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MARCH 1, 1987
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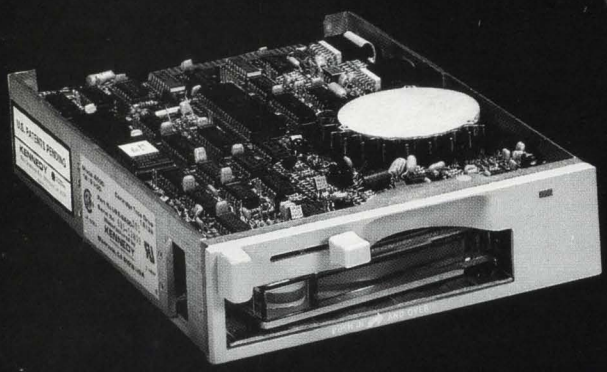

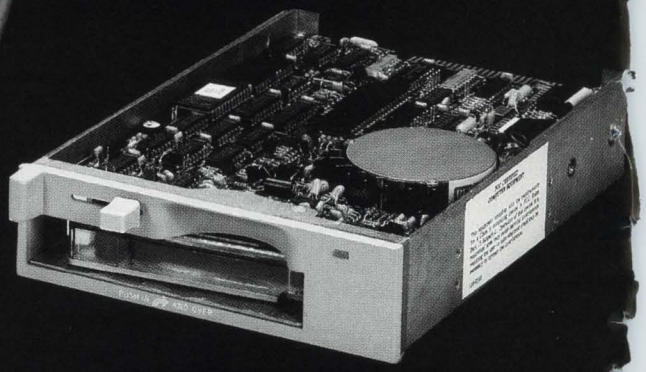

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DATAMATION

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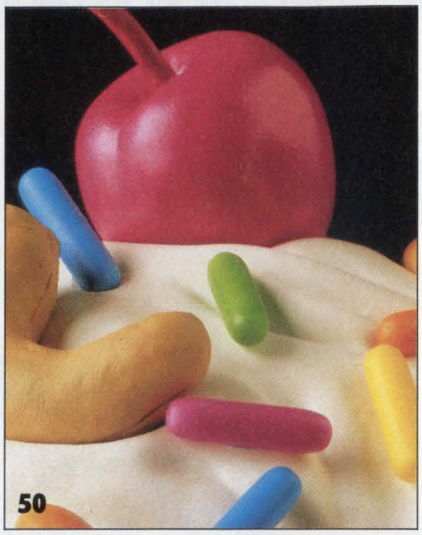
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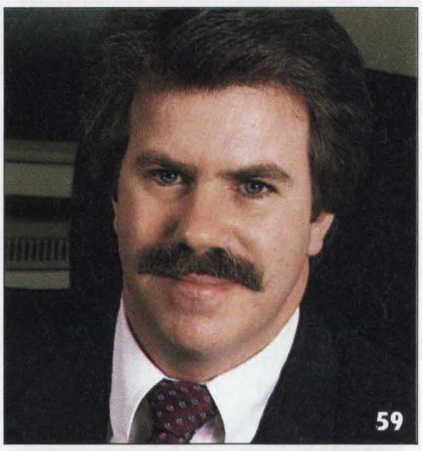
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3-D COVER ILLUSTRATION BY KATHY JEFFERS; PHOTOGRAPH BY WALTER WICK

INTERNATIONAL EDITION

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Editorial

Japan Has Gone Too Far

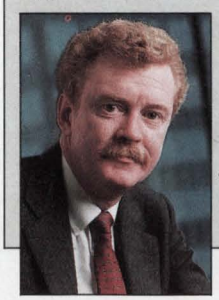
Once again the U.S. is embroiled in a dispute with the Japanese regarding Japan's trade practices. As documented in "Where There Smoke, There's Fire," by associate news editor Karen Gullo and Tokyo bureau manager Robert Poe, p. 17, this time the caldron of disagreement is supercomputers.

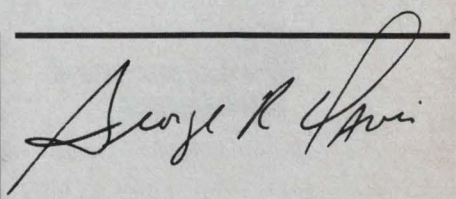
If similar disputes in the past between the U.S. and Japan regarding technology could be called dangerous, this one can be labeled potentially catastrophic. It's time for the U.S. to draw the line on Japan's artificial advantages in the world's computer industry. It's time for the Reagan administration to join the twentieth century in matters of trade.

It is clear by now that despite years of polite discussions with various U.S. and European delegations—both official and unofficial—Japan has no intention of playing the game under the same rules as its trading partners. As Gullo and Poe point out, Japan has perfected the art of freezing out the U.S. and other potential competitors.

The Meteorological Agency case has all the elements of comedy, but it isn't funny. And it isn't anything new; language difference is only the newest twist, joining such classic ploys as loading dock languish, in which anything bearing a non-Japanese label waiting on any Japanese loading dock is always last to be handled, and the 24-hour RFQ, where American and European computer makers receive Japanese RFPs (or RFQs) a day or two before the return deadline, and months after Japanese manufacturers have had them.

The difference now is that we are dealing with supercomputers—maybe the only remaining U.S. edge in computing technology. The time has come to fight back. The U.S doesn't need or even want an artificial advantage, only equal treatment in a worldwide marketplace. The Japanese say that the U.S is not competitive enough. Take away the advantages allowed Japan by several U.S. administrations and force it, through tariffs and quotas, to price its product equally around the world, and then measure U.S. competitiveness. If the U.S. doesn't make a stand now, there may not be another opportunity.





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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.

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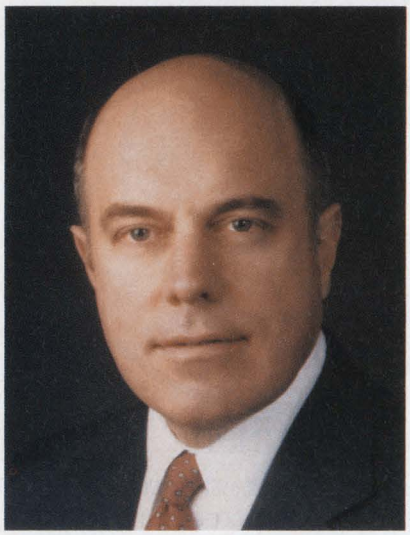

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Rand McNally & Company

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"To survive a 40 percent drop in U.S. prices three years ago, we had to sharpen our marketing focus. To sharpen our marketing focus we had to automate our sales tracking and reporting capabilities. To do that we had to have a high-performance, integrated, database management system with versatile application development tools. In a nutshell...we had to have Cullinet."

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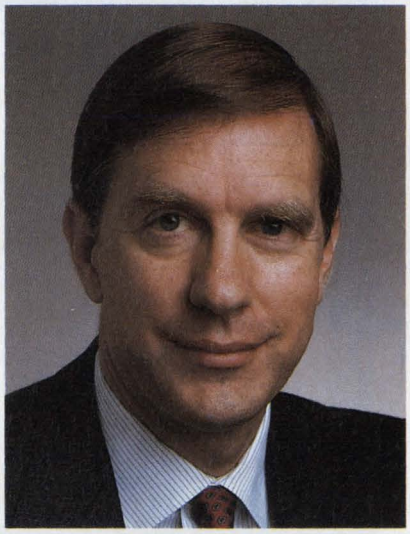
Bjorn Ahlstrom, *President & CEO*
Volvo North America Corporation



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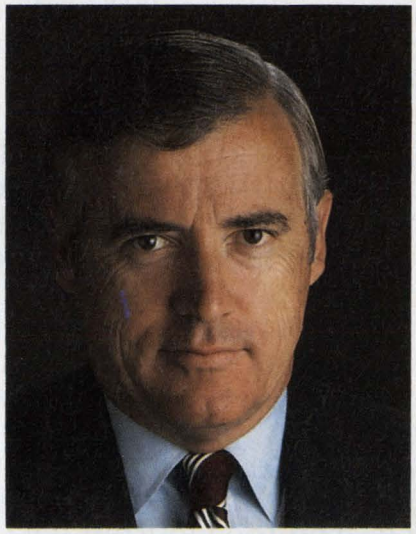

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CIRCLE 8 ON READER CARD

Look Ahead

A SURPRISE FOR AMDAHL

ANN ARBOR, MICH. -- The first installed Amdahl 5860 is being replaced by an IBM 3090-400 with two attached vector processors, following a hotly contested bid at the University of Michigan computing center. When it came time to upgrade the 5860 with a vector facility, the university's top administrators surprised Amdahl by turning to the IBM system despite a university technical committee's recommendation to stay with Amdahl. A university official says IBM offered a "significant" list price discount. Equally important, officials say, was the determination that, in applications with relatively low percentages of vector instructions, IBM's attached vector processor approach offered better price/performance and efficiency than Amdahl's standalone vector processor. The 5860 is being moved from the computing center to the university's administrative computing facility.

A PIECE OF THE PIE

PARIS -- The bidding for a stake in the French telecom equipment maker, Compagnie Géneralé de Constructions Téléphoniques (CGCT), closes tomorrow. CGCT has a 16% share of the French telecom market. Although Siemens was running head to head with the AT&T-Philips consortium at press time, the West German company is tipped as the eventual winner. The French government is demanding over $70 million for a 20% stake in the unprofitable company. CGCT's attraction is that it is the only other supplier of switches to the French PTT besides the newly formed CGE-ITT company Alcatel NV. The French government's motive for favoring Siemens is believed to hinge on a telecommunications policy being planned by the European Commission in Brussels, Belgium. This policy aims to harmonize telecom regulations in European countries with a view toward securing the market for indigenous suppliers--and Siemens is regarded as more indigenous than AT&T-Philips.

TRANSPUTER AS SUPER-COMPUTER

SOUTHAMPTON, ENGLAND -- Researchers at Southampton University say that they will have a test model of a cheap supercomputer ready this month. The heart of the supercomputer design is the transputer processor made by Inmos in Wales. The project will link 320 transputers to produce a computer capable of 250 million operations per second and that will cost only around a tenth of the price of current comparable supercomputers.

COMPETITION FOR BIG BUCKS

WASHINGTON, D.C. -- The National Science Foundation may have left its Phase I supercomputer facilities for dead, but those centers aren't about to go gently into

that good night. Purdue University, Colorado State University, and the University of Minnesota are among six contestants that are chasing a $2.5 million, three-year National Institutes of Health grant. Fighting for those almighty dollars along with the three Phase I pursuers are the University of Texas, the University of Georgia, and the University of California, Berkeley. The award will not come down until May.

LANGUAGE STANDARD FOR AI COMING

PALO ALTO -- A draft proposal for a standard object-oriented programming language is headed for a March 17 review by the Common Lisp subcommittee of X3, the Accredited Standards Committee on Information Processing Systems. The Palo Alto meeting is expected to endorse a language proposal distilled from Xerox Corp.'s Common LOOPS (Lisp Object Oriented Programming System), with features from Symbolics Inc.'s New Flavors language, according to members. The subcommittee efforts aim to produce a standard language that would enable applications to be moved among AI workstation vendors that adopt the standard.

THE GOAL FOR FUJITSU ESPAÑA

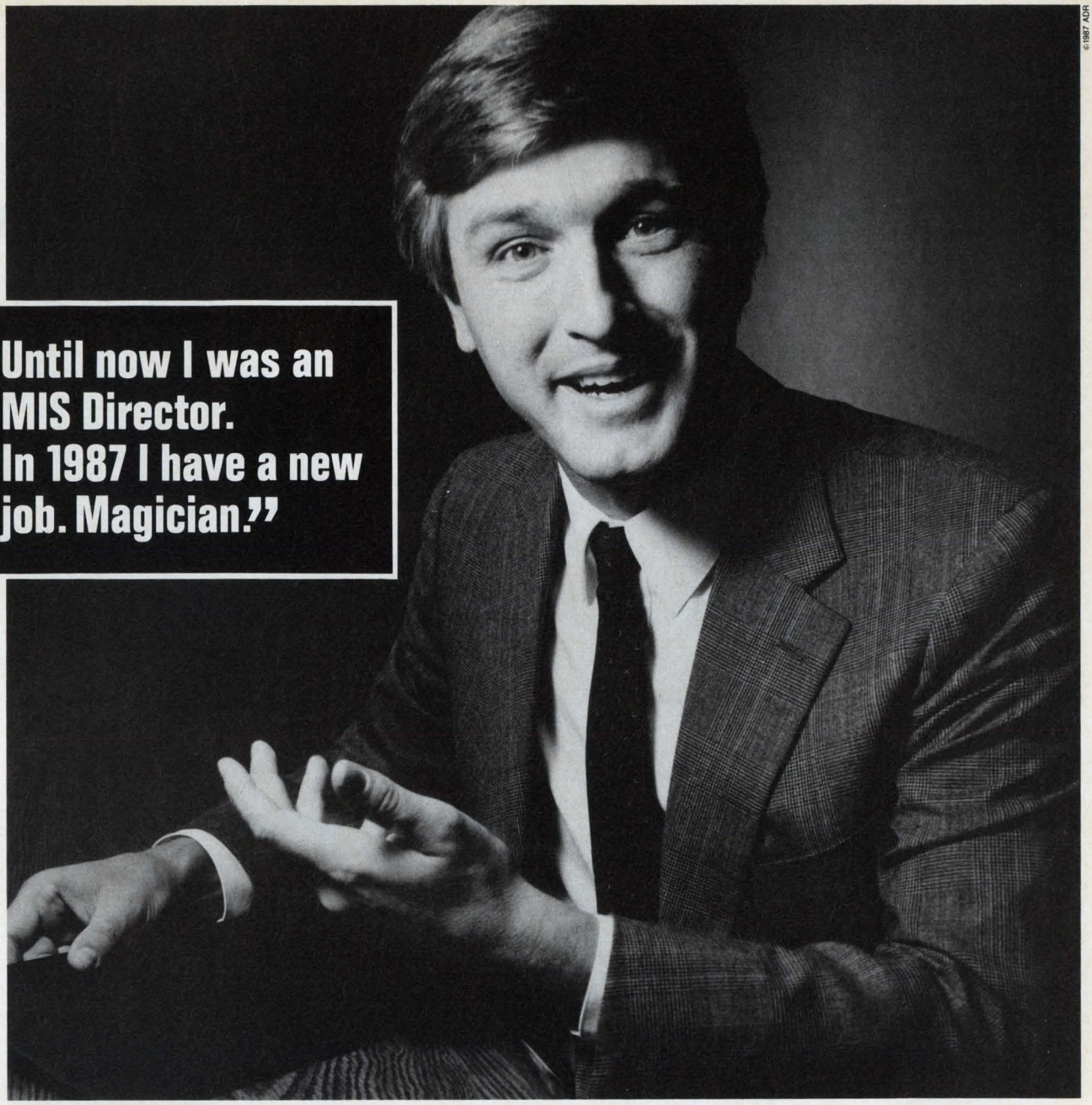
MADRID, SPAIN -- Taking the bull by the horns, Fujitsu España is aiming for second place in the Spanish market this year--just behind IBM. Formerly called Secoinsa, 60% of the company is now owned by Fujitsu and 40% by Compania Telefonica Nacional de España (CTNE), the state-owned Spanish telephone group. To support its growth plan, Fujitsu is planning to launch a whole raft of new products. The first ones, coming this month, will be the Semda series of office systems and minicomputers running the Oasis OS. These systems will replace the Series 20 originally conceived by Secoinsa. A new range of IBM PC compatibles is due in the fall.

WHAT HAMLET COULDN'T DO

BEAVERTON, ORE. -- Sequent Computer Systems Inc. apparently has finally made up its mind and soon will unveil systems based upon Intel Corp.'s 32-bit microprocessor. For the past year, the company has sought to supplement its family of parallel processing computers based upon National Semiconductor Corp. chips. The battle came down to Intel and Motorola, and now Intel sources say their company has won.

MEDUSA FOR IBM ATS

NATICK, MASS. -- Responding to the deep inroads that pc CAD/CAM systems have made into its customer base, Prime Computer Inc. is preparing a version of its Prime Medusa, a two-dimensional design and drafting



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package, for IBM ATs. It is designed for use in conjunction with Medusa on larger 50 Series computers.

NEW PRODUCTS FROM APPLE

CUPERTINO, CALIF. -- Apple finally steps into the IBM compatibility fold this week with the introduction of two new Macintosh personal computers and a slew of peripherals options. The new machines are the long-awaited "open Mac" and another version called the "expandable Mac." The "open Mac" is said to include up to eight expansion slots, while the "expandable Mac" includes an integrated hard-disk drive. Apple describes both machines as MS/DOS compatible. Among the expected add-on peripherals are larger monitors and color monitors.

SYTEK HITS A SNAG

MOUNTAIN VIEW, CALIF. -- Sytek Inc. has hit some last-minute fine-tuning problems that have delayed by two months the targeted launch date for its first Ethernet baseband local area network offerings. The company, which until now has offered only broadband products, hopes to announce the new line sometime in April. The products are also expected to be the first from Sytek to support the DOD's TCP/IP.

TOO SMALL A MARKET

TOKYO -- The Japanese Ministry of Posts and Telecommunications (MPT) has decided that the market for international telecom services is too small to accommodate two new competitiors to the monopoly Kokusai Denshin Denwa (KDD). Hoping for a crack at the market were International Digital Communications (IDC), a joint venture including Cable & Wireless PLC of Britain, Pacific Telesis International, and Merrill Lynch, and C. Itoh of Tokyo. The other hopeful was International Teleway Japan (ITJ), formed by such firms as Matsushita, Mitsubishi, Mitsui, and Sumitomo. Now the MPT has insisted that IDC and ITJ join forces to create a single new entry. Unification talks are scheduled to begin over the next few weeks.

RUMORS AND RAW RANDOM DATA

Cray has decided to stay away from the Second International Conference on Supercomputing and First World Supercomputer Exhibition in May in Santa Clara. . . . Japanese workstation manufacturers may not be deserting Motorola, but they are at least hedging their bets in the upcoming battle of advanced microchips. Softbank Corp., a Tokyo-based software house specializing in migrating Unix to Japanese hardware, is rumored to be on the verge of signing contracts with several major workstation suppliers to fit the popular OS to new 80386-based machines.

The TeleVideo 955. Seeing is believing.

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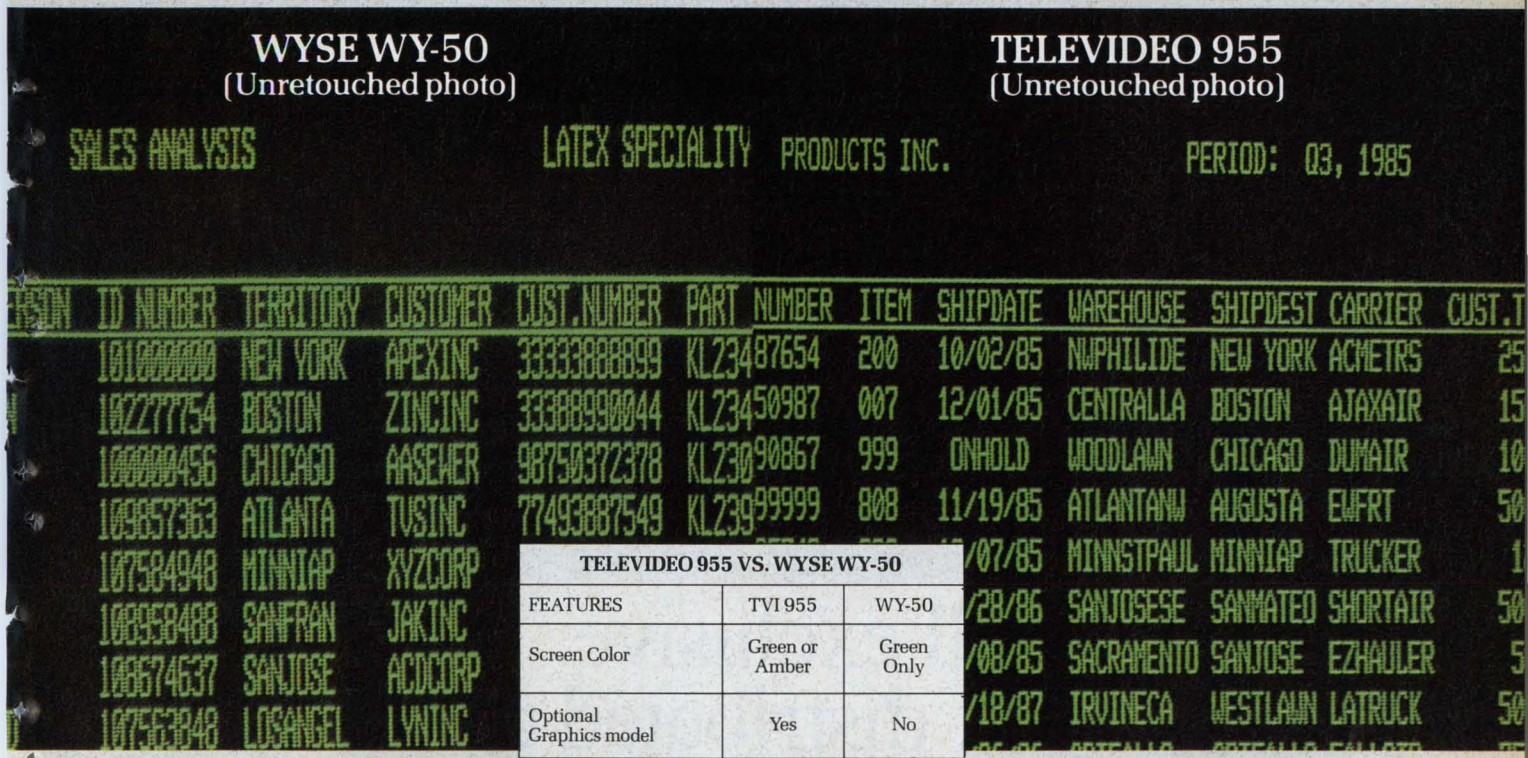

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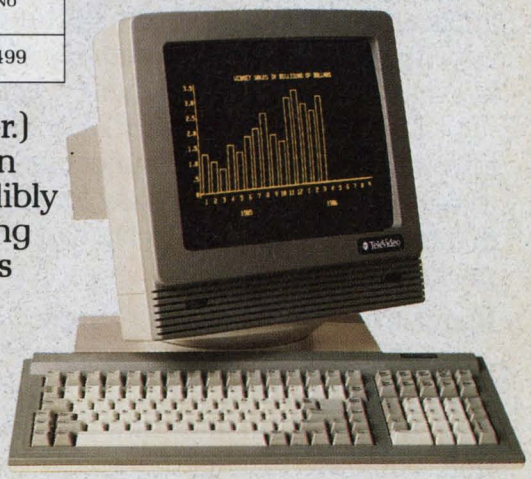

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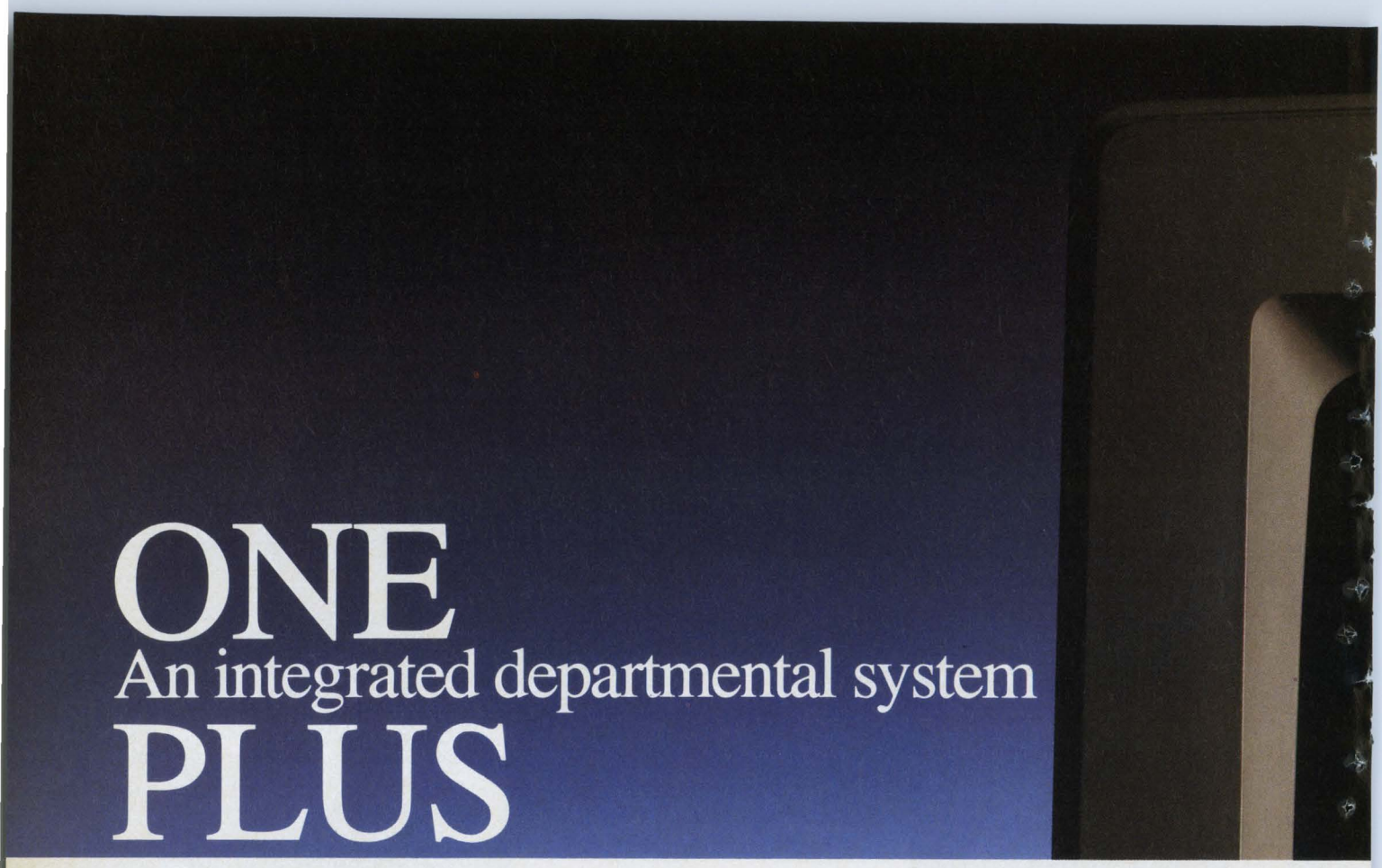

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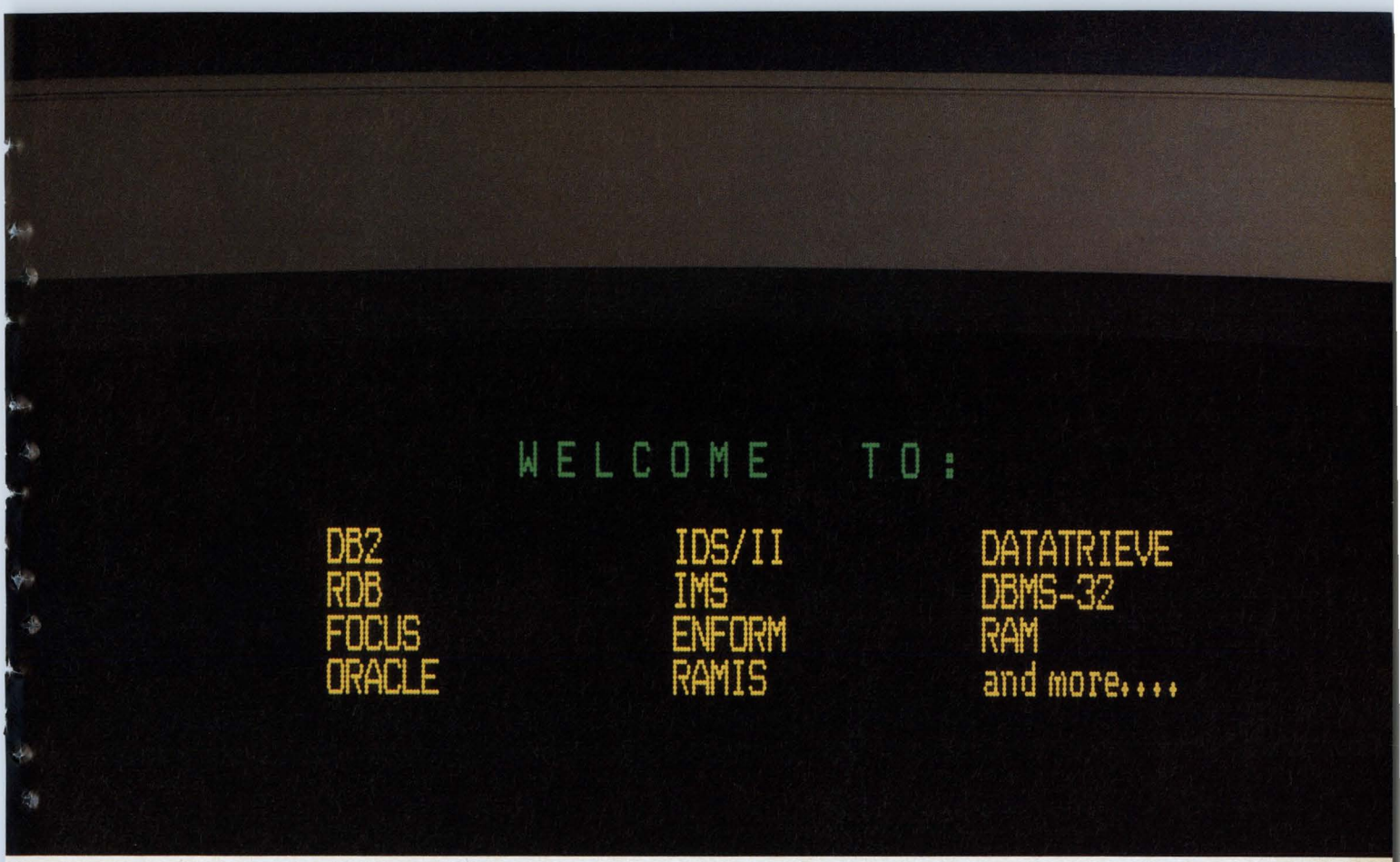

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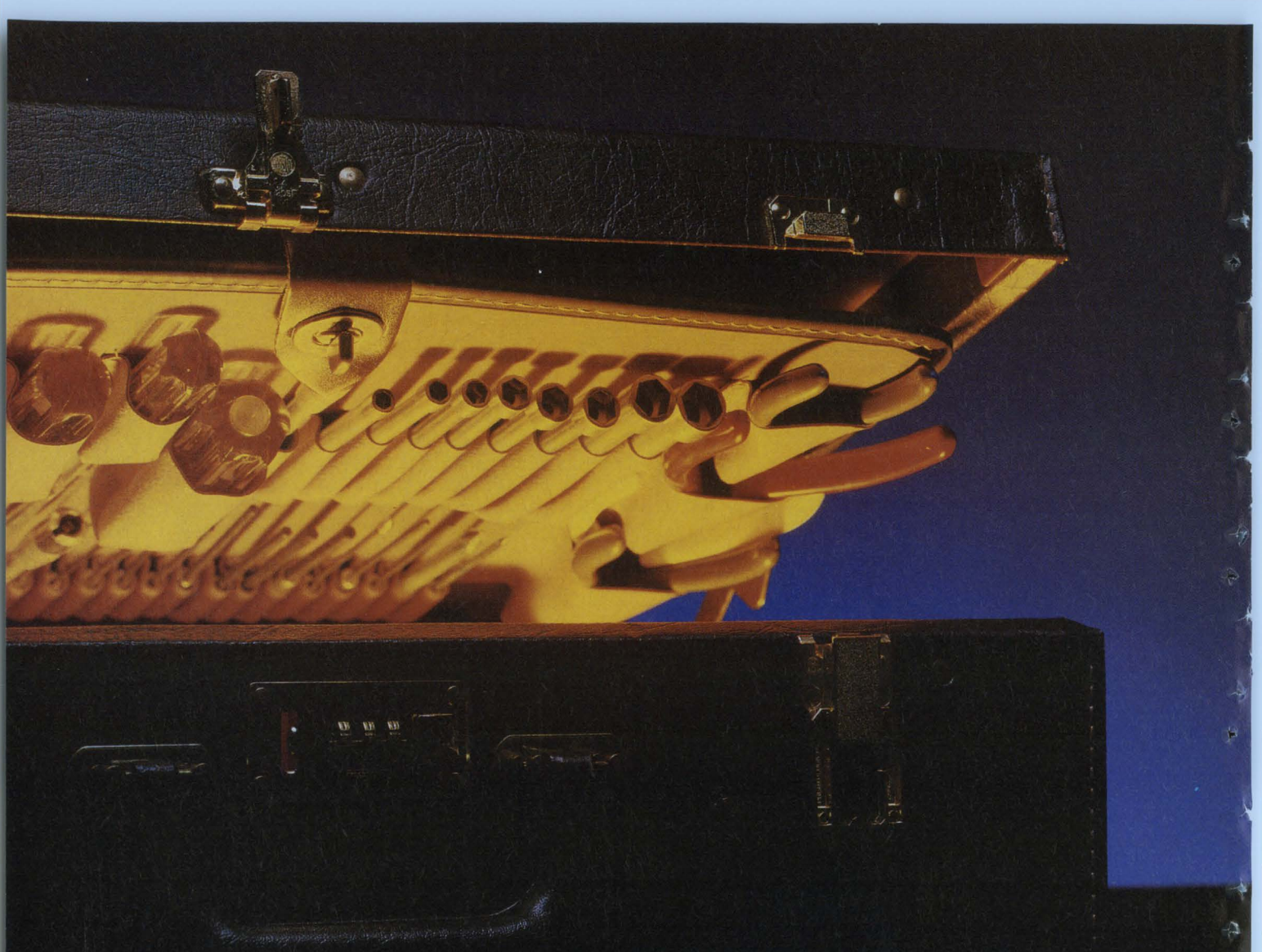

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News in Perspective

SUPERCOMPUTERS

Where There's Smoke, There's Fire

A supercomputer turf battle with the Japanese has raised questions about U.S. competitiveness.

BY KAREN GULLO AND ROBERT POE

The U.S. and Japan are ready to lock horns over what could become one of the most explosive bilateral trade and technology issues to date. The issue involves supercomputers, and the debate concerns charges by American supercomputer makers that their counterparts deny them access to government procurements in Japan and heavily discount Japanese products in the world market in what the Americans say is a no-holds-barred campaign to dominate the global supercomputer market.

Indeed, American supercomputer makers warn that unless action is taken immediately, the market for their products will be dominated by lower-priced imports in much the same way that Japanese products dominate the home electronics, automobile, and semiconductor industries.

"How long do we allow industry after industry to be targeted by Japan and knocked off?" asks Lloyd Thorndyke, president of ETA Systems, St. Paul, a Control Data Corp. subsidiary.

The Japanese deny the allegations, saying that American companies simply aren't competitive enough.

The debate involves Japanese companies such as NEC, Fujitsu, and Hitachi; Cray Research Inc. and Control Data Corp. in the U.S.; and the American and Japanese governments. Spurred by allegations made by U.S. companies of unfair trade practices, the U.S. Trade Representative launched an investigation of Japanese supercomputer trade practices in mid-December.

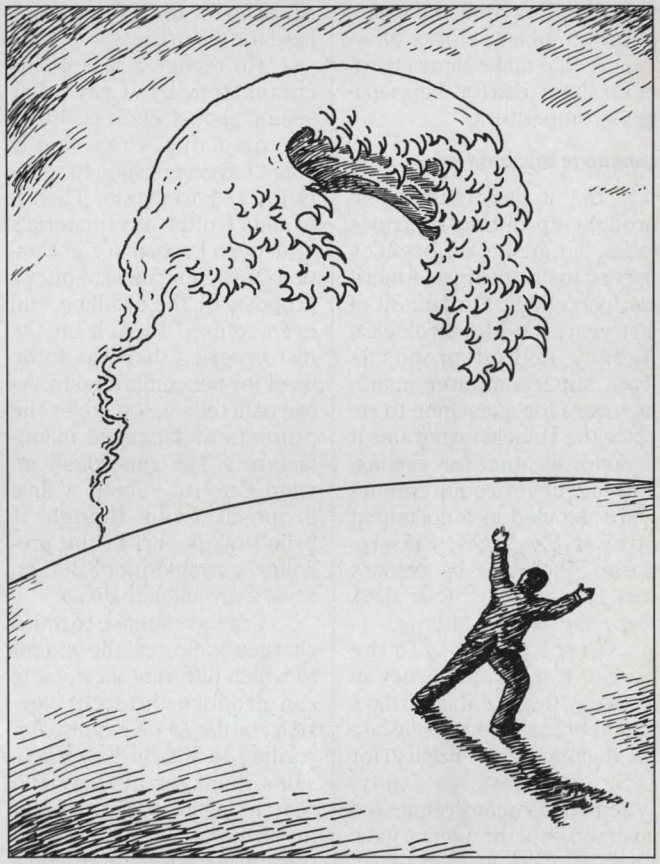
In the first round of MOSS (market-oriented, sector-selective) talks stemming from the investigation, held in Tokyo in late January, a delegation of U.S. trade officials, led by deputy trade representative Michael Smith, met with officials from Japan's Ministry of International Trade and Industry (MITI). The delegation was to submit a report to the U.S. cabinet by March 1 recommending whether Section 301 of the 1974 Trade Act, providing for punitive tariffs and quotas in retaliation for "unfair, unreasonable, or discriminatory" foreign trade practices, should be invoked.

No Common Ground

Such action seems like a very real possibility, given the results of the talks. The meeting ended abruptly with "no common ground" having been found, according to Smith.

Although participants are reluctant to discuss details of the talks, the general picture they paint is clear. Put simply, the U.S. team listed its complaints and the Japanese rejected them.

"We got the clearest explanation of Japanese industrial strategy we've ever had," asserts a U.S. official close to the talks who requested anonymity. "They told us straight out that they intend to develop their supercomputer industry."



Illustrations by R.J. Kaufman

During the talks, the U.S. delegation, which was supplied information about Japanese supercomputer trade and pricing policies by Cray and CDC, claimed that Japanese government agencies and universities discriminate against U.S. companies when procuring supercomputers, as demonstrated by the fact that not one of the 20 or so public-sector supercomputers installed or on order is a non-Japanese machine. The Japanese replied that there is no discrimination, and U.S. supercomputer companies are not competitive enough.

American companies say one of the biggest obstacles they face is "lack of transparency," trade jargon that means they can't find out enough—or find out soon enough—about upcoming procurements to compete effectively.

Many Japanese agencies and universities lease supercomputers rather than buy them. From the Japanese point of view, leasing or renting supercomputers is reasonable because of their high cost.

U.S. companies, however, view this as a form of discrimination for the following reason: under General Agreement on Tariffs and Trade (GATT) regulations, government procurement of certain types of large-ticket items must be announced with a request for proposal (RFP) published in the country's government register. But when supercomputers are leased or rented, as opposed to purchased, the Japanese claim that GATT rules don't apply and therefore no RFPs are filed.

American companies cite other examples of discrimination. Even when they are notified of procurements

to come, the companies say, other stumbling blocks often appear that make things harder for them than for their Japanese competitors.

Language Disqualified

In a specific case brought up during the MOSS talks, language differences served to disqualify an American contender. On Jan. 30 of last year, the Meteorological Agency invited proposals from supercomputer manufacturers for a machine to replace the Hitachi mainframe it used for weather forecasting. The agency's requirements were detailed in a document of over 100 pages; the proposals, including benchmark test results and other data, were due 30 days later.

According to CDC, the leading translation agency in Tokyo estimated that 45 days would be needed to translate the document into English for U.S. engineers to study. When the company requested an extension, the agency gave them 40 days instead of 30. Yuso Takigawa, assistant director of the agency's forecasting department, says a tight installation schedule prevented further extensions. CDC, unable to meet the deadline, withdrew from the competition and Hitachi won the contract.

When Cray tried to sell a supercomputer to the National Aerospace Laboratory (NAL), neither transparency nor language was a problem. The lab, run by Japan's version of NASA, had started planning its supercomputer project for numerical aerodynamic simulation in 1978. Other expensive projects got in the way, however, so it didn't get budget approval until 1986. By that time, everyone, including the Americans, knew NAL was shopping for a supercomputer to replace its Fujitsu mainframe. According to Hajime Miyoshi, computer center director, however, the Americans didn't try very hard for the prize.

He recites a list of sins committed by Cray that seems almost endless. First, he complains, Cray said it didn't have a machine to satisfy the requirements. Then it wouldn't offer any materials or data on its X-MP for evaluation. Next, it refused to offer a proposal by the deadline, and even refused to pick up the test program that was to be used for benchmark tests. As Miyoshi tells it, NAL, over the protests of Japanese manufacturers, still generously invited Cray to submit a final proposal even though it hadn't taken part in the preliminary competition. But, he says, Cray failed to do so.

Cray's response to NAL's charges indicates the extent to which differing viewpoints can produce different versions of the same events. According to Koichi Kawada, a sales manager at Cray Research Japan, NAL's request for proposal stipulated that the entire system be supplied by one manufacturer, including the communications system, front-end machine, peripherals, and terminals. Cray, unable to meet such requirements, didn't make a proposal.

THE JAPANESE DENY THE CHARGES.

Explains Kawada, "NAL's requirements looked like Fujitsu specs. They seemed like a historical Fujitsu user not seriously trying to get any other machine. After reading the request for proposal, if we had thought there was a chance of success, we would have submitted our benchmark results. But we don't give out benchmarks for nothing." NAL's new Fujitsu VP-400 was up and running Feb. 2.

Probably the toughest of the requirements excluding American manufacturers, inadvertently or not, from the Japanese public sector are the price pressures. With the government struggling to cut expenditures in every area, most budget allotments for supercomputers assume a healthy discount from list price. So low are the amounts government agencies will consent to pay that Cray, despite the advantage of the low-priced dollar, is often unable to compete on price even when it can meet all the other requirements. That fact forms the basis for Japanese charges that U.S. manufacturers are simply not competitive enough.

Marcelo Gumucio, executive vice president of marketing at Cray in Minneapolis, says Cray will not discount prices and that the company sells machines based on performance, not price. "We're not asking for any special treatment or advantages. We would only like to compete on the basis of the product. We have been in competitive situations in [the private sector in] Japan where the deal was evaluated based on hardware and software, and we've won. That's all we're asking for. In the case of some government procurements, we didn't have an opportunity to compete," he says.

What's more, says Gumucio, the Japanese are discounting their machines heavily in markets outside of Japan. "We know of instances where the customers paid only a service fee for a Japanese machine," he says. He declined to name the companies or customers involved. The Japanese companies have not commented on these allegations.

Japanese manufacturers are willing and able to cut prices for several reasons. Most important is their vertically integrated structure, engineered by MITI in the late 1970s to help them compete in the semiconductor industry. The cross-subsidization that allowed them to sell integrated circuits at or below cost to build volume for economies of scale is now being applied to supercomputers.

Since their biggest weakness vis à vis industry leader Cray is a lack of software, the most urgent need of the Japanese makers is to get a lot of their machines into the hands of people who will write applications programs.

Doing It With a Vengeance

They're doing so with a vengeance. Case in point: NEC's successful bid to supply a supercomputer at the Houston Area Research Center (HARC) (see "Planting the Flag," May 1, 1986, p. 24). Observers say that a case could be made that the supercomputer trade issue started in March 1986 when NEC won the HARC deal over Cray, IBM, ETA, and Fujitsu, thus becoming the first Japanese company to land a supercomputer deal in the U.S.

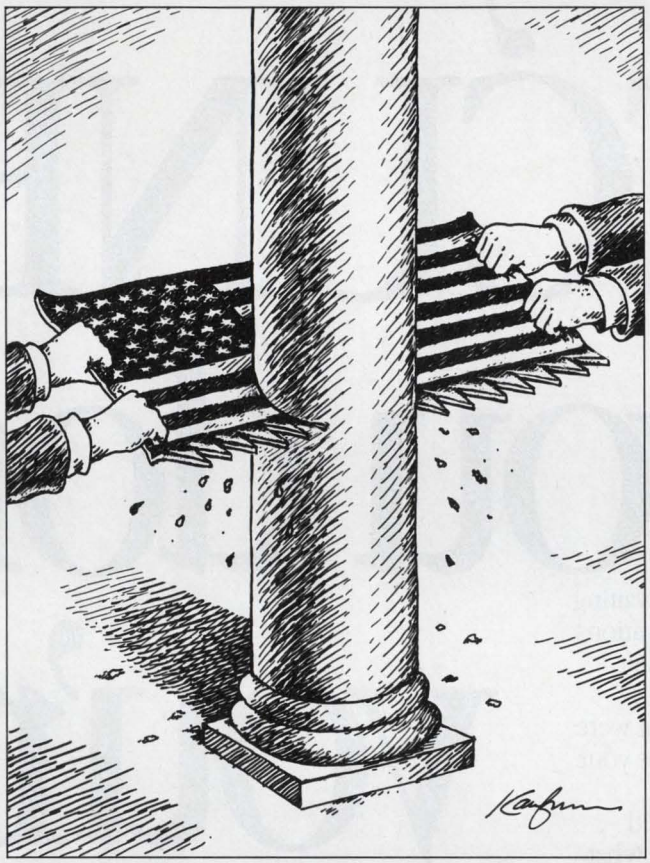
Soon after the deal was made public, the Reagan adminstration's trade strike force started an investigation for possible dumping violations. The lease agreement between NEC and HARC featured a price tag of $9 million for the SX2, which carries a list price of $22 million. HARC, then as now, would not disclose the details of its agreement with NEC, and the government eventually abandoned the investigation. American companies are not going to play the discounting game, according to most sources. They are looking for government support, but not

in the form of subsidies, at least so they say. Gumucio at Cray says the sometimes lengthy process of acquiring an export license to ship products overseas, which requires government approval, can be a roadblock. The government needs to expedite the approval process, which can take anywhere from 140 to 300 days, says Gumucio. "In the time it takes to get a license, the Japanese have a chance to get to the customer," he adds.

ETA's Thorndyke says that "incentive needs to be market driven. There needs to be more of a commitment [from the U.S. government] to the supercomputer industry. We need them not to give money or guarantee subsidies, but to guarantee that the demand for supercomputers is there." If the government would buy more supercomputers, there'd be more incentive for the supercomputer and semiconductor industries to develop advanced technology to keep pace with the Japanese, he says.

Nevertheless, there are those who believe the government needs to sink more money into the development of supercomputer technology, particularly by increasing the funding of university supercomputer centers. But the U.S.-Japan supercomputer trade war comes at a time when such funding is on the wane (see "Render Unto Caesar").

Meanwhile, the parallel with semiconductors seems to be what has Washington worried. Last year's HARC deal and rumors of 80% discounts in Europe make it appear that the Japanese are in the early stages of an export offensive targeting the U.S. supercomputer industry. If the move is as determined as their foray into memory chips, the U.S. industry may be in for a rough ride, however advanced and innovative its technology. ■



Render Unto Caesar

The government's supercomputing funding cut at universities has raised questions about the national interest.

BY WILLIE SCHATZ

They came to bury the National Science Foundation (NSF) Phase I supercomputer centers, not to praise them.

True, when the supercomputer centers at Purdue University, the University of Minnesota, and Colorado State University (CSU) phased into their NSF agreements, they knew they were eventually going to phase out. But the end apparently came sooner than any of the centers had expected. And none of them were too fond of NSF's means. In Phase I, NSF bought cycle time at existing supercomputer facilities and gave hours to NSF grantees. The program, which started in 1984, had a lifespan of two years. It was a stopgap measure until supercomputer centers could be established under Phase II.

Reports of Phase I's death had seemed greatly exaggerated last July when a report by the House Appropriations Committee recommended a budget increase for Phase I centers. When it came to supercomputer centers, the committee made the Wall Street bulls look like bears.

"The budget request for advanced scientific computing shall be increased by $1.37 million to $55 million," says House Report 99-731. "The increase is specifically targeted to the Phase I supercomputer centers. It is expected that these funds will help to maintain an additional one or two such centers at approximately the current level in 1987."

Nice try, guys. Too bad you had no shot.

Not only were the Phase I centers not maintained at the current level, but their users have departed for real Cyber 205 time at Princeton University's John von Neumann Center (JVNC).

So what happened? Just the usual Washington games of money and politics.

According to Pat Burns, coordinator of CSU's computer center, the university received from NSF a verbal commitment last November that it would get a major portion of the $2.2 million it had requested for FY '87 (which started last Oct. 1). Two weeks later, NSF called back to say that the overall scientific computing budget had been cut and told CSU the shocking news: its hoped-for $2.2 million had been cut by $2 million! The other bad news was that its users had to be off the 205 by Jan. 1.

"The National Science Board [which governs NSF] was fairly emphatic about phasing out the Phase I centers this fiscal year," says Paul Rotar, director of NSF's supercomputing program.

"All the users were offered the option to move to the JVNC or to any other center. That's kind of unfortunate, because moving even between 205s is inconvenient at the very least.

"I hope the Phase I centers can find additional funding. I suspect they can. Knowing the time was coming when NSF would stop supporting them, they would have been prudent to start looking for other funds."

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"We were very surprised by the second phone call," Burns says. "NSF knew for a long time it was going to do this. The whole deal was very Machiavellian. They took action at 11:59 when Congress had its back to the wall. It was perfectly executed. They did an excellent job of getting what they want.

"They used the political lobbying of the Phase I program to get an increase. Then they took it away from us. So we did a large part of the work and have nothing to show."

Neither does Purdue. That Phase I center submitted a proposal for $1.8 million for FY '87. According to Sol Rosen, director of Purdue's computer center, NSF also led the center to believe it would be awarded most of its request, then abruptly pulled the plug. So Purdue gets $300,000 in FY '87, and that's only transition money to help users migrate to a Phase II center.

"We don't expect to go out of business, but it makes life difficult," Rosen says. "We're going to try to get state government and private funding, but that won't be easy. NSF is making it extremely difficult for the pioneers to stay in business.

"We've provided the best 205 service anywhere, and it's a hell of a lot more than Princeton can ever provide. We feel somewhat let down. It's like NSF is saying thank you, but now we have our own centers. That's a poor attitude, and this is a nasty situation."

It's none too pleasant at Minnesota, either. That center, which has more total supercomputing power than any other center, requested $6.3 million for FY '87. After a very positive site visit, the NSF staff recommended $2.8 million of continuing funding, which a university source says "seemed like a sure thing at the time."

It probably was in July. It wasn't in November, when the NSF Board recommended that the supercomputer budget reduction of $6 million for FY '87 be taken by accelerating the phaseout of the Phase I centers and reserving as many funds as possible for the Phase II centers.

Minnesota's reward was approximately $1 million, prompting an exchange of letters between Minnesota president Kenneth Keller and NSF assistant director for computer and information science and engineering (CISE) Gordon Bell.

A Destabilizing Move

"I believe that the approach the foundation is taking is not in the best national interest," Keller wrote. "It is not cost-effective, it will destabilize certain centers that are now working well, it may well limit the rapidity of software development, and it will disadvantage a number of researchers. Indeed, with this direction, it appears to me that the Phase II centers lose a great deal of their attractiveness.

"It appears to me," Keller continued, "that to the extent that support of the Phase II centers requires a removal of support for all other supercomputing activities in the country, the Phase II program is not in the best national interest."

Wrong, countered Bell. "We at NSF naturally disagree with you and believe we are acting in the best interest of our users, and the public generally. It is NSF's intent to fund the five national centers such that they can all have the leading-edge computers manufactured by our domestic industry. I regret that we cannot fund all centers, but hope we can move to something that is much more akin to a real market mechanism whereby users are free to use whatever machine they want based on price and service. When the centers become saturated, this argument will be easy to make, and we may consider changing the program direction once again."

So what else is new? Since Bell arrived at NSF last spring, CISE has expanded its activities. The Phase II centers will initiate activities into graphics workstations and large shared programs and databases. Networking, once a part of the Office of Advanced Scientific Computing (OASC), is now a separate networking and communications subactivity within CISE. At least one major parallel processing research center will be initiated this year.

The only scheduled technical upgrade at a Phase II center is the installation of a four-processor ETA-10 this fall at the JVNC. A two-processor version was supposed to have been on-line by now, but it's still at ETA headquarters in St. Paul. Hey, what's six months between friends?

The delayed arrival of the ETA-10 meant a $3 million reduction in what the JVNC requested for FY '87 and what it will currently receive. Cornell will receive $1 million less than it requested. The San Diego, Illinois, and Pittsburgh Phase II centers escaped the budget ax.

"WE WERE SURPRISED BY THE SECOND PHONE CALL."

"We expected less money," says Joseph Traub, director of the JVNC. "If the ETA had arrived on time, it would have been a nonstandard event in computer history. We couldn't deliver the cycles the other centers could, so we were a logical target to take the largest hit. What they did is not something a reasonable person can argue with."

Preserving the Golden Goose

But that doesn't mean they have to like it. The JVNC has had more than its share of troubled times (see "Supercomputer Politics," Nov. 15, 1985, p. 44). Even the San Diego center, despite getting everything it asked for, is feeling the pinch.

"We're very clearly successful at doing what we set out to do," says director Sid Karin. "We've met everybody's goals and expectations and exceeded some others. In times of budget crunch, you don't kill the golden goose. There's a recognition in the supercomputer community that we're doing a first-class job.

"Is this FY '87 amount [$12.5 million] adequate? If adequate means that everybody with a legitimate claim on supercomputer use can be served, the answer's no. If you're talking about continuing what we're currently doing, the answer's yes. I could fill up a leading-edge Cray in a week. But I don't have money to buy it. I'd like a 16-million-word, 8.5-nanosecond machine. But I only have an 8-million-word, 9.5-nanosecond machine."

"That's what this program is all about," says Mel Ciment, acting deputy director of the Office of Advanced Scientific Computing. "You have to allocate finite dollars among the centers the best way you can. How do you divide funds in five places without making them mediocre? I don't want NSF to carry a cen-

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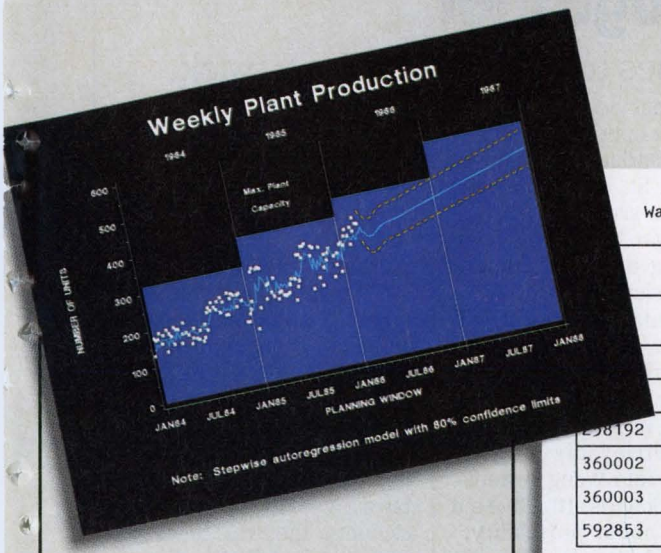

Warehouse Inventory Report - 16JAN87

	Quantity on Hand	Quantity on Order	Projected Reorder Date
	123980	10000	THU, FEB 12, 87
	89450	5000	FRI, FEB 20, 87
298192	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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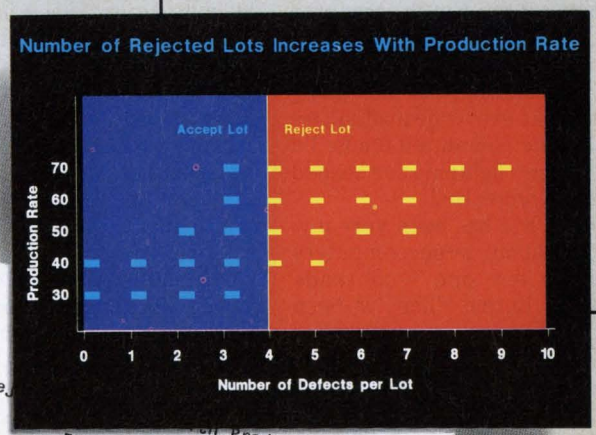

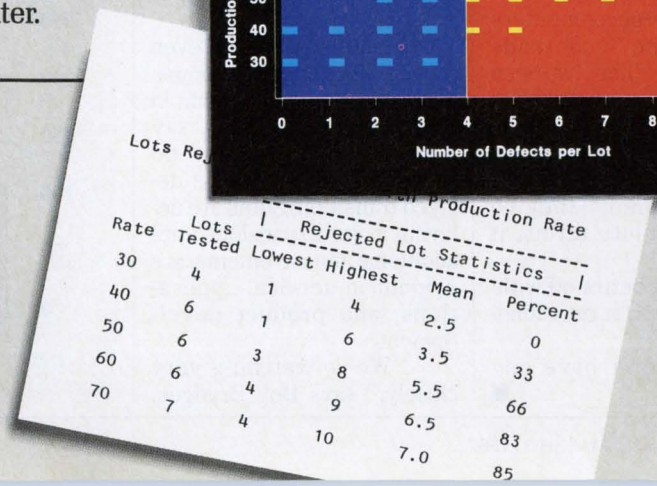

* Computer Intelligence, January 1986.

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ter that's not state of the art. If we have one that's not, it could slip back to VAX level. We sure don't want that.

"I know there's some pain in the budget process. It means center directors may not be able to do as many enhancements as they hoped. But they'll still be state of the art. They'll just be leaner and meaner."

Not according to NSF's FY '88 budget proposal. If Congress follows President Reagan's request—and this may be one of the few budget areas where it justifiably does so—the NSF will be in fat city.

Competitiveness was a major theme of the State of the Union address, and NSF director Erich Bloch used it to justify increasing his FY '88 budget request by 16.5%.

As part of that steep NSF increase, CISE's budget would swell by 22.7% and OASC's by 12.4%.

But obtaining the money and administering it are two very different animals. And what NSF did to the Phase I centers in FY '87 is leaving a bitter taste in many mouths.

"They made a mess again and fell into it," says Peter Patton, director of the Minnesota Supercomputer Center. "If I were going to come in and do some major restructuring that was going to make everyone mad and reallocate committed funds, I'd choose a lightning rod shaped like Gordon Bell.

"NSF has been very myopic about supercomputers since day one," contends CSU's Burns. "They've been hoarding cycles like a little kid with candy. In relative terms, what they did to the Phase I centers wasn't much worse than other things they've done. In absolute terms, it was bad.

"We'll be better off without them if we can get a funding base."

They won't have any choice. ■

STRATEGIES

Pulling It All Together

A troubled Wang Labs tries to put itself back on track.

BY GARY McWILLIAMS

As part of its shift from word processing supplier to data processing supplier, Wang Laboratories Inc. stopped billing itself as "The Office Automation People" and instead adopted the theme "Wang Puts It All Together." That "people" was left out of the newest motto is ironic, considering what the company's executives now propose.

Wang executives concede that they failed to broaden management when they plotted the move into data processing from office automation. The result was a transition dragged out beyond what any would have expected or liked.

It's an important admission that comes as the $2.6 billion computer maker aims to complete its shift by placing more authority in the hands of employees.

That restructuring, along with a larger-than-expected $70 million loss for the second quarter ended Dec. 31, puts a new Wang in the spotlight. Frederick A. Wang, the elder son of chairman and founder An Wang, has taken over as president with a promise to decentralize decision-making, improve service, and shed some of the management layers built up in past years.

Many large users, even those who cheer the company's recent improvements in products and service, say Frederick Wang must do more than complete the delayed transition. Some are delaying major expansions until additional improvements are evident in service, applications, and product development.

"We're watching very closely," says Bob Brydges, an assistant vice president for computer operations and service at Burlington Northern Railroad, St. Paul. "Until the problems are resolved, I'm not going to be too interested in taking more equipment with the same problems."

Similarly, Dunkin Donuts Inc., Randolph, Mass., questions buying a Wang database management system, out of fear the package may irretrievably lock the company into Wang systems. "The package is attractive but I worry about portability," says R. Thomas Burger, vice president of information services. "I worry about putting all my eggs in one basket."

Company in Transition

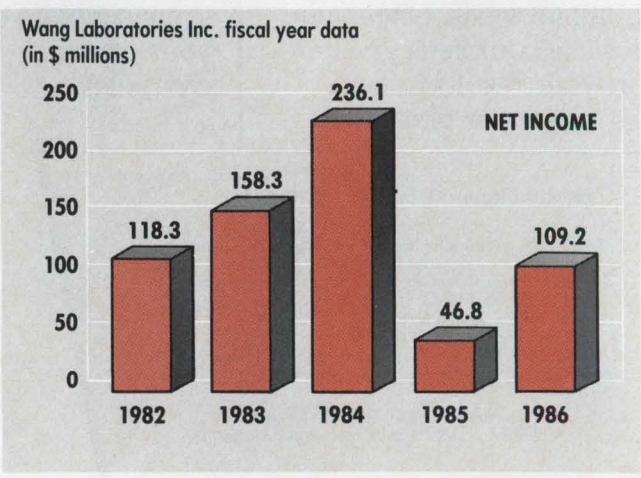
Frederick Wang believes such fears are the result of a period of poor management controls. The company grew remote from its customers and now needs to distribute decision-making power to middle managers, he says. "We have the people and the products but we don't have the systems we need," Wang told DATAMATION recently at his company's headquarters in Lowell, Mass. "We are in transition from a company in which the Doctor [as An Wang is called by most employees] was the dominant figure to a more generally managed company."

Former employees agree. Wang's sales force grew confused and disenchanted as a result of mixed signals from the company's U.S. marketing executives, says a former sales manager who recently resigned. "One day we were focusing on large accounts, then the focus became the installed base, and then it was 'We need applications software to address the midrange.'

"They pushed the sales force in so many directions that the reps in the field would say, 'What is it they want us to do?' "

Wang's hopes to revitalize the sales force rest with Ian Diery, a fiery Australian recently named senior vice president of U.S. operations. Diery, a relative unknown among customers but respected within Wang, is credited with taking Wang Europe into the data processing

FIGURE 1 **What Wang Put Together**



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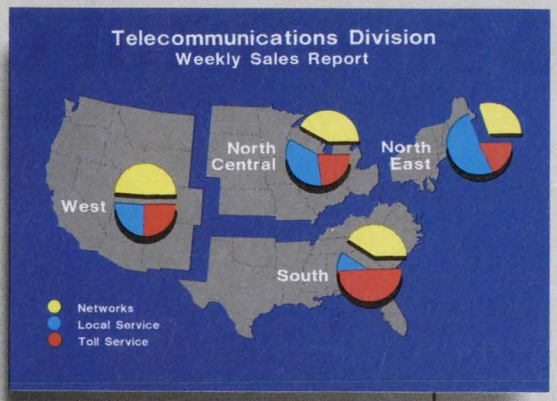

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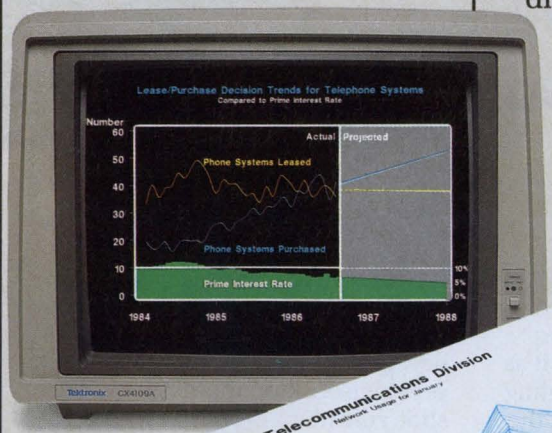

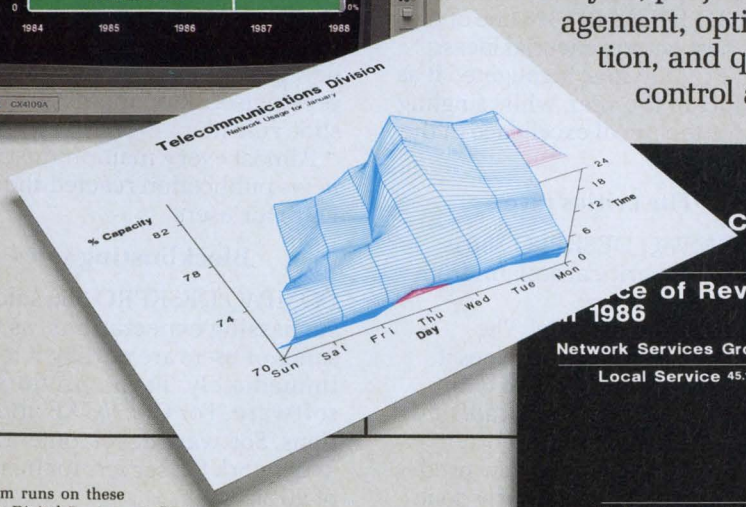

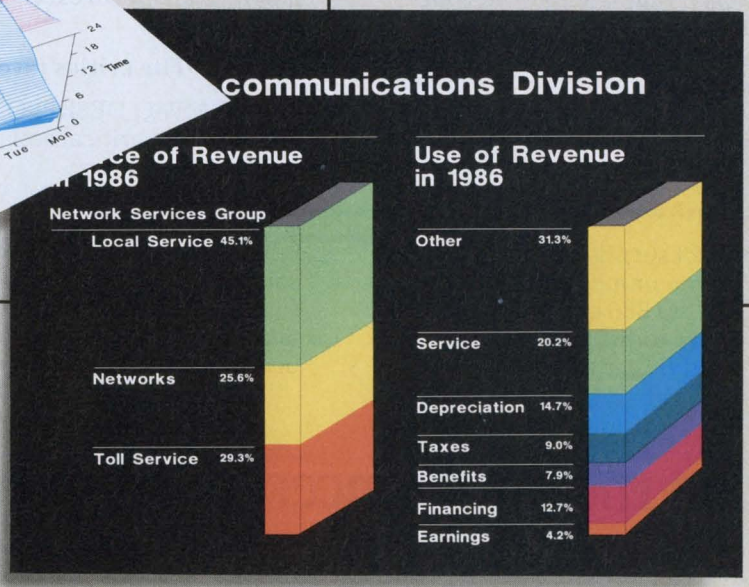

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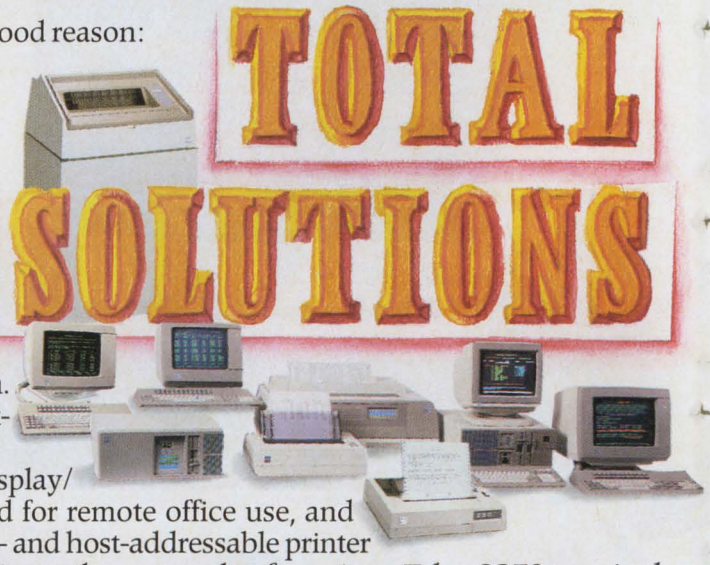

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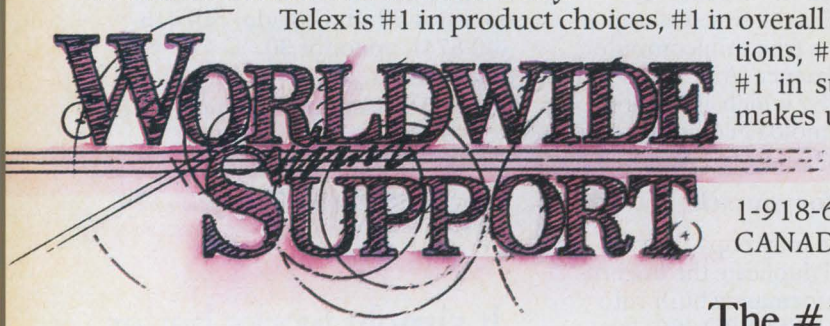

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FREDERICK WANG: "We are in transistion from a company in which the Doctor was the dominant figure to a more generally managed one."

world without the trauma that befell domestic operations.

Diery's credentials include guiding Wang Europe into data processing in a way that produced a growth rate surpassing even Digital Equipment Corp.'s highly touted European operation. Last year, Wang Europe chalked up an impressive 22% revenue growth in local currencies, compared with a slack 4.7% U.S. revenue growth.

His belief in an all-encompassing sales effort is such that Diery is requiring all U.S. managers—from field MIS to personnel—to learn, and be able to give, the same product-line presentation as its sales force. "Part of changing the perception of Wang in the marketplace is changing the perception of our own people," he says.

In Europe, Diery says, the change "took three years of hard work. Here, a lot of the work's been done already. We need to focus it and get the word out that we've made significant progress." Demonstrable changes in the U.S. operation should be visible soon, he says. "I expect to report back to Fred by June that the field organization is in shape."

At the same time it reshapes the work force, Wang still must fight customers' disenchantment with the poor quality and delays of some systems, especially the high-end VS 300 computer. That system's reputation dogs Wang's revival efforts among its larger customers, many of whom were early users of the problematic VS 300 computer.

"How good is advanced networking," asks Tom Maile, vice president of telecommunications operations at the Equitable Life Assurance Society, New York, "when it takes the company two years to get a VS 300 with an operating system to run it? The first thing they've got to do is take the processor, the core of the business, and make sure it's up to snuff."

Wang corporate marketing vice president Harold P. Ano says the VS 300 (recently repackaged and named VS 7310) is now trouble-free. Orders for the VS 300 grew to 86 in the month of December, up from 38 in the month of September, but further work is needed. Maile notes the system cannot yet support 256 terminals as originally promised.

While smaller users say they are satisfied with Wang service, it remains a concern for those accustomed to the more mature service offerings from traditional dp suppliers. To them, the company has been playing catch-up. In two key areas, operating system upgrades and documentation, Wang formalized regular updates and documentation only last year. Its roots in word processing are cited as the basis for the lack of broader support capabilities.

"Traditionally," notes Patricia Wada, who handles office system procurements for the Massachusetts state government, "there's been a difference in expectations for service in word processing and data processing environments. That has created a lot of problems for Wang and other vendors going from office automation to dp."

Software Support at Issue

Diery acknowledges Wang's software support is "nowhere near as good" as its data processing customers require. He promises that "by June, we will be at an adequate level of customer software support. Don't forget, Wang had to learn a big lesson with maintenance on the VS 300."

A second major issue facing Wang is its ability to provide applications software suited to large data processing environments. Dunkin Donuts, Burger says, long searched for general ledger and fixed assets software before finding a package that matched its needs.

Burlington Northern's Brydges agrees. "They are still short some things the old-time dpers are accustomed to having, like monitoring tools, tape and disk management products," he says. "Wang is talking about getting them from other vendors but they are coming slowly."

Again, the shortage of such packages primarily is a result of Wang's evolution, say users. "Many of the packages for the VS were created for smaller organizations," notes Bob Evans, vice president for planning and information systems at El Paso Natural Gas. "We have been a little disappointed with some of the software [that was migrated] over to the VS rather than written to take advantage of the environment," says Evans, referring to distributed processing workstations.

Many third-party VS applications originally were written for IBM's System/34 and System/36 departmental computers and migrated to the VS, says Evans. Like Dunkin Donuts, El Paso Natural Gas also had to hunt for a financial package to accommodate its high transaction requirements.

Despite innovative efforts by Wang to relieve the software shortage, the chances of major new mainframe-class applications for the VS in the near future are not bright. Two recent trends have combined to work against Wang and other vendors of proprietary operating systems: applications developers such as Cullinet Software Inc., Westwood, Mass., and McCormack & Dodge Corp., Natick, Mass., recently moved to focus midrange sales on the VAX/VMS computer market. Other developers, such as SAS Institute Inc., Cary, N.C., are refusing to support additional systems until they complete a rewrite

"I'M NOT GOING TO BE TOO INTERESTED IN TAKING MORE GEAR."

of their packages to the C programming language. The C language coding in the future will enable SAS Institute to address more easily the computers of multiple vendors, but it stalls software for Wang and others in the meantime.

Wang vp Ano acknowledges that more applications are needed. For now, the company relies on some 400 independent software vendors and 140 value-added resellers for the bulk of its applications but is planning other ventures.

To expand visibility of existing third-party software,

"BY JUNE, WE WILL BE AT AN ADEQUATE LEVEL OF CUSTOMER SOFTWARE SUPPORT."

Wang is considering acting as a sales agent for developers with limited U.S. market presence. The selling strategy has been used in Europe under Diery and is being implemented in Wang's Canada operations. Ano also says the company expects to sell applications for certain markets, such as legal, under its own name.

A decision to focus on seven specific market areas including manufacturing, hospitality, and financial services, will improve selection, service, and support, Ano claims.

Wang's thirst for applications recently led it to provide job matching for a contract software developer in India. The agreement aims to provide applications that can be resold or which produce immediate and substantial VS sales.

The software efforts are being complemented with joint marketing of hardware with niche computer makers such as Apollo Computer Inc., Chelmsford, Mass., and Sun Microsystems Inc., Mountain View, Calif. The activities reflect a broadening of systems integration efforts first associated with its networking products.

Customers praise the efforts and they credit Wang with a willingness to provide the legwork involved in finding software. "I think they're a good systems integrator," lauds Donald Hollis, executive vp of customer service for the First National Bank of Chicago's Global Corporate Bank operation.

Wada, the Commmonwealth of Massachusetts' director of the bureau for systems policy and planning, adds, "One of their strong points has been a willingness to work with third-party software developers to provide a solution. They will find a vendor to do custom development work or provide a third-party package and find a vendor to tailor the product."

While product and software may occupy his customers' attention, Frederick Wang sees their concerns as elements of a larger issue: that of making the organization more responsive. Until the structure encourages Wang employees to pull in the same direction, the products and software won't be considered appropriate.

If he's right, the slogan "Wang Puts It all Together" may be as much Frederick Wang's challenge as a corporate theme. "We have the strategies, the direction, the goals. What we have to do as a company is perform," says Wang. ■

The European Example

While Wang Laboratories' U.S. operations have been showing a loss for the last year, the company's European business has remained profitable. Revenue growth in the European, Middle East, and Africa division has remained strong at 26%. By comparison, domestic business is running at zero growth.

According to Tina Casten, director of international marketing at Wang, the company's success abroad is a result of the management philosophy and marketing strategy fostered by Ian Diery, former vp of Wang Europe, and Ken Olisa, who was in charge of Wang's European marketing. It's now up to Arend Vleggeert, who has been groomed to replace Diery, and Nico Hildebrand, who takes over responsibility for European marketing, to develop those strategies.

Key to Wang's European management philosophy is decentralization. The countries within the division are split among five territories, each of which is self-sufficient. Casten explains, "Everyone can have a strategy, but its success depends on how you implement it. In Europe there has been a focused implementation of the corporate strategy, the corporate message filters down for local implementation."

Besides this regional strength, Wang's European subsidiaries have also been more effective than their U.S. counterpart in identifying vertical markets and specific products for particular customer needs. Wang U.K., the company's oldest and most successful subsidiary, is the leader for the rest of Europe. Its focus is on the financial sector. In West Germany, Wang is concentrating on manufacturing industries and will soon open a dedicated software development center.

Unlike their U.S. parent, the European subsidiaries work with a large number of value-added distributors and software houses. These are selected to take products into application and geographical markets Wang cannot address in a cost-effective way.

The European division's main in-house development site is the International Telecommunication Resource Center in Brussels, Belgium. It was originally established to develop protocols specific to the European market, such as ICL's CO3. Most recently it has added an area where Wang's strategic telecommunications partners can test their switches for integration with Wang processors.

"The next frontier in technology will be the integration of voice and data," says Casten, anticipating that the market for integrated systems will emerge more quickly in Europe than in the U.S., where AT&T dominates. Wang is preparing to meet that European market and has already signed Italtel as Italian distributor of the integrated products developed by its Intecom subsidiary in the U.S.

This understanding of third-party marketing and subsidiaries' persistence in fine-tuning products to meet customers' individual needs are characteristics of the European operation that the U.S. company will increasingly adopt. But Casten expects the foreign subsidiaries to maintain their edge. "The European division will hold and may even increase its growth lead on the U.S., simply because it already has the foundations in place to build on," she concludes.

BY SARAH UNDERWOOD

★EXTRA★

FIND CARGO LOST AT SEA!

ITT rushes aid to fleet

A California shipping agent, who used to worry about keeping in touch with a worldwide fleet of container ships by telex, called his operation "shipshape" today.

Bill Lowe, a manager for Los Angeles-based Merit Steamship Agency, Inc., added that ITT Worldcom experts had made it "much, much easier" to transmit cargo schedules.

Merit, a nationwide shipping agency, is one of the few agencies to represent a number of steamship companies in worldwide cargo transport, Mr. Lowe explained.

"We dispatch over 40,000 telex messages a month," he said. "So we really needed a first-rate communications network to keep our customers on top of their imports and exports."

ITT Worldcom solved all the sticky problems that Merit faced with its last international carrier, Mr. Lowe pointed out. "And they even cut some of our costs—by 50%!"

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Among Merit's major clients is Japan Line, which each year moves thousands of containerized shipments, inland and overseas.

BACK IN TOUCH—Shipping agent Bill Lowe after rescue.

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STANDARDS

Stuck in Square One

TCP/IP standardization has been a political hot potato between vendors and the Department of Defense.

BY SUSAN KERR

Who has the authority to make a standard?

That's the question a group of communications vendors, users, and the Department of Defense are puzzling over regarding the Transmission Control Protocol/Internet Protocol (TCP/IP). The answer may turn out to be surprising: few, if any, of the participants want the responsibility.

The decade-old TCP/IP suite of networking protocols, originally developed by the DOD, is only now beginning to feel the full brunt of the standardization craze. Unlike today's evolving Open Systems Interconnect (OSI) connectivity tools being developed by ISO (the International Standards Organization), TCP/IP never had the advantage nor the hindrance of intense predefinition. The result is that there are more than 100 TCP/IP implementations on the market, not all of which are compatible with each other.

So who has the right version and who has the wrong one? That dilemma was to have been solved by the Defense Communications Agency (DCA), which several years ago contracted with the former Burroughs Corp. subsidiary, System Development Corp., McLean, Va., to look into creating a service to ensure that TCP/IP-labeled products could indeed interoperate with other systems supporting TCP/IP. Nothing was ever settled upon and last August the DCA essentially washed its hands of the matter.

Daniel Lynch, a consultant, former SRI International executive, and a TCP/IP enthusiast, took up the charge. He and a group of vendors formed the Coalition for Working Systems (CWS) to find a solution, but as it turns out, vendors appear less willing and able to spearhead such a project than the military. So it's back to square one. Vendor sources indicate that, pushed by Lynch and his group, the DCA may once again be trying to develop and fund certification services.

Customers today demand a Good Housekeeping-like seal of approval on products, and those demands have "spilled over to TCP/IP," says Don Loughry, standards manager of Hewlett-Packard Information Networks Group. In particular, TCP/IP, which developed in a "random" fashion, could use an official forum for testing, he adds. But that's easier said than done.

The commercial vendors aren't all that willing to step up and put their money where their mouths are. With the aid of Lynch's consulting firm, Advanced Computing Environments, Cupertino, Calif., a TCP/IP conference was held last August in Monterey, Calif. It was there that the DCA made its announcement to the 65 vendors who attended that it would no longer pursue the matter of offering certification services.

That forum was helpful, vendors agree, but many balked at funding Lynch to find a way to test TCP/IP compliance.

To join CWS initially, Barton Burstein, product marketing and planning manager at Santa Clara-based Ungermann-Bass, says his company was asked to cough up $2,500. It didn't. HP was asked to provide a sum in the "low five digits," according to Loughry. HP did supply some money, but will not provide more until it understands to what use it will be put.

Lynch says that to date he has received $20,000 from vendors for travel and to study the issue. Last October, he addressed vendors and proposed a "Protocol Testing Institute," a nonprofit corporation to assist vendors in protocol conformance. Vendors would pay a one-time fee of between $15,000 and $60,000 (depending on the company's corporate revenues) and a $17,500 fee for the actual test.

Vendors Balk

The vendors have not gone along with the idea. Voicing a commonly held vendor opinion, Bridge Communications Inc. (Mountain View, Calif.) executive vice president Judith Estrin describes Lynch's initial plans as "too grandiose."

Then why do many of these vendors willingly contribute large sums to other networking groups such as the Corporation for Open Systems (COS)?

One reason is a certain level of uneasiness in dealing with Lynch and an informal group, some vendors say. Yet, in the same breath they praise him as an excellent advocate. But perhaps the real answer lies elsewhere. No one wants to sanction a standard to which his product may not conform.

"The problem we came up with," grumbles one vendor who asked not to be identified, "is that any way you skin it, if you get 10 vendors in a room they all try to maneuver it so that their products are okay and all the others aren't. Everybody wants their products to be the reference set. Of course, each vendor is convinced that he has the right product.

Says Dan Ladermann, advanced products vice president at the Wollongong Group, Palo Alto, "We looked at the coalition, but building a standard interface and tests is expensive. It would cost us a fortune to prove what we know—our product works."

Therein lies the problem, agrees Wollongong East Coast operations vice president Heidi Heiden. Heiden has a special interest in TCP/IP, in that he helped start the DOD's Data Network (DDN). "If everybody's coming from ground zero, then it would work," he says. Instead, with TCP/IP, the established vendors don't want to risk anything and the small startups have neither the funds nor the sway to push for a standardized test.

Yet, the vendors still maintain that they are customer driven. And customers want testing and an official TCP/IP forum.

Pete Ryder, a division chief with the Air Force Logistics Command, Dayton, Ohio, says he was "seething" when the DCA withdrew from the certification drive. He has experienced product prob-

Daniel Lynch formed CWS to resolve the TCP/IP standards issue.

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* Source: Digital News 12/1/86

U.S. SEMINARS

AK Anchorage ..... Apr 14
AL Birmingham ..... May 12
Huntsville ..... Mar 26
AR Little Rock ..... Mar 27, May 12
AZ Phoenix ..... Apr 15
Tucson ..... Mar 25
CA Los Angeles ..... Mar 11, Apr 7, May 12
Newport Beach ..... Mar 17, May 5
Pleasanton ..... Apr 8
Sacramento ..... Mar 10, May 5
San Diego ..... Mar 3, May 14
San Francisco ..... Mar 12, Apr 9, May 7
San Jose ..... Mar 26, Apr 30
CO Colorado Springs ..... Apr 21
Denver ..... Mar 17, Apr 16, May 5
CT Hartford (Farm.) ..... May 5
New Haven ..... Mar 25
DE Wilmington ..... Mar 31, May 5
FL Ft. Lauderdale ..... Mar 5
Orlando ..... Mar 11
Tampa ..... Apr 8
GA Atlanta ..... Mar 18, May 6
Savannah ..... Mar 19
IA Des Moines ..... Apr 15
IL Chicago ..... Mar 11, Apr 9, May 14
Springfield ..... May 7
IN Indianapolis ..... Mar 18, Apr 22, May 20
KS Wichita ..... Apr 2
KY Louisville ..... Apr 8
LA New Orleans ..... Apr 15
MA Boston ... Mar 18, Apr 15, May 14
Springfield ..... Apr 9
MD Baltimore ..... Apr 2
Bethesda ..... Mar 4, Mar 12, Mar 18, Apr 7, Apr 15, Apr 21, May 5, May 13, May 19
ME Portland ..... Apr 22
MI Detroit ..... Mar 10, Apr 7, May 12
Grand Rapids ..... Apr 9
MN Minneapolis ..... Mar 12, Apr 23, May 13
MO Kansas City ..... Apr 9
St. Louis ..... Mar 12, Apr 14, May 12
NC Charlotte ..... Mar 18
Raleigh ..... Mar 12
NE Omaha ..... Mar 3
NH Manchester ..... Mar 5
NJ Iselin ..... Mar 10, Mar 26, Apr 1, Apr 15, Apr 29, May 13, May 19
NM Albuquerque ..... Apr 30
NV Las Vegas ..... Apr 1
NY Albany ..... Apr 23
Buffalo ..... Apr 8
New York City ..... Mar 11, Mar 19, Mar 25, Apr 8, Apr 16, Apr 22, May 6, May 14, May 21
Rochester ..... Mar 19, Apr 16, May 14
Syracuse ..... Mar 10
OH Cincinnati ..... Mar 19, Apr 22
Cleveland ..... Mar 3, Apr 1, May 5
Columbus .. Mar 4, Apr 2, May 6
Dayton ..... Mar 18, Apr 21
OK Oklahoma City ..... Apr 7, May 29
Tulsa ..... Mar 24
OR Portland ..... Mar 24, May 7
PA Allentown ..... Mar 5, Apr 21
Harrisburg ..... May 6
King of Prussia ..... Apr 23
Philadelphia ..... Mar 18, Apr 9, May 7
Pittsburgh ..... Mar 10
Trevose ..... Mar 26
SC Columbia ..... Apr 7
TN Nashville ..... Apr 9
TX Amarillo ..... Apr 7
Austin ..... Apr 1
Dallas/Ft. Worth ..... Mar 17, Apr 14, May 5
Houston ..... Mar 12, Apr 9, May 7
San Antonio ..... Apr 2
UT Salt Lake City ..... Mar 24, Apr 29
VT Burlington ..... May 6
WA Seattle ..... Mar 3, Apr 7, May 12
WI Madison ..... Mar 31
Milwaukee ..... Mar 10, Apr 29
WV Charleston ..... Apr 15

CANADIAN SEMINARS

Calgary ..... Mar 18, May 19
Edmonton ..... Apr 14
Hamilton ..... Mar 17, Apr 21, May 19
London ..... Mar 24, Apr 28, May 26
Ottawa ..... Mar 5, Apr 2, May 7
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IBM presents mid-range computers that offer a difference: Choice.

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Here.

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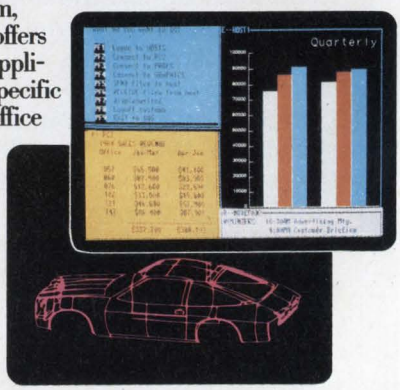

For growth, the System/38 provides a built-in relational data base (allowing you access to data on your own terms) as well as a toolbox of programming aids to help you, in a remarkably short time, custom-design applications that fit the job at hand.

The System/3X family members function equally well

System/3X

the mid-range in where you need most:

as the largest computers in a business or as departmental computers in large companies. And to provide you with the communications and growth options your business needs, the System/3X family was recently enhanced to provide even smoother peer-to-peer communications, greater host and PC connectivity, and stronger networking with IBM 370 mainframes and PCs.

And if you need more power, you can expand the System/36 and System/38 independently, or you can link them in a network where they can share information and resources.

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One choice you won't have to make with IBM is where to find advanced technology, abundant connectivity options and numerous business solutions.

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Both the 9370 and System/3X families use IBM's one-million-bit memory chips and denser logic to achieve their high power and speed. And two new direct-access storage devices give the 9370 and System/3X increased capacity with unusual economy.

All this technology is fascinating in its own right. But it just gives you more in terms of real mid-range computing options: growth upward to mainframes, highways between mainframes and PCs or other workstations—or flexible connections with networks and enhancements either from IBM or other manufacturers.

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To find out more about which IBM mid-range system is the perfect fit for your company, call your IBM marketing representative soon. You'll learn about the kinds of choices you now have in a mid-range computer, and how you can start making them.

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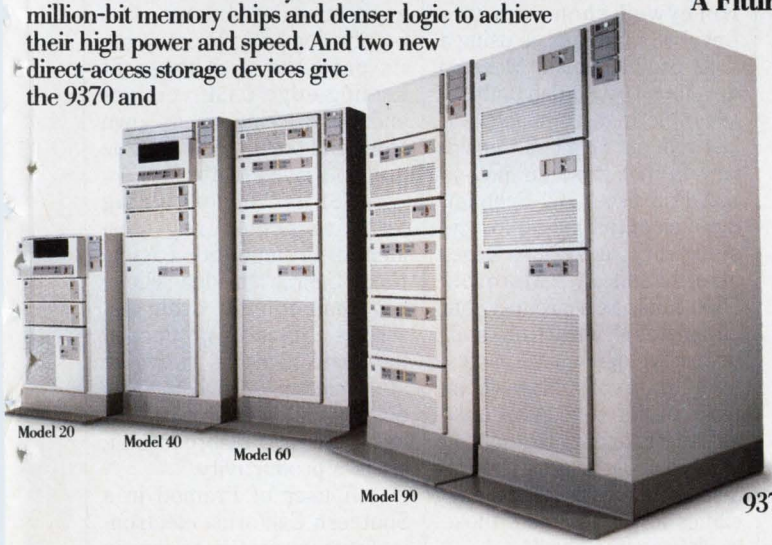

9370 Information System

The IBM Mid-Range. The System of Choice.

CIRCLE 20 ON READER CARD

lems that he believes conformance testing would have caught. For example, during the past two months Ryder has had trouble connecting Gould systems by gateway to the DDN and can't tell which component is at fault.

While Ryder believes that the DCA should be in charge of certification, he "was pleased when the vendors stepped in," and says he will be disappointed if they were to decide not to proceed. Yet, would he join the CWS? No, Ryder says. His budget will not allow it.

The budget crunch being felt on all sides is sending the issue back to DCA. As the largest user of TCP/IP, the defense department is obliged to take on the responsibility for certifying products it buys, most say. But even

"EVERYBODY WANTS THEIR PRODUCTS TO BE THE REFERENCE SET."

Lynch, who is pushing the DCA to get back into the midst of things, says that the DCA will have to change its tactics.

When the DCA asked System Development Corp., to look into the matter a few years ago, SDC "was less ambitious in the sense of creating a lab to certify but more ambitious from the technological standpoint. They were trying to create a thing that would test every bit and field. That's great computer science," but that's not commercially viable, Lynch says. Now part of Unisys's Defense Systems unit, SDC did not respond to questions on its relationship with DCA. Likewise, DCA officials did not return calls by press time.

According to Lynch and others, the DCA, feeling both overworked and frustrated, withdrew. But now, unable to agree among themselves, vendors are looking back to the DCA for leadership. At the very least, says Heiden, all involved realize that tests can't be perfect. A bare bones test should be created to ensure that products "can't do damage to the network," he says.

For his part, Lynch wants out of the testing problem even though this is the issue that brought about the CWS. "Dan Lynch does not want to run a testing service," he says. "I expect CWS to evolve and get rid of the testing thing. . . . I'm trying to tell vendors not to focus on testing but on extending the TCP suite of protocols to bring in new products."

Well, that may work, vendors agree. Lynch is sponsoring another forum this month in Monterey at which he expects 1,000 attendees. Among the issues that must be discussed, he says, are network management, better utilization of IBM's Netbios on TCP/IP, migration paths from TCP/IP to OSI, and standardizing on one electronic mail system.

Thus, the vendors will air out problems rather informally and see what the DCA decides in regard to testing. Still, the whole episode has left some shaking their heads.

"How come we need a group like this now?" asks Ungermann-Bass's Burstein. "Well, things are different. At the ISO side there's no product. At MAP, GM has funded a very large technical staff. COS has a tremendous budget.

"Then look at TCP/IP with its number of customers and vendors. It's five to six times more dense or populous than ISO and you've got Dan Lynch and his answering machine." ■

DEVELOPMENT

In Search of CASE

Although precise definition is elusive, computer aided software engineering is coming into its own.

BY EDITH D. MYERS

A lot of people are trying to make a case for CASE.

CASE, in this case, is computer aided software engineering and not all who are touting it are in agreement as to exactly what it is. Alice Flynn, vice president of application systems and programming for A.G. Edwards Co., a St. Louis brokerage firm, says the term doesn't have a lot of meaning for her. "Systems engineering is what means something to me. Whether the facility used is a computer or not is irrelevant."

She does, however, have a notion of an ideal CASE system. "It should be a basic, modular system whereby system development is almost an assembly process with no need for re-creation."

Flynn, who runs a Honeywell shop with two Level 88 machines, is using a CASE product called Maestro developed by Softlab GmbH, a West German company that last year set up a U.S. subsidiary, Softlab Systems Inc., in San Francisco. Bill Schmidt, director of marketing for the subsidiary, describes Maestro, based on a Motorola 5000 mini, as a product that automates all phases of a software development life cycle.

Flynn calls Maestro as close to her concept of CASE as she has seen. "It's not the ideal modular system I envision but it does provide the facilities for us to create those modules ourselves."

But Joel Presser, president of Softool Inc., Santa Barbara, Calif., worries about disparate products emerging in the CASE arena. "Too many good things can become bad things. You could end up with a tower of Babel when each thing has a different interface." His company sells an integrated environment called CCC (Change and Configuration Control) that controls the four stages of the software development life cycle: requirements, design, programming, and maintenance.

The Government's Interest

Ed Lee, who is a software engineer in the Engineering Systems Group at Digital Equipment Corp. and who is involved in the development of Digital's CASE products, says the government "has almost mandated a CASE approach to software development for its contractors with stipulations for a productive environment in Mil Spec 2167." Digital, he adds, "is supporting the CASE approach by offering tools to integrate its products with those of leading-edge CASE vendors and by working on its own front-end tools, which will be available in 18 months."

CASE is "a positioning term," says Peter Craig, president of Promod Inc., Laguna Hills, Calif., "an idea whose time has come." Craig describes Promod's product of the same name as "a whole life-cycle tool which focuses on the quality aspect of systems and as a by-product increases productivity."

A user of Promod in a Southern California electronics firm who prefers to remain unidentified says that CASE "allows us to do a degree of checking that we never could have done before. We have to have it because projects are getting bigger and manpower

is in short supply."

Bob Mollenhauer, assistant vice president of Colonial Penn Group Inc., Philadelphia, knows that problem. "We needed to get more out of the data processing department with the same resources," he says. Colonial Penn uses Softlab's Maestro to automate its software production.

Mike Lyons, director of the Catalyst Group for Peat, Marwick in Chicago would add another dimension to CASE—reengineering. Traditional CASE, he says, is just right for creating applications, but few companies can afford the luxury of replacing huge systems that work. That's where reengineering comes in and Peat, Marwick, he claims, has the products. The company's PatheVu tools analyze an existing software library, he explains, and tell how complex, structured, and maintainable they are.

A Bandwagon Forming

Tektronix Inc., Beaverton, Ore., acknowledged the CASE wave last August when it renamed its Software Development Products Division the Computer Aided Software Engineering Division. "Right now it's a buzzword that needs to be defined, but people are jumping on the bandwagon so they won't be late," says Mike Mihalik, marketing manager of CASE Division. Tektronix calls its CASE product line the Integral Software Factory. Mihalik says Tek's target market is end users in government and government contractors, telecommunications, and consumer electronics.

The existence of a product in the marketplace with CASE as part of its name worried Craig of Promod when he was positioning his product in the CASE arena. Had he been aware of it (he wasn't), he might have been even more concerned about a fledgling competitor with "case" in the company name. It's an Orange County neighbor of Promod's, CaseWare, in Costa Mesa. Under its present name, the company has been around less than a year but as Computer West Inc., it's been around more than 10, building software systems for the automotive industry. The predecessor company was founded by CaseWare president David Bernhardt and his twin brother John.

CaseWare's product, Amplify Control, currently is in beta test at three Fortune 500 sites and will be available next month.

David Bernhardt believes graphics plays an important part in CASE, which is why he also believes relational databases are not good productivity tools. "They are not effective in storing a lot of graphics images."

Bernhardt also believes artificial intelligence has a place in CASE. "We're working on a knowledge base to store the level of design information critical to CASE."

To further confuse the nomenclature, Glover Ferguson, a partner in the Chicago office of Arthur Andersen & Co. with line responsibility for the firm's CASE efforts, says, "When I try to describe what's going on in data processing, I don't talk CASE, I talk CISE [Computer Integrated Software Engineering]. Most CASE tools stop after the design phase. They don't address implementation in a hostile IBM mainframe environment."

Ferguson says Arthur Andersen is working on a mainframe tool set to be announced this spring that will enable a CASE-created system to fit into a mainframe environment, "as if they were two pieces of Lego.

"That'll get us part of the way there, but I think it will be awhile before anybody is all the way there." ■

BENCHMARKS

Opening the Gates

With about 1,100 pages of legal briefs and a factual study on telecommunications competition to back it up, the Department of Justice (DOJ) is finally making its long-awaited AT&T move. The DOJ is recommending to U.S. District Court Judge Harold Greene that the seven Bell operating companies (BOCs) be allowed to enter a variety of new businesses from which they are now barred by temporary restrictions in the 1982 AT&T consent decree. The DOJ is recommending that each BOC enter most types of businesses except for providing long distance service to, from, or within areas in which that BOC is the local telephone company. AT&T has issued a statement saying it finds it "unbelievable" that the DOJ would send customers, investors, and employees back to square one. With the filing and counterfiling bound to continue for the foreseeable future, this may be only the first skirmish in a long war.

New 3090s

Hoping to spur sales of 370 mainframe equipment as it struggles to regain traditional profit levels, IBM has revamped the price/performance of its large-scale 3090 mainframes. It has also upgraded certain systems software and is offering users cash for trading in their old 3380 disks. The company has upgraded performance of each of the original 3090s and has added two new models, a three-processor system, dubbed Model 300E, and a six-way machine, the Model 600E. IBM says the 600E offers up to 60% more power than the previous high-end Model 400. That would put the 600E's performance at about 75MIPS, according to analysts; the 300E was estimated at about 43MIPS, just below the 400. IBM has promised to reduce the clock cycle time and improve the performance of the existing uniprocessor, dyadic, and four-way 3090s, designating upgraded machines as "E" models. It has also introduced operating system software enhancements, and is offering a limited-time, $16,000 trade-in payment for users who replace early 3380A and 3380B disks with the double-capacity 3380E model. The system software upgrades include a new release of VM/XA that supports vector processing, a new user interface and support of additional real processors, and a new release of VM/SP HPO that supports more active CMS users than before. There is also a new VM Intersystem Facility and a new release of VS FORTRAN. While the E versions of previous 3090s are available now, the 300E (priced at $6.15 million) and 600E ($11.5 million) will ship in the third quarter of this year.

Drops Out

The Hartford Insurance Group has abandoned an effort to break into the market for applications software development tools. The company has dropped its marketing of The Solution, a set of aplications development and maintenance packages running on Wang Laboratories Professional and VS computers. It also canceled agreements with suppliers Yourdon Group, Intech Inc., Lotus Development Corp., and Micro Focus Inc. for software components, a spokeswoman says. In 1985, The Hartford Insurance Group formed a separate subsidiary, Hartford Integrated Technologies Inc., to market the tools. At Wang Labs, a spokesman says that a new relationship with Hartford that would enable it to continue marketing the software is under consideration. Several pilot sites are using the tools but no customers to date, the spokesman says.

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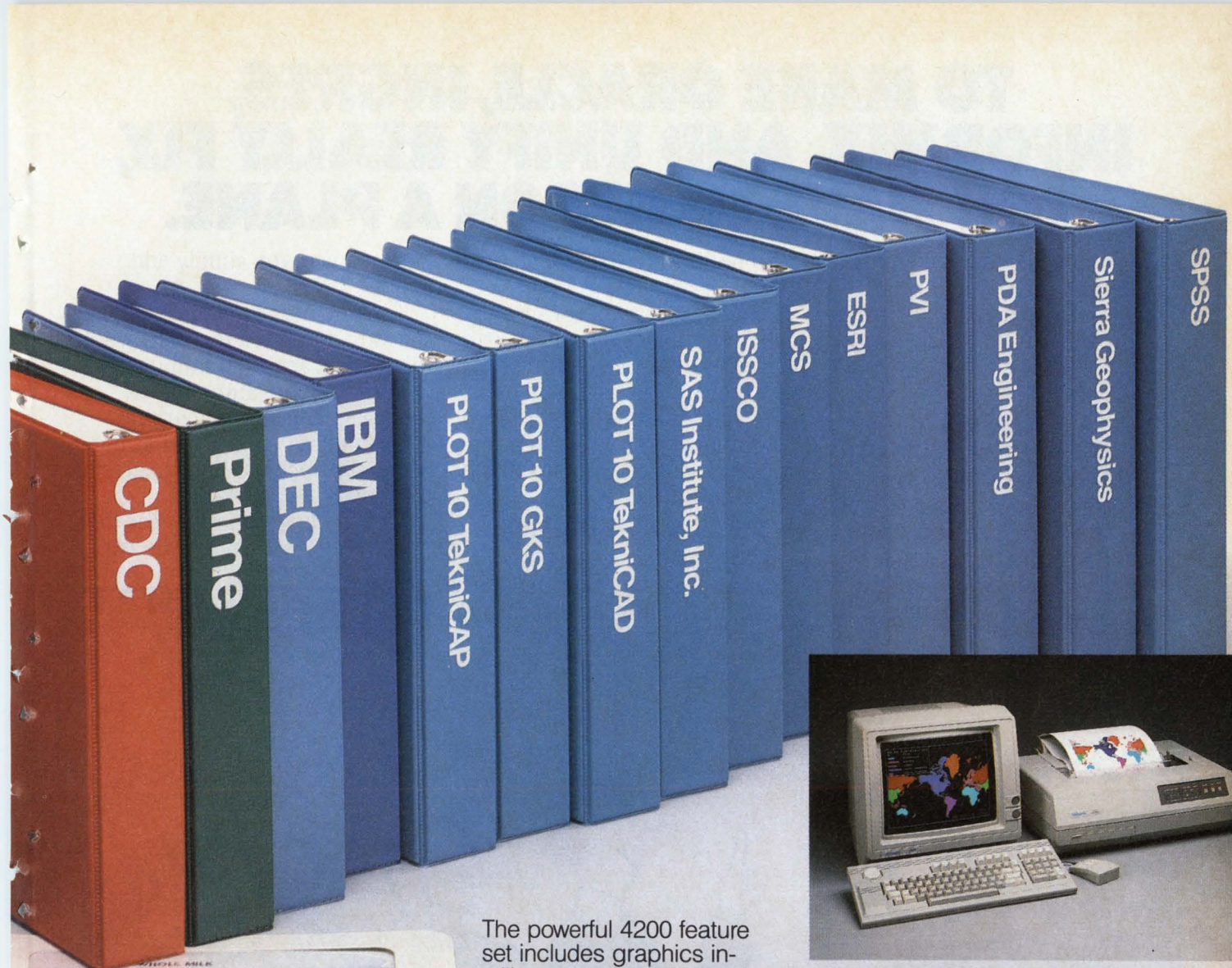

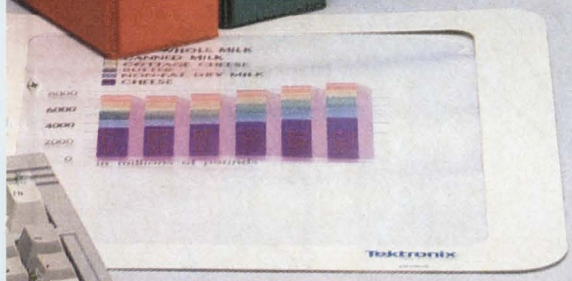

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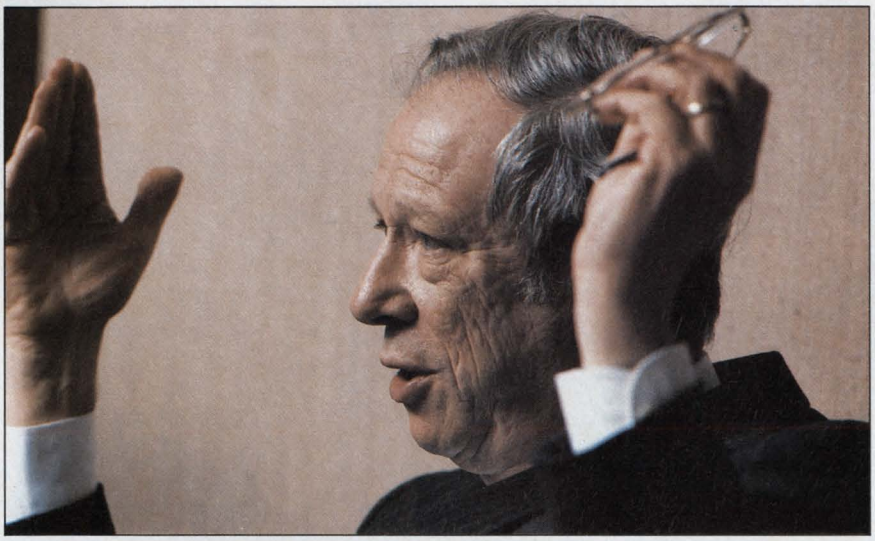
CIRCLE 22 ON READER CARD

Behind the News

INDUSTRY

Unisys: It's On to Phase²

As user concern and industry skepticism subside for the moment, Blumenthal's baby appears to be pulling itself up to a tenuous yet brazen stand.



W. MICHAEL BLUMENTHAL: "It was better for us to go as quickly as we could."

BY JEFF MOAD

They said it couldn't be done.

When Burroughs Corp. chairman and chief executive W. Michael Blumenthal last year announced plans to create a new entity from parts of his company and from takeover target Sperry Corp., there were few in the computer industry ready to predict his $10.5 billion preternatural prodigy would thrive. Sperry customers would jump ship, they warned, despite Blumenthal's promises of continued support for the Sperry 1100 flagship product line. Top Sperry executives also would bolt, leaving the Sperry side of the business without management continuity. And the new company's financial performance would be burdened by the $4.8 billion in new debt taken on as a by-product of the merger.

But just nine months after he flipped the switch that sent life surging into his new creation, dubbed Unisys Corp., Blumenthal is ready to call at least the initial phase of the merger a success. "All the great experts were sure you couldn't put these two companies together," Blumenthal, now Unisys chairman and chief executive, told DATAMATION in a recent exclusive interview. "Well, I think we've made a few converts."

What has turned some skeptics into believers is that the thoughtful, cigar-smoking Blumenthal has far exceeded even his own expectations in putting Unisys on firmer postmerger financial footing and in reorganizing the company to focus its marketing and product development efforts more intently on its key customer bases. Of course, it still remains to be seen if Blumenthal can reverse the long-term trend that saw both Sperry and Burroughs gradually lose mainframe computer market share over the last few years. But the consensus among users and even some initial skeptics is that he is off to a fast start.

Unisys moved a year ahead of its debt reduction schedule late last year when it sold off the Sperry Aerospace and Marine divisions for $1.2 billion and Burroughs' Memorex pcm peripherals marketing arm for another $550 million. Both figures were more than many observers had predicted Unisys would get for those operations.

At the same time, Unisys has exceeded projections that it could cut $150 million from the combined operating budgets of Burroughs and Sperry in 1987. In fact, analysts now believe that cost savings will be at least $250 million next year and as much as $350 million in 1988.

Unisys's increasingly attractive balance sheet has led to speculation that Blumenthal will seek additional acquisitions on the theory that if the power of 2 is good, the power of 3 is better. Blumenthal answers that while he's not interested in another acquisition in the interest of increased corporate size, "sure there are going to be other acquisitions in the life of the Unisys Corporation. I'm not sure that they're going to occur next month or next quarter or next year. But I'm sure there are going to be others."

Perhaps most surprising is that Unisys has managed to prevent a mass defection of Sperry users, who many observers had predicted would be spooked by the Burroughs takeover and would be unlikely to believe management promises that the 1100 Sperry mainframe architecture would be supported and improved indefinitely. Unisys officials say that after Sperry users deferred between $150 million and $200 million in new orders in the immediate postmerger period, orders for new Sperry equipment have returned to premerger growth levels of about 20% annually.

"We haven't had an example of a user who has said, 'Because of the merger we will leave you' or 'We don't trust you,' " boasts Blumenthal, who, along with top Sperry executives, mounted an exhaustive campaign to meet with Sperry users following the merger and to keep them from abandoning Unisys. According to one Sperry user, so persistent was Blumenthal's message about continuing to support the 1100 architecture, "it started to seem like 'In Perpetuity' was his middle name." In fact, says Blumenthal, a few users who had planned to defect from Burroughs or Sperry have been encouraged to hang on.

Didn't Think Merger Feasible

According to Sperry user Allen Elliott, MIS manager for Westchester County in New York and an officer in the USE Sperry users' group, "At first, many of us didn't think the merger was feasible, but I think we're coming around. Blumenthal has taken steps to sell off unneeded divisions and gotten much of the debt paid, and that's positive. Plus, they've introduced a new Sperry machine [the 2200/200] since the merger, and that's eased some of the concern over the architecture."

Photographs by Sol DiMarco

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CIRCLE 23 ON READER CARD

Most users seem to be sticking with Unisys through the merger despite a few disturbing results of the marriage. First, some of the company's cost savings have been achieved through the cancellation of some Sperry new product development efforts.

Second, several visible, high-level Sperry executives have left the company in the wake of the rapid reorganizations that followed the merger. In his most sweeping move, Blumenthal in December reorganized the combined Unisys commercial sales and marketing organizations along the lines of the company's four key markets rather than geographic areas.

The company's mainframe development, Unix development, value-added reseller, and defense products operations have also been combined. The Unisys chief has also closed manufacturing operations in Bristol, Tenn., and Eau Claire, Wis., and laid plans to sell or close one of Unisys's two semiconductor manufacturing facilities.

In addition, he has said he plans to reduce Unisys's 120,000-person payroll by 12,000. Top executives who have departed so far, besides Sperry's retired chairman and ceo Gerald Probst, include 1100 development chief Atim Tiabji and senior vp of corporate planning James Aldridge.

Some Sperry insiders say Blumenthal's postmerger reorganizations, layoffs, and development cancellations have resulted in poor morale in the Sperry ranks. Some point with dismay to the fact that, with Tiabji's departure late last year, high-level 1100 new product development responsibility now lies primarily with former Burroughs executives such as product planning vice president Fred Meier.

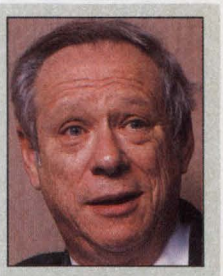
Blumenthal admits he has moved fast in reorganizing the company and that some of his decisions—most notably the line-of-business marketing reorganization—represent what he calls calculated risks. But he says he decided to move swiftly to head off rumors and uncertainty. "We could have moved slowly, gradually, deliberately, step by step, and taken two years," says Blumenthal. "We made the decision that if you go step by step people are waiting for the next shoe to drop. . . . So it was better for us to go as quickly as we could and get it behind us so that everybody knew where he or she stood and who the boss is."

According to USE president Martin Litsky, while some Sperry insiders may be upset with who the boss is and with his rapid organizational changes, most users so far are not. "The changes and departures were to be expected," says Litsky. "Most dp managers are sophisticated enough to know that if one or two individuals leave, it probably isn't going to affect them overall. Sperry people seem to be well represented in the new organization."

Users also seem satisfied with the Unisys approach to new product development to date. According to Litsky, while some users may have some concern with word that specific projects have been canceled, "people are basically glad to see that Blumenthal has made statements and come through on them, regardless of what the changes themselves might be. He has done what he said he would do ahead of schedule and exceeded the dollar targets he had made."

Some Sperry insiders, however, are unhappy about the new product development programs that have been canceled. According to one recently departed Sperry executive who asked not to be identified, Burroughs "started out by saying they wanted to take the best from both companies, but it's pretty clear that their strategy is being driven by [the company's] $8 a share goal. In the last

Observations from Chairman Blumenthal



On IBM:
"They can make a lot of mistakes for a long time to come and still be the overwhelming influence on the world information systems market. I had a boss once who said it takes intelligence and ingenuity and many years of application to ruin a large U.S. corporation. I'm not casting aspersions on IBM; they're a very good company. But they could make a lot of mistakes and still be a very big factor because they are where they are and what they are."

On Digital Equipment Corp.:
"I'm amused because a couple of years ago I was reading a lot of stories about the terrible trouble they were in and how they were really on the skids. I guess there's a cycle about these things. We were considered to be semicomatose also, so these things go in cycles."

On acquisitions:
"Sure, there are going to be other acquisitions in the life of the Unisys Corporation. I'm not so sure that they're going to occur next month or next quarter or next year. But I'm sure there are going to be others. I would think that there are other areas, whether it's in adding to our muscle, or solution selling, or in the area of networking, or the government areas, or in some of the geographic areas outside of the U.S., or in the area of service, where the profit margins and the growth have been—and will continue to be—interesing. All of those strike me as good possibilities."

On the convergence of computer/communications firms:
"Conventional wisdom is that the amalgamation of computer companies and communications companies is proceeding apace. That, in my judgment, is wrong. I haven't seen a lot of evidence of that. I watched what happened when IBM acquired Rolm and see no evidence that that is a great boon, at least today. I watched with interest AT&T's efforts to get into the computer business, and I don't see any evidence that that's crowned with success. . . . Nobody has been knocking on our door or, from what I can tell, anybody else's in quantity, saying, 'I don't want a telephone anymore, I want a telephone-computer.' "

On IBM's control of industry standards and the lack of open standards:
"The users don't understand. The users should take a real interest in this. And they should have a stronger voice in insisting on common, well-defined standards [that] cannot be manipulated. Because it would be a real advantage to them. They all complain that these computers can't talk to each other and that it costs so much money to upgrade, and that's the reason. Perhaps it's the newness of our industry that results in the dominant supplier having such an advantage."

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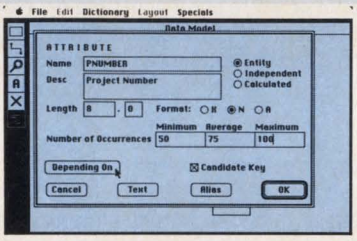
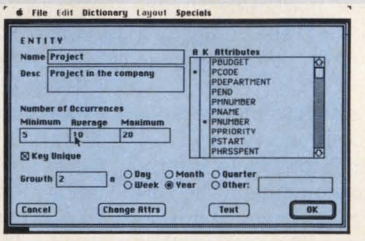


attributes may appear with different names

statistics to optimize the performance of your system



key indications

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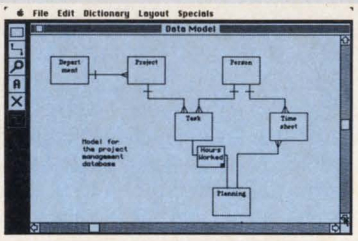
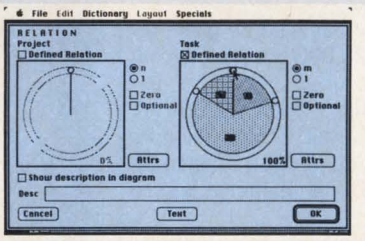


names of relations

direct access to your dictionary

relation type



statistics

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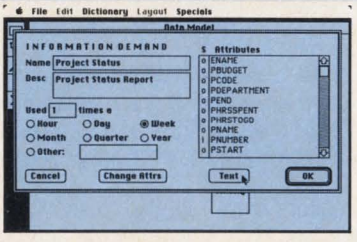
attributes that define the relation

record and analyze the transactions you want to perform

basis for your access path analysis



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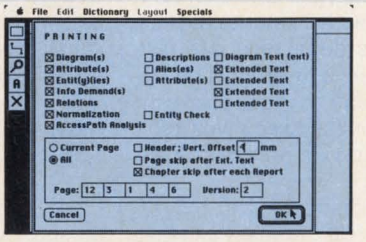

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CIRCLE 24 ON READER CARD

two or three months, a lot of products have been cut or had their funding reduced."

Unisys officials acknowledge they are reviewing all of Sperry's new product development efforts and have canceled or deemphasized some that they believed either wouldn't live up to user expectations or couldn't be justified by market size or user demand. "We've had to take a closer look at how our engineering and development dollars are being spent," says Blumenthal.

Report Discontinuing Projects

One widely reported Unisys decision was to discontinue the Atlanta-based development of a VM-like virtual operating system for the 1100 mainframe based on the KeyKos transaction OS developed by KeyLogic Corp. of Cupertino, Calif. And Unisys has announced its intent to discontinue its participation in development projects associated with its membership in the Austin, Texas-based Microelectronics & Computer Technology Corp. industry consortium, a decision that will save the company between $15 million and $20 million a year, according to Blumenthal.

Unisys officials recently confirmed to DATAMATION that they also have discontinued Sperry plans to market back-end database processors manufactured by Britton-Lee Inc. of Los Gatos, Calif., and Teradata Inc. of Los Angeles. The company also has shelved for the time being artificial intelligence-based product plans that had originated at both Burroughs and Sperry.

Meier says that while Unisys has plans to support relational database products and the SQL programming language, it has dropped marketing of the Britton-Lee machine and has discontinued talks with Teradata because most of its users are currently committed to its hierarchical database systems. "We will maintain the Sperry product line because there's no question there's an uptapped gold mine in getting more capacity to the Sperry customer base," says Meier. "... Where we lose our shirts sometimes is in these new product areas."

Of course not all of Sperry's development efforts have failed to survive their Unisys review. Some users of Sperry equipment even have evidence that Unisys will respond to pressure from large customers for specific new products. One threatened Sperry project, known internally as Big Mipper, is a file locking feature that will allow users to join multiple 1100 databases. A handful of large airlines reportedly have been eager for the feature. Following the merger, they lobbied with Unisys for its continuation. As a result, the project is still being funded, say Unisys officials.

In addition to cutting out some development efforts, Unisys is focusing on combining existing Sperry and Burroughs projects where possible, or sharing technologies and investments. Development areas targeted by Unisys for close cooperation include:

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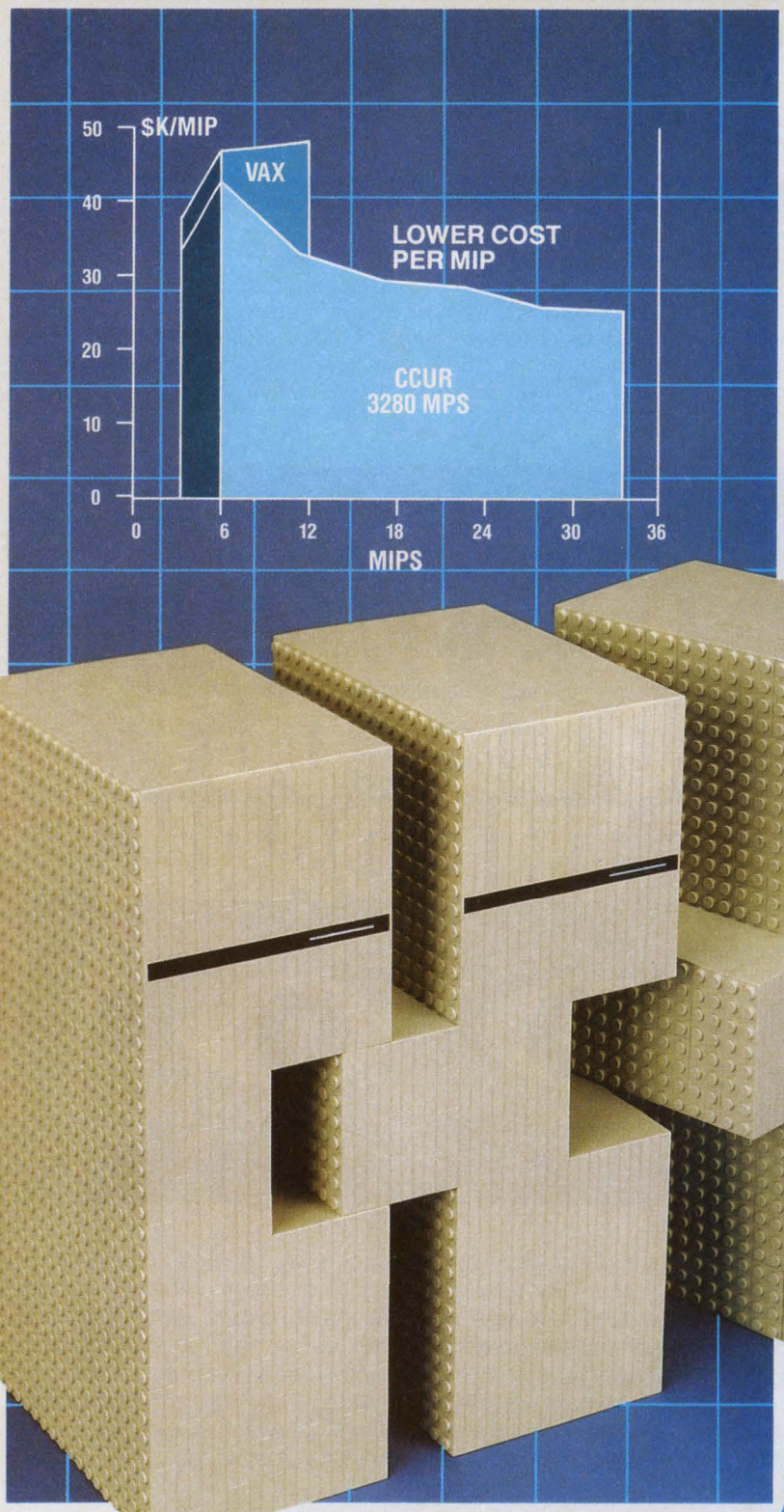

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• Large systems. While the development of the next upgrades to the Burroughs A Series and the Sperry 1100 mainframe lines are far along and won't be changed, Unisys is planning to standardize on key development technologies and system components for the follow-on mainframe generations, due no sooner than 1990. Unisys will use the same CAD systems to design the products and the same cablings and enclosures; it also plans to use the same memory components on the two lines.

• Peripherals. According to Meier, Unisys plans to standardize the Sperry and Burroughs products on one line of printers and to reduce outside sources of storage devices, sharing disk storage technology across the product lines. Unisys recently signed an oem agreement with Data Products for printers, and is expected to migrate Sperry users to disk drives based on the 3380 technology Burroughs developed while it owned Memorex. Developing interfaces from the Memorex disk to the Sperry 1100 line could take 18 months, however.

• Workstations. Unisys is working on supporting its B20 networked microcomputer system under the Sperry 1100 and on supporting Sperry's IBM PC-compatible products as terminals both in B20 and A Series networks.

• Unix-based systems. All oem suppliers of midrange Unix-based hardware are being evaluated as their contracts expire, and Unisys is expected to do some weeding out, especially in areas where there is system overlap. Oems that stay on the Unisys supplier list will be asked for concessions. "We'll want to improve our [profit] margins," Meier says, ". . . and we'll want manufacturing rights. Also some help with application software."

• Software. Burroughs, which considers operating system development one of its strengths, has already turned its engineers loose on the 1100 OS in the hope of improving system performance by upgrading I/O function and adding fast cache memory features similar to the "soft cache" main memory capability recently announced for the A Series. Unisys also plans to modify Sperry's Mapper end-user application generator software to run on Burroughs hardware and move Burroughs' Linc programmer-oriented tool over to the Sperry hardware. Unisys is also looking at adapting Burroughs' health care, banking, administration, and manufacturing software for Sperry systems.

• Communications. While both Sperry and Burroughs have taken preliminary steps to allow their proprietary communications protocols to interface to IBM's Systems Network Architecture and to the OSI standard, both still have a lot of work to do. The Burroughs mainframes, for example, interface to SNA only on a gateway basis using IBM's HCF facility. The company continues work to support open industry standards, but, says Unisys vp for product programs Peter D. Bakalor, "We are studying the issue to see what can be done in common so that we

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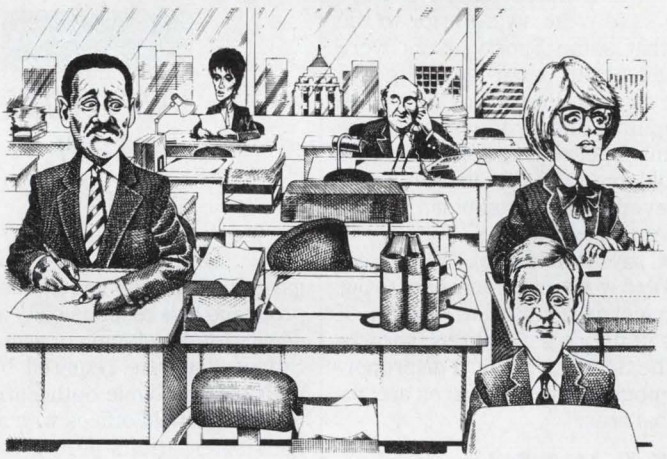

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have to cut the code only once."

Meanwhile, Unisys is continuing with Sperry's next 1100 performance boost, code-named the Super 90, while sources say the next upgrade of the A Series, known to users as the A 17, is still expected as early as the end of 1987. The A 17 is thought to be essentially an upgrade of the A Series I/O throughput capability, while the Super 90 will use logic or subsystems being developed for Sperry by Hitachi Ltd. Described by some observers as a stopgap performance boost measure undertaken by Sperry prior to the merger, the Super 90 is expected to be announced toward the end of 1988.

Observers say that schedule means the Sperry mainframe line over the next two years could continue to fall behind the mainframe performance standard being set by IBM and its plug-compatible competitors. Blumenthal says Burroughs people were aware prior to the merger that some Sperry users were concerned about what he calls the "weakness or lateness" of follow-on Sperry mainframe products. But, he says, many Sperry users also realized those problems "were much more likely to be relieved from the combined company than from Sperry alone."

Now, says Blumenthal, "We are going to have to work extremely hard to put into the pipeline a sufficient number of upgrades in future generations, particularly on the Sperry side. So a disproportionate amount of our resources are going into that area."

No Quick Fix for 1100's Problems

Unisys won't be able to fix the 1100's problems right away, and that may make it harder for the company to halt the ongoing erosion in its mainframe market share position, which has been caused both by defections in the Unisys customer base and by the inability of Burroughs and Sperry to increase sales to their existing customers as fast as IBM generates sales to its base. According to figures published by International Data Corp., Framingham, Mass., the Burroughs/Sperry share of the worldwide mainframe market between 1981 and 1985 in units fell from 20.7% to 10%. Recently released figures show Unisys's share in 1986 dropped again to 8.6%.

Although Unisys officials insist that defections from its customer base are no more frequent now than in the recent past, large customers continue to walk away. Sperry, which once was a strong vendor to major U.S. airlines, has seen that position erode in recent years as deregulation has forced the airline industry to consolidate. Recently, one of its largest airline users, Minneapolis-based Northwest Orient, decided to drop its Sperry-based reservation system and to sign on as a user of the TWA IBM-based system.

While Unisys continues to cut its operating expenses and combines key new product development efforts, officials say the company also has a plan to cut down on defections from its customer base and to generate more sales to its existing users. Much of that plan is tied up in the company's Nov. 25 sales and marketing reorganization, which laid out Unisys's four key vertical market niches. Most important, the reorganizations gave the four new line-of-business units profit and loss responsibility and responsibility for developing or acquiring applications software required by users in their niches. While both Burroughs and Sperry had field offices with line-of-business orientations before the merger, they lacked the software responsibility.

"WE'VE MADE A FEW CONVERTS."

The four key businesses identified by Unisys were communications and airline systems; financial systems; public sector systems; and industrial and commercial systems. The latter will sell primarily to manufacturing, technical, energy, engineering, and retail users.

Unisys is hoping the new line of business organization will allow its sales and marketing organization to become better acquainted with the details and requirements of their customers' businesses so those organizations will fill in gaps in Unisys's off-the-shelf application software offerings, long a weak point for both Burroughs and Sperry. In addition, by combining marketing of Burroughs and Sperry products, Unisys hopes to sell users of one product line products from the other side.

While the new organization was put into place only in mid-January, Unisys already has made at least one major investment decision based on feedback from the communications and airline marketing organization. According to marketing vp Jan Lindelow, Unisys will "drastically increase our investment in airline applications. If we had done that earlier, maybe we could have changed Northwest Orient's decision. We haven't given up."

Users haven't had much experience with the new line-of-business organization, but they seem to like the idea, even though in some cases it will mean a change in their sales and support contacts. According to user Elliott, "They should be able to develop a depth of knowledge about their users' needs that they didn't have before." Another Sperry user, Norm Clausen, manager of dp at the Internal Revenue Service in Fresno, Calif., says, "The change has meant that some of the branch managers have been replaced by Burroughs guys who don't know the terminology. But overall that hasn't been a problem."

Blumenthal is betting his Unisys experiment is coinciding with what he senses as a fundamental shift among MIS users away from a concern with which vendor is supplying the equipment and toward a user-driven interest in the best solution. "Six or seven years ago, most of what our people talked about and worried about was how to make inroads in convincing MIS vps to do business with us. And most of their frustrations were that a lot of these people had a large vested interest to stick to what they had learned. What changed in the last several years, and maybe it's one of the things that gives IBM some difficulty, is that the user—that part of the company that actually has to work with these solutions—has gained power and has asked for service and solutions. He finds that more important than who the provider is."

That's not to say it's going to be easy for Blumenthal and Unisys to gain ground in the computer business or even retain a hold on their current strong position in key government, financial, transportation, and communications markets. "If this is going to work it means that we must grow as fast as the markets grow," says Blumenthal. "If we do, we can maintain our scale. But you'll have to come back five or 10 years from now and see if that really happened." ■

Sarah Underwood, associate editor, Europe, and David R. Brousell, news editor, assisted in the reporting of this article.

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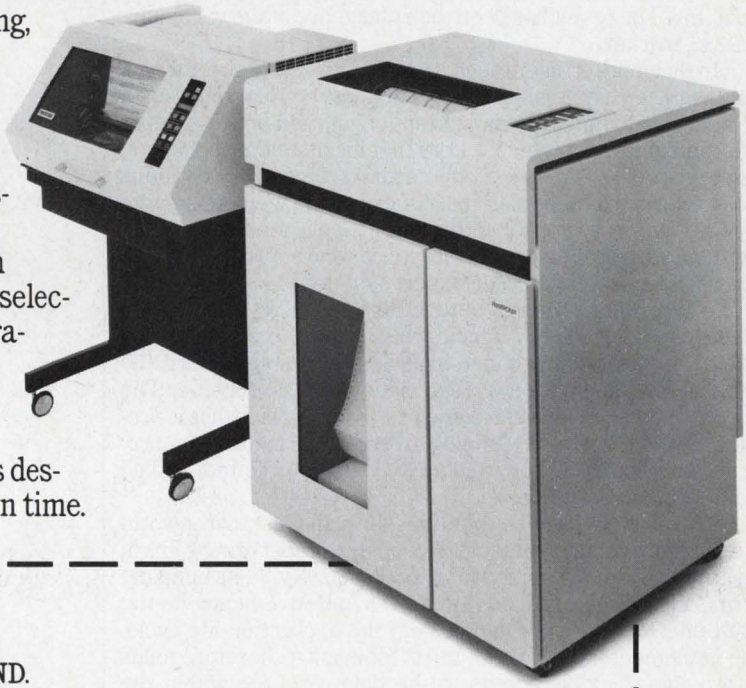

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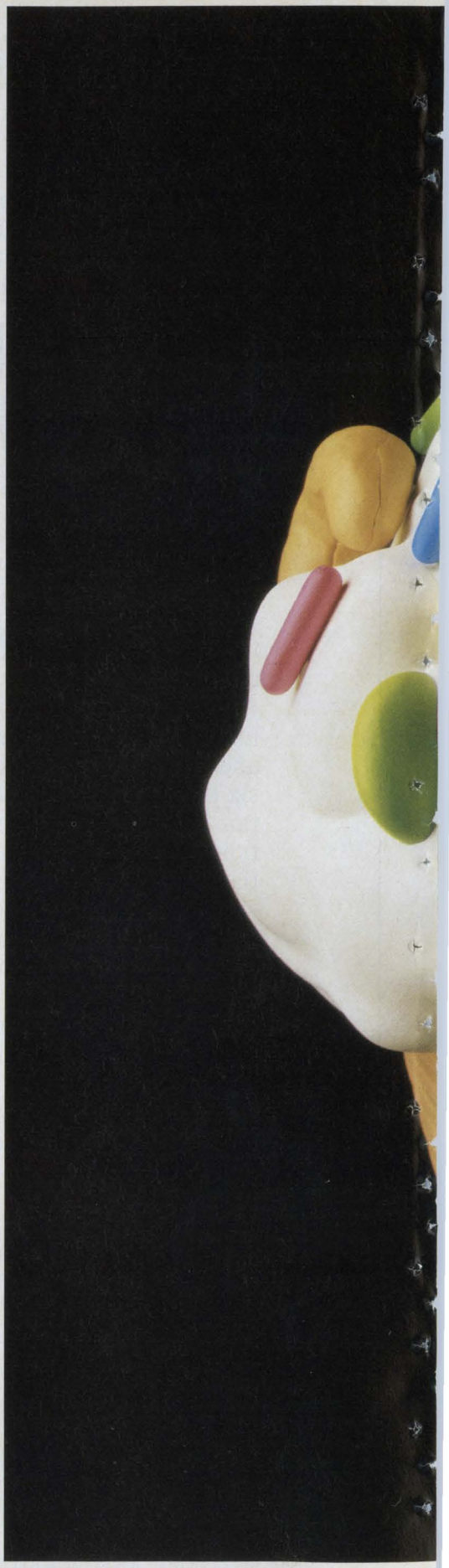
The automation of automation is the logical extension of the practical implementation of the relational concept. It's also the basic tenet underlying the host of tools that promise to add value to the plain vanilla database management system you're operating today. Searching the market for this "practical implementation of relational," MISers will be faced with three issues—what to do about SQL, the repository, and the need to support distributed and workstation applications. The plethora of products that address these issues in various ways include application and information generators, support wares for workstation and network-oriented RDBMS applications, information management software such as information directories, and knowledge-based expert systems.



BY PAUL R. HESSINGER

"Every new wonder tool I try just seems to add to the automation anarchy I'm trying to overcome," laments a dp executive trying to make sense of today's DBMS marketplace. Adds another, "Is relational—whatever that is—going to help with the data chaos problem we have?"

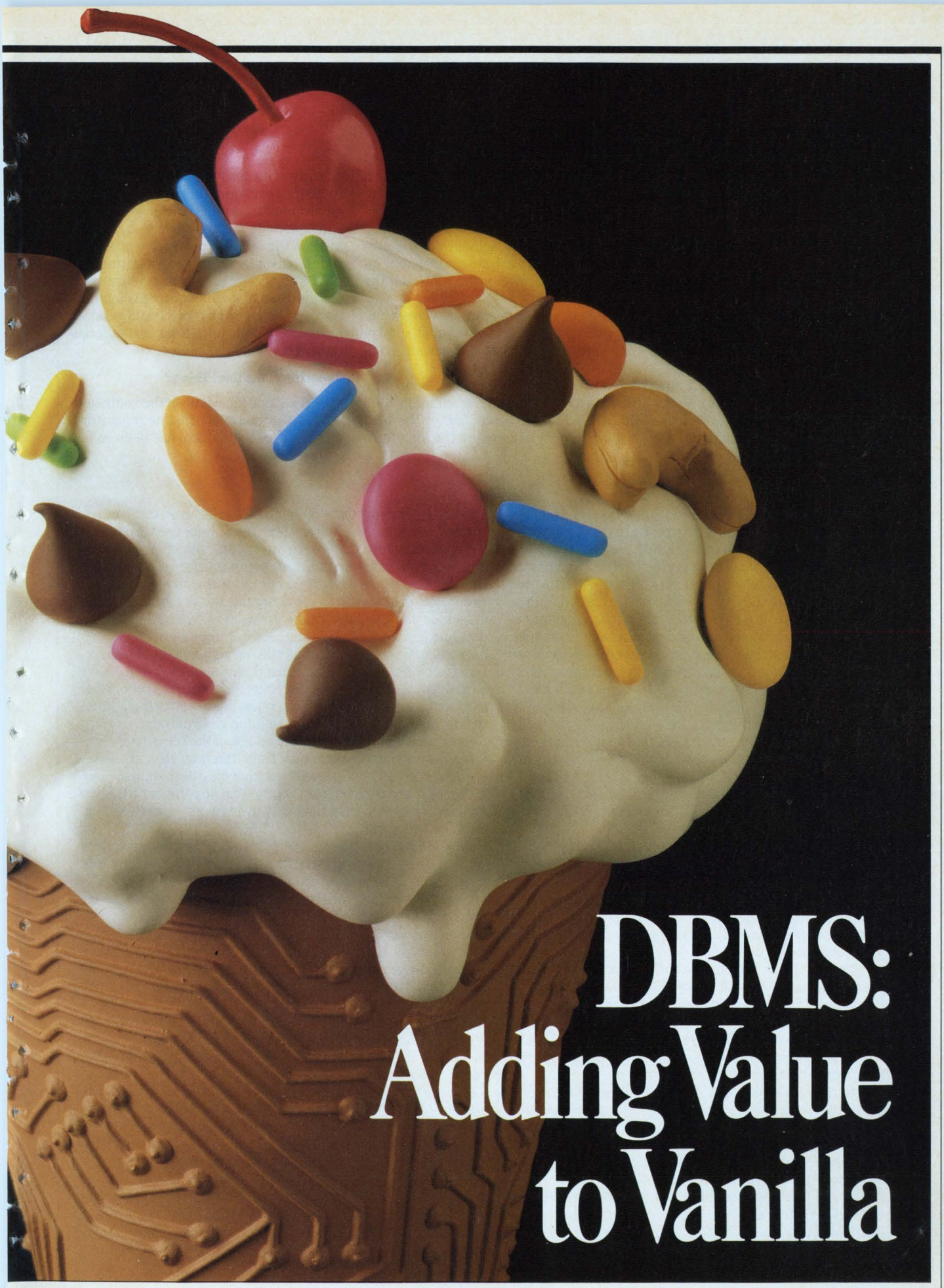
Venturing into today's database management system marketplace is like going into an ice cream parlor that offers 31 flavors with toppings. The counterman tries to pile as many scoops as he can on your banana split. In the same way, vendors keep dishing out more and more customized answers to user problems. The result has been the emergence of the value-added DBMS market.

In that market, users seem to have a sweet tooth for wares that bear the relational label. Products in the relational realm are being combined with a host of appetizing add-on tools: application and information generators that facilitate the application delivery process; support products for intelligent workstations and network-oriented relational database management system applications; software for information/application asset management, such as information directories and application dictionaries; and knowledge-based expert systems.

While there's no substitute for having an information strategy—the details of which are beyond the scope of this article—value-added products can be a real step toward the practical implementation of the relational DBMS scheme. The inherent power of an RDBMS derives from the fact that it provides a framework for defining overall information requirements with an underlying technology that's oriented to data sharing and integration.

Today's DBMS add-on tools face the same test that any other new information technology faces—they must bring gains in application productivity and information quality. In its simplest terms, increased productivity means improvements in the cost-effectiveness and timeliness of the application life cycle. The implementation of these DBMS tools must therefore focus on providing flexible access to the data resource within the broader context of a comprehensive information asset management effort. And that effort is, in turn, supported by the value-added wares—the automation of automation that is the logical extension of the practical implementation of relational.

Searching the value-added marketplace for this "practical implementation of relational" can be a challenging undertaking. The level of abstraction inherent in the relational model created by IBM fellow and independent consultant E.F. Codd is both a blessing and a curse, especially in the quest for tools that are implemented on top of an RDBMS. It should also be pointed out that there are DBMS wares on the market today that are powerful products despite the fact that they are not "fully relational"



DBMS: Adding Value to Vanilla

3-D Illustration by Kathy Jeffers; Photograph by Walter Wick

DBMS: Adding Value to Vanilla

(at least as far as Dr. Codd is concerned).

Back in the relational world, there are three key issues that have surfaced in the value-added, RDBMS software market: the emergence of SQL as a de facto industry standard for data access; the need for RDBMS repository facilities to support application development and information retrieval tools; and the need to support applications operating in distributed and intelligent workstation environments.

Let's first look at SQL. A direct outgrowth of Codd's relational model, SQL is not, in and of itself, a tool. Nevertheless, it presents tremendous productivity potential. SQL is much more than a language for structured queries. What SQL actually does is provide a consistent interface layer between the tools and the RDBMS.

In other words, if a software product does not have an SQL capability today or if the vendor lacks a coherent, comprehensive definition of how SQL will be supported, then that product should be disregarded as an implementation tool. In fact, adopting SQL is one of the best ways a vendor can ensure the long-term viability of its product, since it will be able to adapt to various hardware/software environments. And it works well on the end-user side because it can be implemented transparently. SQL also offers the added advantage of allowing multiple DBMSs to access the same application, a feature that's becoming increasingly important as more and more DBMS vendors incorporate SQL into their data definition/manipulation facilities.

Repository: the Real Thing?

A second key issue in the value-added RDBMS arena concerns the repository. Despite the fact that IBM has been calling

What's Important in a DBMS?

A study was funded by the Weatherhead School of Management at Case Western Reserve University, Cleveland, to define the most important characteristics for selecting and acquiring a database management system. The 18 companies participating in this study were chosen for their sophisticated environments and long-term experience in the data resource management area. At least two data resource management professionals—data administrators, database administrators, data analysts, or database designers—were interviewed within each organization. They were asked to ignore conversion costs and address the question, "If today you were to purchase the best DBMS available, what would you consider to be the most important features for selection?"

The participants in the study identified 18 items as being most important in DBMS selection. Some of these are not DBMS features, as narrowly defined. They include vendor attributes and other things considered crucial for long-term user satisfaction with a DBMS. The following is a list of the DBMS musts compiled from the survey.

Database definition facilities: the DBMS should directly and automatically support one-to-many and many-to-many relationships between entities.

Database manipulation facilities: the DBMS should provide data manipulation languages of various types, both procedural and nonprocedural, for end users as well as for information system developers.

Data retrieval facilities: the DBMS should have data retrieval facilities for end users and information system developers.

Access control facilities: the DBMS should provide access control at least down to the data item level, possibly even down to the value level, to avoid bottlenecks created by file locking.

Backup and recovery facilities: these should be automatic and not solely dependent on the operating system.

Database restructuring facilities: these should give automatic support for database offloading, redefinition, and reloading.

File handling utilities: the trend toward compatibility and equipment integration demands software utilities that harmonize different file formats and database organizations.

Database administrator utilities: these software tools support the need of the database administrator to fine-tune continuously the individual databases.

Data dictionary/directory facilities: among the most essential data resource management tools, these facilities provide intelligence on data resources and support data administration and timely systems development and maintenance.

Application software interface: in many industries there are basic applications that drive the DBMS selection process. Therefore, the system that best supports the selected application software has a major competitive advantage.

Datacom software interface: for organizations that are widely dispersed geographically, the DBMS that best supports its datacom software configuration has a competitive edge.

Machine efficiency: companies with large volumes of transactions to be processed soon learn that not all DBMSs are alike when it comes to machine efficiency. Several firms report that they incurred substantial conversion costs replacing a DBMS that failed in a high-transaction volume environment.

Degree of data independence: the ability of the DBMS to divorce the logical database definition from the way it's physically stored increases opportunities for changing both things. Similar benefits are derived from a DBMS that separates the logical database definition from the many user views—queries or application programs.

Compatibility with other DBMSs: to satisfy today's wide variety of MIS needs, most organizations are likely to acquire more than one DBMS. To share the company's data resources, it is necessary for these different systems to be able to freely transfer data back and forth.

Training time/costs: as the number of a DBMS's users grow, the necessary training time and costs increase correspondingly. Companies are interested in two phases—the training time needed for elementary, productive work, and the time it takes to achieve proficiency with a particular package.

Ease of use: once the user has learned how to work with the DBMS, the flexibility of the language, the transparency of the functions, and the system's ability to support applications become critical considerations.

Vendor support: a key selection criterion is the ability and willingness of the DBMS vendor to resolve customer problems in such areas as implementation and machine performance. The vendor's knowledge about the DBMS internals is essential for a prompt and effective solution to these problems.

User group strength: the existence and strength of a large group of organizations using the specific DBMS is an important selection factor. It increases the likelihood that the product will be maintained and improved by the vendor as well as by third parties.

BY TOR GUIMARAES

its data dictionary product for DB2 the Repository, the company has yet to announce the real thing. In fact, the company's frequent discussion of a DB2-based system repository has resulted in two major misconceptions. Misconception number one is that the repository, and hence DB2, will be mandatory in an MVS environment. Misconception number two is that the repository will be the mechanism for merging IMS and DB2 data. These are complete distortions.

The current concentration on the repository concept reflects the growing need for a user-oriented dictionary/directory of data about the information and applications available in a systems environment. Two types of repositories are necessary, one that is global and one that is tool specific and local. An RDBMS provides the ideal mechanism for the global repository. Local directories/dictionaries will be needed to support the applications and data within their spheres of influence.

But what about a common layer between global and local repositories? SQL is the obvious direction here. As a specific tool is evaluated, the explicit role of a dictionary/directory facility must be defined. An application development tool will have both similar and unique repository needs compared with an information retrieval tool. So the strongest bond between multiple repositories will in fact be data, which, not coincidentally, should also be the focal point of a value-added RDBMS implementation strategy.

The last crucial concern in the value-added RDBMS realm involves the ability of a tool to operate in a distributed environment. Information retrieval systems will need underlying network technology to support the transfer of data between processors, a process that must be highly transparent to users. To present a single-user view, data must be gathered from multiple nodes in a network. Application development tools will modify the major functions to run on workstations, particularly for analysis/design and prototyping purposes. The use of a standard data language, SQL, and the availability of a repository that can be shared will further leverage the raw functionality of the RDBMS tools.

Products in the Marketplace

Now we'll take a look at some of the products in today's value-added RDBMS marketplace, starting with application generators. Generators that can be used only with specific DBMS products include Natural from Software AG, Reston, Va.; Mantis from Cincom Systems Inc., Cincinnati; ADS/O from Cullinet Software Inc., Westwood, Mass.; Accolade from Computer Corp. of America, Cambridge, Mass.; and Ideal from Applied Data Research, Princeton, N.J. These vendors, however, have opened the architecture of their generators to accommodate other file structures. That accommodation was accomplished through gateways, initially to VSAM, then to IMS DB (DL/I), and more recently to SQL. In moving their products closer to the IBM camp, these companies have dulled the competitive edge of their own DBMS wares.

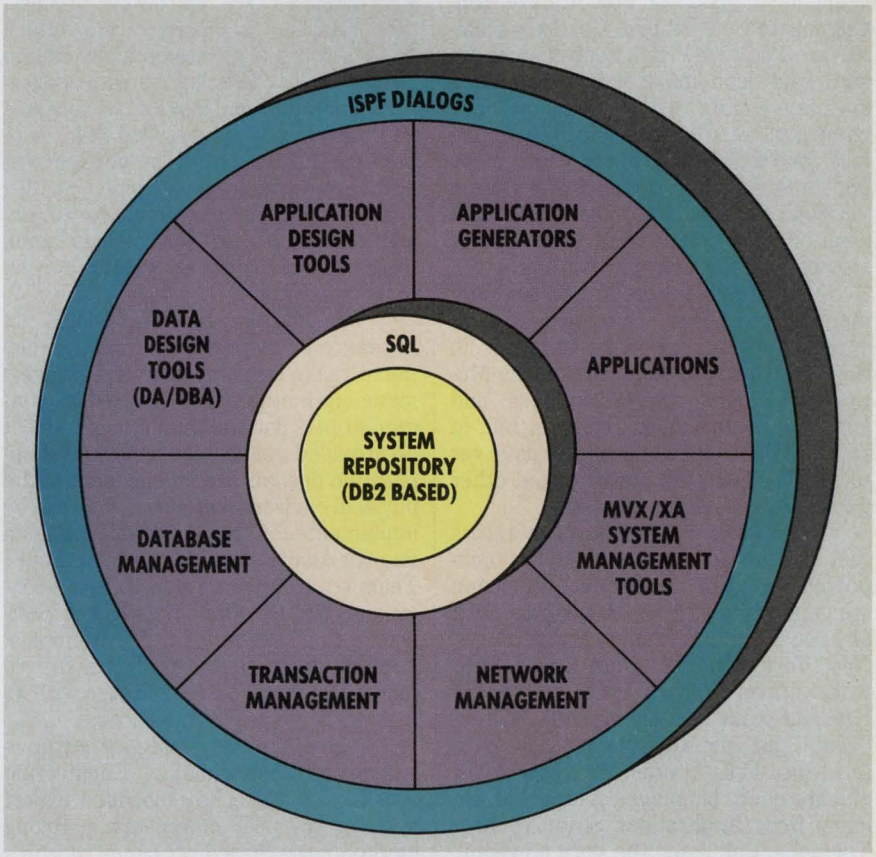
Nevertheless, that edge remains pretty sharp, according to users who report that neither of IBM's generators, Cross System Product (CSP) Set nor IMS ADF II, can compete with the products offered by these independent software suppliers. That means that generators like Natural and Ideal could wind up building applications for DB2 or other SQL-based DBMSs. Other generators such as Mantis and ADS/O have much stronger overall architectures to continue propelling them forward. IBM is also making some inroads. As IBM does a better job of integrating its tools with DB2, both CSP and IMS ADF II are scoring more points with committed DB2 users.

IBM DBMS products that generate COBOL to interface to IMS DB/DC, IMS DB/CICS, and DB2 will be among the most important acquisitions many MIS departments will make in the value-added RDBMS area. There are five basic products in this league to choose from: APS from Sage Systems Inc., Rockville, Md.; Gamma from Knowledgeware Inc., Ann Arbor, Mich.; Pacbase from CGI Systems, Pearl River, N.Y.; Telon from Pansophic Systems Inc., Oak Brook, Ill.; and Transform from Transform-Logic Corp., Scottsdale, Ariz.

Both Pacbase and Transform have strong life cycle orientations. APS and Telon are leaning in the same life cycle direction, actively pursuing the repository route. While Gamma currently seems to be lagging behind on many counts, Knowledgeware could be the first to come up with a complete application development system as it races to integrate Gamma with its Information Engineering Workbench.

There are two very powerful prod-

FIGURE 1 IBM's Repository Concept



DBMS: Adding Value to Vanilla

ucts in the non-IBM generator group—Application Factory from Cortex in Wellesley, Mass., and Powerhouse from Cognos Inc. in Ottawa. Cortex's architecture and Cor-Vision analysis and design front end make it a very strong alternative for DEC installations. The company recently introduced an interface for DEC's Rdb RDBMS. You can expect IBM shops to demand a Big Blue version of the product. The main weakness of these wares from an IBM-world viewpoint is the lack of an SQL link.

There are also application development systems that are integrated with application software. Typical wares in this field are Millenium:SDT from McCormack & Dodge in Natick, Mass., and Umbrella from Hogan Systems Inc. in Dallas. These types of products have yet to approach the full power of the other generators already discussed.

Next come information generators that run the power gamut. At the high-powered end of the product spectrum are information retrieval systems such as Focus from Information Builders Inc., New York; Ramis II from Online Software International, Fort Lee, N.J.; Nomad2 from D&B Computing, Wilton, Conn.; and Inquire from Infodata Systems Inc., Falls Church, Va. At the other end are query languages such as ASI/Inquiry from Applications Software Inc., Torrance, Calif., and the very powerful, resource-intensive Intellect from Artificial Intelligence Corp., Waltham, Mass.

Products for Query and Report

In addition, there are products that are DBMS dependent for query and report generation purposes. There are interesting initiatives under way at such companies as Management Science America. The Atlanta software house is tightly coupling its Information Expert product with applications. As MSA moves toward broader use of DB2, this value-added feature will beef up the underlying strength of the firm's application portfolio.

Additional categories of products such as computer aided systems engineering (CASE) tools and workstation-based facilities that are targeted at specific aspects of relational implementation are also making their way onto the market. In the CASE arena, two firms are prominent—Nastec Corp., Southfield, Mich., which markets Design Aid, and Intech Inc., Cambridge, Mass., which sells the Excelerator. Both products, which are pc-based, go beyond simply automating the documentation of graphics such as dataflow diagrams. What they attempt to do is automate the analysis/design process. Nastec and Intech are both planning to link up with application generator vendors to do what comes naturally in the value-added field: support the automation of automation. But both these vendors must come up with a sharable, perhaps mainframe-based, design library. If they don't deliver soon, their products could be ignored by systems integrators.

The CASE category of products can appear to be quite distant from the relational realm. But as entity relationship modeling methods are adopted, a common RDBMS data definition facility must be provided by the CASE tools so that application designs are independent of the physical environment where they will be implemented. Other CASE wares include Pro-Kit Analyst from McAuto, St. Louis; Teamwork/SA from Cadre Corp., Atlanta; and The Solution from Hitech Software Engineering Corp., Memphis. Looking down the road, Texas Instruments may enter the CASE corps with its Information Engineering Facility.

Also in the CASE category is Knowledgeware's Information Engineering Workbench. With its embedded expert system, the IEW automates a strong methodology (based on James Martin's work). This so-called "methodware" is a powerful approach that is not, however, for the fainthearted. Set to make waves in this market is Cullinet, which has teamed up in a venture with a company across the Atlantic, British firm Learmonth & Burchett Management Systems Ltd. LBMS's Auto-Mate analyst/designer workstation, which will provide a powerful CASE front end to Cullinet's products, will also enable the U.S. company to further leverage its integrated data dictionary, which is the driving force behind its integrated architecture.

Cincom is also a tough contender in the CASE marketplace. The company's Normal data analysis/modeling tool is a strong mechanism for defining data to its Supra RDBMS. As Cincom elevates the functionality of Normal to the conceptual and logical levels of design, the product should become even more important to Supra users.

There are also a variety of other products that merit mentioning. The PC/SQL-Link SQL generator from Micro Decisionware, Boulder, Colo., is an example of this type of tool. It generates a user's data needs in the form of SQL, communicates the SQL to an RDBMS, and then translates the returned data to the appropriate pc format. The pc-based generator completely "hides" SQL from a Lotus 1-2-3 user, for example.

Dataserver is a very powerful integrated workstation RDBMS implementation that is being developed by Sybase of Berkeley, Calif. Users looking for departmental and workstation tools should keep in mind Dataserver and other products such as Unify from Unify Corp., Portland, Ore., and Informix from Informix Software, Menlo Park, Calif.

Also worth noting here are the major efforts of Oracle and Relational Technology Inc., Alameda, Calif., to build distributed data management environments. Both companies have products that extend the practical implementation of relational into the departmental/network realm.

Impressive Products

Finally, from the knowledge-based expert system universe come impressive products such as ADS from Aion Corp. in Palo Alto. Aion is well ahead of the pack in recognizing the need to provide expert system facilities in a native IBM MVS enviroment. An SQL bridge provides the data needed for the knowledge base. The Aion-generated expert systems will then draw inferences from this knowledge base that will facilitate use of expert systems for application delivery.

There are many other expert system tools making their way onto the market. The important thing to remember is that while intelligent applications can be built, they need access to raw data—data that are increasingly being stored in RDBMSs. Knowledge-based expert system tools should be subjected to many of the same evaluation criteria that are used to examine application and information generators. After all, inference-based technology is just another attack on that old bugaboo, the application backlog.

The facility for data sharing/integration that is the inherent strength of a relational DBMS provides a solid foundation for application development. A practical implementation of relational, however, requires a value-added strategy that focuses on the tactical importance of application delivery and information retrieval tools that empower an RDBMS. ■

Paul Hessinger is vice president of research at Computer Task Group Inc., a consulting and professional services firm headquartered in Buffalo.

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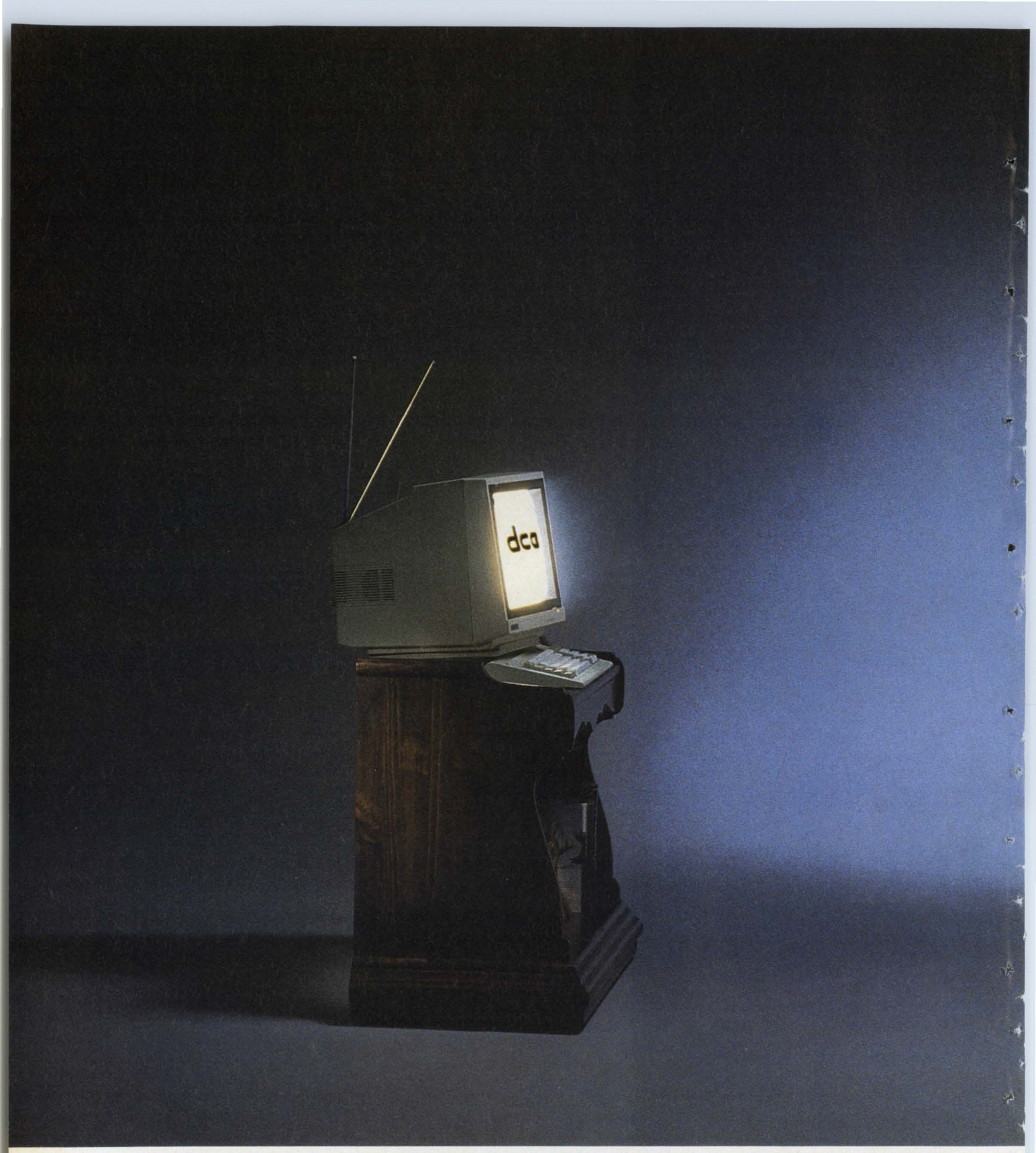

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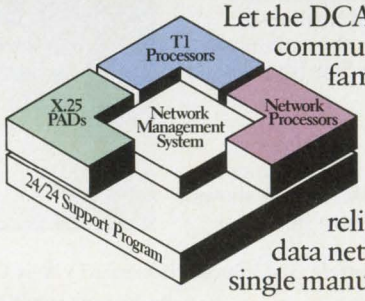

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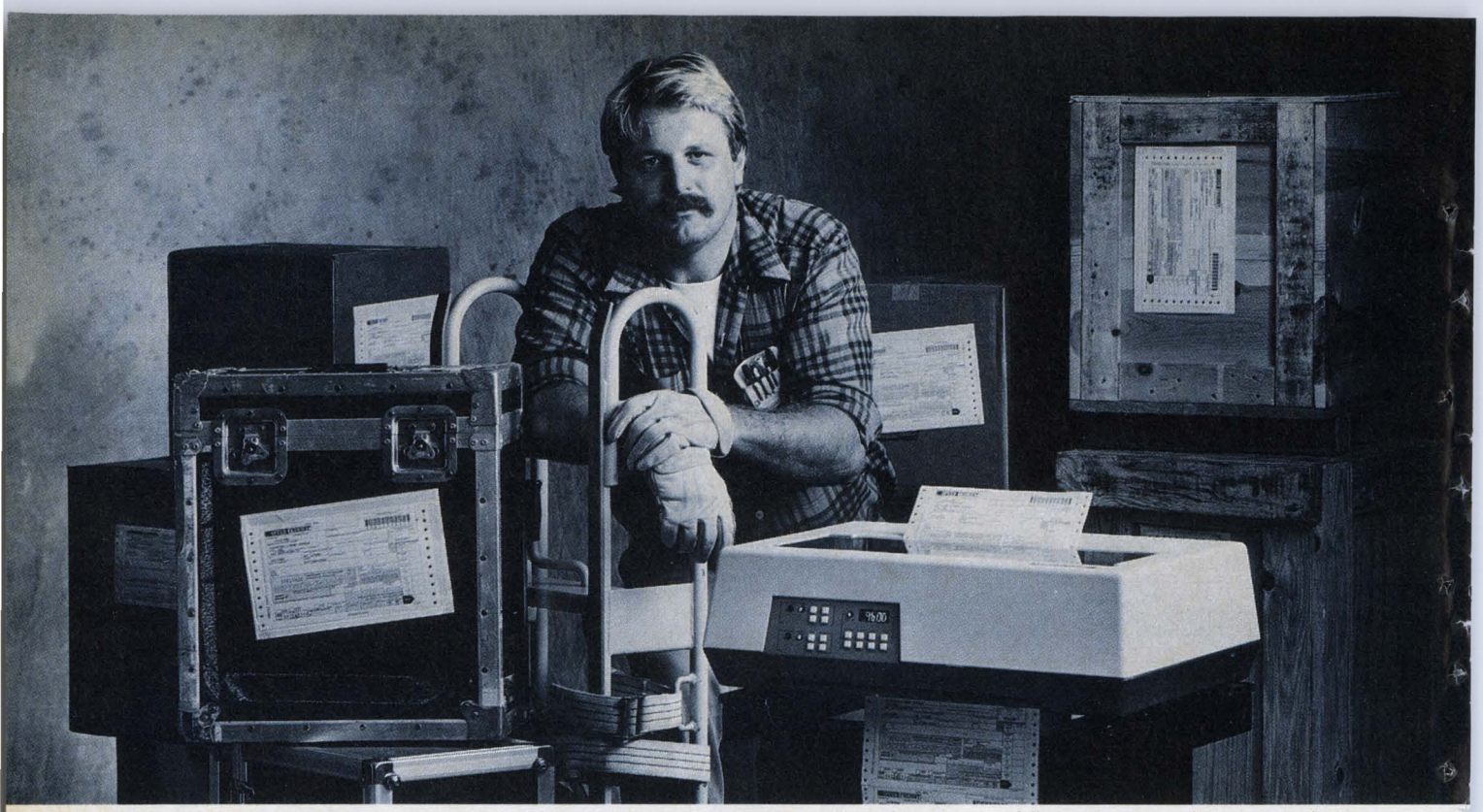

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CIRCLE 32 ON READER CARD

In 1984, IBM's share of the DBMS market hit an all-time low because of incursions made by independent software houses. Two years later, the mighty company was back in the winner's circle, capturing 40% of new DBMS sales with DB2, the top package in the market. IBM reversed its fortunes by revamping and repositioning DB2 as a broad-based, production-level DBMS. The software's image and performance were beefed up, which in turn beefed up sales. Those strong sales should continue into the '90s, when the market will be forced to focus on DB2 tools and applications.

DB2: Dressed for Success

BY RALPH EMMETT CARLYLE

Last year, DB2, perceived by customers largely as a tool for low-volume, decision support applications, was repositioned by IBM as a broad-based, production-level database management system. The software's performance was given a huge boost and it was offered to customers free for a six-month trial. For added spice, IBM privately told its customers—many of whom had bought non-IBM DBMS wares—that DB2 would be closely coupled to its hardware in the years ahead. The word was that the jazzed up software would be the basis for a new data dictionary or "Repository," a key element in the emerging MVS/XA and VM/XA architectures that would hold system generation information for all its operating systems and systems software.

IBM also spread the word, telling anyone who would listen that DB2 was now its strategic offering. It was a classic marketing exercise and a slap in the face for critics who believed that IBM was still a hardware company that didn't know how to sell software. Once again, the mighty company proved it could win against its independent rivals by creating an aura of success and demand for its product.

"IBM gave away a ton of DB2 in 1986, but as the year drew to a close, a new phenomenon emerged—customers began buying it in droves," says Jerry Chichester, ceo of Focus Research, a West Hartford, Conn., company that tracks the growth of new DBMS installations at IBM sites.

Metro Life's Dan Cavanagh: "It's inevitable that DB2 will become the industry standard."

Photograph by Andrea Brizzi

Remarkable Product Turnaround

IBM had miraculously staged one of the most remarkable product turnarounds in its corporate history. In 1979, IBM was riding high, with a 65% share of annual DBMS shipments. Methodically whittling away at that market share were independent software firms such as Culinet, Applied Data Research, and Software AG, all of which have gained market share at IBM's expense. Rock bottom finally came in 1984, when the company managed to capture only 20% of new

DBMS sales to its U.S. customer base. This downward DBMS trend was dramatically reversed last year. "IBM took 40% of new DBMS sales to its U.S. customer base," according to Chichester, "and DB2 is now outselling Cullinet's IDMS/R as the top package in the marketplace."

Indeed, DB2 sales seem to be soaring. Sources in IBM's GUIDE user group claim that there are 1,000 U.S. licenses for the software that first went into beta test in 1984. Those figures don't seem too far off to Chichester, who declares that he "can definitely confirm 750 paid licenses in the U.S. But God knows how many unpaid there are, because IBM is still offering the software for free use when it suits them."

IBM as usual won't comment on these numbers, but sources close to its DB2 development center in Santa Teresa, Calif., claim that the giant has exceeded its own internal expectations for the product and is "buoyant" about 1987.

Cullinet founder and chairman John Cullinane recently told DATAMATION that IBM had priced DB2 as a "loss leader" to get it into MIS shops. "People are largely just playing with it, because DB2 still lacks the tools for full production use." Though once true, that statement may prove to be wishful thinking on Cullinane's part.

The IBM customers polled by DATAMATION were of a different mind about DB2. The comments offered by Dan Cavanagh, vp of electronic installation at Metropolitan Life in New York, echo the view of many MIS directors on DB2: "Once it became apparent that IBM was serious about DB2 as a production DBMS, we all began to look twice at it. I think it's inevitable that DB2 will become the standard for the industry."

Reluctant to Discuss Systems

Many leading corporations are developing large-scale systems using DB2 that they are reluctant to talk about. "To gain a competitive edge you have to automate the revenue earning or more strategic aspects of the corporation," points out Lee Foote, manager of electronic data interchange for Du Pont, the $30 billion, Wilmington, Del., manufacturing conglomerate. "You need a relational model like DB2 for this."

Joseph T. Brophy, senior vp for MIS at the Travelers Insurance Companies in Hartford, Conn., admits to using DB2 for his corporation's vital and strategic Customer Information File. But he won't discuss Travelers' numerous other projects that are focused around DB2. Brophy and others believe that the software could help brighten the fortunes of both Big Blue and the industry as a whole.

Navy Retail Logistics System's Tom Funk: "The industry is getting behind DB2."

Photograph by Sal DiMarco

Nevertheless, their enthusiasm for DB2 hasn't blinded these MIS luminaries to the software's shortcomings. Du Pont's Foote, whose company has made enormous investments in IMS, notes, "DB2 still hasn't the integrity or robustness for us to start rewriting all our IMS applications. That's still years away. But it could happen."

Repair work on the software may get under way soon. Sources reveal that Santa Teresa has accepted requests from GUIDE for 50 improvements to DB2, "some of them major." Part of the effort would be concentrated on devising an integrated data dictionary and state-of-the-art application development tools. Other possible items on the improvements list include new security control and audit facilities; a new Query Management Facility (QMF) function to beef up performance with multiple users or large sequential volumes of data; better data extraction and conversion facilities that enable DB2 to be used with other data formats; and a new optimizer.

Customer sources hear that Santa Teresa has three unannounced releases of DB2 under development at any given time, and that IBM management intends to make two new versions of DB2 available each year. The last new release (version 2.0) was announced in February 1986 as part of IBM's repositioning exercise. Sources claim that release 3.0 is "imminent" and that 4.0 will arrive by the end of this year.

DB2 customers report that the software's performance ranges from some eight transactions per second to around 50tps. "I've heard tell of a customer in the Netherlands who has his DB2 system tuned to 100tps, but you've got to take such numbers with a pinch of salt," notes Jerry Gerard, manager of technical services at New York State Retirement Systems in Albany. "Performance is also a factor of workload and the DBMS design to do the work," points out Gerard, whose installation was a DB2 beta test pioneer back in 1984.

"In a few months, we'll be approaching 10 CICS [calls per second], with response times below three seconds," predicts Gerard. "Our database will have grown from its present 20GB to 30GB." Gerard and other DB2 production

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users say that in some instances the DBMS is approaching or exceeding IMS performance. "But that's not generally the case yet," Gerard adds.

Metro Life's Cavanagh believes that IBM can improve DB2's performance to 100tps by 1990 through hardware assists alone. "They have all kinds of stuff up their sleeves," hints Cavanagh. Some of that "stuff" may be in the form of microcode. Many MIS directors expect DB2 to be increasingly bundled into the hardware in the years ahead. "It will lie under the covers in microcode form, and if you want it, you'll have to pay for it," prophesizes one customer in the manufacturing sector.

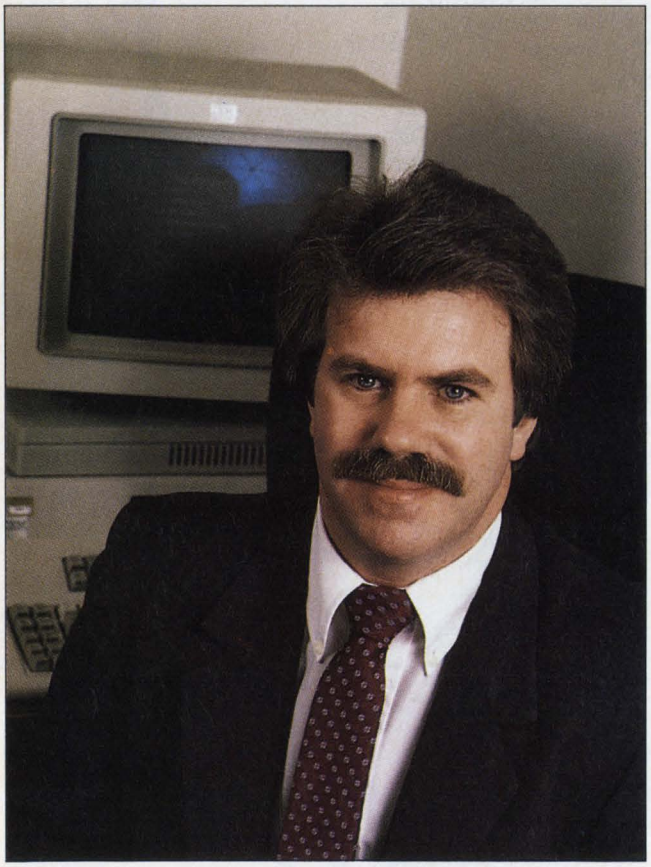
"It's scary," admits Hugh Allen, database administrator for a Citicorp industrial credit division in Harrison, N.Y., that uses Cullinet's IDMS/R package on its IBM hardware. "You assume that the independents will stay compatible with IBM as in the past, but you don't know whether they'll be able to take advantage of the new IBM hardware features."

Yet, as Allen and other Cullinet customers stress, a DBMS sale does not hinge primarily on the system's engine. Instead, the important thing is the product's associated family of productivity tools—an area where customers say IBM has been weak for years.

"One of the main reasons for the independents' success against IBM has been their rich offerings of programmer and end-user tools," says Focus Research's Chichester, who points to the vast array of data dictionaries, 4GLs, screen painters, report writers, and query languages that the independents rained on the industry. IBM, which has not kept up with this flood of add-on products, may not have to. Its success with DB2, coupled with the spread of its related SQL language, may mean the company doesn't even have to make the effort to close the tool gap.

As Tom Funk, a data administrator in the U.S. Navy Retail Logistics System in Mechanicsburg, Pa., points out, "The industry is getting behind DB2. AI companies, 4GL vendors, and application developers in all sectors are beginning to write software for DB2."

Funk and his group are beta testing new software from Texas Instruments that automates the systems design process. These Information Engineering Facility (IEF) tools, and similar versions from other companies, were originally developed with other DBMS systems such as IDMS/R and ADR's Datacom/DB in mind. Now, Funk explains, these tools are targeted instead at the DB2 environment. "We're using TI's tools to help us create a large-scale DB2 prototype. And because of it, the U.S. Navy—whose sister wholesale division intends to use IDMS/R for a large multiyear, multibillion dollar system—will get its first exposure to the new IBM software. Who knows," he adds, "where it all might lead?"



N.Y. State Retirement Systems' Jerry Gerard: "Performance is a factor of workload and DBMS design."

Photograph by Andrea Brizzi

IBM Creating Applications Generator

Vaughan Merlyn, an Atlanta-based consultant who is a noted authority on 4GLs, claims that IBM has internally tested a number of third-party application development packages that could be offered with DB2. "IBM," he insists, " is also creating its own applications generator for companies to spew out software that will only run in a DB2 environment."

Merlyn and other experts are convinced that IBM will recapture the DBMS engine in hardware by the early '90s, forcing the market to focus on tools and applications for DB2. "The independents are being driven out of systems software to the applications interface—which is precisely where IBM wants them to be," declares Merlyn.

But rather than this being a dreary scenario inimical to change and innovation, Merlyn and others believe that the standard use of SQL as a database access and data manipulation language will result in the creation of thousands of new software companies and programs from nontechnical software writers. "It really looks as if SQL is going to be a universally accepted language," predicts Du Pont's Foote. "It's the COBOL of the 1990s."

For the present, independent software houses will attempt to remind IBM's customers that if they want to do real work now, they need existing tools and solutions, not a meal of "pie in the sky." Sober realities aside, IBM's users have been clearly impressed by the freshness of DB2.

"The code is clean, not patched or polluted like IMS or IDMS," sums up New York Retirement Systems' Gerard. "That's its real appeal. We can all make a fresh start." ■

1986 Subject Index
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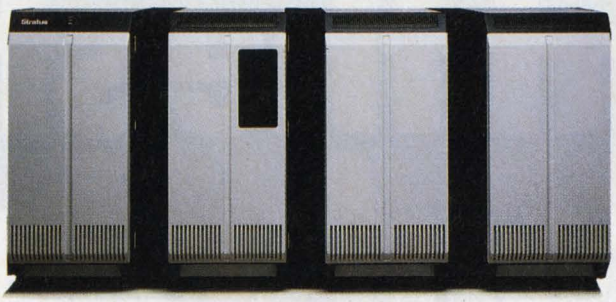

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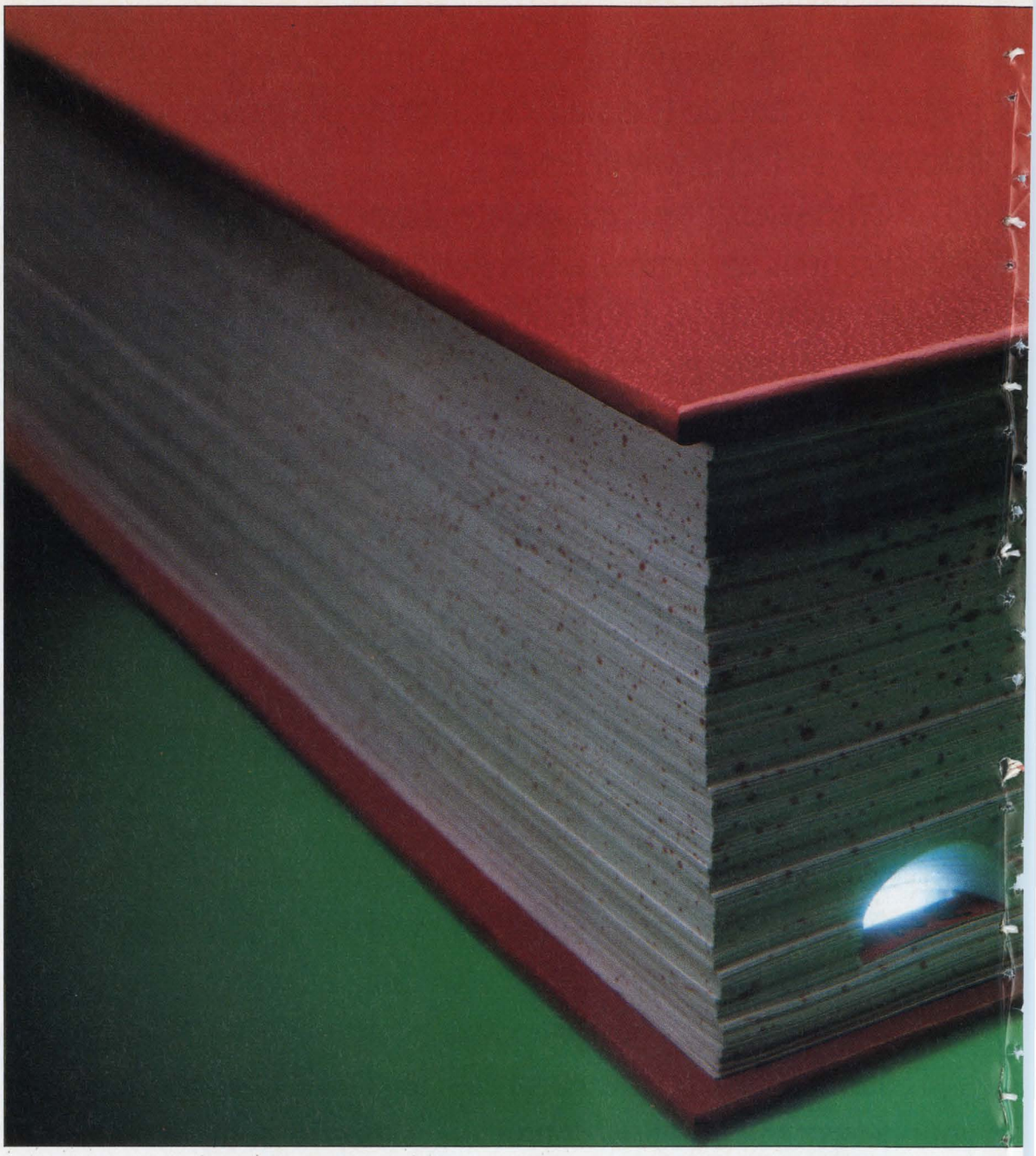
The data dictionary has come a long way since the days when it was a simple listing of data elements. The modern data dictionary is the key to integrating planning with software development, workbenches with programming environments, application systems with application systems, and the MIS organization with its users. It is the ultimate repository for data about the information resource management (IRM) environment and is also the key to controlling information products, keeping their production costs and lead times down. But before you can implement this important support software, you must first reevaluate your control architecture and make any necessary changes. Only then can the productivity pluses promised by data dictionaries be realized.



Photograph by Togashi

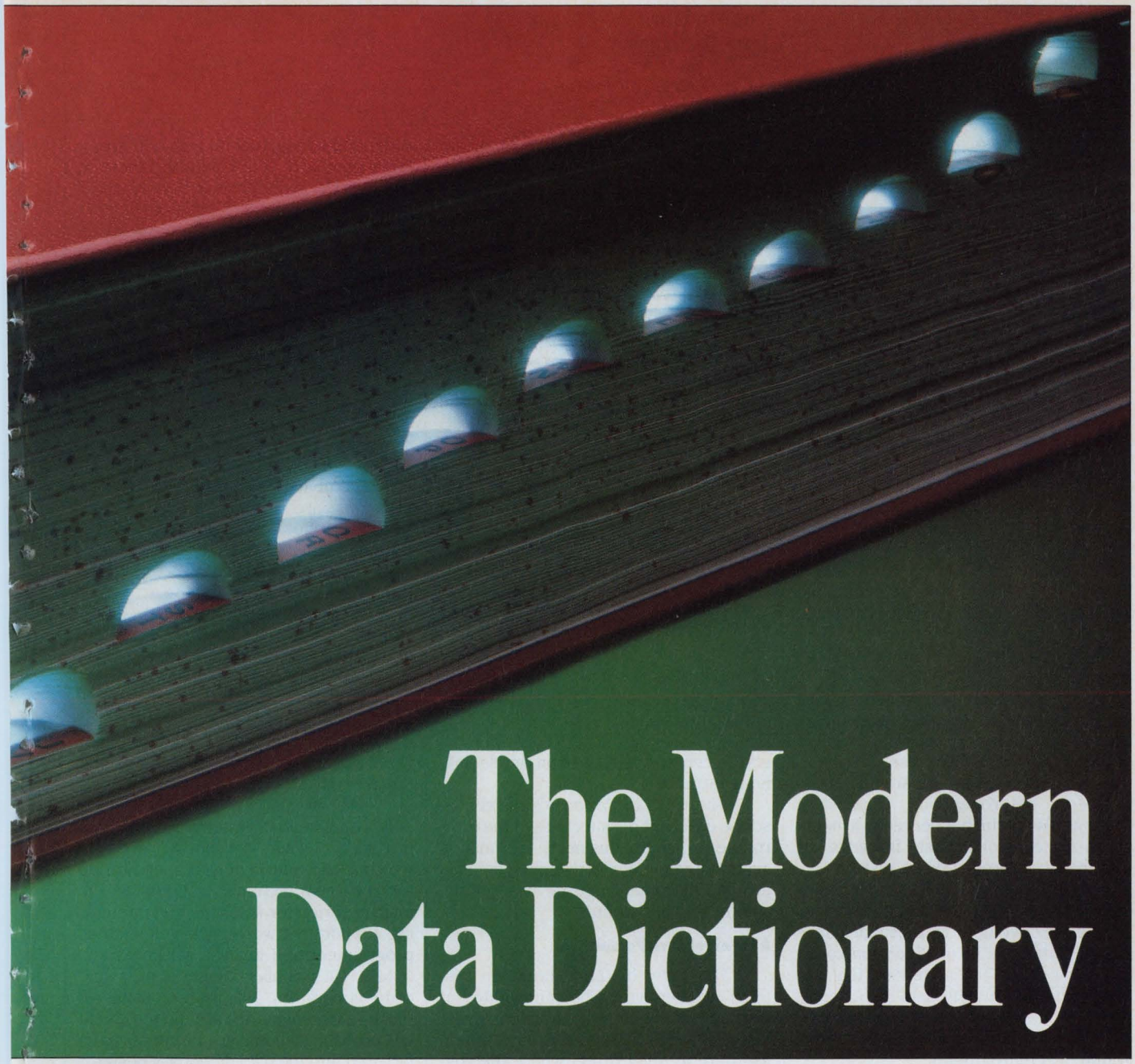
BY DANIEL S. APPLETON

From its beginnings as a simple listing of data elements, the data dictionary has evolved into a product definition database for the entire MIS organization. The modern data dictionary is shared among all information resource management (IRM) functions that have an effect on planning, designing, producing, and supporting information products. It is also the key to both product differentiation and cost reduction in the IRM operation.

The modern data dictionary does not stand alone. It is support software for the IRM "control architecture"—the standards and procedures used by an MIS organization and its users for planning, analysis, design, construction, and support of information products. Information system planners and architects, application developers, data administrators, and end users must all use the modern data dictionary to do their work.

The fundamental job of a control architecture is to orchestrate all business activities related to information resource management into a comprehensive system of control. This system must generate appropriate information products in an efficient and effective manner. There are two basic forms of IRM control architecture: an application portfolio control architecture and an asset-based control architecture. Each control architecture sets different requirements for data dictionary support.

The application portfolio control architecture builds or buys information products that are basically standalone ap-



The Modern Data Dictionary

plication systems; each application has unique I/O mechanisms, storage, and processing. This architecture is sometimes referred to as "process-bound" information resource management.

The asset-based method first seeks to build reusable information assets—assets that can subsequently be leveraged by software development teams to quickly and easily build a variety of information products in response to changing user requirements. This type of IRM scheme is sometimes called "data-driven" information resource management.

These two fundamentally different control architectures have fundamentally different requirements for data dictionary support. In the application portfolio environment, there are often several data dictionaries, one or more for each application. Each of these data dictionaries is an integral part of a specific programming environment—it's embedded within the DBMS, the 4GL, the application generator, or the code generator that's used to build and support an individual application. Embedded data dictionaries contain only the information constructs that are useful to that application's programming environment.

Basic Focus on Data Elements

In some cases, MIS organizations have implemented generalized (non-embedded) data dictionaries such as IBM's DB/DC in an attempt to achieve cross-application integration. Nevertheless, the basic focus of these generalized dictionaries is on data elements and naming conventions, not on integration. In an application portfolio control architecture, integration can be accomplished only when applications are required to share the same programming environment. Even if several applications happen to share the same DBMS or 4GL, however, there is absolutely no guarantee that they have been designed to be integratable.

In the asset-based IRM environment, the data dictionary is intended to be the repository for reusable information structures that are used by application developers and end users to create not only applications, but other application products as well. Applications are integrated with one another because they share the same logical information structure, even though these standardized structures may simultaneously be imple-

mented within several different programming environments. In other words, the modern data dictionary, not the programming environment, becomes the vehicle for integration, which is accomplished across heterogeneous programming milieux.

Differences in Construction

A major difference between these two types of data dictionaries is found in their internal construction. The "portfolio" dictionaries use what is called a two-schema approach. They map external schemata—user views of information such as reports or screens—directly to internal schemata, which are the record, file, and database formats. "Asset" dictionaries, which use the American National Standards Institute (ANSI) three-schema approach, introduce a "conceptual schema" into the equation. The conceptual schema defines neutral, reusable information structures, including data and procedures, as well as constraints.

The asset dictionary is more than a tool to integrate the planning, design, construction, and support of information products. It can also be used by users who want to access data stored in distributed, heterogeneous application systems. And it further serves as a mechanism for controlling data integrity for data that are stored in those systems.

As an access mechanism, the modern data dictionary provides the user or application developer with a single query language that can be used for controlled on-line or batch access to data that are stored throughout the data dictionary's realm. That realm encompasses multiple, distributed, heterogeneous programming environments.

As an update mechanism, the data dictionary can control the logical database state, particularly when the physical databases are scattered throughout several different programming environments that are within the data dictionary's span of control. The dictionary can perform these additional functions in semiactive or active mode. In semiactive mode, run-time modules are generated from the dictionary by programmers, and they are linked with other object code modules.

In active mode, components of the data dictionary are active at run time. Deciding which dictionary modules to make semiactive or active involves trade-offs between programming efficiency and program efficiency. Semiactive dictionary functions are generally less flexible but more efficient than active dictionary functions.

The modern data dictionary's turf has been well described by John Zackman in a paper entitled "A Framework for Information Systems Architecture" (published by the IBM Los Angeles Scientific Center). Zackman envisions the information systems architecture as a matrix of three columns and six rows. The columns describe the essential "descriptive models" that constitute information products—data, function, and network. Data models are generally described in terms of entity-relationship-entity; function models are viewed as input-process-output; and network models are constructed based on a node-link-node formula.

THE ULTIMATE REPOSITORY FOR IRM DATA.

The rows in Zackman's matrix describe different perspectives of the environment: scope, business, information system, technology constraints, detailed design, machine language description, and the actual system.

A Level for Each Perspective

The view of the information systems planner would be represented at the highest level of abstraction. Asset managers such as the data administration folks are at level three, where the conceptual schema exists. Users are on levels one and two. Application builders (programmers and analysts) generally see levels two through five, while technologists such as database administrators and communications specialists look at tiers four and five. The external schemata are found at level two and the internal schemata at levels four and five.

By now it should be evident that there are no turnkey solutions to the modern data dictionary. Building and maintaining one is as complex as it is important to productivity. Like any crucial resource, it needs constant attention and continual investment, even more so since it is the centerpiece for IRM.

Your particular version must be assembled from a combination of purchased software, internally generated code, and conceptual information structures specific to your business. Since the dictionary's main purpose is to support the control architecture, it is crucial that you reevaluate that system and make whatever changes are required before you commit to implementing data dictionary software. The decisions you make here will determine the types of information constructs and levels of abstraction that will be in the data dictionary.

Then you must decide what you want the dictionary to be: a passive design tool; a fully active combination of design support tool, user access device, and update control mechanism; or some other combination. Once these critical decisions are made, you will know whether or not you must choose a two- or three-schema internal construction. Three-schema construction is required if you want to move beyond the active design support tool stage or if you are working in multiple, distributed, heterogeneous programming environments.

Your next task is to select the conceptual schema representation language, which will become the key language for integrating planning, design, software development, data administration, and the user in your control architecture.

You will also use this language to build a conceptual schema for the data dictionary. This conceptual schema, which is the crucial design specification for your data dictionary, should be the main criterion for selecting and integrating support software packages such as programmer and analyst workbenches, DBMSs, 4GLs, application generators, and code generators. Of course, some of these technologies are around today and will probably become requirements to be factored into the data dictionary design.

To sum up, the modern data dictionary is the ultimate repository for data about the IRM environment. It is the key to integrating planning with software development, workbenches with programming environments, application systems with each other, and, finally, MIS with its users. It is also the key to controlling information products, and reducing the costs and lead times related to producing them. When you come right down to it, the modern data dictionary is essential to productivity. ■

Daniel S. Appleton, a frequent contributor to DATAMATION, is president of D. Appleton Co. (Dacom) Inc., a Manhattan Beach, Calif., firm that specializes in data resource management methods and tools.

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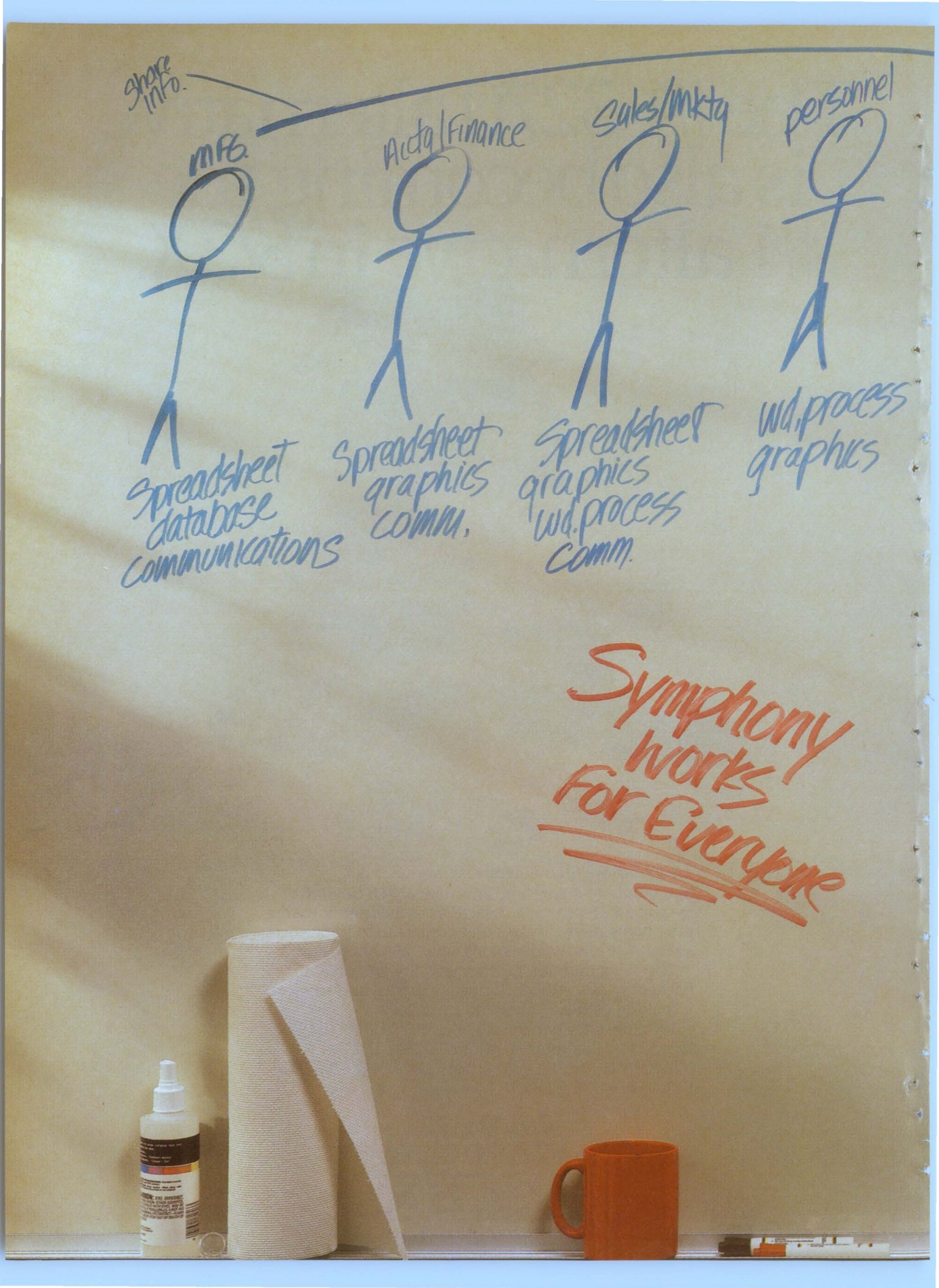
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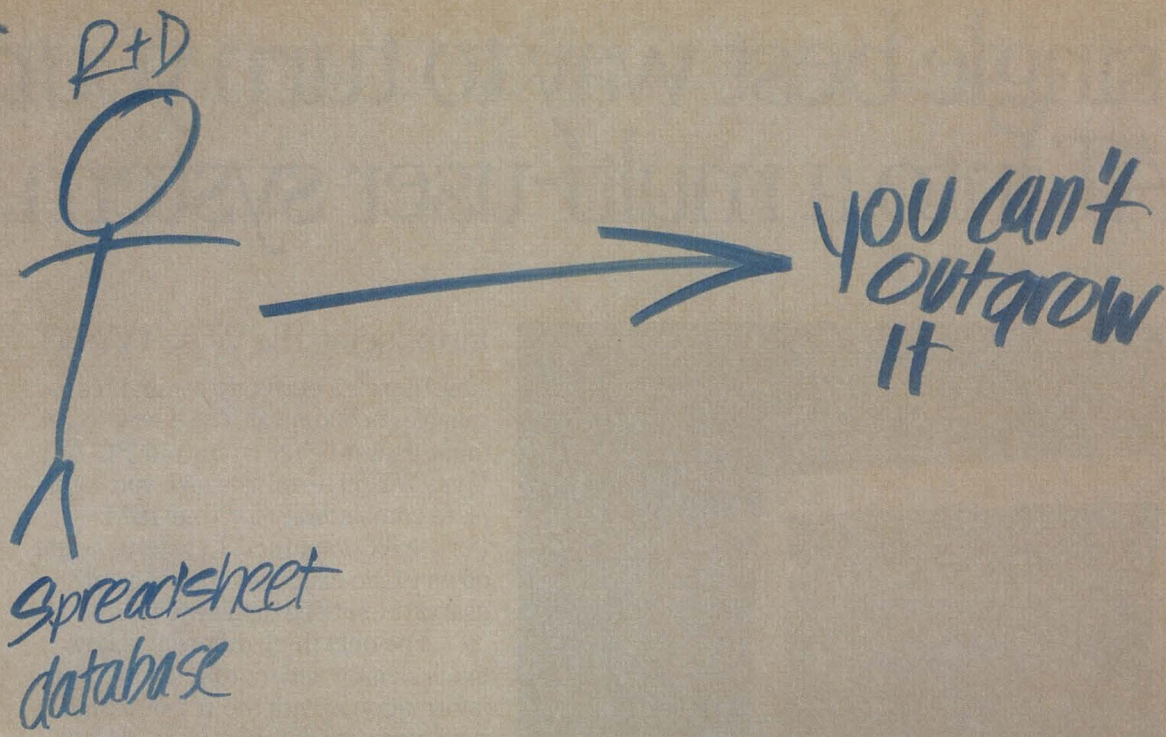

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CIRCLE 38 ON READER CARD

Many information centers have become so consumed by the enormous demands on their time and resources that strategic issues and planning are overlooked. The managers of these centers have missed the opportunity to train and consult with those users higher up the organizational ladder who can use info center tools to make a more strategic impact on the company.

Steps to a Successful Info Center

BY JOHN N. OGLESBY

Most information centers today are virtually buried under the demands for their services. They can't hold enough training classes to satisfy their users, their hot lines ring off the hook, their consultants are busy from the moment they arrive at work until long after they should have gone home, and the stream of user requests for assistance seems to grow ever stronger. This turmoil of activity devours the energies and attention of both staff and management.

Often, the majority of the info center's resources are expended on applications that do not offer a particularly high strategic advantage to the organization. The result is that management doesn't believe the benefits justify the enormous investment that's been made, and the information center falls out of favor. What has happened is simple. The urgent has driven out the important. The squeaky wheel has been greased; the wagon rolls faster but hasn't been improved.

What has been missed is the opportunity to train, educate, and consult with users higher up the organizational ladder who can make a more strategic impact on the organization with information center tools. Once introduced to the tools available, these higher-level individuals quickly see the benefits of an info center.

One major benefit is that decisions can be made more rapidly and with better information. The way in which the organization does business can be dramatically improved. This is the kind of result management remembers and rewards. The information center that serves its organization in this manner will be a success. But it's a success not easily won.

What, then, can the info center do to thrive? I believe there are seven strategic steps that will lead an information center to the success it seeks and its company expects.

Seven Steps to a Successful Info Center

1 *Apply tools to business problems.* Many information centers simply train users and then leave it to them to figure out how to apply the appropriate tools to their business problems. A more successful strategy is to help users identify which areas to attack, and then guide them to apply the proper tools to solve a problem effectively. Then let them know what level of your support will be required.

Communication between the information center staff and its users is crucial to its success. Information center management should meet regularly with user management to review progress and identify future applications for tools and services.

Encourage your staff to establish and maintain a high level of interaction with users and look for opportunities to apply information center tools to their business problems.

You may want to consider staff exchanges with user areas. These allow information center personnel to get more deeply involved in the users' business and user personnel to gain more in-depth knowledge of the capabilities of your tools and the methods of applying them effectively.

2 *Match the info center strategy to the organization strategy.* Make sure the information center is deeply involved in the formulation of the organization's strategic and tactical plans. Identify the "driving force" of the organization and choose projects based upon how closely they support this driving force.

Organize your priorities and work flow to focus on the most important, highest return opportunities first. Be careful not to expend large amounts of time and resources on those things that don't matter much.

Be aware of the politics of your company. Know who the movers and shakers are and make sure that what's important to them is important to you. Information center management should spend a lot of time with upper management. Make yourself and the accomplishments of your group known in these upper circles. It's important for you to stay in the know.

3 *Be proactive, not reactive.* Don't just wait and see what requests and projects arrive at your door; seek out those opportunities that offer the greatest potential return. Stay involved in your users' business. Be creative and seek out opportunities to apply your tools and technology in new and different ways.

Keep an accomplishment scrap book. Don't wait for management to ask how successful you've been. Regularly sell them on the importance of your group by letting them know about your successes.

4 *Manage a dynamic training program.* Recognize that as your user base grows and matures, its training needs progress and change. Plan for and make the appropriate adjustments at the point of need.

Recognize and plan for the higher volume of basic training needs that will develop as the popularity of information center products catches on, and more and more users want training. Remember that as users progress to higher levels of proficiency, they will need more advanced training.

5 *Develop your staff.* Don't let your staff become so busy chopping trees that they don't take the time to sharpen their axes. They should progress and mature, just as users do. Provide the technical, business, and management training they need.

Provide business training to educate your staff in how your company or organization operates. Show them the big picture.

Give your staff training in interpersonal relations, in communicating bad news, managing expectations, etc.

Provide assertiveness training to better equip your staff to involve themselves in their users' business and decision-making processes. It will also help them to say no to time wasters.

Provide specific technical training to elevate staff skill levels.

6 *Make systems development a good customer.* Your systems development group needs the use of information center tools as much as the rest of the organization. You need their support to ensure that users' information processing and decision support needs are supplied in a neatly integrated package. Work with systems development to coordinate a consistent response to user requests.

Provide special training for systems development personnel. Train them to recognize when user requests could be satisfied by the users themselves with information center products. Show systems development managers how to do a more efficient job using your tools. Help them establish plans for using information center tools for development, when appropriate.

7 *Research, research, research.* The lifeblood of any organization is research. This couldn't be more true than with the information center. Advanced technology and productivity tools are your business. Keep abreast of developments in your field and how they might benefit your organization.

Make sure that the new tools you evaluate either support or extend old ones. Think carefully before abandoning use and support of a long-used product or before introducing a conflicting one.

Measure new technologies against your organization's needs, operations, philosophies, and methods.

Remember that data sharing and connectivity needs will arise as more and more users become proficient in the use of info center tools. Needs will develop for micro-to-mainframe, pc-to-pc, and package-to-package communications.

Build a sensible and secure user environment and select tools and technologies that complement and extend that environment. Pay particular attention to productivity enhancement add-ons for existing products that make them more flexible, easier to use, or more extensible.

Information centers must serve the whole organization, focusing their attention on the most important, highest-return areas first. The old Pareto principle of concentrating 80% of the effort on the most important 20% of the tasks is critical. Information center managers must prepare themselves, their staff, and their users for the task.

Those information centers that successfully meet this challenge will be among the most talked about, most recognized, and most important groups within their companies. ■

John Oglesby, who is information center manager at First Tennesse Bank in Memphis, is cofounder and president of the Information Center South Central Regional Association of Management.

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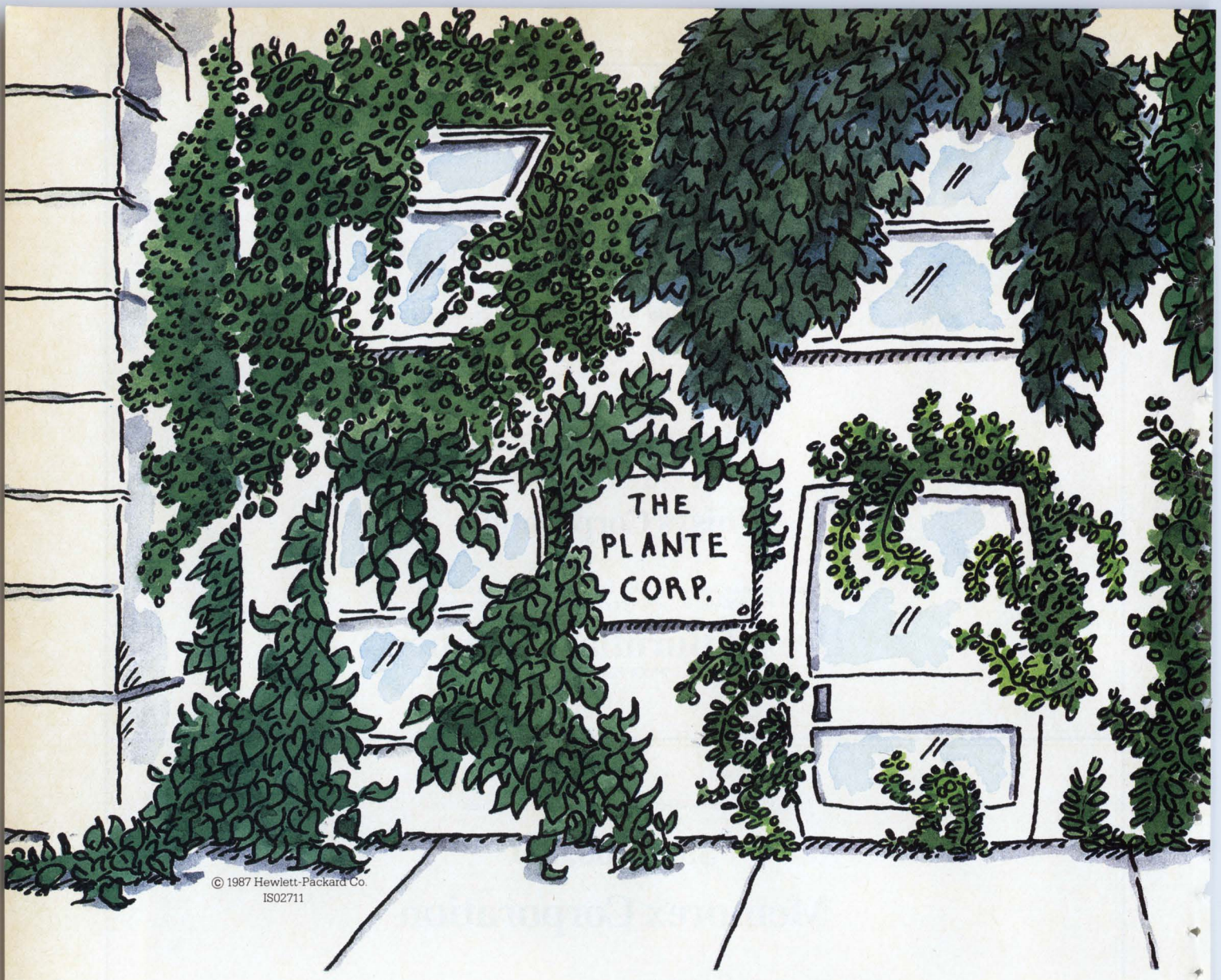
December 1986

CIRCLE 39 ON READER CARD



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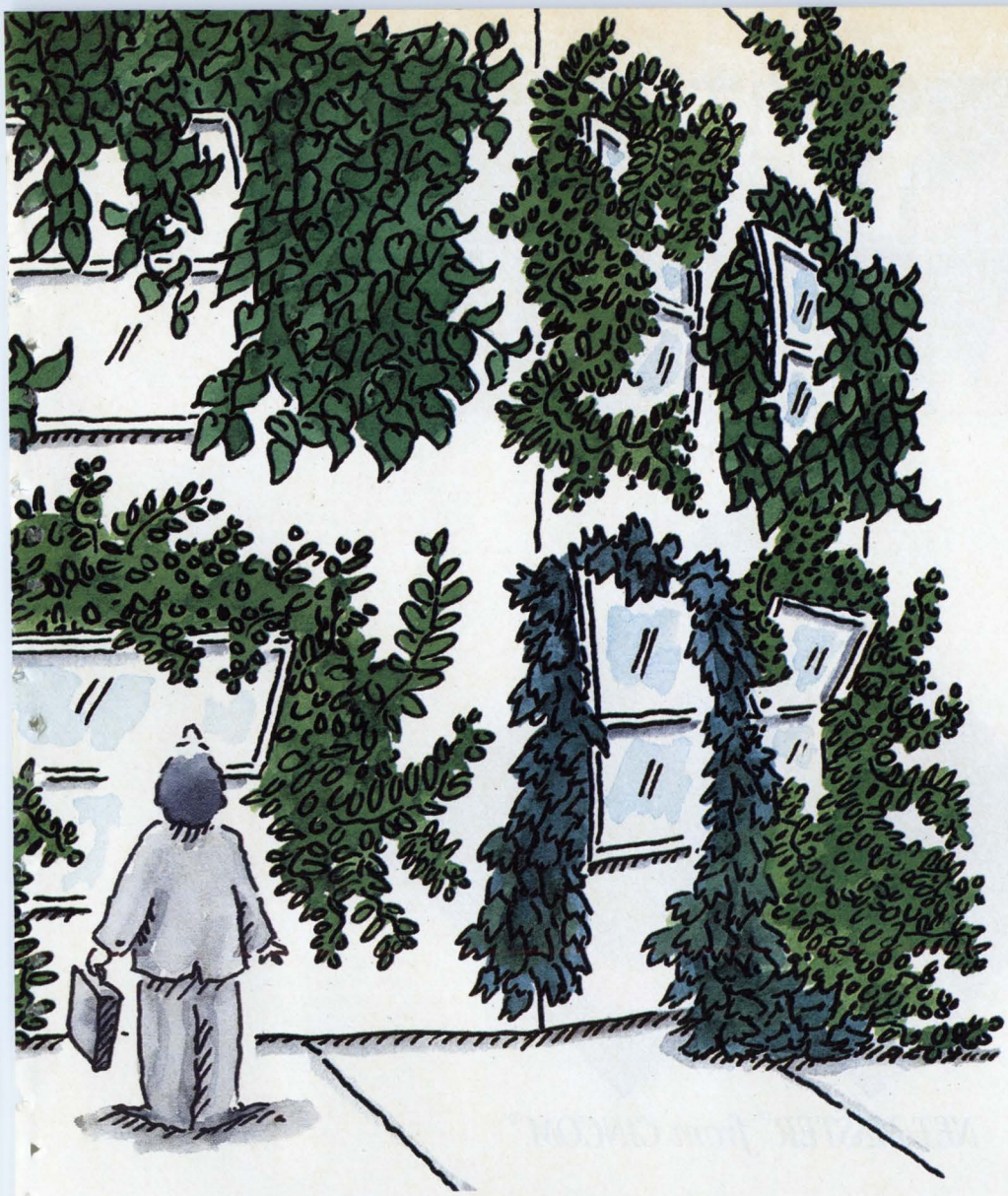

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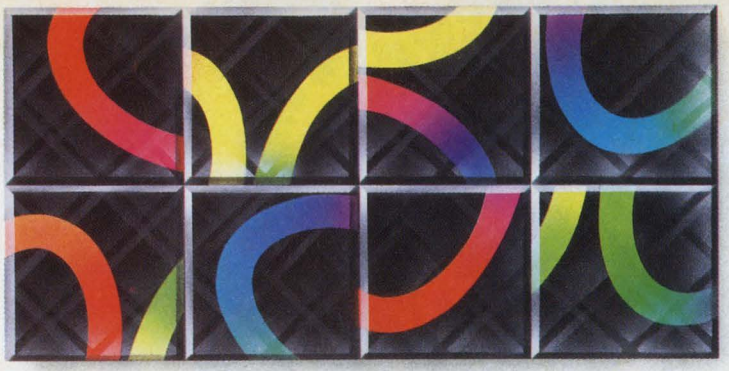

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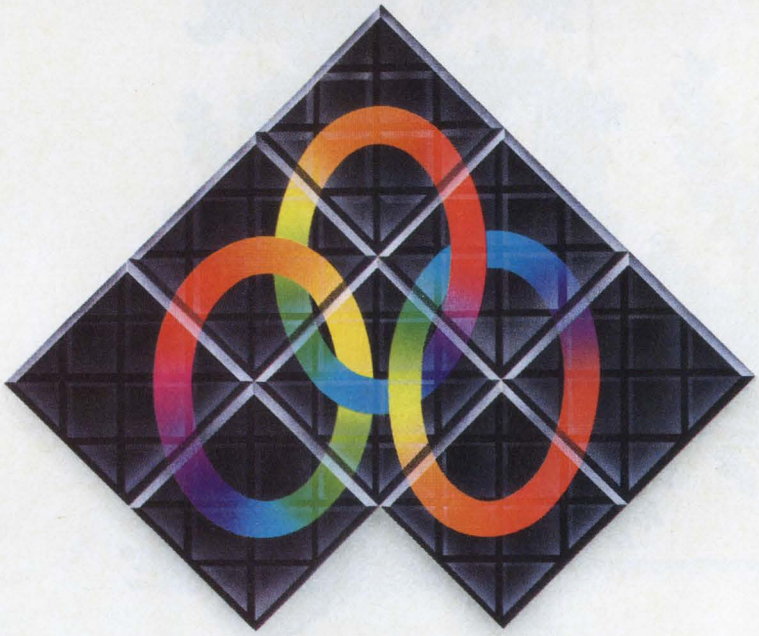

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CIRCLE 41 ON READER CARD

The NSA's proposed plan to replace DES with a new federal encryption standard would bring major changes to users in the private as well as the public sector. Objections to the replacement scheme raised by the banking industry, the largest commercial user group of encryption products, suggest that private sector acceptance of the NSA's current plan is uncertain. But most experts agree that DES is still a safe and efficient algorithm for commercial use.

The Destiny of DES

BY ROBERT G. ANDERSEN

Last year the National Security Agency (NSA) announced its intention not to recertify the Data Encryption Standard (DES) at its regular five-year review, due in 1988. The agency contends that the use of the DES algorithm, which has been a federal standard for 10 years and is well established as the American commercial encryption standard, has spread to extremely sensitive applications that make it an attractive target for U.S. adversaries. The NSA currently plans to replace DES with a family of new codes that the agency will distribute and regulate itself.

NEW NSA CODES ARE NOT JUST AN UPGRADE.

The planned NSA encryption codes are much more than a simple upgrade of the current DES algorithm. They represent a significant new direction in encryption systems and standards. Implementing the new algorithms would also represent a major shift for the NSA, the nation's largest and, in some respects, most secret intelligence agency; except for certifying DES, the NSA traditionally has played a minor role in regulating codes or dealing with commercial and private organizations. If the intelligence agency proceeds with its plans to replace DES in 1988, its relationship with the private sector will change drastically.

Commercial acceptance of the NSA plan as currently proposed is by no means certain. The DES algorithm, which was initially certified by NSA in 1977 and recertified in 1983 as a federal standard for encrypting unclassified but sensitive information, has won wide commercial acceptance, as demonstrated by its adoption as an American National Standards Institute (ANSI) standard and by the wide variety of DES hardware and software products available.

The NSA's intent not to recertify DES has caused confusion throughout the

banking community—the largest commercial user group of encryption products. Many financial institutions question the NSA's reasons for abandoning DES for all government encryption needs except those of the Treasury Department. (The NSA will continue to mandate the use of DES-based ANSI authentication standard X9.9 for all federal systems that handle government EFT transactions.) The prospect of decertification has raised concern among bankers over the safety of using DES. More important, bankers have voiced strong opposition to the DES replacement scheme, calling it unsuitable for their needs and questioning, among other things, whether the NSA will assume any financial liability should losses occur with its new codes. The NSA's handling of such objections could determine how the plan will fare in the private sector as a whole.

In short, for commercial organizations planning for or using a data encryption system, the prospect of a new federal standard based on proprietary algorithms hardly clarifies your choice of a solution—but neither is it cause for adopting a wait-and-see attitude. Most experts agree that DES is still a safe, efficient algorithm for commercial use, but that a new, stronger public algorithm to replace DES may be needed. Several alternatives to DES, such as proprietary algorithms and public key schemes, have been available for years and will continue to make sense for some users, whether or not DES is replaced as a federal standard (see "Alternatives to DES"). One thing is clear: the NSA's planned replacement codes, which will probably not be available for commercial use for about two years, will not settle the 10-year-old controversy that has characterized debate over encryption standards and DES.

An Algorithm and a Key

Most encryption systems, including a DES-based system, have two main components: an algorithm and a key. The DES algorithm, a complex iterative process comprised of substitutions, permutation, and "exclusive or" mathematical operations, is public information. It has been published in Federal Information Processing Standards Publication 46 and is detailed in numerous articles and books.

The electronic key in a DES-based system, on the other hand, constitutes a shared secret between the originator and the receiver of a transmission. Together, the public algorithm and secret electronic keys are used to encode and decode messages. The DES algorithm is fixed; the key is a variable that is controlled by the user. Guaranteeing the confidentiality of messages encrypted in any private-key system, such as DES, depends on keeping the keys confidential.

NSA plans to replace DES with a family of new private algorithms being developed under the Commercial COMSEC Endorsement Program or CCEP. (COMSEC is military shorthand for communications security.) The CCEP is a result of presidential National Security Decision Directive 145 signed by President Reagan in September 1984. This directive addresses the communications security of government contractors, particularly with respect to national security.

The CCEP algorithms represent a new strategy in encryption standards. Rather than certify a new single public al-

Alternatives to DES

In addition to DES and the forthcoming algorithms to be developed under the Commercial COMSEC Endorsement Program (CCEP), there are at least two major alternatives for users seeking protection for their data transmissions: proprietary algorithms and public key cryptosystems. These systems, however, are also subject to some concern and consideration.

A proprietary algorithm can be developed solely for the use of a single organization. Assuming that such algorithms are strong enough to withstand cryptanalysis, a few potential problems may still remain. First, the cost to develop and implement a proprietary system would be considerable, and may even be prohibitive. Second, any algorithm developed by an outside party would be subject to the same "trust me" and "due care" questions raised by the new NSA CCEP scheme. Finally, if the algorithm is to be used outside the U.S., NSA must approve it before it can be exported.

Public key cryptosystems are inherently different from private key systems such as DES. Public key systems are based on one-way functions. These functions, which are relatively easy to calculate in one direction, are computationally impossible to reverse. The message sender must look up the recipient's one-way encryption function in a public key directory and use it to encrypt the message. Receivers maintain their own secret keys or mating decryption algorithms for this one-way function.

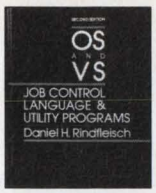
The primary difference between a public key and a private key system is that in a public key system, no secret keys are exchanged between communicating pairs. Public key systems do not, however, eliminate the key distribution problem; the keys must still be distributed during system startup. A public directory that contains each participant's one-way encryption function is shared by the community. The strength of these systems lies in the receiver maintaining the secrecy of the decrypting function and the ability of the algorithm to withstand cryptanalysis. If someone solves the public one-way function, the system is compromised.

The most popular public key cryptosystem is the RSA system developed by Rivest, Shamir, and Adelman. The one-way function is based on the difficulty in factoring very large prime numbers. The solution to this problem has eluded mathematicians for hundreds of years.

Nevertheless, public key systems have several drawbacks. First, the security of the system depends on the integrity of the directory. Modifications to the directory cannot be tolerated and additional controls are needed to ensure this. Second, public key systems, because of their complexity, have a reputation of being slow. (This will change as hardware implementations of RSA become available.) Finally, in large networks using RSA, the "synonym" problem could occur if two nodes use the same prime number to develop their one-way functions.

While public key systems are well known among encryption experts, they are something of an unknown commodity to the general user community. As more of these systems become commercially available, they will undoubtedly increase in popularity and use.

The American Bankers Association and the NSA are currently pursuing a compromise and resolution to the proposed DES replacement plan. While specific recommendations have yet to be made public, some observers speculate that a viable compromise could be either a "DES II"—a public algorithm with user-controlled key management that's stronger than DES—or a new type of system based on a proprietary algorithm that has user-controlled key management. Optimists expect an agreement to be reached this quarter.



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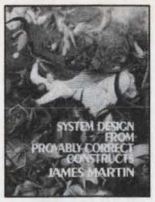

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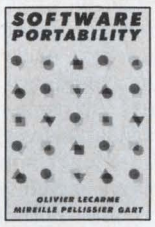

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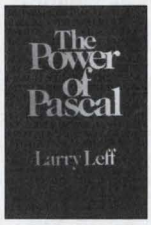

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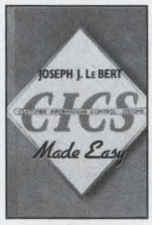

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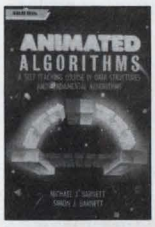

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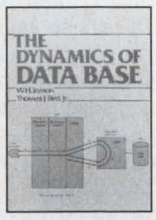

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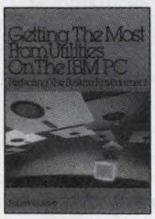

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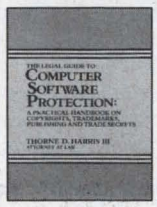

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gorithm to replace DES, the NSA will develop several proprietary encryption algorithms. The public DES algorithm is being replaced with several secret algorithms to address a problem known as cross-vulnerability—the compounded risk incurred by all users if someone breaks DES with a general solution. Currently, the only known attack on a DES-encrypted message is to exhaust all possible keys. While the costs of applying massive computer power to such a task are now prohibitively high for most would-be code breakers, the increasingly widespread use of DES and the declining cost of dp hardware together are improving the potential cost benefit.

The NSA's idea is to develop and distribute private CCEP algorithms and their electronic keys. This has prompted new concern in the cryptography field and banking industry. The algorithms will not be made public for scrutiny and testing, and the keys will be handed out by the NSA to government users. NSA may also make a key-distribution service available to the private sector as well.

In order to keep the algorithms confidential, NSA will disseminate the secret encryption algorithms to approved hardware manufacturers who will implement the algorithms in specialized, tamper-proof ICs. When the implementation is complete, the IC will be examined to ensure that it meets NSA's rigid standards.

System and module designers will also present their encryption systems to the NSA for approval. If their encryption systems are okayed, the NSA will allow the system manufacturer to purchase and integrate encryption ICs with a secret CCEP algorithm that will not be disclosed to the system vendor. This equipment will then be certified for government work in unclassified applications. (DES was initially certified by NSA in 1977 and recertified in 1983 for use in encrypting unclassified but sensitive government information.)

In addition, the vendor may market the NSA-approved product to the private sector. This certification assures the end user that the system complies with rigorous NSA design and operational standards. Under this scheme, encryption products containing the NSA CCEP algorithm will not be available commercially for at least two years.

Major Drawback to Private Algorithms

While the involvement and expertise of NSA will certainly upgrade encryption hardware and provide improved capabilities for protecting the confidentiality of sensitive data in the private sector, there is one major drawback to the use of private algorithms. They will never undergo the close scrutiny that a public algorithm must face. The CCEP algorithms will never be challenged by encryption experts in academia and industry.

The public examination of DES and the ensuing controversy surrounding it resulted in a healthy exchange of ideas and opinions. This ultimately led to today's generally high degree of confidence in the integrity of the DES algorithm. The secret CCEP algorithms will never be able to duplicate or guarantee that confidence level.

When the National Bureau of Standards adopted DES as the federal encryption standard in 1977, it stated that the algorithm satisfied the worst-case threat model for nondefense agencies for 10 years. Although there is still no known solution for the DES algorithm, the NSA's plan indicates that some national security strategists, at least, no longer regard DES to be adequate protection for vital data.

EXPERTS CALL NSA'S KEY DISTRIBUTION PLAN UNFEASIBLE.

Many cryptography and data security experts disagree with NSA's contention that DES is vulnerable. Robert Courtney, a former data security specialist for IBM and president of his own security consulting firm, RCI, based in Port Ewen, N.Y., argues that the opposite is true. "You have an incredibly strong algorithm that's being exported and available to foreign governments and companies, and the NSA is having a difficult time reading [other people's] mail if it is protected by the DES. That's the primary reason NSA doesn't want to recertify the DES."

The business concerns voiced by the banking community are a result of the NSA's intention not to recertify DES, and not simply a reaction to the agency's planned involvement with the financial sector. Actually, the banking industry welcomes the NSA's expertise.

"Bankers are not cryptographers," explains Ed Zeitler, a vp at Security Pacific National Bank in Los Angeles, who has been appointed NSA liaison by the Data Security Committee of the American Bankers Association (ABA). "When we purchase encryption products, we want the confidence in knowing these products implement certified encryption standards designed for the financial community. We hope the NSA will continue to play a significant role in certifying encryption products for the financial community."

The issues raised by the financial community, which are indicative of concerns shared by the entire range of encryption system users in the private sector, fall into three closely interrelated areas: liability, international implementation, and "due care."

The financial liability issue is raised because of the third-party key management structure of the CCEP encryption systems. Removing the responsibility of creating, distributing, destroying, and archiving the encryption keys from banks causes them to lose complete control over these systems and ultimately control over the financial risk they incur when processing transactions protected by these systems. When using CCEP-based systems, the lines of liability are no longer clearly delineated. Who is financially liable for damages resulting from corrupted transactions if banks no longer completely "own" the systems of controls over these transactions? It is extremely doubtful that NSA is willing to accept this financial liability. Current DES users design and change their own keys at will, which adds to the strength of the standard. The proper handling and distribution of the algorithm's keys are just as important as its inherent strength.

NSA's Motives Questioned

Many experts question the NSA's motives for controlling key distribution and claim the logistics of such a scheme would be impossible. RCI's Courtney claims the agency would have a difficult time, at best. "The NSA is considering changing each user's key on a weekly basis. That," Courtney says, "would require the full-time effort of everybody in the agency."

The second major issue involves international banking traffic. This concern is raised because of the proprietary nature of the CCEP algorithms and NSA-controlled key management. A significant volume of EFT transactions performed by

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The Destiny of DES

large U.S. banks is done with correspondent banks in foreign countries. The American banking community warns that their non-U.S. correspondent banks may not accept an encryption system developed and controlled by an arm of the U.S. government.

In actual practice, the CCEP algorithms will probably gain little acceptance internationally. Indeed, why should any government or industry outside the U.S. entrust its sensitive data to a secret encryption algorithm developed by a U.S. intelligence agency? The prime role of the NSA, after all, is to monitor worldwide communications for U.S. military and intelligence needs.

The final issue, "due care," is directly related to NSA's planned decertification of DES. Bankers are concerned about implementing a prudent system of controls over their networks and computer systems. Are they practicing proper due care and due diligence when they implement systems that they do not fully control or know very little about? Put another way, are financial institutions exercising responsible due care in maintaining their own systems when they unquestioningly trust or rely upon a third party to maintain adequate security in these systems?

Zeitler of Security Pacific National Bank says, "I would like to see a U.S. agency provide support to the financial community concerning the certification of cryptographic products. I want to have confidence that these products have been reviewed and certified by somebody that has taken on that responsibility."

These three problems must be resolved before the banking community will use any system other than DES. Obviously, replacing DES with new CCEP algorithms is not a straightforward swap. To iron out the differences, the ABA and the NSA have begun to talk. Zeitler, as the NSA liaison for the ABA, says that the goals of their talk are twofold. First, the implementation issues raised by the CCEP algorithms and the decertification of DES must be immediately addressed. Second, the ABA and NSA want to develop a long-term working relationship.

It appears that the long-term relationship depends heavily on resolution of the first goal. To achieve this, the ABA and NSA must overcome significant differences. Even basic security motives are far apart: the NSA's experience is with mandatory security systems in military/government applications to safeguard national security, whereas bankers need to implement prudent, cost-effective controls in a business environment to protect assets. The future direction of private sector encryption standards may well depend on how the NSA and the ABA settle their differences.

Even so, DES will not disappear overnight. NSA's support of ANSI standards for EFT transactions indicates that DES is still a due care standard. Whatever plan comes out of the NSA's review in 1988, DES will continue to be a major factor in the implementation of financial encryption and authentication systems for several years at least. ■

Robert Andersen is a senior manager with Ernst & Whinney, an international management consulting, accounting, and tax advisory firm in Cleveland.

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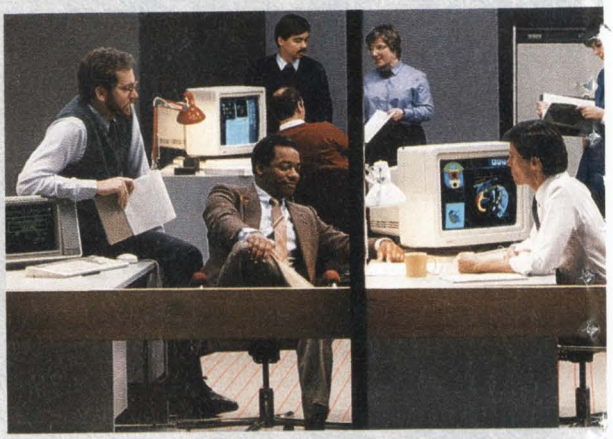

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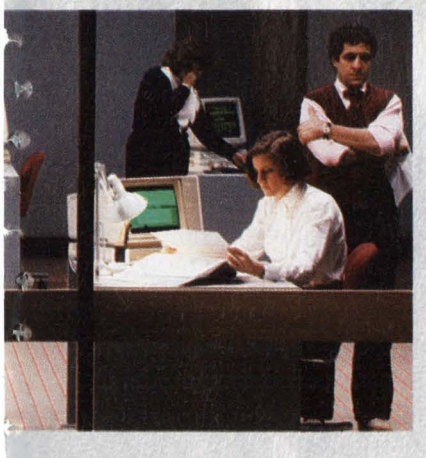

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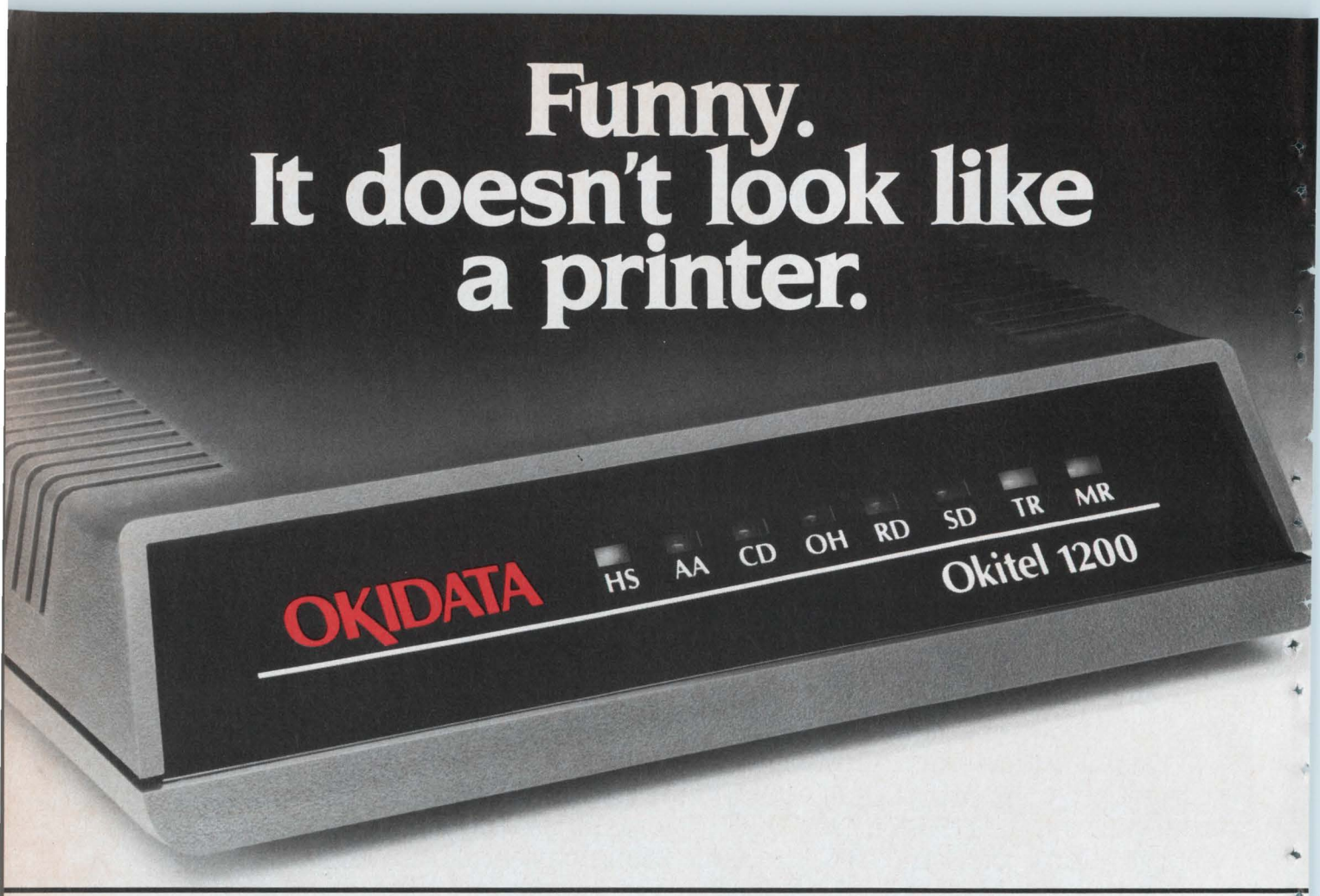

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Real Time

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DIGITAL EQUIPMENT CORP.'s recent introduction of two new VAX configurations, its most powerful computers ever, has been greeted by the computer industry with some yawns, but mostly applause. Those applauding this latest move by the thriving minicomputer maker, whose profits nearly doubled in the second quarter of '86, see the announcement as an aggressive attack on IBM, with its line of high-end mainframe systems. The skeptics see it as merely a stopgap measure until Digital comes out with a multiprocessor version of its VMS operating system, expected later this year.

Digital's offerings are two clustered configurations of its VAX 8700. The VAX 8974 and VAX 8978 systems are said by the company to be "alternatives to mainframes." There was no new central processor introduced. The systems are based on VAXcluster technology and are composed of four or eight 8700 processors. The VAX 8974 processes at 25MIPS and is said to be in competition with IBM's 3090 model 200. The 8974 is priced at $2.6 million while IBM's machine is priced at $4.1 million. The VAX 8978, DEC's most powerful system ever, can process at 50MIPS, which places it in the same performance arena as the IBM 3090 model 400. The price arena is quite different, though: the 8978 is $4.8 million while the IBM is $7.9 million.

The combination of multiple processors offers a high degree of data security. There is no single point of failure as in mainframes, so when one system fails or is being serviced, the others continue to operate.

In addition, the $48,000, 2.5GB SA482 disk subsystem was announced by Digital, which described it as an integral part of the new systems, and one that is also being supported on the full VAX line.

Digital also announced large database software products, including VAX SQL, a database language; VAX Data Distributor, which distributes relational data among processors; VAX Performance Advisor, for improving system performance; and new versions of VAX DBMS and Rdb/VMS DBMSs.

The new systems and the disk subsystem are seen as a real threat to IBM in the central computer room. Digital's long history of compatibility among its entire range of products and with IBM mainframes stands in its favor, particularly when compared with IBM's disparate product lines.

Whether or not Digital can woo away Big Blue's customers in a market that until now has been IBM's biggest and most profitable—the MIS shop—remains to be seen. IBM is sure to be watching.

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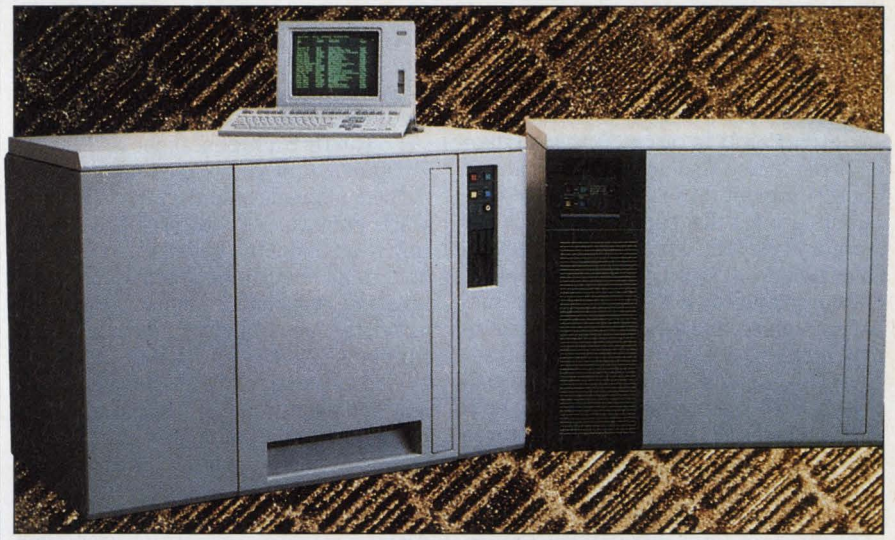


Wang's VS 7000 Series supports up to 192 workstations and 255 peripherals.

Wang Rolls Out Revamped Minicomputer Line

High-end VS line enhanced to assert firm's commitment to departmental computing

BY THERESA BARRY

Wang Laboratories, which has been making news recently with layoffs, financial losses, and salary cuts, took to the offensive with the introduction of its new series of high-performance VS computer systems and enhancements to its Pace software product.

The VS 7000 Series consists of two product groups. The 7100 is comprised of three systems—the 7110, 7120, and 7150. The 7300 group is comprised of the 7310, and the 7320 dual-processor system that Wang says it will introduce later this year.

Systems can be upgraded by swapping processor boards. Up to 128 workstations and 192 peripheral devices can be supported on the 7100 models and 192 workstations and 255 peripherals can be supported on the 7310. A 67.7MBps system bus interconnects all system components. The 7100 supports up to 10 I/O controllers; the 7310 supports 15. The systems have up to 16MB of memory, in 4MB increments, and up to 32KB of internal cache memory. An optional floating point unit is available on the 7150 and 7310. Up to 16 external disk drives are supported on the 7110, 24 on the 7120 and 7150, and 40 on the 7310. VS 7000 processors run under the VS release 7 operating system, and the 7000 systems support Wang Office software.

Wang claims the 7100 models provide up to two times the throughput performance of the earlier VS 85 and VS 100 models. The 7310, it claims, is the functional equivalent of the VS 300. The VS 7110, 7120, 7150, and 7310 are available now. Prices range from $90,000 for a 7110 with 4MB of memory to $280,000 for a 7310 with 16MB of memory.

Along with the VS 67000 Series, Wang has announced release 2.0 of its Professional Application Creation Environment (PACE). Wang claims enhancements of this product in the areas of application development, integration with Wang applications such as Wang Office, and the ability to incorporate different forms of information into PACE-based applications. PACE release 2.0 is available this month and is priced from $13,000 to $39,000, depending on the VS system used. WANG LABORATORIES INC., Lowell, Mass. CIRCLE **265**

Next Generation LaserJet

Hewlett-Packard also unveils scanner and high-volume laser printer.

Hewlett-Packard's newly introduced LaserJet Series II is targeted at multiuser environments. This enhanced version of the HP LaserJet Plus is an eight page-per-minute printer that comes with 512KB of memory resident. Memory boards available include a 1MB board for full-page, 300dpi graphics, a 2MB board for full-page graphics, and a 4MB board for memory-intensive needs.

This newest LaserJet is approximately 30% lighter than previous models. It weighs 50 pounds. New features include a paper path for correct order output, two font cartridge slots and support for a greater variety of paper stocks,

a 200-sheet input bin and a 100-page correct-order output bin, and an improved 16-character front-control panel.

This is the first product to incorporate Canon's new LBP-SX printer engine, developed jointly between HP and Canon. The printer uses HP Printer Command Language (PCL), as do other printers in the HP family.

The LaserJet and LaserJet Plus will be marketed by HP for only six more months. The LaserJet Series II is available March 1, is priced at $2,495, and includes six built-in fonts, disposable toner cartridge, and RS232C and Centronics interfaces. A 1MB memory board is $495, a 2MB board is $995, and a 4MB board is $1,995. A toner cartridge is $115.

HP has also introduced the HP LaserJet 2000 printer, a high-volume printer suited to multiuser environments. It's available in three models. The standard 2684A features PCL compatibility, 1.5MB RAM, full-page, 300dpi raster graphics, two 250-sheet input bins, and a 1,500-sheet correct-order output bin. The 2684P has the same features plus a third paper-input bin holding 2,000 sheets of 8½-inch paper. The 2684D features the third bin plus duplex printing. They're priced respectively at $19,995, $21,495, and $24,995, and all are available now. A 1MB add-on memory module is available for $750, and printer interfaces are $500 each.

The HP ScanJet scanner is Hewlett-Packard's first desktop scanner. It's a flatbed, monochrome scanner. With software support, users can select a resolution from 38dpi to 300dpi. It is said to be able to distinguish between 16 different levels of gray, and it supports three image-data types: binary, dithered, and four-bit gray scale. Both MS/DOS and MS Windows versions of HP Scanning Gallery software are included, and a bidirectional Centronics interface card is also featured. The price is $1,495 and the interface card with Scanning Gallery software is $495. HEWLETT-PACKARD, Palo Alto. CIRCLE **268**

Harris Introduces Supermini

New member of CX family based on 32-bit processor

Harris Corp.'s Computer Systems Division recently introduced the Unix-based HCX-9 superminicomputer, an extension of its existing HCX family. The HCX-9 is based on a 32-bit proprietary processor that operates at 8MIPS using C, and at 7.5 megawhetstones using FORTRAN. A dual VMS bus architecture provides 40MBps of throughput per I/O bus. Harris claims this is four times the I/O throughput of its HCX-7 system.

The HCX-9 Unix operating system, HCX/UX, incorporates a dual universe switch, says Harris, which expands the software development capabilities for the AT&T Unix System V.2 and 4.2 BSD

universes, and also enhances software portability for each environment by providing all libraries and utilities.

A basic system includes a proprietary 32-bit processor, an eight-slot VMS bus, 4MB of memory, console processor, I/O controller with eight asynchronous serial ports, 32-user Unix license, and C compiler. Shipments begin this month. The base price is $195,000.

Harris says one of the first installations of HCX-9 is at the University of California, Berkeley. The Computer Systems Research Group will replace its Harris HCX-7, in use for a year, with the HCX-9, to test source code for the future release of the 4.4 BSD version of Unix. HARRIS CORP., Computer Systems Div., Fort Lauderdale, Fla. CIRCLE **266**

Vector Processor for VAX

VAX front end designed for scientific and engineering computing

The NMX-464 from Numerix Corp. is a vector processor front end to VAX computers designed for scientific and engineering computing. Numerix claims it has peak computation rates of between 12MFLOPS and 24MFLOPS.

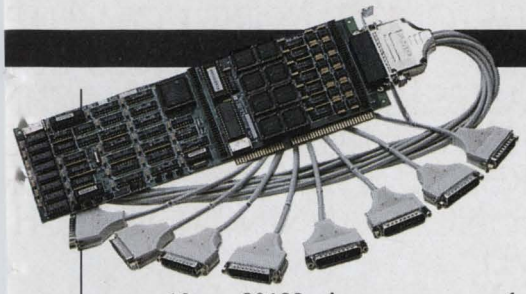
Virtual memory size of up to 1 million instructions and data memory sizes of up to 64MB are available in the pedestal-mount configuration that stands 24 inches high by 10 inches wide by 31½ inches deep. Integrated Vector Processing (IVP) software available with the 464 is said to allow transparent use of its vector processing capability in a VMS program development environment. An optimizing FORTRAN compiler—allowing vector and scalar program execution without microcode programming—is included as a subset of the IVP software.

The entry-level price for the NMX-64 is $66,500. NUMERIX CORP., Newton, Mass. CIRCLE **271**

Communications Boards

Two boards feature on-board coprocessor and four or eight ports.

DigiBoard has introduced two new boards for the IBM PC. The DigiBoard COM/8i and COM/4i are said to provide four times the processing speed of existing multichannel boards. They're designed to work with the IBM PC, XT, AT, and compatibles. They incorporate a modular I/O design, with the I/O contained on a daughter card that mounts on the COM/Xi host board. The host board



uses a 10MHz 80188 microprocessor and 256K of dual-ported RAM. Four-port and eight-port RS232C asynchronous daughter-card options use 16450 communications chips. Comware software include a MS/DOS device driver that allows the system to access up to eight ports per board, for a total of 32. Utility programs allow a user to create application software that can use the on-board processor and memory.

The Digiboard COM/8i is $1,195 and the COM/4i is $969. The price includes cabling and software. DIGIBOARD INC., St. Louis Park, Minn. CIRCLE **270**

Parallel Processor and Software

Encore announces series of computers in its Multimax family.

Encore Computer Corp. announced recently the Multimax 320 Series of parallel processing systems. Fully configured, the system can support several hundred users. This introduction expands Encore's Multimax architecture first announced in 1985.

The Advanced Processor Card (APC) is the computing element of the Multimax 320 Series. It contains two independent 2MIPS processors. Up to 10 APCs can be installed in a system allowing for processing power expansion from 4MIPS to 40MIPS. The APC processor is a 32-bit National Semiconductor 32332 with the 32382 memory management unit. APCs are priced individually at $29,000.

An optional floating point accelerator (FPA) is available for each processor for engineering and scientific users. A system with 20 processors and FPAs is said to have a peak performance of 40 megawhetstones. An FPA is priced at $10,000 per APC.

All processors in a 320 system share up to 128 million bytes of main memory. Processors communicate with memory over a 100 million byte per second bus. A new Mass Storage Card (MSC) is also available with the system. It supports 12 million bytes per second of I/O traffic on three independent I/O channels. Up to five MSCs can be configured in a 320 system and up to 100GB of on-line disk storage can be accommodated. Each MSC is priced at $15,000.

An entry-level system with 4MIPS, 8MB of memory, 408MB of disk, a 6250bpi tape drive, an operator's console, and system software license is priced at $131,000. Fully configured, the system is priced at $500,000.

Encore will also offer its UMAX V Release 3 for the 320 and the previously announced 120 system. The Network File System file-sharing capabilities will be available with UMAX V and UMAX 4.2 operating environments. The new 320 system is also software-compatible with currently installed Multimax 120 systems, claims Encore, and a 120 can be upgraded to a 320 by swapping dual processing cards for advanced processing cards. ENCORE COMPUTER CORP., Marlborough, Mass. CIRCLE **267**

Telex's 3270 Products

Nine new products announced for the 3270-compatible market

Telex's new products for the IBM 3270-compatible market include a 3191 plug-compatible display, windowing support for the 274 control unit, and a color version of its Combined Function voice/data terminal.

The 191 is a 12-inch, 3191 plug-compatible display, available in green or amber phosphor, which contains up to 1,920 characters. Support of an attachable matrix or ink-jet message printer and light pen is available as an option. The price is $1,235. The C179 is a 14-inch, four-color terminal with integrated telephony and multiple communications facilities. The price is $2,995. The 046 is a 15-inch, single-station control unit display for small cluster requirements in remote locations. It is functionally compatible with the 3276, and it displays 1,920 characters in green or amber phosphor. It's priced at $2,495.

The 274 control unit has been enhanced in two ways. New functions include windowing support for standard Telex or IBM-attached displays and support for the attachment of an IBM 3179G Graphics Display Station. The 274 with multiple logical session support is priced at $1,750; the windowing feature is priced at $1,500.

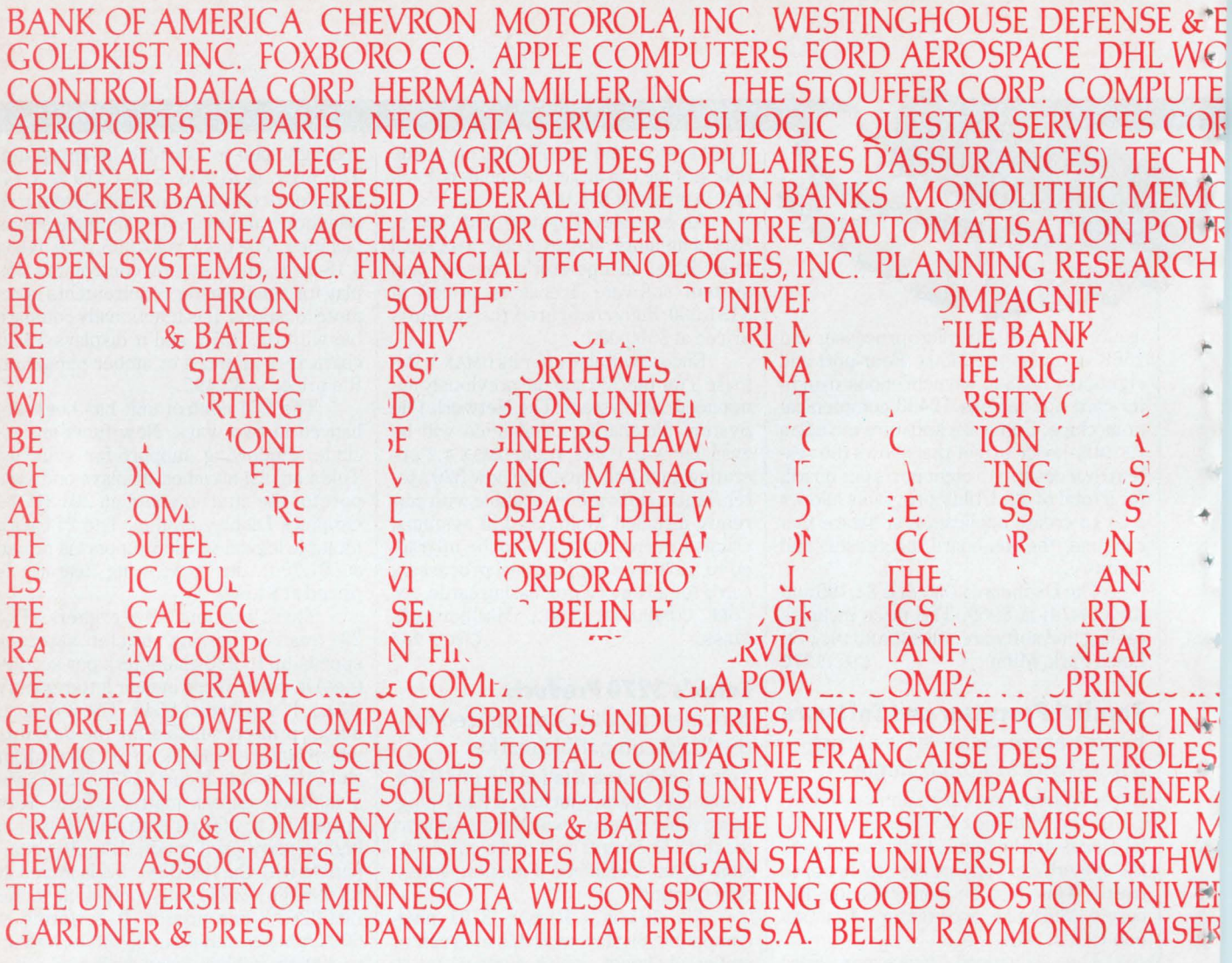
There are four new printers. The 201 matrix message printer supports speeds up to 220 characters per second (cps) in draft, 44cps in near letter quality (NLQ). It's priced at $545. The 851 is an ink-jet printer, suitable for the desktop, which features speeds up to 220cps draft and 110cps NLQ. It costs $775. The 187 is a tabletop impact matrix printer with speeds up to 200cps draft and 100cps in high-density print mode. It's plug-compatible with the IBM 3287 and is priced at $3,995. The 262 is plug-compatible to the IBM 3262-3 line printer. It performs at 600 lines per minute in dp mode, and up to 800lpm in high-speed draft mode. It's priced at $13,800. TELEX COMPUTER PRODUCTS INC., Tulsa, Okla. CIRCLE **269** ■

Looking Back

TEN YEARS AGO IN DATAMATION: "Bubble memory technology hasn't touched many of us yet, but it just might be about to. Bell Labs engineers are testing a recorded message machine using magnetic bubble memory technology that operates with no moving parts. . . ." (From Hardware/Off-line, March 1977, p. 236.)

FIFTEEN YEARS AGO IN DATAMATION: "In the early 1960s advertisements for programmers abounded in pictures of missiles, war planes, and other accouterments of destruction. Today we would find such advertisements repelling. Everyone has been disillusioned by the war, some because they believe our country to be in the wrong, others because our mighty technology and resources have proved unequal to an army of peasants—none of whom have college degrees. We can all agree that national defense is more palatable when it deters Russia than when it invades Cambodia. . . ." ("Programming: the Quiet Evolution," in Forum, March 1972, p. 147.)

TWENTY-FIVE YEARS AGO IN DATAMATION: "Most users currently seem to have unrealistically high estimates of the amount and urgency of their data transmission requirements and an unrealistically low estimate of what it should cost to meet their requirements. . . .responsible users should never forget that a four-cent stamp will move a lot of bits a long way reasonably quickly." ("A Criticism of Inactivity," by H.E. Rennacker, March 1962, p. 57.)



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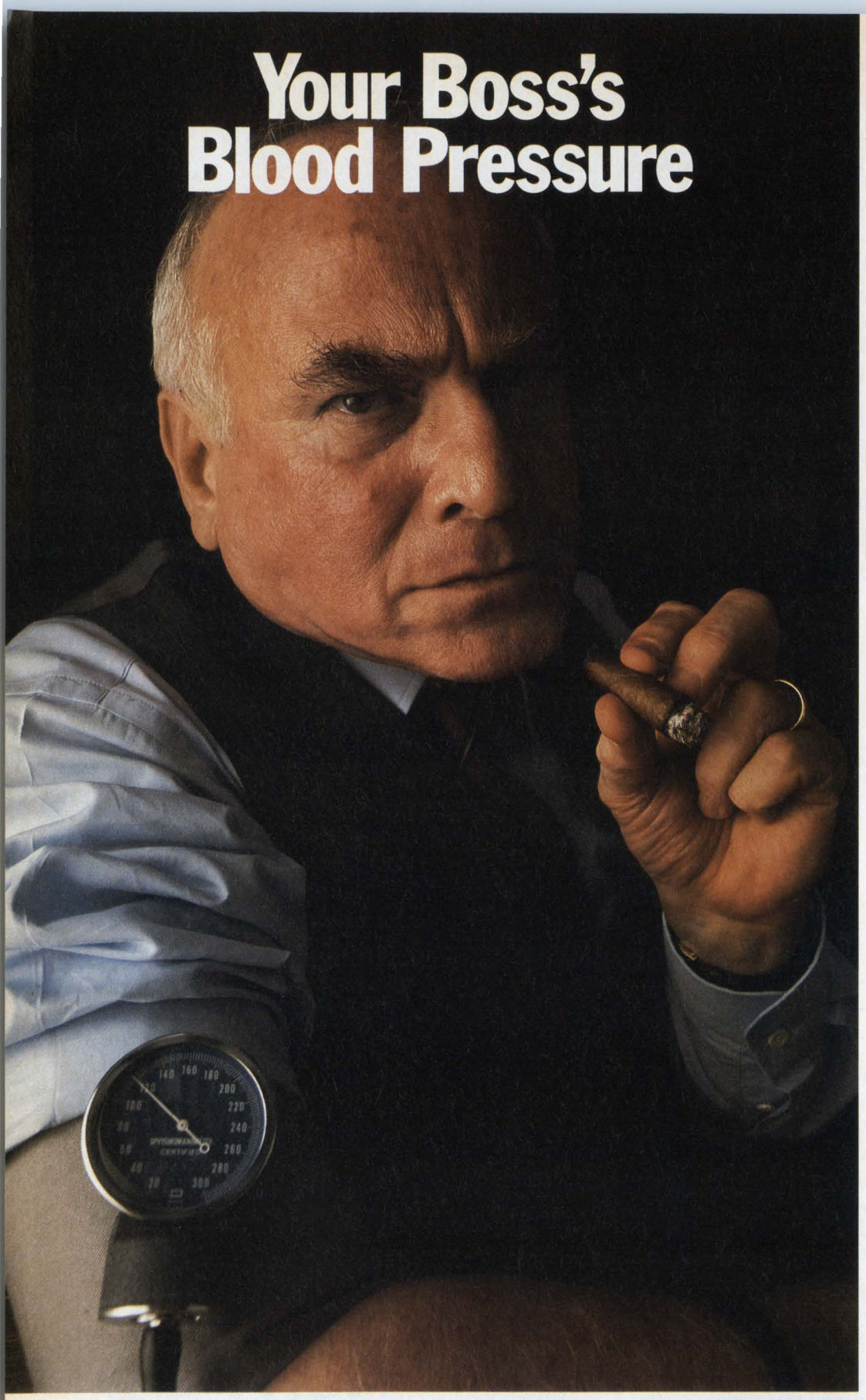
CIRCLE 45 ON READER CARD



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UPDATES

ELEVEN MAJOR WORKSTATION and software vendors recently banded together to announce their support of a windowing standard for graphical computing in networked environments. As of last October, there were three major windowing factions, each heading off in a different direction (see "Three Hats in the Ring," Oct. 15, p. 32): Sun Microsystems, Mountain View, Calif., with its Network-extensible Window System (NeWS); an MIT project developing the X Window System; and ANSI, which launched a task force on display management last June. The X Window System so far has the most backers, and they announced their support at a recent X Window user conference in Cambridge, Mass.

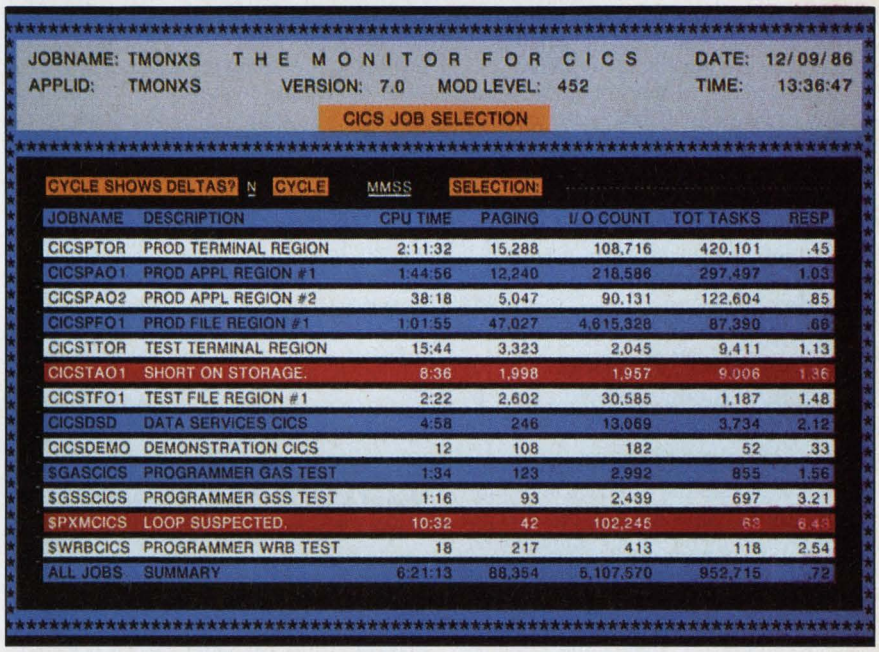
The companies backing the X Window System are Adobe Systems, Apollo Computer, Applix, Dana Computer, Data General, Digital Equipment Corp., Hewlett-Packard, MassComp, Siemens AG, Sony, and Stellar Computers. IBM, which was invited to join in the announcement of X Window support, declined, but is "considering" X Window for "inclusion" in its Advanced/IX operating system for the RT PC workstation, according to a spokesman. In December, IBM added X Window to its Berkeley 4.2 bsd Academic Information System, the operating system sold to colleges and universities for the RT PC.

Denied entry to the X Window user conference, Sun Microsystems remains undaunted by the major show of support for a rival to its NeWS product. "Sun believes there is a need for multiple windowing systems standards. . . . Customers should be given a choice," says technology marketing manager Bill Keating.

HP plans to implement X Window only for its Unix-based workstations, while Apollo, Digital, DG, and Masscomp have announced they will replace proprietary windowing systems and migrate to the proposed standard.

X Window has been under development at MIT since the summer of 1984 under Project Athena and the Laboratory for Computer Science. Project Athena was set up to explore the use of high-performance computer workstations in MIT's curriculum. The institute plans to continue the design and development of X Window as an open architecture with the involvement of other universities and the computer industry. X Window is currently applicable only to 2-D graphics and almost exclusively in the Unix environment. The system has no licensing restrictions and MIT makes it available with complete source codes.

SOFTWARE



The job selection screen of the Monitor for CICS. Message alerts users to storage space shortage.

CICS Monitor Enhanced by Landmark Systems

Major new features include abilty to monitor when CICS is disabled.

BY THERESA BARRY

Landmark Systems recently announced version 7.0 of the Monitor for CICS. This latest version features the new Cross System Monitor, which Landmark claims will function even when CICS is stalled or disabled, because it uses Cross Memory Services and runs as a VTAM task in its own address space outside of CICS.

Four components make up the new features: an exception component, which provides the ability to display, analyze, and cancel active and suspended tasks from the Cross System Monitor address space; a performance component, which provides graphic representation of resource utilization for all or selected CICS systems; a storage component, which provides the ability to display and alter CICS control blocks, tables, and programs, even when CICS is locked up; and the control component, which provides secure user access and customization of PF key assignments. The Monitor for CICS version 7.0 is available this month; the permanent site license fee is $21,000. LANDMARK SYSTEMS CORP., Springfield, Va. CIRCLE **250**

VAX Expert System

For developing personalized investment portfolios

The APEX client profiling system is designed to help field agents from banks, insurance companies, and other financial institutions deliver expert financial planning advice to middle-income customers. The expert system software is claimed to incorporate "knowledge" about taxes, investment, estates, retirement, insurance, and cash and credit management.

The profiling system runs in batch mode on a DEC VAX computer. It is claimed to take into account clients' priorities and then develop specific investment recommendations, which are delivered in a personalized, 15- to 20-page printout. Data are collected on a standard

pc during the day, sent to the VAX for overnight processing, and the results are returned electronically the next day.

Apex plans to market its profiling system to large financial institutions at a base price of $150,000; that includes customization, installation, maintenance, and initial support. The annual software license costs $150,000 more. Field testing is under way and installations are slated to begin in May. APPLIED EXPERT SYSTEMS, Boston. CIRCLE **251**

"Unintegrated" Package

SPI makes available individual modules of Open Access II.

Software Products International recently announced that the modules in its integrated software package, Open Access II, are now available on an individual basis. Open Access II Network, introduced last October, made the program available for local area networks. SPI claims that many requests for standalone modules came from LAN users of the product.

The modules are Database and Spreadsheet. Open Access II Database with Programming Language is a relational database that SPI says has virtually unlimited file, screen, and reporting formats. It can access and join eight files. The System Query Language (SQL) is used for specifying data retrieval criteria, and the Programmer programming language is used for customized application development.

Open Access II Spreadsheet with 3-D Graphics includes a goal-seeking feature, which SPI says frees users from repeated what-if usage. Spreadsheet uses virtual memory combined with RAM management, so model size is limited by disk space, not by RAM. Graphics include 3-D surface plots, scatter plots, stacked line and bar graphs, and overlays. Only the sophisticated 3-D graphics require a graphics card. Database is priced at $395; Spreadsheet is $295. For both, the price is $595. On a network, the entire system is priced at $3,995 for unlimited users. Open Access II is available in 11 languages. SOFTWARE PRODUCTS INTERNATIONAL, San Diego. CIRCLE **252**

Communications Packages

Connect Digital's VAX systems to IBM mainframes

Systems Strategies Inc., a subsidiary of AGS Computers Inc., Mountainside, N.J., has announced the introduction of VAX-Link, its new family of communications software for connecting DEC VAX and MicroVAX systems under Ultrix, Unix, and VMS operating systems to IBM mainframes. The family of nine connectivity solutions include SNA/270, BSC/3270, SNA/RJE, BSC/RJE, LU 6.2, DIA, DCA, SNADS, and X.25.

The VAX-Link packages are downloaded in RAM onto Digital's standard communications processor boards, such as the KCT for the VAX Unibus and KMV for the MicroVAX Q-bus. Single-copy prices for the VAX-Link software packages range from $3,500 to $10,000, depending on hardware. SYSTEMS STRATEGIES INC., New York. CIRCLE **253**

Uccel Enters VM/VSE Market

Tape/Manager provides centralized tape drive management.

The VSE Systems division of Uccel Corp. announced its first product in the VM/VSE market. Tape/Manager VM-VSE is said to provide centralized tape drive management and tape volume control for VM/VSE installations.

Uccel says the new package removes the requirement for dedicated VSE tape drives by allocating and managing an unlimited number of tape drives across multiple real and virtual cpus. A central catalog enables system operators and CMS users to control both VSE and VM tape files and volumes effectively. Over 30 commands are provided, all with on-line help. A security hierarchy prevents unauthorized user access to commands and tape resources.

Tape/Manager VM-VSE runs as a service virtual machine and requires VM/SP CMS release 3 or higher. It supports all nine-track devices. The price is $22,500; a field upgrade for current Tape/Manager customers is $7,500. UCCEL CORP., VSE Systems, Boston. CIRCLE **254**

Tolerant's Ada Product

Cites large customer base bidding on federal DOD contracts

Tolerant Systems Inc. has introduced TADS—the Tolerant Ada Development System—a software development system for the Ada programming language. When announcing the product, Tolerant cited the fact that the Ada language has been mandated by the U.S. Department of Defense for mission-critical systems and a large number of its system integrator customers bidding on federal defense contracts. TADS is hosted on Tolerant's fault tolerant, Unix-based Eternity Series systems.

TADS features a production-quality Ada language compiler that complies with the ANSI 1983 Military Standard 1815A. It's designed for high-speed compilation and efficient execution of Ada language programs. TADS includes a symbolic, interactive facility for debugging, and utilities for creating and maintaining libraries of Ada programs.

TADS is priced at $20,000; a $4,000 run-time license is also available, allowing users to execute TADS application programs on Eternity systems that do not have the full development software. Tolerant says it derived TADS from the Verdix Ada Development System (VADS) under a software license agreement with Verdix Corp., Chantilly, Va. Other languages available with the Eternity series include C and COBOL. TOLERANT SYSTEMS INC., San Jose. CIRCLE **255**

WordStar, Release 4 . . .

MicroPro makes 125 enhancements on word processor.

MicroPro International has updated its popular micro-based word processing package, WordStar. An updated version for the CP/M operating system, which was WordStar's original format, will be available later in the year.

Among the more than 125 enhancements MicroPro is claiming are full path support, on-line 220,000-word thesaurus, line and box drawing, go-to page, improved support for the HP LaserJet printer, stored ruler lines, programmable macros, undo command, 40 programmable function keys, 14-function calculator, file locking for LAN support, and improved speed. Release 4 is priced at $495; LAN file server versions are $595; upgrades are $89. MICROPRO INTERNATIONAL CORP., San Rafael, Calif. CIRCLE **256**

. . . And R:Base V, Release 1.1

Microrim adds direct interface to Lotus's T-A-C to its DBMS.

Microrim's Release 1.1 of its popular micro-based database management program, R:Base System V, includes a direct interface to Lotus Development Corp.'s "The Application Connection" (T-A-C), which allows users to transfer data files between mainframe and micro-based computers. Mainframe DBMSs supported by T-A-C include Ramis, Focus, SQL/DS,

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SAS, Nomad2, APL/DI, ADRS2, and IC/1. It also provides the ability to export and import data in the dBase III and III Plus file format. R:Base System V can also import and export from 1-2-3, Symphony, VisiCalc, Multiplan, and ASCII files. Data from pfs:File dBase II files can be imported.

R:Base System V, release 1.1 operates in a standalone or multiuser LAN environment and is priced at $700. Upgrades are $200. MICRORIM, Redmond, Wash. CIRCLE **257**

Art Production Tool

Adobe Systems introduces package for producing high-quality art.

The Adobe Illustrator is a new Macintosh graphics package based on the Adobe PostScript page description language, which is becoming the industry standard.

Adobe claims a user can use virtually any images—scanned from a photo, logo type, blueprint, rough sketch, art from a scrap file, or MacPaint image. Adobe Illustrated enables a user to trace shapes and then fill in the image, adjust lines, and add captions using the product's "pen tool." The drawing, including text, can be rotated to any angle, scaled, skewed, and manipulated, says Adobe.

Adobe Illustrator is priced at $495. ADOBE SYSTEMS INC., Palo Alto. CIRCLE **258**

Micro Version of Telon

Pansophic's mainframe application productivity system

Telon PC from Pansophic is a new version of Telon, the mainframe application productivity system. It's designed for installations already using Telon for the mainframe and it allows systems designers to use a micro within the Telon development environment, says Pansophic.

The micro product is said to incorporate all functions of the mainframe version, and all programs developed on the micro version are compatible with mainframe Telon programs. The system captures design information from nonprocedural input, generates COBOL or PL/1 source programs, and provides integrated testing of generated applications in IMS, CICS, or batch environments.

The heart of Telon PC is the Telon Design Facility (TDF), which takes external design characteristics and programming information and allows the developer to paint the screen. The TDF resides on the mainframe and the micro, as do all TDF databases, utilities, and storage facilities, allowing datasets to be developed and maintained in both environments via micro-to-mainframe links.

Micro functions are also included, such as a short help message at the bottom of each Telon screen and extended micro screen attributes that enable developers to choose from 16 colors in foreground and background.

Telon PC operates on an IBM XT, AT, or compatible using PC/DOS 2.1 or higher, and requires 640K RAM, 5MB of hard disk, and a double-density 360K floppy disk or high-density 1.2MB floppy drive. The price starts at $9,500 for two copies; site licensing is available for sites with multiple PCs. PANSOPHIC SYSTEMS INC., Oak Brook, Ill. CIRCLE **261**

COBOL II Optimizer

CA introduces CA-Optimizer for IBM's MVS and MVS/XA.

CA-Optimizer II release 1.0 is a code optimization, debugging, and source analysis product that Computer Associates says supports the new and expanded capabilities of IBM's COBOL II and MVS/XA operating environments. It's for sites running IBM's MVS and MVS/XA systems. It enables users in COBOL II environments to use the features of CA-Optimizer for MVS and MVS/XA.

Optimizer II provides a COBOL II language help facility with split-screen capability. The optimizer component was enhanced to include additional optimization techniques that CA says achieve an average reduction of 10% cpu performance over the COBOL II "opt" option. It's said to handle programs up to eight times larger than previous CA-Optimizer environments did.

CA-Optimizer II Release 1.0 is priced at $48,000 for IBM's MVS and MVS/XA operating environments. COMPUTER ASSOCIATES INTERNATIONAL INC., Garden City, N.Y. CIRCLE **259**

Ada on the Altos

Altos unveils its Ada Compiler for use on Altos 3068.

Altos Computer Systems recently announced its Ada Compiler for generating multitasking applications in conjunction with its Altos 3068 host computer system.

The product consists of the compiler, library manager, unit manager, binder, run-time executive, and documentation. It executes on a 3068 supermicro runnning AT&T Unix V.2, reads an Ada source program, and updates the current Ada program library. The library manager organizes the creation, deletion, and modification of Ada program libraries. The unit manager organizes constituent units of Ada program libraries and establishes the dependencies between units. The binder program assembles the program units necessary for a particular Ada application and produces an object file suitable for use by a linker program. The run-time executive organizes the operation of programs for multitasking.

The Altos Ada Compiler is available now for use on the 3068. The price is $3,995. ALTOS COMPUTER SYSTEMS, San Jose. CIRCLE **260**

Looking Back

FIVE YEARS AGO IN DATAMATION: "After more than eight years of crunching numbers, the Illiac IV supercomputer has been retired by its users at NASA's Ames Research Center at Moffet Field, Calif. It has been replaced by a one-megabyte Cray 1-S, one of the two fastest commercially available computers around. . . ." ("Illiac Out, Cray Comes In," by Edward K. Yasaki, in "News in Perspective," March 1982, p. 98.)

TEN YEARS AGO IN DATAMATION: "AT&T legal strategists have come up with a tried and true tactic to wield against their competitive nemesis, MCI Communications Corp. It is known as 'deep pocket' strategy and AT&T, according to legal observers, is using it to the hilt to make the MCI antitrust suit as long and drawn out, and as expensive, as possible for the specialized common carrier. . . ." (Look Ahead, March 1977, p. 16.)

FIFTEEN YEARS AGO IN DATAMATION: "The federal government, through the Wage and Hour Division of the Department of Labor, has ruled that computer programmers and analysts are not professionals and therefore are nonexempt from the Fair Labor Standards Act regulations on minimum wage, overtime, and equal pay provisions. . . ." ("A Professional Is a Professional Is . . ." by Edith Myers in News in Perspective, March 1972, p. 97.)

BOOKS

Thinking About Thinking

THE SOCIETY OF MIND
by Marvin Minsky, Simon and Schuster, New York (1987, 339 pp., $19.95).

BY EDWARD M. FISHER

Nowadays, there seems to be more artifice than art in the field of artificial intelligence. Dozens of startup companies are slapping together expert systems and hyping them as the answers to everything from medical diagnosis to factory floor management. In academia, researchers are proclaiming themselves the true keepers of the AI flame, even as they're courting venture capital to convert their PhD theses into products.

Marvin Minsky, the MIT professor often called the "father" of AI, remains above this fray. He has little interest in garden-variety expert systems and his reputation does not require Wall Street's blessing. Instead, he concerns himself with abstract possibilities.

In his new book, *The Society of Mind*, Minsky shares his thoughts on how an electronic system that mimics the functions of the human brain might eventually be built. Similar to though not in fact a brain, such a system would be a mind.

That is an important distinction, given today's primitive state of knowledge of the structure of the brain. Like all good computer scientists, Minsky knows that to imitate something's function, one need not necessarily recreate, nor even fully understand, its form. The brain is a thing. Mind, to invert an old expression, is a state of. "This book tries to explain how minds work. How can intelligence emerge from nonintelligence? To answer that, we'll show that you can build a mind from many little parts, each mindless by itself," writes Minsky.

The sum of those parts, linked together to "think," forms Minsky's Society of Mind ("society" for short) system. Building a full-blown society system using today's technology is not possible. At best, Minsky believes, it is at least 10 years off. Rather than lamenting unavailable hardware, Minsky spends the bulk of the book explaining the underpinnings of his society theory. Learning, reasoning, memories, emotion, all yield to his explanatory efforts. Much discussion is devoted to agents, the irreducible autonomous components of all intelligent activity and so, too, of a society system.

Minsky's equation of the society system's appearance of intelligence with intelligence itself (if it walks like one and talks like one, it must be one, he would say) recalls another AI milestone. In the early 1960s, Joseph Weizenbaum, then a young MIT professor, developed ELIZA, a computer program that engaged its users in intimate question and answer sessions and gave the illusion of intelligence.

Like Weizenbaum, Minsky is proposing a system that is something of a illusion. No matter; Minsky's real goal seems to be to stimulate his audience to think about what he has done, and perhaps pursue new paths along the road to understanding more about the mind.

That audience is not limited to scientists. In fact, the book has a heavy psychological bent. Although written for laymen, this book is not easy reading. That's no fault of its prose, though the writing often ventures into the soft-tech cutespeak so common to the *Gödel, Escher, Bach* school of literature. There's just no escaping the fact that the subject matter is difficult: thinking must be rough on the brain. The fact that Minsky understands the value of analogy in conveying the essence of a new concept goes a long way toward easing the reader's job. A glossary that nicely defines many of the book's psychology-related terms (now I understand the meaning of gestalt) is a welcome addition.

In an unusually long "Postscript and Acknowledgement," Minsky thanks what seems to be everyone he has worked with over the last 30 years. (Many of those mentioned are famous science fiction writers.) This gives cause for wondering whether Minsky considers this book his crowning achievement. Undoubtedly, he has accomplished something significant. To gauge just how important, however, we may have to wait several years. The value of Minsky's work may become clear in the yet-to-be-hatched theories that this book will no doubt inspire. In a decade or so, I'm guessing, my copy won't be the only red-lined edition. ■

Computer journalist Edward M. Fisher wrote about pc graphics in DATAMATION's Jan. 15 issue.

CALENDAR

APRIL

Congress for Progress XII (Exposition and Conference of the American Production and Inventory Control Society).
April 8-10, Atlantic City, N.J. Contact Walter J. Pietrak, Richardson-Vicks Inc., 330 Warminster Rd., Hatboro, PA 19040, (215) 956-1066.

Infocom 87 (10th Annual Rocky Mountain Exposition and Conference).
April 15-17, Denver. Contact Mile High Chapter, DPMA, P.O. Box 334, Denver, CO 80201-0334, (303) 789-4547.

AI '87 (Artificial Intelligence and Advanced Computer Technology Conference and Exhibition).
April 22-24, Long Beach, Calif. Contact Jim Hay, Show Manager, Tower Conference Management Co., 331 W. Wesley St., Wheaton, IL 60187, (312) 668-8100.

DEXPO South 87.
April 28-30, Nashville. Contact Expoconsul Int'l., 3 Independence Way, Princeton, NJ 08540, (609) 987-9400.

MAY

APL87 International Conference.
May 10-14, Dallas. Contact APL87 Registrar, 440 Northlake Shopping Center, Dallas, TX 75238, (214) 341-2546.

CDI (Compact Disk Interactive) Business Strategy Conference and Exhibition.
May 11-13, San Francisco. Contact Online International, 989 Avenue of the Americas, New York, NY 10018-5485, (212) 279-8890.

COMPEURO '87 (International Conference on VSLI and Computers).
May 11-15, Hamburg, Germany. Contact IEEE Computer Society, 1730 Massachusetts Ave. N.W., Washington DC 20036-1903, (202) 371-0101.

Canadian Information Processing Society (CIPS) Congress '87.
May 12-14, Winnipeg, Canada. Contact CIPS, Winnipeg Section, P.O. Box 2610, Winnipeg, Manitoba, Canada, R3C 4B3, (204) 947-2837.

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

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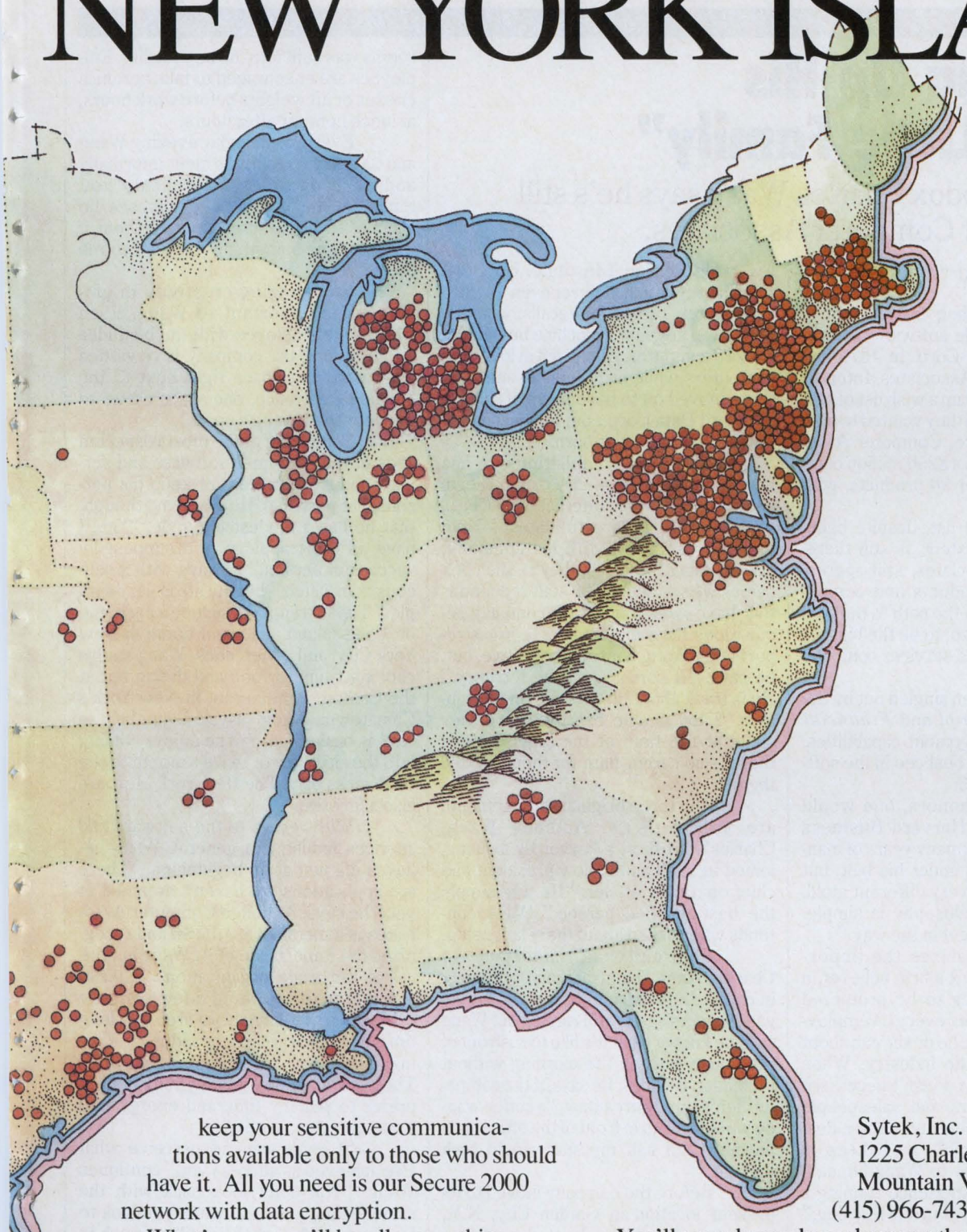

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CIRCLE 51 ON READER CARD

PEOPLE

Bringing Up His Own "Little Family"

The unorthodox Charles Wang says he's still having fun at Computer Associates.

BY THERESA BARRY

When Charles B. Wang and his staff of three bought a single software product from Standard Data Corp. in 1976 and formed Computer Associates International Inc., they drew up a wish list of other software products they wanted to buy. In the 10 years since, Computer Associates has grown into a $250 million company, marketing over 90 products, with 2,300 employees.

But the wish list, despite being fulfilled to a great extent, is still there, and Computer Associates, still aggressively acquiring products and companies, will continue on the path to the goal Wang set 10 years ago: to be the biggest and best software and services company in the world.

Wang has been singled out by the *Wall Street Transcript* and *Financial World* for his management capabilities, and was even named best ceo in the software industry in 1983.

With these honors, one would think Wang was a Harvard Business School graduate with many years of management experience under his belt, but Wang comes from a very different mold. His management philosophy is simple: "Don't let structure get in the way."

Wang emphasizes the importance of learning. He's a firm believer in grooming employees to be promoted within the corporation; every CA employee is urged to learn all he or she can about CA's products and the industry. When hiring, Wang says, CA doesn't necessarily look for managers and salespeople who are knowledgeable about the industry. Once hired, their jobs are to keep on learning. This applies to Wang himself. "I don't have any experience running a $250 million company. I'm still learning," he says with a smile.

Wang, born in Shanghai, China, 42 years ago, emigrated to the U.S. in 1952. He received a degree in mathematics and physics from Queens College, New York. His first job was as a programmer trainee at Columbia University's Riverside Research Institute. Until that time, he says, he had never even touched a computer. In fact, he recalls, when he first saw a keypunch machine he thought it was a computer. But he fell in love with computers while at Riverside, and from there moved on to become vp of sales at Standard Data Corp., out of which Computer Associates was born.

The many acquisitions CA has made over the years—ISSCO, San Diego, and GE's Software International Corp., Andover, Mass., are the latest—have meshed very well with his company, claims Wang. "Overall, they're the companies we wanted." The staff reductions that have gone along with company acquisitions have initiated some press reports that Wang considers negative, but, he says, "It comes with the territory." He is frank about his feelings on the subject: "I tell people exactly where they stand at the time of the acquisition. If there is no career path for them, we tell them."

The three original staff members are still with CA. Anthony Wang, Charles's brother, a lawyer by training, joined in 1979 and is now president and chief operating officer. "He was simply the best-qualified person," Wang contends when asked about the relationship.

Continuity is important to Charles Wang. The tradition of bringing in coffee and pastry for the staff that began 10 years ago is still carried on. Wang says he knows what it's like to rush out of the house early in the morning without breakfast. Besides, he says, if the company didn't supply breakfast, "a coffee wagon would pull up in front of the office each morning and half my staff would rush outside."

Before the company moved to its present location in Garden City, N.Y., one year ago, it was located next to a State University of New York campus. CA employees had the use of the gym facilities, and every Thursday night Wang and his fellow employees played basketball. Because they moved farther away from the campus, a gym with locker rooms was built into the new facility. Employees are encouraged to take aerobics classes or lift weights before work hours, at lunch hour, or after hours.

Every Wednesday evening Wang and CA's key executives meet informally and exchange ideas. "What do you think?" is one of Wang's key phrases, he claims. "If people screw up, I tell them; if they've done something right, I also tell them."

Encouraging creativity in employees is important to Wang. Each month, the employee with the best idea on improving the company is rewarded with a parking space right next to the building's entrance, one space closer to the door than Wang's spot.

Wang, one of the most respected ceos in the computer software and services industry, prefers to keep his personal life personal. He does say, though, that he has a modest life style. "Yes, I have all the trappings of a supposedly successful person," he says with a self-conscious laugh, "but my life is very simple." Those trappings include a big home on Long Island, a second home in New York City, and a Mercedes. Wang enjoys cooking Chinese food and dining out at the Canton, a restaurant in New York's Chinatown. Wang plays racquetball as well as basketball, and he enjoys coming into the city once or twice a month to see the Knicks play. The New York Mets are also a favorite.

With regard to the software and services industry in general, Wang believes it's just at its beginnings. "There are applications we haven't dreamed of yet," he says. Although Computer Associates is a member of ADAPSO and recognizes the importance of it, Wang is critical of the trade organization. "ADAPSO represents the views of a few software companies that have been around a long time. That isn't where the industry is going," he says. "ADAPSO is powerless. They talk and don't get anything done. I prefer to put my time and energy into Computer Associates."

"I don't want to perceive what I've achieved as success yet," continues Wang. "You don't look back with the same feeling you have when you look to the future. When there's still so much to learn you don't feel as if you've achieved so much."

Wang says he will continue to build the business and expand that wish list. "As long as I'm having fun, I'll keep on doing it." ■

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CIRCLE 52 ON READER CARD

LETTERS

What's Wrong

In "What's Wrong with DBMS" (Dec. 15, p. 66), the content of what I said was correctly repeated. There are some details that were misstated that do not affect my opinions.

We do not consider RAMIS and FOCUS "relational." These DBMSs provide tremendous "ad hoc" capability. We recognized the importance of "ad hoc" in the early '70s. The strength of these DBMSs in this area was so important to us that we worked with IBI and Mathematica to develop an interface to our IDMS databases.

Stepping onto my soapbox for a moment, I would like to clear up a misconception that the five DBMSs mentioned in the article are an "integrated database system." I have come up with the proper arguments for what my instinct was telling me was wrong.

First, the timing factor: each system has its own updating cycle. The personnel system is updated frequently each day. The payroll system is updated on Tuesday. The other systems have their own update cycles, and yes, the cycles are different from the above two systems. The problem is that no two systems ever have the same exact set of data at the same time. Ask the same question at the same time, on the same day, of the five systems and get up to five different answers.

But does it really matter? Of course it matters. To get the correct answer to the question, the question must be posed to the correct system.

Second, how do people design computer systems? Each and every computer system that I have seen comes with a program that edits and validates the input. By now everyone has heard of GIGO—garbage in, garbage out. The edit and validation program is designed to eliminate GIGO.

The problem then is that there are five edit and validation programs in these systems. When a need arises to enhance one of the systems, the edit/validation program for this system is changed. But someone forgets about the other four, or there is a delay in the production use of the revised edit/validation program (it takes only one). Presto—instant reject.

And now it is a manual job to get things corrected, both programs and data.

BARRY GROVES
RCA
Princeton, New Jersey

READERS' FORUM

Relational: A New Religion?

Do you know why that regulation-spawning fussbudget, the Food and Drug Administration, has no labeling requirement for the term "natural"? It is because the word doesn't mean anything. In the sense that a substance is found in nature, everything man comes across is natural—the alternative is supernatural. In the sense that something natural is untouched by the hand of man, nothing on earth is natural—at least not since the Pleistocene. So the agency that strictly regulates use of the terms peanut butter and ice cream ignores natural.

Lacking such regulatory wisdom or self-restraint, the dp industry is hit by cyclical waves of hype that roar in and then slip away, leaving our trade basically unchanged. Ten years ago, "distributed processing" was applied to almost everything someone wanted to sell. Later it was "information centers" and more recently "relational." I've seen ads for relational database packages, relational compilers, even relational office furniture.

The word relational was coined and popularized by E.F. Codd and C.J. Date. Once it described a way of looking at data access that seemed more rigorous—almost mathematical—than the seat-of-the-pants approach common before 1971. Their work had the hallmark of genius. Then, sadly, like "fourth generation," relational was picked up by the hype makers and glued onto everything they wanted to sell. It was debased into a buzzword as meaningless as natural.

Relational differs from other hype words in one important respect, though. Its inventors, Codd and Date, are still around. Whereas no independent authorities stand behind terms like user friendly, there *is* someone we can ask whether, indeed, one vendor's office chair is more relational than another's. About a year ago, database Vendor C suffered competitive pressure from Vendor I. Vendor I was telling trusting executives that its database system was more relational than C's. Understand, meaningless hype or not, big bucks were at stake. So Vendor C hired an authority to study its package and express his opinion of its relational-ness. His answer, after he collected his fee: "It is not relational."

Now wait just a minute here. In the sense of embodying the perfection of pure math, no real software can be relational any more than a real pencil line can be Euclidean. After all, Codd's seminal work defined no updating. In the sense of incorporating the SELECT, PROJECT, and JOIN operators described in the paper that won Codd the Turing award, almost all current DBMS releases are relational.

If relational-ness is measured by one man's flexible dogma, then the subject leaves the natural realm and enters the supernatural. It takes on the quasi-religious nature of the argument between light-is-a-wave and light-is-a-particle, or that of entity-relationship design versus normalization. Is Christ present in the Eucharist? Whatever your opinion (and especially if you have none), you could have been slain for it 400 years ago.

In a recent ad for a seminar, Codd and Date quoted my own humble opinions as an example of "ill-informed . . . misrepresentation." Well now, that seems a bit strong. I hold no grudge against these thinkers. As I've said, I look up to them as geniuses or (to keep the analogy) prophets of a new faith.

But the most successful religions, it seems to me, have prophets who have died and only disciples, who can interpret their leader's frozen words without his butting in, to carry on. Of course I don't really want either of these "relational" fellows to get sick. (In fact, Chris Date is younger than I and, blessed with a wiry build, will likely outlive my kids.) But I wish they would stick to philosophizing and let me get on with installing my new payroll system.

FRANK SWEET
Database Consultant
Jacksonville, Florida

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that brain of
silicon will say,
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and your mission!"
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