purposes written into S.786. The bill states, "The purposes of this act are to create a forum for discussions and targeted research on the present and future impact of computer and communications systems on our nation and its citizens; and present critical alternative views and choices to the president, Congress, and the public generally, so that such views and choices may serve as a catalyst for change, if necessary, and maximize the benefits of the Information Age to our society."

Fundamental Disagreement

ADAPSO insists that this means discussing anything and everything that affects the country, not the industry. Fred Lafer, senior vice president and general counsel of ADP and a former ADAPSO chairman, makes the point

Photograph by Jim Tuten

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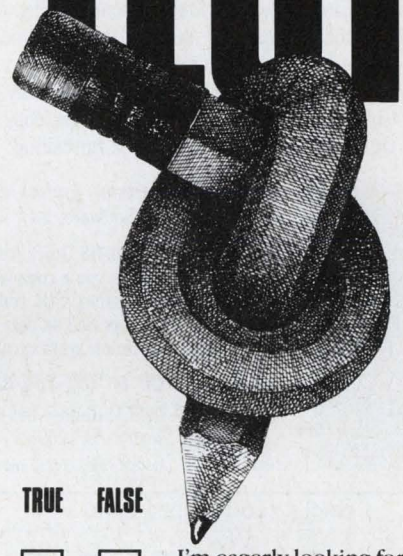

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News in Perspective

that if other industries, such as the asbestos industry, had had a commission along the lines ADAPSO envisaged, the asbestos contamination problem might have been identified and aired publicly long before it became a crisis.

"The initial concept was not one of doing something national through the Congress that's good for each company," Lafer says. "The concept was to do something good for the country and the society, knowing that will be good for the companies.

"I'd rather have the issues out in the open," he continues, "even if I don't like all of them, than to bury an issue I don't like and have it come back to haunt me later. Would I let my pregnant daughter in front of a vdt? I don't know. But that's what the IAC should be talking about. I'm not interested in a public relations campaign."

All sides agree the commission itself is a laudable goal, at least in print. But ADAPSO's opposition doesn't like the method by which it would be accomplished. The IAC would consist of 23 members—three each from the Senate, the House, the information industry, labor, and academia and a maximum of two public officials from state and local governments; the executive branch gets six slots, with one each reserved for the Secretaries of Commerce, Education, and Defense or their respective designees.

DIGITAL'S AISENBERG DOESN'T WANT TO KILL THE BILL, JUST MODIFY IT.

"IBM and DEC are very emotional about it and strongly against it," says John P. Imlay Jr., chairman of Management Science America Inc., Atlanta, and vice president of image and communications for ADAPSO. "IBM opposes it because it only has three industry members. They've made clear to me that the risks far outweigh the rewards." Imlay is a member of the DATAMATION advisory board.

Caught in the crossfire, ADAPSO has to walk the very thin line between keeping its vision of an IAC alive and not offending other industry associations.

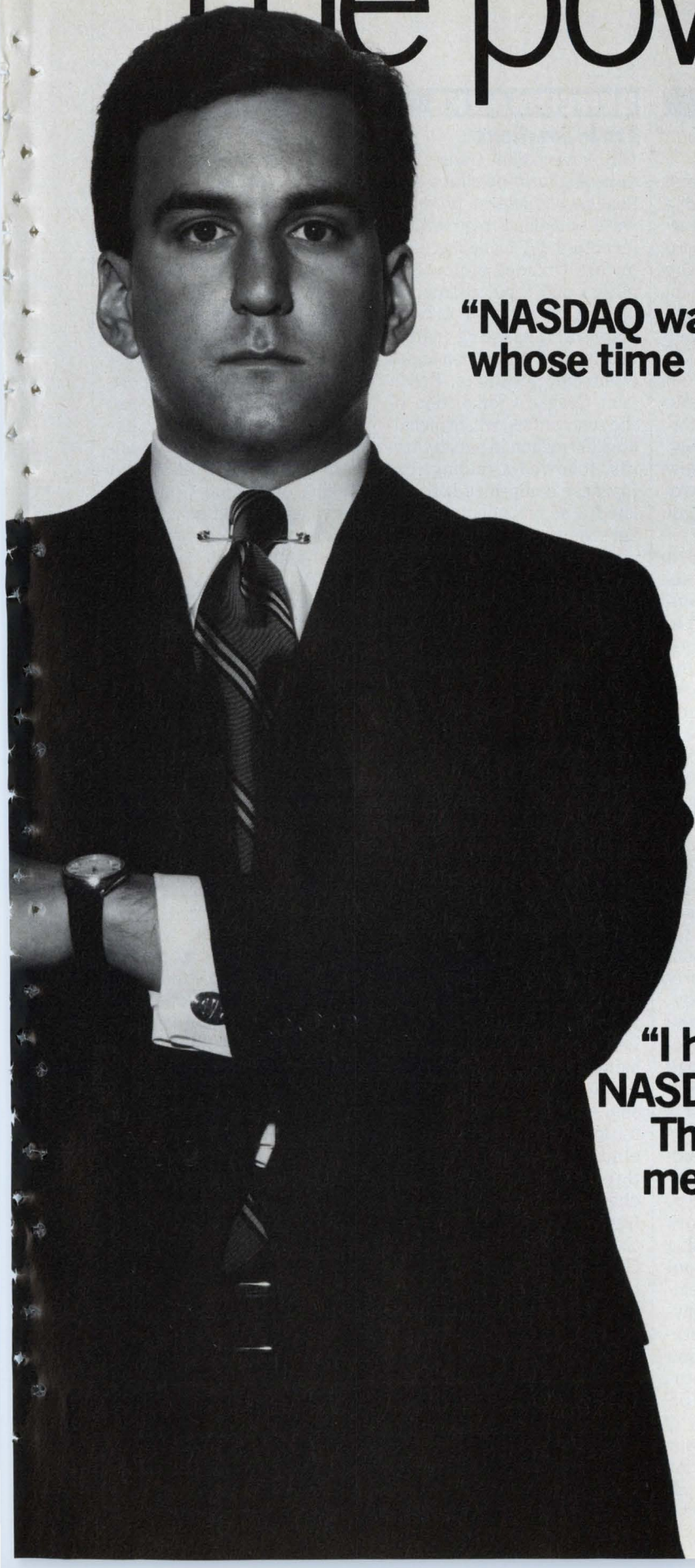
"It's going to be a real uphill battle," DeBakey admitted at the management conference. "I think we need to hold back from pushing it. But I hate to see us drop it, or aggressively pursue it as is."

So they'll do a little bit of both. ADAPSO's board of directors voted at the management meeting to seek a truce with opposing trade associations. Playing peacemaker, however, could harm considerably ADAPSO's efforts to establish an IAC with the broad spectrum of participation it originally thought was necessary.

The objections of IBM, Digital, and AT&T to the IAC as constituted in last year's bill became so strenuous that they hired Stuart Eizenstat, once President Carter's top gun as the assistant to the president for domestic affairs and now a potent lobbyist, to plead their case.

Meanwhile, the controversy over IAC has been a drag on its early proponents. "This has been a real embarrassment to me," says Imlay, who, with ADP's Lafer called in a considerable number of chips in persuading Nunn and

The power of 2



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"I help keep NASDAQ running. That makes me part of it."

UNISYS
The power of 2

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Lautenberg to introduce the act in March 1985.

"I went charging up the hill waving the flag," says Imlay. "All of a sudden I looked behind me and everybody was in a foxhole.

"The senators have been taken aback by the opposition, and so have Fred and I. With this opposition, I don't think we can win. So we probably shouldn't even try. I think we have to move forward and cut our losses."

So don't look for the son of S.786 to appear in the 100th Congress just yet. The ADAPSO board has instructed Imlay and Lafer to see if they can find some common ground with the opposition.

"The goal is widely shared on a general basis and somewhat on a specific basis," says Michael Aisenberg, Digital's manager of federal government relations and manager of ADAPSO's government relations committee. "The differences are tactical. No other industry filters its public policy views through a body that may be inimical to its interests.

"There is a mischaracterization of the concerns that have been raised. We don't want to deep-six it. We want to modify it so it can get the support it needs."

That's going to take some serious diplomacy among the trade associations. It might be easier to achieve peace in the Middle East.

So far, ADAPSO isn't agreeable to attempts by other groups to modify IAC. CBEMA's proposal, a private sector-driven industry council that would sponsor discussions, debates, and seminars on information age issues, would get the industry's views to Washington, grants Jay Goldberg, ADAPSO's chairman and the chairman of Money Management Systems, New York. But "that's not what the IAC is about. ADAPSO is not open to something that only represents industry."

ADAPSO doesn't have much time to come up with a proposal that all sides can accept. The next ADAPSO board meeting is June 22. If the group waits any longer to introduce IAC legislation in the Senate, it won't have a chance of passing.

"We at ADAPSO feel we've been had," Lafer says. "We were allowed to go forward practically by ourselves. We almost got it passed. Now that we're ready to reintroduce the bill, everybody's got objections."

"Nothing suggested it should draw attention and serious examination," Aisenberg says. "Now we need to look at other alternatives, and I hope the ADAPSO committee will consider them."

Aisenberg has already proposed one. It would be a private sector commission consisting of senior corporate board members of affiliated organizations; it would coordinate public policy positions and strategies, develop liaison activities with government, public interest, and academic groups, and organize and manage a charitable foundation. It would present proposals and report annually, but it would not be written into law. Congressional recognition would come through a joint resolution, which doesn't have the force of a statute.

"This isn't worth shredding the trade associations' harmony," Aisenberg says. "We should be able to work this out. Passions are running high, but they should cool down once everybody realizes that we won't have anything unless we get it together. I think this will be a good test of everybody's maturation in the Washington process."

They haven't given out the grades yet. Stay tuned for the report card. ■

BENCHMARKS

Trade Sanctions

U.S. government trade sanctions and tariff penalties on a final list of Japanese products were scheduled to go into effect April 17, including computers (except supercomputers and 8-bit microcomputers), hard disk drives, displays, measuring instruments, and some consumer electronic products. President Reagan's imposition of the restrictions, which included $300 million in penalty tariffs, followed a finding that Japanese companies had violated a semiconductor trade agreement with the U.S. It also followed the termination of Fujitsu Ltd.'s proposed investment in Fairchild Semiconductor Corp., a Cupertino, Calif.-based unit of French-owned Schlumberger, after American semiconductor companies had protested.

Two Promoted

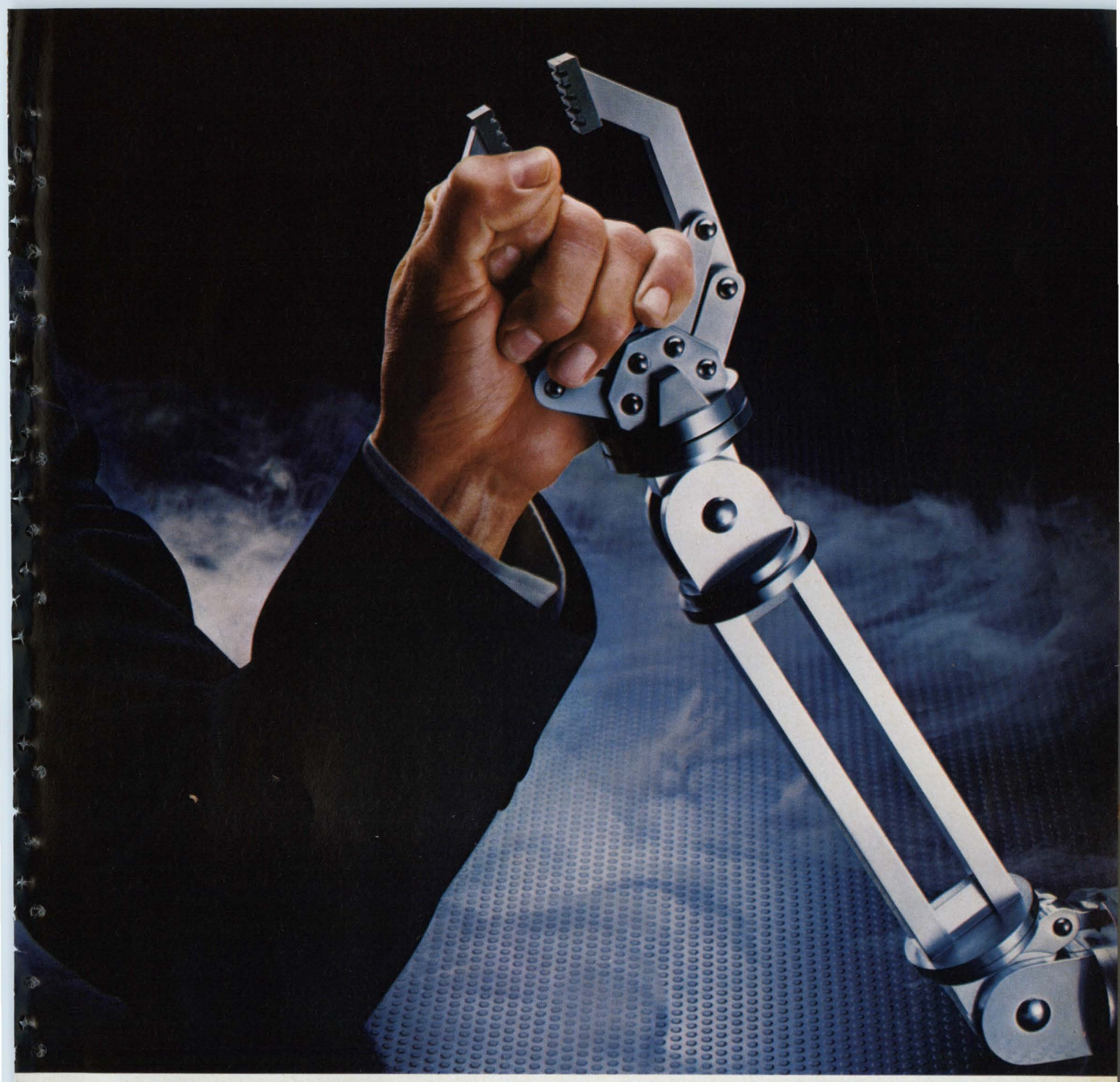
IBM announced that vice chairman Paul J. Rizzo would retire in August and that it had named two new executive vice presidents, the next highest ranking posts after chairman, chief executive, and president, all held by John Akers. The two named were Kasper V. Cassani, formerly chairman of IBM Europe, and Jack D. Kuehler, formerly head of IBM's technology division and its development of large-scale computers. Cassani will now be responsible for most of Rizzo's duties, including overseeing IBM's three major foreign units as chairman and president of IBM's World Trade Corp. and the Information Systems Group, which handles marketing in the U.S. He also becomes a member of IBM's management committee. Kuehler, who had been a director, will handle the Federal Systems Division and continue as head of Information Systems and Storage and the Information Systems Technology Groups. Rizzo, 59, will become dean of the School of Business Administration at the University of North Carolina at Chapel Hill.

No Ground Swell

A special committee set up by ADAPSO last fall to look into IBM's exclusive marketing agreement with banking software supplier Hogan Systems Inc., Dallas, has reported that a survey of the ADAPSO membership and others has revealed "no heated concern" about the deal. Arthur Rollins of Boeing Computer Services Co. and head of the special committee says a couple of hundred ADAPSO members as well as 20 financial software houses that are not members of ADAPSO were part of the survey. "The net of the survey was that a few people expressed concern, but there was no ground swell," Rollins reports. "There is not much ADAPSO is planning to do." Concerns about the Hogan-IBM deal had been raised at ADAPSO's 25th annual meeting (see "The Domino Theory," Dec. 1, 1986, p. 20).

Venture Set

Honeywell Bull formally came into existence following the completion of Honeywell Inc.'s sale of a majority stake in its computer business to Groupe Bull of France and NEC of Japan for $527 million. The new company is headquartered in Minneapolis and is 42.5% owned both by Honeywell and Bull, with NEC owning the remaining 15%. Honeywell Bull has 20,500 employees, 10,000 former Honeywell Information Systems customers, and a 1986 revenue base of about $2 billion. Jacques Stern, chairman and chief executive of Bull, was named chairman of the new company and Jerome J. Meyer, former HIS executive vice president, was named president and chief executive officer. ■



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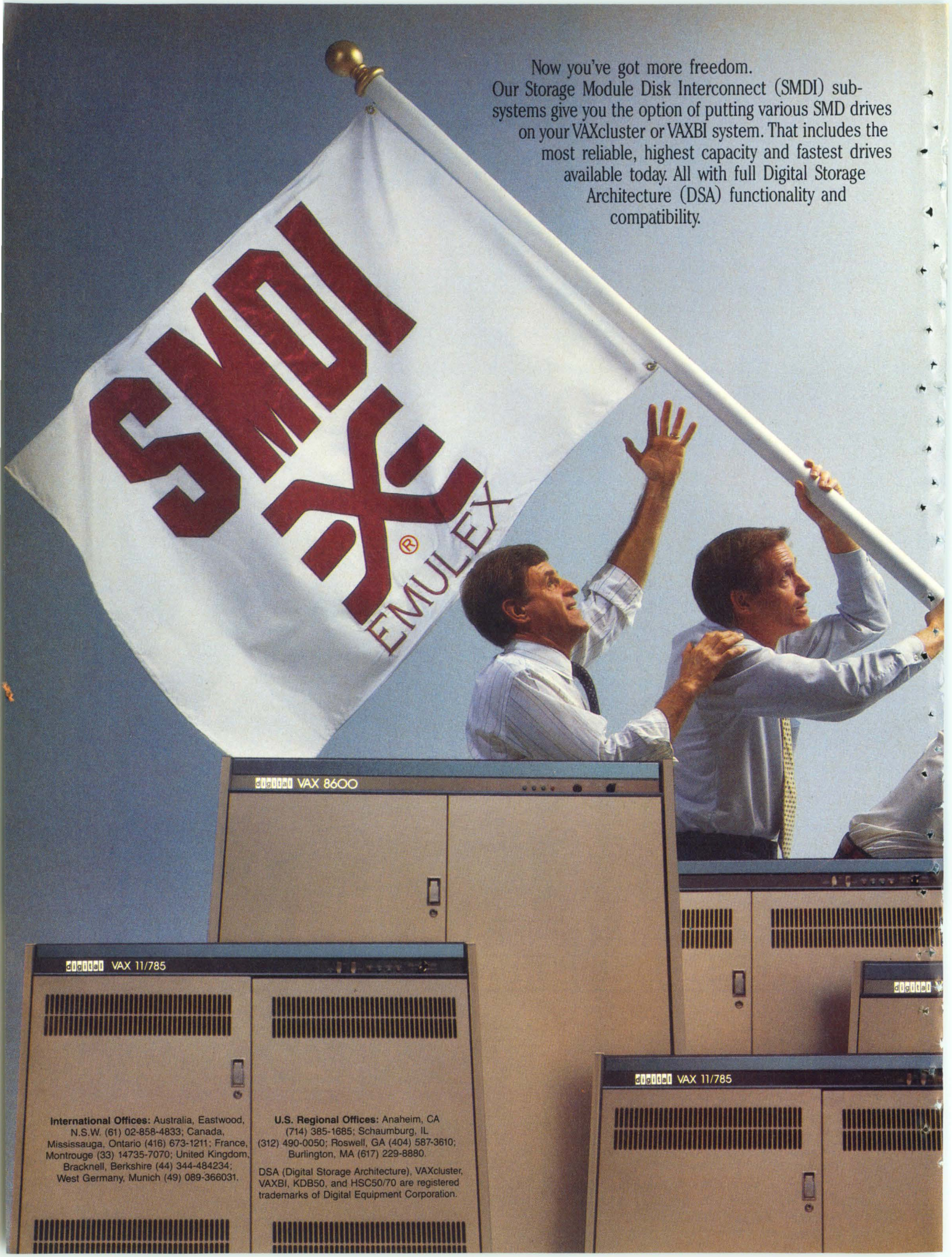

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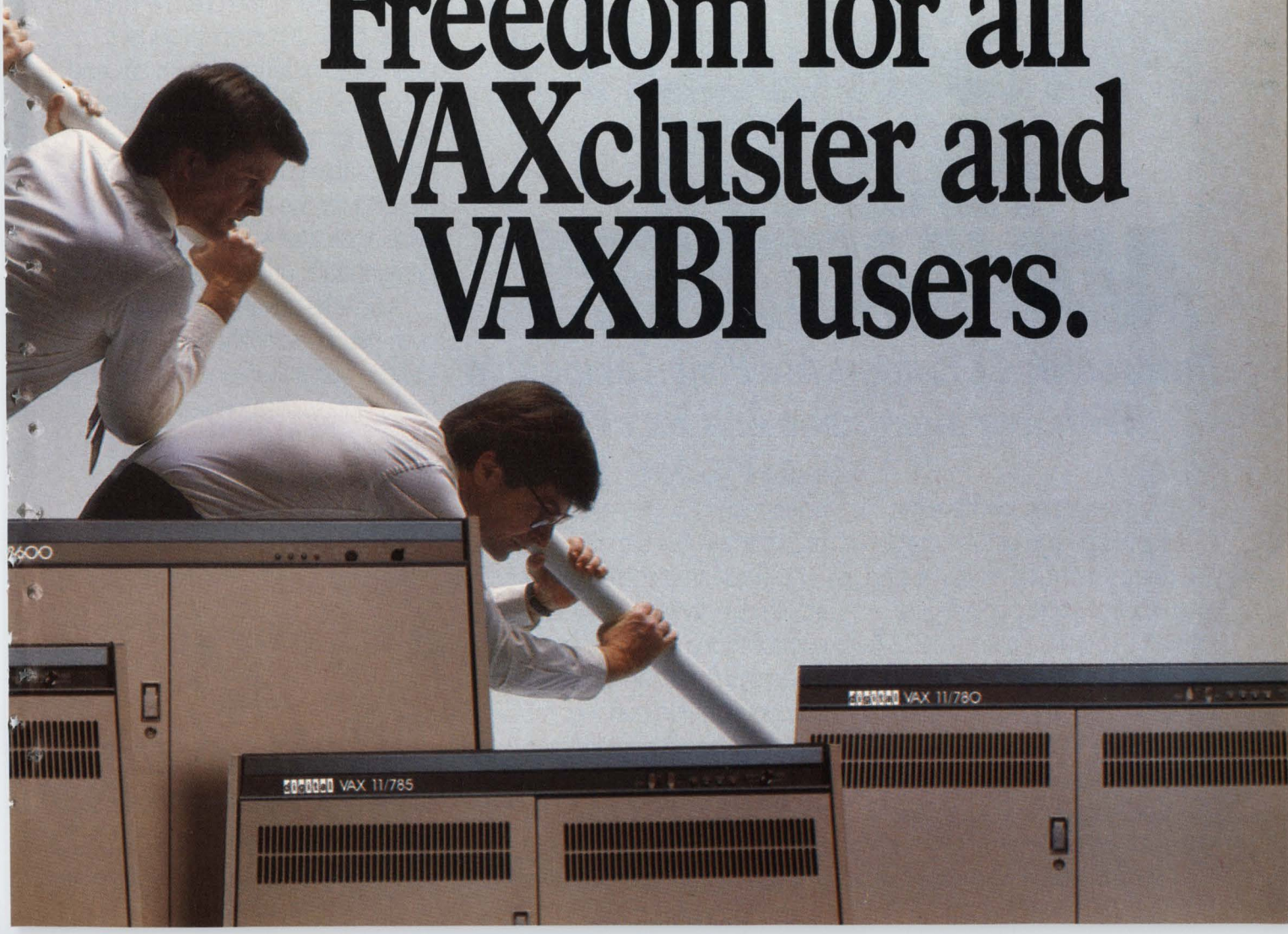

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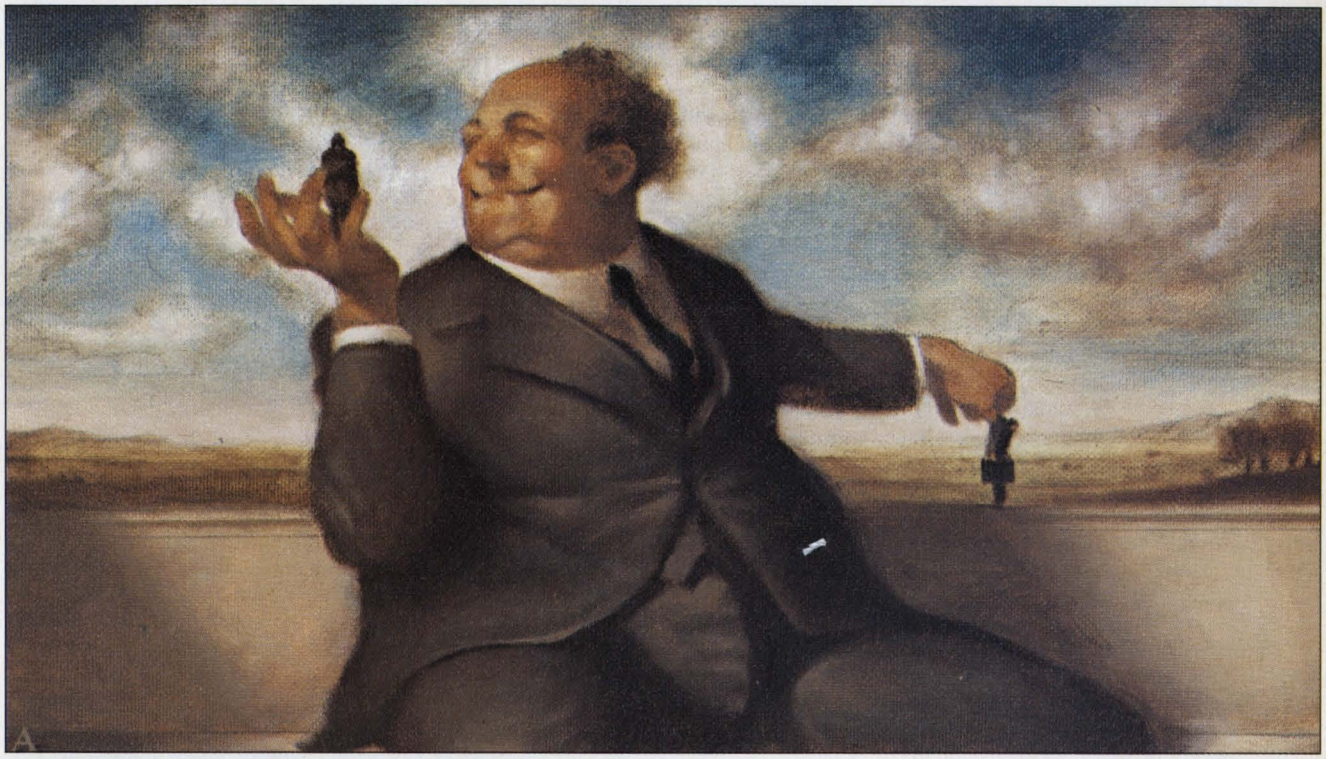

Illustration by Dan Adel

The Godfather Syndrome

Software has taken center stage in IBM's move to sign third-party vendor agreements, but do they end up giving the user a better deal?

BY SUSAN KERR

Tricom Automobile Systems Inc. signed a deal granting IBM exclusive rights to sell Tricom's automotive dealership management software in December 1985. After one year, IBM severed the agreement. Now Tricom is back to square one.

Sound familiar? Even if Hayward, Calif.-based Tricom is little known outside its vertical market, it is not alone in its experience with IBM. Vendors ranging from network maker Sytek Inc. to just about any disk drive manufacturer (Computer Memories Inc. is the best known case) have seen IBM deals fall through.

Until now, the most notable examples of failed arrangements between IBM and third parties have occurred in the hardware arena, but an increasing number of software vendors are opening themselves up to just that possibility. IBM has not kept secret its desperate need for applications software to make its self-proclaimed "year of the customer" a success, and a good chunk of that software will be supplied from outside.

For sure, the risk of a software vendor being "dumped" by IBM is less than that of a hardware vendor. "Unlike iron, IBM does not know how to develop [applications] software," claims Brian Jeffrey of the International Technology Group, Los Altos, Calif. So, he concludes, "Cooperating on the software side is still safer than on hardware."

IBM's lackluster position in the applications software arena, then, may be the safety net for companies supplying Big Blue with these types of products.

Some element of benevolence certainly seems to be in evidence as IBM warmly embraces third-party software vendors in a variety of joint marketing and exclusive licensing deals. Still, some industry seers warn that snuggling up to IBM could endanger one's health.

Some worry that, by its very weight, IBM will dominate a select group of vertical market software suppliers, destroying chunks of the independent software industry. On the flip side, others worry that IBM has entered vertical markets helter-skelter, with little appreciation for or patience with the way business is done in these areas. The result in scenario number two is that a good number of today's IBM software participants will follow Tricom's route and soon be back in business for themselves.

Software companies contacted by DATAMATION that have struck deals with IBM say it is tough to pass up the chance to do business with Big Blue. IBM often can legitimize a market as well as a company. Some add privately that if IBM's in the market and you don't sign with them, then maybe one of your competitors will.

Contingency Plan Recommended

Given these incentives, the rule seems to be to sign up for the best deal you can and make sure you have a contingency plan if things head south. As one IBM software supplier grumbles, he'll never be an equal partner with IBM so who really knows what it has in mind?

Despite an internal programming staff some analysts peg at 20,000 strong, Robert Berland, IBM group director of strategy, requirements, and quality assurance, says third parties are responsi-

ble for "a lot" of IBM's software revenues. "In the applications area they are a major contributor," he said in a recent interview with DATAMATION.

That's likely to continue. IBM can't develop everything but it is being forced "to get closer to customers and understand their needs [and] provide a total approach," says Berland. "Customers with back offices in place are now focused on how to meet business needs." To do so, they are demanding a wider breadth of applications.

IBM has defined approximately 15 major industry groupings it hopes to infiltrate, ranging from transportation to education. According to Bill Kayma, IBM's senior program administrator of complementary resources operations, the top three industries it reaches through joint marketing software partners in midrange systems are manufacturing, distribution, and finance.

IBM is also stepping up its attack on the PC and mainframe ends. "The System/36 pieces are in place. In the PC area, IBM is relatively weak on the applications side," comments Rick Martin, a former IBMer now a research analyst with New York-based Sanford C. Bernstein & Co.

Alan Gross, a spokesman for the Microcomputer Managers Association, New York, says that IBM has never approached him with a third-party software package in hand. Not that it would matter much if it did, for in Gross's mind, IBM packages are overpriced and the company has never resolved application package support issues. Yet, keeping in mind the long-awaited new generation of PCs for which new software will become available, Gross anticipates "they'll make a push" in selling packages.

As IBM grapples with ways to supply such a large number of total solutions—hardware, operating systems, communications, applications, and so on—it has made sweeping changes in how it does business. How well its people can adjust will have a direct bearing on how well its vertical market partners will do. Ulric Weil of Gartner Securities Corp., Stamford, Conn., says the big organizational changes are probably over for a while, but "attitudinal changes are coming to a fore . . . . Everybody [working at IBM] understands this is a new ball game."

Among the changes is the return to its structure of a decade ago, wherein regional salespeople sell by vertical markets rather than strictly by a set geographical area. Also, 5,000 employees have been added in the field this year, but making industry specialists of them is no small task.

If, for example, you "take a kid out of college and put him in a blue suit and a white shirt, he won't be an expert in insurance," concedes Berland. Customers expect expertise from IBM, he says, and "The only way to build a vertical market is working and living with that vertical."

That's where joint marketing participants come in. Software partners report an unending stream of briefings to hundreds of IBM salespeople. For the most part, the caliber of the salespeople is high, they say. Additionally, IBM does on occasion target certain software items and give bonuses to salespeople who help move these packages.

Other organizational changes inside IBM include moving the previously independent Information Services unit under the control of the Information Systems Group. Information Services' mission is to develop and/or acquire software for many IBM products whereas the ISG is responsible for sales and marketing in the U.S. A need to integrate the identification of customers' software requirements and those actually offered was the reason for this move.

IBM CAN'T DEVELOP EVERYTHING.

The changes don't stop there. Once those software requirements are identified, the method in which the packages are brought under IBM's wings is shifting subtly and some people aren't too pleased with Big Blue's direction.

A Trend Toward Exclusivity?

In 1983, IBM began its Marketing Assistance Program whereby the company makes joint sales calls with select software developers of products running on midrange IBM systems. Most hardware vendors have a similar program. Today there are 1,600 partners in the program, a whopping 300 of which joined in 1986. But this year, only a few more companies will be admitted, says IBM's Kayma. Instead, the emphasis is on getting more out of those companies already on board. For example, IBM recently instituted a bonus system for program partners that land new accounts.

So far, so good.

But those partners may find themselves up against heady competition in the long term. As growth in the Marketing Assistance Program slows, an increasing number of industry participants and observers feel that IBM will more often engage in another type of arrangement: exclusive deals.

While IBM has put its label on others' software for years, gaining control over these products seemed to hold little interest. Not so anymore, if you go by last May's announcement of a five-year exclusive licensing agreement between IBM and banking software developer Hogan Systems Inc., Dallas. After suffering losses in six of the preceding eight financial quarters, Hogan signed over to IBM all product rights in the U.S., Puerto Rico, and Canada in return for approximately $1 million a month for the next five years and a percentage of sales made over that predetermined minimum.

That deal seemed to signal a new era in dealing with IBM. To some it also raises troubling questions about IBM's modus operandi.

Comshare Inc., Ann Arbor, Mich., signed on as one of IBM's first complementary marketing partners back in January of 1984. IBM's deal with Comshare was for the company's System W decision support software for IBM mainframes. This two-year agreement expired in 1986.

"IBM currently is frowning on nonexclusive deals," charges Comshare chairman Richard Crandall. "I can say generally we had a good arrangement for Comshare and an excellent return [from the IBM relationship]. We'd like that same kind of arrangement to be available, but it's not."

One reason for IBM's apparent preference for exclusive deals is that it receives revenue from the sale of the software to customers. Under the Marketing Assistance Program, IBM gets money only from the hardware portion of a sale.

To take that one step further, exclusive deals also give IBM control over the price of the product. IBM is selling the same version of Hogan's software that Hogan did, but is charging between 13% and 18% more, confirms Hogan executive vice president Richard Aldridge.

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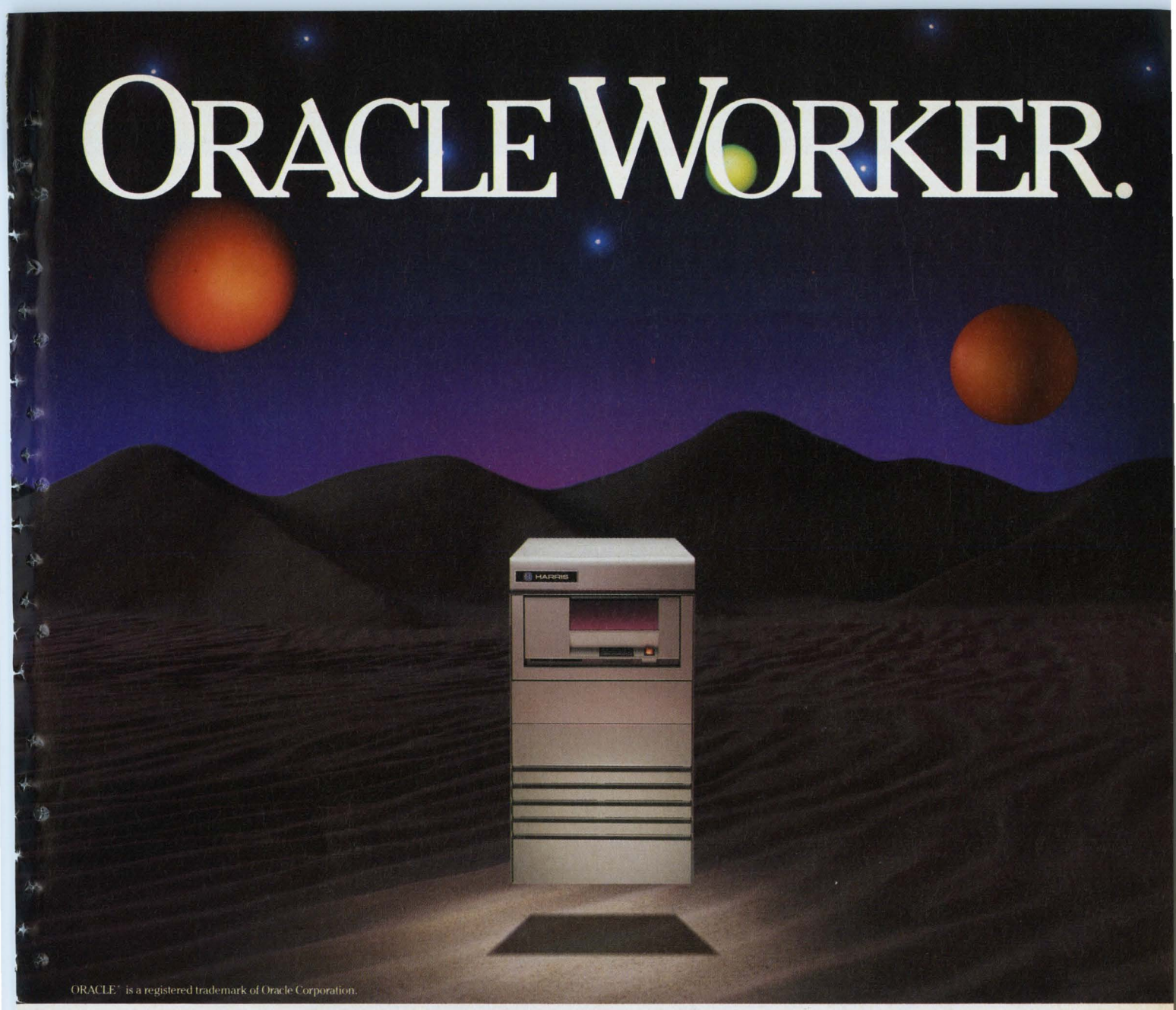

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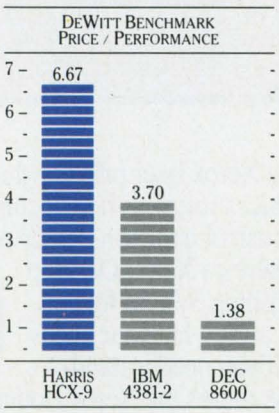

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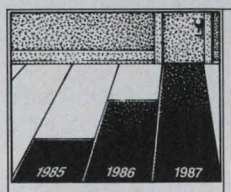

Fig.1

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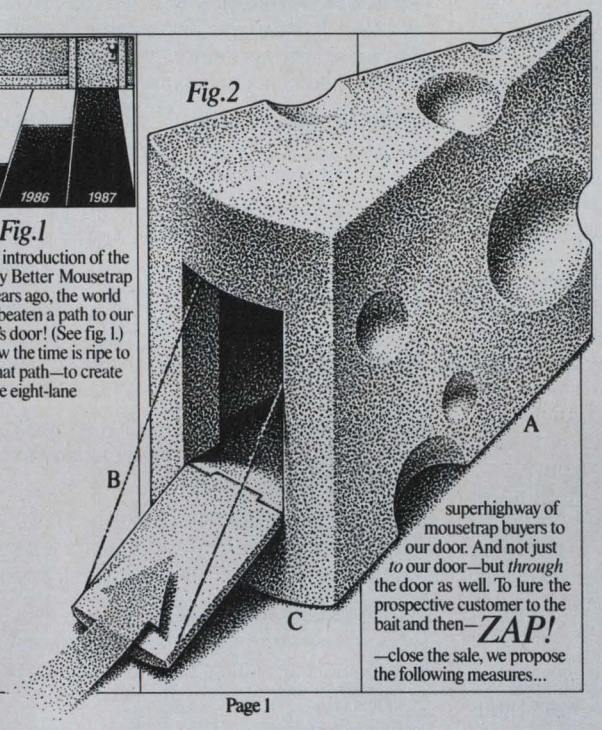

Fig.2

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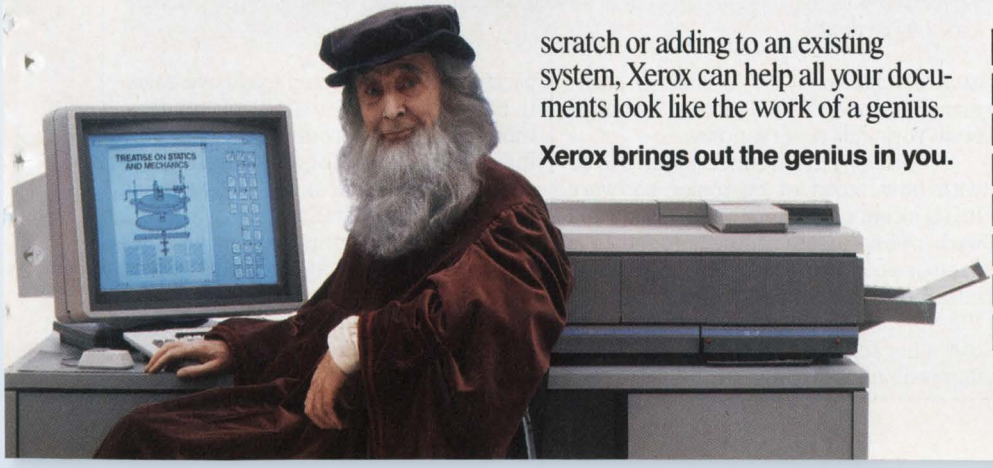
Page 1



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IBM attempts to shrug off both criticism that it made a backdoor acquisition of Hogan and fears that these deals are the first step toward what could one day be domination of pricing and product development in key vertical markets.

"I think you'll see exclusive deals as they make sense," comments Berland. "IBM is a worldwide company with worldwide customers and we like to deal as a single company interface to a customer."

One-Stop Shopping

That "single interface" provides customers with one-stop shopping. But even Berland alludes to the relationship between pricing and single sourcing. "Exclusivity is very important in many cases," he says, since it's better "not to have multiple people coming in calling on customers. Then you do not play games with prices."

Obviously, customers have to agree to pay those prices. National Laboratory Center, Memphis, did just that when it signed up with IBM in February. IBM, remarketing medical laboratory management information software developed by Lab Force Inc., Dallas, probably charged $50,000 more for this type of package than competitors do, says Michael Bilger, NLC director of information systems. Although he likes Lab Force, Bilger says that he would not have bought the software directly from it.

"I've been installing lab systems for eight years," comments Bilger, "and I've gotten a lot of 'Oh, that's a hardware problem,' from the software guys and 'Oh, that's a software problem,' from the hardware guys. With this all-in-one sale, I just say, 'That's your problem.' "

"IBM is very good at promoting value-added benefits," agrees First Interstate Bank vice president Donald Atwood. The Denver bank uses both Hogan and rival Uccel Corp., Dallas, software. But, Atwood says, "I'm pretty neutral" about preferring to deal through IBM rather than directly with a software house. "I'm more concerned with the quality of service as opposed to who provides it." The bad news for IBM is that if those at First Interstate "were really interested in one-stop shopping, we would have gone all Uccel."

Bilger, at least, had alternatives to IBM. What concerns some key industry participants is that that choice may soon go by the wayside.

While defending the Hogan deal—"They have every right to do it"—ADAPSO chairman Jay Goldberg, chairman of Money Management Systems, New York, has reservations.

"Our long-term concerns have to do with how much of customer software IBM is intent on dominating. They started with operating systems, moved into databases, and now are moving strongly into the application development arena. Where will it stop?" No one knows, and IBM's not telling. The company says it's impossible to say how many third-party packages it resells on an exclusive basis. It has signed up a variety of vendors, though, ranging from Wicat Systems Inc., Orem, Utah, (for a PC-based line of educational software) to Telesoft, San Diego (Ada products).

But even when nonexclusive deals are signed, exclusivity seems to pop up somehow. Last November, IBM's Health Industry Marketing organization and Federal Systems Division inked the nonexclusive deal with Lab Force. Signing an

A Gallery of Some of the Major Deals

LOCKHEED CORP.: This company was a partner in one of the earliest IBM reseller deals for applications software, if not the first. The Sunnyvale, Calif., aerospace giant inked a contract in 1981 allowing IBM to resell its CADAM (Computer Augmented Design and Manufacturing) system. The relationship is ongoing. The company's Calcomp unit signed what insiders describe as an "exclusive" deal with IBM in 1983 for a graphics workstation IBM designates as the 5080.

MICROSOFT CORP.: It struck a deal in the summer of 1980 to supply a PC operating system.

INTEL CORP.: In December 1982, IBM acquired 12% of the Santa Clara-based microprocessor developer. IBM eventually upped its stake to 20% before the January 1986 announcement that it was reducing its holdings roughly by half. In 1984, IBM acquired licenses to manufacture Intel-designed chips.

COMPUTER MEMORIES INC.: IBM contracted with CMI in 1984 to supply 5¼-inch Winchester disk drives. The computer giant announced in August 1985 that it would not renew the agreement with the Chatsworth, Calif.-based company. CMI recently announced plans to acquire and adopt the name of Hemdale Film Corp.

TANDON CORP.: Also in Chatsworth, Calif., Tandon signed with IBM to supply floppy disk drives, but IBM canceled orders in January 1985. At the same time, IBM agreed to purchase Winchester disk drives.

SYTEK INC.: The Mountain View, Calif.-based company entered into a deal with IBM in late 1982 to supply IBM PC Network boards. A product was officially announced in August 1984. In January 1986, IBM decided not to renew the contract.

COMSHARE INC.: In January 1984, the Ann Arbor, Mich., company signed one of the first complementary marketing agreements for its System W software. The deal expired in 1986. In an unrelated arrangement, Comshare also had a value-added remarketing agreement for the IBM PC until December 1986.

ROLM CORP.: IBM acquired 23% of the Santa Clara-based PBX maker in March 1984. It purchased the rest of the company in November 1984. Today, Rolm is a wholly owned IBM subsidiary.

SOFTWARE PUBLISHING CORP.: In May 1984, the Mountain View, Calif., company signed a deal allowing Big Blue to sell under the IBM label its PFS brand of microcomputer software. The deal is still in place.

STRATUS COMPUTER INC.: In what is said to be the first deal in which IBM agreed to remarket a complete third-party computer system, Marlboro, Mass.-based Stratus agreed in January 1985 to allow IBM to sell its fault tolerant computers. The deal is ongoing.

HOGAN SYSTEMS INC.: Hogan signed a landmark deal in May 1986 granting IBM exclusive marketing rights to banking software for five years in the U.S., Canada, and Puerto Rico, and nonexclusive rights throughout the rest of the world. Dallas-based Hogan also signed a 20-year licensing agreement with IBM separate from the exclusive deal.

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exclusive contract had been "hit upon [during negotiations] but we made it clear in the beginning that we didn't want it," recalls Lab Force marketing vice president George Schwend. Even so, it appears somewhat exclusive in practice, as Lab Force seems to prefer letting IBM handle most of the marketing for its IBM products, concentrating itself on its Prime Computer Inc. line. The Dallas company will receive roughly $5.5 million during the next year from IBM.

Even more telling is Schwend's decision not to become a partner in the Marketing Assistance Program (often called MAP). "We didn't want to be a MAP," he says. "I'm not an IBM expert but I thought if you avoid being a MAP then you'll not be in competition with the IBM field. Philosophically, there are about 350 health care specialists for IBM. We wanted to gain full support of IBM specialists in a nonthreatening," or noncompetitive, environment.

Ironically, that's the same argument many value-added resellers have made in favor of becoming participants in the program. Donald Coggiola, executive vice president of Policy Management Systems Corp., Columbia, S.C., a 16-year IBM sales veteran, says his company used to be an IBM var. This January, Policy Management Systems entered the Industry Manufacturing Assistance Program (IMAP). His company provides application software in the property and casualty insurance arena running on System/38-class machines.

"As a var in the early days of the program, we were competing with IBM for the same customers," says Coggiola. "We pursued this [IMAP] relationship."

There's no proven method for channelling the conflict, and while IBM continues to wage its war on solutions, it's inevitable that some companies will be caught in the crossfire.

Dallas Talley, president and chief executive of Tricom, reports that his one-year deal with IBM ended on a "friendly" basis but "was not as successful as either of us wanted." One reason the deal never got off the ground was that IBM targeted the big car manufacturers, which were expected to promote the package to their dealers. After IBM hit a snag trying to sell into General Motors (which was in turn trying to cope with its Electronic Data Systems Corp. subsidiary), the agreement stalled.

Talley says it was best to call it quits after a year, "before getting so swept up like CMI" (the former IBM disk drive supplier Computer Memories at one point depended on IBM for 81% of its business). By keeping another product line out of the deal, says Talley, Tricom maintained its own distribution channels and was able to readjust relatively easily once the arrangement was terminated.

A Threat and an Opportunity

Software vendors seem aware of the threat of withdrawn business. Despite his enthusiasm, Policy Management Systems' Coggiola admits that "none of my revenue objectives are based on this deal. My contingency plans are business as usual."

Likewise, Lab Force's Schwend says, "You have to think that the marriage could go bad." Additionally, "I have no guarantee that IBM isn't writing one [its own software package] right now," although he doubts it.

SOME STRESS THE NEED FOR A CONTINGENCY PLAN.

In the meantime, there are immediate benefits to doing business with IBM, dollars aside. IBM is well known for stringent quality requirements and this applies equally to software and hardware. Companies report that they've had to make significant improvements to documentation and tighten up their accounting and business practices.

"We did have to modify the product to meet their requirements," says one IBM partner who asked not to be named. "Other things we had to do were to meet IBM standards for documentation and testing—most small companies don't really have standards in those areas. They forced us into a discipline that's good no matter what."

Following rules set by hardware companies is likely to become more prevalent. While some big vendors such as IBM archrival Digital Equipment Corp. haven't made the move to exclusive software remarketing arrangements, Hogan's Aldridge predicts it's the wave of the future: "Software companies will be driven . . . to trying to align themselves with hardware vendors or even companies like EDS. There are so many software companies that distribution becomes more critical than functionality."

And that's a shame, says Bernard Goldstein, ADAPSO pioneer and currently a partner in merger and acquisition consultancy Broadview Associates, Fort Lee, N.J. "Users have been the enormous beneficiaries of a great variety and breadth of software. It's that very choice and enrichment of options that really makes their hardware investment pay off. When we have an industry such as software that is characterized by shared markets and great fragmentation, there's also a Darwinian process of survival of the fittest. "With IBM anointing a single vendor, it . . . conceivably is anointing a company that isn't the fittest . . . . And, further, IBM's selection of one bride could conceivably slow the investment of capital to support software companies."

Despite his pleas, even Goldstein admits that nothing's truly black and white. IBM as a company has made great contributions to the industry and it's not always fair to paint it as a monster. Moreover, perhaps the bigger and more immediate safety net is the fact that internally IBM is not a unified entity. Multiple diviions have the charge of acquiring and/or developing software and each tends to go about that task differently. Thus, it's unlikely that IBM will dominate more than a handful of industries in the near future.

Customers will have the final word. "Multivendor environments are a plus," says Raymond Dwyer, senior vp of corporate systems at Bank of New England. "Why would we give IBM the right to decide who is a good software supplier and who isn't?" Nevertheless, the bank, which currently does not use Hogan software, plans to give it another look. IBM, for its part, puts on a charitable face. "When [IBM] goes in an area, it stimulates" that market, Berland explains.

IBM has stimulated a lot of areas in its time. "IBM is doing things they don't even know the effects of," says ADAPSO's Goldberg. But maybe applications developers are beginning to learn what everybody else already knew: "If you're a hardware manufacturer today, you compete with IBM. If you're a software guy, you also compete with them. But historically it's been the systems software guys. Now it's applications." ■

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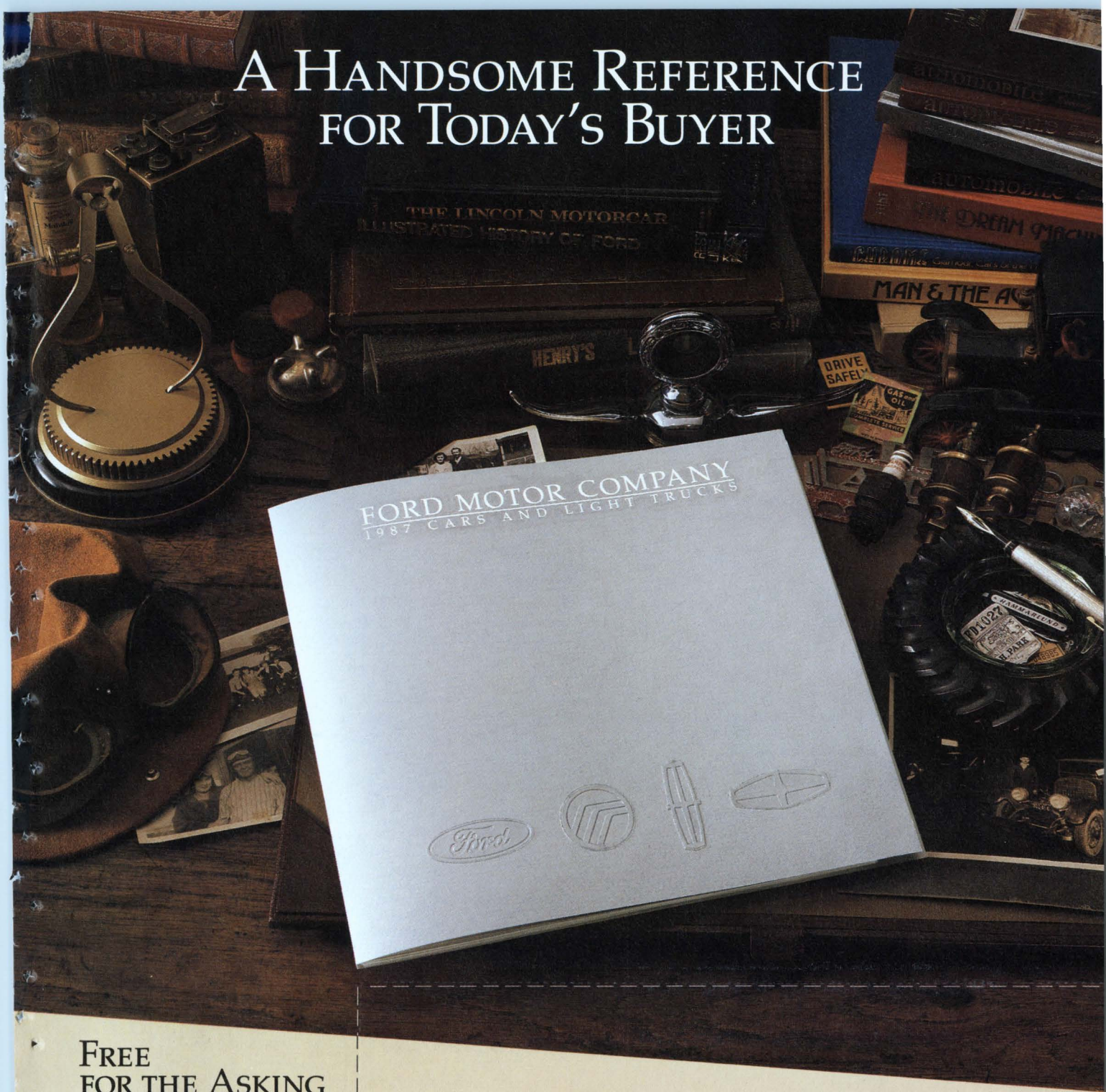

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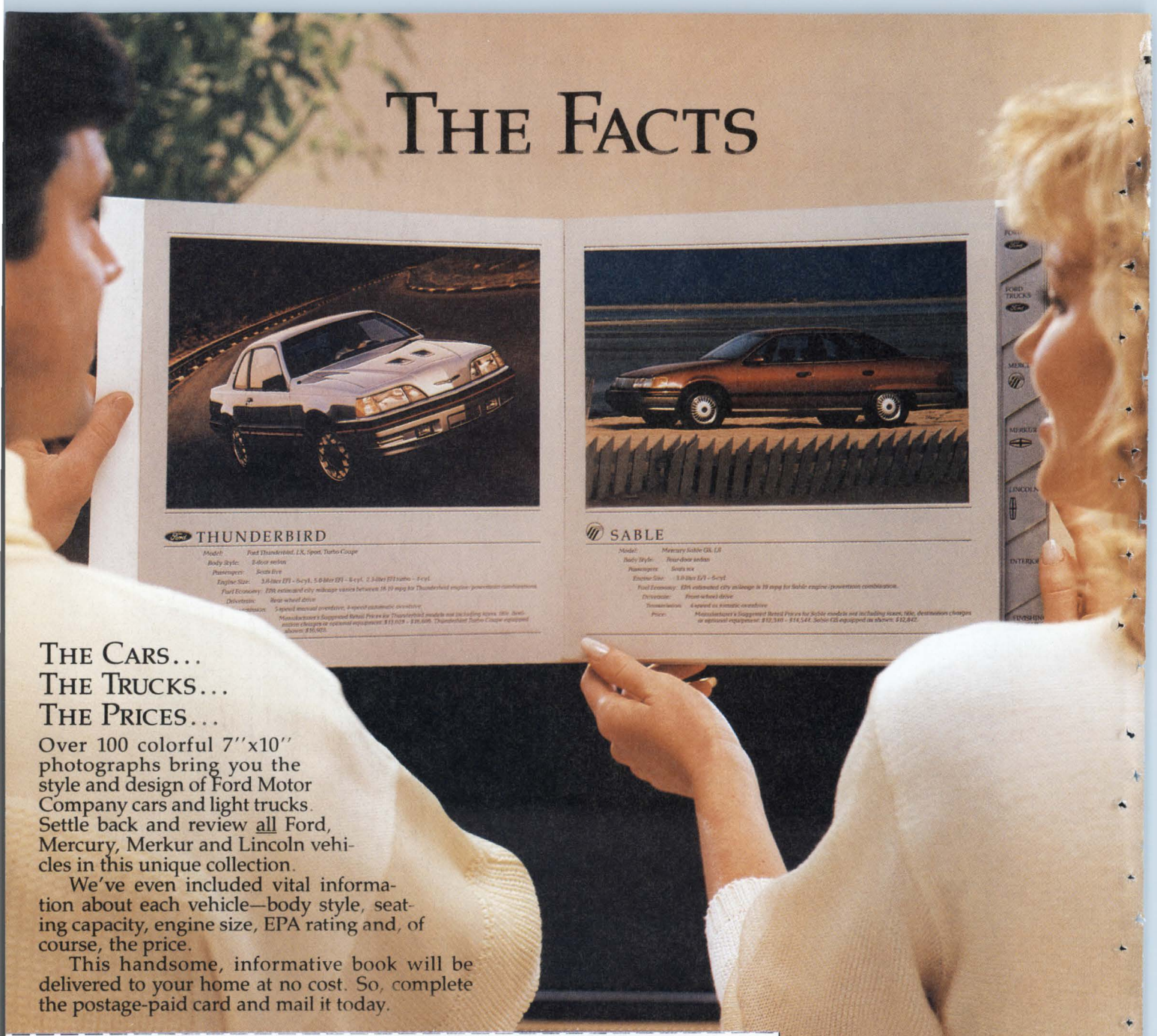

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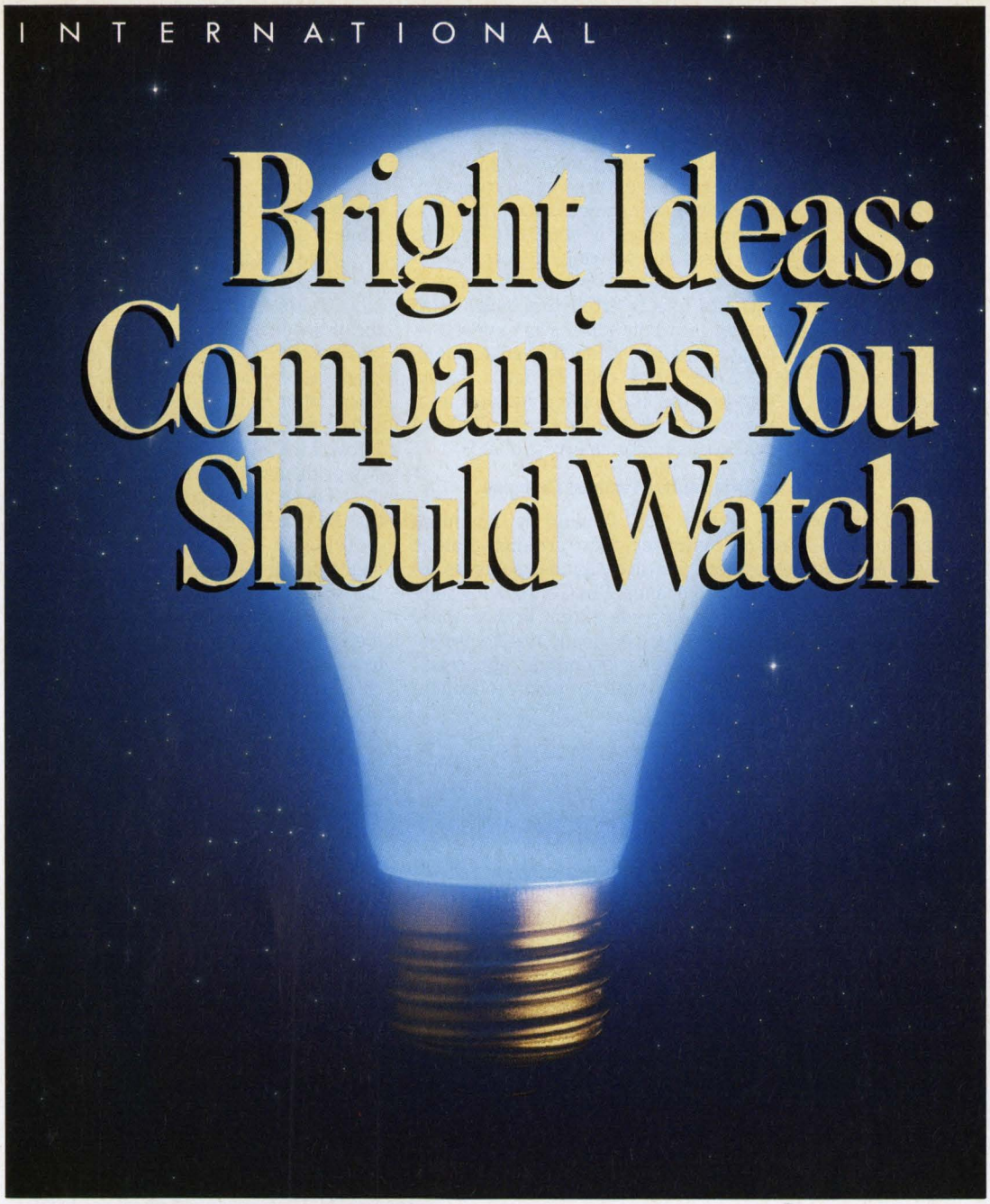
Bright Ideas: Companies You Should Watch



Photograph by Walter Wick

The thousands of small companies that populate the world's computer and communications industry are a constant source of innovation. Some of those companies have a brighter than average future. In search of the best and the brightest, DATAMATION asked its worldwide network of writers to identify 10 up-and-comers. Seen together, they provide a snapshot of an industry in the midst of technological turmoil. High-performance workstations, advanced software techniques, more powerful peripherals, computer architectures, and communications products are the hot growth areas where the market is still open to newcomers. It's these newcomers that prove innovation and commercial ambition are alive and well, and living all over the world.

BY PAUL TATE

This article is dedicated to the thousands of small companies with bright ideas that keep the world's information systems industry on its technological toes.

Too often today, the international dp industry focuses its attention on the mighty few and ignores the contributions of the many. That may not be suprising in a fast-changing business where size is often regarded as some sort of guarantee of commercial survival and technological excellence. But such an emphasis certainly undervalues the innovative strengths and marketing potential of the little guys. After all, among the ranks of those smaller companies are firms with some of the best ideas in the business.

With companies like Tandem, Apple, and Lotus among their role models, the small companies that have ambitions to get into the big league are ever hopeful. The trick is getting the right mix of

funding, technology, marketing, distribution, and hard work—and then praying for a fistful of luck at the right time.

That isn't easy, and only a few will ever make it. Many will crash, many will be bought out, and many will simply never go anywhere.

Spotting the few up-and-comers among those companies is even trickier. First, the pace of technological change is very rapid. In the time it takes to read this article, someone, somewhere, could have made the business plans of a small company obsolete. Second, the sudden approach of a large international vendor to a small company can change its prospects from average to exceptional at the drop of a worldwide marketing deal. Third, the strength of a small company's management team and its financial backing may not be fully tested until the company reaches a critical mass. And then, of course, there's always the unexpected disaster to watch out for.

Nevertheless, among those vulnerable ranks are companies with technical and marketing ideas that should not go unrecognized—especially at a time when the industry is passing through a difficult phase and trying to cope with the post-boom, post-pc, end-user mentality. Not to mention the frantic preparation for the onslaught of new technologies and massive digital communications networks.

DATAMATION put its network of writers across the U.S., Europe, Japan, and Australia to work to determine some of the unrecognized companies with the brightest ideas. The criterion for selection was simple: a young, up-and-coming company (a "Yuccy" of the information business) with a technological or marketing idea that makes it stand out from the crowd.

The selected company profiles on the following pages are the result of that DATAMATION survey. Obviously, such a list could never be complete. It is simply a snapshot of one level of an industry in the midst of technological turmoil.

On the technology side, the ideas that form the commercial basis of these up-and-coming companies are as varied as they are new. High-performance workstations, advanced software techniques including AI, new peripheral technologies, computer architectures, and communications products all feature strongly in the survey. These are the hot growth areas where the market is still open to newcomers.

Some other trends emerged too. Perhaps the most obvious are the differences in risk funding around the world.

The U.S. venture capital community remains far more advanced than anywhere else when it comes to backing good ideas and starting up new companies. Thousands of enthused U.S. entrepreneurs benefit from this enlightened funding environment every year, although some areas, such as pc technology, have been out of favor lately. Nevertheless, the funding methods used are highly flexible, and there's still a lot of money looking for an investment.

Venture Capital Business Changing

While risk funding is far more scarce in Europe, there are signs that the European venture capital business is beginning to change. "In Germany, Scandinavia, and to some extent France, there are more creative and innovative uses of venture funding becoming apparent," notes Roger Hunt, a senior consultant with international consultant P.A. Technology in the U.K. "In Britain, the situation is still rigid. The guy with only a concept or a prototype still has very few people to go to."

SOME OF THE BEST IDEAS IN THE BUSINESS COME FROM SMALL FIRMS.

But in West Germany and Scandinavia a number of large organizations have decided that there may be some future benefit in helping to generate an innovative entrepreneurial spirit in their countries. Siemens, for example, has put up funds to help stimulate the startup cycle in West Germany. More important though, the traditional approach of hands-on financing is gradually being replaced by new funding methods that involve hands-off patronage.

In Japan, meanwhile, finding independent funding remains a serious problem for a startup company. Since there is no venture funding tradition as such, new ideas are either stifled or they are confined to the R&D labs of large organizations. What passes for venture funding in Japan is in fact financial support from these same large companies. There may not be a shortage of funds in Japan overall, but there is definitely a shortage of opportunity for entrepreneurs to go it alone.

A new trend emerging in Europe is a closing of the gap between academia and industry. In the past, the phenomenon of the European academic entrepreneur was rare, but over the last few years there has been a significant increase in the number of university teams that have set up their own companies. Sweden's Infovox and West Germany's LCBloc are two prime examples of this trend.

These are two of the 10 companies that DATAMATION has chosen to cover in more detail. They have been picked to illustrate the differences to be found in the world of the small companies.

Ultra Corp., for example, is little more than a year old but already has systems in beta test. Advanced Systems Architectures from the U.K. is three years old, and although it hasn't made a fortune yet, it has a customer profile that would make many a firm envious. Marcus Information Systems is five years old and still hasn't brought a product to market. Australia's Austec is 11 years old but has been going through a period of rebirth over the last few years and is now setting its sights very high for 1987.

Other companies, like Landmark Systems Corp., Intelligent Technologies Inc. of Tokyo, and to a lesser extent AION Corp. are already reaping rewards in the software business, and Jupiter Technology, with a new data communications processor just launched, is finding itself inundated with potentially lucrative inquiries.

Each of these firms is built around an innovative idea—either technical or marketing—and each stands a good chance of hitting the big time in the not too distant future.

In an industry where innovation is the food of progress, it is small companies like these that help feed the world's appetite for better, cheaper, and more useful technologies.

Contributing to the company profiles were Wim Amerongen in Amsterdam, Per Eriksson in Stockholm, James Etheridge in Paris, Manik Mahta in Bonn, Janette Martin in Milan, Norman Kemp in Sydney, Robert Poe in Tokyo, Sarah Underwood in London, Theresa Barry and John W. Verity in New York, Jeff Moad in San Francisco, Willie Schatz in Washington, D.C., Gary McWilliams and Ralph Emmett Carlyle in Boston, and Edith D. Myers in Los Angeles.

10 to Watch

THE CICS-START COMPANY

Landmark Systems Corp.

Springfield, Va.
Founded 1982
Product: CICS monitor

When Landmark Systems Corp. first began selling the Monitor for CICS in 1983, the company was pleased to end the year with $12,000. By the end of 1986, Landmark had increased its revenue to $7.5 million and it now boasts 1,800 installations, 45% of them outside the U.S.

For Landmark's founders, Pat McGettigan and Kathy Clark, that growth is a dream come true. Like many entrepreneurs, they took a risk and quit their full-time jobs to concentrate on developing their product, a performance management package for the CICS IBM mainframe teleprocessing system. McGettigan first wrote a version of the system back in the late '70s while working for Blue Cross & Blue Shield. It became so popular within the company that he decided to take it onto the open market four years later. He was aiming for a tough niche that had already attracted Candle Corp., and more recently Boole & Babbage.

At first it was an uphill climb—the good old startup story of working 16-hour days and seven-day weeks and having little money in the coffers. The system had to be rewritten to improve its commercial chances in the face of such reputable competition. This took almost a year. But by that time, the future was beginning to look brighter for the company, not so much in the U.S. market, as they had expected, but in Europe. In the first nine months of marketing, Landmark built up a base of around 20 European users and this gave it the momentum for a more concerted push in the U.S.

Now, the company has about 60 U.S. employees, offices in Springfield, Va., Gaithersburg, Md., Sacramento, Calif., and Los Angeles; sales agents in Europe, the Middle East, South America, and the Far East; and a foot firmly in one of the most strategic mainframe applications areas—teleprocessing.

The reasons Landmark's Monitor has performed so well have much to do with the product's specifications. It runs on OS/VS1, MVS, and DOS/VSE systems, is comprehensive in its coverage of CICS functions, and has a flexible user interface incorporating color graphics. With a reputed user satisfaction level of 98%, Landmark is obviously on the right path. Its latest version, 7.0, which has a Cross System Monitor feature that allows MVS sites to run the product outside of CICS, gives the company an even better chance of success.

But what has really helped Landmark the most is the way the market for on-line systems has developed over the last few years. As Kathy Clark puts it, "On-line systems are now a much more important part of a company's business than five years ago and that has created a new attitude toward performance measurement. We still think there's a long way to go."

REAL-TIME WAITS FOR NO MAN

Advanced System Architectures

Camberley, Surrey, U.K.
Founded 1984
Product: Real-time systems design

There was only one non-U.S. company invited to participate in the Department of Defense-sponsored SDI Systems Design Tools Conference in Virginia in January. That company was U.K.-based Advanced System Architecture Ltd. (ASA), which is a young startup specializing in real-time systems design tools.

Founded in 1984 by two men steeped in the traditions of the European computer and communications industry, ASA offers consultancy services and a graphics workstation design aid developed in-house called Auto-G.

It has come a long way in a short time. Though its 1986 revenues amounted to only $1.3 million, ASA has managed to get a foothold in some key accounts in Europe. On its customer list are AT&T/Philips Telecommunications in the Netherlands, GTE-Atea in Belgium, MBB-ERNO in West Germany, and a host of prestigious accounts in the U.K., including British Aerospace, the Royal Military College of Science, GEC Avionics, and the Royal Armament Research and Defence Establishment.

Not bad going for a new firm with just over $1 million of funding.

ASA has two things in its favor—its founders and the fast-developing market for complex real-time systems. One of those founders and now ASA's managing director, is Chris Williams, who has 20 years of sales experience working for ICL and Software Sciences in the U.K., Belgium, and the Netherlands. The other founder, and now ASA's technical director, is Göran Hemdal, the man responsible for the hardware and software design of the AXE central office telecommunications exchange sold by Sweden's L.M. Ericsson.

Together, they set up the company to develop one of Hemdal's latest innovations—a real-time systems design and operations technology called Sofchip. The Auto-G design tool is based on the G language, which is a vital part of the Sofchip technology. ASA claims that by using Sofchip it can create effective real-time systems, cut implementation costs by 50%, double performance efficiency, and cut maintenance costs by 80%.

Together with a team of 30 employees, the two founders have made some high-level inroads into the world of high-level real-time processing in Europe. Apart from their impressive customer list, ASA is also taking part in both the Esprit and Race research programs sponsored by the European Commission in Brussels.

Its next stop is the U.S., where it has already become an approved Department of Defense contractor and is now discussing deals with some major U.S. systems builders.

THE BONSAI BOOMER

Intelligent Technologies Inc.

Tokyo
Founded 1985
Product: Far Eastern AI software

When Yasumusa Suzuki was 26 years old and studying for his PhD at Princeton, he had a commercial brainstorm. Now, at 29, Suzuki is a founding member of one of Japan's hottest little companies, Intelligent Technologies Inc. (ITI).

ITI adapts and extends AI software developed by Carnegie Group Inc. (CGI) of Pittsburgh, and sells it in the Japanese market. It began operations in January

1985 and has been so successful that its predictions for this financial year are revenues of over $10 million.

Suzuki couldn't have done it all alone. When he returned to Japan in 1984 he had already talked to CGI's new president Larry Geisel and the rest of the board about setting up his Japanese company, but he needed someone who could help him locally. He went to Heisuke Hironaka, former head of mathematics at Harvard and the director of the Research Institute for Mathematical Sciences in Kyoto. Heisuke helped him find a management team and funding of $645,000, and within a few months ITI was in business with six employees.

Now there are 43 people working for ITI of whom 29 are software engineers. ITI has also appointed as a senior advisor Raj Reddy, the director of robotics at Carnegie-Mellon University in Pittsburgh and former chief scientist at the World Computing Center in Paris.

ITI currently has two main products, an expert systems builder called Knowledge Craft and a natural language processing system known as Language Craft, both originally developed by CGI. ITI has sold its Japanese versions of the products to NEC, Hitachi, and Toshiba so far, and is distributing them through selected agents across Asia. It also offers educational and consulting services geared to AI technologies. ITI's own products based on the CGI work are also under development and are expected to be launched later this year.

The link with CGI has also developed since those early discussions. The two companies are cooperating in distribution of each other's products, joint development, equity exchange, mutual directors, and exchanges of management.

There are many practical results of this agreement. For example, half of ITI's software engineers now work in the U.S. with CGI; Suzuki has become one of CGI's directors, while CGI executive director Michael Chambers has become a director of ITI; on the equity side, CGI now owns 1,200 of ITI's 5,700 shares, while ITI owns 10,000 of CGI's 10 million shares (both companies' shares are privately held). ITI shares are also held by C. Itoh subsidiary Marubeni, by Nissho Iwai, and by two of the only Japanese venture capital companies, Nikko Venture Capital and Orient Capital.

Suzuki seems to have created a high-tech gold mine. Japan, which first spawned the idea of a fifth generation research project back in the early '80s, is well tuned to the ideas behind AI technologies. And while the researchers race to produce world-beating innovations for the future, ITI is flooding the market with practical products that can tackle some of today's problems.

FINGER ON THE BUTTON

LCBloc

Saarbrücken, West Germany
Founded 1983
Product: Universal keyboard

Back in 1982 at the University of Kaiserslautern in southwest West Germany, a group of researchers got fed up with typing scientific papers on word processors that could not handle symbols and formulas. The solution they developed was a liquid crystal display (LCD) keytop that could be programmed to suit the writer's needs.

That initial idea has grown into the LCBoard product line, which is expected to generate sales worth $24 million (DM45 million) this year. Behind the product is a 60-employee company with a listing on the U.S. OTC market and a handful of oem contracts that it hopes will take it into the big league of peripherals suppliers.

The company was originally set up as COS Technologie GmbH in the summer of 1983—the name change to LCBloc came with the listing late last year—when the university team moved to Saarbrücken with its LCD keytop technology. Its plan was to build a system-independent keyboard that could display and input any character set defined by the user of a multilingual or scientific application.

The LCBoards now available use LCD keys not only for the character set but also for function keys. Each is initially blank and is labeled by an on-key processor. The keyboards work with IBM and compatible pcs, allowing users to either create their own character sets or download one supplied in software by LCBloc.

To date, the company has tackled scientific symbols as well as a range of European languages, Russian, Arabic, and Kata Kana. Chinese, says sales manager Irmela Voigt, is taking longer because of the low resolution of the keys and the complexity of pictorial languages.

The LCBoards cost from about $300, depending on the number of LCD keys, and are made at LCBloc's base in West Germany. The company is hoping to sell at least 100,000 this year, although it has now been around long enough that its markets are beginning to shift.

Voigt reports that the majority of sales to date have been made through pc dealers to end users, but she now expects the company's oems to become the largest market. Ericsson and Siemens have already bought small quantities of LCBoards to sell with multilingual applications.

But sales are expected to explode when the five-member staff at the company's recently opened subsidiary in San Jose starts its attack on the U.S. market. Like further product development, LCBloc's move into the U.S. is being funded by the company's arrival on the New York OTC market in search of $6.5 million (DM12 million). West Germany does not have a similar market where young companies can raise capital.

LCBloc does not intend to stop there. Voigt concludes, "We want our latest general purpose keyboard to be attached to every pc as a standard product."

ALL-IN-ONE COM

Jupiter Technology

Waltham, Mass.
Founded 1981
Product: Datacom computer

It took almost two years for Kenneth Ingham and Richard Howell, the founders of Jupiter Technology, to get the seed money they needed to develop a multifunction data communications processor, the System 1000. They finally managed it in late 1983.

It took only a couple of days for the market to get enthusiastic about the system when it was launched a few of months ago. "We've been going bananas with all the inquiries," remarks Bruce Allen, who was brought in as vp for engineering after a stint as Gould Inc.'s director of distributed data systems development.

What Jupiter has developed is a Motorola 68000-based machine with a power range of up to 14MIPS that can act as a front-end processor, protocol converter, line concentrator, LAN server, gateway, network management and control device, and a data PBX . . . "among other things," adds Allen.

The thinking behind this was that most of the traditional communications black boxes on the market were only partial solutions for network managers. They took too much time and money to install, adapt, and operate. So, the Jupiter

founders came up with an answer they believe will offer a lot more for a lot less.

The multipurpose machine is controlled by software to adapt to a changing network environment and that software can be tailored to the specific needs of the user. What makes the system go round is Jupiter's proprietary communications operating system Softlink. This allows the user to break major teleprocessing systems into discrete functions that are implemented in the machine as software modules called Softblocks.

"The people who are most excited about the product are those who have had big problems setting up communications networks based on traditional minis," reveals Allen.

These are just the people that chairman Ingham, founder of packet switching company Amnet, and Jupiter's president Jim Flach, who used to be the vp for Xerox network systems strategic business unit, are looking for. They expect Jupiter's business to rocket over the next few years, particularly in the financial sector.

OUT OF THE BLUE

Aion Corp.

Palo Alto
Founded 1984
Product: Mainframe AI

Sitting in the IBM Palo Alto Scientific Center in early 1984 were four AI researchers, Harry Reinstein, Jan Aikins, Garry Hallee, and Scott Grinnis. They had just finished developing an expert systems tool written in Pascal and designed to run on IBM's mainframe range. It worked beautifully, and was code-named Prism.

Then a little frustration set in. "We felt we had done some good work for IBM," explains Jan Aikins. "At that time there was virtually nothing out there like [Prism]. So we decided, 'Why not be brave?' and we left IBM, met up with Larry Cohn who had worked for IBM and then for Trilogy, and started AION Corp."

The result is a three-year-old company of around 25 people that has established itself as a strong contender in the mainframe AI business.

While IBM eventually created its Expert Systems Environment (ESE) out of the Prism project, AION took the system a stage further. "At first, we were aiming for the IBM PC market, but that soon became very overcrowded with expert systems tools," recalls Aikins, who is now the company's director of advanced development. So, AION's main product, called the Application Development System (ADS), is designed specifically with mainframes in mind—under VM and MVS. Yet, unlike some of its competitors, the product allows users to write a knowledge base and deliver the final system on either a PC or a mainframe.

"We tried to make it so that it would have all the regular development features of mainframe programming," says Aikins, "combined with the techniques of expert systems that give you the increases in productivity."

This is the practical approach to mainframe AI technology that has won AION some major oem customers, including Boole & Babbage and Management Science America. These two software giants are using ADS, sometimes embedded in their own products, to enhance their mainframe software offerings. For example, one Boole & Babbage's system, called DASD Advisor, monitors DASD performance; an ADS-developed system is used to interpret the results.

With such other customers as Arthur Andersen on its books, AION is well placed to become a major mainframe AI supplier on both end-user and oem bases. It looks as if the four founders are about to see major dividends from their hard work.

"It's been great," says Aikins. "It's a lot of fun. We do everything from making the coffee to supporting a major sale. It has been quite a learning process for all of us."

GOING FOR A GIGABIT

Ultra Corp.

San Jose
Founded 1986
Product: Supercomputer network

Its goal is to develop a network for supercomputers that breaks the 1Gbps barrier, and though the company is still developing its technique, it already believes its chances are excellent.

This is no group of youthful technicians with overindulgent imaginations. The chairman of the board is Ken Oshman, founder of Rolm Corp., who is sitting on a pretty penny after the IBM takeover of his old company. The president, Stan Tenholt, and the vp of engineering, Rex Cardinale, are also former Rolm executives. Added to that are former NASA supercomputer specialists Newt Perdue, Drew Berding, and Wes Meador, and $3.1 million of venture funding.

Ultra has been in operation only since January of 1986 but it has already installed its first test system at Apple. A Cray X-MP/48, linked via the startup's new Ultrabus to a raster screen display, is achieving transfer rates of 80MBps. Further test sites are planned soon.

"What we aim to do," explains Perdue, the company's vp of business development, "is to start at the high end and grow down. We think that the high-end market is going to be very big in the future. It is increasing at around 40% a year now and if you look at the factors affecting this growth—like graphics applications in the scientific and engineering sectors, for example—you can see why we are confident."

The high-speed Ultra network will link supercomputers and minisupers to the new generation of high-performance technical workstations now under development by companies such as Apollo, Sun, and Dana. The network will use a proprietary backplane and bus and will link the processors to the workstations in a star topology. The network will first be supported on the Cray supercomputer range, with products scheduled for launch in early 1988; then Ultra will provide systems for Unix-based high-performance processors such as the machines being developed by Convex.

WORD OF MOUTH

Infovox AB

Stockholm, Sweden
Founded 1984
Product: Text-to-speech system

When customers of Sweden's Första Sparbanken want to get information about their accounts, all they need nowadays is a push-button telephone. They dial the bank's computer and are answered by a synthesized voice system that asks for their ID numbers and what options they require. By using the phone buttons, they can get synthesized voice answers to most questions about their financial status.

That voice system was developed by a small Swedish company called Infovox. It was set up in 1984 by researchers from the Swedish Royal Institute of Technology in Stockholm.

Two of the founders, Björn Granström and Gunnar Fant, wrote their first

scientific papers on voice synthesis techniques in 1972, but it wasn't until 1984 that they felt there were enough commercial opportunities for them to turn their theories into a commercial product.

The product is called Text to Speech (TTS) and is based on a pc extension board with software that turns ASCII text files into meaningful sounds. The system can be adapted for many languages. The TTS system has been extended for use with large databases and telephones and is sold as the SC 2000.

Infovox believes that since speech is the most natural form of communication, it will become a highly popular method of interaction between people and machines. Initially, the applications are likely to be confined to systems that give time, travel, or entertainment information, or other applications where there are large volumes of inquiries for specific information.

Voice mail systems, such as VoiceCom in the U.S., are also a prime application area, and in the hope of developing this type of system, Sweden has recently handed over its 40% stake in the company to the country's telecom organization Swedish Telecom.

The other major shareholder is a venture capital company called Ventronic, which is owned by the same man who owns the Micronic portable pc company in Sweden. Fortuitously, that is the marketplace with which Infovox would like to grapple. The pc that shouts back may not be as far away as you'd like.

A SVELTE RDBMS

Marcus Information Systems

Santa Monica, Calif.
Founded 1982
Product: Entity relational database

When databases get relational, they also get very big, and responses get very slow.

But that does not have to be the case, say two distinguished industry innovators who have spent the last four years and over $5 million developing a technology that they believe represents a radically different approach to the storage, retrieval, and manipulation of information.

Set up in 1982, Marcus Information Systems got its first lump of venture capital in 1983 and began what has become a momentous task. "If you'd have said then that we would still be here in four years' time without any revenues coming in, I would never have believed you," admits ceo Ray W. Sanders.

If the name rings a bell, that's because Sanders was the founder of Tran Communications, now part of Amdahl Corp. He is working with another well-known industry figure, Edward L. Glaser, who helped with the design of the IBM 701, has been referred to as the father of Multics, and holds key patents on the Burroughs 5000. He has been blind since he was seven years old and his new company is called Marcus after his current guide dog.

The technology that has taken so long to develop is a hardware and software package containing an entity relational database in which every data value is stored only once, even though it may be used in different places and tables across the database. The result is a data compression technique that saves on storage, makes the database content addressable, and vastly improves response times. Sanders says that the Marcus technology can run between 10 and 100 times faster than current systems.

An end is now in sight for the 10 or so diligent Marcus employees: Sanders reveals that the first product will be launched at the end of this year. It will be a board for personal computers, particularly those using the new 386 chips, and it will be aimed at users who need a high-performance database but don't want to trade in their pcs for minicomputers.

The next step will be a chip set implementation and later a high-performance relational database machine.

Marcus is not planning to sell the technology on its own, however. It is searching for strategic partners—both user organizations, with which it can sign a technology transfer agreement as it has already with Lockheed, and other suppliers. "We like to think that everybody in the world will eventually be our customers," says Sanders.

THE ACE FROM UNDER

Austec International

Melbourne, Australia
Founded 1976
Product: Networked COBOL

Although the original company was founded in 1976, the present-day Austec is really only four years old. It was in 1983 that it sold off all its commercial application software business to Control Data Corp. and began a new life concentrating on developing its COBOL program generator and compiler. It already had a strong history of COBOL generator development behind it, having supplied Data General with its Proxi generator product.

Among its customers and marketing partners now are IBM, Unisys, AT&T, NCR, and Olivetti, which bought a majority stake in the company back in 1981.

The company has 70 employees around the world and this year is planning to get more heavily involved in selling to end users instead of relying on royalties from its marketing agreements. It will certainly have to do something different if it intends meeting its 1987 target. Last year its revenues were $9 million. This year it hopes to pull in $30 million.

Austec's main offering is the product range called Ace. AceNet is a networked set of transportable COBOL compilers that allows applications to operate across different hardware and software systems. AceNet is compatible with the OSI networking standard and includes AceBridge, a key software compiler component that supports several ANSI 74 and 85 COBOL implementations. This has been adapted to run on IBM's MVS, Digital Equipment Corp.'s VMS, MS/DOS, Honeywell's GCOS, and most of the popular versions of Unix.

Austec has a number of large users to its credit, including Lockheed, which uses the network, tied to its Honeywell IDS database at the Kennedy Space Center, to allow applications running on Apollo and VAX workstations to access the database.

With that set of products under its arm, the company also began to expand once it had shaken off its old applications house image. In 1983, it set up Austec Inc. in San Jose, and in 1985 it added a European subsidiary, Austec Ltd. in London, to its international network. Now, even the headquarters are moving out of Australia. Though the main development labs will still be in Melbourne, the firm is restructuring and incorporating itself as a U.S. company. The theory is that it has to go where the business is and Austec has made a name for itself in the U.S. as a reliable and innovative supplier of COBOL systems. In the U.S., its new approach to combined oem and end-user sales is likely to be more successful.

The opportunities excite the staff. "It's a big world out there in COBOL land," enthuses Austec's European head Brian Wadsworth, "and we can increase our business enormously in some areas."

The TeleVideo 955. Seeing is believing.

WYSE WY-50
(Unretouched photo)

TELEVIDEO 955
(Unretouched photo)

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

PERSON	ID NUMBER	TERRITORY	CUSTOMER	CUST.NUMBER	PART	NUMBER	ITEM	SHIPDATE	WAREHOUSE	SHIPDEST	CARRIER	CUST.
	1010000000	NEW YORK	APEXINC	333333888899	KL234	87654	200	10/02/85	NWPHILIDE	NEW YORK	ACMETRS	2
JW	1022777754	BOSTON	ZINCINC	333888990044	KL234	50987	007	12/01/85	CENTRALLA	BOSTON	AJAXAIR	1
	1000000456	CHICAGO	AASEHER	987503723?8	KL230	90867	999	ONHOLD	WOODLAWN	CHICAGO	DUMAIR	1
	1059857363	ATLANTA	TVSINC	774933887549	KL239	99999	808	11/19/85	ATLANTANW	AUGUSTA	EWFRT	5
	1075384948	MINNIAP	XYZCORP					/07/85	MINNSTPAUL	MINNIAP	TRUCKER	
	1089558488	SANFRAN	JAKINC					/28/86	SANJOSESE	SANMATEO	SHORTAIR	5
	1086574637	SANJOSE	ACDCORP					/08/85	SACRAMENTO	SANJOSE	EZHAULER	
JT	1075563848	LOSANGEL	LYNINC					/18/87	IRVINECA	WESTLAWN	LATRUCK	5

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

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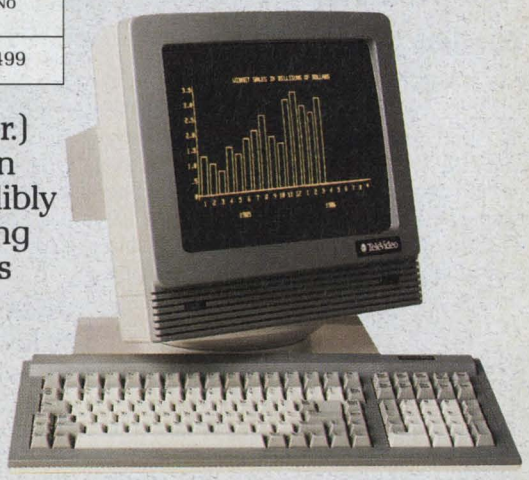

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CIRCLE 31 ON READER CARD

Lucky 13

Technology Concepts Inc.
Sudbury, Mass.

With Stuart Wecker, the key designer of DECnet, as a cofounder, this company developed a C language version of the DECnet networking protocols that has been bought by Valid Logic, Unisys, and Sun Microsystems. Late last year, Technology Concepts was acquired by Bell Atlantic, and now, with a firmer financial foundation, it is poised for major expansion of its business.

Uniras A/S
Söborg, Denmark

This eight-year-old Danish company has become a leader in the European graphics business, following some major marketing agreements with IBM and Cray Research. IBM sells 13 of Uniras's graphics packages for the RT PC on a worldwide basis. Cray Research is now migrating all of Uniras's products to run on its machines. Uniras expects its revenues to increase by 30% this year to $12 million.

Teradata Corp.
Los Angeles

Regarded as the first high-end database machine vendor, Teradata has quickly become a leader in the field that is expected to continue its fast growth. The company has projected its revenues for this financial year at $45 million, up from $18 million last year, and recently made its first non-U.S. sale, in the U.K.

Video Display Systems S.P.A.
Florence, Italy

Founded in 1980, this company has built up an impressive market base in Italy for its graphics terminals, graphics workstations, and image processors. Among its major users is the Fiat industrial automation spin-off Comau. VDS is embarking on a major European expansion plan and hopes to increase its 1986 revenues of $3 million by 40% during 1987.

The Instruction Set
London

This company, which began in 1984 with three employees, provides training and consultancy in systems software. Now with 60 employees, it provides over 60% of all Unix and C training in Europe. Among its clients are Intel, Motorola, Sun Microsystems, Hewlett-Packard, and the X/Open vendor group. The Instruction Set won the Recognition for Information Technology Award for newcomer of the year in February.

Software Clearing House Inc.
Cincinnati

Established in 1979, this company is based on a clever marketing idea. Unlike many software houses built around one product or expertise in one area, the Software Clearing House uses 24 independent software developers to provide the firm with 50 main packages and over 100 enhancements to software products. It then sells these to the end-user market. The company calls this corporate philosophy "distributed development." The software is aimed at the Unisys, NCR, and pc markets. Software Clearing House is also doing well abroad: almost 25% of last year's $10 million revenues came from outside the U.S.

Tandon Computer GmbH
Frankfurt, West Germany

A spin-off subsidiary of Tandon Corp., Chatsworth, Calif., Tandon Computer was founded in late 1985 and achieved revenues of $37 million in 1986, its first full year. Whereas its parent company has been traditionally an exclusively oem operation, Tandon Computer sells complete IBM-compatible pcs to end users. Originally set up in Europe, where it has already sold 40,000 machines, the company has been selling complete systems in the U.S. since late 1986.

ANSA Software
Belmont, Calif.

Developer of the Paradox database management system that has had significant success in the U.S. and Europe, this company achieved revenues of $8.1 million in 1986, its first year of operation. Ben Rosen is chairman of the board and Ronald Posner, formerly a vice president at Ashton-Tate, is president. It won the U.K.'s Recognition for Information Technology Award for software product of the year in 1986.

Ingenico
Paris

This firm offers POS terminals and card readers, designed in-house, mostly on an oem basis and has marketing agreements with some of the biggest names around, including Groupe Bull, NCR, and Unisys. Last year was the company's best yet, with revenues up to around $19 million from $6 million in 1985.

Expertech
Slough, England

Set up in 1984 by U.K. AI luminary Alex d'Agapayeff, Expertech launched its first product, the Xi expert system shell for micros, in 1985. Now it claims to have a 50% share of the pc-based expert systems market in Europe and boasts 3,000 users of its software worldwide. It is hoping to break into the U.S. market in a big way this year and has opened a new distribution office in Redwood, Calif.

Meiko
Bristol, England

Six employees of the U.K.'s semiconductor champ Inmos left in 1985 to set up Meiko. It sells systems based on multiples of the 10MIPS Inmos Transputer chip. The product, Computing Surface, ranges from 1MFLOPS up, depending on the number of chips used. It expects '87 revenues of $10 million and says it has secret oem deals in the pipeline.

Multiflow Computer Inc.
Branford, Conn.

Founded in 1984, this firm aims to develop a unique form of parallel processor, based on an instruction word of 1,000 bits or more. It will sell into the general purpose technical computer market. Multiflow Computer boasts $17.6 million of venture capital, the technical ambitions of former Yale professor Joseph A. Fisher, and the business acumen of former NCR exec Donald Eckdahl.

Stella Systems
Tokyo

Stella reportedly turned the Japanese pc market on to the use of graphics. Set up in 1982 with seven employees, it now has 43 people in Japan and 10 in Cupertino, Calif. Stella is protecting its lead in the growing graphics market by developing micro-based packages that interact with mainframe databases. In '86 it had revenues of $3.2 million. ■

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CIRCLE 32 ON READER CARD

Users of IBM's largest disk drives have discovered something the hard way—supply and demand can affect their dp operations as much as MIPS and megahertz. IBM, which has also felt the same supply-and-demand tug, chose to offer a trade-in program to migrate users to newer 3380s. In order to unplug their old disks, users face losses on machines that are subleased and writedowns of equipment that is sold. This very real storage dilemma is likely to get worse during the next year or two.

The Crash of 3380

BY HESH WIENER

Mainframe users around the world have installed more than 225,000 IBM 3380 series disk drives, machines that have a list price value of roughly $24 billion. These users, who will add thousands of new 3380s to their storage stockpiles this year, will continue to plug in these drives for the remainder of the decade. Yet despite favorable customer response, the peripherals now pose a serious problem for many frustrated users, who have found out the hard way that supply and demand can affect their operations as much as MIPS and megahertz.

The original 3380 models, which account for the majority of installed machines, have lost most of their economic value, leaving their owners with unprecedented budget shortfalls. At the same time, orders for newer 3380 machines have been disappointing for IBM. One industry expert predicts that before the year is out, IBM will once again change the rules of the game to revive flagging disk business. When that happens, users' disk problems will get even worse.

Industry guru Jim Porter, president of research and consulting house Disk/Trend Inc. in Los Altos, Calif., thinks IBM's next move will be to ship 3380-type disks with capacities of 7.5GB per unit. These disks will provide a 50% capacity improvement over the company's 5GB E models. Porter's auguries carry a great deal of weight with drive makers.

The new disks, which will be the third and final version of the 1980 product line, will be welcomed by users who want more storage at lower cost in less space. In fact, those supersized 3380s might have hit the market sooner if IBM had succeeded with its sales strategy for the 3380-E and 3380-D. But last year, asserts Porter, IBM missed its marketing targets by a mile, leaving piles of unsold 3380-Es on its loading docks: "The company closed 1986 with a tremendous number of unsold 3380s in inventory—something like 10,000 boxes."

IBM could not move forward until it had rid itself of this hoard of disks. In order to clear the decks for a new product announcement, Big Blue decided to offer a drive trade-in program, an unprecedented sales tactic that was announced on Jan. 26. Until May 29, users who return old 3380s get $16,000 off the price of each new box they buy.

This represents significant savings for IBM's biggest users, who can apply the trade-in to the net price they get after volume purchase price reductions. Many big shops get discounts that range between 10% and 15% off the AE4's list price of $122,480 and the BE4's list price of $98,140. So the additional $16,000 works out to quite a break—a sum that approximates the 10% investment tax credit under the old tax law.

Photograph from Bettmann Archives; Prop photograph by Steve Cooper

BUY
SURPLUS
3380s
IBM 3380
BUY
APPLES
5c EACH
TANGERINES

The trade-in program is IBM's way of getting its disk business back on track in a hurry. The company's year-end effort to sell new 3380s was derailed by the used equipment market. As 1987 began, the value of used 3380s was still plummeting. Not only were more users likely to defer upgrades to E drives, but some might well migrate backwards. By choosing cheap, old drives, users could reduce the very budgets they might have exceeded if they went for new disks.

There are two ways users pay for unplugging old disks—losses on machines that are subleased and write-downs of equipment that is sold. For the past year or so, lessees who pulled out disks before their lease terms were up have had to subsidize subleases. The amount they typically have had to cough up is $400 to $500 a month for each machine they banish. Users replacing old, leased 3380s with newer models will bleed at this rate from the moment they yank out the old disks until their leases run out. Thus, the costs could easily persist for a year or more. The amount these users must pay is the difference between the monthly lease rates on the machines as specified in their original contracts and the current sublease rates prevailing in the marketplace. Of course, users who trade up when leases end don't have to pay a penny.

Other Users Clobbered Too

The losses are not confined to users who lease disks. Users who sell 3380-AA4s and 3380-B4s purchased in 1985 or 1986 get clobbered too. Instead of losing money for several months, they must suffer an accounting adjustment. Disks on a user's books will be carried at a large percentage of their acquisition cost; they are usually written off over five years. Today's used equipment market will pay only a small fraction of this book value. The difference must be accounted for when the sale is made. In some cases, a user who owns disks can arrange for the machines to be leased to another user.

Despite these costs, many users are continuing to unload their old 3380s. There is a method to this apparent madness. Crowded computer centers and rising data storage requirements are forcing dp shops to put more disk capacity in less space, even if that process is expensive. This migration has been going on for a year and a half as users pull out older 3380s and install the AE4 and BE4 models that store twice as much.

Some 3380s are easy to remove. A user who bought 3380s and amortized

A Brighter Tomorrow for the Disk Business

The worst is over, according to Jim Porter, the disk industry's most influential observer. During the next two years, he says, the market for these peripherals will grow twice as fast as it did in 1986. When Porter talks, the disk industry listens. He is president of Disk/Trend Inc., the Los Altos, Calif., research and consulting house that tracks the ins and outs and ups and downs of the disk market.

In the latest Disk/Trend report on rigid drives, Porter estimates that sales in this segment rose a scant 9.7% to $15.05 billion in 1986. Porter, who believes this sluggishness is only temporary, predicts that growth will rebound and reach a 19.7% annual level by 1989.

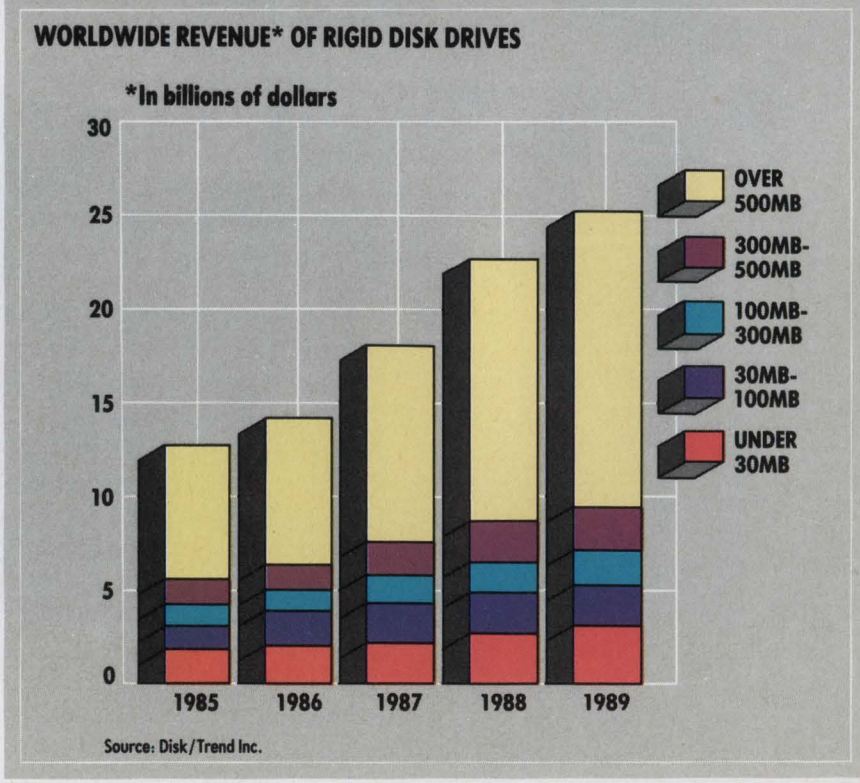
The large-capacity disks that store over 500MB per spindle are the biggest revenue producers in the market. These devices, which were responsible for 51% of the disk industry's overall take in 1986, are expected to account for $10.45 billion this year. Last year, worldwide sales inched up 9.4% to $7.88 billion.

The IBM influence, along with the oem push, are the main factors affecting growth in the large-capacity sector, according to Porter. The computer giant controls approximately 72% of this market, a percentage that Porter predicts will plummet to 59.3% by 1989.

To beef up demand for the big disk drives, Big Blue may offer another midlife enhancement to improve the cost-effectiveness of its 3380. What's more likely, says Porter, is that next year IBM will introduce a new high-performance drive with disks that are smaller than 14 inches. This drive would help pacify IBM's mainframe customers who need much better performance for their on-line applications than the 3380 can deliver.

The independent disk makers that produce large-capacity drives for non-IBM mainframes have also made waves in the market. "Oem drive [shipments] will grow rapidly," forecasts Porter, who expects 8-inch and 9-inch drives to represent 68% of worldwide unit shipments by 1989. Active in this arena are 8-inch producers Control Data, Hitachi, and NEC, and 9-inch manufacturers Century, Northern Telecom, Pertec, and Toshiba. These oem ranks will soon swell when the high-performance folks enter the fray.

Disks with a capacity under 30MB pulled in an estimated $2.07 billion in 1986



sales, which represented 14% of the world's disk trade. Revenues in the rigid disk realm jumped 11.3% and this year Porter prophesies that they will reach an all-time high of $2.27 billion. The move away from the 5¼-inch format to the smaller 3½-inch size is the most significant trend in the 30MB world, according to Disk/Trend's disk jockey, who sees this shrinkage continuing. Leading the shrinkage movement is IBM, which will force its PC imitators to toe the same measurement line. Porter thinks that roughly 91% of 30MB drives will be in the 3½-inch format by 1989.

Ranking third on the fixed drive revenue list are disks in the 30MB to 100MB range. Sales of these drives skyrocketed 48.8% to around $1.9 billion last year. IBM, a big contributor in this sector that represents 12% of the market, is producing most of the disks.

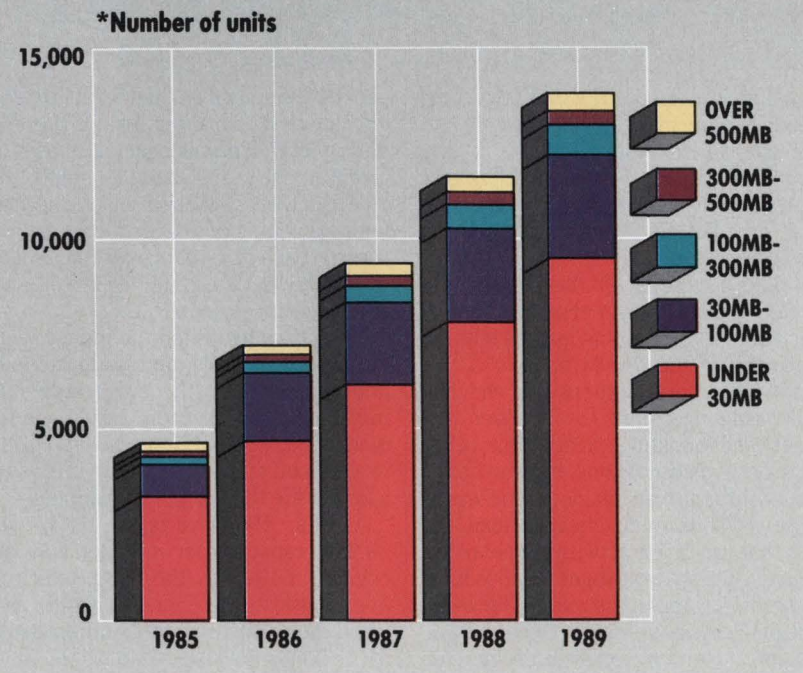
Slumping sales of $1.29 billion in 1986 earned drives in the 300MB to 500MB category fourth place in the revenue race. These drives garnered an 8.5% share of the market last year. Porter believes the downward trend of these drives, which is mainly due to the increasing popularity of smaller disks, will be reversed this year when, he predicts, worldwide revenues will reach $1.8 billion.

"Until 1984, the 300MB to 500MB range was almost exclusively the domain of 14-inch and 10½-inch drives, but the product mix," Porter points out, "is now changing rapidly." These drives accounted for less than half of the total unit shipments in 1986. One year earlier, worldwide shipments peaked with the delivery of 94,100 spindles, 78.3% of the total for all drives in this category.

Porter also foresees these 300MB to 500MB drives making more use of multiple-spindle subsystems with mainframe computers. This multiple-spindle subsystem approach, he contends, will be superior to the high-capacity 14-inch drives in terms of cost, floor space utilization, and performance. "It may also be," he maintains, "the pathfinder for similar subsystems using 8-inch or 5¼-inch drives" that could be offered by plug-compatible drive suppliers.

Disks in the 100MB to 300MB range represented the smallest (7.8%) share of the fixed disk market. Porter forecasts sales, which rose 7.3% to $1.18 billion in 1986, of about $1.4 billion this year.

SHIPMENTS* OF RIGID DISK DRIVES



Source: Disk/Trend Inc.

them to market value or below won't have a write-off. Neither will customers whose lease terms end as new machines are scheduled to come in. All these users have to do is notify their lessors that there will be no renewal. They can then discuss terms for purchasing the new disks.

The users in a bind are the ones that are in the middle of their lease terms or amortization schedules. The rental units still have to be removed when new disks arrive. These unfortunate users can't just cancel their leases, nor can they easily delay the installation of new machines. They have to stick to plans made well before the present crisis was apparent.

Users who switched over in 1986 were often trying to get investment tax credits. Some wanted to squeeze the migration costs out of their old budgets before a new fiscal year started. Users who've made the move this year may have faced pressure from their companies to get more data on line, or they may have had to meet the terms of IBM's volume purchase deals—deals that militated against procrastination.

The best these users could do was to sublease their unwanted machines to others who needed the old 3380s. At that point the dimensions of the problem became visible. The gap between old lease rates and new ones had become a chasm.

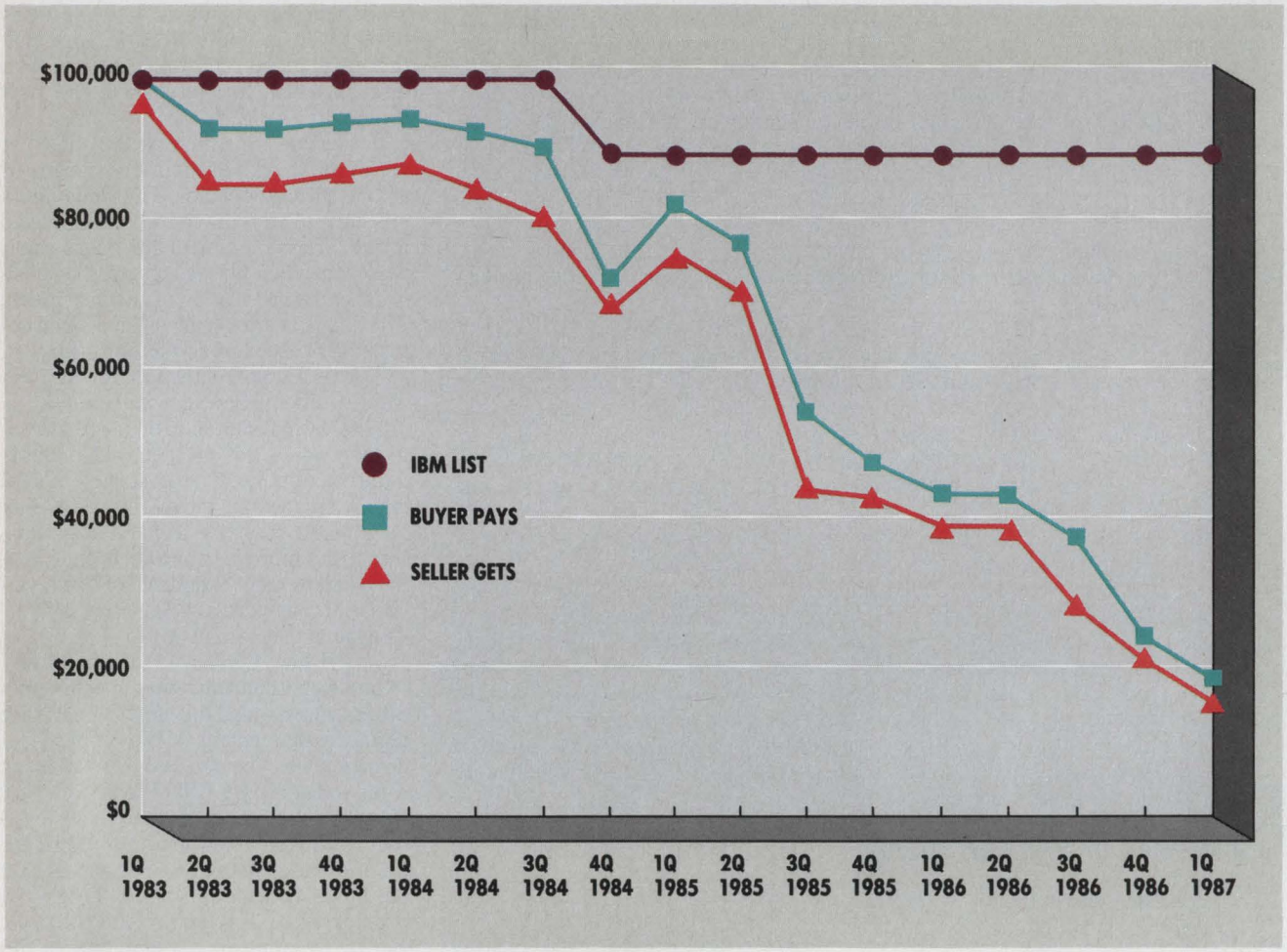
The typical three-year 3380 lease that was inked a few years ago called for monthly rates between $800 and $1,200 per box. Leases in this price range were considered to be reasonable at the time. But two years can be a long time in the life of a disk drive. For the old 3380s, it was an era. The usual three-year lease written today specifies monthly rents of only $350 to $450 a box, so even if users can find a sublessee with the help of their leasing company, they will still suffer.

Under a lease agreement, the original lessee is obligated to make up the difference, which can come to $400 or $500 a month per machine. If the difference is more, say $700 a month, even a user with very deep pockets is likely to wonder whether migration is worth the price.

Not Necessarily a Big Mistake

This doesn't necessarily mean that users who must pay to rid their shops of old 3380s made a big mistake. In mid-1985, when many users signed three-year pacts for 3380-AA4 and 3380-B4 disks, IBM's newer AD4 and BD4 models, which had the same capacity with some additional features, leased for roughly twice as much as older units. For users

FIGURE 1 **List and Market Prices of IBM's 3380-AA4**



who didn't need the newer disks, the old ones were real bargains. These users are now giving back a portion of the money they have saved.

A parallel set of developments has occurred among users who purchased 3380s and now want to sell them. When first announced, the AA4 listed for $116,050 and the B4 was priced at $84,240. In mid-January, the used equipment market had fallen to the point where independent dealers were offering users as little as $12,500 to $13,000 a unit for old 3380s. Then, on Jan. 26, when IBM announced its trade-in program, the used equipment market bid up the price of the machines a little. Dealers' offers to users hovered around $15,000 a box. At the time, dealers were unwilling to match IBM's price because they felt they would lose money if they paid any more for disks that were so hard to resell.

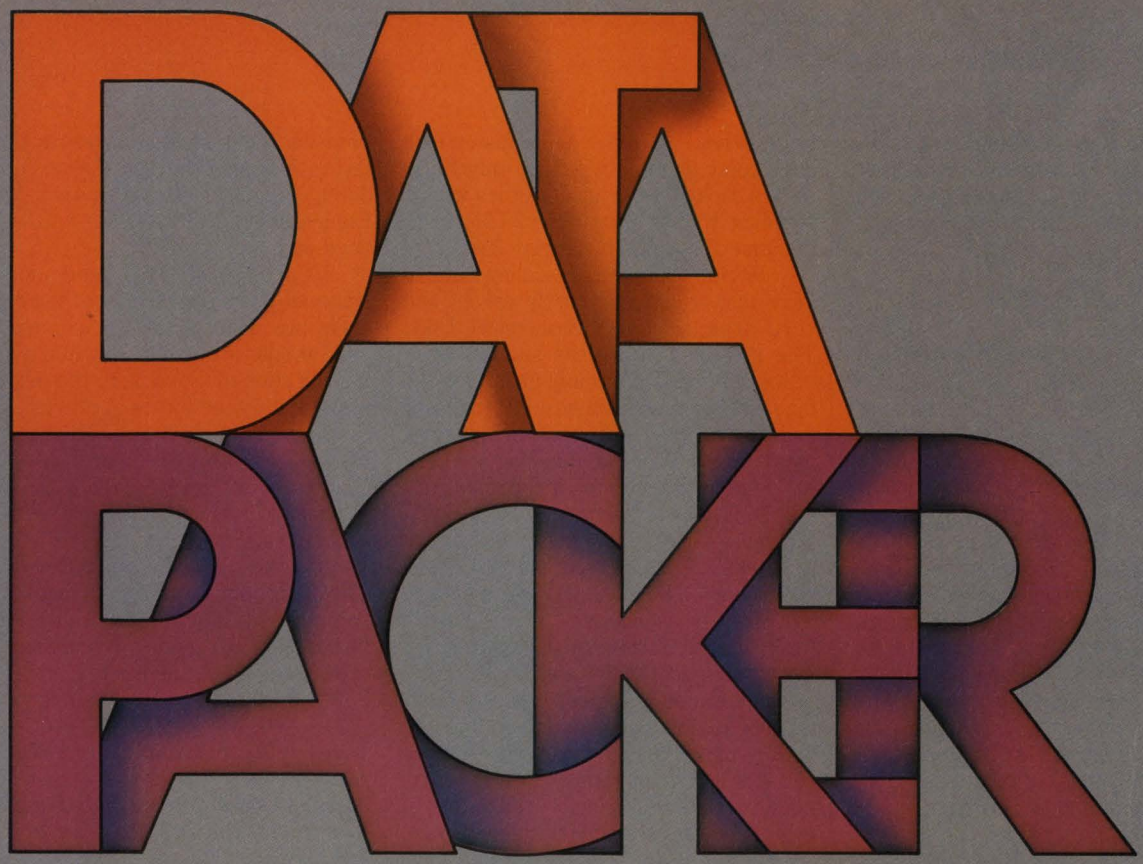
IBM's previous flagship disk, the 3350, had a much longer and healthier economic life. So did the 3330 that preceded it. The market in 3380-AA4 and 3380-B4 drives began to dive in late 1985. By early last year, it was clear that sellers would be setting the grueling pace for what remained of the original 3380s' life cycle.

The last hope for the market was the new tax law, which eliminated lease-based tax shelters. Some lessors felt that this would make leases on new 3380s somewhat more expensive, thereby stimulating user interest in older machines and boosting prices. But other investors—income funds, mostly—have jumped into the fray, making some leases on new 3380s even cheaper than the ones that can be inked with the aid of tax shelters. Cheap deals on new 3380s have further undermined the market for older 3380 disks. As new, larger 3380s become available, user interest will be increasingly diverted from 2.5GB disks.

Disk/Trend's Porter doesn't expect IBM to sell more than 3,700 of its single-capacity, 2.5GB units in the U.S. during 1987. The sales picture was much brighter last year, when IBM sold 11,600 2.5GB drives. Stateside sales of 3380s with capacities of 5GB or more are forecast to reach 31,000 this year. In '86, IBM moved fewer than 22,000 of the 5GB boxes in the American market.

IBM has always led the industry with high-capacity disks, and its incremental improvements in the 3380 series are merely part of the company's commitment to stay ahead. But the 3380 got off to a difficult start, and the line is enjoying a longer life than originally planned.

IBM's 1965 vintage 2314, with 29.2MB capacity per spindle, was succeeded in 1970 by the 3330, which delivered 100MB per spindle. Three years later, the company doubled the capacity of the 3330 when it introduced the model 11. Then in 1975, Big Blue offered its biggest shops the 3350, which was pack-



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CIRCLE 33 ON READER CARD

The Crash of 3380

aged in a dual-spindle unit that had a 634MB capacity. Finally, five years later, IBM unveiled the 3380, also a dual-spindle device that came with a 2.5GB capacity.

Obviously Off the Pace

The early 3380s were flawed, and IBM didn't get production running properly until 1982. In 1985, IBM came out with revised versions of the 3380, the D and E groups. The Ds, with the same capacity as the original 3380s, can be upgraded to Es that have twice the storage volume. But by this time, IBM was obviously off the pace it had set for two decades. If the 3380 had come out of the chute as planned, 1985 might well have been the year IBM introduced a really new top-of-the-line disk. But Porter forecasts that the 3380, in one form or another, will be IBM's large-capacity flagship for at least another couple of years.

Users who need faster disks will have to wait, according to Porter. "A smaller, faster unit, aimed at users with heavy transaction loads, is unlikely to be announced for another year or so. Until then, the 3380-D will be IBM's fastest large drive." When a truly faster disk does come along, it will have only 1.5GB to 2GB capacity, but access times will be significantly better than the 23.5msec to 25.5msec provided by current 3380s.

Porter sees users installing a mix of very fast, relatively costly drives and very large, relatively economical disks. The rate at which disks succeed each other depends on pricing, user budgets, dp patterns, and changes in processor and disk controller technology. The way users select disks also depends on the differences between large mainframes and their smaller cousins.

Disks with capacities above 5GB are not generally suited for use with small processors. The IBM 9370s, for instance, will rarely be used in applications that call for strings of 3380-class disks, while the more compact 9335s will be far more popular among users of the rack-mounted IBM minicomputers. Disks like the 9335, with 855.6MB per box, are far more suitable for smaller machines, and may evolve into a family that is used on all IBM systems below the 3090 range. Average access time for a 9336 is just over 26msec. That speed makes it slightly faster than any other IBM disk except the 3380, and far faster than rival Digital Equipment Corp.'s 456MB RA81 that's used with the VAX 8000.

It's important to remember that since all potential buyers of used 3380 disks are using similar machines, they have similar problems. So when it's time for one shop to move on to the next generation, it's time for most others to take the same technology trip. The used disk market will absorb thousands of machines, but when many users are selling them and few are buying them, prices will naturally fall.

So the old disks don't exactly die. Their economic value just fades away, sometimes rather quickly. And as long as IBM makes its money by pushing improved disks out the door, it won't take long for old disks to lose their cachet. ■

A contributing editor to DATAMATION, Hesh Wiener is president of Technology News of America, a New York publishing firm specializing in computer industry analysis.

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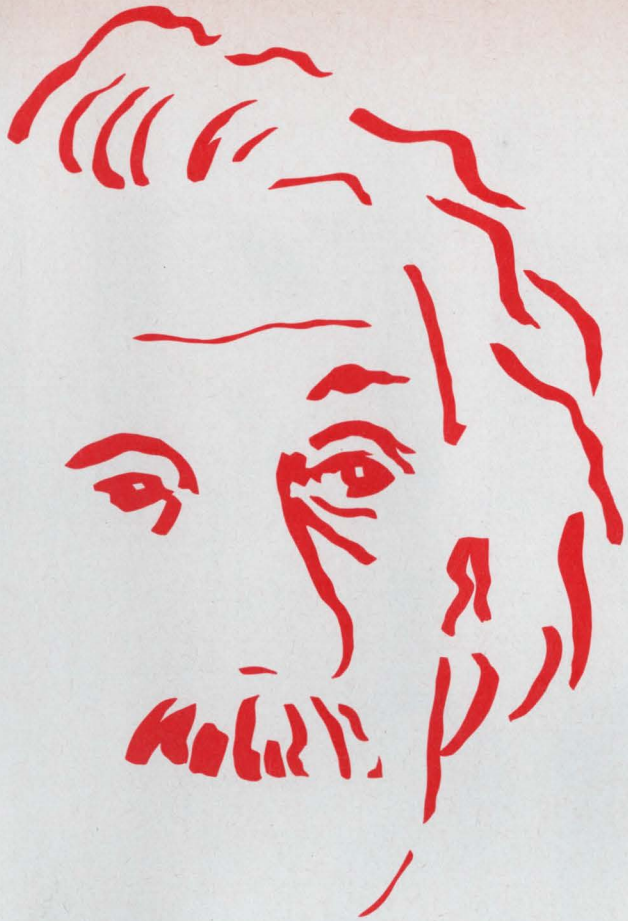

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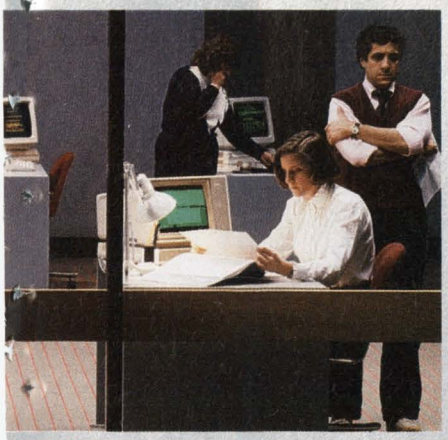

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The object-oriented paradigm is a programming method gaining much commercial attention from those who must build advanced computer systems. It promises tremendous advances in programmer productivity compared with traditional structured programming techniques, because its basic unit is the self-contained object, which combines data and algorithm. Proponents claim that object-oriented programming is more "intuitive" than previous methods and therefore is easier to work with. With processing power and memory priced so low, a number of companies, large and small, are creating a market for object-based tools.

The OOPS Revolution

BY JOHN W. VERITY

Just down the road from the general store in Sandy Hook, Conn., past a sweeping turn in the Pootatuck River where all that could be heard was the rush of a waterfall and the rustle of pine trees, there sat, many years ago, a red brick building that saw the beginnings of a technological revolution.

It was there in the mid-1800s, it is said, that Charles Goodyear worked to perfect his accidentally discovered process for vulcanizing rubber. Vulcanization turned raw sap from the Amazon into a tough, versatile product that eventually was used in the manufacture of automobile tires. Goodyear's discovery thus transformed an entire industry.

APPLE'S LISA AND MACINTOSH ARE OBJECT BASED.

The general store, circa 1831, is still there, selling everything from hammers and nails to chocolate chip cookies. The old brick building is there, too, and one can still hear the pines whispering and the waters spilling over rocks outside. And, if Tom Love, chairman and cofounder of Productivity Products International (PPI), is to be believed, there's another revolution fomenting behind those brick walls, one that is about to change the way another industry does business.

This revolution has no Lenin as its fiery leader—Love's flashy white BMW betrays strictly capitalist tendencies—nor does it need one. This is a movement of the people, and a worldwide one at that. From Oslo to Tokyo to Palo Alto, the growing masses, their consciousness raised at international conferences, are saying things that would make Marx spin in his grave if he could hear them. "Class structure," they demand. "Inheritances for all."

If Love and others at the vanguard of this revolution get their way, class and inheritance will in fact become vital issues for software builders everywhere. Those are concepts key to the practice of object-oriented programming, a technique fast becoming commercialized by Love's venture-financed PPI, and by such firms as AT&T, Xerox, Tektronix, and Apple. These vendors and a growing list of large users claim that object-oriented programming systems (no one calls them OOPS yet) are already making good on the promises that the last great leap forward—structured programming—continues to make but has yet to fulfill.

Although structured methods have clearly extended the possibilities of computer programming, they have been less than satisfactory when dealing with large, complex systems, particularly those that are highly interactive and whose specifications are therefore difficult to pin down early in the development cycle. Backlogs continue to grow, bugs proliferate, deadlines are missed, maintenance is as tough as ever.

"Structured programming was only a small help," states Love. "It provided only a 10% to 15% improvement in productivity when people were really looking for improvements of 10 to 15 *times*." Object-oriented programming tools, he claims, stand ready to provide those needed improvements because they offer means for a radically different, more "intuitive" way of conceptualizing and building systems.

Instead of decomposing systems into hierarchies of nested boxes as orthodox structured design methods do, the object-oriented way is to simulate the

world in terms of cooperating "objects" that relate by passing strictly defined messages to one another. "It's program as stage play," states one convinced user.

"Object-oriented programming is the structured programming of the '80s," says Bjarne Stroustrup, a respected software thinker at AT&T and author of its object-oriented language, C++. "In the right hands it is a major lever."

"It's significantly more of a revolution than structured design, because it applies to a wider variety of applications," comments David Thomas, associate professor of computer science at Carleton University, Ottawa.

Vision of a Global Market

Of course, the object-oriented gang may sound less than, well, less than objective when they claim their approach improves programmers' productivity by factors of 25 or more, or that it is more easily used by "lesser trained programmers," or that it finally makes possible the reusable software "components" the industry has coveted for so long. Perhaps most fantastic is the vision some share of a potentially global marketplace for software components analogous to today's microchip arena. Love's PPI has already trademarked the term "software-IC" and is seeking partners to help build such components.

Surely the multibillion-dollar software business has seen more than its share of snake oil and wonder cures before. Yet, the fact is that a growing number of companies, some of them backed by substantial capital and resources, are successfully hawking object-oriented tools. There is serious talk among software theorists, moreover, that object-oriented techniques will fundamentally change the way computer systems are conceived and designed. Large companies whose products depend heavily on complex software—companies like LM Ericsson, AT&T, ITT, and Hewlett-Packard, to name but a few—have adopted the technology in one form or another. Revolution or not, something is going on.

Tangible evidence of that something was seen in Portland, Ore., last October when the first conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA) was held. Some 20 vendors showed up for the ACM-SIGPLAN sponsored conference, more than 50 papers (only a third of those submitted) were delivered, and some people hoping to attend had to be turned away for lack of space (just over 1,000 people got in). The meeting's organizers, who represented everyone from IBM to the Central Intelligence Agency, were surprised by all of this—but only a little.

"A lot of people have been working with object-oriented programming for a while now and this conference was overdue," says OOPSLA program chairman Daniel Ingalls, a principal engineer at Apple Computer Inc. "The fact that we had to turn people away shows that the area is really growing."

"It's an unstoppable trend," declares even Tom DeMarco, a noted advocate of structured methods who is founder and a principal of the Atlantic Systems Guild in New York.

While similar conferences have been held recently in France and Britain, there are other signs of object-oriented programming's increasing acceptance. Digital Equipment Corp., for example, has set up an Object-Based Systems Group in Hudson, Mass., where it does much of its work in artificial intelligence and advanced programming.

SMALLTALK BINDS DATA AND PROCEDURAL CODE TOGETHER.

Another big industry name, Xerox, has spun out a new company, ParcPlace Systems in Palo Alto, which will create and market a variety of software tools centered around Smalltalk. That language, developed over the past 15 years at Xerox, is considered by most observers to represent the archetype of object-oriented programming. Xerox has licensed Smalltalk to such firms as Tektronix, Apple, HP, and Sun Microsystems for use on various workstations and is seeking more such partners, according to Adele Goldberg, ParcPlace president.

There's been activity on campus, as well. At Brown University, IBM has helped fund a multimedia database project whose programming is object oriented. The so-called Intermedia system combines texts and illustrations into a "web of information" that can be browsed, annotated, and shared among teachers and students using workstations. It is interesting to note that Brown programmed IBM RT in part with software migrated from Apple's Macintosh.

Dave Patterson, a professor at the University of California, Berkeley, has designed a reduced instruction set computer (RISC) microprocessor designed specifically to run Smalltalk. It's called SOAR. Farther up the coast at Oregon State University in Corvallis, computer science instructor Timothy Budd reports that the first printing of his book, *A Little Smalltalk* (Addison-Wesley, Reading, Mass., 1987), has sold out. He has also sold about 300 copies of his Unix-based teaching version of the language, which goes by the same name.

In nearby Beaverton, where Tektronix sells a line of Smalltalk-based workstations, Servio Logic Development Corp. markets Gemstone, an object-oriented DBMS for personal computers and VAXs. Computer Corp. of America, Cambridge, Mass., is understood to be working on similar products.

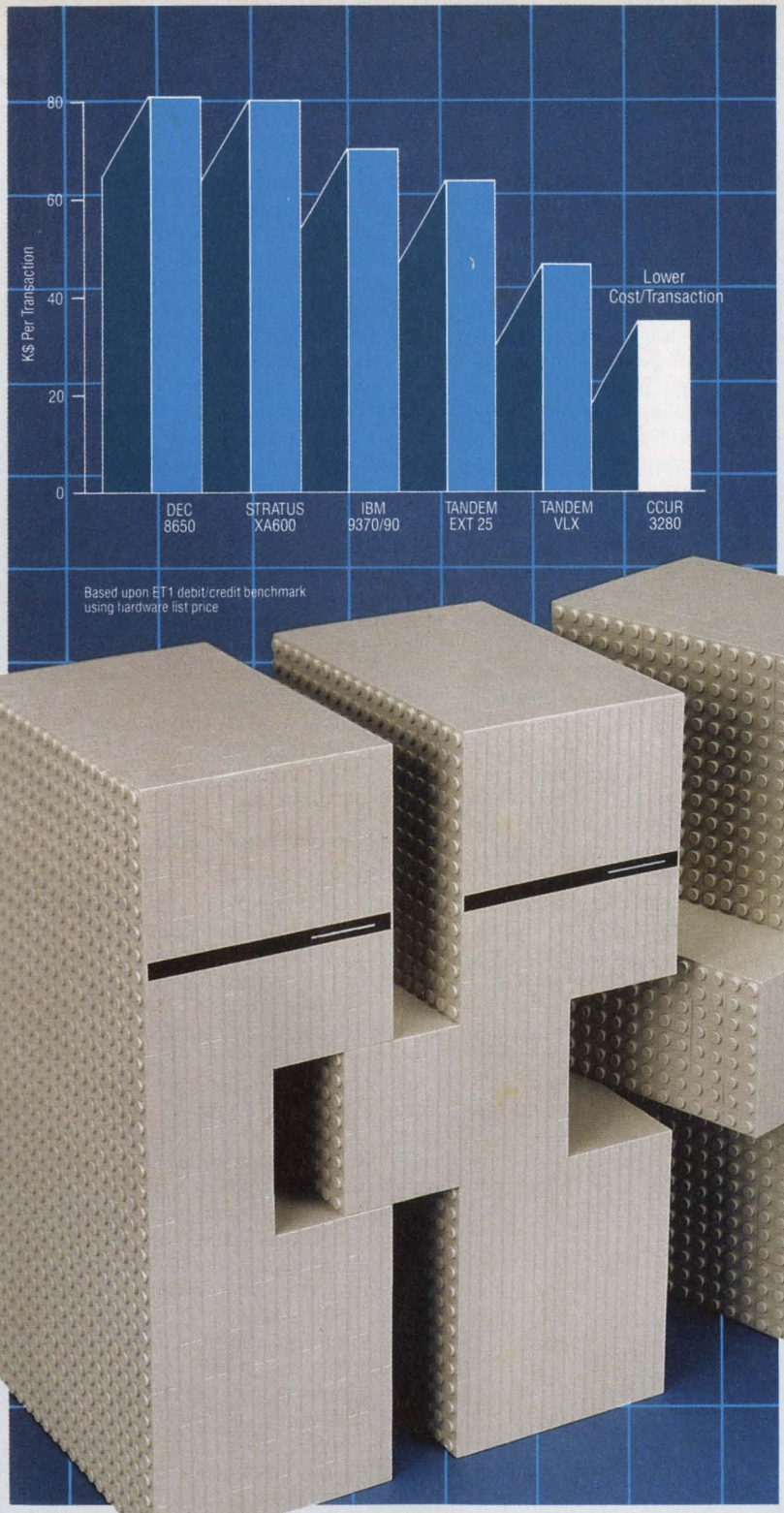
Digitalk Inc., Los Angeles, sells for $99 an impressive, homegrown version of Smalltalk for the IBM PC family. The software has found extensive use at Olivetti, the Italian computer maker.

Back in the States, Tom Love's PPI claims to have installed some 2,500 copies of its Objective-C package, a preprocessor that feeds standard C compilers with object-based code. It also sells Vici, which interpets C and Objective-C code for debugging and instructional purposes. Customers include HP, Accuray, and NASA.

A Product with Pluses

AT&T is gearing up to push C++ into the commercial market after seeing it find use at some 200 universities worldwide, according to Zach Shorer, product manager in Morristown, N.J. Shorer claims that over a million lines of C++ code exist within AT&T alone, and that the language, even without much push from the company, has been adapted to machines ranging from Unix workstations to Amdahl mainframes; a Cray supercomputer version is in the works. Bjarne Stroustrup, the language's modest author, says his C++ is "spreading like wildfire" within AT&T, where it is used for, among other things, simulating VLSI chips.

Key Logic, a Santa Clara offshoot of Tymshare, will soon introduce an entirely new operating system for 370-type mainframes that completely replaces MVS and competes in terms of transac-



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tion processing speed with IBM's TPF/2 (the former ACP). The software has been written in an object-oriented version of PL/1, according to Key Logic president Ann Hardy. "We couldn't have built the system without it," she says.

The CIA has commissioned Xerox to build a system called the Analyst, a "multimedia spreadsheet" that enables intelligence analysts to peer into numerous textual and graphical databases at the same time. The hush-hush system is composed of objects.

"Best of the Known Techniques"

Enthusiasm abounds. "We've been convinced since 1975 that this is the best of the known techniques," says Carleton University's David Thomas, who was given a private showing of Smalltalk back then. But as he and others are quick to point out, it's only been recently that object-oriented programming has become commercially feasible, because it requires substantial computing resources to be effective. Prices for memory and processing power have reached low enough levels, particularly in the form of desktop workstations, that now the basics of the object-oriented technique can be taught and used throughout industry and academia. "Now there are a lot of people beavering away at this technology," he says.

"It's definitely the wave of the future," states Paul Cubbage, senior analyst at industry researcher Dataquest in San Jose. He doesn't think, however, "that it will be at the center of the market until the 1990s."

Indeed, even Love, who's raised close to $3 million in venture capital to launch PPI, believes the new methods and languages have a long way to go before they dent COBOL usage to any extent. "We won't go bust our pick on that," he replies when asked if PPI intends to try for the mainframe market. Instead, the company plans to attack the applications backlog at the "fringe," where entirely new, advanced, and often complex systems get built. Insurance companies that have to build their own multimedia databases, for instance, will be forced to adopt object-oriented tools if they want to succeed, Love maintains.

If there really is an object-oriented revolution going on, Smalltalk is its manifesto. For most people, it is the first thing that comes to mind when the subject of object-oriented programming is broached. A product of Xerox's Palo Alto Research Center (PARC), Smalltalk was the brainchild of the company's brilliant computer scientist Alan Kay. Kay's precocious vision in the early 1970s was of a notebook-sized computer with which children and other nontechnical users could interact graphically through a display of two-dimensional objects. The objects would reflect the machine's internal state and could be manipulated to change that state.

Dynabook, as Kay referred to his laptop dream machine, could not possibly be built from the hardware or software available back then. Nevertheless, he and his team of researchers (which included Ingalls and Goldberg), built and simulated as much of it as they could. The fruits of their labors were a dazzling series of innovations at PARC that helped yield, among other things, Xerox's Alto and Star workstations, the mouse-icon-window-bit-mapped-screen display as the leading idea in user interfaces (popularized by the Macintosh), and Smalltalk as a way of life.

Well, almost. Smalltalk was not just another programming language, one quickly learned; it was a complete programming "environment" unlike anything anyone had ever seen before. It provided an abstract world in which the usually distinct boundaries between program and operating system and between data and program were blurred, a world in which a new conception of programming could flourish.

Primary Cause of Project Failure

The very name of the data processing industry reflects the paradigm of procedural programming, as seen in FORTRAN and COBOL programs, for instance. Data are structured in some way in order that they may be processed by a separate and shifting collection of procedures. But since there is no firm connection between these two elements (they are stored "without context," Love explains), a change in data structure can easily invalidate some or all of a program's routines, and vice versa. This, say software theorists, is the primary cause of failure in large, complex projects where no single person can comprehend both data structure and program logic in their totality. Traditional languages force programmers to rely on potentially faulty assumptions about which data types are valid for which routines.

As a result, fixes, patches, and extensions to a program tend to produce unwanted, unpredictable side effects and even catastrophic failures which, so far, no amount or form of structured methodology has been able fully to prevent. "At about 100,000 lines [of code], things start to break down with the old methods," states Love. "As your ability to understand a system declines, your ability to add to it declines as well."

In contrast, Smalltalk and related languages bind data and procedural code tightly together—inseparably, in fact—in the form of objects. Each object contains its own data, appropriately struc-

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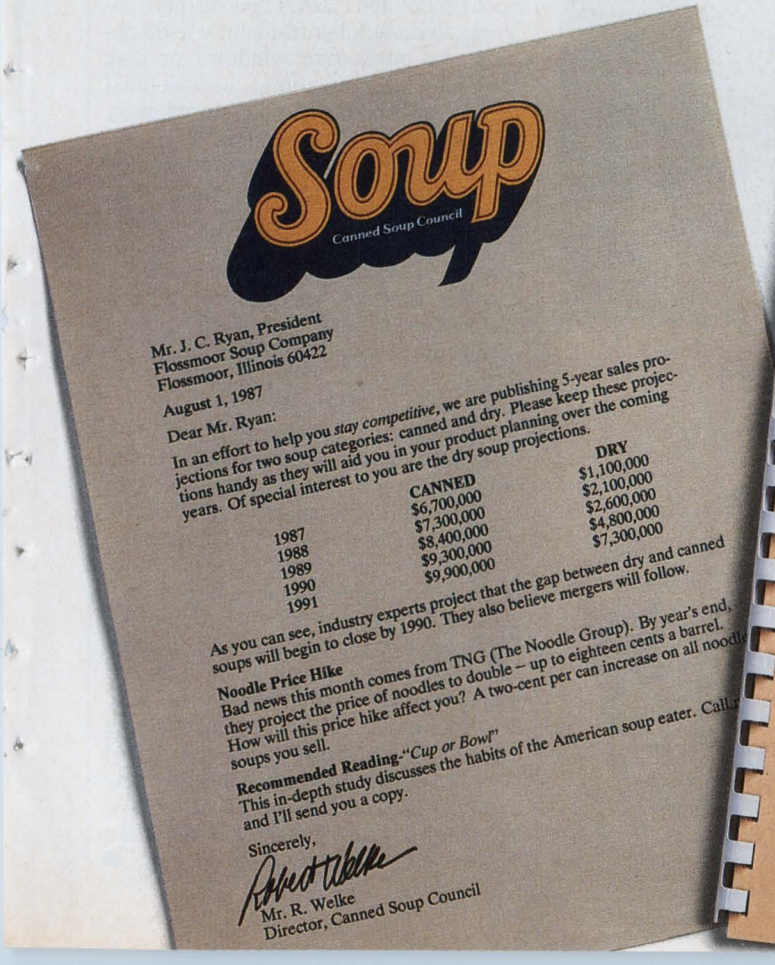

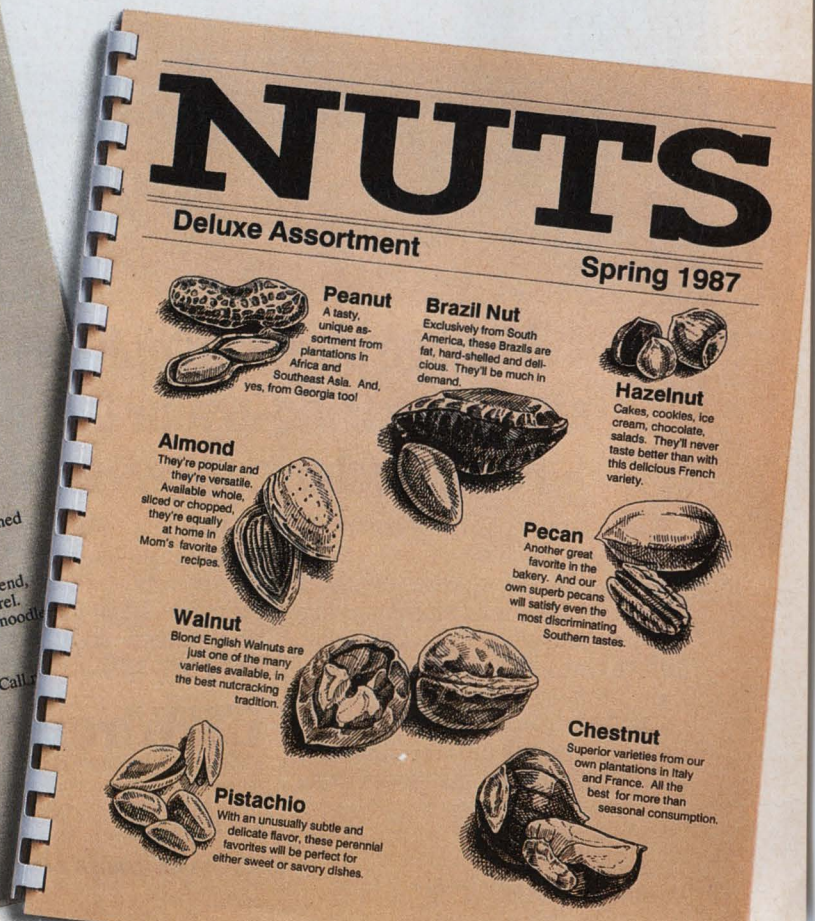

tured for its particular use, to which it has sole access and sole responsiblity for manipulating according to private procedures. Thus, there's no chance for data and code to get out of sync with one another, as it were, and there is greater possibility for building flawless programs quickly and in a way that permits almost endless extension and change. With relative ease, objects can be put together to form new systems and extend existing ones. "You don't destroy the original [code], you just extend it and build upon it," explains Jim Anderson, president of Digitalk.

Objects are quite different from traditional subroutines. For one thing, they reflect a deeper abstraction: by strictly tying data to code, objects actually maintain structure and context even as they helpfully "hide" those qualities from the programmer. Moreover, they respond only to certain strictly defined messages passed to them by other objects. Once it receives a message it knows how to handle, an object takes full control of the system until it passes control to some other object via another message. (In contrast, traditional "well-structured" subroutines eventually pass control back to a main routine.) The programmer need not know anything about an object's internal structure, either its data or procedures, yet he can still use the object if he knows the messages it can receive and act upon.

Finally, the object's interface to other objects is clearly defined and cannot be subverted: a Smalltalk program cannot jump suddenly into the middle of an object in the way that a wayward FORTRAN program might mistakenly activate code deep within a subroutine. This strictly defined interface, combined with the fact that data and procedures are sealed away from dangerous tinkering, prompts talk of a future marketplace of software objects, designed to be cataloged and available off the shelf from networked libraries of components.

Already, Artecon Inc. of Carlsbad, Calif., sells a family of basic graphics objects designed to work in PPI's Objective-C environment. Love expects additional sets of useful objects to become available in such areas as communications, databases, and user interfaces.

In addition to their encapsulated nature, objects gain much power from their ability to *inherit* properties and behavior. All objects reside in a many-leveled hierarchy of *classes*. Each object is considered an *instance* of its class and, like other instances thereof, it displays the properties and behavior of not only that class but also those of all classes above it in the class hierarchy. Thus, the object "Secretariat" might be an instance of the class "horse" and inherit properties and behavior from the class "mammal," which itself would inherit from the class "animal." Inheritance makes it possible to define complex new objects without the bother of writing everything from scratch.

Means to Tremendous Improvements

Although objects and the notions of inheritance and class take some getting used to—several months, at least, for traditionally trained programmers, it is said—they provide the means for achieving tremendous improvements in productivity. For one thing, large collections of predefined, well-documented classes and *methods*, the algorithms in an object that act on incoming messages, can be delivered for programmers to use as is. Such predefined classes may be quite sophisticated, defining frequently used objects like interactive windows or disk browsers. In addition, user-defined classes and objects may be stored away for future use and adaptation.

Interactive systems tend to employ sophisticated, graphical interfaces that display a high degree of modularity and are therefore more easily programmed in terms of objects, says Beau Sheil, a Xerox PARC alumnus who now heads Price Waterhouse's newly formed Technical Center in Menlo Park, Calif. (see his "Power Tools for Programmers," February 1983, p. 131).

ParcPlace's Goldberg notes, too, that the notion of objects can be easily grasped by nonprogrammers, who can "define their own applications and prototypes" in terms that are familiar to them.

"The world we see around us is made up of objects, not subroutines," says one proponent. But does that make for a revolution, a replacement of structured design methods? AT&T's Shorer thinks so. "We have a tiger by the tail," he says. But Oregon State's Budd takes a more cautious view: "Object-oriented programming is just part of a bigger revolution. People are realizing that we have a plethora of languages available because all language paradigms are important."■

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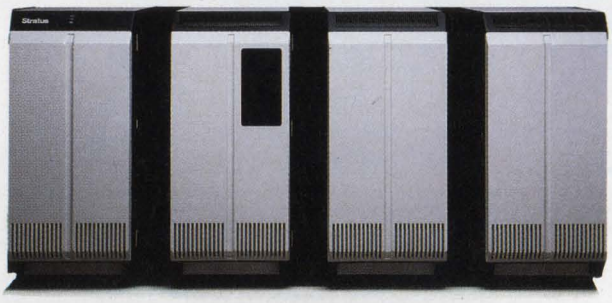

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The Structured Query Language is an industry phenomenon. With over 50 SQL products available, almost every kind of hardware system can run some form of it. Yet SQL is not a panacea for database management. It lacks some features of the underlying relational DBMS model; definitions in the SQL standard lead to incompatibilities between different implementations; and some aspects of the standard are still undefined. While some stories about ease of development, maintenance, and improved productivity are undoubtedly true, buyers should be skeptical of many SQL vendor claims, particularly regarding compatibility and portability.

Where SQL Falls Short

BY C.J. DATE

The dp industry seems to have fallen in love with the Structured Query Language. SQL products are available on almost every kind of hardware (over 50 products at last count) and no end is in sight. But, as sometimes happens in a love affair, extravagant claims are being made regarding the merits, attractions, compatibility, and general desirability of the love object. My purpose here is to try to inject a note of moderation into such claims.

Before getting into details, I would like to make two points absolutely clear. First, the recent widespread acceptance of SQL stems from, and parallels, the widespread acceptance of relational database technology—and nobody could be more pleased than I am that relational technology is finally having the impact I think it deserves. The criticisms that follow should definitely not be taken as criticisms of the relational approach; they are criticisms of SQL per se, nothing more.

Second, I'm by no means implacably opposed to SQL. On the contrary, I believe that SQL has many admirable features. The thesis of this article might be expressed as "SQL is great. But it could have been so much better." SQL really *is* great, compared with older database languages such as DL/1, and there have been some significant successes with it. The stories regarding such factors as ease of application development and maintenance, and improved productivity really do have a significant basis in fact.

Nevertheless, the picture is not quite as rosy as some people have tried to paint it, and I would like to explain why. To do so, I will address three main questions: what's wrong with the SQL language per se, what's wrong with the SQL standard, and what about application portability?

First, what's wrong with SQL per se? I want to consider the SQL language purely *as* a language. More specifically, I want to look at SQL as a language that is intended as a concrete realization of the relational model. From this standpoint, SQL is deficient in at least three major respects. It omits important relational features, lacks orthogonality, and is extremely redundant.

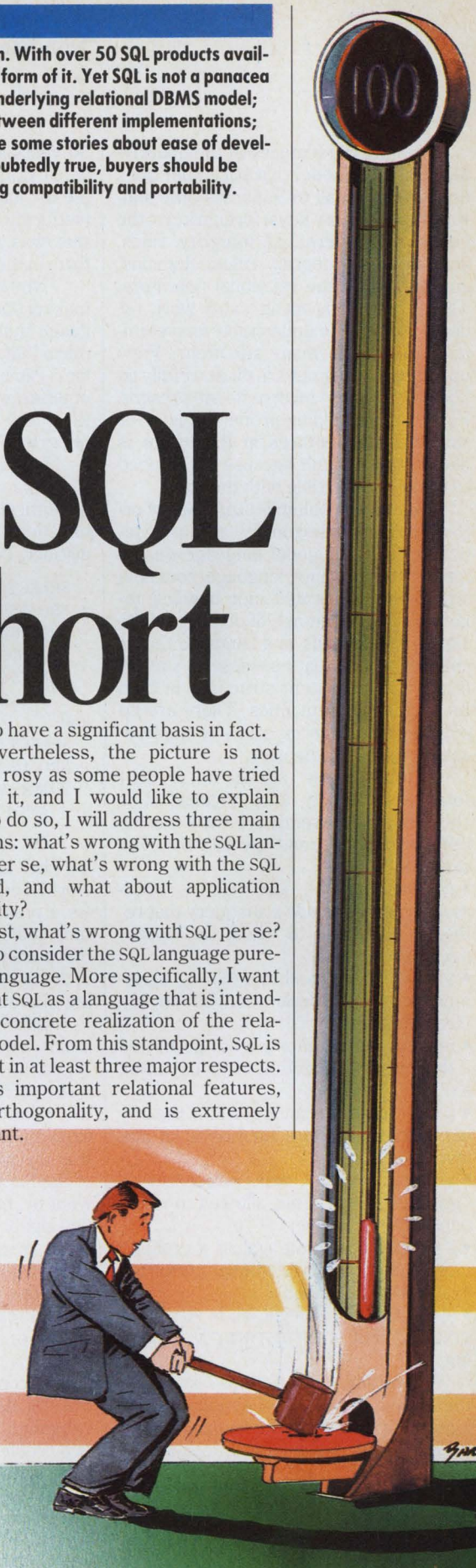

Illustration by Andrea Baruffi

Where SQL Falls Short

Among the features of the underlying relational model that SQL either does not support at all or supports only indirectly are primary keys, foreign keys, the entity and referential integrity rules, user-defined integrity rules, domains, and certain of the relational operators. These omissions mean extra work for users, and lead to undesirably unsystematic behavior in many situations. View updating, for example, is disgracefully ad hoc—not to say incorrect—at present. Furthermore, adding proper support for such missing features in the future is likely to be difficult because of the need to remain compatible with the past.

Another problem is SQL's lack of orthogonality. Orthogonality means independence. Orthogonal language design means that distinct language concepts are cleanly separated, not bundled together. The advantage of orthogonal design is that it leads to a language that is coherent—one that possesses a simple, clean, and consistent structure, in both its syntax and semantics. There are no exceptions or special cases or unpleasant surprises for the user.

Unfortunately, SQL in its present form is extremely unorthogonal. It is chock full of apparently arbitrary restrictions, exceptions, and special rules. For example,

- INSERT, UPDATE, and DELETE statements cannot include a subquery that refers to the table to which the update operation applies;
- UNION can be used in a SELECT statement or a cursor declaration, but not in a view definition;
- updates via a cursor are not permitted if the cursor declaration includes ORDER BY;
- a SELECT clause cannot include the key word DISTINCT more than once, at any level of nesting;
- a FROM clause that references a "grouped view" is not allowed to reference any other table;
- a SELECT operation against a grouped view cannot include a WHERE, GROUP BY, or HAVING clause; and
- SUM (X + 1) is legal, as is SUM (DISTINCT X), but SUM (DISTINCT X + 1) is not.

Ironically, restrictions such as these have the effect of simultaneously increasing the size of the language while decreasing its power or functionality.

No Excuse for Including Restrictions

There was actually no good excuse for including such restrictions in the first place. It is not as if SQL was defined 25 or 30 years ago. Orthogonality has been a well-established language design principle for many years; there was really no justification for ignoring it in a language that was first implemented in product form in the '80s.

Nor was there any justification for making SQL the extremely redundant language that it is today. By redundancy I mean that all but the most trivial of problems can be expressed in SQL in a variety of different ways. For example, consider the query "Find supplier names for suppliers who supply part P2" (assuming the usual suppliers-and-parts database). This is a very simple problem, yet it is not difficult to find no less than seven formulations for it, all at least superficially distinct. To take just two examples:

```
SELECT SNAME
FROM S
WHERE SNO IN
   (SELECT SNO
   FROM SP
   WHERE PNO = 'P2')
```

and

```
SELECT SNAME
FROM S, SP
WHERE S.SNO = SP.SNO
   AND SP.PNO = 'P2'
```

Of course, the differences would not be important if all formulations worked equally well, but that is unlikely. As a result, users are forced to spend time and effort trying to find the version that performs best—which is exactly one of the things the relational model was trying to avoid in the first place.

SQL's high degree of redundancy stems, to a great extent, from its genesis. When the language was first designed, it was specifically intended to differ from the relational calculus (and, I believe, from the relational algebra). That goal was the motivation for the introduction of the "IN subquery" construct. As time went by, however, it turned out that certain algebraic and calculus features were necessary after all, and the language grew to accommodate them. As a result, the entire "IN subquery" construct could now be removed from the language with no loss of function at all.

This is ironic, since the "IN subquery" construct was the justification for the "Structured" in Structured Query Language in the first place. Unlike the two problems previously mentioned, fixing redundancy would require major surgery.

Now for the second question, what's wrong with the SQL standard? The official ANSI standard version of SQL suffers from certain problems over and above those already mentioned.

The first such problem stems from standard SQL's functional deficiencies. The standard has been characterized, perhaps a little unkindly, as "the intersection of existing implementations." While this comment may not really be fair, it does highlight the general criticism that the standard, at least in its initial form, seems more concerned with protecting existing vendor implementations than with establishing a truly solid foundation for the future. Partly as a consequence of this, the standard omits a number of features that are definitely useful in practice. Some of the omitted features are these:

- all data types other than numbers and fixed-length strings,
- REVOKE and DROP operations,
- the SQL Communications Area,
- Dynamic SQL (PREPARE, EXECUTE, etc.),
- ALTER TABLE,
- CREATE and DROP INDEX,
- explicit locking facilities, and
- data definition and data control statements in programs.

No Two Implementations Identical

As a result of such omissions, any SQL implementation, even if it does support all the features of the standard, is also certain to include a large number of implementation-defined extensions. Consequently, it is virtually certain that no two SQL implementations will be precisely identical to each other, and no SQL implementation will be precisely identical to the standard. Even the IBM implementations, DB2 and SQL/DS, are not 100% compatible (and neither one is a subset of the other).

Beyond functional deficiencies, the standard also gives rise to another sort of problem by including certain aspects that are explicitly stated to be implementation-defined. Examples of these implementation-defined aspects inlude

- SQLCODE values on error conditions,
- effect of certain operations on cursor positioning,
- precision of result of arithmetic expressions,
- character collating sequence,
- whether views are physically materialized, and
- position of nulls in an ORDER BY sequence.

As a result of such considerations, two SQL implementations can each conform to the standard and yet be incompatible with each other.

Another weakness of the SQL stan-

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dard is its seeming predilection for a static schema. A major advantage of genuinely relational products is that they support dynamic data definition; in other words, data definition operations are dynamically executable, and they can be invoked both interactively and from within an application program. In the standard, by contrast, such operations can appear only within the context of a schema; while the standard does not actually specify how a schema is entered into the system, it does seem as if the definitional interface is something distinct from both a conventional interactive interface and a conventional programming interface. In fact, it seems to be rather static.

In comparison with the dynamic facilities already implemented in most relational products, this static approach represents a major step backward. It is a throwback to the inflexibility of prerelational systems. From a relational standpoint, in fact, the whole idea of drawing a sharp dividing line between data definition and data manipulation, as the standard does, is an archaic one—one that is wholly inappropriate to the relational environment.

Other difficulties arise from aspects of standard SQL that are left undefined. For example, the standard appears not to specify how operations on views are to be processed, at least not in any direct fashion. At a more detailed level, the standard also does not specify whether literals are considered to have the NOT NULL property. This point is significant, given the restrictions on the UNION operation set forth in the standard definition. So once again, it is entirely possible that two implementations could be "conforming" and yet incompatible with one another.

Portability Is Justification

My final question concerns application portability. Application portability is of course the main justification for the existence of the standard in the first place. And again, some words of caution are appropriate. First, the shortcomings previously identified mean that it is probable that no two SQL implementations will be precisely identical to one another, and no SQL implementation will be precisely identical to the standard. For instance, it is possible to identify over 40 points of difference, some of them very major, between the standard and DB2. (And on the whole I would say that DB2 SQL is fairly close to ANSI SQL!) Thus, all claims on a vendor's part to the effect that its products "support the standard SQL language" or is "compatible with IBM's DB2 product" should be treated with suspicion, to say the least.

But SQL's problems with portability go beyond the domain of the standard itself. To begin with, it must be understood that SQL by itself is not a full programming language, nor was it ever intended to be. On the contrary, it is what E.F. Codd, the creator of the relational model, originally called a database sublanguage. As a consequence, SQL statements must be embedded in some host language such as COBOL in order to gain access to facilities SQL itself does not provide. The portability of a given program will thus depend on the portability of the host language in question as well as on the portability of SQL per se.

One major question regarding portability has to do with data types. Different host languages support different data types, and conversion among those data types is notoriously difficult. In fact, the SQL standard defines different database data types for each host language. There is no guarantee, for example, that a database created for and populated by a COBOL program will be accessible from a PL/1 program. Furthermore, such matters as default precision and scale and string length are left as "implementation defined" with the result that a "standard" application that runs on a Digital Equipment Corp. VAX may very well not run on an IBM machine.

SEPARATING DATA DEFINITION AND MANIPULATION IS AN ARCHAIC IDEA.

Another issue related to the question of portability is catalog compatibility. The SQL standard does not include any specification for a standard catalog structure (and indeed it is difficult to see how it could have done so, given that the catalog tends to be somewhat implementation dependent).

Nevertheless, the unfortunate fact is that generalized applications, precisely because of their generalized nature, do frequently need to read and interpret catalog information. An example of such a generalized application is IBM's own Query Management Facility (QMF), which is an ad hoc query and report writing front end for both DB2 and SQL/DS. The lack of a standard catalog structure is likely to impose severe limitations on the portability of such generalized applications, a category that includes most "third party" software products.

The standard also does not include a dynamic SQL facility, a facility to construct SQL statements dynamically at run time and then have those statements executed. Since such a facility is likely to be implementation dependent, it's hard to see how that facility could be included in the standard. Still, the omission will likely once again curtail the portability of generalized applications, which tend to require such a facility.

My last point concerns distributed database systems, which are fast becoming a hot topic in the marketplace. Supporters of the SQL standard argue that it could provide a basis for cooperation between distinct systems as equal partners in a distributed database system. From one point of view, such a system could be regarded as an environment in which application portability is the problem par excellence. Here I would add only that the deficiencies already identified are just part of the story. Other problems include different physical data representations, different communications protocols, and different commit protocols.

Finally, let me reemphasize that I am not suggesting that investment in an SQL product is an unwise move. On the contrary, I strongly believe the opposite is true. However, would-be purchasers and users of SQL products should study the problems discussed and decide for themselves how significant the issues are in their own environments. Users should also approach vendor claims with a healthy degree of skepticism, weighing the costs against the undoubted benefits that an SQL system can provide. ■

C.J. Date is an author, lecturer, and consultant specializing in relational database technology. He is cofounder, with E.F. Codd, of the Relational Institute and the Codd and Date Consulting Group, both located in San Jose.

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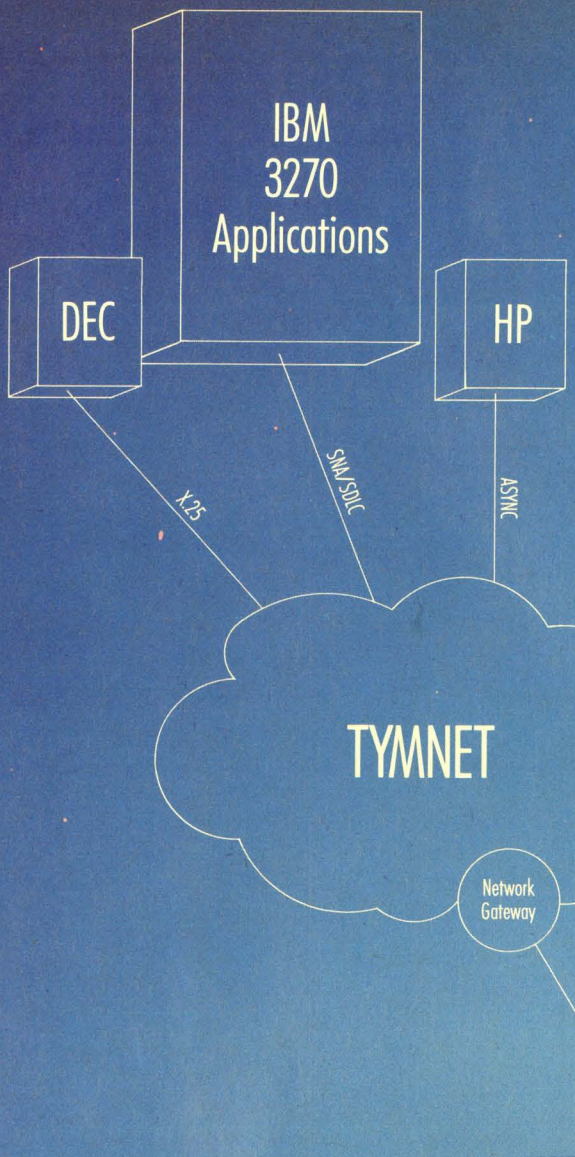

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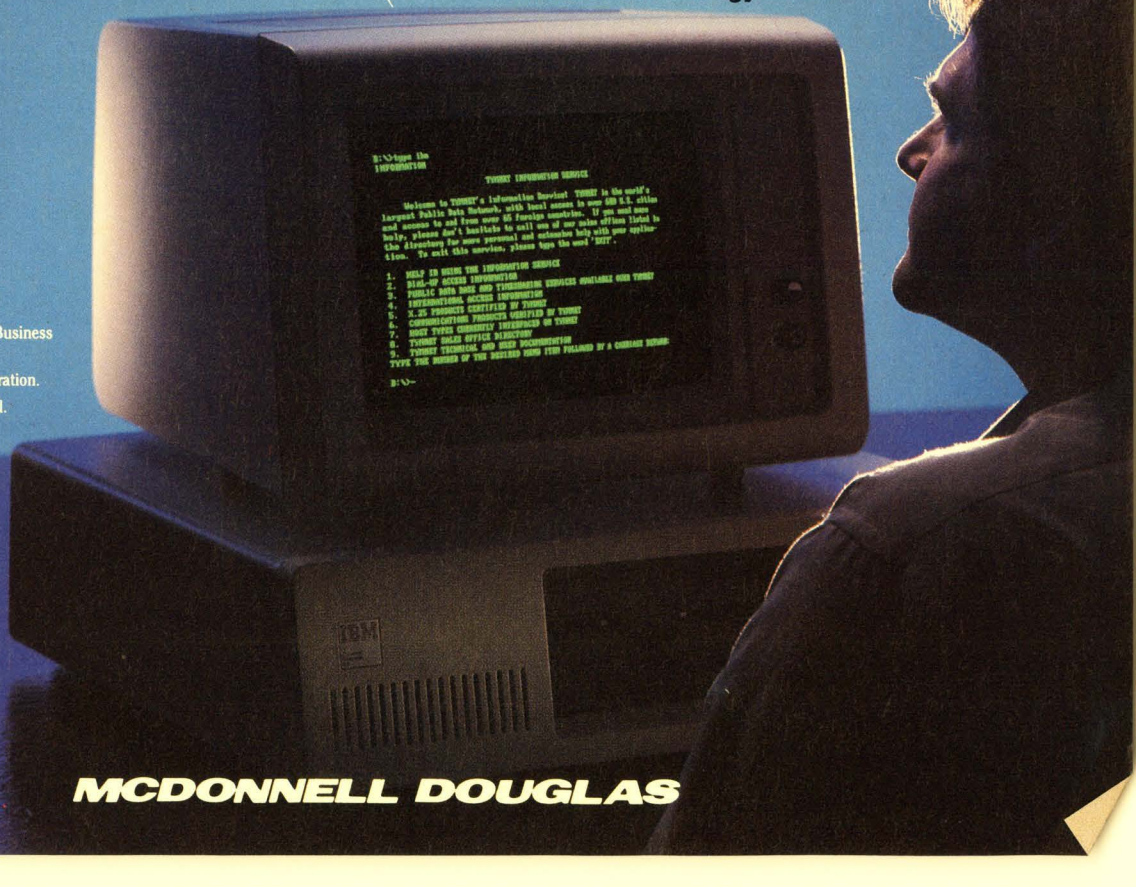

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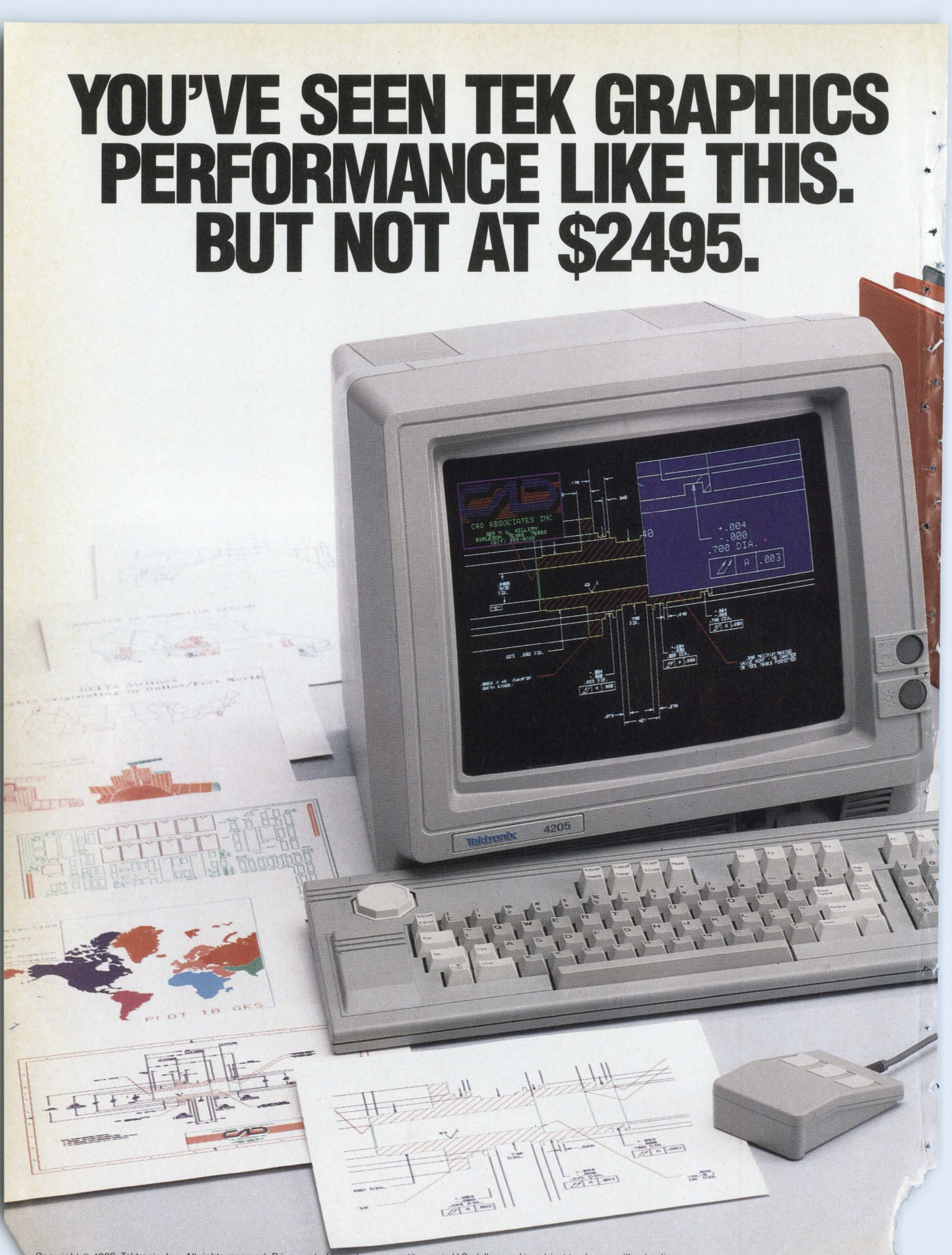

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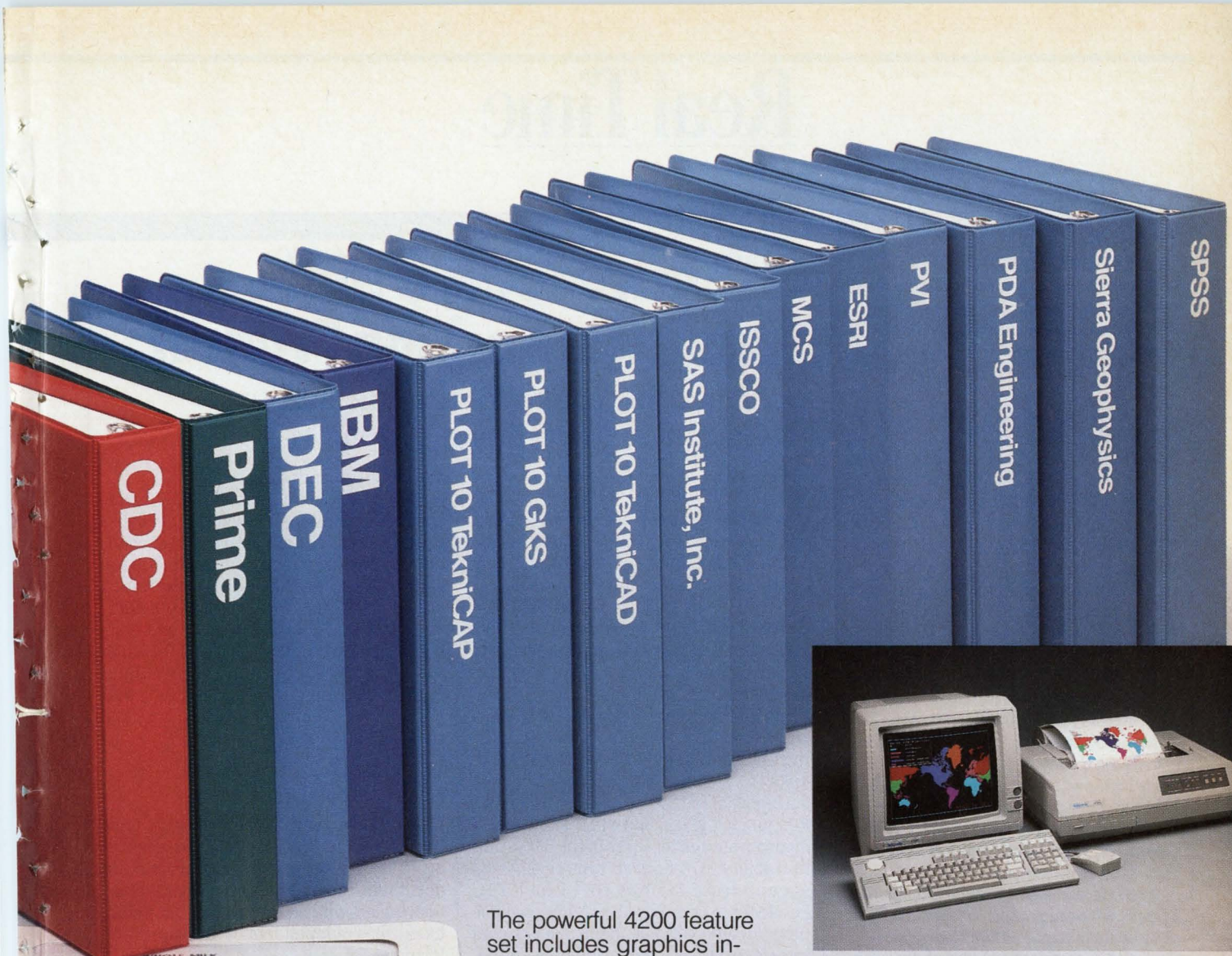

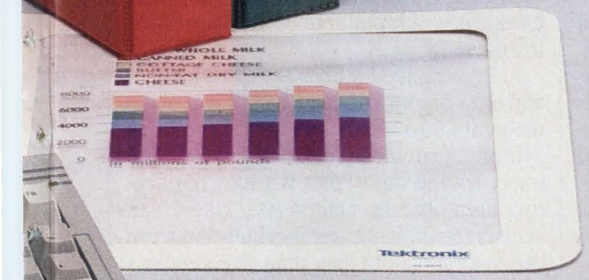

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OFF-LINE

OPEN SYSTEMS INTERCONNECTION (OSI) protocols are not expected to become a reality for another two to five years. In the meantime, users and vendors are implementing proprietary network protocols (see "They Just Can't Wait to Integrate," Feb. 15, p. 17).

The desire for networking standards remains high, however, and a group was formed recently to champion the cause. The Network Computing Forum, initiated and sponsored by Apollo Computer Inc., Chelmsford, Mass., is comprised of academic institutions and manufacturers of workstations, supercomputers, software, and network server products. Among the 29 members are Alliant, Apollo, Apple, Concurrent, Convex, Oracle, Rockwell International, Texas Instruments, and 3Com, and such research centers as the MIT Project Athena, the University of Iowa, the University of Michigan, and the San Diego Supercomputer Center.

As stated in its charter, the forum's goal is to create a style of computing that "exploits high-performance, tightly integrated links between general purpose workstations, special purpose workstations, supercomputers, near-supercomputers, and a variety of network servers."

Apollo is pushing its Network Computing System software product, a tool that allows developers to create networked applications. Other participants will push their own networking schemes, such as the MIT Project Athena and its X-Windows platform.

The forum will tend to address the applications point of view rather than the physical connections aspect of network computing, says Bill Wallace, vice president of software at Convex Computer Corp., Richardson, Texas. Convex and all the other charter members of the forum do business with Apollo.

The first sessions of the forum will focus on portable mechanisms for building, locating, and implementing network computing services. An example of such a service, says Wallace, is moving an application, like inverting a matrix, from a workstation to a minicomputer interactively and returning it to the workstation once the computation is complete.

Subsequent sessions of the forum will address areas such as security, software licensing, and transparent access to other high-performance computing resources from the workstation.

HARDWARE

CNT Introduces a High-Speed Networking Product

Designed for remote IBM mainframe-to-mainframe data communications

BY THERESA BARRY

Computer Network Technology Corp. has unveiled the ChanneLink Model 5100/R, designed for IBM-to-IBM data center networking.

The 5100/R is based on CNT's ChanneLink 5100, introduced in 1986. CNT claims it permits multinode data transfer of information without any host intervention. Capabilities of the 5100 include IBM channel-to-channel (CTC) emulation, multiple concurrent CTC activity, the ability to connect mainframes up to 4,000 feet apart, and compatibility with such host applications as VTAM, IMS/MSC, RJE, NJE, RSCS, JES, and NDM. The 5100/R incorporates all features of the 5100, plus the ability to connect remote links at speeds from 300bps to T1 and T1C (1.54Mbps, or twice T1). Additional features include variable, definable network interface (VDNI), which allows operations to change link speeds without halting network activity; network functions including virtual circuit, alternate path, load leveling, and error handling; and Network Operator, network management software that is optional. Specific IBM mainframe host software is not required.

ChanneLink 5100/R can network more than 65,000 IBM mainframe channels with each other, says CNT. Transfer rates between the 5100/R and IBM block multiplexor channels are supported at 3MBps, or full data streaming channel speeds. The vendor claims 95% use of available T1 bandwidth.

Computer Network Technology Corp.'s ChanneLink Model 5100/R for remote datacom.

The ChanneLink 5100/R is installed in customer sites and is available now. A configuration with one IBM channel and two links is priced at $35,000 for each data center. Additional mainframes can be added for $7,000 to $8,000, additional pairs of T1s are $6,000, and Network Operator software is $7,500. COMPUTER NETWORK TECHNOLOGY CORP., New Hope, Minn. CIRCLE **250**

Optical Disk Processor

Integrates information into relational database.

LaserBase I from Image Management Systems is an "optical data processor," capable of assembling word processing documents, handwritten notes, engineering drawings, or microfilm into electronic files independent of data source or format.

LaserBase I stores acquired images and data on optical disk. Users can organize data into a relational database. The system provides for one-to-one and many-to-one data links without duplicating data objects, claims IMS. Users can access the data at their workstation from the optical disk in less than five seconds on average, says the vendor. Database security features include a hierarchical access scheme and an audit trail.

LaserBase I has an open network architecture, and its native network is Ethernet. Access to LaserBase I is by means of a mouse-and-window format. The number of electronic files in the database is unlimited.

The hardware platform for the LaserBase I system is a Sun Microsystems workstation. A single-user configuration, including hardware and software, is priced at $150,000. Multiuser installations begin around $250,000. The software alone is $50,000.

IMS says it has a system installed with the Navy in Norfolk, Va., where it's being used in the armed forces' CALS (Computer Assisted Logic Support System) project. CALS is a system being implemented

for the cataloging of parts and their related documents. IMAGE MANAGEMENT SYSTEMS INC., Providence, R.I. CIRCLE **251**

Modems

Fujitsu's new Trellis-coded card and new synchronous modem line.

Fujitsu America has announced a 19.2Kbps core-card modem for oems. It features fallback speeds of 16.8Kbps, 14.4Kbps, 12Kbps, and 9.6Kbps. It's a full duplex, four-wire leased line modem with 16-state, eight-dimensional coding. The 56-square inch card is Trellis-coded. The price is $3,550 list and $1,900 in oem quantities of 1,000.

The EZ series is Fujitsu's new modem line. The synchronous modem line is available in standalone versions or rack-mountable card versions. The family features on-board diagnostics and built-in automatic equalizers to minimize line interference and maximize performance. The modems are available now. A 2,400bps version is priced at $695; a 14.4Kbps version is $2,995. FUJITSU AMERICA, Data Communications Group, San Jose. CIRCLE **252**

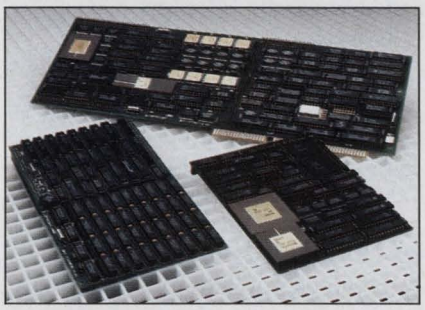
Accelerator Board Family

For IBM ATs and Multibus II, NuBus, VMEBus workstations.

Sky Computer has introduced its vectorized Vortex accelerator board family. Vortex can execute at 20 million single-precision (32-bit mode) or 10 million double-precision (64-bit mode) floating point operations per second. Additional features include a separate multiplier and adder from Analog Devices, Norwood, Mass., each of which operates at 10MHz; a 32-bit RALU (register and/or arithmetic logic unit) from Wafer Scale, Freemont, Calif.; and VLSI from Sky.

The board features Sky's VEX vectorizing preprocessor software, which converts standard FORTRAN 77 language programs to vectorized language programs. It's designed to work with the IBM AT, and it will run on most ANSI-standard FORTRAN compilers, says Sky.

Vortex's architecture features fast and slow memories with an internal data bus architecture that operates at 80MBps. The low-end AT version of Vortex uses a portion of the 80MBps bandwidth to achieve a Linpack performance of 2MFLOPS in 64-bit mode. The high-end Vortex achieves a 5MFLOPS rate in 64-bit mode.



The Sky Vortex is priced at $9,900 for the AT version. The Multibus II, NuBus, and VME versions start at $11,900. The AT version includes a baseline arithmetic unit (a one-slot accelerator board) and a processor with 1MB of on-board memory. SKY COMPUTERS INC., Lowell, Mass. CIRCLE **253**

Printer from Digital

Second PostScript printer in LN03 family of desktop laser printers.

Digital Equipment Corp. confirmed its commitment to Adobe's PostScript page description language with the introduction of its second printer to incorporate it. (Digital's first PostScript printer, the PrintServer 40, was introduced last November). The ScriptPrinter is part of what Digital is calling its VAX Integrated Publishing solution, which includes the printer used with the VAXmate, WPS-Plus, Aldus PageMaker, and a Microtek desktop scanner.

The new printer features 29 resident typefaces and it prints up to eight pages per minute. PostScript allows printers to generate complex text, line art, halftones, images, and patterns. It prints files created using the ANSI/Sixel, ReGIS, and Tektronix 4010/14 protocols, through VAX host-resident software translators. The printer communicates using a standard RS232C serial interface.

ScriptPrinter is available now and is priced at $6,295. DIGITAL EQUIPMENT CORP., Maynard, Mass. CIRCLE **255**

NEC Rolls Out Pcs

Three new 80286 micros compatible with IBM AT.

NEC Information Systems recently introduced three new micros to comprise the APC IV Advanced Personal Computer family. They are the PowerMate 1 and 2 and the BusinessMate.

Standard features of the PowerMate 1 are an Intel 80286 16-bit to 24-bit microprocessor with 8MHz processing speed and 640KB of RAM, expandable to 8.6MB. The base unit includes six full-size expansion slots, one RS232C serial port, one parallel port, and a built-in clock and calendar. Two 5¼-inch and one 3½-inch internal disk storage units are featured, and over 80MB of internal storage can be configured. PowerMate 1 is shipped with MS/DOS 3.2 and GW BASIC 3.2, and NEC's 14-inch MultiSync monitor is offered. The PowerMate 1 is available now for $1,995. Two graphics boards are offered as options.

The PowerMate 2 is based on the original APX IV, introduced in April '86. Its features include those offered by the PowerMate 1, and it is expandable to 10.5MB of RAM and has two RS232C serial ports and five internal disk drive storage units. Storage options include 1.2MB and 360KB floppy disks; 66MB, 40MB, and 20MB half-height 5¼-inch hard disks; and a 40MB internal streaming tape backup unit. It's priced at $2,595.

The BusinessMate is a multiuser system that allows up to eight nonintelligent terminals to be connected under the SCO Xenix operating system. IBM PCs and PowerMate 1 and 2 terminals can also be connected as terminals.

BusinessMate is based on Intel's 80286 16-bit to 24-bit microprocessor running at 8MHz to 10MHz and is configured with 640KB of RAM, expandable to 10.6MB. Disk storage options are the same as for the PowerMate 2 (minus the 20MB hard disk). The price is $6,000. NECIS, Boxborough, Mass. CIRCLE **256**

HP's 9000 Series

New Model 330 workstation replaces Model 320.

Hewlett-Packard has extended its 9000 series of technical workstations with the Model 330, which is available in four configurations: the 330C, 330CMA, 330M, and 330MMA.

HP is positioning the 330 to compete with the Apollo DN 300, the Sun 3/110, and the DEC VAXstation II workstations. It's geared toward engineers, scientists, programmers, and architects.

The 330 uses the 16.67MHz Motorola 68020 microprocessor to deliver 2MIPS of processing power. The processor is linked by a 32-bit wide bus to 4MB of on-board main memory, which is expandable to 8MB. A 16.67MHz Motorola 68881 floating point coprocessor accelerates math operations. The 330's new

32-bit I/O bus provides 6MBps bandwidth to peripherals. HP says it is compatible with earlier Series 300 interfaces and peripherals.

Additional features of the 330 family include IEEE-488 peripheral/instrumentation interface and 802.3 LAN port, RS232C serial interface, two-channel DMA controller, HP-HIL, and four-slot card cage. Four operating systems are available: HP-UX, BASIC, Pascal, and an HP DOS coprocessor card. HP claims the Model 330 is object-code compatible with other Series 300 systems under HP-UX, and source-code compatible with HP Precision Architecture HP 9000 Model 840.

The four models vary in display screen size and capabilities. The 330C is priced at $16,900, the 330CMA is $15,900, the 330M is $12,700, and the 330MMA is $12,500. All are available now. HEWLETT-PACKARD, Palo Alto. CIRCLE **254**

Server Workstation

Allows DEC VAX and MicroVAX terminals to run PC software.

Logicraft has introduced the 386-Ware server workstation, the latest in its line of Digital and IBM PC interconnect products.

The 386-Ware's architecture is an 80386-based server workstation coupled to the Digital standard Ethernet network. It supports up to eight simultaneous MS/DOS users and multiple systems can be attached to each Digital minicomputer. Program files and data files are stored on the VAX hard disk. It's configured with a serial port, a parallel port, and a floppy disk drive. PC expansion slots are available for additional PC peripherals. Each DOS user on the server has access to six 32MB logical disks and can switch between MS/DOS programs and the Digital operating system. The server supports up to 16MB of memory and dynamically allocates memory to each user.

For four simultaneous users, 386-Ware is priced at $9,995; for eight users, the price is $12,995. Pricing includes all hardware and software needed to add PC compatibility to a Digital system. LOGICRAFT, Nashua, N.H. CIRCLE **257**

NBI Expands Line

Introduces publishing workstation, minicomputer, and scanner.

NBI recently extended its electronic publishing product line with three new products.

The Pro-Publisher Plus workstation is a smart terminal attached to an NBI 520 or 570 minicomputer. It features a high-resolution, 17-inch monitor, keyboard, and mouse. NBI says it is designed for long documents and complex graphics. It incorporates industry standard architecture such as VME Bus and Unix 4.2, allowing it to be used as a standard Unix workstation and providing compatibility with NBI's 5000 Series systems. Full-page resolution is 1,024 by 1,440 and WYSIWYG display is provided. Software included with the workstation includes document composition, chart graphics, spreadsheet, design graphics, spelling, communications, and equations. The price is $6,500.

The NBI 520 is a minicomputer that can support up to 16 users and provides up to 212MB of storage. It provides 2MIPS of computing power and uses a 32-bit 68020 processor and VME bus. It's fully compatible with other NBI minicomputers, says the company. The price is $18,900.

The NBI Pro-Scan flatbed scanner allows users to scan images up to 8½ by 14 inches. The Pro-Scan system includes a scanner, an NBI 4110 personal computer with 20MB of storage and 640K of RAM, a mouse pointing device, an NBI Net interface board, and image editing software. It connects to the company's 5000 series workstations and the 500 series minicomputers via NBI Net. It provides a resolution of up to 300 by 300dpi. The Pro-Scan is priced at $9,995. NBI INC., Boulder, Colo. CIRCLE **258**

New Compaq Deskpro

A 12MHz version replaces 8MHz Deskpro 286.

Compaq has rolled out its most powerful 80286-based microcomputer, the 12MHz Deskpro 286, in three models.

Compaq says the new 12MHz version runs up to 50% faster than the 8MHz version, which was introduced in April '85 and, Compaq claims, is its most successful desktop product. A dual-speed processor on the new micro allows users to switch between 12MHz and 8MHz. The expansion bus always operates at 8MHz while the processor is running at 12MHz, so that compatibility with 8MHz 80286-based expansion boards is maintained. An 80287 coprocessor for mathematical calculations is optional.

The 12MHz Deskpro 286 supports up to four half-height storage devices, including a 20MB, 40MB, or 70MB fixed disk drive and an optional 40MB fixed disk drive tape backup. A 5¼-inch, 1.2MB diskette drive is standard and an optional 360KB diskette drive is available.

The system board provides up to 2.1MB of RAM. Seven expansion slots are incorporated, and a 101-key keyboard is included. Video options include the Compaq Enhanced Color Graphics Board and Display Controller Board, and the Compaq Color Monitor and Dual-Mode Monitor.

The 12MHz Compaq Deskpro 286 is available immediately. The Model 1 is priced at $2,999, the Model 20 is $3,999, and the Model 40 is $4,999. COMPAQ CORP., Houston. CIRCLE **259**

Looking Back

TWENTY YEARS AGO IN DATAMATION: "Yes, Virginia, there is an MIS." (From Editor's Readout, Robert B. Forest, May 1967, p. 21.)

TWENTY-FIVE YEARS AGO IN DATAMATION: "Low-power microwave transmission of data over the horizon at high speeds without using relay stations has been reported by IBM, San Jose, Calif. In recent experiments, computer data was transmitted over a mountain at speeds of 500K bits/second, with power as low as 16 watts, using small antennas. "The experiments, being conducted by IBM's Advanced Systems Division, are based on a technique called 'knife-edge diffraction,' which uses the narrow ridges of a mountain range to deflect radio signals." (From "Data Transmission Over the Mountain," May 1962, p. 75.)

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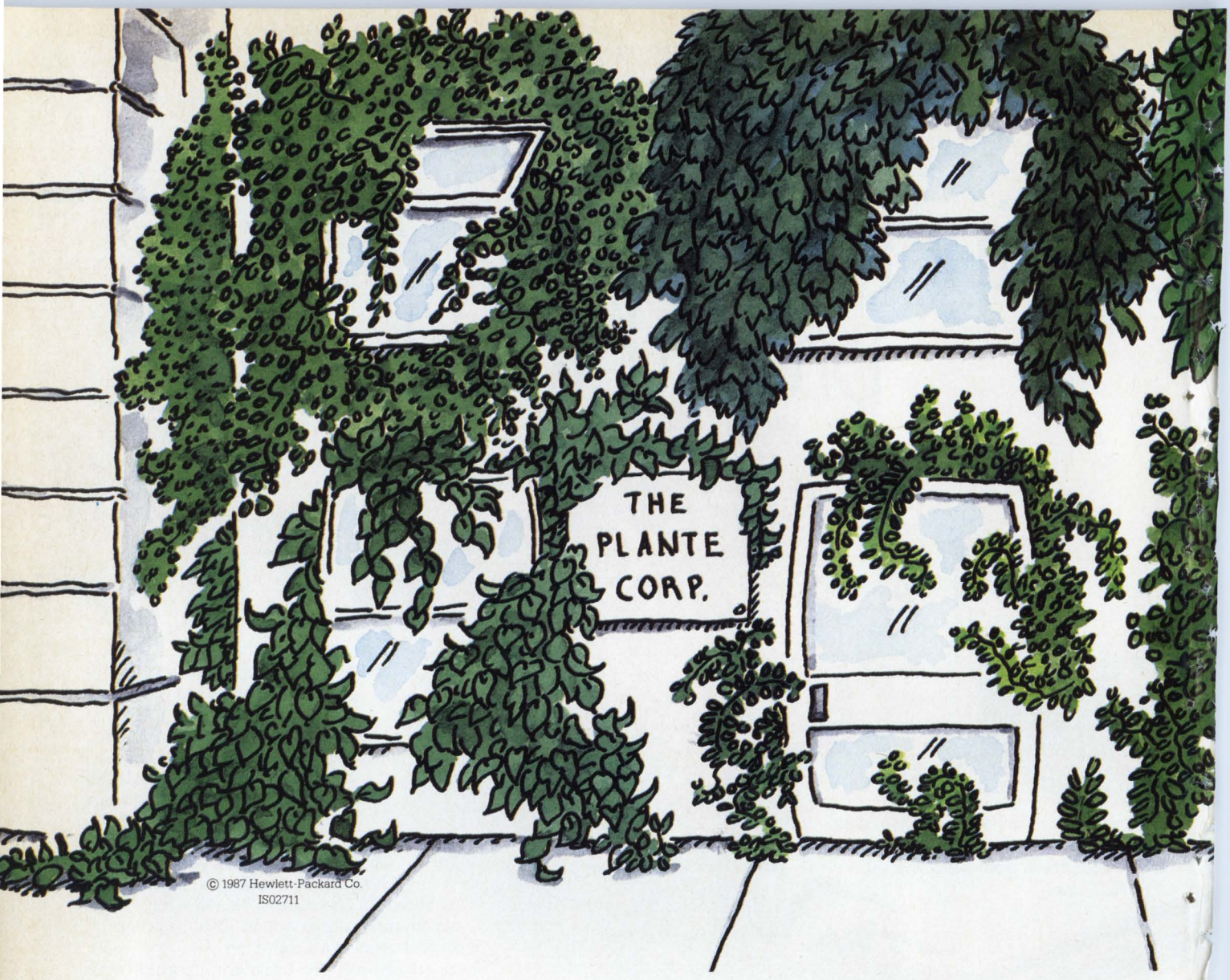

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CIRCLE 47 ON READER CARD

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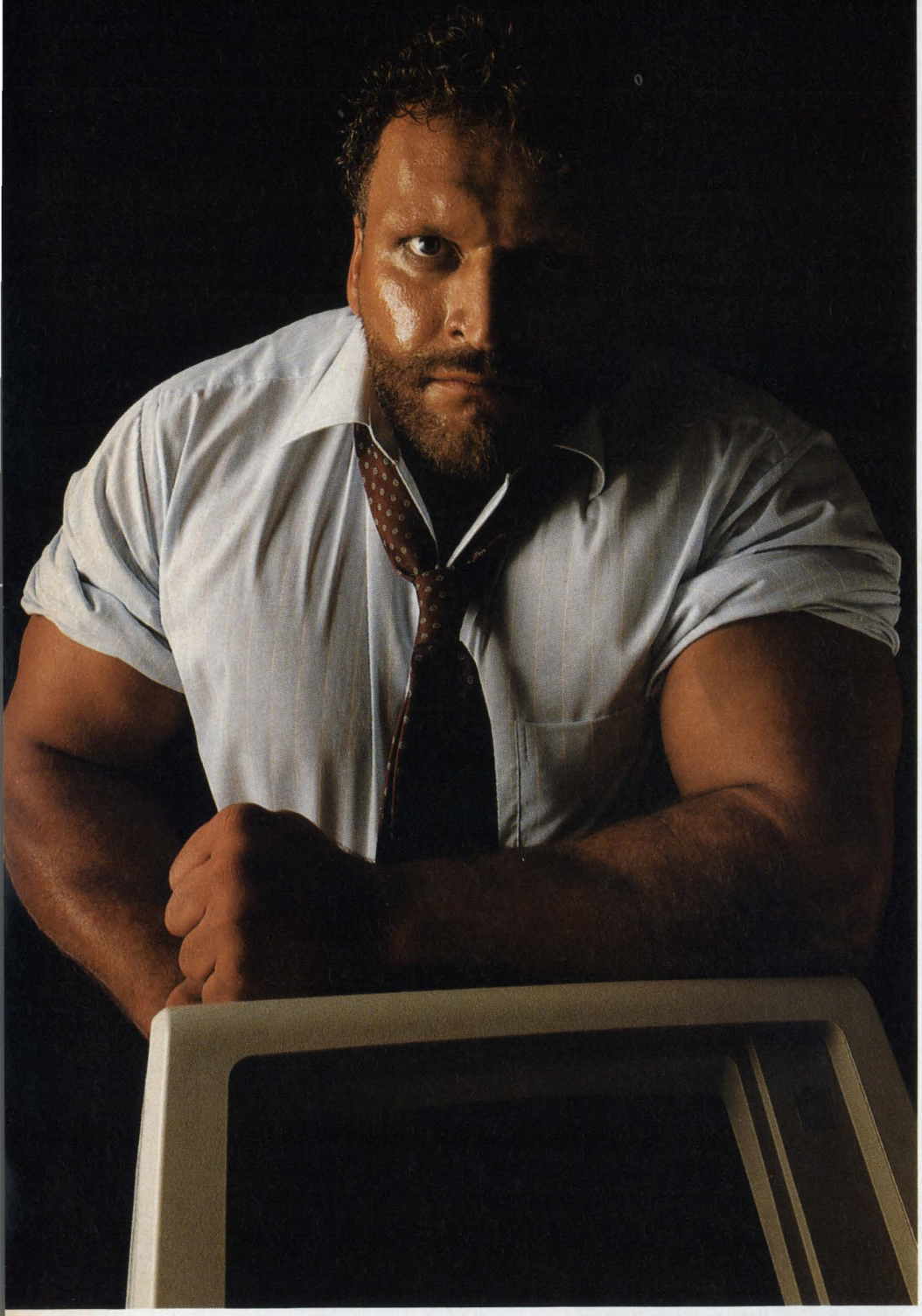

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CIRCLE 46 ON READER CARD

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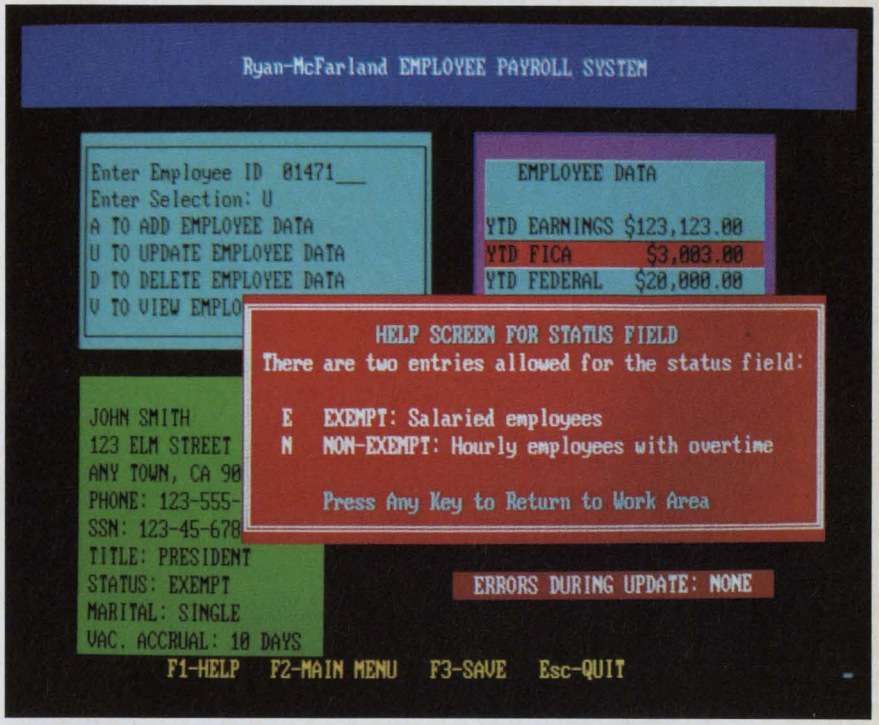
UPDATES

DIGITAL EQUIPMENT CORP. recently announced a software program for desktop publishing that it has been talking about since last fall (see Look Ahead, Oct. 1, 1986, p. 10). The Digital Document Interchange Format (DDIF) is a revisable compound document interchange format that allows different systems in a network to exchange documents containing information in the form of text, graphics, and images. It was designed to support the Office Document Architecture (ODA) guidelines now being developed by the International Standards Organization (ISO). By conforming to ODA guidelines, Digital is assuring that its systems will be able to interchange compound documents with other vendors' systems that comply with the ODA standard. "Digital is commited to a smooth interface between DDIF and ODS," says Jackie Kahle, marketing manager of the Electronic System Group at Digital.

A group of four European companies—Bull, ICL, Olivetti, and Siemens—is also preparing an ODA standard, which is being supported by the European Commission as part of the Esprit research program. The four companies formed a joint venture in early 1986, following in the footsteps of the European Computer Manufacturers Association (ECMA), which made recommendations for standardizing document exchange. The group is currently studying ways to implement more standard formats for variable layouts, data and computer forms, and structured voice transmission and recognition. The specifications for DDIF are based on existing CCITT X.409 and ISO ASN.1 recommendations, and are consistent with the X.400 international mail and messaging standards. Standardized Generic Markup Language (SGML) encoded documents are also supported.

Digital has provided copies of the specs to three software vendors with which it has signed cooperative marketing agreements—Interleaf, Datalogics, and Information Dimensions Inc., all of which have agreed to provide DDIF interfaces from their software.

SOFTWARE



Ryan McFarland's Employee Payroll System.

Language Compiler Productivity Tools

Ryan McFarland's new COBOL and FORTRAN application development programs

BY THERESA BARRY

Ryan McFarland has introduced two new tools for use with its RM/FORTRAN and RM/COBOL compiler products. They are the first in what the company says will be a series of tools designed to enhance productivity for software programmers. RM/Forte is an application development "environment" for use with the FORTRAN compiler; RM/Screens works in conjunction with RM/COBOL-85.

RM/Forte manages programmers' program files by combining them into one environment. The company claims that users of RM/Forte have reported productivity gains of up to 50% because of time saved in writing and testing RM/FORTRAN applications.

Its basic functions are managing projects, editing, compiling, linking, and executing.

A user can move between tasks with a few keystrokes. RM/FORTRAN, version 2.4, which was introduced at the same time as the productivity tools, will include RM/Forte. The new version of RM/FORTRAN will be bundled with RM/Forte and is priced at $595. RM/Forte is available as an update for $150. Initially, it will run under PC/DOS. Both the new version of RM/FORTRAN and RM/Forte will be available in late June.

RM/Screens is said to reduce by 40% the time programmers spend producing screens for their COBOL applications. The utility automatically generates the COBOL code needed to define screens and data entry fields and to validate the data entered.

Three subsystems for formatting screens, defining fields and validation criteria, and generating code are included in RM/Screens.

Two additional utilities allow screen prototyping and cross-referenc-

ing of all screens and fields.

RM/Screens will be available in July and is priced at $400. Bundled with RM/COBOL-85 for PC MS/DOS environments, its price is $1,600. RM/COBOL-85 alone is $1,250. RYAN MCFARLAND, Rolling Hills Estates, Calif. CIRCLE **260**

Graphics Interfaces

Kurzweil unveils software interfaces to Macintosh and IBM PC.

Two new microcomputer software interfaces for the Kurzweil 4000 intelligent character recognition document scanner were recently announced. The interfaces, called ArtScan, are geared toward users who need to input line art graphics from various sources into a personal computer for further editing, storage, printing, or publishing.

The Macintosh ArtScan interface converts graphics at full resolution into SuperPaint and MacPaint for editing, storage, or printing. PICT format files for resizing illustrations can also be output. Output of graphics to printers for both microcomputers include ImageWriter and LaserWriter. Files are output as bit-mapped raster images. The IBM PC interface works with PC Paintbrush. Users input line art graphics on the 4000 scanner, which are then accepted by PC Paintbrush for editing, storage, and printing.

Recommended hardware is a Macintosh Plus or Enhanced 512K Macintosh or an IBM XT, AT, or compatible. The Mac interface includes FreeTerm communications software. Both interfaces can be used to transmit graphics to page layout software programs.

The interfaces are free to purchasers of the Kurzweil 4000 and ArtScan software enhancements. Separately, ArtScan is $4,500 in a 10MB configuration, $5,500 in a 30MB configuration. The 4000 ICR scanner is $36,500. KURZWEIL COMPUTER PRODUCTS INC., Cambridge, Mass. CIRCLE **261**

VAX Expert System Shell

Redesigned to run on Digital's VAX computer under VAX/VMS.

Inference Corp. has rewritten its Automated Reasoning Tool (ART) software, used to develop expert systems and other knowledge-based systems, to run on the DEC VAX. It was previously available only on Symbolics, TI Explorer, and Sun workstations. The package is designed to run under the VAX/VMS operating system. It is written in C and includes such features as memory management ("virtually garbage-free," the company says), ambidextrous pattern-matching, integrated object-based and rule-based programming, and graphics.

The software, which is designed for manufacturing, financial services, and similar applications, is priced at $29,500 until July 31. Thereafter, the price goes up to the "normal" $65,000. INFERENCE CORP., Los Angeles. CIRCLE **262**

Decision Support

Execucom's newest IFPS/Plus incorporates AI technology.

IFPS/Plus 3.0, the decision support software program from Execucom Systems, now provides users the ability to ask "why?" in addition to "what if?" and "how?" the company says.

The program uses natural language queries to ask such questions as "Why did net income go down in quarter three?" The program provides answers in natural language terms, such as "Net income went down in quarter three because sales in region four decreased."

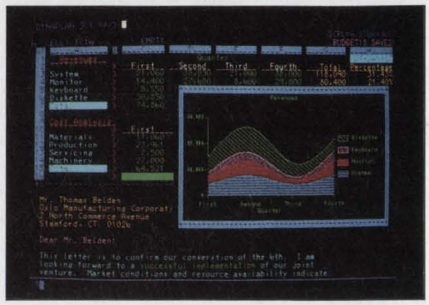
This new release of the 12-year-old product is the result of a collaborative effort between Execucom and the Intelligent Systems Lab at Carnegie-Mellon University, Pittsburgh, begun in 1983. The company says the new release has 250 additional enhancements, including user-definable full-screen forms, data-driven applications via tables in the built-in relational database, improved interrogation of multidimensional models, the incorporation of features from IFPS/Personal (the pc version of the product), a template library, and the ability to customize with synonyms and processing defaults.

IFPS/Plus 3.0 is available now for IBM MVS/TSO, VM/CMS, DEC VAX, Prime, and selected Unisys environments. The price ranges from $9,000 to $85,000 depending on system and the number of users. EXECUCOM SYSTEMS CORP., Austin, Texas. CIRCLE **263**

Integrated System

For IBM mainframes using MVS/TSO and VM/CMS.

Dynasoft Corp. has announced its Dynasoft Integrated Software System, which links spreadsheet, word processing, graphic, and database interface business functions.



The package features overlay windows, allowing users to manipulate data in the spreadsheet, graphic display, and word processing document simultaneously. Overlay windows also show changes in graph or word processing documents as information in the underlying spreadsheet is altered.

Dynasoft says one set of commands operates all four systems and all processing is done in one environment. Pop-up menus prompt users for commands.

Dynasoft Integrated Software System is priced from $17,500 to $49,000, depending on system configuration. Upgrade prices are available for Dynasoft's Dynaplan spreadsheet package. DYNASOFT CORP., Rosemont, Ill. CIRCLE **264**

Nomad2 Module

D&B Computing offers Reporter Nomad as standalone unit.

Reporter Nomad, which D&B Computing Services claims is the most widely used component of its Nomad2 4GL/DBMS family, is now being offered as a standalone software product.

Reporter Nomad facilitates reporting, inquiry, and data extraction, and can be used both interactively and in batch mode, against external files and DBMS structures, and with Nomad2 databases. Reporter Nomad features Nomad Windows, a mainframe windowing environment. Included in Reporter Nomad are general purpose and financial reporting tools, as well as a nonprocedural 4GL and the control of a procedural language.

An optional inquiry package allows users to create customized, menu-driven inquiry and analytic applications. It includes a database browser, database navigation commands, and screen formatting commands. Also available as options are the Nomad Assistant, a nonsyntax, menu-driven user interface for database reporting, and Beamit, a mainframe-to-micro file conversion program. Reporter Nomad accesses both sequential and

VSAM files. Optional interfaces access IBM's SQL/DS and DB2, files on Teradata's DBC/1012 database machine, and data in IMS and IDMS databases.

Reporter Nomad is priced from $31,500 to $42,000. Inquiry is $8,000, the Assistant is $7,500, and Beamit is $5,000. D&B COMPUTING SERVICES, Wilton, Conn. CIRCLE **265**

PC-to-PC Communications

Package communicates via IBM's SDLC protocol.

Network Software Associates recently introduced RemoteTalk, an IBM PC-to-PC synchronous communications package that provides both remote control and concurrent background file transfer capabilities.

It runs on IBM PCs and compatibles and is designed primarily for remote support, training, and file transfer applications, says NSA. When two PCs are linked, the local PC is transformed into an extension keyboard and screen of the remote PC, allowing the local PC user to view and directly key into the remote's application program.

RemoteTalk operates at up to 19,200bps on a PC or compatible with 192K of memory, an SDLC adapter board, and a synchronous modem. It supports three modes of operation on each PC: RemoteImage, which is used for remote access and control applications; RemoteTalk, which allows the primary PC to transfer files or issue control commands interactively while the second sends messages; and PC/DOS mode, which allows PC/DOS applications or commands to be performed in the foreground while RemoteTalk functions such as file transfer are performed concurrently in the background. Other features are interactive message windows for typed conversations, password protection, data compression, an idle timer, batch command processing, and optional autodial capabilities.

RemoteTalk is available now for $295. NETWORK SOFTWARE ASSOCIATES INC., Laguna Hills, Calif. CIRCLE **267**

Information Management on PC

Ramis/PC Workstation introduced by On-Line Software.

Ramis/PC Workstation is an information management environment for PC end users. It features a relational database manager, a 4GL report writer, a workstation manager, and a micro-to-mainframe link.

Ramis/PC has a menu-based architecture consisting of four components. KeepIt is the relational database manager, which facilitates file definition, screen design, indexing, file linking, data entry, and maintenance. RamLink is the communications program that connects the PC to the mainframe Ramis Information System. PC/Reporter is the 4GL-based report writer. It has a direct interface to dBase III files and works with other file types, such as DIF, Comma DeLimited, KeepIt, and Ramis Save. Workstation Manager organizes PC software and applications by providing access to each component of the program. It provides built-in utilities such as DOS commands in pop-up menus and security through encryption.

Ramis/PC Workstation is priced at $375 per PC. On-Line is offering one free copy with the purchase of Ramis Information System. ON-LINE SOFTWARE INTERNATIONAL, Fort Lee, N.J. CIRCLE **268**

Data Communications

Includes PC-to-PC remote control and host terminal emulation.

Carbon Copy Plus from Meridian Technology Inc., based on that company's existing Carbon Copy program, is a data communications package for IBM PCs and compatibles that features PC-to-PC remote control, PC-to-host terminal emulation, and X-Modem and Kermit file transfer protocols.

The new product includes all of the remote operation and control features of Carbon Copy, says Meridian, plus additional remote control features, including the ability to link two PCs over an asynchronous dial-up link or direct serial connection. Plus also allows a local PC user to access, observe, and control the operation of a remote PC.

Remote features retained from Carbon Copy include memory-resident operation, log file and audit trail, remote printer support, remote keyboard enable/disable, and support of interactive graphics.

Plus emulates asynchronous terminals, such as a DEC VT-52 or VT-100, Televideo 920, and IBM 3101. It can directly read and execute Crosstalk script files, and it supports IRMA remote emulation boards. Carbon Copy Plus supports X-Modem and Kermit asynchronous protocols allowing both binary and ASCII file transfers.

The product is now available directly from Meridian. It runs on any IBM PC, XT, AT, Convertible, or compatible with 256K of memory, and is priced at $195. For PC-to-PC remote control applications, each PC requires a copy of the program. MERIDIAN TECHNOLOGY, Newport Beach, Calif. CIRCLE **266**

Looking Back

FIFTEEN YEARS AGO IN DATAMATION: "James M. Morris, associate publisher of DATAMATION since last May, has been named publisher of the magazine. Mr. Morris, who is both an engineer and veteran publishing executive, joined DATAMATION in 1963 as a sales representative." (From People, May 1972, p. 142.)

James Morris in 1972.

TEN YEARS AGO IN DATAMATION: "In an unparalleled performance, IBM drove the industry wild this spring with a series of announcements that wore out 500 Wall Street calculators." (From "The IBM System/370 Model 3033," by Angeline Pantages and Michael W. Cashman, May 1977, p. 235.)

FIVE YEARS AGO IN DATAMATION: "A Raleigh, N.C., dp executive threw up his hands in dismay. 'It's harder and harder to stay on top of things today,' he lamented. 'I'm supposed to be the resident technical guru. That means keeping up with state-of-the-art technology. At the same time I've been told if I want to advance in this company, I must broaden my management skills. Meanwhile, I've been busier than hell just keeping the dp department running effectively.' " (From "I'm Learning as Fast as I Can," May 1982, p. 113.)

FIVE YEARS AGO IN DATAMATION: "Anthropomorphic programming, suggested by researchers at the University of Waterloo, may be the answer to some future supercomputing problems." (From "Seeking Speedy Software," Edward K. Yasaki, May 1982, p. 66.)

PEOPLE

ADR's New Torchbearer

Dennis Strigl defines his mission as a recommitment to addressing the day-to-day needs of his company's customers.

BY KAREN GULLO

"Hardware and software vendors . . . are not focused on the day-to-day, practical needs of customers," says Dennis Strigl, sitting in his new office in Princeton, N.J.

"Incidentally," he adds, "ADR is no exception."

Strange, this coming from one of the top executives of the company in question. Strigl, 41 years old, became president of Applied Data Research last fall, several months after the company was acquired by Ameritech Corp. Formerly president of Ameritech Mobile Communications, Strigl had no previous experience in the software industry. But, he says, his experience as a manager who regularly used information and reports that were products of the technologies in MIS affords him a view of the computer industry that is respectful yet critical. Thus the jab at ADR.

"Vendors are somehow focused on the future, focused on everything but everyday practical needs," he observes.

But in the same breath, Strigl makes it clear that while software companies may be guilty of overlooking practical needs, ADR is committed to providing working solutions for its customers. "ADR is recommitting itself to solving those day-to-day needs," he says. "Our mission is to provide MIS with the ability to use more efficiently and productively the computers they already have."

Only a high-level manager can know the pressure on today's MIS department to do more with the technology it now possesses, says Strigl. This is a perspective he feels can be very useful to ADR. "Top management and MIS managers are concerned that in some instances computer costs have tripled or quadrupled, and at the same time, the bottom line hasn't experienced similar [growth]," he adds. "If you look at the pressure being placed on MIS professionals, you have pressure for increased productivity, while workloads are greater, budgets are tighter, and management is saying, 'Do more, but spend less.'

"An MIS director today almost has to be a magician."

Strigl came into leadership at ADR at a rather troubled time for both the company and the software industry (see "Business As Usual?" March 15, p. 19). His appointment as president gave off an aura of parent company pressure and displaced Martin Goetz, who had had the post from 1984 to 1986 and left it to become chief technology officer of ADR. ADR suffered losses in 1985 and apparently in 1986 as well. Strigl isn't blind to the problems. "For most in the industry, 1986 was not a good year," he agrees. "ADR is no exception."

But he is optimistic about the future, saying that a slew of enhancements of existing products and a commitment to support SQL will meet customer demands for reliability and efficiency. "There's been a lot of marketing promises made in the industry in the past that haven't been kept. That's part of the crunch that I think MIS is in today," says Strigl. "When we make a promise, we want to deliver on that promise."

While many ADR users say they were not surprised when Ameritech brought in one of its own to head the newly acquired company, there were rumblings of concern a good 10 months before that, when the telecom giant first acquired ADR. Some observers worried that the huge bureaucracy of Ameritech, parent of five midwestern Bell operating companies, would have a negative effect on ADR (see "Deep Pocket Partner," Jan. 1, 1986, p. 22).

Strigl says there is "no heavy hand of Ameritech" at ADR. In fact, he says, the environment at ADR is not very different from that of the mobile communications division he headed previously.

Originally from the East Coast, Strigl has lived in Chicago for the past five years, where he was area vp for AT&T Information Systems before joining Ameritech as a marketing vice president. He was named president of Ameritech Communications in October 1983, then became president of the mobile communications unit in April 1984.

Strigl is a tennis and jogging enthusiast and looks as though he could sprint a couple of miles and not even break a sweat. In 1980 he was one of the runners who carried the Olympic torch at the Olympics in Los Angeles. He is married and has two teenaged sons.

For now, though, Strigl's energies are consumed by Ameritech and ADR, both of which he describes as "very innovative companies. The spirit of the business is very much the same. There's a high level of esprit de corps." The big difference, he adds, is "the bureaucracy of the telephone company is not present here." ■

DENNIS STRIGL: "When we make a promise, we want to deliver."

Photograph by Tom Sobik/Black Star

BOOKS

Top Gun

BECOMING A TECHNICAL LEADER: AN ORGANIC PROBLEM-SOLVING APPROACH
by Gerald M. Weinberg, Dorset House, New York (1986, 284 pp., $28.50).

BY PAUL S. LICKER

Gerald Weinberg's latest book, *Becoming a Technical Leader*, should be familiar to those who have read his previous books, attended his courses, or consulted with him. Through 24 chapters as diverse as "Where Power Comes From" and "Obstacles to Effective Organizing," Weinberg pounds out one theme: his personal philosophy and how his life has shaped him to bring its message to us. You have to admire a man who would expose himself so much in his books. In the first 28 pages he mentions himself no fewer than 227 times.

The book is intended for those who have missed Weinberg's workshops. "Our workshops do not teach people to become leaders," he reveals in this book, "they merely give a boost to each person's unique experiential process of self-development." Because the book is written in this style, everyone will get a unique payoff from the effort of reading it.

And it is an effort. Inductive reasoning from single examples; proof of a rule by personal experience; lack of precise, operational definitions; grand oversimplifications and generalization; name-calling and guilt-by-association techniques; and a lack of scientific rigor and evidence characterize this chronicle. Because the book is a personal, rather than a scientific, statement, criticism in this vein is a bit heavy-handed. It is also unnecessary, because the book ultimately fails in terms of its appropriateness and usefulness regardless of its philosophy.

Weinberg teaches leadership ("the process of creating an environment in which people become empowered") through what he calls an "organic" model of change: motivation, organization, and innovation. He builds his advice around this untested model and weaves a tapestry of ideas from therapy (Virginia Satir and Carl Rogers), sincerity (Dale Carnegie), organizational power analysis (Barry Oshry), and most prominently, Gerald and Dani Weinberg. As a tapestry it is attractive and the ideas might withstand a workshop setting, but they fail in a book. While many are well tested or obvious in their original fields (especially those about problem-solving), many more are speculative (including those about innovation and power). The ideas flow freely, but will readers who apply Weinberg's dicta become technical leaders? That seems doubtful in light of the lean treatment of technical leadership per se.

The book is less about leadership than understanding yourself as Weinberg has done (a noble idea in any field). But it ignores technology, saying little about the mutual interaction of technology and technologists and how both in turn influence leadership. While correctly noting that technologists fall back on their technical strengths under pressure, Weinberg fails to cite any of the recent trends that reduce the technical component (4GLs, for example) and increase the interpersonal component of leadership (e.g., information centers).

Instead of fact, the reader gets advice from Weinberg, his family, his students, and his clients. Some of this advice is good (learn to see yourself as others see you); some bad (attempting to use Satir's approach to therapy on oneself); and most irrelevant or humorous (such as advice to change things in your environment and see what happens!). The value and appeal of this book are the same as most self-help books. It promises simple and mostly painless how-tos to persons who want help badly. Weinberg promises some pain—but *much* pain is likely to result from applying his oversimplified advice to complex situations. An example of this danger is found in the exercises, which may be instructive in a workshop, but which can frustrate or confuse without guidance. Consider this from p. 101: "What difficulties are you now experiencing? What are you learning from them?"

This book is for followers, specifically followers of Weinberg; I do not recommend it for potential technical leaders who will face a turbulent and sometimes hostile environment. ■

Paul S. Licker is associate professor of management information systems at the University of Calgary and has written two books, The Art of Managing Software Development People *(John Wiley & Sons, New York, 1985) and* Fundamentals of Systems Analysis with Application Design *(Boyd & Fraser, Boston, 1987).*

CALENDAR

JUNE

Audiotex '87 Exhibition and Conference.
June 15-17, New York City. Contact Carol Peters, Online International, 989 Avenue of the Americas, New York, NY 10018, (212) 279-8890.

Electronic Data Processing Auditors Association (EDPAA) Annual Meeting.
June 15-17, Seattle. Contact EDPAA, P.O. Box 88180, Carol Stream, IL 60188-0180, (312) 682-1200.

Localnet East Exhibition and Conference.
June 15-17, New York City. Contact Carol Peters, Online International, 989 Avenue of the Americas, New York, NY 10018, (212) 279-8890.

NCC '87.
June 15-18, Chicago. Contact NCC '87, American Federation of Information Processing Societies (AFIPS), 1899 Preston White Dr., Reston, VA 22091, (800) NCC-1987, or (703) 620-8955.

CEPA 1987 Spring Conference.
June 22-23, Washington, D.C. Contact Society for Computer Applications in Engineering, Planning, and Architecture Inc., 15713 Crabbs Branch Way, Rockville, MD 20855, (301) 926-7070.

Plas-Tech '87.
June 23-25, Atlantic City. Contact Delia Associates, Route 22 W., P.O. Box 338, Whitehouse, NJ 08888, (800) 526-5978.

A/E/C Systems '87 (Computer Show for the Design and Construction Industry).
June 23-26, Washington, D.C. Contact Conference Director, P.O. Box 11318, Newington, CT 06111, (203) 666-6097.

JULY

Sixth National Conference and Exhibition of the American Association for Artificial Intelligence.
July 13-17, Seattle. Contact American Association for Artificial Intelligence, 445 Burgess Dr., Menlo Park, CA 94025-3496, (415) 328-3123.

ACM SIGGRAPH '87.
July 27-31, Anaheim, Calif. Contact Association for Computing Machinery Inc., Special Interest Group on Computer Graphics, Conference Services Office, 111 E. Wacker Dr., Chicago, IL 60601, (312) 644-6610.

LETTERS

Smoke and Fire, Smoke and Mirrors

Regarding "Where There's Smoke, There's Fire" by Karen Gullo and Robert Poe (March 1, p. 17) and the editorial in the same issue (p. 3) concerning Japanese supercomputers: some of the comments about the Japanese would sound nonsensical if reflected back on us. If American companies can give better price/performance, why don't they? And if they were on the other side of the coin, wouldn't they try to be the "lower-priced imports" in other countries, as American products have been at times?

Also, regarding discriminatory practices: late notification is not fair, although it's used in lots of cases here. But how can one complain that the Japanese government issues its official documents in its own language? I don't see the United States government issuing RFPs in Japanese, or in any language other than English. Other people have made the effort to learn the language of this marketplace in order to do business here. If we don't bother to learn theirs, we can't expect them to bend over backwards for us.

HARLAN ROSENTHAL
Fair Lawn, New Jersey

Congratulations on your great editorial and article on the Japanese trade problem. The only trouble is that it is too little, too late.

Where was DATAMATION when the Japanese were systematically capturing the U.S. as part of their Greater East Asia Co-Prosperity Sphere on automobiles, ICs, tvs, pcs, etc., etc., etc.?

The trouble with most Americans dealing with the Japanese is that they don't understand the Japanese, and expect them to play by Western rules. They don't, and they won't.

DANIEL B. McDEVITT
Progress Engineering and Consulting Enterprise Inc.
Tulsa, Oklahoma

Correction

There was an error in "Disaster Recovery: Who's Worried?" (Feb. 1, p. 60). Sungard Services, Wayne, Pa., does *not* charge its clients for transporting employees to hot sites. According to Robert F. Bronner, Sungard's vp of marketing, "Sungard encourages use of the Sungard Remote Testing Operations Centers that are available around the country at no charge for testing purposes, or at time of disaster." We apologize for the error.

READER'S FORUM

Agents of Change?

Some information systems people fancy themselves agents of change. In their view, business people are those who resist change. But change comes in many flavors; I've found at least three—which I'll call alpha, beta, and gamma—and I contend that the dp/MIS department's supposed taste for change hardly includes them all.

Alpha change is a purely technical change, of the kind imposed on end users when pencils are replaced by keyboards and printed reports by screens. End users have to do things differently and may also have to learn five different sets of commands and function keys before being able to do anything they deem useful. In addition, all this has to be accomplished with the pressures of their regular work unabated. Seldom are they enthusiastic about this sort of change.

Beta change finds resistance from MIS's own ranks. This category refers to the application of new technologies within MIS. Of course, some MIS people love to explore new technologies and more advanced toys—oops, I meant tools. But many are unwilling to abandon assembler or COBOL in favor of software generators and 4GLs. Nor is data dictionary discipline to their tastes. They complain about poor documentation of commercial software, but hate to document their own creations. Sound familiar?

Still, there's a third kind of change, which is seldom, if ever, referred to in MIS articles and discussions.

MIS professionals like to proclaim that the rapid change characterizing today's business environment demands the strategic application of information technology. We are convinced that all we need is a chance to apply it and all end users' woes will go away. But how do we go about introducing these changes?

First we study the requirements of the target system. This usually means that we study what exists, with the occasional attempt to extrapolate perceived trends to allow for future developments. Then we freeze our findings. Over the frozen body of requirements we pour the concrete of programming. Implementation can easily be a year or more after the initial definition of requirements.

All this might have been quite rewarding and satisfactory in the 1950s and 1960s, when we were dealing with highly predictable, closed dp systems. This is not the case in the mid-1980s. Already some time before the implementation, the end users usually complain that they need modification to the initial requirements. After the system is installed, the requests for changes come down like a snowstorm. We in MIS bravely resist this onslaught. We have a backlog of work that determines our current priorities; we log in complaints for the next time we redesign this system or add enhancements. We hope this will teach users to think more about their requirements in future systems.

But why are the users asking for changes so soon? Are they so feebleminded?

They are not feebleminded—many are as analytical as we are. Fascinated with the change in information technology, we completely overlook another change, which occurs continuously in organizations. This change, like the evolution of a living organism, is hard to notice. It occurs daily and originates from continuous improvements that clerks, workers, and managers bring to their daily tasks.

In an open manual system all these changes would be absorbed and incorporated without anyone noticing. Not so in a semiclosed, computer-based version of the same system. It is the information technology equivalent of the work-to-rule strike. The system is embalmed as it was initially defined. Any change must be discrete, usually in big steps, nearly revolutionary. This is a complete mismatch with the evolutionary, imperceptible, or creeping change that occurs in the living organism of a corporation. Thus the improvements that might be beneficial have to be handled outside of the existing system.

This change, gamma, is the one we must focus our attention and research on. We have to develop tools and means to enable it to occur freely and be incorporated promptly in our computer-based systems. First, however, we must recognize how vital this sort of change is.

At present we are not its protagonists. We are its strongest opponents.

JACEK KRYT
Professor
Continuing Education Division
Ryerson Polytechnical Institute
Toronto, Ontario

If you'd like to share your opinions, gripes, or experiences with other readers, send them to the Forum Editor, DATAMATION, 875 Third Ave., New York, NY 10022.