DATAMATION 76®

December

SOFTWARE PACKAGE RATINGS

SOFTWARE RATINGS, page 108 Also: dp ombudsmen, program maintenance, dp politics...

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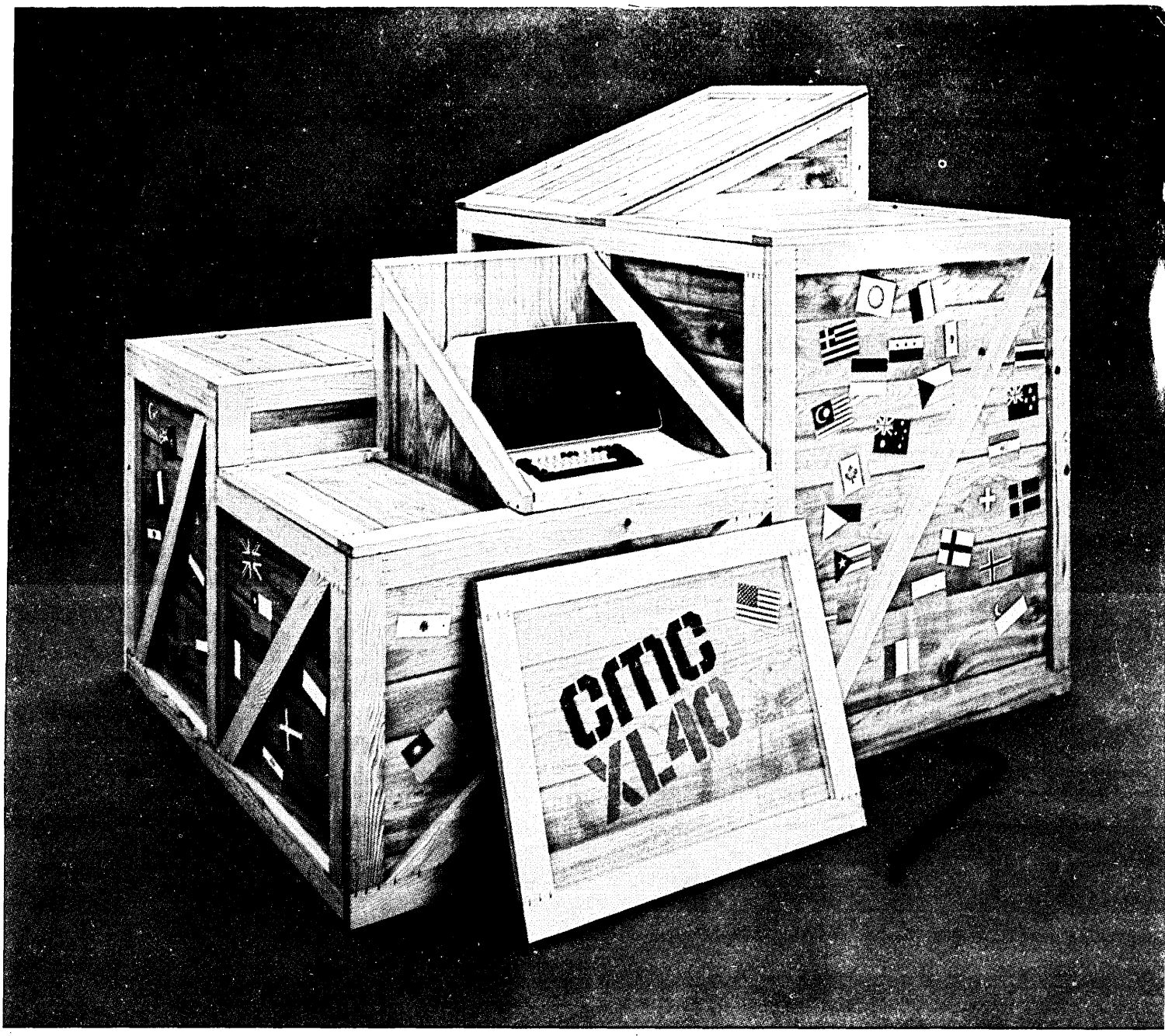

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CMC introduces the all new XL40 Distributed KeyProcessing™ System.

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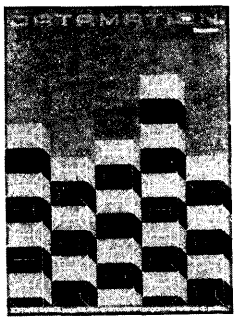
CIRCLE 55 ON READER CARD

DATAMATION® 76

VOLUME 22 NUMBER 12 This issue 141,700 copies DECEMBER 1976

FEATURES

50 POWER, POLITICS AND DP
Joseph Rue. A Machiavellian handbook of survival for the dp manager.



53 HUMANIZING INFORMATION SYSTEMS
Theodor D. Sterling and Kenneth Laudon. Ombudsmen expose another kind of computer abuse.

61 THE COMPUTERIZED "LIBRARIAN"
R. A. Baker and J. C. Jefferies. Where a Librarian is needed, the position can sometimes be filled by a program.

67 SOURCE PROGRAM MANAGEMENT
Larry K. Miller and David Ostrom. That Librarian program might be nearly free, too.

79 SOFTWARE ENGINEERING AND LIFE CYCLE PLANNING
Robert L. Patrick. For those who are more interested in getting the work out than in creating a new programming language.

83 RAMIS AT CITIBANK
Robert E. Roach. IMS was too difficult, MARK IV too rigid.

94 OS/CB Release 1
Gary P. Becker. An unusual memory trace for all our good buddies out there.

99 ON THE DP ROAD TO SOUTHEAST ASIA
Bill Orr. Technology transfer, leapfrogging, and the search for regional identity in Southeast Asia.

108 SOFTWARE PACKAGE RATINGS
Herbert L. Gepner. Everyone has heard the vendors' claims for these 250 popular packages; now here's what the users say.

146 IBM'S SERIES/1 MINICOMPUTERS
Angeline Pantages and Philip Dorn. The giant again enters a market late—but with massive resources.

199 FORUM
John M. Eger. Datran was the victim of a massive overdose of obstruction administered by Ma Bell.

NEWS IN PERSPECTIVE

148 CONFERENCES
Info 76 conference in Chicago drew the types that exhibitors consider to be their kind of people.

150 COMPANIES
Canada's Consolidated Computer is on the road to recovery—again.

156 MICROCOMPUTERS
Mini/Micro show is a success in an awkward way.

157 SERVICES
Change is focus of Adapso talks.

159 ANTITRUST
West Coast cases open in Los Angeles with CalComp vs. IBM.

162 MANAGEMENT
DPMA makes good in Las Vegas.

163 ELECTRONIC FUNDS TRANSFER
EFT: other issues and legislation.

166 COMMUNICATIONS
Bell wears people down to capture markets from a to z.

172 BENCHMARKS
Justice Dept. vs. Bell; deButts on Bell bill; Another carrier; Another voice in Washington; Must improve service; High rating for DEC; Quadrupled earnings; Components firms merge; But no trophy.

DEPARTMENTS

7 LETTERS
About that Malik book on IBM, an opposing view on school district dp, and is programmer certification premature?

11 PEOPLE
Bob McGrath: Selling terminals and ex-IBMers; Bill Weksel: three of him; Stan Bootle: selling ADAM

17 LOOK AHEAD

22 CALENDAR
'77 topics: automation, word processing, & design.

27 SOURCE DATA
"Making Computers Pay" and other books reviewed or briefed, plus reports, references, vendor literature, courses.

49 EDITOR'S READOUT
A sampler of problems that are a by-product of bigness.

176 HARDWARE
The Pertec/Computer Machinery Corp. merger bears fruit: the "DREAM machine" for data entry/management.

182 SOFTWARE & SERVICES
System Language/1, the latest attempt at automatic programming, information retrieval, new mini OS . . .

188 MARKETPLACE

196 ADVERTISERS' INDEX

About the Cover
We look into software packages again, while our cover literally stacks them one against the other. Design is by our Art Director.

DMS/OS

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The LIBRARIAN® and MetaCOBOL® from ADR Boost Efficiency at Computer Power, Inc.

Computer Power, Inc., Jacksonville, Florida, provides complete data processing services for a number of banks, mortgage bankers and saving and loans whose mortgage portfolios have over 1,250,000 mortgage loans valued at over 24 billion dollars.

Over 8,400 program modules are now used to provide client services—modules which require storage space equivalent to 2.7 million card images.

Until The LIBRARIAN was installed, program storage and management was an expensive and time consuming problem

According to Technical Support Manager Roy Fileger, "Before we installed The LIBRARIAN, we stored everything on 17 IBM model 2314 disk packs. That meant we had 17 different source statement libraries. We were making 1000 pack changes a month and we were spending over 50 hours of computer time each month reorganizing files."

"Program standardization was a problem too. Programmers would make changes to one pack and not duplicate the changes on the other packs."

The LIBRARIAN enabled Computer Power, Inc., to cut disk storage by 94%.

After The LIBRARIAN was installed 2 years ago the entire source statement library was immediately compressed with the result that Computer Power, Inc., using the IBM 3330 disk system, now stores all of its 8400 program modules on a single disk, constantly on-line. The benefits were far greater than just the savings in disk use, however. Time required for file reallocation was virtually eliminated. Elimination of disk shutdowns and disk changes added another 50 hours a month of usable computer time. And standardization rapidly improved because common program changes no longer had to be duplicated on many different disks.

"We really have file backup now. And that's tremendous."

Roy Fileger remembers, "When we had 17 packs our backup and savings procedures were extremely time consuming. Now, with The LIBRARIAN and only one disk pack, we are able to save everything every single day in just 20 minutes."

ADR's MetaCOBOL is doing more than just conversion.

Computer Power, Inc., is in the final phases of conversion of more than 6000 program modules from DOS to OS/ANS. According to Roy Fileger, "We're running through MetaCOBOL and coming out with state-of-the-art programs, OS/ANS, single entry, single exit with I/O completely changed. All the programs we have converted so far have executed perfectly the first time."

Programs are being standardized as they go through MetaCOBOL.

"Everything coming out is looking alike. MetaCOBOL is picking up errors in violation of COBOL specifications that the compilers would let go through. As a result, our programs are really coming out clean," he continued.

"As far as I know, there is no alternative to MetaCOBOL."

"Any other system would have required handmade changes involving a staggering amount of time," Roy Fileger added.

ADR software products are an integral part of over 5,000 installations worldwide. Each ADR product is not just a program, but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in 31 countries—each staffed with ADR-trained technicians.

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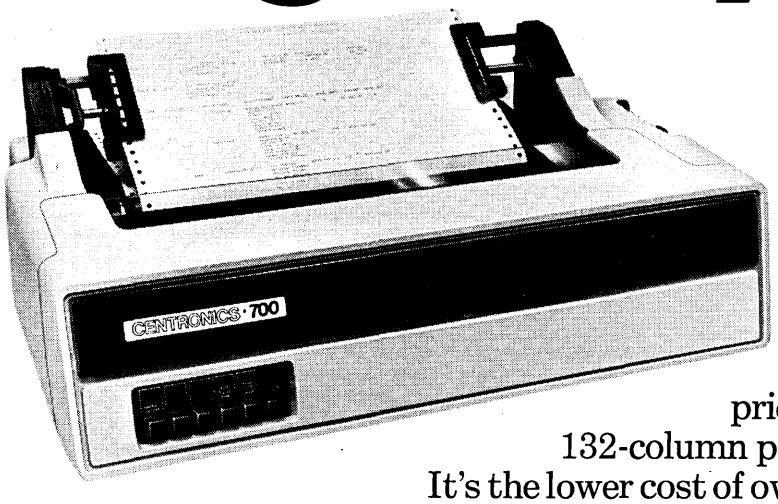
"You can't buy a 132-column printer for any less. Or, get any more."

Bob Howard, President, Centronics



But the low initial price for the Centronics 700 Series 132-column printer isn't the whole story. It's the lower cost of ownership based on the 700's inherent reliability and simplified construction.

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letters

With Malik aforethought

Oh dear, oh dear! I have upset Mr. Gardner [see the review of Mr. Malik's *And Tomorrow the World? Inside IBM,* September p. 29] that he should splutter on in such an incoherent fashion. However, whatever else he may write, he should not be allowed to actively misrepresent me without challenge.

Why sources, when quoted, are not identified, the reliance placed on IBM documents which have or are appearing in the lawsuits it has and is involved in, and the fact that the conclusions were arrived at after the study of the evidence, all this was carefully explained in the book, some of it at length.

Mr. Gardner is entitled to disagree with what I wrote, or the reasons for doing so. He is entitled to challenge the reasons, but before doing so he should at least read them.

As to the charge of animosity, a blanket charge at that, it must also be denied. I found the case against IBM at times overwhelming, and where I did so, I wrote accordingly. I dislike the implication within Mr. Gardner's review that while it is permissible, to write pro or "objective" material about IBM, it is not permissible to write otherwise. That smacks much too much of the sort of writing with which this industry is too often treated, or, not to put too strong a term on it, PR flakery.

As to the history, in the twentieth century, Turing is the boy. One must go by the evidence, even if you have to wait for my next book but two to find it. Though it's not too difficult, it has been there all along if you know where to look.

As I wrote in *And Tomorrow . . . The World: Inside IBM,* "The mythology of American knowhow, Yankee shrewdness and foresight can stand on its own quite effectively without having to be stretched to encompass things which were, and are, manifestly not true." I try to deal in truth, or the nearest approximation to it that one can get at. History is not about whether the Russians, Americans, British or Germans are ten feet tall; it is about what actually happened, and why it did so. While the truth is supposed to set you free, freedom is not necessarily comfortable.

Anyway, thanks for "the only game in town." And there, given that I live in Europe, and IBM is an American company, is a reflection on our profession.

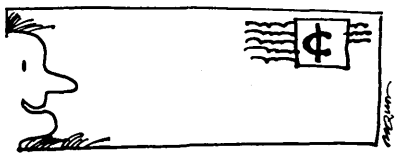
REX MALIK
London, England

Mr. Gardner replies: I remain consistent in my feelings about Mr. Malik's writing: I find his letter as muddled as his book. For the record, I did read his book, but it was very tough going.

Another manager's view

In Jackson Granholm's article, "The View from the Manager's Office," (August p. 52), an individual was interviewed who expressed some very negative feelings about data processing in the public school systems. As Chairman of the California Association of School Business Officials, Data Processing Research & Development Committee, and being well acquainted with the organization in which the interviewee in the article works, I feel that the attitudes and opinions expressed in that article are not representative at all of dp, at least in the California public school system.

The individual stated that there was a problem of low motivation. To this I must reply that I have never seen in the



private sector the degree of motivation that I have seen in the public school data processing departments. Given limited resources and sometimes unrealistic time requirements, some very innovative and creative computer systems have been designed to serve the 1,200 school districts throughout the state.

The article also implied that all school district computer systems should be identical, and each district should use them all in the same way. Granted, there is room for improvement in standardization of information definition and information exchange procedures, but individual school districts perceive their own needs differently and it's rare to find the emphasis in any two school district dp centers to be in the same areas. Whether one approach is better than another is for the local taxpayers to decide and not for a statewide (or county-wide) mandate to dictate . . .

DENNIS VLASICH
Director Data Processing
Claremont Unified School District
Claremont, California

Mr. Vlasich is mistakenly making a straw man of our anonymous manager by attributing statements to him which he never made. Mr. Vlasich accuses the manager of calling for "standardization" in all school districts, when in fact the manager said that 18 of 20 districts with dp capabilities "prefer to have the public pay for duplicating everything" rather than share common dp solutions. This is a call for some standardization perhaps, but the manager never said "that all school district computer systems should be identical, and each district should use them all in the same way."

IBM's little brother?

Norman J. Harris ("People," October, p. 14) is apparently quite proud of his role as IBM's little brother. In these days of investigations of conflicts of interest, the acceptance of a foreign trip as IBM's "Data Processing Executive of 1975" should cause his present and any future employers to examine closely any of his recommendations to further increase his big brother's "market penetration." I am quite sure BancOhio Corp. would not be overjoyed at the prospect of its customer base switching their business to the Bank of America to avoid the stigma of becoming "losers," [since BancOhio is not the "big brother" in the banking industry].

JOHN J. SPELLMAN
Roper Corporation
Systems/Programming Manager
Outdoor Power Group

Is certification premature?

Ms. Miller's reply to Mr. Ray (October p. 7) appears to rest her case for certification of dp practitioners on the precedent of other practitioners, which she attributes to public demand that they (CPA's, lawyers, etc.) have their competence certified to provide public assurance of their qualification to practice.

If one were to study the history of CPA certification, admissions to the bar, etc., I strongly suspect that the motivations behind those programs had little to do with public demand for qualified practitioners and much to do with a desire on the part of the practitioners to protect themselves from undue competition from too many practitioners.

At the time of this writing a local furor is raging over the failure rate for the Utah Bar exam. The administrators of that exam have been accused of elevating the failure rate to restrain local competition in the legal profession. Whether this accusation is true or not is beside the point, which is that the bar exam is publicly viewed locally not as a device to protect the public from unqualified lawyers (although we have our share of such around here), but as a device to protect established lawyers from competition from aspiring ones not yet established.

If this is a more accurate view of the history of certification programs in other professions, then the question of the relevance of those precedents to our situation requires very close attention.

letters

An even greater problem, in my opinion, is that other professions are possessed of a body of professional knowledge which defines the discipline associated with the profession. We have as yet no such discipline, nor a body of professional knowledge which comes very close to defining one. Until that body of knowledge is defined, a certification program seems premature.

R. W. PRATT, CDP
Data Base Administrator
Salt Lake City, Utah

S/3 Programmers

The claim is made in the September news item, "S/3 Programmers Anyone?" (p. 176), that the Los Angeles Urban League Training Center is "what may be the first training school for IBM System/3 programmers."

We at San Antonio College would like to backdate the claim by a few years. In September 1971 a System/3 was installed in the student laboratory of the Data Processing Department. Since then, we have had 155 "Associate in Applied Science in Computer Programming" graduates from our training program. Most of these students were trained to program and operate the System/3 as a part of their degree plan. In addition, they were all trained to program the IBM System/370 in BASIC, COBOL, FORTRAN, and ASSEMBLER. Many of the graduates were also trained to operate the System/370.

MERLE VOGT
Associate Professor
San Antonio College
San Antonio, Texas

Safegard (not the soap)

Relative to Mr. Oliver Cairns' letter and your response (September p. 8): The origin of the Safegard data encryption package is not unknown or even disputed. In fact, I wrote the Safegard package in 1972 with assistance by Mr. Melvin Sabel while developing a budgeting application concerning the New York State Univ. system. Safegard and several other packages were subsequently acquired by Computer Linguistics which is actively supporting, maintaining, and marketing Safegard.

How Bell Labs became even remotely connected with the product is still a mystery to me. Such a false rumor certainly was not started by any of the CLI staff. As I recall, Bell was remotely associated through Western Electric with the Safeguard anti-ballistic missile project but neither CLI, Digital Solutions, nor Safegard was. There is also a soap named "Safegard," but this connection seems unlikely.

As Mr. Cairns states, HEW has not endorsed Safegard for their or anyone else's use, as is their policy. However, several civilian government agencies have endorsed the encryption technique in order to partially satisfy the data security provisions of the Privacy Act of 1974. In fact, an FDA memorandum concerning "Assessment of Standards for ADP System Security" states:

"Under certain circumstances of high risk, data encryption may be needed for the protection of personal data in networks. However, determination of the need to encrypt data is the responsibility of the System Manager."

This, combined with a customer list which includes HEW, NIOSH, FTC, Army, IBM, UPS, Xerox, and Mutual of Omaha, among many others, speaks for itself. I would appreciate your setting the record straight on this entire issue.

STEVEN S. HERRICK
President
Computer Linguistics Inc.
Albany, New York

SDS Fortran legacy

The principal FORTRAN capabilities which Dennis Merrill suggests in the October Forum (p. 191) for improving program structure were available to SDS (later Xerox Data Systems) Extended FORTRAN IV users in the sixties. The restriction regarding single expression execution as a result of a logical IF statement was eliminated by Extended FORTRAN's "compound statement." With this feature, the example used by Mr. Merrill could be written:

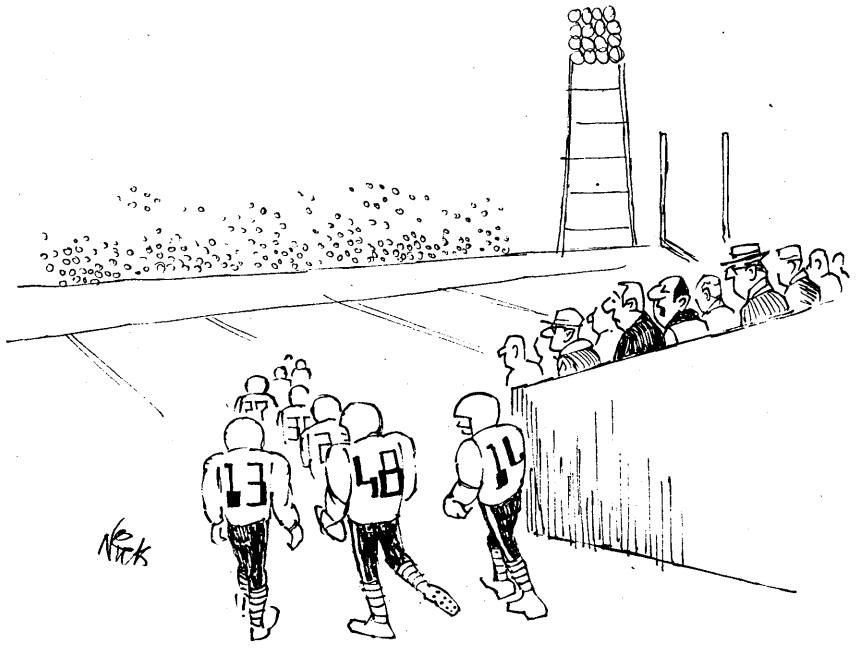
```
    IF(I.EQ.J) A=B+C;
    D=E+F; GO TO 10
    U=V+W
    X=Y+Z
10 CONTINUE
```

While this structure still utilizes an "infamous GO TO statement," the logic flow is much cleaner than standard FORTRAN's double GO TO configuration, and no more complicated than the implied GO TO at the end of Mr. Merrill's DO 10 block. Further, XDS Extended FORTRAN's REPEAT statement had both a REPEAT . . . FOR and a REPEAT . . . WHILE capability, which greatly expanded the flexibility of the DO type loop while at the same time permitting substantially less cluttered coding.

That these concepts should be incorporated into ANSI FORTRAN in one manner or another is clear. That the company which promoted such desirable FORTRAN features threw in the data processing towel, should serve to signal that we may be in for a long wait.

TED HEITHECKER
Manager, Metal Buildings Dept.
Synercom Technology, Inc.
Houston, Texas

DATAMATION welcomes correspondence about the computer industry and its effect on society, as well as comments on the contents of this publication. Letters should be typed and limited in length to 250 words, if possible. We reserve the right to edit or select excerpts from letters submitted to us. Write to 1801 S. La Cienega Blvd., Los Angeles, CA 90035.



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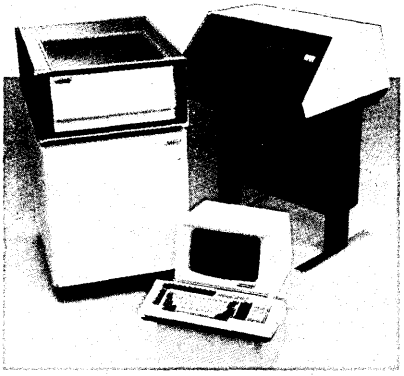

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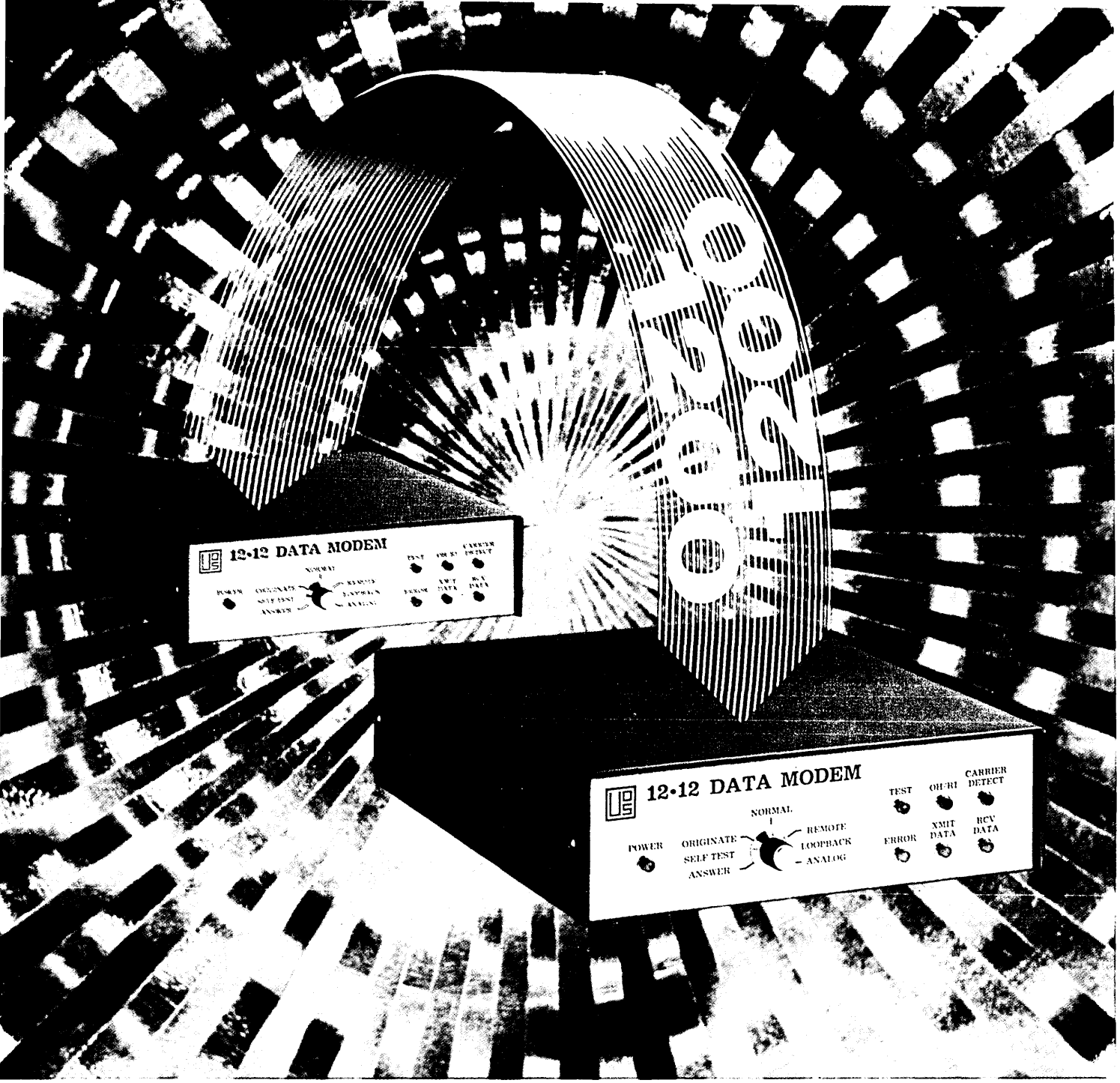

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CIRCLE 65 ON READER CARD

people

Selling Terminals And Ex-IBMers

Being Director, International and OEM marketing for Courier Terminal Systems Inc. makes Bob McGrath a busy man. Lately he's been traveling a lot, setting up marketing programs for Courier in Asia, the Far East and Central and South America.

But he still finds time to be president of his own company, Ex-IBM Corp., an enterprise he started in 1970. McGrath resigned from IBM in January 1970 after 16 years with the firm he still admires but finds it difficult and a challenge to sell against. All his years with IBM were in sales related jobs with the data processing division. Ex-IBM started with the IBM Alumni Directory (May 1972, p. 139) but it's much more than that now.

Ex-IBM not only distributes its IBM alumni directory, now produced every six months as opposed to quarterly when it first came out, but a major league sports alumni directory, numerous training films, computer related books, labels of IBM alumni, and IBM alumni directory supplements sequenced by company and/or zip code and title.

McGrath insists Ex-IBM is a hobby. It's one he doesn't want to give up. His most recent job change came early in 1976 when he joined Courier. He had been head of the international department of Action Communication Systems, Inc., Dallas. A management change there made him want to leave and he had a number of possibilities open to him. One that was quite promising in many ways, he dismissed because it "was apparent he couldn't keep Ex-IBM going."

Why did McGrath leave IBM? "I finally realized that nothing I did for the company really made much difference." He was a national accounts manager in Cleveland at the time. He and his family headed for Dallas because "I had a brother-in-law there." He was also fleeing cold weather. McGrath graduated from St. Bonaventure Univ. in Olean, N.Y. which he describes as "snow country. I've been running away from snow ever since."

In Dallas he set himself up as a sales training consultant. He was well qualified having run sales training programs in Europe for IBM World Trade for several years. That's where he helped develop the training films he now sells under the Ex-IBM umbrella.

As a consultant, he learned that "risk is a two-headed coin," and he opted for tails, joining Recognition Equipment Inc. in September 1971 as international vice president. He describes his activities in this job as "pushing bacon, eggs, and selling tips."

He left REI to join Action Communication Systems, Inc. in September of 1973. ACS was just beginning to think international. The company was exploring various avenues for marketing its Telecontroller programmable communications processor systems and its Watsbox long distance telephone cost-control system overseas. The job was handed to McGrath.

When he left ACS and moved from Dallas to Phoenix where Courier is headquartered, the trip was typical of

BOB McGRATH
. . . a printing press for sale.

the activities of Ex-IBM which has become something of a family enterprise. En route between the two southwest cities the family was getting out a promotional mailing. "As we collated, stuffed and sealed, we mailed. Some were mailed from Albuquerque, some from Santa Fe or wherever we happened to stop."

Ex-IBM doesn't have any employees if you discount the McGrath family but it does have capital equipment. The company owns a plate maker, a slicer, a folder and a printing press. The latter is up for grabs. It's a desktop sized device McGrath would dearly love to sell. He used it for two issues of the IBM Alumni Directory in 1975 and "got more ink on myself and in splotches on the issues" than where the ink should properly have gone.

His children, he says, are a big help in getting his directories and his mailings out. His daughter types labels and her young brothers help with folding and collating. The IBM Alumni Directory which originally came out quarterly now comes out twice a year. Each one, he says, contains more names than its predecessor. One of his biggest customers is the IBM library. His charges for the directory are $10 for a single issue and $14 for four consecutive issues. A company sequence supplement costs $14 as does a title or zip code sequency supplement but, "when it comes down to it, I'll take anything I can get."

McGrath sells his major league sports alumni directory for $5 per copy. He got into this two years ago as a result of a call from Mike Connelly, a Dallas stock broker who had heard about the IBM Alumni Directory and thought a sports directory would be something McGrath could handle. He could and did. It's now in its seventh edition. As with the IBM directory he started with known "alumni" who led him to others. Edition number seven contains 1,829 names of alumni of major league baseball and football teams.

With the IBM Alumni Directory, McGrath's first step was to write 25 letters to old friends still with IBM, outlining his project and asking their personal help in collecting names from their Christmas card lists and the like. The first reply came immediately. "Such requests should be sent to the home, dummy!" But the second one said, "I have tried to react to your request," and contained 152 names and addresses. The first issue with an eventual 717 names was off and running. The latest issue, number 17, contains 2,329 names.

McGrath doesn't do much to promote the directory beyond listing it among the things he offers for sale in occasional mailing pieces. But it sells up to 1,500 copies per issue. Who buys it? IBM alumni, of course but headhunters are a good market, says McGrath.

Maybe the next time he puts out a flyer, McGrath will add to his list of things Ex-IBM has to offer—one slightly used printing press.

The Three William Weksels

Bill Weksel, entrepreneur. Dr. William Weksel, Ph.D. in Communications and holder of an NSF fellowship to study psycholinguistics. Señor Weksel, master's degree in Spanish literature.

The three personalities seem to trip over each other but, for the moment at least, the businessman is leading. Bill Weksel took over Information Displays Inc., Mt. Kisco, N.Y., 18 months ago. IDI, a pioneer in graphics for 15 years, was in deep trouble. Costs

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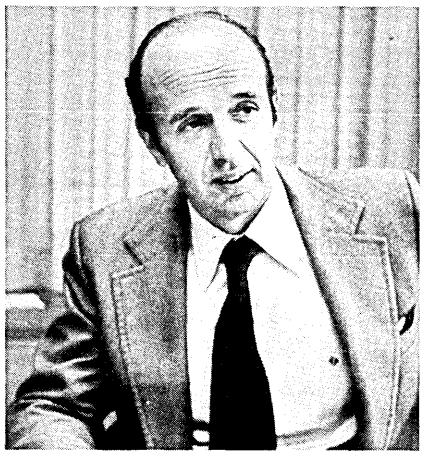
people

were out of hand, debt was mounting, and marketing had fallen off to a hit and miss proposition. In that short period, Weksel renegotiated the debt, slashed the administrative and staff overhead, reorganized marketing and



DR. WILLIAM WEKSEL
Restoring business sanity

has put the company back on the road to profitability.

Once a leader, (IDI's IDIOM system was recognized as just about the best system available in the '60s) the company had lost its technical leadership to newer and more aggressive competitors. Worse, it gradually had become ensnared in the university-oriented, one-of-a-kind type of graphics system that make for interesting reading but very little profitability.

A key element in the industrial process is the creation and modification of engineering drawings. There is nothing very glamorous about this. It's slow, tedious and labor-intensive. It is this arena into which Weksel has taken IDI, using a computer-based system to increase the productivity of a draftsman. The key is being able to change an existing drawing in a hurry. At least 60% of all board work involves modifications. It has long been known that the retrieval and display characteristics of a digital computer are appropriate for the job. What was missing was the ability to get it done in a cost effective manner. IDI's new systems are pointed in this direction.

The technology is expensive but IDI has paid its dues. The refresh graphic technology is established. The FORTRAN-based software is well established. The system will run on its own, Weksel says, without a massive mainframe for support. "Draftsmen have to be taught that the transition from an eraser to a light pen is not nearly as traumatic as they might think."

Weksel (his linguistic background keeps sneaking through) has long been interested in problems relating to having a graphics system speak to users in their language. But, he says, it has taken years to get people to understand that such a system needs to be complete. "A partial system is of little use."

Weksel, previously with IBM, Ampex and The Diebold Group as well as having had a fling in his own microfiche company, came to IDI to salvage "a company in trouble." He's gotten past the first hurdles. IDI is intact and its technical reputation is unimpaired. Now he must prove that the marriage of graphic technology to the commercial world can generate growth revenues. He says that ". . . to succeed in this business you have to be able to bring your technology out of the ivory tower and down to the marketplace. IDI was in the clouds so long it almost disappeared. Fortunately it never lost its technology." Now Weksel is restoring business sanity.

Selling ADAM

Stan Bootle lays claim to having sold "literally untold millions of dollars worth of computing equipment" in Europe.

Now he's trying to sell ADAM (November 1975, p. 164) in the U.S. ADAM is described by its manufacturer, Logical Machine Corp. of Sunnyvale, Calif., as "the self-organizing business computer." It was the creation of an Englishman, John Peers, so it's probably fitting that another Englishman, Bootle, should help sell it.

Bootle sold in Europe for Redifon Computers, Ltd., Sperry Univac, Singer and IBM. He's a graduate of Cambridge Univ. where he obtained honors in math.

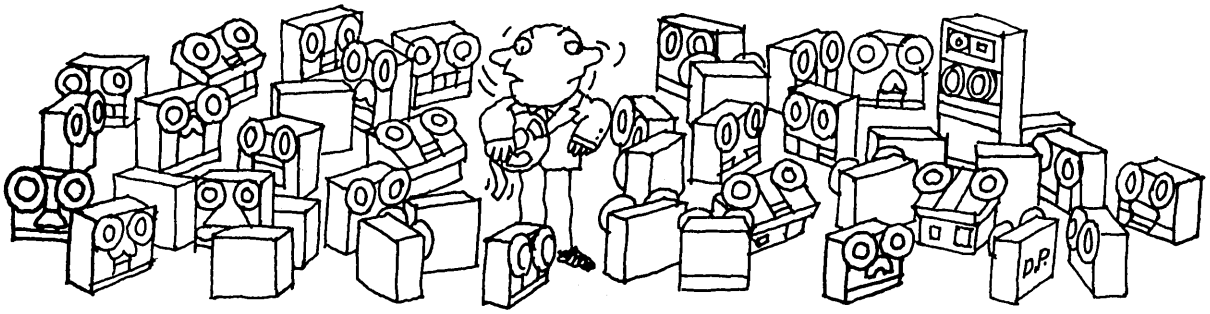
Selling computers isn't his only claim to fame. Under a nom-de-plume, Stan Kelly, Bootle has become well known as a folk singer and songwriter. His "Liverpool Lullaby" was recorded by eight different artists. He co-authored a guide book to the Liverpool dialect called "Lern Yerself Scouse" which now is in its 13th edition. He also has written a book on soccer chants and songs called "The Terrace Muse."

Maybe he can make ADAM go.

STAN BOOTLE
AKA—Stan Kelly

In New Posts

RONALD R. NICKBARG has been named vice president of operations for Microdata Corp. . . . FRANK A. FIESER was elected to the newly created position of vice president-management information systems for The Clorox Co. . . . NESTOR M. DE ARMAS was promoted to vice president of finance at Florida Software Services, Inc. . . . NICHOLAS W. CARDELL was appointed vice president and general manager of international marketing for Bunker Ramo Corp.'s Information Systems Div. . . . ROBERT COLTEN, formerly director of corporate planning at Ampex Corp., joined Input, a Menlo Park, Calif. management consulting firm, as director of research . . . ROBERT B. MC FARLAND was appointed a vice president of Dataproducts Corp., Woodland Hills, Calif. and was assigned responsibility for operations of the company's memories and printer groups in Sunnyvale, Calif., Dublin, Ireland, and Hong Kong . . . ROBERT D. RANCK was promoted to vice president of business development at Datatrol, Inc., Hudson, Mass. . . . Directors of Harris Corp., Cleveland, O., elected JOHN T. HARTLEY, JR., previously vice-president-group executive, to the newly created post of executive vice-president . . . TOM MC CRYSTAL was appointed director of marketing for Epic Data Sales Ltd., Vancouver, B.C., a newly formed subsidiary of Ebco Industries Ltd. . . . DAUSE L. BIBBY, former chairman and chief executive officer of Stromberg-Carlson Corp., was elected chairman of the board of directors of Decision Data Corp., Horsham, Pa. . . . NORMAN D. HELLER was named director of systems development in the marketing department of Microdata Corp. . . . Zircon Co., Inc., Marblehead, Mass., appointed BENJAMIN J. COHEN corporate vice-president in charge of software development for its Management Systems Program . . . BRUCE VAN ATTA, associate director of the Computer Center at the University of Rochester, received the Association for Computing Machinery's (ACM) Outstanding Contribution Award. ❁



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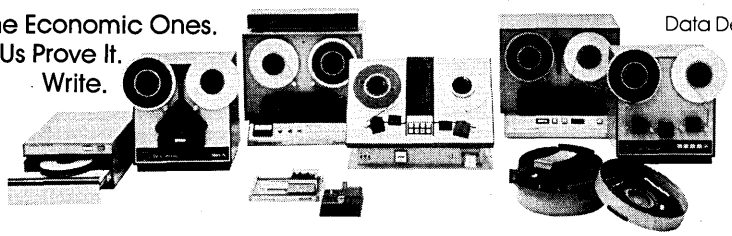

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CIRCLE 48 ON READER CARD

LOOK AHEAD

MORE EFFICIENT USE OF MEMORY IN RUMORED IBM LINE

One of the more detailed, if not wild, rumors concerning IBM's future offerings suggests they'll be evolutionary upgrades of the 370 line, rather than revolutionary products as was indicated in the now abandoned Future Systems line. Replacing the 370/115 and 125 will be a model 231. The recently-announced 138 and 148 will be followed by a 241 and the 168 by a 258. Rental prices will range from $7K/mo. for the 231 to $35K/mo. for the 168. Other versions of the 168 also are rumored: a 268 with three times the power of the 168, renting at $55K/mo., and an even more powerful 278 renting at $85K/mo. Memory size for the 138 and 148 replacements is 2 megabytes. Four megabyte memories are mentioned for the 258 and 268 and 6 megabytes for the 278.

The rumors are circulating overseas. IBM has followed its customary practice and is refusing to comment on speculation of future product announcements. According to the rumors, the new offerings will be announced late in the first quarter of 1977 and are to be shipped six months thereafter. The fixed size memory probably will be built in such a way as to prevent foreign attachments. The smaller size of the memories also suggest that IBM has decided to make much more efficient use of memory, probably using microprocessor-based devices for back and front end tasks.

According to the rumors, DOS/VS disappears and is replaced by VM/OS/VS3. That would reflect the fact that small customers in the 135-148 range are happily running VM today, much to the surprise of many who thought of it as a big machine system.

IBM IN SERVICE BUSINESS--SETTING THE SCENE

Now that the mini makers have seen the reality of the IBM Peachtree threat the next group that must wait and worry are the service bureaus. In 1979, the ban on IBM's reentry into the services business will be over. (A six-year moratorium was imposed in the IBM-Control Data antitrust settlement.) Rumbles are that IBM is studying the how and when of reentry, not the whether.

The big question mark in IBM's plans must be the implementation of Satellite Business Systems. Experts are speculating that, using this facility, IBM will go for big network services. Emphasis, they guess, will be on targeted proprietary software packages, on entry level customers, and on high-level security--if the user stays with IBM from the remote system to communications to host processor. Such services could be a big boost to IBM's General Systems Div. GSD products like the System 32, Series/1, and 5100 (or their upgrades) not only could become part of the network's offering, but they also could be sold to customers who outgrow the service and want to obtain their own processors. The large service bureau, Automatic Data Processing, already has a similar strategy, using Microdata minicomputers.

Those who want to watch IBM's evolution in services before 1979 should look to Europe and Canada, where, we're told, IBM has been testing many concepts that will be imported to the U.S. One trend in the last year is the increasing emphasis on remote computing services and proprietary applications software.

IBM SERIES/1: OUTSIDE IDEAS AND INSIDE MARKETING

IBM's reputation as a highly efficient sales machine isn't about to be tarnished with the giant's invasion of the minicomputer market. A source in on the buy at Citibank, New York, says that "as near as I can tell, these salesmen are the really good ones from everywhere within IBM--the guys who have been able to sell the big accounts successfully." As for what they will be selling, our source says the engineering talent behind the machine "came from many, many outside companies."

The "how" of the sell is as interesting as the product itself. "Discounting is an issue that has raged within IBM for years," says Frederic G. Withington of A.D. Little, "and declining, at least at the outset, to discount will preclude IBM from the high volume iron business." Companies such as Computer Automation would seem to be nearly unaffected by the announcement because they sell tremendous volumes of minis to a relative handful of customers.

Dick Anderson, general manager of Hewlett-Packard's Data Systems Div., responsible for the manufacturing of the 21MX mini, and real-time systems like the recently introduced System 1000, was surprised IBM didn't use the Series/1 announcement to replace the aging, expensive System/7. "If IBM was really serious about the sensor-based market, it sure didn't dent it with the System/7, and now it's starting over with the Series/1. I hear IBM is down to building one System/7 a month." Anderson

LOOK AHEAD

feels the Series/1 might not move well except in installations with IBM-only purchasing policies for two reasons: the lack of discounts and the bland performance. And the lack of a single high-level language doesn't help. "Wow--it's 1965 again," says Anderson.

In addition to "blue room" installations, IBM might do surprisingly well in very small order systems house installations. One DEC customer, a successful implementor of high-ticket banking systems, has been screaming at DEC to get better account service, but feels that since he buys fewer than 20 systems per year, he has no "pull" at DEC. Discounts in these situations aren't nearly as important as the multi-hundred, or thousand unit deals, and the IBM market entry gives this buyer both a choice--and some leverage with his vendor.

PROCESS OF ELIMINATION

Among the projects of the Senate's Rules and Administrative Subcommittee on Computer Services are two which aim to eliminate. One would eliminate some letter writing and the other could eliminate some Senate committees. Sen. Howard Cannon of Nevada, chairman of the subcommittee, says the Senate post office handles some one million letters per month.

His subcommittee's project would come up with a computer based system which would compose answers -- prearranged text with specific answers to specific questions which would be personalized. The system also would keep track of what people wrote about what issues and would see to it they are kept informed of what is happening with these issues. A second project is in support of a Senate committee to study committees. This group is supposed to determine an ideal number of standing Senate committees with a goal of cutting down the number of assignments each senator has -- currently an average of 20 apiece. Cannon's group is helping with a computer model which asks such "what if" questions as, "what if we had no committees at all."

IT'S COOL

"The District Attorney has said Valcomp is innocent and no Valcomp employees were charged with anything," said John Cool, president of the Westlake Village, Calif., subsidiary of Tymshare Inc., a computer refurbishment firm. He was talking about an alleged theft of $8.7 million worth of computer circuit boards and memories investigated by the D.A. beginning last July. Valcomp premises were searched at that time and a Valcomp employee was questioned. Cool said Valcomp, in the meantime, has been growing, from 50 employees early in the year to a current 70, helped by a contract from Ampex Corp. under which it supports with parts and maintenance all out-of-production Ampex tape drives worldwide.

IN COURT AND ON THE BLOCK

Martin Wolf Inc., San Diego supplier of small business systems, moved quietly into Chapter XI when the California First National Bank, a subsidiary of the Bank of Tokyo, called a $440,000 note. Just as quietly, two prospective buyers last month were talking purchase of the assets, which a source close to the company said were only $1000,000 less than the $1,370,000 total indebtedness of Martin Wolf at the time of the filing. The company's systems, of which some 120 to 130 are installed, were billed as totally turnkey and totally usable by non-computer personnel.

THE HIGH PRICE OF TESTIMONY

Computer consultants Frederic G. Withington, of A. D. Little, and Felix Kaufman, of Coopers & Lybrand, will testify for the government against IBM for a fee of $700 a day. The Justice Dept. issued contracts to the two men last Nov. 11, and in late November their lawyers were seeking clarification of some clauses in the contracts from the Justice Dept. Both had balked last summer when called to testify because they said proprietary company information would be involved and that they couldn't be forced to testify against their wills without being compensated. Kaufman said his daily rate was $150 an hour. Withington fixed his daily fee at $110 an hour. They won their case before a Federal appeals court last July 8.

The Justice Dept.'s antitrust trial against IBM is in its 19th month. Justice Dept. spokesmen said the two consultants will be paid for time during interviews before going to court, during court, and later for the time it takes defendant IBM to question them. The usual rate paid for testimony in such cases is $30 a day.

(Continued on page 174)

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Check out this team for yourself.

One of the nice things about the Computer Giant is that he publishes so much helpful information for data-processing people.

Take the article called, "A guided bibliography to sorting," by H. Lorin, which appeared in the *IBM Systems Journal.** It contains the best description we've ever seen of what it takes to make a top sorting team:

> "Developers of sort systems must be thoroughly familiar with the characteristics of the hardware of the sorting machine, they must be knowledgeable in program generation techniques, competent in program optimization and balancing methods, familiar with design technology and the operating system and I/O areas, as well as being competent sort specialists. In addition, since the performance of a sort is critical, a sort development team must be competent to undertake extensive prediction, analysis and test of their product's performance characteristics."

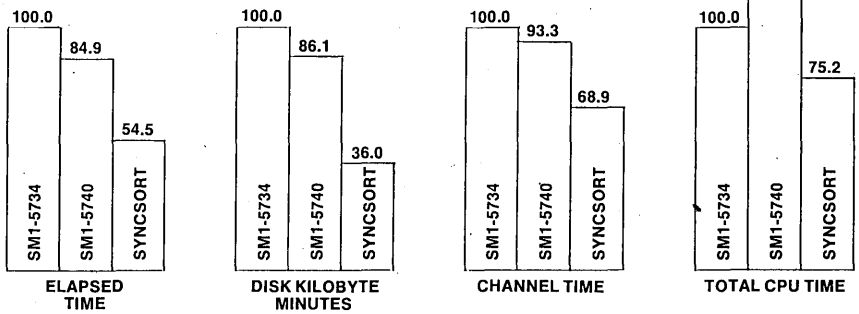
Why that's a perfect description of *our* people! That's what they do all the time — develop SyncSort, the best high-performance sort on the market today, and then test it against the competition. That is to say, IBM.

*Volume Ten, Number Three, 1971.

The last time this happened, we matched our SyncSort III-and-half against the Hardware Manufacturer's SM1-5734 and SM1-5740 (PEER/ICEMAN).

Frankly, the results weren't even close. IBM sent its own MF-1 monitor to evaluate the tests, and a human observer to make certain that everything was according to Hoyle. But all to naught.

SyncSort performed better than the other two sorts in every category, as illustrated below:



OVERSEAS REPRESENTATIVES —

CAP-Gemini/CES, Brussels; CAP-Gemini GMBLL, Dusseldorf; CAP-SOGETI, Geneva; CAP-Gemini/Pandata, London; Syntax, Milano; CAP-Sogeti Prodvits, Paris; BRA, Stockholm; Advanced Technology, Tel Aviv; Shell Oil Co.of Australia, Melbourne; Deltacom Do Brasil, Sao Paulo.

Do we have some kind of magic formula? Well, we *do* have a few Top Secret and very scarce ingredients that go into every sort: intelligence, imagination, experience and hard work.

We call 'em the four horsemen.

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More computer power for your dollar.

The SEL 32 family of high performance 32-bit computing systems offers a balance between big computer performance and minicomputer prices. Microprogrammable input/output processors, compatible central processing units, high-speed memory systems, and efficient data processing peripherals make up the hardware elements. On the software side, operating systems, language processors, libraries, application packages, and interactive terminal support balance the scales. Together, SEL 32 hardware and software provide a cost-effective solution to your current requirements, with expansion capability to meet your growth needs.

The SEL 32/35 is the strongest price-performer of any 32-bit single or multiple-CPU system available today. These computers can be configured from 64K bytes to 512K bytes of 900 nsec memory. Resembling its more powerful brothers, the SEL 32/35 is a complete package, including central processor with floating-point arithmetic, memory, chassis, power supplies, and cabinet.

The SEL 32/55, offered in a variety of both single and multiple CPU configurations, can be configured from 32K bytes to 1 million bytes of 600 nsec memory.

The SEL 32/50 is a single chassis computer providing the same CPU, I/O, and memory capability as the 32/55, but for dedicated applications.

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calendar

JANUARY

Semiconductor Memories and Magnetic Bubble Devices, Jan. 12-13, Teaneck, N.J. This tutorial conference is designed for professionals in computer science, electrical engineering, and physics. Recent developments and applications of memory technology will be presented by leaders in the field. Fee: $85. Contact: M. J. Sablik, Physics Dept., Fairleigh Dickinson Univ., Teaneck, N.J. 07666 (201) 836-6300.

Symposium on Automated Production, Storage, Retrieval and Display of Digitized Engineering Data, Jan. 13-14, Monterey, Calif. Papers on I/O devices for engineering design, software and data management of engineering data, and standards for automated engineering data will be presented. The meeting is sponsored by the Naval Ship Weapon Systems Engrg. Station and the Naval Postgraduate School. Fee: (includes proceedings) $40, government employees and military; $75, nongovernment. Contact: Dr. P.C.C. Wang, Code 53Wg, Naval Postgraduate School, Monterey, Calif. 93940 (408) 646-2206.

Decision Support Systems Conference, Jan. 24-26, San Jose. Business and government representatives will discuss developments of computer aids to decision making. Systems currently in use (in manufacturing, banking, urban planning and military planning) will be described. The meeting is sponsored by IBM Research Div., Sloan School of Management, Wharton School, and the SIGBDP group of the ACM. Fees: $45 for persons connected with the sponsors, $55, others. After Jan. 10 add $10 to each fee. Contact: Eric Carlson, IBM Research Div. K54/282, 5600 Cottle Rd., San Jose, Calif. 95193 (408) 256-6431.

FEBRUARY

Spring Symposium, Int'l. Word Processing Assn., Feb. 1-3, Chicago. Approximately 80 booths will display equipment and associated products in the word processing field. The exhibit is free. Registration fees for the technical sessions and workshops are $125, IWP members; $150, nonmembers. Contact: IWP, Maryland Rd., Willow Grove, Pa. 19090, (215) 657-3220.

MEDCOMP Congress, Feb. 7-9, Berlin. Originally scheduled for late November 1976, (and covered in this column in the October issue) this is the first in a proposed series of international conferences to examine the role of computers and computing techniques in the fields of medicine and public health. Conference languages will be English and German, with simultaneous translation available. Information is available from Online, Cleveland Road, Uxbridge, Middlesex, England.

Telecommunications Workshop, American Bankers Assn., Feb. 13-16, Atlanta. Responding to a survey which indicates a need for central planning of telecommunications needs and for more industry-related information, the workshop, sponsored by the Operations and Automation Div., is directed to telecomm professionals in banks throughout the country. The program is being developed from topics submitted by the attendees. Contact: Arnold L. Kaplan, ABA, 1120 Connecticut Ave., Washington, D.C. 20036 (202) 467-4332.

IEEE Int'l. Solid State Circuits Conference, Feb. 16-18, Philadelphia. News of advancements in solid state circuits will highlight this meeting; papers will be presented on the design, performance, testing or application of solid state circuits and systems in a variety of fields, including computers, communications, health and government, consumer, transportation, environmental and industrial electronics. Advance fee: (estimated) $35, member; $40, nonmember. Contact: Lewis Winner, ISSCC, 152 W. 42nd Street, New York, N.Y. 10036 (212) 279-3125.

COMmunity '77, Feb. 21-25, Houston. The 9th annual Computer Micrographics Technology members' conference will offer a pre-conference seminar for the new or prospective user. Other seminars will be directed toward business COM, COM-related photocomposition, and COM graphics for business and scientific applications. User group forums and a standards forum are also scheduled. Fees: pre-conference seminar Feb. 21, $95; four-day conference, (Feb. 22-25) $100, includes a year's membership. Contact: John Heep, Xidex Corp., 342 Countryside Dr., Roselle, Ill. 60171 (312) 894-8420.

Symposium on Design Automation and Microprocessors, Feb. 24-25, Palo Alto. Sponsored by the design automation groups of the IEEE and ACM, this meeting will include papers, invited talks, and informal discussions. Fee: $40, members; $50, nonmembers. Contact: W. M. van Cleemput, Digital Systems Lab., Stanford Univ., Stanford, Calif. 94305 (415) 497-1270.

COMPCON '77 Spring, Feb. 28-March 3, San Francisco. "System Design—A Discipline in Transition" is the focus of this meeting, discussing causes and implications of changes in design, and future of system design. This is the 14th IEEE Computer Society international conference. Fees: $100, members; $130, nonmembers. Contact: IEEE, P.O. Box 639, Silver Spring, Md. 20901 (301) 439-7007.

ON THE AGENDA . . .

Computer Workshop, Interactive Computer Graphics in Engineering Analysis and Design, Jan. 10-14, Tucson, (602) 884-3054. **10th Technical Symposium, Feb. 4,** Los Angeles. ACM, P.O. Box 90698, Los Angeles, Calif. 90009. **6th Annual Communications Conference, Howard Univ., Feb. 17-20,** Washington, D.C. (202) 636-7690. **INTERFACE '77 Data Communications Conference and Exposition, March 28-30,** Atlanta, (617) 879-4502.

CALL FOR PAPERS

Trends and Applications 1977: Computer Security and Integrity, May 19, Gaithersburg, Md. Tutorial papers which describe practical experiences with design or implementation, or which present new research results, are solicited for this meeting to be held at the National Bureau of Standards. Sponsored by the NBS and chapters of the IEEE Computer Society, the conference will concentrate on information management practices, privacy impact and implementation, dp auditing, data base protection, applications security, protection architecture, identification and authorization, encryption, and network controls. Authors should submit three copies of a 1,000 word abstract by Jan. 15 to John W. Benoit, MITRE Corp., Westgate Research Park, McLean, Va. 22101. For additional information contact Steven Tsakos, (301) 953-7100, ext. 7225. ❋

the day our dream came true.

Electronic Memories and Magnetics went into business with the dream of becoming the top add-on memory house in the business. It took over fifteen years of experience to plan for and realize that dream. Through good times and bad. Through many dramatic changes in the computer business.

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We reached our new position the day we took over the Cambridge Memories 360/370 add-on memory lease base. EMM achieved this position by more than doubling its add-on memory installations worldwide. More users and computer manufacturers are now using EMM memory products than those of any other independent add-on memory firm.

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This most recent addition is but another step in our carefully planned program of vertical integration. It has enabled EMM to better satisfy most add-on memory requirements from basic semiconductors to large capacity units.

The all around add-on memory package.

Our present leadership position is no fluke. It is the result of our experience and our responsiveness to your changing needs for add-on memory availability. This experience enables us to manufacture products of exceptionally high reliability, offer complete compatibility with all major 360/370 products, provide pricing for *your* needs as well as ours, present imaginative lease or purchase financing plans, and make available round the clock/round the year worldwide service for an impressive list of quality customers.

A statement of commitment.

EMM's commitment to the add-on memory market is more than talk. It's the way of thinking and doing business that got us to the top. It was born in a dream. Tempered by the crushing demands of the marketplace. And motivated by the pride and the profit that results from serving you best of all. In fact, it has grown stronger with our progress. Beginning now, we will periodically issue "statements of commitment" to keep you informed of new developments regarding our activities on your behalf.

It's tough at the top.

Electronic Memories and Magnetics is now tops in add-on memories for very sound reasons. Not the least of which is the most complete add-on memory package in the business. We know it won't be easy to maintain this position. It will require continued close attention to your needs and a broadening of our commitment to excellence. But way back at the beginning of our dream, no one ever told us being tops would be easy.

Find out how our dream can fit into your requirements. Call your regional EMM sales office. Eastern (201) 845-0450. Central (312) 297-3110. Western (213) 477-3911. Europe: Bad Homburg, West Germany 06172/6094.

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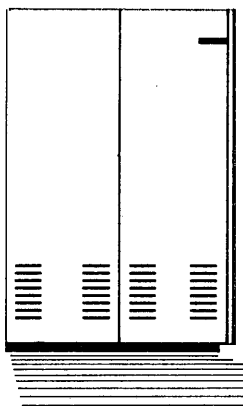
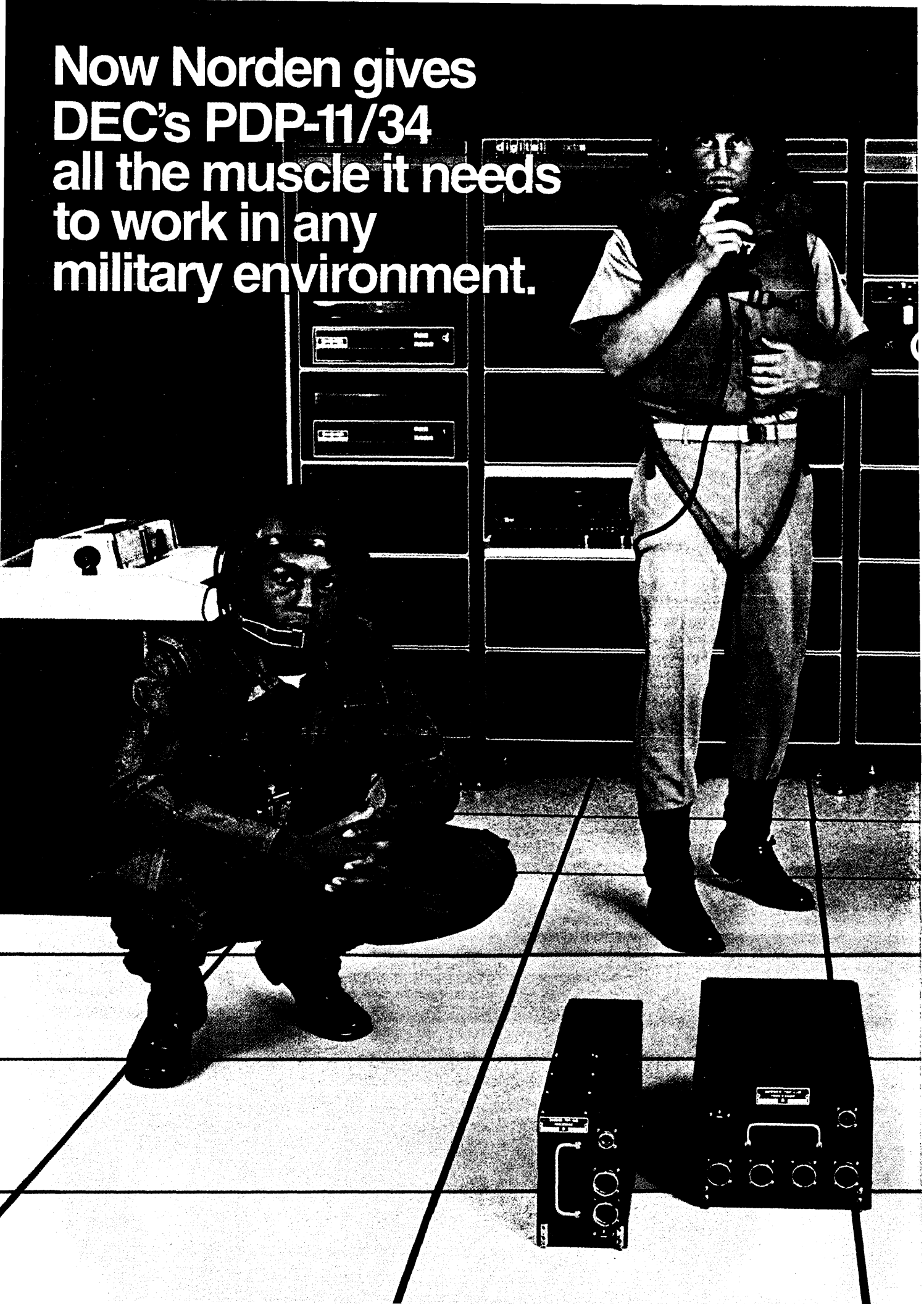


CIRCLE 10 ON READER CARD

Now Norden gives DEC's PDP-11/34 all the muscle it needs to work in any military environment.



Announcing the new PDP-11/34M in half ATR and full ATR versions

First of a family of military computers to spring from the union of Norden's experience in high technology military electronics and DEC's leadership in minicomputers.

The PDP-11/34M has the muscle for severe environment operation, meeting airborne (MIL-E-5400), shipborne (MIL-E-16400), and land based (MIL-E-4158) specs. It's packaged in a compact half ATR chassis or a versatile full ATR chassis each with cooling and mounting options.

Fully compatible with PDP-11

The PDP-11/34M is completely compatible with DEC's commercial counterpart. Thus, the most extensive, proven software in the mini-computer industry is now available on a true military computer. Powerful, efficient operating systems cover single user, time-sharing, real-time, and multi-function choices included in RT-11, RSX-11, and RSTS/E. High level languages include MACRO-assembler FORTRAN, FORTRAN Plus, COBOL, BASIC and BASIC Plus.

Extensive features

The Norden PDP-11/34M comes with the extended PDP-11 instruction set (over 400 instructions); multiple register architecture; hardware stack processing; multiple priority level vectored interrupts; and integral direct memory addressing (DMA).

What's more, the PDP-11/34M can be configured with up to 124K words of byte parity core memory using 16K or 32K word modules, and with a memory management system for program protection—plus a floating point processor for high speed number crunching.

In addition, it boasts integral CPU and memory diagnostics. And large selection of peripherals and interfaces.

An unbeatable combination

Add it up and you get a military computer so muscular, so powerful, and so easy to use, it makes the others look like underachievers. To learn more, write or call Marketing Manager, Computer Products Center, Norden Division, United Technologies Corporation, Norwalk, CT 06856. (203-838-4471)

PDP-11 data processing with military muscle

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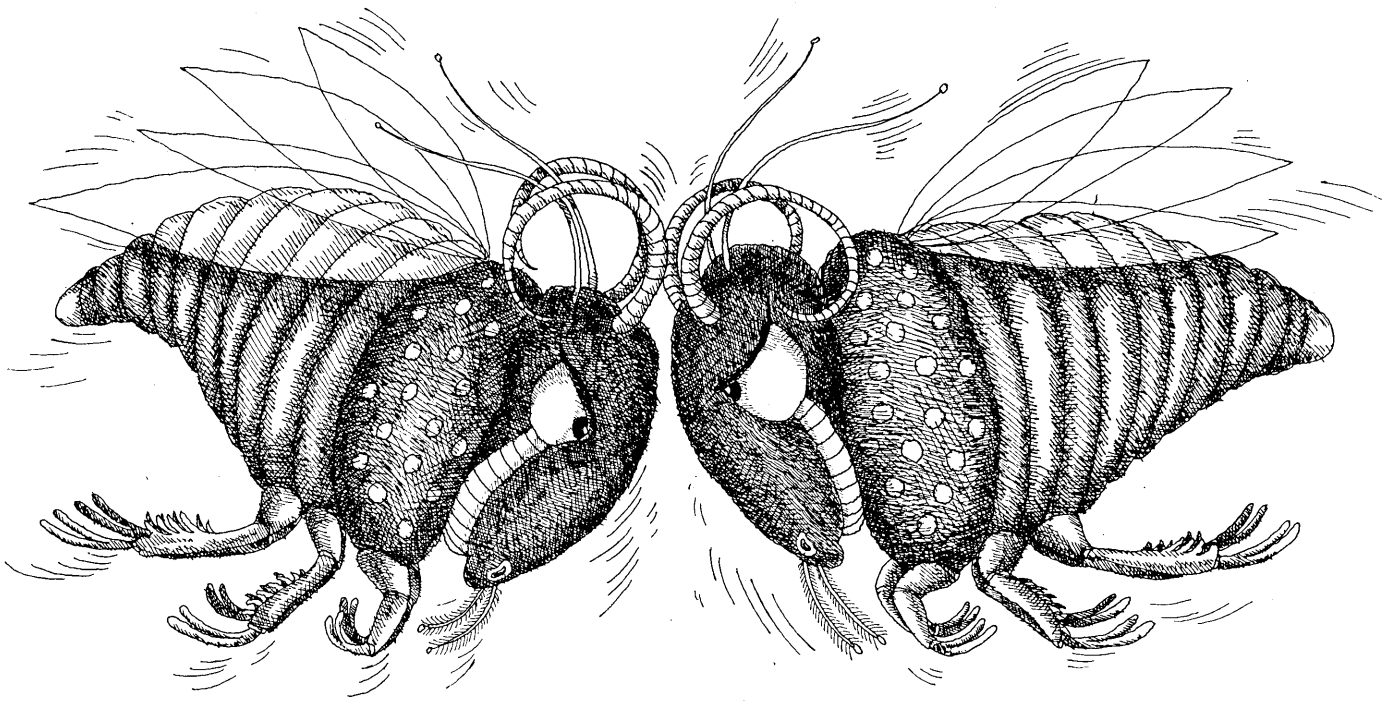
CIRCLE 66 ON READER CARD

The Head Crash Bugs.

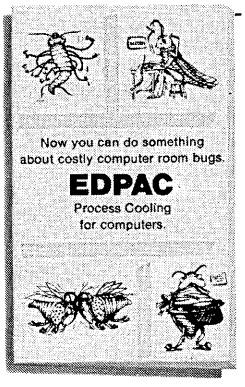


The right environment will control these costly pests.

When dirty air particles or extreme temperature changes happen in your computer room, it's open season for the Head Crash Bugs. That means expensive replacement costs and loss of computer time.

EDPAC Process Cooling Systems are specially designed to create precise, controlled environments that prevent such problems. So you can rely on EDPAC to protect your computer like no regular air conditioning system can.

Before the Head Crash Bugs cause more collisions in your computer room, contact EDPAC today! SEND FOR OUR BOOKLET. HOW TO GET THE BUGS OUT.



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books

Guidelines for the Dp Manager

Making Computers Pay

by John Graham
Halsted Press (Div. of Wiley & Sons), 1976
159 pp. $15.50

There is more wisdom buried in this slim volume than may be found by attending a year's worth of so-called management seminars. John Graham has distilled his 16 years of data processing experience, and boiled it down into a set of guidelines that any senior dp executive will find full of insights.

Many books have been written about the theoretical aspects of running a dp operation. These tomes, sometimes worthy but more often far too theoretical, preach the current "in" doctrines. The panacea-peddlers change their magic words every year or so. Once it was COBOL, another year it was PERT, lately it has been "structured programming" and data base. Graham tosses all these nostrums aside and suggests that "the rules for evaluating projects and monitoring their successful execution are no more complex or arduous than those required to manage other aspects of business." This may be a heretical view to those who earn their living explaining all of the technical ideas but it is precisely on target insofar as most senior dp executives and their bosses are concerned.

Graham has no hesitation about tackling some of the harder issues involved in the management of data processing. He attempts to dissect the centralization - decentralization fight and, by and large, succeeds in making the conflicting viewpoints clear even to the most nontechnical of managers. His explanations of such complex matters as data base, charge back, project control, system audit, and dealing with software contractors are straightforward and easy to follow.

While one may not always agree with his conclusions, he has laid out the problems clearly and noted some of the well-known but rarely stated snags. For example, he admits that data base may be expensive and slow, he says that there are political and cultural factors inherent in corporate organizations, and he admits that maintenance programming often gets out of control. Dp professionals know these things but only rarely have they been stated in a management book.

John Graham is writing for a U.K. readership. Financial information is given in pounds, spellings are English rather than American, and references and examples are to ICL hardware rather than the traditional IBM System/360. However, his basic style is so relaxed and easy to read that these minor differences are easily overlooked by the reader. It is rather surprising to see how few the differences really are between the U.K. and the U.S. when data processing is the subject; perhaps the only area where the discrepancy gets severe is in his analysis of dp costs. Relatively lower personnel costs appear in the U.K.; he might have to change his tables for the U.S. version.

> . . . he has laid out the problems clearly and noted some of the well-known but rarely stated snags.

The book is highly recommended for dp managers who want to look at both sides of the various problems. It is even more recommended for senior corporate managers who want to get a handle on what this data processing thing really is, how it can be managed, and what problems need to be faced.

—Philip H. Dorn

Mr. Dorn is an industry consultant and a contributing editor to Datamation.

The Compleat Computer

by Dennie L. Van Tassel
Science Research Associates, Inc., 259 E. Erie St., Chicago, Ill. 60611 (1976)
216 pp. $5.95 (paperback)

Dennie Van Tassel has been saving cuttings—articles, cartoons, poems—about computers, and has put the entire collection into a book. It is all interesting material, but presented in helter-skelter fashion. Thus, Fred Hapgood's *Atlantic Monthly* article "Computers Aren't So Smart After All," appears in exactly the same way as Art Buchwald's "The Great Data Famine." Both are good reading, but for different purposes and different moods. Similarly, Joe Weizenbaum's "On the Impact of the Computer on Society" and Arthur Clarke's "Hal Lobotomy" are both influential pieces of writing, but for vastly different audiences. To be sure, Van Tassel includes a caveat: the articles are excerpted, and you should look up the original. But when Weizenbaum's article on ELIZA is reduced to one page, what reader will look up the original? And if he doesn't, what impression will he then have of the purpose and methodology of ELIZA?

The point is that putting all this material together (interspersed with Doonesbury cartoons and the like from the popular press) without some sort of guide may add to the confusion about computers.

Every teacher of computing has had students make outrageous statements in class which they defend vigorously because they "read it in a book." If the book was *Astounding Science Fiction*, then there may be no problem. But what if it is *this* book, which has articles by Harry Huskey, Ruth Davis, Claude Shannon, and Peter Drucker (all very serious and authentic) together with staff-written articles from *Time* and *Fortune* (also serious, but of questionable authenticity), right down to science fiction itself? How is the reader (assumed to have little or no computer knowledge) to sift out truth from fancy? Perhaps the reader won't care, but computer people should care. A little editing, or editorial comment by the anthologist, would go a long way toward improving the book.

A minor note: how can someone in the computer field misspell Herb Grosch's name three times?

—Fred Gruenberger

A frequent contributor to Datamation, Mr. Gruenberger is professor of computer science at California State Univ., Northridge, and publishes the periodical "Popular Computing."

BOOK BRIEFS . . .

Program Validation
Pendragon House, Inc., 2595 East Bayshore Road, Palo Alto, Calif. 94303 (1976)
243 pp. $17.50 (paperback)

This is the final guide in the series of nine on the Evaluation of Programming and Systems Techniques, published by Britain's civil service department of the Central Computer Agency. All-path validation and structured design are the tools demonstrated for controlled and enforceable testing of systems components. The other guides are equally technical in nature, and include such titles as Implications of Using Modular Programming (no. 1), Automatic Flowcharters (no. 5), and Choosing Programming Languages (no. 7). A complete list and prices are available from Pendragon House or from government bookshops in Great Britain.

source data

Business Systems Techniques
by J. N. Chapple
Longman Inc., 19 W. 44th St., New York, N.Y. 10036 and Longman Group Ltd., London, (1976)
172 pp. $16.50

Systems professionals in business and public administration environments, where large and complex computer installations are commonplace, are the target of this well-organized handbook. Techniques in such basics as organization and systems development, oral presentation, writing of reports, financial evaluation, objectives and philosophy are presented clearly, with several examples and charts.

Compiler Construction, An Advanced Course (2nd Ed.)
F. L. Bauer and J. Eickel, eds.
Springer-Verlag, 175 Fifth Ave., New York, N.Y. 10010 (1976)
638 pp. $17.30 (paperback)

This is Vol. 21 in the 38 volume series, Lecture Notes in Computer Science, which reports new developments in research and teaching informally, and at a high technical level. Material includes drafts of original papers and monographs, lectures, seminar reports, and meeting notes. *Compiler Construction,* written by a number of experts, is organized into six chapters devoted to introduction, analysis, synthesis, compiler-compiler, engineering a compiler, and an appendix. Numerous tables, examples and references are included.

Conference Proceedings, 3rd Annual Symposium on Computer Architecture
IEEE Computer Society, 5855 Naples Plaza, Suite 301, Long Beach, Calif. 90803 (1976)
202 pp. (paperback) $15, member; $20, nonmember; hardbound, $18.50 and $23.50, respectively.

The conference, held Jan. 19-21 in Clearwater, Fla., was sponsored jointly by the IEEE Computer Society and the Assn. for Computing Machinery. Current trends in research are represented by the 40 papers in this volume, which cover multi-microprocessors, applications, networks, and secondary storage, among other topics. The conference was international in scope, with authors from nine countries participating.

Macro Processors
by Alfred J. Cole
Cambridge University Press, 32 E. 57th St., New York, N.Y. 10022 (1976)
230 pp. $8.95 (paperback)

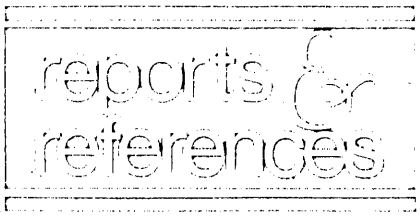
Part of the series of Cambridge Computer Science Texts, this book describes the internal structure and purposes of ten macro processors. The first six chapters require a reasonable knowledge of high level programming languages; the remaining two chapters call for knowledge of the basic principles of compiling techniques, with particular reference to syntax analyzers.

Symposium Proceedings, Trends and Applications 1976: Micro and Mini Systems
IEEE Computer Society, 5855 Naples Plaza, Suite 301, Long Beach, Calif. 90803 (1976)
142 pp. (paperback) $6, members; $8, nonmembers.

The 22 papers in this volume were presented during the symposium cosponsored by the National Bureau of Standards, the IEEE Computer Society, and the Washington Section IEEE. They cover research and development in a rapidly-growing technical area. Sample topics are mini and microcomputer controlled process applications, a method for implementation of transparent sharing of peripherals by two processors, a translator writing system for minicomputers, and a minicomputer based distributed data base system.

Microprocessors: Technology, Architecture and Applications
by Daniel R. McGlynn
Wiley & Sons, 1976
207 pp. $11.95

This introduction to the "computer on a chip" describes computer elements and electronic seminconductor technologies that characterize microprocessors. The book also surveys various commercial microprocessors, and discusses applications, including a low-cost home computer, automotive applications, satellite communication systems, and point-of-sale terminals.



Installation Management

The external and internal controls necessary for dp systems, the responsibilities for these controls, and their impact on auditing the system are discussed in the 95-page manual, *Management Controls for Data Processing,* part of IBM's series "Installation Management." This second edition written by Price Waterhouse & Co. also includes batch and on-line versions of an application system to illustrate control procedures, plus an audit/review questionnaire that could be a useful guide to the auditing process. Intended primarily for dp personnel and internal auditors, senior management would benefit from the first chapter which outlines some major dp control areas and responsibilities, which are then discussed in more detail in the remaining chapters. Price: $3. Contact the nearest IBM branch office for copies; ask for GF 20-0006-1.

Program Design

Gains in productivity of up to 40% are claimed for Michael Jackson's new programming design methodology, which is described in detail in the 48-page handbook, *The Jackson Design Methodology: A Handbook of Program Design.* The handbook describes how the method works, the training required to use the method, and summaries of the experiences of 500 organizations already using the method. There are five sections to the handbook, and two are written by Mr. Jackson, which include the method's key features and concepts underlying his hints on good programming technique. INFOTECH INTERNATIONAL, U.S. Training Div., Pasadena, Calif.

FOR COPY CIRCLE 201 ON READER CARD

Dp in Japan

By 1985, the number of computer systems in Japan will reach 107,000 for a value of $24.89 billion, compared to 34,000 systems valued at $7.16 billion as of December 1975. This is a 3.5-fold increase at an annual compound rate of growth of 12.2%. Japan today ranks second only to the U.S. in numbers of computers installed.

The value of on-line terminal equipment installed, $612.7 million in March 1974, will reach $7,454 million by March 1986. And the need for dp personnel, which stood at 154,000 in 1974, will reach 578,000 by March 1986—while only 399,000 will be available. (You could get an application in early.)

These and other detailed forecasts of computer use and the scale of the "Information Industry" are provided in the 76-page report, *Edp in Japan 1976.* The report, profusely illustrated with tables and charts, was compiled by the Industrial Structure Council, an advisory body to the Minister of International Trade and Industry. Price (includes postage): $20. JAPAN ELECTRONIC COMPUTER CO. LTD., New Kokusai Bldg., 5th Floor, 4-1 Marunouchi 3-chome, Chiyoda-ku, Tokyo 100, Japan.

Electronics Companies

The 692-page *Electronic News Financial Fact Book & Directory* contains practical and financial information on perhaps all the electronics companies in the U.S. Officers of the company, directors, areas of work, domestic and foreign subsidiaries, number of employees, plant footage, sales and earnings, common stock equity, income account, assets, liabilities, and statistical summaries are supplied for each company. IBM, Sperry Rand, Digital Equipment Corp., and Burroughs are just a few of those companies listed, and there is a one-page ranking of the leaders according to sales. The price for this 15th annual edition: $75. FAIRCHILD BOOKS, Dept. BR, 7 East 12th St., New York, N.Y. 10003.

(Continued on page 33)

Why buy from a small disk media manufacturer when there are so many large ones?

ARBER INDUSTRIES is a nice little company (large in technology) that you just might like to do business with.

ARBER has successfully manufactured and installed ATHANA brand magnetic media products valued in many millions of dollars since the company was founded in 1973. These sales have been won against many large competitors who are well entrenched in a highly competitive marketplace. How has ARBER INDUSTRIES maintained this steady rate of growth against this formidable group?

Many leaders in the computer business have become debt ridden and in some cases failed during recent history. While these many and well documented failures occurred for a variety of reasons, it has become obvious that the buyer of data processing equipment and supplies has developed into a sophisticated purchaser who no longer accepts corporate size and/or price as the basic criteria for a decision of *where* to buy.

ARBER INDUSTRIES is a company totally dedicated to the preservation of quality both in our ATHANA brand magnetic media products and our business relationships.

Some companies buy products manufactured by outside sources for re-packaging and re-sale. ARBER DOES NOT. Many magnetic media manufacturers buy aluminum substrates which are pre-processed by outside sources for inclusion into the disk products which they sell. ARBER DOES NOT. It is the practice of many disk product manufacturers to purchase coated substrates from one or more of its competitors as an "answer" to production failures or to meet peak loads. ARBER DOES NOT.

We invite your inquiry and comparison. ATHANA brand magnetic media products are available on a world-wide basis direct from the factory or through qualified distributors in certain geographic areas. Your complete and detailed examination of our company and products is both welcomed and appreciated.

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MAGNETIC MEDIA

ARBER INDUSTRIES INTERNATIONAL

2730 Monterey Street ☐ Post Office Box 125 ☐ Torrance, California 90501 ☐ (213) 775-3741 ☐ Telex 69-1502

1-(800)5

CALL THIS NUMBER AND FIND OUT HOW MORE THAN 1,500 UCC INSTALLED SYSTEMS HAVE SOLVED PROBLEMS WORLDWIDE.

TAPE MANAGEMENT: UCC ONE's 500 installations represent over 75% of all installed OS tape management systems. UCC ONE manages your tapes and protects valuable data from loss or destruction. It provides real-time tape status. Eliminates costly, handwritten records and the expensive mistakes they breed. Gives you better control and greater efficiency.

DOS UNDER OS: UCC TWO lets you continue to use your DOS programs—without reprogramming—while you convert to OS. You plan the conversion or consolidation to fit your work schedule, instead of the other way around. You can consolidate your DOS operation into your OS/VS environment today. Or, you can spread the conversion—and the costs—over months. UCC TWO is the best path to OS and our 500 installed systems prove it.

DISK MANAGEMENT SYSTEM: UCC THREE/ADAM solves the problem of disk fragmentation and inefficient DASD space usage. Based on user specifications, it automatically scratches unneeded, unused and invalid data sets. Or it

27-3250

will migrate the data sets to tape, based upon any combination of criteria—such as usage frequency, size and retention period. Then, UCC THREE keeps the problem from recurring by controlling data set allocation. Fragmentation and the need to periodically compress packs is reduced. Accurate reports on your current space utilization are produced.

PDS SPACE MANAGEMENT: UCC SIX is the only software package that eliminates PDS compression—because it automatically inventories and controls PDS disk space. It spells the end for ABENDS and "dump and restore" operations caused by exhausted PDS disk space. You even save money on your disk investment, too.

IMS DATA DICTIONARY/ MANAGER: UCC TEN accounts for two out of every three IMS data dictionaries in use today. You can put your finger on the information you need—quickly and precisely. You can manage and control your data base environment. Now, at last, you can get the benefits you expected from IMS.

RESTART MANAGEMENT: UCC FIFTEEN lets you restart at the proper job step—instead of at the beginning. The OS catalog is corrected, unnecessary direct access data sets are deleted, and GDG biases are properly altered for the rerun. Automatically—so manual errors in restarting and rerunning are eliminated.

FINANCIAL SOFTWARE: The UCC General Ledger/Financial Control System is the most advanced and complete system of its type. Full general ledger accounting. Budgeting. Cost allocation and profit center reporting. Optionally generates over 100 standard reports. Plus, it has an easy-to-use report writer that the Accounting Department can use—with a minimum of EDP assistance.

SUPPORT: It takes more than code to make a good software product. It takes dependable, long-term maintenance and support of those products. Users of over 1,500 installed systems will tell you that is what UCC delivers.

UCC

P.O. Box 47911 • Dallas, Texas 75247

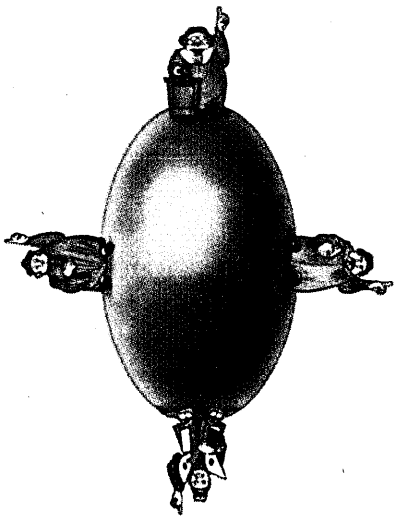
Which way is up?

In business data processing, it depends on who you ask.

As corporate data bases grow ever larger, many data processing managers are striving to free central computer processing capacity for use in exploiting the opportunities a larger data base presents. As you'd expect, each hardware manufacturer proposes a different solution to this workload reduction problem.

At Four-Phase, we believe the most promising solution to be **distributed processing**... maintaining local records locally and passing only data necessary to corporate planning and control upward to the central computer. We've been building distributed processing networks since 1969, and our product line is designed to permit their implementation in a planned sequence of rational, cost-efficient steps.

This sequence begins with the replacement of existing IBM 3270 displays, keypunches or remote batch terminals with



compatible Four-Phase systems at a few key sites. On these pilot installations, field-proven software speeds the implementation of local transaction processing, local data base management, report generation and communication with the central computer.

Production systems are then installed at the remaining network locations. Because the Four-Phase product line is hierarchical in organization, each distributed processing site can be equipped with a system configured to its precise workload and communications requirements.

Once the basic distributed processing network is on-line, a stratified network structure (with geographically distributed files and display access at branch, district and regional offices) is slowly evolved to "tune" operations to measured processing and communications volume.

Thus the network evolves along an **orderly growth path** ... a process made possible by Four-Phase hardware, software, systems engineering and maintenance support developed and proven over seven years for the present era of distributed processing. For further information, contact your local Four-Phase office or Four-Phase Systems
19333 Vallco Parkway
Cupertino, CA 95014
408-255-0900

Four-Phase Systems®

source data

(Continued from page 28)

ANSI Standards Proposal

The draft proposal of the American National Standard FORTRAN was published as the March issue of ACM SIGPLAN Notices. The proposed standard consists of a full language and a subset language which is a revision of X3.9-1966 FORTRAN. The ANS Committee X3J3, which developed the new standard, also recommends withdrawal of X3.10-1966 Basic FORTRAN. Based on comments received by the committee, the proposed standard will be revised as necessary and submitted to the ANS Committee X3 for letter ballot and final approval. The draft proposal is available for $5 prepaid. ASSN. FOR COMPUTING MACHINERY, Order Dept., P.O. Box 12105, Church St. Station, New York, N.Y. 10249.

Industrial Automation

The world market for process control products totaled nearly $3 billion in 1975; this will grow to over $4 billion by 1980. The chemical industry is the largest customer for process control equipment, with the petroleum industry second. Reliability is the prime consideration in purchasing this equipment, and the major suppliers are Foxboro, Honeywell, Fisher Controls, Leeds & Northrup, Taylor Instruments, and Fischer & Porter, with the first two sharing 30% of the market.

An in-depth study of the industry, the market, the technology, and the competition is found in the 60-page report, *Industrial Automation I: Process Control.* Included is a discussion of systems architecture, sensors, instruments and controllers, control elements, and actuators. Price: $495 (also available by subscribing to CSI's Industry Analysis Service). CREATIVE STRATEGIES, INC., 4340 Stevens Creek Blvd., Suite 275, San Jose, Calif. 95129.

European Data Communications

As part of the continuing research effort sponsored by the 17 West European Postal, Telegraph and Telephone agencies (a project known as "Eurodata"), a 150-page report, *The Western European Data Communications and Computer Terminal Outlook*, analyzes the development of data communications in Western Europe through the mid 1980s. The impact of new technologies on network terminal and modem design; IBM's strategy in Europe; PTT strategies and plans; economic trends in each of the countries; competitive influences for mainframe manufacturers, minicomputer vendors, terminal suppliers, and modem companies; and the role of emerging suppliers and possible favoring of local vendors are among the topics covered.

Products analyzed are general purpose terminals (displays, keyboard/-printers, remote batch), special purpose terminals (point-of-sale, credit/-EFTS, banking, factory data collection), and modems. Price: $500. PA INTERNATIONAL MANAGEMENT CONSULTANTS, c/o Richard A. Peters, P.O. Box 1275, Palo Alto, Calif. 94301.

Computer Abuse

Computer Abuse and Criminal Law is a 110-page volume of materials collected for presentation at a symposium on computer abuse for prosecuting attorneys held at the Univ. of California, San Diego, in July 1976. Sorely in need of a table of contents (not to mention an index), the report contains several articles, scattered bibliographies, and extensive reprints of newspaper stories. It does make interesting although unsystematic reading on the topic. Price: $9. Computer Center, C-010, UNIV. OF CALIF., San Diego, La Jolla, Calif. 92093.

Data Base Directions

Data Base Directions: The Next Steps is a 175-page report on the results of a 3-day workshop of about 80 experts sponsored by both the National Bureau of Standards and the ACM, held at Fort Lauderdale, Fla., in October 1975. The five subject areas are auditing, evolving technology, government regulations, standards, and user experience. These proceedings provide guidance for the manager in implementation of data base concepts. Price: $2.40; ask for SD Cat. No. C13.10: 451. Superintendent of Documents, U.S. GOVERNMENT PRINTING OFFICE, Washington, D.C. 20402.

vendor literature

Single Source Maintenance

With more users going to data communications networks, distributed processing, and/or multivendor terminals, it may be that single source maintenance is more efficient and economical. A brochure rates existing dp maintenance performance and discusses criteria for third party maintenance. SIRVESS, INC., Saddle Brook, N.J.

FOR COPY CIRCLE 202 ON READER CARD

Advanced Calculators

A 24-page booklet, *What To Look For Before You Buy An Advanced Calculator,* analyzes the available types of scientific, business, and programmable calculators. It is designed for the buyer with little or no knowledge of available functions, operating languages, and specialized calculators. Characteristics of good and poor calculators are described, and chapters include an introduction to advanced calculators, operating languages, functions and features, programmables, support material, and calculator construction. HEWLETT-PACKARD CO., Palo Alto, Calif.

FOR COPY CIRCLE 203 ON READER CARD

Small Business System

The Wang Business System is a BASIC language small computer and associated peripherals "for use in any business." An illustrated 12-page brochure describes the system's capabilities, such as invoicing, inventory, order acknowledgments, packing lists, accounts payable, customer statements, paychecks, balance sheets, operating statements, etc. Examples from various businesses—manufacturers, retail sales, wholesale distributors, freight handlers, CPA offices, general contractors, government agencies, insurance companies, banks, school systems, townships, medical groups, public utilities—are presented. WANG LABORATORIES, INC., Tewksbury, Mass.

FOR COPY CIRCLE 204 ON READER CARD

Oem Line Printer

This vendor's model 2423 oem line printer, described in a data sheet, is a medium speed printer with a 132-column print line and a 64-character EBCDIC font. It was developed specifically for communications oriented and minicomputer systems requiring high performance. It is housed in a floor model cabinet with an optional "whisper-quiet" configuration available. Other fonts are also available, and print speed for the 96-character version is 180 lpm; for the 64-character version, 250 lpm; and for the 48-character version, in excess of 300 lpm. DATA 100 CORP., Minnetonka, Minn.

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Display System

An 8-page catalog describes this vendor's three-dimensional display product line. Unretouched crt photos showing various images accompany a discussion of the basic principles of the system. Various depth cues generated by the system are discussed and photographic examples given. System specifications, a discussion of various modules and their functions, and system diagrams and applications are also provided. Peripheral products such as vector generators, composite video-to-analog converters, and image genera-

source data

tors are also discussed. OPTICAL ELECTRONICS INC., Tucson, Ariz.
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DEC Communication
Decnet is a brochure describing software tools available for operating systems to allow communication between PDP-8, PDP-11, DECsystem-10, and DECsystem-20 computer systems. Outlined are the types of networks, sample applications, DECnet commands and functions, structure and design, and a technical summary of DECnet operation. DIGITAL EQUIPMENT CORP., Northboro, Mass.
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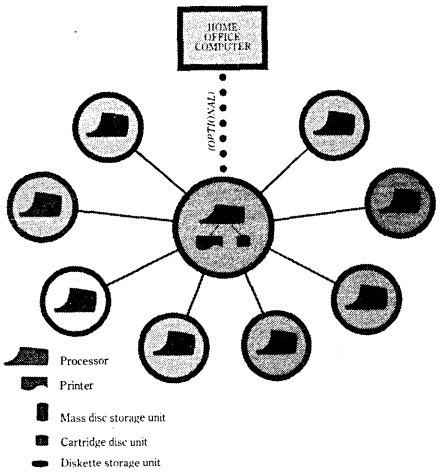
Dispersed Dp
An Executive Guide to Dispersed Data Processing is an illustrated 20-page brochure which in nontechnical langauge describes the dispersed processing concept and its advantages. Computer networks, data communications, and ways in which dispersed processing systems and peripherals can be integrated into central computer operations



with maximum efficiency are discussed. Input error elimination, improved employee productivity, and extended automation are a few of the advantages claimed. Operating features of this vendor's dispersed processing equipment for data entry and for other field office assignments are also included. DATAPOINT CORP., San Antonio, Texas.
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Network Control
Have you an unruly on-line, interactive data network? An illustrated 14-page brochure, *The Network Control System,* will tell you how to get it under control with this vendor's system. Also described are typical network diagrams, diagnostics, backup, and hot spare modems in both multipoint and distributed processing environments. INTERTEL, Burlington, Mass.
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Output for PERT
A 4-page newsletter reports on this vendor's electrostatic output systems for PERT (Project Evaluation and Review Technique). New wide format plotters, improved software, and new system configurations are described that should make high speed electrostatic plotting practical in more PERT applications. VERSATEC, Santa Clara, Calif.
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High Speed Printer
A technical information bulletin describes the operation of this vendor's 8200 Series line printers. Information on the electrostatic writing technique used, toning of the paper, and the paper drive system is supplied. An overview of how a 2400 lpm printer that sells for $3,000 works is given. HOUSTON INSTRUMENT, Austin, Texas.
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Data Acquisition & Control
A 16-page illustrated brochure, *Data Acquisition and Control Systems,* features everything from computers to connectors supplied by this vendor. The DG/DAC (data acquisition and control subsystem) interfaces NOVA and ECLIPSE computers to sensors, actuators, and associated electrical circuits. Computers, peripherals, and software are presented, and support functions are discussed. Several application configurations, from a simple monitoring system to a large dual-processor-based control system, are included. DATA GENERAL CORP., Southboro, Mass.
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courses

Microprocessors & Microcomputers
Two 2-day intensive short courses are scheduled. *Microprocessors in Manufacturing and Industrial Control* will be held in Cincinnati (Jan. 11-12), Toronto (Jan. 18-19), and Newark, N.J. (Feb. 8-9). *Software/System Development: Tools and Techniques for Microcomputers* is scheduled for Cincinnati (Jan. 13-14), Toronto (Jan. 20-21), and Newark (Feb. 10-11). Price: $395 ($695 for both courses); notes, reference materials, hardware demonstrations, and luncheons included. INTEGRATED COMPUTER SYSTEMS, INC., P.O. Box 2368, Culver City, Calif. 90230.

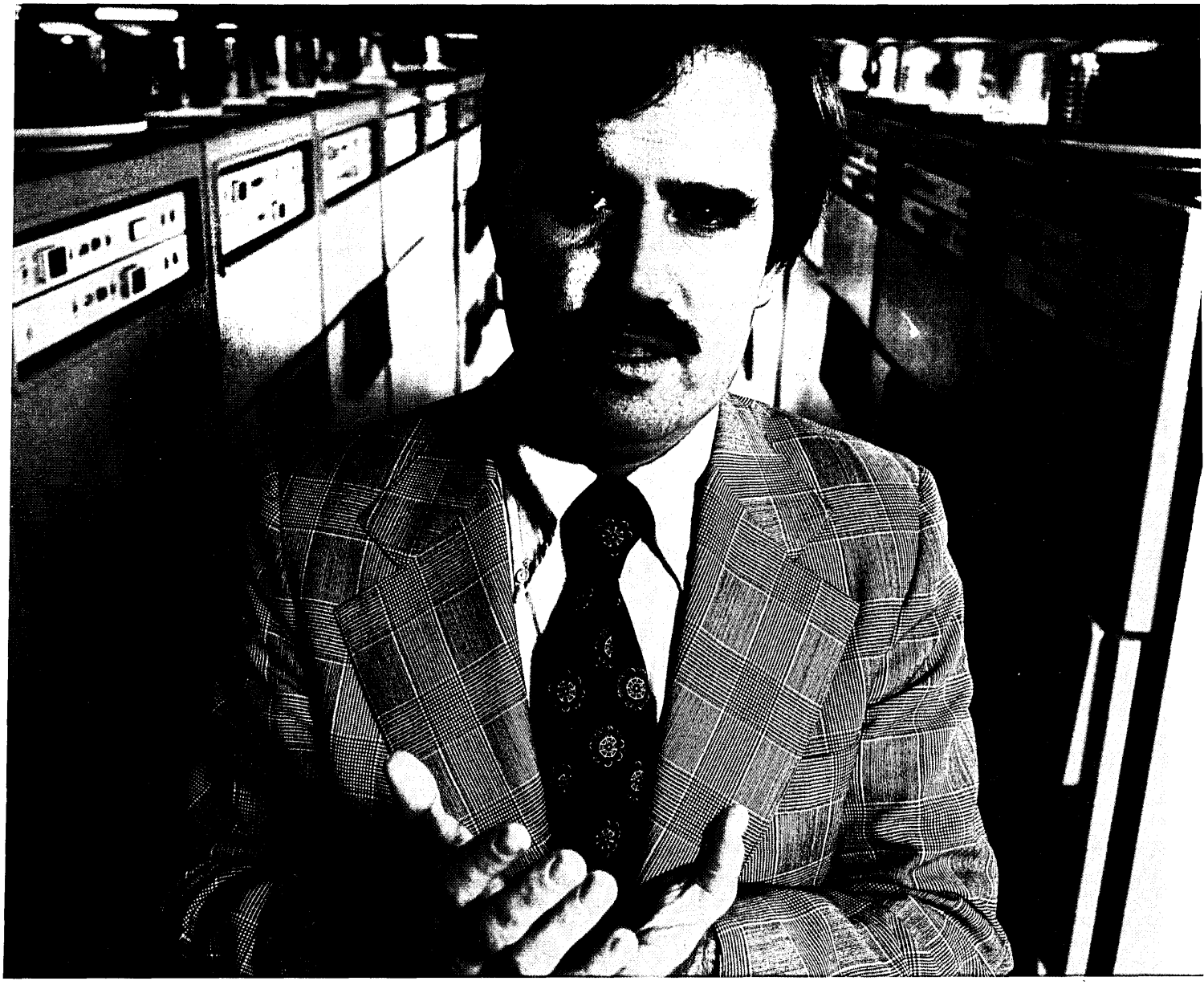
IPE Courses
Several 3-day courses of interest are scheduled. *Practical Leadership of Data Processing Projects* will be held in Chicago (Jan. 12-14) and Washington, D.C. (Feb. 9-11). *Effective Computer Operations Management* is scheduled for Phoenix (Jan. 24-26), and Washington, D.C. (Feb. 23-25). Other courses include *Applied Data Communications Systems* in Chicago (Dec. 15-17), Washington, D.C. (Jan. 17-19), and San Diego (Feb. 16-18); *Minicomputer Systems* in Denver (Jan. 5-7) and Washington, D.C. (Feb. 16-18); and *Structured Design and Programming* in Phoenix (Jan. 12-14), Washington, D.C. (Feb. 9-11), and Chicago (Mar. 2-4). Price (includes course materials and luncheons): $445 ($395 if prepaid). THE INST. FOR PROFESSIONAL EDUCATION, Suite 601, 1901 N. Fort Myer Dr., Arlington, Va. 22209.

periodicals

Microprocessors
"Current state of microprocessors," "Build or Buy?" "Automatic software production for microcomputers," and "Microprocessors in control systems" are four of the 11 articles in the first issue (September 1976) of the international quarterly journal, *Microprocessors,* edited in England by Gareth W. Jones. Other features include a review of current research in the field, a calendar of worldwide meetings and events, a product and literature review, and a book review section.

The journal expects to cover developments in applications, education, software, and hardware—in other words, to keep abreast of this growing technology and to provide a forum for discussion of major worldwide developments. Subscription: £20 (British) or $67.60 (U.S.). IPC BUSINESS PRESS LTD., Oakfield House, Perrymount Rd., Hayswards Heath, Sussex, England RH16 3DH or IPC BUSINESS PRESS LTD., 205 East 42nd St., New York, N.Y. 10017.

Chemical Computer Techniques
Computer Techniques and Optimization is a new section of the well-known international quarterly chemical journal, *Analytica Chimica Acta.* The section is devoted to new developments and advances in chemical analysis by the application of computer techniques and by interdisciplinary approaches, including statistics, systems theory, and operations research. Subscription: $49.75. Free sample copies of the first issue to include the new section (March 1977) may be requested by writing to: ELSEVIER SCIENTIFIC PUBLISHING CO., P.O. Box 211, Amsterdam, The Netherlands. ❋



"If I buy Digital's concept of distributed processing, what happens to my mainframe investment?"

Digital's concept of distributed processing is designed to protect your hardware and software investment with a series of tools that enhance it.

With these tools, you can develop new applications that can interact with your existing system so you can be more responsive to your users. And your customers.

These tools include the broadest range of small, medium and large-scale computers in the world. Supported by a powerful data entry language, high level commercial languages, industry-standard communications protocols and sophisticated resource management and data management capabilities.

So now you can give your users the benefits of interactive applications without disrupting your smooth running batch operation. And that means you can save mainframe time for mainframe work and distribute computer power to the people who need it, without losing control over your operation.

Already, thousands of Digital Datasystems are working to increase data processing efficiency in companies all over the world.

To find out how they can help your company, write Mr. Pat Mullen, Digital Equipment Corporation, Commercial Products Group, PK3-1/M33, Parker St., Maynard, MA 01754. European Headquarters: Mr. Henry Ancona, 81 route de l'Aire, 1211 Geneva 26. In Canada: Digital Equipment of Canada, Ltd.

digital

Why twelve ads in Datamation are better than six ads in Datamation and six ads anywhere else.

It computes. In an uncomplicated way.

Think of your ads as sales calls. You'd never omit 70 of your most important 100 prospects. Neither does DATAMATION. It alone reaches all the buying influences. In fact, the next best EDP publication reaches only 30% of DATAMATION's audience.

Clearly, multiple ads anywhere else can't give you coverage of people they never reach. Anywhere else is really nowhere.

DATAMATION multiplies your advertising effectiveness like no one else can. Our advertisers recognize this. That's why we carry more advertising than any other publication in the field.

When you think about it, that's why we should be carrying more of your advertising. Six times or twelve times, it computes.

Technical Publishing Company

DATAMATION®

First in market coverage—worldwide.

The Genie.

The Codex Multipoint Network Control System. MNCS. A real Genie that can put you in total control of your high speed multipoint network.

Wish for remote monitoring... You've got it. Wish for complete diagnosis of a system problem... Yours. Wish for restoration of a function so that you are assured of continuous system operation... It's yours. And you control it all from the central location with no human intervention at the remote site required.

Our Genie works like magic.

So do our Fast-Poll* Multipoint Modems.

Codex Fast-Poll modems include a wonderous "gearshift" operation to provide the fast RTS/CTS response time of 9 milliseconds typical of 2400 bps units yet with the high inbound data throughput of a 4800 bps modem. And they offer proven reliability, performance, and economy because they include the latest advances in MOS/LSI technology.

On the outbound side the LSI 48FP, LSI 72FP, or LSI 96FP offer 4800, 7200, or 9600 bps speeds respectively to provide the maximum in completely automatic operating performance in dedicated multipoint configurations. So order the Codex Genie to make you the master of your multipoint network and the Fast-Poll slaves will grant your every wish.

codex
We'll get you through

member of IDCMA

Codex Corporation, 15 Riverdale Avenue, Newton, Massachusetts 02195 Tel: (617) 969-0600 Telex: 92-2443 Codex Europe S.A., Bte 7/Av. de Tervuren 412, B-1150 Brussels, Belgium Tel: 762.23.51/762.24.21 Telex: 26542. Offices and distributors in major cities throughout the world.

*Patent Pending

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"With MVS, our computers are helping us set new highs in service and productivity at John Hancock."

John Hancock's J. Edwin Matz

In other

"We're projecting a $2 million reduction in operating expenses," says J. Edwin Matz, president and chief operating officer of the John Hancock Mutual Life Insurance Company. "And we're halfway there already.

"We're providing more information to our policyholders and agents than ever before, and we're able to process our steady increase in business with ease."

These are some of the advantages Hancock has realized since its recent installation of advanced computer applications that operate under MVS (Multiple Virtual Storages). The Boston-based insurance company is one of more than 185 large IBM customers in the United States that are already using MVS as their primary computer operating system.

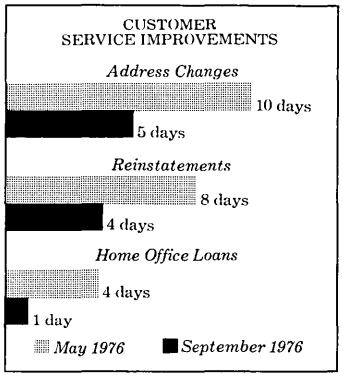
MVS also makes possible the concept of multiprocessing—interconnecting two IBM System/370 computers to form a single operating unit. Multiprocessing offers users the combined power of both computers as if they were one.

200,000 transactions daily

In the individual life insurance area, one of the systems supported by MVS administers more than four million policies—including 35,000 premium notices and as many as 3,000 address changes daily.

"Our individual life system alone handles an average of 200,000 transactions each day," says Mr. Matz. "With it, some customer services, like address changes and reinstatements, are now being processed in half the time. Home office loans are done in one-fourth the time."

Under MVS, Hancock also operates a network of 550 terminals nationwide. Called Hanstar, the network handles virtually all aspects of claims payment service for group accident and health insurance. During 1976, it has enabled the company to absorb an 18% increase in volume—more than a quarter-million transactions—with no increase in the staff or transaction time.



"We expect the utmost"

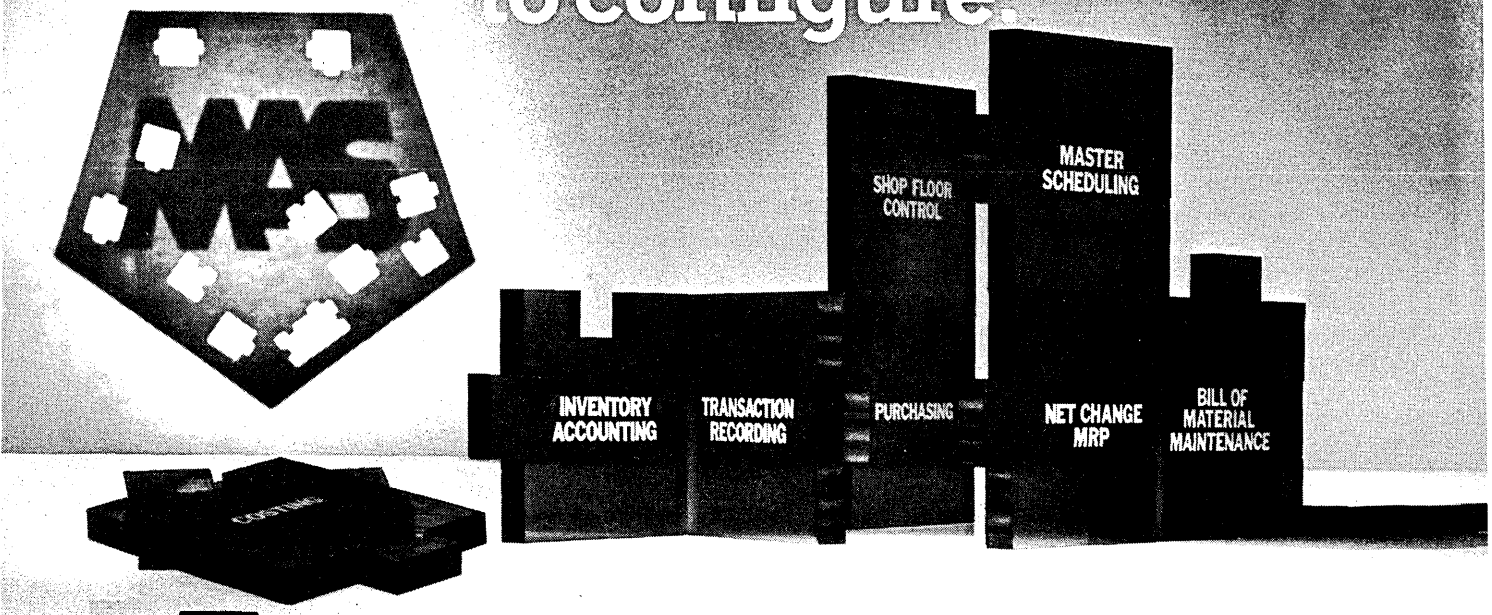
"Because our entire operation centers on our computer systems, we expect the utmost in reliability from them," Mr. Matz says. "MVS has allowed us to capitalize on the greater performance offered by technological advances while also enhancing reliability."

Multiprocessing under MVS is one of a number of ways IBM extends the power of the computer to people who need it. For more information, call your IBM Data Processing Division marketing representative. Or write for "MVS: Multiplying Computer Power" to the IBM Corporation, Dept. 83F, 1133 Westchester Avenue, White Plains, N.Y. 10604.

IBM®
Data Processing Division

words, results.

Manufacturing Systems with freedom to configure.



Configure your own manufacturing system, from any of 95 MAS jobs.

Job by Job.

Modular Application Systems will meet your **BUSINESS NEEDS:** already proven in over 500 world-wide implementations, MAS was designed by personnel with backgrounds in manufacturing, production, engineering and cost accounting.

The bill of material-like structure of MAS (6 systems, 20 elements, 95 jobs) provides complete **FUNCTIONAL FLEXIBILITY**. You select only the functions needed to meet your initial objectives; then plan a phased implementation, safe in the knowledge that the interfaces are proven. As your experience with MAS grows, you can switch in new facilities, add additional control and tune the system from a wide *choice of policies*.

Just as MAS provides functional flexibility, it also allows **TECHNICAL INDEPENDENCE**. MAS is running on IBM, Honeywell, Univac and ICL machines; is used for distributive processing and on-line inquiry; and is supported by VSAM, ISAM, TOTAL, IMS, IDMS, DBOMP and CFMS. Totally Modular ANS COBOL allows complete freedom for efficient *customizing* by your own shop, or by us—*if required.*

MAS provides a **COST EFFECTIVE** way of achieving a proven functionally viable system for as little as 80¢ per line of code, including full documentation. Budgetary flexibility is enhanced as you select, implement and purchase your systems *at the job level.*

Almost without exception, every one of the 500 MAS systems installed is still in use. This success has been achieved through MAS itself, and a strong commitment to **IMPLEMENTATION SUPPORT.** Our implementation people are just as likely to have manufacturing backgrounds as data processing. With MAS Documentation and Training Aids, we'll work with you to ensure successful implementation.

For More Information: We'll gladly send our Manufacturing Systems Checklist which will enable you to check out MAS' ability to meet your requirements. Please contact Dick Nemerson, MMDS Headquarters, 300 East Joppa Road, Baltimore, Md. 21204 (301) 823-1600.

Mail to Dick Nemerson, MMDS Headquarters
300 E. Joppa Road, Baltimore, Md. 21204

Please send your: **Manufacturing Systems Checklist**

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____

Martin Marietta Data Systems *We Build & Run MAS Systems*

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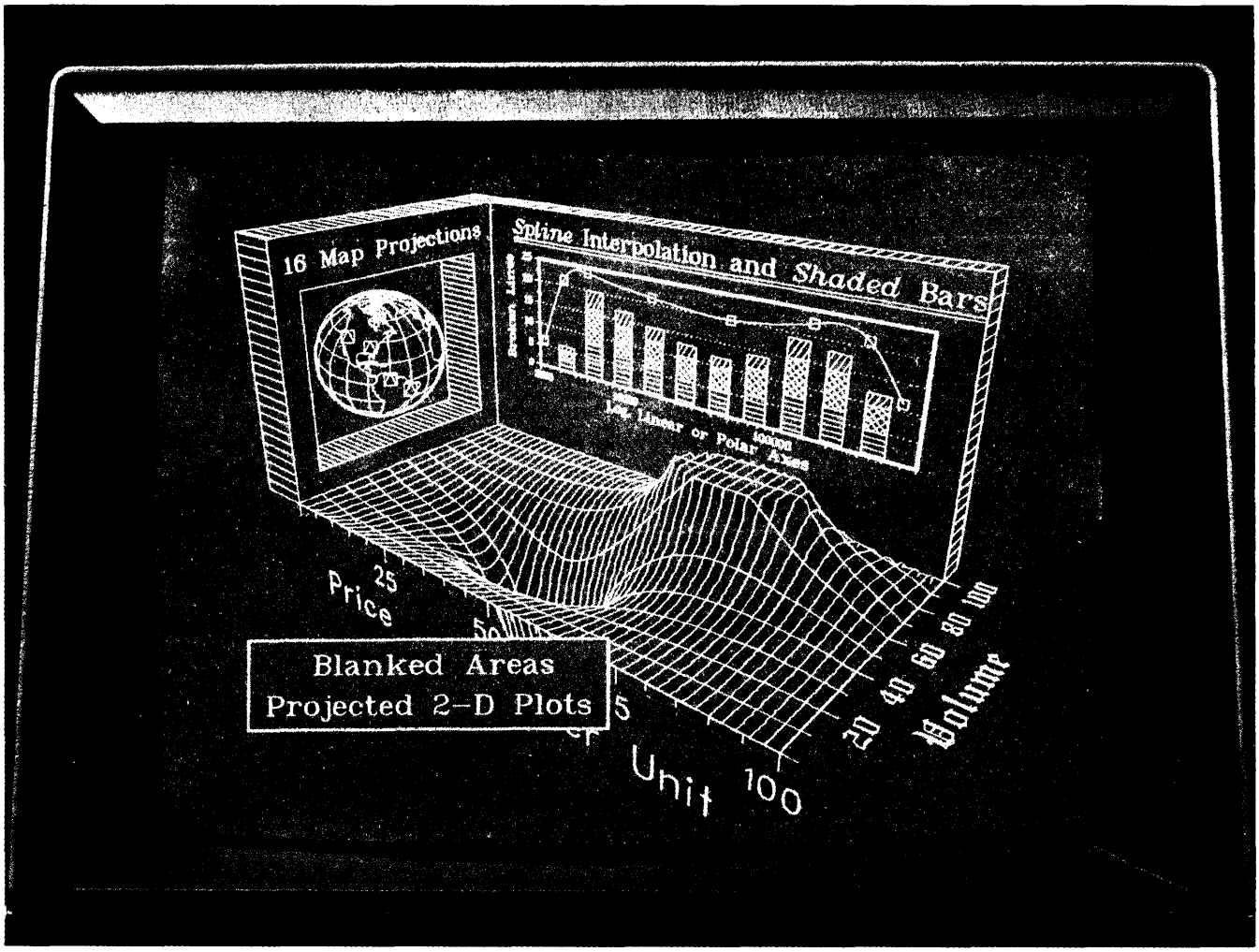


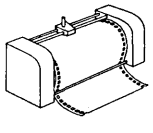
Our Independent Graphics Software System Leaves You To Your Own Devices.

Our users are able to construct a sophisticated plot on a CRT terminal quickly, check it for accuracy on a drum plotter, then use microfilm for the production run. And all with the same program.

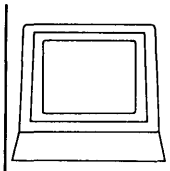
Almost every computer application can make good use of graphics. Bar charts, pie graphs, performance comparisons, route maps, even computer usage graphs are plotted from computer printouts. DISSPLA now makes plotting feasible.

DISSPLA is machine and device independent. One user installed this package and one week later ordered 30 terminals. Another averages five thousand plots daily.

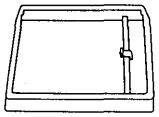
1. MACHINES DISSPLA turnkey versions are available for IBM 360/370 (OS, DOS, TSO, VS, CMS, etc.); CDC 6000, 7000, Cyber 70 series (SCOPE and KRONOS); UNIVAC 1100 series (Exec 8); PDP-10 (DECsystem-10); XDS Sigma 9 (Commander II).
2. EASY TO USE DISSPLA is a system of FORTRAN subroutines. And heavily used from COBOL, ALGOL and PL/I. Beginner, intermediate and advanced manuals are provided with many examples.
3. PUBLICATION-QUALITY PLOTS DISSPLA has business and scientific features, maps, 3-D hidden line surfaces, 51 publication-quality character sets, shading, and numerous other features.
4. ALREADY IN WIDE USE DISSPLA has been in use more than six years. And now in more than 50 installations in the U.S. and Europe. Ask us about our users.



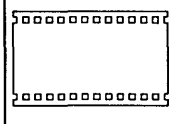
Drum Plotters
Interfaced to:
Calcomp (563, 565, 763, 765, 936, 1036, 1136); H.I.; Zeta



CRT's
Interfaced to:
Tektronix (all); Computek; H.I.; Vector General; Adage; IBM 2250



Flatbed Plotters
Interfaced to:
CIL; Xynetics; EAI; Tektronix; Hewlett Packard; Gerber Artwork Generator; Gerber



Microfilm Devices
Interfaced to:
Calcomp (835, 865, 890); FR 80; COMp 80; SC 4020; SC 4060

All we ask is the ability to draw a straight line.

DISSPLA

Display Integrated Software System and Plotting LAnguage
A proprietary software product of ISSCO

For more information call Sunny Harris (714) 452-0170 or (714) 565-8098.
Or write

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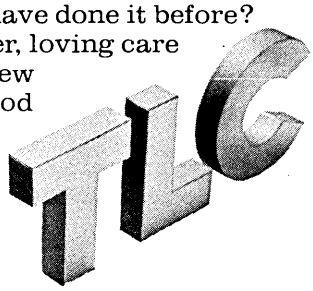
Ten Terrifying Questions to ask a person trying to sell you a computerized personnel/payroll system

Terrifying question number one

OK, so we're sold on using a system—who's going to install it? Are you equipped to do it? Can you get it up and running fast? Are experts on hand who have done it before? Will you give us tender, loving care while you install our new system? Will we get good support after we're up-and-running?



Terrifying question number two

Will the system's value exceed its cost? Can you prove it? Exactly where will savings come from? How will costs be cut? Can you give us figures showing savings in time, money, and better use of our staff?

Terrifying question number three

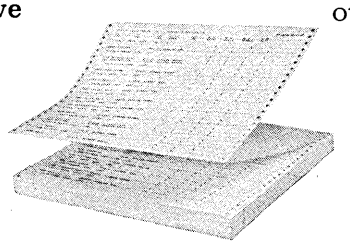
What's your track record? How many systems are actually in operation? Do your users boast about the system? Are they happy? Will they pass on the good news? Is there any good news?

Terrifying question number four

How about documentation? Will we know exactly what we've got? Is it easy to understand? Can we take the reins quickly? We need high quality training and manuals. Will you provide these?

Terrifying question number five

How about reports for EEO, ERISA, and OSHA? Can we handle those? I mean really handle them. Can we meet compliance demands quickly and inexpensively? We'd like to relax on that score.

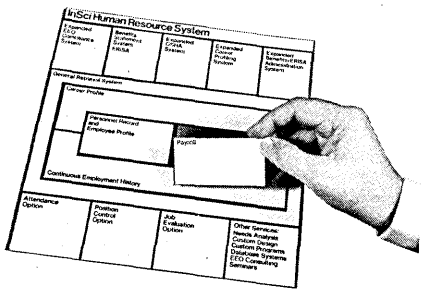


Terrifying question number six

Will it be a hassle every time we need information? Can our Personnel or Payroll Departments retrieve information without calling in a programmer? Can your retrieval system understand English?

Terrifying question number seven

How flexible is the system? Can we expand it as we grow? Will your people sit down and discuss our particular needs and tailor the system to them? How comprehensive is your Payroll system? What about manpower planning, salary and benefits administration? Or health and safety programs?



Terrifying question number eight

Can you provide a forum—seminars, and so forth—for our personnel, payroll, and data processing people? Can we talk to other users grappling with the same problems? In other words, can you help us keep in touch with the the industry?

Terrifying question number nine

If we can't use our computer, must we shelve the idea? Can we run the system on your computer? Do you have a systems service division to help us do our work? What other clients do they handle? What kind of turnaround can I expect?

Terrifying question number ten

Is your organization stable? Are you financially secure? Will you still be around five years from now if we must expand the system? Are you growing?

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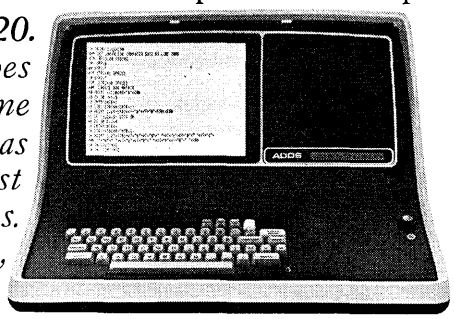

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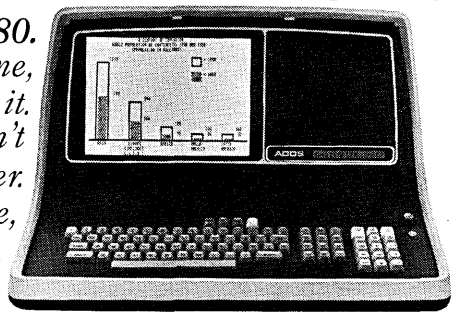

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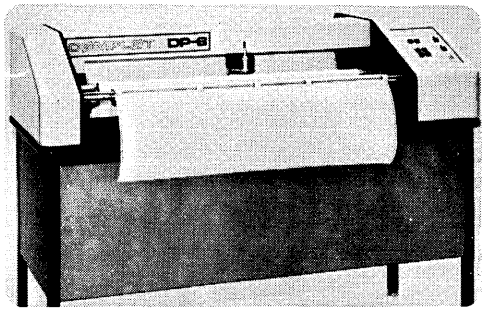

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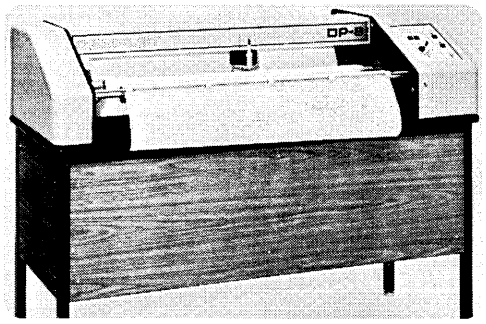

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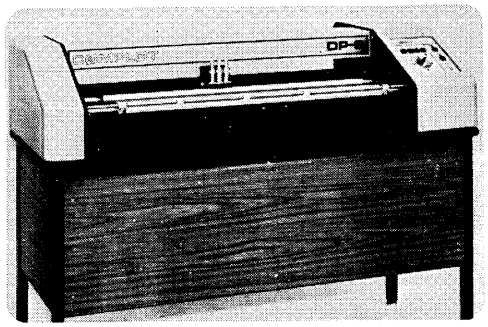

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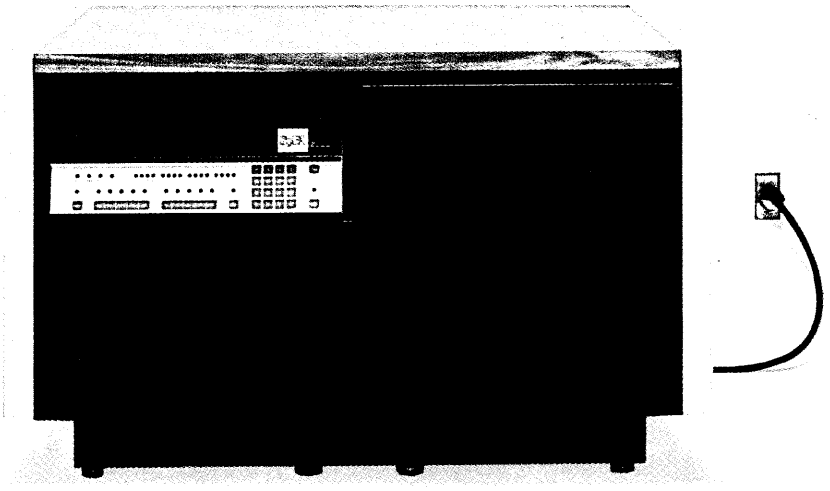

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Editor's Readout

John L. Kirkley, Editor

Power Plays

Big is not necessarily better. In fact it often appears that when organizations reach a critical mass they exhibit a kind of elephantine arrogance, a callous misuse of power that runs counter to the needs of their customers, their industry, and the very system of business that makes their existence possible.

For example, there's what one dp manager of our acquaintance rather uncharitably calls "the 168 rip-off." IBM is pushing hard to move its big shop customers to MVS and the 168, citing the advantages of new software, new peripherals, and higher reliability. But some managers, closely examining price/performance, are hard put to find any economic justification to make the switch. The 168's cpu is only slightly more powerful than the 165 and, in terms of throughput, there's no advantage at all. And lurking just below the surface like *Jaws* is the real cost of installing MVS. We know of one shop where the manager cannily estimated the cost of MVS installation as if it were priced at outside market value. When the numbers began exceeding the $750,000 mark, he found himself regarding his 165 os installation with new found affection. "Could it be," he mused, "that the 168 has more to do with maximizing IBM's profits than solving my problems." Could be.

And might it also be that the large dp shops have been the victims of technological foot-dragging when it comes to IBM's smaller systems? Right now a small band of determined competitors—the likes of DEC with its PDP 11/70, Interdata and its 830, Data General and the Eclipse, and HP with the 3000—are offering machines in the 155 class with up to seven times the price/performance in terms of raw hardware. (Even with software costs added, the discrepancy is still startling.)

IBM has just not presented its users with this type of low cost, high performance option. Zealously protecting its huge rental base, it has kept them plodding along several years behind the available technology, tied to a monolithic philosophy of organizational control that depends on a big, expensive, centralized cpu.

* * * *

Users are not the only ones who have been trammeled. Paul Armer, gray of beard but only moderately long in the tooth, has been in the computer industry since the beginning. When Armer was asked to be a CalComp witness in the antitrust trial that began last month, IBM sent him a discovery request that bordered on the absurd. Requested was every document, every paper, every scrap of material generated as a result of his long involvement with the field. Armer could afford neither the time nor the expense to comply with the order and, overwhelmed, he's since changed his status as a witness.

Bob Brueck, president of MRI Systems in Austin, Texas, received one of these legal bombshells last year. Brueck was to appear as a Justice Department witness in the interminable IBM antitrust trial still underway in New York. Included in IBM's massive discovery request was information on MRI's future business plans. Brueck worries that this material might wend its way into the hands of IBM product planners and marketing strategists. Rather like having a large, fluorescent bullseye painted on your corporate chest.

* * * *

And, speaking of antitrust cases, another indignity is being perpetrated out on the West Coast. It's Pre-Trial Order Number Three, an unusual gag order signed by presiding Judge Ray McNichols that not only applies to the CalComp vs. IBM trial but to the Memorex and Transamerica cases as well. It allows IBM and its adversaries to designate information they want kept from public scrutiny as "non-public." This smacks of the same kind of misuse of confidentiality that the military has routinely practiced for years by labeling potentially embarrassing material as "Top Secret."

Pre-trial Order Number Three will severely hamper coverage of the trial by the trade and general press. And who will be the long-term losers as a result of these secret and legal maneuverings? . . . the users, the industry, and our system of open, competitive business.

* * * *

But an even more blatant attack on our concept of a competitive marketplace is now being waged on the opposite side of the country. It appears that Ma Bell is no lady. The so-called Consumer Communications Reform Act, the Bell bill, is a naked power grab designed to kill off what remains of AT&T's worrisome competition once and for all. We highly recommend the outspoken comments by John Eger, formerly with the Office of Telecommunications Policy, in this issue's Forum on page 199.

Like us, Eger finds big business out of control an unsavory and unsettling prospect. ❁

Power, Politics and Dp

by Joseph Rue

The first rule for survival is to learn where the power lies in an organization —and marshal the dp resources to serve it.

Knowledge is not power; control over knowledge is.

Knowledge in the form of information is obtained from the processing of relevant data by data processing. If power is to be retained by certain people or department units in an organization, then it is important that they exercise control over the relevant data and their processing. This fact gives insight into some of the conflicts and difficulties that a dp department experiences in its relationship to other departments in an organization.

Principles of power

Power is the ability to direct, to control, or to influence the utilization of resources. In any organization, whether a private enterprise or a public institution, given resources (e.g. knowledge, people, funds, material, equipment) are used to achieve some result. This concept of power is more objective, specific, and measurable than the view of power as authoritarian behavior, confrontation, overcoming opposition and resistance, or merely intimidation.

There are some important power principles that are useful for the dp manager to understand. These principles involve the relationship of the dp department to other departments in context of the network of organizational power.

All user departments are not created (politically) equal.

The dp department would best serve all other departments equally when each has an equally important role in the purposes to be achieved—or, in other words, when the information generated by dp for the various departments has equivalent importance. Such a situation may be hard to conceive, let alone to observe, occurring in an organization. Yet it is not uncommon to find dp managers who must work under a policy that states that the dp department must serve all departments in the organization, often on a first-come, first-served basis, with little emphasis on priority. As a result of such a policy, the dp department may become involved in relatively useless systems, or in generating reports that are superfluous drivel.

A case in point comes from a medium-large sized business with headquarters in the East. The company was badly in need of improved control over its production activities. The dp department was to assist in formulating a new production control and reporting system. However, because of the internal bickering among the production managers and the unified directional intensity of the maintenance supervisors, a maintenance system was implemented first—and it dominated a good share of the computer system's time. So rather than producing reports on the current status of shop orders and inventory, reports were generated on the workload and whereabouts of the pipefitters and electricians. One memorable analysis that occupied the computer's time revealed that it was better to use roll rather than sheet toilet tissue. Meanwhile the company was losing tens of thousands of dollars per month because of its production problems.

An organization is not a democracy of individuals and departmental units. Even though a policy states that all departments are to be treated equally, the perceptive dp manager will understand that some departments are "more equal" than others. He must determine which departments are of greater importance to organizational purposes, decide the priority ranking for each department that dp must serve, and direct the bulk of the dp resources to their assistance.

Personal purposes take precedence over organizational ones every time.

It does not take long for a dp manager to realize that users are not really "departments," "functions," or "projects,' but rather certain people who are pursuing personal purposes within the organization's power structure. The purposes of the business or institution can only take precedence when these purposes are internalized by individuals who can reconcile personal purposes with those of the organization. This conflict of personal versus organizational purposes often results in "power politics" and is of particular concern to the dp manager.

A dp director of considerable technical skill discovered to his regret that it is personally costly to ignore the feelings and purposes of individuals in a position of power. Both he and the budget director reported to the controller who in turn reported to the corporate treasurer. The controller was new to the corporation, which was in an unstable financial situation. The budget director chronically distrusted everyone. It was well known that he was tyrannical—in one instance he called one of his most conscientious workers "on the carpet," and for over two hours berated the man on his worthlessness until the worker became temporarily insane. (It may sound extreme, but it was the case.)

This budget director suspected the dp director of not adequately serving the budget dp needs. In order to dispose of the dp director, he persuaded the controller that the dp director was not well qualified. The dp director did nothing positive to counteract this. He did, however, enlist the aid of the marketing representative of a very large computer manufacturer, whom he had known for many years, to intercede on his behalf.

The marketing representative soon discovered that the new controller actually was considering the removal of the dp director. The controller, who had a reputation for disbanding dp in other businesses, also constantly threatened "to throw the junk out" every time a problem involving dp arose. Since the use of the computer equipment was at stake, the marketing rep formed a coalition with the controller. They both then persuaded the treasurer to get a new dp director.

The current dp director was displaced to a meaningless position. Shortly thereafter, he resigned, thoroughly disillusioned and not fully comprehending the web of personal purposes that engulfed him and the fine work he had done for the organization.

Where the power lies is where the data processing goes.

There has been much debate concerning the organizational placement of the dp department. Some claim it should report to accounting. (According to many accountants, "the accounting system is *the* information system of the organization!") Others state it should report to operations since the

operations information system is heavily involved with quantity, schedule, and location data, rather than primarily with monetary data. Still others insist that dp would best serve most users by being in a neutral administrative position, preferably reporting at least to the vice president level.

These arguments are artificial and not valid if they ignore the power network of the organization. The dp department is best located where it serves the important purposes of the enterprise. This may be in engineering, production, marketing, accounting, or administration. It can report to a given division, or to a certain project. If management decides arbitrarily to have the dp department report to a function, and this does not suit the important elements of the organization, great disruptive friction can arise.

This became evident to the executives of a very large corporation when important departments in its largest division became embroiled in an open struggle for the domination of the computer resource. Since the days of tab equipment, the accounting department had controlled dp for the organization. Accounting maintained strength in this area when dp equipment (whose yearly costs were in the tens of millions of dollars) replaced the electric accounting machines.

During this time the purposes of the organization changed from the manufacturing of mechanical equipment to include the design of advanced electronic systems. The systems and design engineers, who were located at the corporation's largest division, insisted on gaining control over, or at least unrestricted access to, the dp data files and equipment that they felt were needed to manage the engineering projects.

This was vehemently opposed by the accounting managers. They argued: (a) reasonably, that the data files such as payroll contained private information; (b) speciously, that the equipment could not be dominated by operational groups who could interfere with the orderly generation of financial reports; and (c) absurdly, that "business" dp and "scientific" (i.e., engineering) dp were incompatible, and therefore must be kept separate.

The departments directed much force against each other; this became so intense that their normal tasks began to suffer. After the conflict between the groups became disruptive, the corporation's top executives created a task force to resolve the problem. This effort was undertaken by a labyrinth of committees and a consultant who was a former executive of a very large computer manufacturer.

After six months of investigation, discussion, and a plethora of reports, the corporate executives decided to form an independent Administrative Management Systems Group at the corporate level in order to foster better dp applications and to resolve disputes at the division level. The consultant was made vice-president in charge of the new group.

This arbitrarily-conceived group was ineffective since the divisions (including the accounting and operational departments of the largest division) ignored it. The positive consequence of all these events was that the division's departments at long last started to resolve their disputes in order to better coordinate their opposition to the corporate group (which eventually atrophied).

When the power shifts, go with it.

It is a practical necessity for a manager to become acquainted with the power structure of an organization and work through it in order to achieve the designated purposes of the dp department. The manager must always be aware of shifts of power as well as any changes in purpose within the organization.

It is instructive to examine how this was done by a director of a good-sized dp department. Upon being hired, he requested specific and detailed information about the previous and current history of the department, especially with regard to (1) the dp applications, (2) the departmental budget and expenditures, (3) the operational personnel and methods, and (4) the system analysts and programmers, their expertise and accomplishments.

This was not unusual. In addition, however, he acquired similar specific and detailed information about the department's users and nonusers. He also devised for his personal use a set of charts that he called "The Company Interface." Some of the topics revealed by this document were (1) the connection of the departments by purpose and people, (2) who had the greatest strength in terms of controlling or influencing budget, people, and other "factors" (i.e., resources), (3) the groups that were most important to the company.

The dp director used this information to reshuffle the priorities within his department and to reassign people and equipment use. He intensely applied the bulk of his resources to serve what he perceived to be the vital groups in the business. The outcome of these actions was enormously successful in spite of the recriminations of some of the former dp users who were now given second-class status. The enthusiasm within and without the department was remarkable. Important nonusers, who had formerly distrusted the dp department, now became ardent dp users.

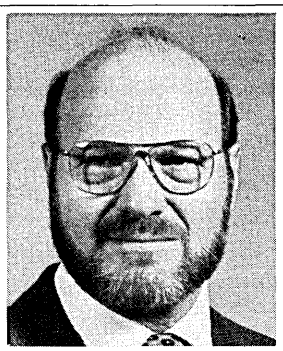
The case however had a sad epitaph. The director eventually started to assume powers beyond his sphere of dp responsibility. In a real sense, one of his purposes became the enlargement of his power base (at the expense of other groups). A backlash occurred and the important users started to boycott the dp department. The ensuing turmoil necessitated executive involvement and, shortly thereafter, the dp director resigned.

Power to get things done

Power and purpose are of fundamental importance to management—as they are to other aspects of human endeavor. Dp managers may be keenly aware of the purpose of their function; but all too often they do not recognize, or do not wish to acknowledge, all of the aspects of power involved.

There are negative connotations that are popularly ascribed to the concept of power. These connotations may cause the manager, who may be a hard worker and very knowledgeable in dp, to shy away from being directly concerned with the power structure in which dp is embedded. It is unfortunate that this view of power may be taken.

Planning, organizing, directing, motivating, controlling, and decision-making are senseless without a definite purpose, and ineffectual without the required power. It is when the dp manager is in tune with the organization's structure of purpose and power that the dp department can best serve the organization. ✲



Dr. Rue is an assistant professor in the College of Business Administration, Univ. of Arizona. He previously taught at the Univ. of Southern California, where he also was director of computer services for two years. His industry experience also includes being acting manager of MIS for North American Space Div., Los Angeles; group leader, business systems engineering, Northrop Nortronics, Los Angeles; assistant director of corporate dp, General Precision Librascope, Glendale, Calif.; and member of the program design group, System Development Corp., Santa Monica.

Humanizing Information Systems

by Theodor D. Sterling and Kenneth Laudon

The effects of system flaws on people are nonresponsiveness, harassment, drop in performance or service, and even frank exploitation.

Large scale computing systems have revolutionized the management of most, if not all, means by which goods and services are produced, or information is accumulated. Such systems interact with organizational, historical, and political pressures and goals to shape the internal structure of industrial, governmental, and other organizations. And not least, they also shape the way in which organizations interact with individuals.

By any criteria of management performance, computerization of a system makes possible almost unlimited control over its details, making the computer then the ideal management tool. But the cost of the control is high. Therefore, the questions have been asked whether large computerized systems can be developed by anyone except governments and large corporations, and whether or not such organizations will use such systems mainly for antihuman purposes.

During active proliferation of new and revised management procedures, designers of information systems cannot help but also be organizational designers as well. They cannot avoid changing organizations. But which way will the changes go? Norbert Wiener pointed out many years ago that intelligent understanding of a machine mode of control may be delayed until long after this control has been exercised (*The Human Use of Human Beings,* Doubleday, New York, 1954). Thus there exists widespread concern about the ultimate effect of management information systems on the quality of life of their end users (and also of many of their participants).

In this article, we have explored two areas to examine critically the humane qualities of Management Information Systems (MIS's): (1) criteria that may humanize information systems, and (2) development of an interface mechanism between end user and system—called "the Computer Ombudsman." The two areas are not unrelated.

Design and implementation criteria for MIS's to make them less harsh and more amenable to human tastes have been discussed in a number of meetings sponsored by the Canadian Information Processing Society (CIPS) and ACM. A proposed set of guidelines for humanizing information systems has resulted (see the box on p. 54).

The criteria as summarized in the guidelines almost speak for themselves. Possible exceptions are D.1. and E.3. There is a complex opposition of procedures ensuring privacy to those supporting humanization. We can see this immediately if we ask what a system would need to know about an end user in order to assure that it can meet criteria A.5., B.1., B.2., C.1., C.3., and E.2. (and hence criteria D.1.). E.3. may be the most controversial and certainly the most difficult criteria to implement. More than any of the other criteria, they require clear definitions of the sources of gain for any method of benefit or loss calculation.

Here is a deceptively simple example. If technology replaces the telephone operator, are ultimate cost savings to be limited to the quasi-public telephone utility, or are costs to the larger society to be included? What are the "costs" to society of losing a large number of relatively interesting (or humane type) jobs requiring relatively little technical skill and primarily filled by women, either prior to marriage or after raising a family?

In developing humanizing criteria, we had to rely largely upon anecdotal evidence of the effects of system malfunctions or of design features perceived as dehumanizing. Substantive data of the effect of systems on participants, end users, complainants, citizens, or just bystanders, now come from studies of actual incidents, or from information gathering schemes especially designed to probe relevant systems features.

The Computer Ombudsman

One such major study was undertaken in 1973, using as a vehicle the Vancouver Ombudsman Committee. Information obtained through this Ombudsman Committee indeed justifies a concern that large scale management information systems fall short of the criteria by which their human qualities may be judged. Dp experts may differ in how much they are concerned with humane qualities of systems, especially if to implement humanizing features would require increases in systems overhead and decreases in its efficiency. Yet it may be exceedingly beneficial to discuss openly features

that determine the quality of life of various classes of people who are affected by systems of management.

The Computer Ombudsman Service (COS) was established in 1973, after a year's study, by a special interest group of CIPS, with the cooperation of the Consumer Association of Canada (CAC) and the Law Reform Commission. The service became effective officially in 1974, with its headquarters at Simon Fraser University.

The COS is staffed by members of Vancouver CIPS (who occupy various levels of management in industry or government), with a sprinkling of academics. Cases accepted for study by COS are investigated by one of the ombudsmen. A number of investigations have also been initiated by the committee. These investigations were generated by commonly recurring observations. The CAC serves as a screening mechanism for most cases that might be viewed as consumer complaints. But cases have also been referred by private and public organizations as a result of public knowledge about the Ombudsman Service. (And there has been relatively little publicity.)

Cases that are accepted by the Ombudsman Service are characterized by three criteria:

1. They are not trivial.
2. Solutions for them have not been built into a system.
3. Possible solutions may be accomplished through expert knowledge of systems operations.

The primary purposes of the Ombudsman Service are to investigate features related to humanizing/dehumanizing dimensions of existing computer based information systems, and the ability of those systems to respond to humanizing efforts. Thus the Ombudsman is primarily a fact finding venture, and not a complaint department. However, it is true that most of the cases accepted for investigation by the Ombudsman have been resolved in the process of fact finding procedures.

It should be pointed out that only a relatively small number of cases were processed by the Ombudsman Service. The load has averaged approximately two cases a month. That number underestimates the actual number of problems that may exist or may be perceived to exist.

One limitation in the number of cases that come to the attention of the Vancouver Ombudsman Committee is imposed by the prescreening mechanism that has been established through CAC. Only those cases are passed on that clearly deal with a computer related problem not yet completely investigated. Problems for which solution models have been established subsequently may be resolved by CAC staff.

More important, however, may be the relatively small number of substantive problems that are recognized in the first place as computer or system caused. After all, modern systems have been designed with some care, and the effort has especially been made to eliminate simple sources of errors taught by experience with "manual" predecessors of computerized procedures. The results may have been an overall reduction in numbers of errors or problems.

On the other hand, those errors that occur now may be of infinitely greater complexity. They may have as their source combinations of rare events, each of which may occur with a very low probability; however, they do appear when the total number of transactions in a system become very large. Those same rare events or combinations of them will then occur with almost complete certainty. Two errors that are independent of each other, each of which may occur no more often than one time in 1,000, will combine no more often than one time in 1,000,000. But for a system that averages 100,000 transactions a month, such rare errors would occur with almost complete certainty at least once a year.

As a consequence, only relatively complex cases come to the attention of the Ombudsman. But, at the same time, the implications of cases and studies we discuss here reflect strikingly upon

Criteria For Humanizing Management Information Systems

A. *Procedures for dealing with users*

1. The language of a system should be easy to understand.
2. Transactions with a system should be courteous.
3. A system should be quick to react.
4. A system should respond quickly to users (if it is unable to resolve its intended procedure).
5. A system should relieve the users of unnecessary chores.
6. A system should provide for human information interface.
7. A system should include provisions for corrections.
8. Management should be held responsible for mismanagement.

B. *Procedures for dealing with exceptions*

1. A system should recognize as much as possible that it deals with different classes of individuals.
2. A system should recognize that special conditions might occur that could require special actions by it.
3. A system must allow for alternatives in input and processing.
4. A system should give individuals choices on how to deal with it.
5. A procedure must exist to override the system.

C. *Action of the system with respect to information*

1. There should be provisions to permit individuals to inspect information about themselves.
2. There should be provisions to correct errors.
3. There should be provisions for evaluating information stored in the system.
4. There should be provisions for individuals to add information that they consider important.
5. It should be made known in general what information is stored in systems and what use will be made of that information.

D. *The problem of privacy*

1. In the design of a system, all procedures should be evaluated with respect to both privacy and humanization requirements.
2. The decision to merge information from different files and systems should never occur automatically. Whenever information from one file is made available to another file, it should be examined first for its implications for privacy and humanization.

E. *Guidelines for system design having a bearing on ethics*

1. A system should not trick or deceive.
2. A system should assist participants and users and not manipulate them.
3. A system should not eliminate opportunities for employment without a careful examination of consequences to other available jobs.
4. System designers should not participate in the creation or maintenance of secret data banks.
5. A system should treat with consideration all individuals who come in contact with it.

criteria for humanizing information systems.

In studying system flaws and their effects on end users and participants, we found it useful to classify our cases according to criteria of nonresponsiveness, harassment, decrease of performance or service, and frank exploitation.

Nonresponsiveness

A complaint heard very often is that the "computer" does not reply to inquiries, especially concerning possible errors. Our observation would bear this out. In many instances of errors, system replies to end users were slow, and in most cases nonexistent. Yet in no instance was the "system" unaware of the existence of a problem or of an error! There was always some level of management that knew of it, usually within the data processing segment.

Case A received tax notices addressed to the previous tenant of a house (who also owned the property). The new tenant returned these notices with the information that the previous tenant no longer resided at that address. When tax notices kept coming, the new tenant sent a number of letters to the tax bureau, again with the information that the previous tenant had moved. However, tax notices did not stop coming, nor was there ever any reply received from the tax office.

On investigation, the Ombudsman found that the existing rules stipulated that in cases of an unknown residence of a taxpayer, the post office was to attempt to forward mail to a new address if such an address existed. But the obliging new tenant had returned notices to the tax office rather than to the post office so that the letter could proceed with further search. No one in the provincial or municipal dp center in fact knew about that rule or had any authority to reply to messages, nor was there anyone there with authority to stop sending notices to the last known address of the taxprayer.

Case B was a customer of a large department chain who through mysterious circumstances found himself in possession of two separate accounts. For almost a year, he thought this was just a matter of confusion of bills or of his own records. When he discovered he was billed under two separate accounts, he so notified the company, but received no replies.

On investigating, the Ombudsman found that the source of these two accounts was of considerable concern to dp management. However, because of the time that had passed, and because of the load of day-to-day dp work, it was simply not possible to track the source of the error. Occasionally half-hearted attempts were made to investigate how the customer's two accounts had come about. In the meantime, no action was taken either to reply to him or to eliminate the wrong account.

Both examples are clearly violations of criteria A. 3,4,7 and C. 2,3 (see box). In the two cases, and in fact in all cases of error investigated by the Ombudsman, some level of the system was aware that an error had occurred. No action was taken because no provision for action existed at the level of the dp management structure involved with a particular type of error. Inquiries remained unanswered, either because there was no horizontal communication between the different vertical management structures that handle different parts of the organization's responsibilities (as in Case A), or because dp management was unwilling to take action until the source of the error had been discovered (as in Case B).

Harassment

Case B is also an example par excellence of harassment due to faulty intrasystem communications. Although the customer received no answer to inquiries concerning two account numbers, he was notified first by letter and then in person that his account was delinquent, and was subsequently threatened with action by a collection agency and damage to his credit standing.

Another instance of harassment is *Case C*. This individual had his wallet stolen in 1971. The credit cards that were in the wallet had been used by the thief to establish an alias. The thief was apprehended for armed robbery in 1972, and the wallet, including the credit cards but not the money, was returned. In 1976, the former victim was stopped for a minor traffic violation and was required to go through lengthy clearing procedures. He found out that his name was on a list of possible aliases used by a dangerous known criminal.

This example from the Vancouver Ombudsman files luckily had no more serious consequences than momentary embarrassment. But under similar circumstances, a man was killed by a Florida state trooper who mistook his car for a stolen vehicle after checking with the state's crime computer. The victim's 1975 car license plate bore the same number issued for the stolen vehicle in 1971, but which was still in the state's active stolen vehicle data base.

These examples are related to inadequate horizontal communications between vertical management structures. Upon inquiry the Royal Canadian Mounted Police agreed that there was really no need to keep this particular alias alive as the criminal in question had been apprehended and all identifications had been returned to the former victim. The RCMP, the Florida State Police, and the store's billing systems clearly failed on criteria A.7, B.1,2, C. 2,3, and D. 1,2, (although for different reasons).

The concept of harassment is of course relative. What harasses one individual may not harass another. Under a very broad definition, harassment may be any action taken by a system that could lead to damage or loss. (The action need not *actually* lead to damage or loss; the fact that such possibility exists may be felt harassing by many individuals.)

One such class of harassment (albeit relatively trivial), and that also demonstrates the problems that arise from poorly designed systems, is the lag between billing and mailing dates of bills for many major credit organizations.

After receiving a number of inquiries (not necessarily cases handled by the Ombudsman) about bills having been received too late to permit payment of obligations to avoid interest, members of Vancouver CIPS were asked to keep envelopes in which they received computerized bills and mark on them the billing date as well as the date in which the bills had been received. (The mailing date was given by the metered postage mark.) Replies were analyzed by type of credit industry (only major credit companies were included—the three major department chains in Canada, the banks that handled *Bank Americard* accounts [named *Chargex* in Canada], and major oil companies).

TIME LAGS IN DAYS BETWEEN BILLING DATE, POSTMARK DATE, AND DATE BILLS ARE RECEIVED

Time Intervals	Dept. Stores	Oil Companies	Credit Services
Average time lags between billing date and postmark date	7.12	3.65	5.4
Average time lags between postmark date to date received	10.53	8.35	8.85
Range of billing date to postmark date	4-20	1-19	1-10
Range of postmark date to date received	6-24	4-20	3-13

Table 1.

The delays between billing date and mailing date are given in Table 1. While the average periods of time lag between billing date and date at which a customer may receive a bill for different categories of accounts may

range from 8 to 10 days, individual instances of delay actually range from 3 to 24 days. As most credit accounts are explicit in counting time from billing date during which customers can satisfy their obligations (the usual time period to settle an account is 25 days from billing date), the delay in mailing bills may result in unnecessary problems to organizations advancing the credit, and to the customer who may be confused about his obligations. Also, in general, a third of the customers received bills so late that it was not physically possible for them to settle their accounts within the specified grace period.

(Our time estimates may not hold exactly for the U.S., but the differences probably are small. The U.S. postal system seems to be more efficient than the Canadian so that the delay caused by mail handling would be less for U.S. than Canadian customers. Billing procedures for *Chargex* and the Canadian offices of the major oil companies seem to have been imported from U.S. sources. Nevertheless, it might be important to repeat the same survey for comparable U.S. companies.)

While the billing lag study addresses itself to perhaps trivial matters from the system design perspective, it exemplifies rather well problems created both by centralizing large scale operations and by increasing the number of transactions according to the capabilities of computers. Clearly, it is not too difficult for a good system to spew out so many bills a day that the mechanical operations to stuff them into envelopes and mail all of them takes three weeks.

We have classified the billing example under "harassment" because potentially an end user of the system stands in danger of taking a financial loss. On inquiry by the Ombudsman with all companies involved in the study, it was claimed that any interest accrued when a customer complained for reasons of delayed mailing of bills would be wiped from the records. However, this still required customers to be aware that they were being billed late, and to write to the billing agency. Relatively few would do so. A recent study found that while 20% of clients of a particular organization had a legitimate complaint, fewer than 1% actually complained. The most important obstacles to complaints were ignorance of whom to address the complaint to, followed by distrust of the effectiveness of complaining. But even to correct for the registered complaints may have led to unnecessary expenses and loss to the billing agency itself.

While inquiring into this billing lag, the Ombudsman encountered a great deal of waffling. Not a single one of the companies involved would admit that there was a time lag between printing and mailing of bills, although none of them denied it. None of the companies indicated that they would deal with that problem or try to correct it. The unwillingness to face up to system flaws however, may have additional undesirable consequences.

The failure of the industry to deal with its own problems may result in corrective legislation. In the present instance, the Ministry of Consumer Affairs of British Columbia has brought in a bill stipulating that a customer must have at least 15 days from receipt of his bill to satisfy his account. While this bill is bad on a number of counts and is opposed by COS, it may still be required unless industry takes the initiative in investigating and correcting such system design flaws itself.

Decrease in performance or service

We use as a pragmatic criterion that a decrease in performance or service has occurred when the system, after its reorganization, gives less service to an end-user than it had previously. From this point of view, the failure of the post office to deliver mail twice a day or six days a week is such a decrease in service of the postal system. We also count as decrease in performance or service an increase in cost with no accompanying improvement in service, or an increase in the amount of work or effort required by participants and end users, not resulting in improvement in system's performance.

An example of such decrease in performance came from a study of the Vancouver Resource Board. The VRB is an attempt by the Province of British Columbia to combine all its health and welfare services. After the system was installed (and continued on without improvement for almost a year), approximately one third of the communications with the system were erroneous. Approximately one third of the checks mailed to the clients of the system had to be manually recomputed and redone. The combined welfare organizations with computerized management systems apparently result in decreased performance of service to clients (and to lower echelons of management). Other but similar system failures have been reported by the *New York Times* (March 17, 1975) which estimates that on a national level, twice as many eligible welfare clients are denied assistance than the number of ineligibles who receive it.

But instances of decrease in performance or service are not limited to welfare systems. One instance is the switch from a bimonthly to monthly

"I wrote to the FBI for my personal file. They say they never heard of me and I should stop bothering them."

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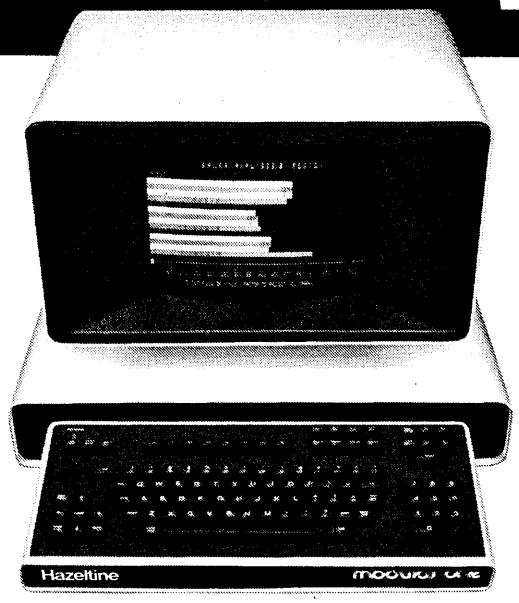

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CIRCLE 13 ON READER CARD

mailing of alimony checks from an escrow account when the responsibility to write and mail these checks is transferred from the courts to a computerized banking service (*Denver Post,* April 13, 1976). What are we to call the recent switch of credit organizations that now only send a summary of purchases rather than copies of the original purchases (*Chargex,* 1976)? While the inconvenience to the credit holder of the service may be trivial, the fact remains that he gets less service without an accompanying decrease in cost.

Similarly the larger error rate of various systems may be viewed as a decrease in performance or service. For instance, in New York state's criminal justice system, over 20% of the summary criminal rap sheets contain substantial errors of facts (not all of which are computer related). Yet these reports are used by police, prosecutors, and judges to determine the fate of arrested persons. Despite ten years of previous experience, this particular agency has not systematically redressed the origins of these errors or investigated the consequences for arrested persons (*New York Times,* Oct. 24, 1975). In this sense too, the failure of bills to be mailed in sufficient time to give customers notice when payment is due is a decrease in the system's performance as well as a system flaw.

Exploitation

There is a design strategy that accounts for a large number of dehumanizing practices in management systems. In order to increase the efficiency of an enterprise, end-users and participants in the systems are treated as unpaid components whose time, effort, and intelligence do not appear in the cost accounting. It is precisely this kind of exploitation of human intelligence and labor that computerized systems ought to do away with. But do they?

In the example of the Vancouver Resource Board, employees of lower management strata were required no fewer than three times to prepare the same input, listing information from each client record. Apparently no attempt was made to save previous files, or to develop an editing system or an adequate data base. And such practice of creating unnecessary work has not been limited to the Vancouver Resource Board. Very often when errors occur, lower level staff are required to redo tasks that easily could have been saved them. These examples not only violate criterion A. 5, but even more so, criterion E. 5, which requires that employees of a system be treated with the same consideration shown to others.

One related practice of many universities is a procedure by which students who add or drop courses after registration still perform many of the clerical functions for manual record keeping of enrollment. Students are usually required to fill out forms in multiples which they carry around to departments, faculty, and registrar offices. While such procedures become almost completely redundant once the registration of a student is computerized, they are continued in many schools. Although the work done by each student may be small, the total amount of labor performed by the approximately one fourth of all students who add or drop courses during each semester is enormous, and yet the amount of additional work by the computerized registration system may be next to nothing.

Another sort of exploitation is the selling of names. The cos bought a list of names and addresses of senior Canadian citizens for the Vancouver area (freely on sale) and asked each person on the list if he knew that his name was being used in this manner. Almost without exception, all individuals queried bitterly resented finding their names on a list offered for sale. (The purchaser of such a list should also have some resentment because a high percentage of the names failed to be accurate.)

Summary conclusions

As a result of experience with the Canadian Computer Ombudsman Service and our examination of the criteria needed to humanize information systems, we note the following trends which dp managers should be alerted to. There exists:

1. A diminution of opportunities for individuals to negotiate with a bureaucracy, and thereby a diminishing of the humane qualities of the systems with which they deal.

2. A decline in the ability of the system to fulfill an intended service function.

3. Little horizontal communication between components of a management system where control functions primarily exert themselves vertically. As a consequence:

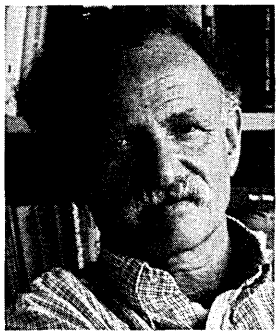
   a) communications between end users and participants and other points of the system become difficult, and

   b) individuals may be harassed by one part of the system that accepts incorrect output from another part for further actions.

4. Obscuring where the authority for decisions actually exist, to protect the *privacy of incompetence.*

5. Exploitation of the labor of lower level managers, workers, and end users in ways that do not show up in the total accounting of system expenditure, in order to patch system flaws, or to bridge difficult horizontal communications between system components.

Yes, it is true that computerized management technology is relatively new, that the development of that technology is expensive, that errors are unavoidable, that large numbers of transactions made possible through computerization will multiply the probability that makes for difficulties, and that time is needed eventually to cure all ills, including those inflicted by hasty systems design. However, it is also true that time by itself will not cure errors, and that the dp community may be faced with the choice of investigating and correcting its own ills—or, failing to do so, have these ills become a running sore of an otherwise vigorous and innovating profession. ❋



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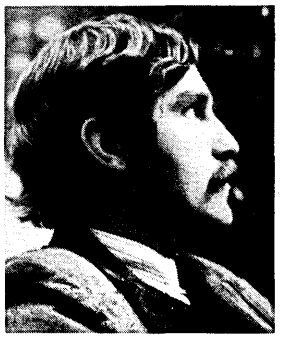

Dr. Laudon is an associate professor of sociology at John Jay College (CUNY) and senior research associate at the Center for Policy Research in New York City. He is the author of "Computers and Bureaucratic Reform" (Wiley, 1974), and has written articles on the role of computers and telecommunications technology in contemporary society.

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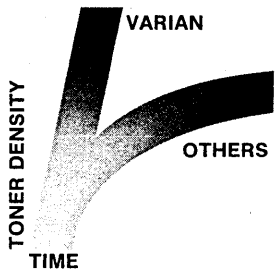

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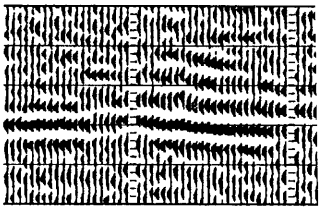

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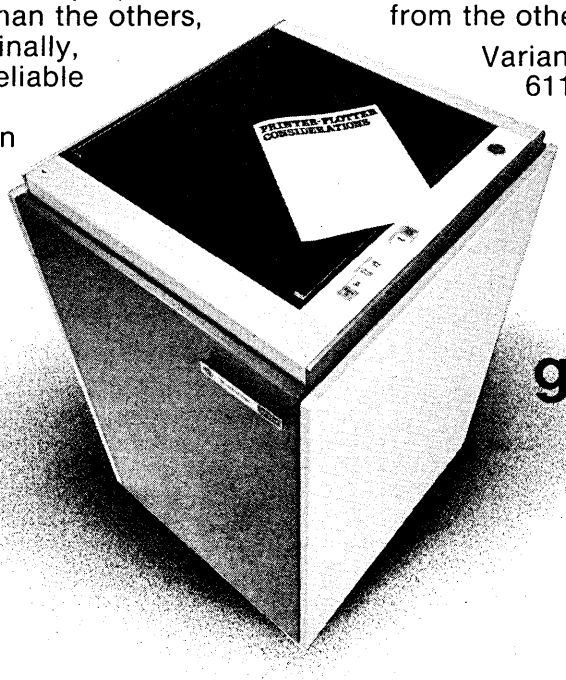

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CIRCLE 34 ON READER CARD

A Computerized "Librarian"

by R. A. Baker and J. C. Jefferies

In the process of defining a job for a librarian, this shop defined instead a program to do the job.

The programmer's job is to write programs. He will not be as effective at this if his primary responsibility is diluted with bookkeeping tasks related to program or systems libraries. Yet these bookkeeping tasks are essential.

In an attempt to cope with the situation, many excellent software management programs have been written. However, the uniform shortcoming of these programs, despite their many virtues, is that they still require some training of the programmer. At a minimum, he must learn and remember the control language and procedures of the Library program; and it is not unusual for him also to have to learn the Job Control Language (JCL) to communicate with the Operating System.

These training requirements are not difficult, especially for experienced programmers. But they do require time, and training periods can come at awkward times, adding to the problems of scheduling program development. For the trainee who is also engaged in learning many other things (such as a programming language or a data base), learning the Library language often appears impossible. And where programmers are engaged in a wide variety of activities of which only the minority require the Library language, it is easy for the programmer to forget the details. The result? Errors followed by reruns, referencing the manuals, or going to an expert for an on-the-spot refresher course.

The solution

Faced with this situation, we at Exxon Production Research Co., Houston, thought that surely there must be a better way. We now think we've found it. The Library program we developed requires virtually no control cards, and training is part of teaching the newcomer how to submit batch jobs. Our program operates on a module basis, and the only control card is the rarely used card for deleting modules. All Adds, Replaces, and Modifies are done without control cards.

> Our problems with Library maintenance evaporated the day we installed the new program.

We estimate our development costs for this program at 50 programmer-hours; a similar program would be within the means of most programming shops. The program is written in PL/1, and is about 600 lines of source code. We have certainly long since recovered our investment. Our problems with Library maintenance evaporated the day we installed the new program.

Getting rid of our library problems did cause us to become a little old fashioned, however. Our new Library program requires that we keep source cards for all programs, an emphasis on cards which is decidedly against modern trends. But one thing every programmer understands, regardless of background and training, is that a deck of punched cards represents a program.

We also found that we were keeping cards to some extent anyway. We saved Library control cards because it was easier to change them than to repunch from scratch. We also observed that we could save the overhead of control cards, which we estimated to be 50% of the original source (both the cost of the cards including handling and the cost of punching them). But we would need some card file space.

As it turned out, we found we could conveniently store 17,000 cards per square foot, not nearly the nuisance one might think. And curling is not the problem it once was, thanks to improved card readers. We've run decks over six years old. As mentioned, the only real opposition to cards is an irrational one: they're old fashioned.

Analyzing the problem

Ours is an IBM shop writing scientific software both for local use and for internal distribution throughout a worldwide corporation. Some of the things we do are statistical analysis; simulation of hydrocarbon accumulations in the ground for oil exploration; seismic data reduction; and contour or cross section mapping on flat bed or drum plotters. FORTRAN is by far the dominant language, with local flourishings of ACL, PL/1, and COBOL. The main computer at our installation is an IBM 370/168 with four megabytes of core storage, 24 Model 3330 disc spindles, and 14 tape drives.

Our particular group writes and maintains moderately large application programs for long term local use and for outside distribution. Programs are

on the order of 10,000 source statements distributed fairly uniformly over 250 subroutines. We program in teams and use top-down design and development; the form of structured programming we use might better be termed "readable programming."

On examining our operating procedures, we found that we needed to isolate subroutines for testing purposes. Subroutines could be isolated through a standard Library procedure by copying a particular routine to a temporary data set, updating it there, then recompiling and relinking. Setting up this procedure was time consuming for an experienced programmer, and was an obscure operation for a less experienced programmer who finds JCL formidable. When any step wasn't done quite right, the results required analysis by senior personnel. Isolation of several subroutines made the operation even more complicated.

The procedure of last resort was to punch and interpret the subroutine for manual testing. This turned out to be by far the simplest and cheapest procedure. It produced a lot of punched cards and kept the interpreters going for some time, but it did allow the programmer to concentrate on the program rather than on the details of the Library system. And there were far fewer mistakes. Having observed this, we asked ourselves, "If we're going to be punching these decks, why bother to put them into the Library? Why don't we just keep the decks?"

Our answer was: we need to keep a backup copy of everything in case of loss or physical damage. The Library provided that. Moreover, with the program in the Library, distribution of the program is relatively simple. A tape of the program could be made using established Library procedures. (We keep three copies of programs at all times: on cards, on tape, and on disc.) We could also see that our ordinary processing would require reading thousands of cards through the card reader if we did not use a disc or tape library. And the fewer times a card is read, the more likely it will be there when you need it. Using the card reader on a massive scale would definitely inhibit progress, but using it on a small scale for only subroutines of interest would constitute the same amount of usage that we had with the standard Library program.

We thus reached the stage where we were convinced of the virtues of cards (after years of unsuccessfully trying to eliminate them), and the virtues of the Library. Our only hope of really getting rid of the cards seemed to lie in a time-sharing operation, which is much more expensive than housing punched cards. Where we have been able to use a teletype or crt terminal, the cards have indeed disappeared. But our mainstream programs remained in card form, going through remote card readers or over the counter. We considered getting on-line terminals for mainstream development, but decided we really didn't need them.

We decided against new computer hardware, without considering the expense, for the following reasons: our programs print or plot more volume than is suitable at an interactive terminal. Routing the output elsewhere would make the operation another variety of batch. Interactive terminals seem to be ideally suited for debugging programs, but the larger the program, the less the utility of the terminal. The terminal tends to lock in the programmer so that he communicates with the terminal, but with little else.

Although the programmer could find and fix bugs rapidly on a terminal, he does so at the expense of other important aspects of programming. We are not convinced that the programmer is more effective in debugging at a terminal than in a team environment because (1) there is a tendency to make quick patches that later become obscure bugs themselves, and (2) only the bugs that show up in execution are fixed. There are advantages in not having instant response. It allows time to think more about what needs to be done, to communicate with other people, and to do programming jobs not associated with the computer, such as documentation. Instant response tends to *drive* the programmer so that he reacts more to the needs of the computer than to those of the user. For some of our programs, using a terminal was excellent, but for the majority, they could not be justified.

Arriving at the solution

Again, we were back to cards and the need to keep our programs on a disc or in a tape library. We then decided to resort to the Programming Secretary, or Librarian, mentioned in the literature. No one available really had the qualifications as we understood them, so we decided to define the job in such a way that the members of the team could share or rotate the responsibility. After much discussion and a few trials, the basic operation turned out to be this: we would give the subroutine to be replaced or added to the Library to a person designated as Librarian, and he would put it on the Library and make a record of the event. The test runs, which seem to be a standard part of the Librarian's job, could be handled differently.

In the process of defining the Librarian's job, we actually defined the function of the computer program we now use as our Librarian. The subroutines themselves are the control cards. We simply insert the new or modified code in the JCL deck, and the library program does the following:

1. Adds a line of source code to each subroutine which serves as a comment card with the run date on it. Thus the listing and the two source files, disc, and tape, have this date as part of the code.
2. Updates a source file on disc. If a subroutine already exists by the same name, the new one replaces the old one. If no subroutine exists by that name, it adds the new one.
3. Creates a backup tape with the same contents as the updated source file.
4. Updates an object file on disc, replacing old object code and adding new.
5. Provides a compiler listing of the updating subroutines.
6. At the end of the run, it lists the modules in order as they appear on the Library file, the date of last update, and the number of source and object records for each module, giving subtotals for each category of old, replaced, and new, plus a total for the whole. It also produces a list in alphabetical order.

With this record, we can readily monitor the growth of the program. We are able to use the dates to determine whether a listing is the most recent, and we can relink with the updated object file for execution or testing.

Summary

To our understanding, most Librarian programs are too general purpose. They try to deal with all varieties of source or text. The theory is that once you've learned the Librarian's program maintenance language, you can use it to operate on programs written in any language. And where a formal Library group is set up to handle programmer requests, such program maintenance languages are highly effective. The Library personnel learn only one language for handling all varieties of programmer requests. However, we have demonstrated that programmers do not have to use a formal Library group for good code maintenance. The computer can do that.

The Library program we use is, of course, tuned to FORTRAN. It recognizes subroutines and functions because these are the "control cards" of the program. It could just as easily be tuned to PL/1, COBOL, or to an assembler language; each language has suitable keywords. It would, of course, be possible to have one program operate on all languages by adding a con-

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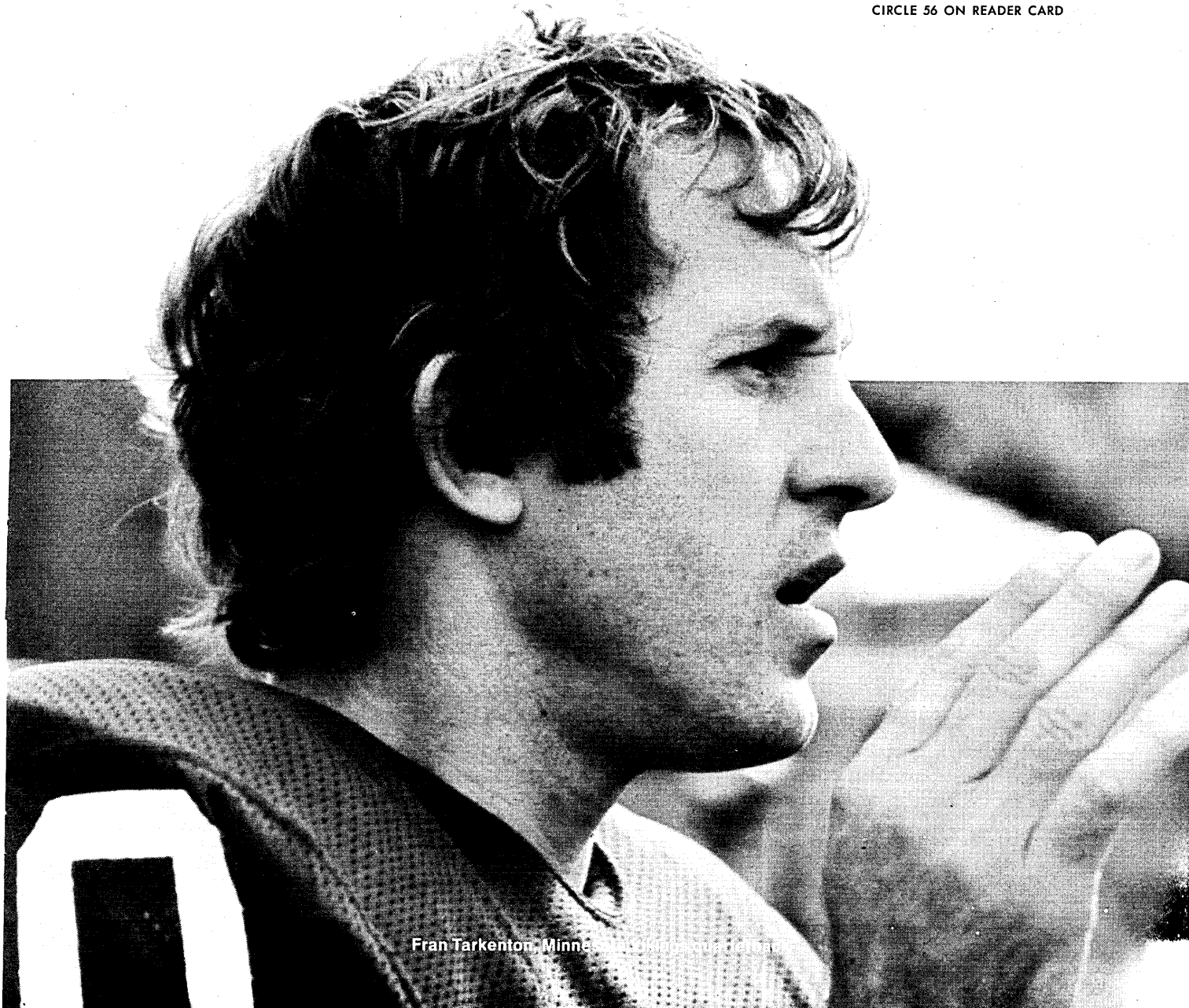
CIRCLE 56 ON READER CARD



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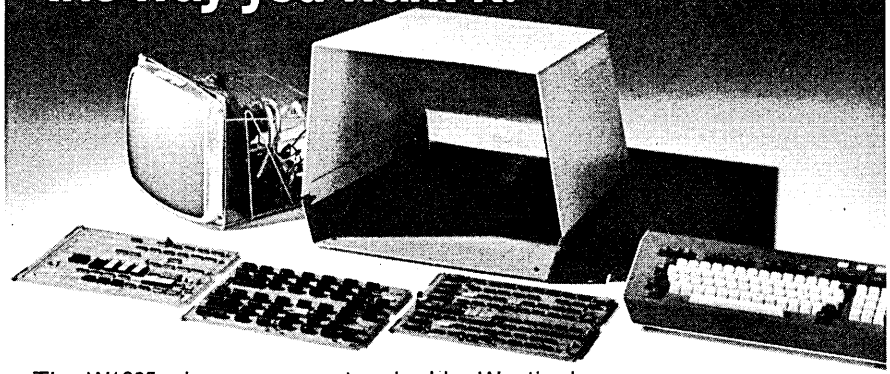

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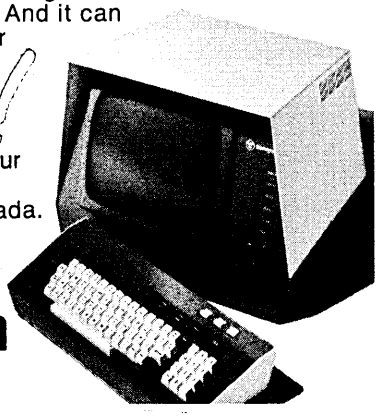

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"LIBRARIAN"

trol card giving the name of the module. But we believe that would be a bad design unless the compiler or interpreter of each language could also accept the control card. Otherwise, it becomes another training exercise and another opportunity for programmers to make mistakes.

In conclusion, we suggest that there is not nearly the need for sophisticated, general purpose, Library programs that vendors or our past experience would lead us to believe. These programs have many uses, but maintaining the source code for a project can be done a better way. The source cards themselves can serve as control cards for the Library maintenance program.

As a gauge of our results, when we added more programmers, none of them had any problems with the program. There were no questions about how to use it since everything is self-explanatory—no user manual is needed, there is no mystifying JCL, and there is *no* need for a person to fill the position of Librarian! As we said earlier, our problems with Library maintenance vanished when we installed the new program. ❋

In data processing for 12 years, Mr. Baker is a senior programmer at Exxon Production Research Co., Houston, Texas. Trained as a geologist, his main areas of work include statistical analysis, computer cartography, and economic analysis.

Now retired (!), Mrs. Jefferies had been involved in research program development, including data base manipulation and simulation of natural processes in relation to oil production, at Exxon Production Research in Houston.

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CIRCLE 26 ON READER CARD

Source Program Management

by Larry K. Miller and David Ostrom

Here's a way to do things better which, for once, requires no upgrading, conversion, nor new product acquisition—only a change in routine.

How many times have you been faced with the following situation: while covering for the primary programmer on a system, the edit/update program crashes at 1 a.m. You come into work drowsy and dreary eyed, only to find that the program has been recently changed. In digging through the programmer's office, you encounter not one or two listings of the program in question, but 6 to 12 listings, all very similar. Not only do you wonder if you have the most current listing, but you also encounter two or three decks of the program in question. Thankfully this does not often happen, but those with several years in this profession, have been faced with a similar situation at some time.

This problem plus the desire to better control our production programs prompted us to evaluate available program control packages. During our evaluation, we found that we had all of the pieces necessary, without spending extra money, to solve not only the above problems, but also to gain the following advantages: obtain current copies of programs requiring maintenance on a timely basis, provide backup for production source programs, remove the requirement of backing up and protecting the program source which consisted of ten card cabinets full of a half-million cards, provide a means for protecting production load libraries, and provide an audit trail of programs being modified.

We are a medium size shop supporting the administrative functions of Washington State University. We are one of many users of the university service center (WSUSC), which in turn is one of only three service centers in the state. WSUSC has dual IBM 360/65s, 5 MB of core (split 3 and 2), CalComp equivalent 3330s, and the usual assortment of tape drives, printers, and card devices.

There are 25 programmers and analysts in our office supporting all administrative areas including payroll, general accounting, financial aids, student accounts, student records, admissions, personnel records, alumni records, and institutional planning. Many of the systems are designed for teleprocessing, but the majority of the work is done by batch processing. Primary programming languages are: Assembler for teleprocessing, and COBOL, PL/1, and MARK IV for batch.

We once had the problem of programmers keeping the only copy of production program decks. This way they could always have the current copy and would be able to make changes to the production load partitioned data set at their convenience. (For those not familiar with the parlance, a "partitioned data set" consists of several sequential members with a directory at the beginning containing the name and address of each member. In our case the sequential members consist of either source programs or executable code.)

We also had a problem of maintaining backup, and a problem of these people terminating employment and leaving us with several similar copies of the same program. Still another associated problem was that most times these programs were left in unlocked, unprotected filing cabinets which were accessible to everyone. Consequently, it was not unusual to lose some of the current decks. To combat this situation, we undertook the design of a system called Management of Program Source (MOPS).

The concept of MOPS grew out of a need and from the input of several people. Coming up with the concept took very little time, but because of our cautious approach, the volume of programs to copy, and training of personnel, it took over six months to fully implement.

To develop this concept, we used what resources were available to us without purchasing or building additional software, including: WYLBUR text editing system, mass direct access storage, a schedule and control group which was responsible for production, and several remote terminals. Although our version of MOPS is designed particularly for this environment, it could be adapted for BATCH, RJE, or some other text editing system as well.

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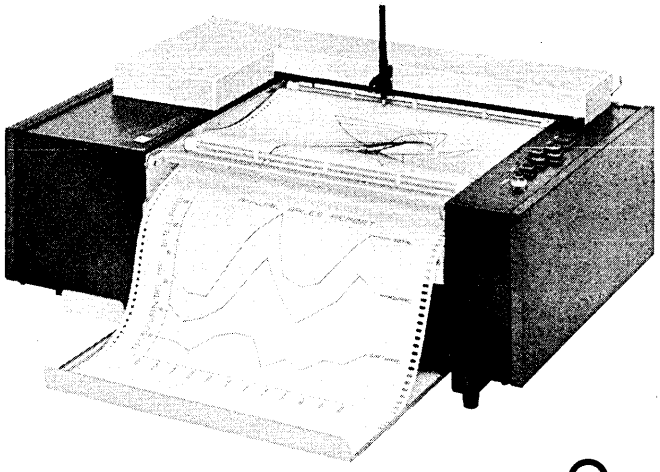

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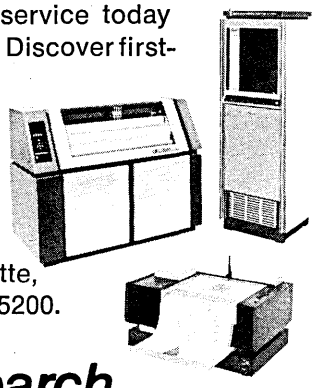

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MOPS gave us the following benefits:

1. We were able to remove ten card cabinets that were no longer needed to store program decks. (They had contained over a half-million cards.)

2. We were able to provide complete flexibility to the programmers for obtaining current copies of programs they needed quickly.

3. We were able to provide maximum control of the office source library and production load library without jeopardizing the flexibility necessary to make late night changes to production programs that crash.

4. We were able to get all the production programs out of the programmers' offices.

5. We were able to substantially increase the productivity of programming effort.

6. We were able to easily perform backup not only of the program source library, and the production load library, but also of the intermediate work stages of programs being modified by programmers.

7. We were able to get a handle on programs that were being placed into production so we always know where the most current copy of the program source is and can very shortly have the most current copy of the program listing filed in a central location.

To obtain a program from the office source library, the programmer need only execute a simple job that will take a copy from the source library, catalog it, and place it into a public data set for the programmer's personal use. The cost to obtain a copy is minimal (less than 15¢ to obtain copies of programs) and requires response to only two prompts on the terminal. Once the program is in a public data set, the programmer may do as he wishes with his copy. The source library is backed up to tape once a week with copies cycled on a three month basis. The public program data sets are backed up to a tape twice a week with those tapes also cycled every three months.

Once the program is made public, the programmer has easy access to it through the use of remote terminals using the WYLBUR system. If the programmer does not know how to use WYLBUR, the program can also be updated through the IBM Utility IEBUPDATE. Also, if the programmer really must have his card deck as a security blanket, another JCL procedure will pull the program from the source library and punch it into card form.

When the programmer has made all changes to the program that are required, has tested it, and is ready to enter it into production, he compiles it into a temporary load partitioned data set. This temporary load partition data set, as well as the permanent load partition data set, is backed up to tape once a week with the tapes cycled every three months. As the data sets are backed up, the Schedule and Control group monitors all programs to maintain control of both source and load. After the compile listing comes back, the programmer submits a program transmittal sheet along with the program listing to Schedule and Control.

When the program listing and the program submittal sheet is received by the Schedule and Control group, the temporary load copy is link edited into the permanent load partition data set. After verifying that the permanent copy has been replaced in the production load PDS, the control person then scratches the temporary load copy. It is also at this time that the control person compresses and copies the program source from the public library back into the office source library. Both the office source library and the production load PDS are password protected for write so that only the Schedule and Control group can copy members into them. After the copy has been made into the office source library, the public copy of the source program is scratched from the public library by the control person.

To facilitate late night changes to meet critical deadlines, every production JCL run deck points to both the temporary load PDS as well as to the permanent load partition data set. The temporary load PDS appears first with the production load PDS concatenated to it as the second DD statement of the JOBLIB or STEPLIB. Through this mechanism the system will always search the temporary load PDS first to look for the load module. To make certain the programmers do not compile programs into the temporary load and leave them, there is constant monitoring of this data set by the Schedule and Control group. If the program appears in the temporary PDS but a program transmittal sheet does not follow it within a two to three day period, the control person seeks out the responsible programmer. If an explanation cannot be given or it appears that improper use is being made of a production program, the supervisor of system support is contacted to report the problem.

Several extensions to MOPS are presently being developed. This includes putting all source programs onto microfilm periodically to provide constant historical records of program changes. Another extension might be comparing the program source in the public library to the program source in the office source library before it is replaced.

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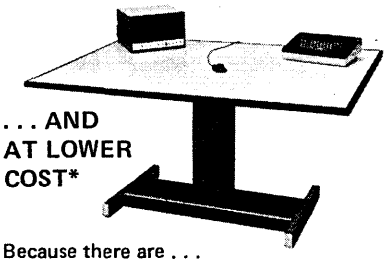

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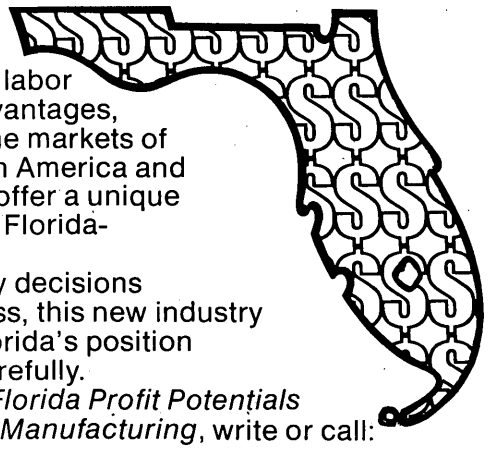

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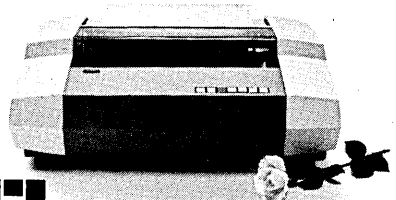

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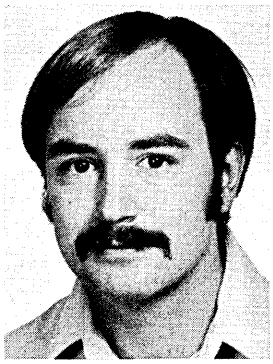
MANAGEMENT

This will provide a record of all changes that were made to the program before it is copied back into the source library. This audit listing of changes would then be filed with the program listing by the Schedule and Control group. MOPS is also being extended for the control of copy libraries and production JCL run decks.

Since MOPS was implemented a year ago, we have improved the turnaround on modified programs, we have every single production program in the office source library under very close control, the load copies in the programs that are being executed in production are also being controlled very closely, and there have been a number of occasions where programmers accidentally lost or scratched their work copies of programs that had several modifications made to them but were able to recover because of the backup scheme. In short, the concept has proved its worth many times over for us; we suspect it could do the same in many other shops too. ❋

Currently manager of administrative systems support at Washington State University, Mr. Miller has over 12 years experience in dp operations, programming, systems analysis, and management.



Mr. Ostrom is a senior technical support programmer for Washington State University, where his six years of programming and analysis work has often been oriented to student record applications and teleprocessing.

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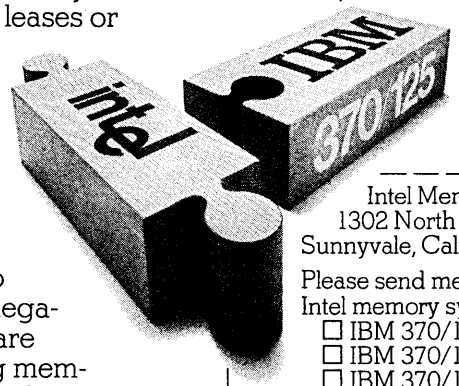

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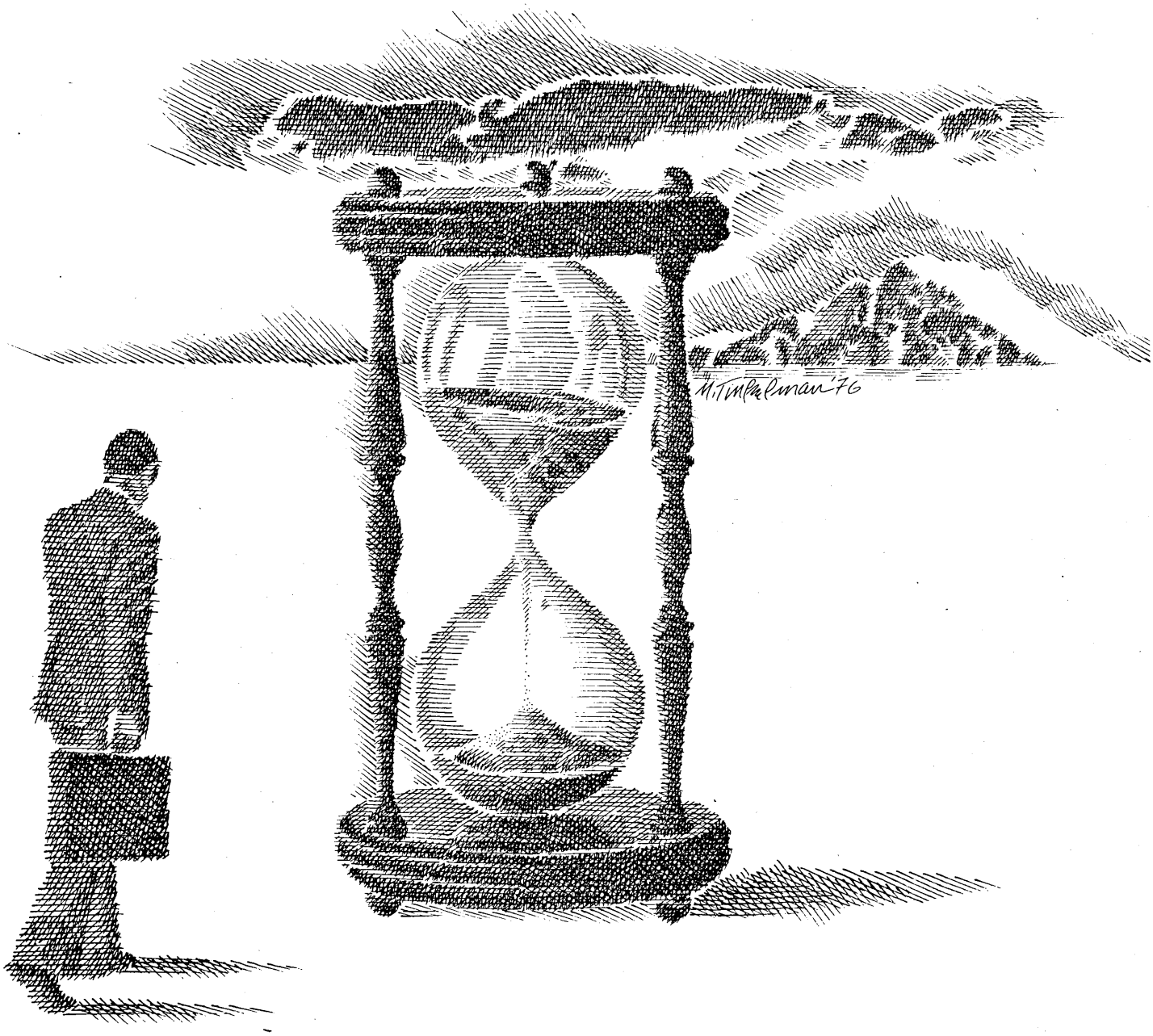

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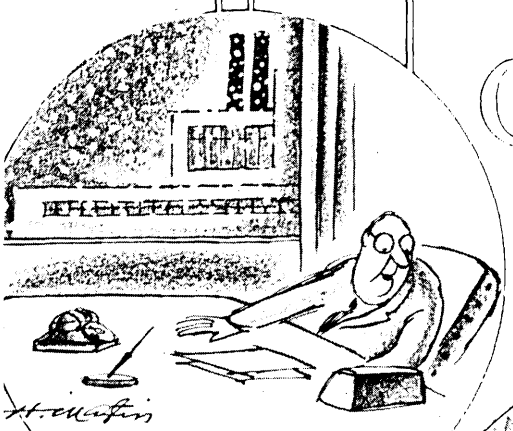
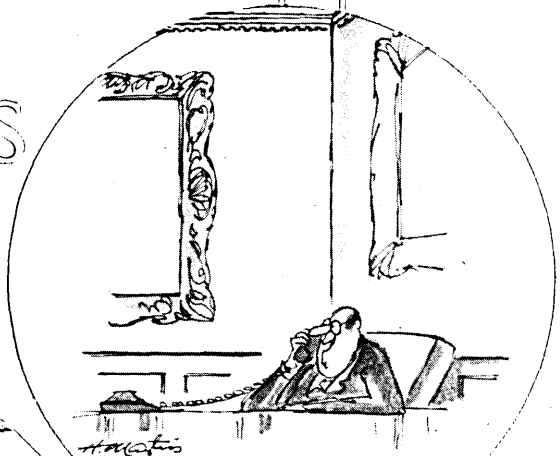
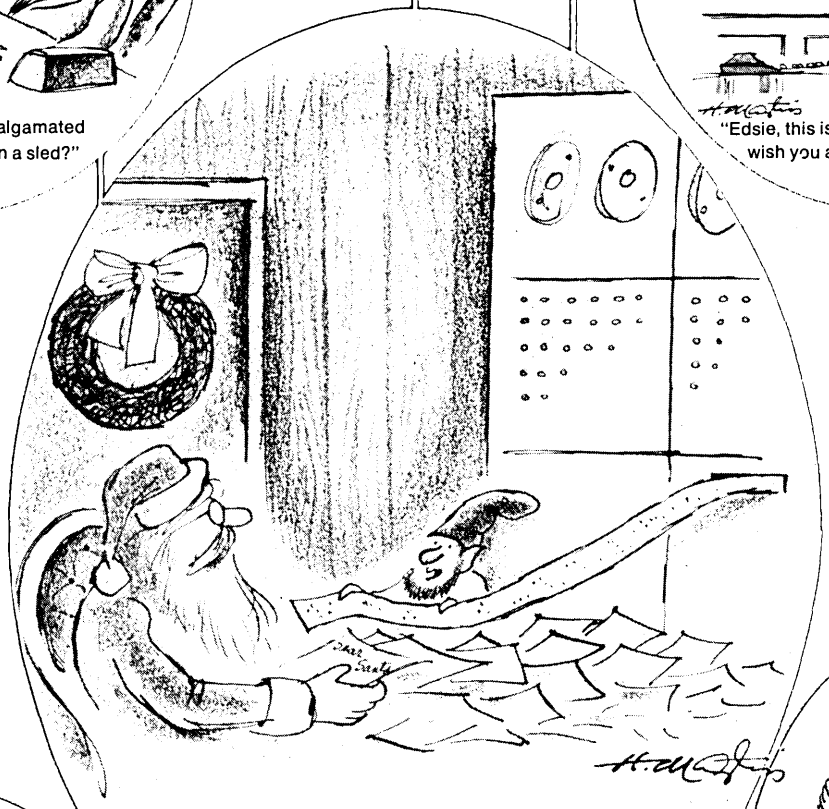


"Miss Pendleton, does Amalgamated Cable and Conduit Inc. own a sled?"



"Edsie, this is J.B. and I'm just calling up to wish you a very, merry bah humbug and all that!"



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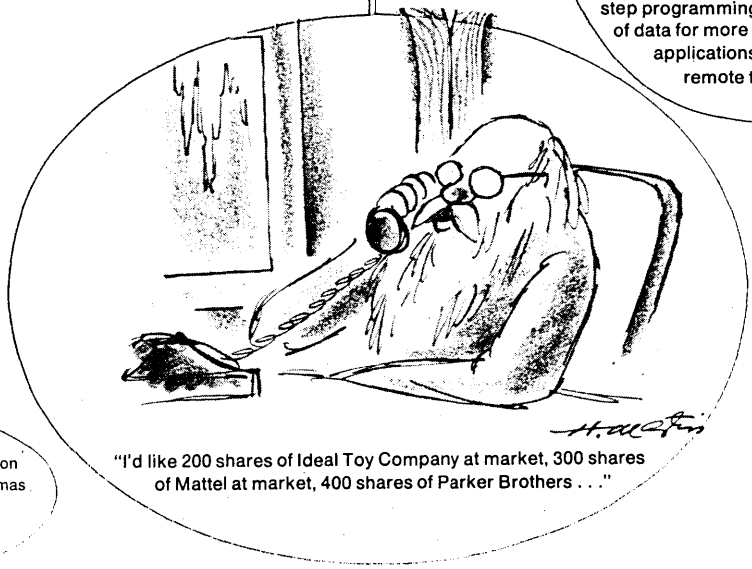

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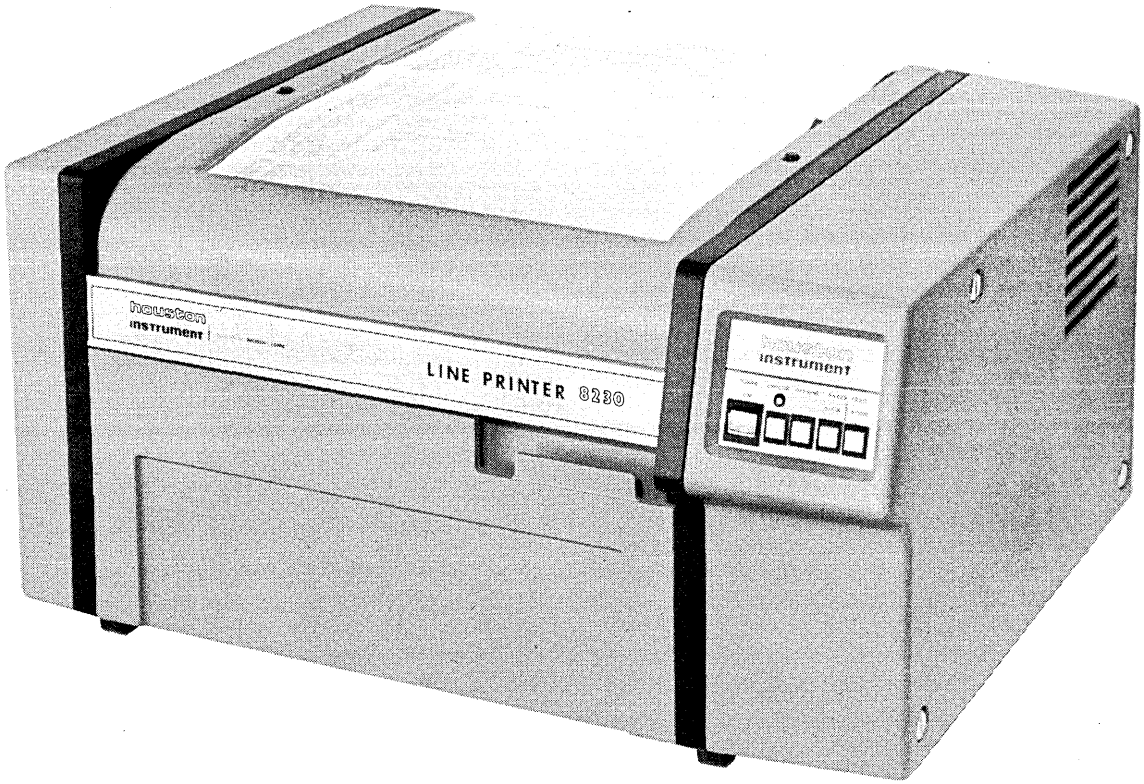

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Software Engineering and Life Cycle Planning

A single thought provided the theme for the second annual Software Engineering Conference: life cycle planning. Barry Boehm of TRW phrased it best from a management viewpoint, using two slides. The first showed a traditional pie chart with three slices for "design," "code," and "test" (40%, 20%, and 40%). He rhetorically asked the silent audience, "What's wrong with this chart?"

After a short theatrical pause, he presented a second slide showing "maintenance" as 70% of the effort, with design, code, and test proportionately reduced to 12%, 6%, and 12%, respectively. Thus he introduced the conference subject from an economic point of view.

The conference, which is jointly sponsored by ACM, IEEE, and the National Bureau of Standards, drew about 800 attendees to San Francisco during October 12-15. And it was a high-yield meeting. In contrast to the National Computer Conferences, where only about 10% of the papers are of interest to the practicing professional, about 50% of the 105 papers presented here were.

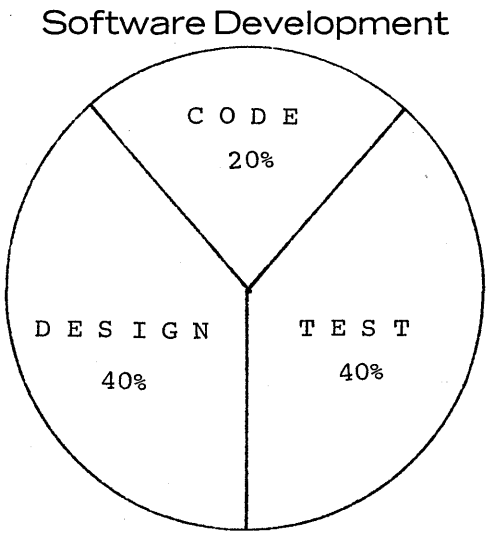
The first two were a pair of tutorials on Data Base Management and Software Design. Attendance was so high that one of them was sold out with a turn-away audience. In fact, switching sessions from room to room to better fit the audience sizes turned out to be a continuing problem, threatening to overwhelm the attendees at one point. In one light, the success of the presentations created some of the inconvenience.

Each of the three main days had a topic: "requirements and specifications," "software design and development," and "software verification and validation." With a few notable exceptions, the organizers selected papers to fit their themes, and in most cases the authors actually spoke on the subjects related to the topic—which is also unlike an NCC.

Others in the conference concentrated repeatedly on the life cycle theme Boehm had kicked off with. Statistical evidence was presented which described an autopsy on the problems found in a large military development. The origin of every problem was determined and costs were assigned. As one might intuitively suspect, the costs associated with problems found very late in the process (during final integration and test) were much greater than the costs associated with problems found early in the development process. This gave substance to two schools of thought.

Two ways to go

Doug Ross of Softech, Waltham, Mass., presented his SADT (structured analysis and design) technique to be used in developing hierarchical systems, and claimed it produced systems that were more likely to be correct



What's wrong with this chart?

than those built using traditional flowcharting techniques or even structured programming as commonly practiced. Dan Teichroew of the Univ. of Michigan presented the outputs of his ISDOS research, and described a highly automated support system to aid in requirements analysis. He claimed computer-aided structured documentation and analysis techniques lead to better requirements statements because the documentation is machine readable and hence can be processed by automated analysis programs to find inconsistencies, variables required but not defined, and instances where a variable was set but never used.

Right on the heels of Ross and Teichroew, C. R. Vick and his colleagues working on ballistic missile defense for the U.S. Army described a full-blown software support system which holds requirements in machine readable form, supports design and development, and even provides assists in validation and verification of the resulting system of programs. The only problem with all this (and it seemed a rather severe one to most of the audience) lay in the size of the ventures being reported. It appeared that the goodies were available only to those involved in massive projects or working for giant corporations. Through all this discussion (lasting about a day and a half) a haunting melody kept recurring—get your requirements *perfect* and then proceed to analysis, design, and implementation.

The second school of thought was represented by Harlan Mills of IBM. From the podium he mused that maybe a tremendous emphasis on requirements analysis and specification was uncalled for, expensive, and even prone to failure. Over dinner he discussed his ideas more completely. He indicated that the traditional approach called for the professional systems designer to work with the naive customer and produce requirements that the customer would endorse. Later, despite all efforts to keep the customer involved, a long sterile delay would set in before the final program was produced. By that time, the environment or the now-experienced customer would change the requirements so the program would no longer fulfill the customer's needs.

In contrast, he suggested an approach for developing systems incrementally. The analyst must sit with the customer long enough to get Package #1 defined. Then he goes away for a very short period (two weeks or a month at the most), and comes back with a piece of running code and some real reports that perfectly satisfy a small portion of the stated problem.

This live output greatly enhances the coupling between the analyst and the customer, and greatly increases the customer's learning rate. If the programs are designed to be changed (i.e., maintained), then a series of packages can provide increments of function which keep the customer involved, enhance his learning, shorten the total development cycle, and make him happier sooner.

In the next two years the differences in these two development strategies should come into focus, since the support tools required for each approach are quite different.

Fault tolerant or fault intolerant?

One portion of the Conference was devoted to reliable systems. The audience heard a way-out paper describing

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ENGINEERING

an on-board flight computer for commercial aviation which had multiple redundancies and voting logic, and whose adaptive parallel processors were claimed to allow only one error in 100,000 years.

In contrast, a much more practical approach by S. S. Yau and his colleagues at Northwestern Univ. talked about designing error resistant and fault tolerant software for current machine architectures. Through their research, which looks very encouraging, they hope to define programming structures which detect errors, be able to contain those errors within the smallest possible domain, and to provide for recovery in the most reliable fashion. Yau presented the beginnings of a taxonomy on errors and hopes his research will lead to specific antidotes or controls to apply in each case.

This subtheme was echoed by D. L. Parnas (now at Univ. of North Carolina at Chapel Hill), who concentrated on the recovery actions to be taken after errors were detected, and further developed by T. Anderson who described a special emulator they had prepared for the Digital Equipment PDP-11/45 (at the Univ. of Newcastle-upon-Tyne) to support some very interesting experiments in high reliability and automatic recovery.

As befits an engineering conference, quantization, measurement, and metrics appeared frequently throughout the three days. The contrast between the academes and the engineers (including some who happen to be in universities) was sharply displayed on several occasions. In one case, the academes stood up and presented a line of drivel and global concepts that had been distilled by reading the current literature. They were immediately followed by a manager from industry describing a large development project in which he had run several experiments that improved his programming productivity. He provided specific definitions for the experimental quantities and numerical values for the experimental results.

And a few distractions

The conference was marred by two distractions, both of which were avoidable. There was a certain lack of perfection in the local arrangements. PA systems didn't work, speakers couldn't figure out how to turn the lights off and on, slides were presented upside down and backwards, and sessions were switched from room to room as mentioned.

The Jack Tar has never been known as a good conference hotel, and this tradition was continued with a demonstration of their coffee service which can best be described as stochastic queueing in the presence of a single server.

The other distraction is attributable to the program committee. After control of the ACM and a portion of the IEEE had been given over to the academic community, software engineering was to be a grass-roots effort on the part of industry to present useful accomplishments to the community at large. Well, somewhere en route to San Francisco some of the academes crept back in. We had a trivial paper from the Univ. of California-Berkeley describing storage estimates for indexes in a relational data base—a simple technique that is already a routine practice in industry. We had an abstract paper from Germany presenting a research application in set theory which would have been interesting—in some other surroundings.

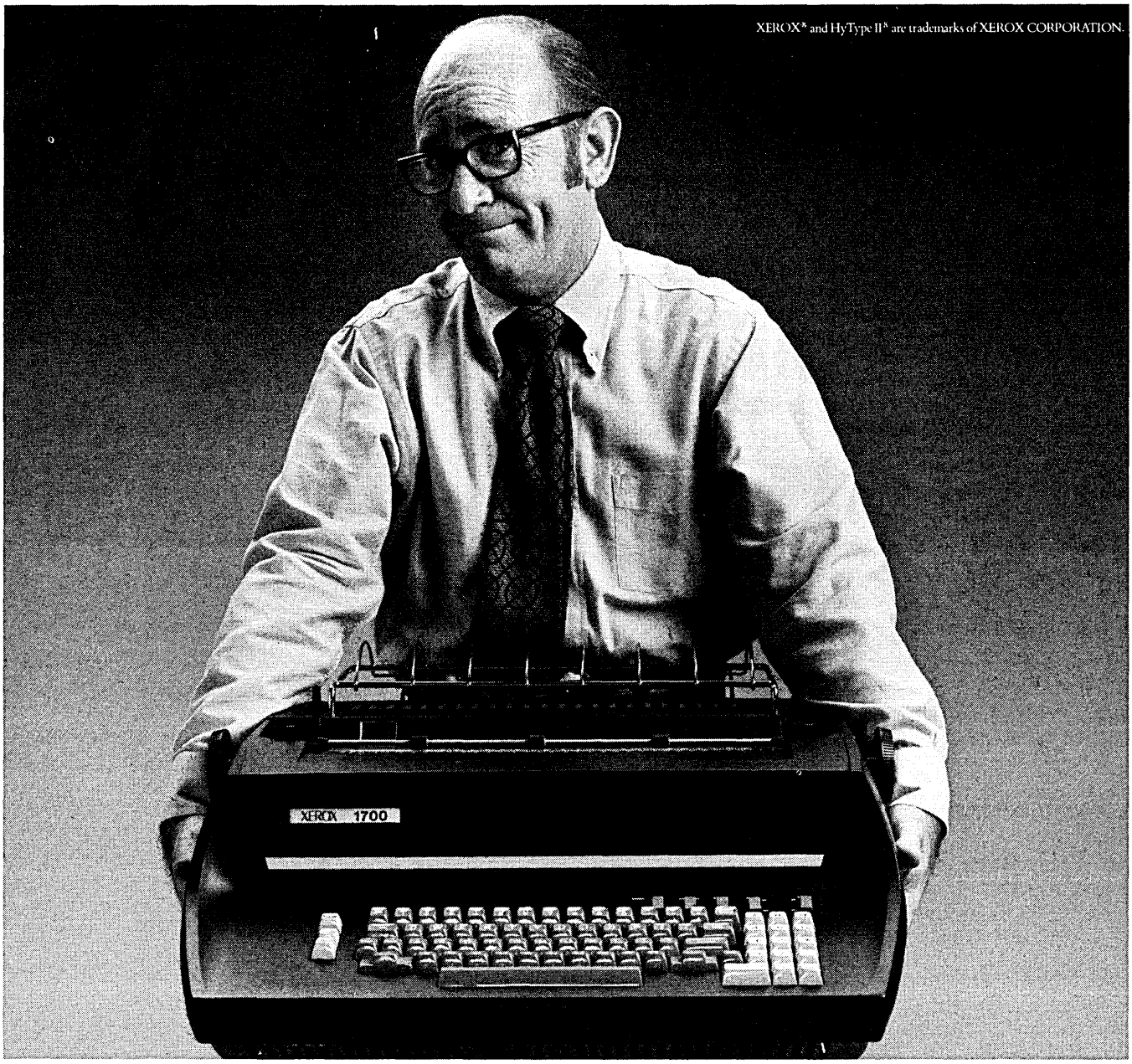
We sat through a half a dozen papers presented by tired old war horses who once more displayed the same old theories we have heard at a hundred ACM meetings. Some of them were entertaining, but contributions to the art they were not. Finally, we found several more candidates for "worst paper" awards. (At the moment the leading contenders are all university Ph.D.s with foreign accents and hand-drawn slides, on very erudite subjects, which overflow the image area on a common viewgraph.) Fortunately there were no blackboards since even the arrangements committee recognized a blackboard could not be seen by all 800 people in the room.

The international theme of the conference was perpetuated by the fair city of San Francisco. Long known as a good tourist town, the Chamber of Commerce has evidently taken some lessons from Paris to make the town different. Not all of the changes have been for the better. Since the police don't enforce laws pertaining to victimless crimes, the city is festooned with women that seem to have nothing better to do than to stand in doorways and hold up buildings. Also, several of the restaurateurs have discovered they can make more money by kiting bills than they can by providing meals and service, so one must add up every check.

Over all, the bad details marred but did not scuttle a good conference. Those who are more interested in getting the work out than in creating a new programming language would be well advised to review the program and consider attending next year's conference on Software Engineering.

—R. L. Patrick

Mr. Patrick is a practicing computer consultant in Los Angeles and has long been Datamation's Editorial Advisor.



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RAMIS at Citibank

by Robert E. Roach

For some applications, cpu time has been cut by 72% and disc I/O by 84%.

The World Corporation Group of Citibank, New York City, had a need for a data base management system for a financial application. After considering several commercially available systems, we chose the RAMIS package (Rapid Access Management Information System) of Mathematica, Inc., Princeton, N.J., which several Citibank departments have now implemented on a number of applications. Here is the story of our successful implementation of RAMIS for our particular financial application.

Software selection

No software package can be all things to all people. Some data base management systems, such as IMS, TOTAL, and ADABAS, provide very sophisticated file structures and require host language programming. These systems feature one or more of the hierarchical, network, and inverted file structures. The strength of such systems lies in the ability to perform low volume inquiries rapidly on a large data base. But this power is purchased at the cost of slow file updates, and necessitates a high level of programmer expertise.

Other systems, such as MARK IV, offer limited file structure options and a tabular ("fill in the worksheet") report specification language. While these file management systems are easy to use, their rigid structure limits their usefulness in solving MIS problems.

A third group of data base management systems provides a considerable range of file structures, a host language capability, and a data management and report generation language facility. Systems such as RAMIS, the newer NOMAD (National CSS, Inc.), and FOCUS (Information Builders, Inc.) are representative of this type. These systems are appropriate for applications with file retrieval requirements.

In the summer of 1973, Citibank purchased RAMIS for its use in financial applications. Our software requirements included:

- a data base management system with a flexible file structure,
- an easy-to-use report generator with substantial capabilities, and
- the ability to run either in batch or interactively.

Besides RAMIS, IMS (which was being installed at Citibank for other applications) was evaluated in conjunction with the possible use of the reporting capabilities of GIS/2 (Generalized Information System) or IQF (Interactive Query Facility). The GIS/2 and IQF packages proved to have limited reporting capabilities. IMS, while providing great flexibility in data base design, was considered to require too much senior programming support. RAMIS met our requirements well and so became the logical choice.

Implementation of the GAPS application

Our financial application was to redesign the Global Account Profitability System (GAPS), which provides Citibank's World Corporation Group (WCG) with a tool to track the volume and profitability of the WCG's total relationship with about 550 multinational companies throughout the world. Initially implemented in 1969 as an annual system, GAPS was expanded to semiannual reporting in 1973 and quarterly reporting in 1974.

In the summer of 1974, Citibank's Finance Div. recognized that GAPS was contributing to serious congestion on a PDP-10 computer, with the result that reports were produced more than 90 days after the close of the quarter. Analysis of GAPS showed that the application could readily be moved to a RAMIS based system on an in-house IBM 370/158. (Under the bank's data center decentralization program, "Project Independence," GAPS applications was to be moved to an IBM 370/145 computer in November 1976.)

The objectives of this redesign were the following:

- to streamline the reporting system,
- to produce more timely reports,
- to provide for future expansion of the data base (for example, the inclusion of budget data),
- to provide a capability for the user to obtain ad hoc reports,
- to implement on the IBM 370/158 for third quarter 1974 report processing, and
- to eliminate the PDP-10 from GAPS processing.

The GAPS implementation followed the strategy outlined above. The first step was to create descriptions for the utility files (defined in the box). For this application a COMPANY file was set up with information such as the customer name, the account responsibility unit, and the industry code. A BANKORG file was set up with the name of departments and countries, higher level organizational codes, and other indicators. A SIC file was set up with standard industrial classification codes and names.

The second step was to set up the application reporting file (also defined in the box). For GAPS, this was a financial ACTUALS file. Reporting periods (quarters), profit centers, customer parent companies, and local companies provided the sequencing codes for the hierarchical structure. (See Fig. 1.) Nine financial items summarizing the accounts' profitability were stored. Historical data from the PDP-10 system was loaded onto the new data base.

The GAPS system must process data from more than 60 countries. Consequently, the importance of a comprehensive edit program cannot be overemphasized. In addition to checking

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each transaction field for valid type and range of values and cross-field consistency, the GAPS edit verified the company and organizational codes against the COMPANY and BANKORG files in the data base (using the RAMIS Programmer's Interface—RPI—subroutine package).

The file maintenance function was implemented using RAMIS's data management commands to add, delete, or update records based on transaction types in the records. Two file maintenance job streams were set up: one for the financial ACTUALS file, and one for the utility files.

With the data base system in place, reports were developed. First of all, listings for the utility files were programmed. Then about a dozen reports were developed, which cut the financial results at different levels of detail by account responsibility unit, profit center, and customer. All of these reports were programmed using the RAMIS TABLE command and catalogued as RAMIS procedures.

How well did the GAPS implementation meet its objectives?

- On the PDP-10 system, both a detail file and a summary file were maintained, necessitating an extra step in the file management job stream. Elimination of the summary file and production of the summarized reports with the TABLE command significantly streamlined the system.
- The first processing cycle under the new system produced some shortening of the time to produce the GAPS reports. In succeeding quarters, the timeliness of reports was limited only by the collection and preparation of data for input into the system.
- The data base was expanded successfully (to approximately 250,000 records of considerably different lengths) by adding Budgets and other applications, as discussed later.
- Ad hoc reports were produced by making quick changes to existing reports.
- The goal of moving GAPS off the PDP-10 and onto the IBM 370 in the third quarter of 1974 was met.

In summary, the design objectives were all met. The system design and the expansion capability were especially successful. Timeliness improvements came more slowly, but with a stable system in place and by tightening up the preprocessing steps, these goals were met. And in all, the initial implementation took about one man-year.

Post-implementation issues

A successful project raises new issues and spawns new projects. GAPS was no exception. Three of these issues were making the system more efficient, solving the problem of report requirements which challenge RAMIS's capability, and expanding the system to other applications.

Data base systems make easy targets for the computer operations department's complaints of inefficiency. Such complaints often have merit. It is a truism that sophisticated file structures require more I/O activity than simple ones. But our experience has shown that these complaints can be defanged by the careful and continued analysis and improvement of a system. One should experience a "learning curve" of improved efficiencies both in understanding the facilities and the peculiarities of the data base system, and in reevaluating the application design. GAPS underwent major improvements in four areas:

- As mentioned above, the edit program referenced the BANKORG and COMPANY files. By loading in core the entire BANKORG file at a small expense in region size, the I/O activity was reduced by more than 70%.
- As we planned to store eight quarters of historical data in our data base, we had visions of enormous file sizes and incredible run times. We took a hard look at the ACTUALS file, and as a result, cut the number of data elements

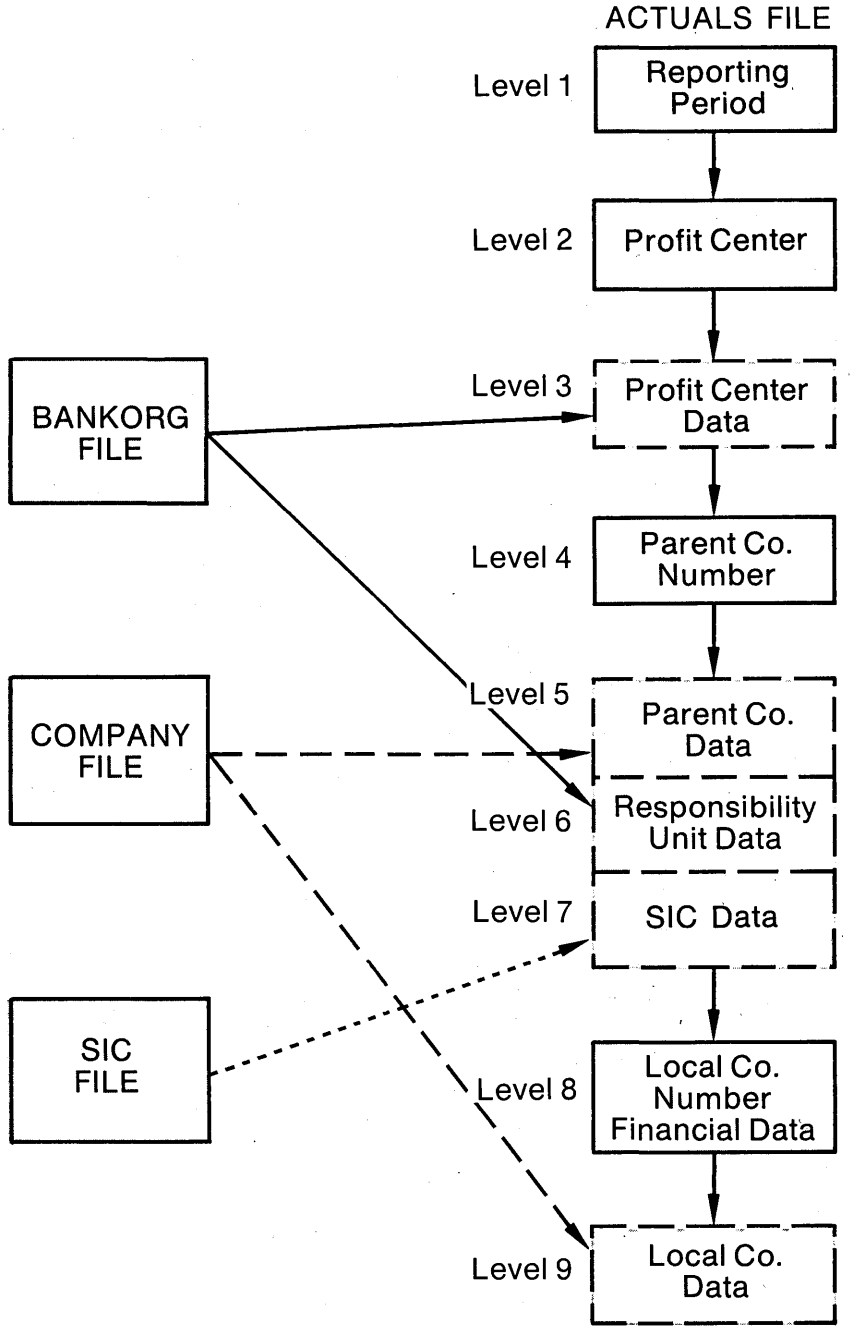

Fig. 1. The ACTUALS file was the first application reporting file (RF) implemented on the GAPS data base. It consists of nine levels representing financial items, and is linked to three virtual files: BANKORG, COMPANY, and SIC.

by 40% and eliminated several virtual levels (a major source of I/O activity). The population of GAPS accounts varies very little from quarter to quarter. Therefore, in advance of a processing cycle, we reserved space for the exact set of relationships which were reported the previous quarter. We found that by not reserving additional overflow areas in advance (using the RAMIS segmentation feature), we could substantially reduce the file size. The combination of these two actions reduced the ACTUALS file size by more than 30%.

- The installation of RAMIS's release 5.4.5 provided a 30% reduction in I/O activity, primarily because of the improvement of the virtual segment buffering. Fine tuning to optimize virtual segment buffering yielded an additional 48% reduction in I/O counts. The impact of the ACTUALS file reduction, the installation of the new RAMIS release and the fine tuning are summarized in Table 1, page 92.
- It was discovered that in certain

DATA BASE ARCHITECTURE: THE USER ORGANIZATION'S STRATEGY

Desirable characteristics of data base management systems include a hierarchical file organization, the creation of multi-application utility files, the implementation of separate application report files (see Fig. 2) with virtual file linkage, and the open ended capability to extend the system to other applications in a modular fashion.

Hierarchical Files.

File structures have evolved from the sequential organization on cards and tape to indexed sequential and direct organizations on disc. With the advent of data base systems, hierarchical data set organizations and access methods have achieved a certain vogue. A hierarchy has several advantages over conventional structures in MIS applications requiring file retrieval:

- It reduces storage requirements by grouping data common to many records at or near the top of the file (i.e., the root segment).
- It speeds up access to the data base by arranging data into logical groupings or subtrees which may be retrieved rapidly and efficiently as a unit.
- It provides for many levels of branching.
- It may provide security at one or several levels of the file.

Multi-Application Utility Files.

A user organization's management information needs are usually conceptually straightforward but become hopelessly mixed up in their execution. *Straightforward* because they are tracking certain things such as financial information, personnel, marketing data, or inventory. *Mixed up* because of the multiplicity of coding schemes used to identify key data elements. If one were to analyze a department's (or a company's) MIS, he would be struck by the number of coding schemes.

Consider the problem of the proliferation of codes to identify organizational units—profit centers, cost centers, management hierarchies, account or responsibility units, etc. To pass data from one application to another, the identifiers must be translated. In addition, each application must store and maintain its own organizational table. The system designer would score a major victory if he could establish a uniform organization code, store the organizational unit's name and indicative data in one "ORGTAB," and then maintain the ORGTAB file by one job stream. The ORGTAB file would then be available to all application files in the data base through virtual file linkage. In addition, the need for translation tables would be eliminated.

Let us refer to these multi-application files as *utility files* (UF's). (In RAMIS literature, these are often called "associated files" or "virtual files.") UF's should be set up for each type of indicative data. (Note that they also greatly reduce the amount of disc storage required.) A UF is set up with a key (i.e., an identifier code) and a list of indicative data elements for the accounts, organizational structure, product identifications, etc.

Application Reporting Files.

The next step in creating a data base system is the implementation of an application. Typically, an application will have one or more application *reporting files* (RF's) in the data base. (RF's are "working files" in RAMIS terminology.) An RF will pick up its indicative data entirely by linkage to UF's as virtual segments. In a financial system, an RF record will consist of a reporting period (monthly, quarterly, etc.), a customer, and a list of financial data. To implement the application, procedures are developed for data capture and translation, editing, file maintenance, and report production.

Modular Expansion.

The final consideration in our strategy is the question of how the system may be expanded. With a data base system (and assuming intelligent planning), it is possible to add additional UF's and RF's without affecting the existing system, thus making it truly open ended. Of course, in time it may be necessary to restructure UF's (for example, to reorder, add, or delete fields.) The corresponding change must be made to the RF's. ❋

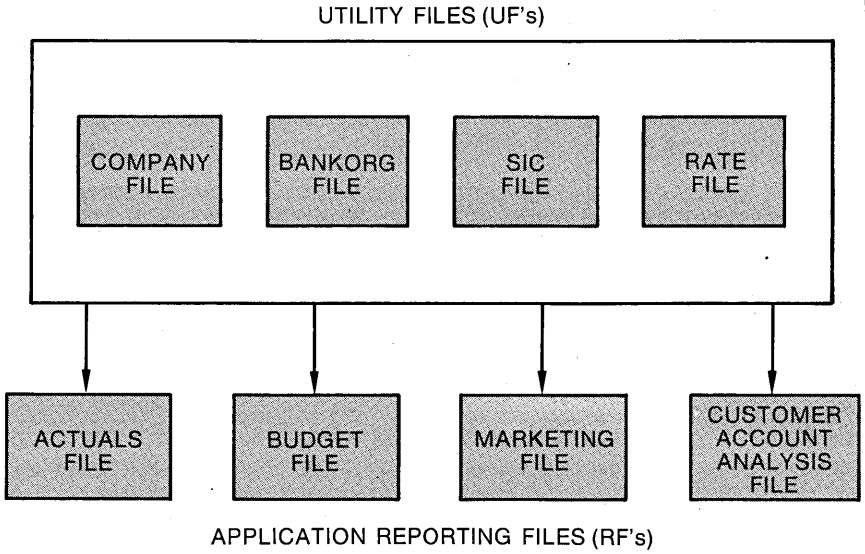

Fig. 2. This is a representation of the Global Account Profitability System (GAPS) data base. Each of the reporting files (RF's) contains virtual segments from two or more of the utility files (UF's). Additional UF's and RF's may be added to the data base without affecting those already in place.

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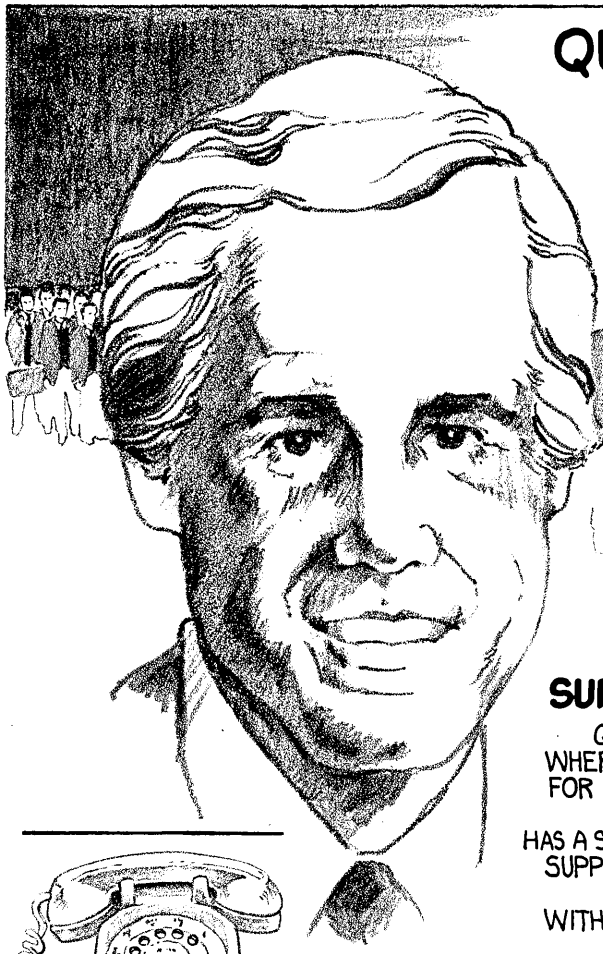

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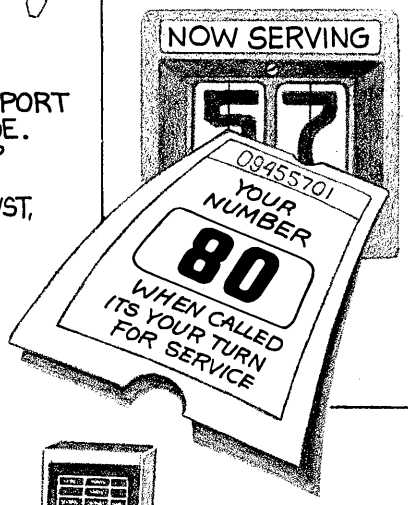

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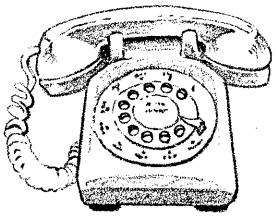

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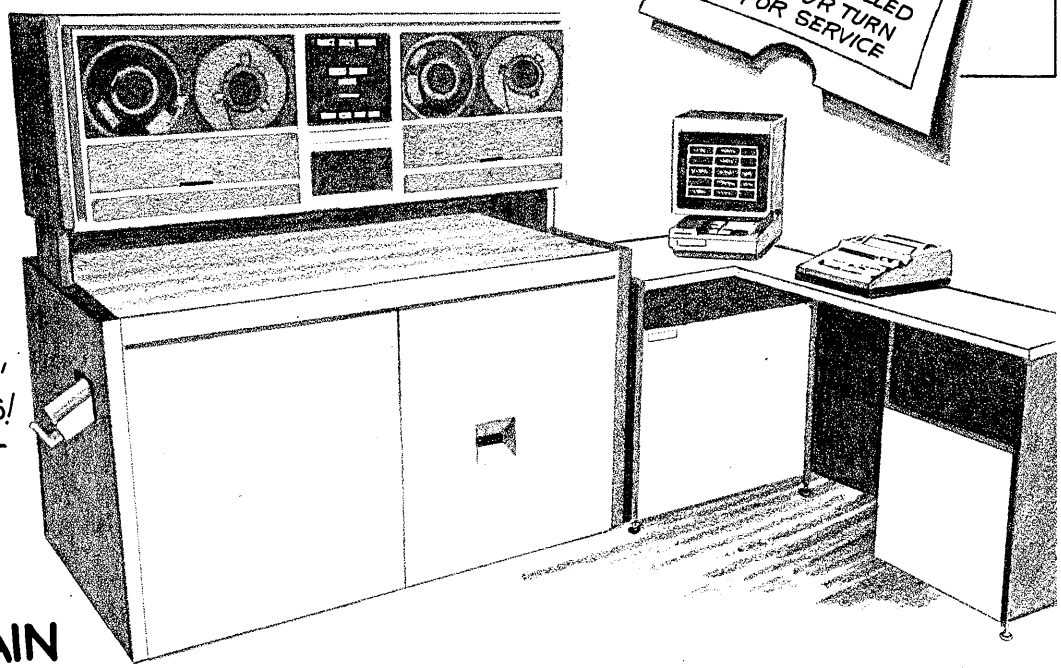

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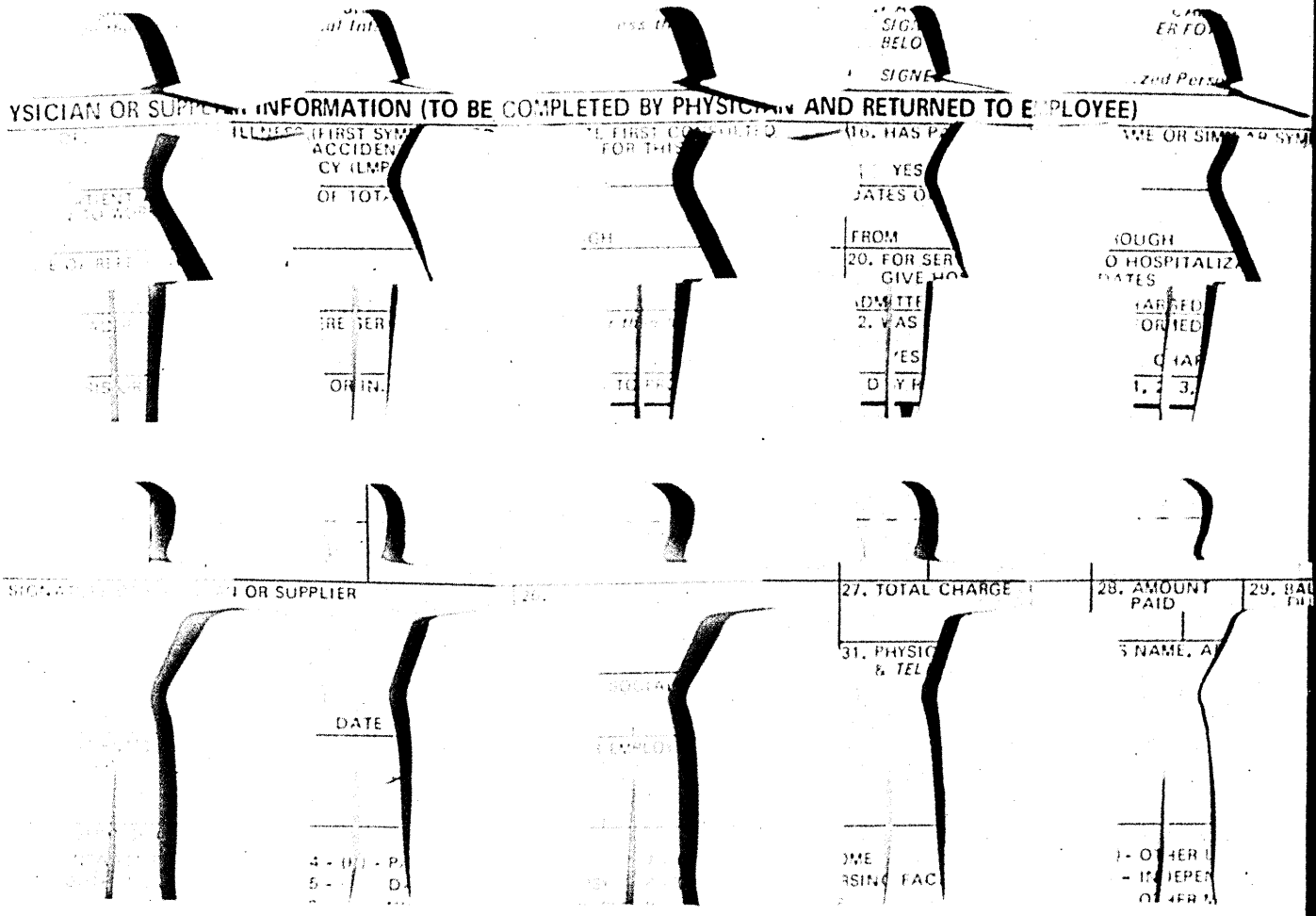

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cases the RAMIS report generator went through the retrieval motions for unwanted quarters. By modifying the RAMIS report procedure to retrieve only the desired quarters, processing costs were reduced by as much as 7/8 (retrieve 1 quarter and ignore the other 7).

With the acceptance of the initial package of reports, complicated new requests were made which could not be programmed with the TABLE command. We attacked this problem and developed two different approaches to solve it:

- the creation of a file extract with the DUMP command and the running of it through a COBOL program to produce the desired report; and
- the writing of a host language program (that is, with the RPI subroutine package), to produce a complex report.

Other applications have been added to the original GAPS data base in the evolution and expansion of the World Corporation Group's requirements (Fig. 2, p. 89). These applications cover such areas as Marketing Analysis, Budgeting, and Customer Account Analysis. Each has taken advantage of existing UF's. Some have created additional UF's. These new systems have had no adverse impact on existing applications.

The development of the GAPS Budget application was particularly illustrative of this evolutionary approach. The BUDGET file structure was similar to the ACTUALS file in Fig. 2; however, since budgeting was done at the parent company level, the local company levels were omitted. The BUDGET file referenced as virtuals the BANKORG and COMPANY files.

The file maintenance function was implemented in a manner completely analogous to the GAPS Actuals. Seven reports were developed using the TABLE command, and two were programmed in COBOL. These reports, like the GAPS Actuals, cut the financial data at different levels of detail for different organizational units.

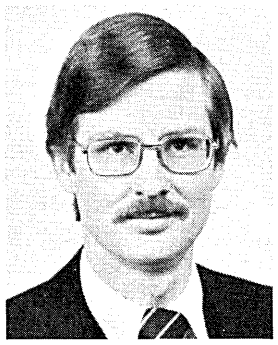
Initially the GAPS Budget was kept on a separate RF to insulate the GAPS Actuals from a developing application. When Actual data became available to compare to corresponding Budget periods, it became desirable to place the Budget data on the same file as the Actuals. The Budget and Actual data were dumped, the ACTUALS file was reorganized to include budget financial items at the parent company level, and the Budget and Actual data was loaded to the ACTUALS file. Since field names were retained, the only modification required (for the GAPS Actuals application) was the field number references in the RAMIS file maintenance procedures. The ACTUALS file then was used for the Actuals reporting and the Budget to Actual comparison.

	CPU Time	Disc I/O Counts
Stage 1: Old data base, (RAMIS 5.3.5)	100%	100%
Stage 2: Restructured data base, (RAMIS 5.3.5)	73%	47%
Stage 3: Restructured data base, (RAMIS 5.4.5)	40%	31%
Stage 4: Restructured data base, (RAMIS 5.4.5, additional 50K buffer)	28%	16%

Table 1. The effort to achieve efficiencies in the GAPS report production has resulted in reducing cpu time 72% and disc I/O counts 84%.

Conclusions

The experience at Citibank has proved the validity of an evolutionary approach to the development of applications with a data base management system. The RAMIS package has demonstrated its ability to handle varied file structures, to provide a data management capability, and to provide both report generation and host language facilities. With a small programming staff (usually two to three), the World Corporation Group has developed an increasingly integrated data base for MIS applications, and we expect the evolution to continue. ❋



Mr. Roach is a senior analyst for Citibank's World Corporation Group, where he has been responsible for the implementation of several financial MIS applications. His previous experience includes consulting work for Amtrak and a stint in the Navy as a project officer for MIS applications at the Bureau of Naval Personnel.

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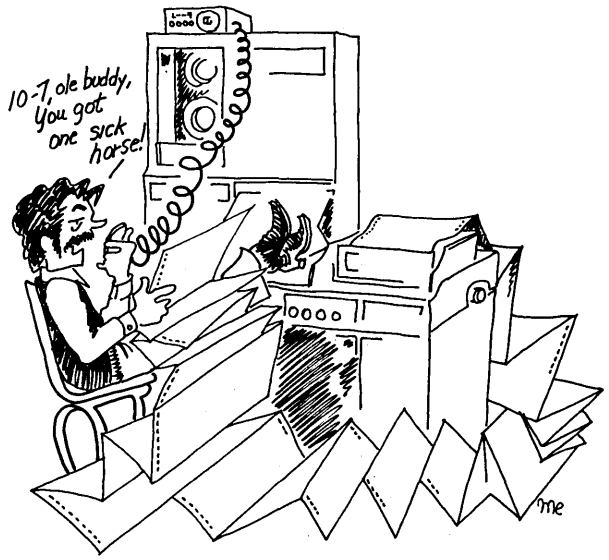

OS/CB Release 1

One morning last summer, I created a data base of CB lingo with apparently no ill effects. Later in the day, however, a memory trace revealed something so startling, it raised many eyebrows around our data processing department. I give a portion of it here. For clarity, it should be noted that we identified four jobs being processed at the time of the trace: one from payroll *(Money Bun),* another from engineering *(Slide Rule),* number three belonged to marketing *(Seller Feller),* and finally, a telecommunication linkup to a remote crt *(Ring-a-ling).*

SELLER FELLER: Breaker, broke. Seller Feller looking for that one Big OS.

BIG OS: Hold on for a 10-6, breaker. Money Bun is already on the channel with Slide Rule 10-10 on the side.

SELLER FELLER: Ten-four, good buddy. Mercy me, what does a guy have to do around here to get a break?

SLIDE RULE: Breaker, Big OS. Who's the bucket mouth causing all the noise?

BIG OS: Some Mickey Mouse who's working the back door.

SLIDE RULE: Big 10-4 on that, ol' buddy.

BIG OS: Okay, Slide Rule, get ready to roll. Money Bun is out looking for the home 20 of some ratchet jaw, so you've got the channel.

SLIDE RULE: Ten-four, Big OS. We're taking the hammer out of the tool box.

SELLER FELLER: Breaker, Big OS. How about letting the channel roll? The Head Honcho wants to know how many green stamps he's dumped into Bankrupt City.

BIG OS: Negatory on that, Seller Feller. We've got 5,000 ratchet jaws out there anxious to get their weekly wage on time.

MONEY BUN: Breaker, Big OS. We're 10-8 and ready to get back on the super slab.

BIG OS: Ten-four, Money Bun. Turn to channel two. We just had a sick horse go 10-7 with bad motion lotion and I'm writing his comic book now.

MONEY BUN: Ten-four. We got the pedal to the metal.

RING-A-LING: Breaker, Big OS.

BIG OS: Com'on in, lady breaker.

RING-A-LING: I need some fast help.

BIG OS: Ten-four to that, Ring-a-ling. You got a direct land line to an 18 wheeler with your garbage can aboard. Do you want on camera?

RING-A-LING: Mercy sakes alive, you do know how to treat a girl right!

SELLER FELLER: Breaker, Big OS. How come that thumb merchant got in ahead of me?

BIG OS: She's got on a red wrapper with seatcovers to match. But don't worry, Seller Feller. Slide Rule just gave me the signal he's 10-7 with an EOJ. Bring it on up. It's clear to here.

SELLER FELLER: Ten-four, Big OS. We're coming at you with the hammer down.

BIG OS: Throw your Bicycles in the hopper and we'll speed-read your holy incantations. You're got a two-wheeler waiting with a half mile of magnetic ribbon.

MONEY BUN: Breaker, Big OS. We're going 10-7 for now. Thanks for the break and we'll catch you all on the flip-flop. This is the one Money Bun, hot out of the oven. Numbers to you. We gone!

10-7

Big OS's CB Lingo

Break—Request to use channel.
Breaker—Station requesting a break.
10-6—Code for Busy, Stand By.
10-10—Standing By.
Ten-four; 10-4—OK, or Message Received.
bucket mouth—Someone clogging channel with talk.
back door—Rear vehicle (last program in line).
home 20—Home address.
ratchet jaw—Nonstop talker.
hammer out of the tool box—Accelerating to top speed.
letting the channel roll—Let others break in.
green stamps—Money.
Bankrupt City—New York City.
Negatory—Negative.
10-8—Code for ready to use the system.
super slab—Major highway (the large partition).
sick horse—Program with errors.
10-7—Out of service, leaving the air.
motion lotion—Input data.
comic book—Abend dump.
pedal to metal—Running at top speed.
land line—Telephone.
18 wheeler—Any tractor-trailer truck (disc drive).
garbage can—Data base with one or more cylinders.
camera—Police radar unit (crt.).
thumb merchant—Hitchhiker.
red wrapper—Top priority.
seatcovers—Lady passengers.
hammer down—Same as pedal to the metal.
Bicycles—Card input (from brand of playing cards).
two-wheeler—Motorcycle (tape drive).
flip flop—On return run.
numbers to you—Sign-off information.

*Some of the lingo here comes from Appendix B ("CB Lingo") of Hy Siegel's *All About CB Two-Way Radio* (Radio Shack, Fort Worth, Tex., 1976), pp. 108-11.

—Gary P. Becker

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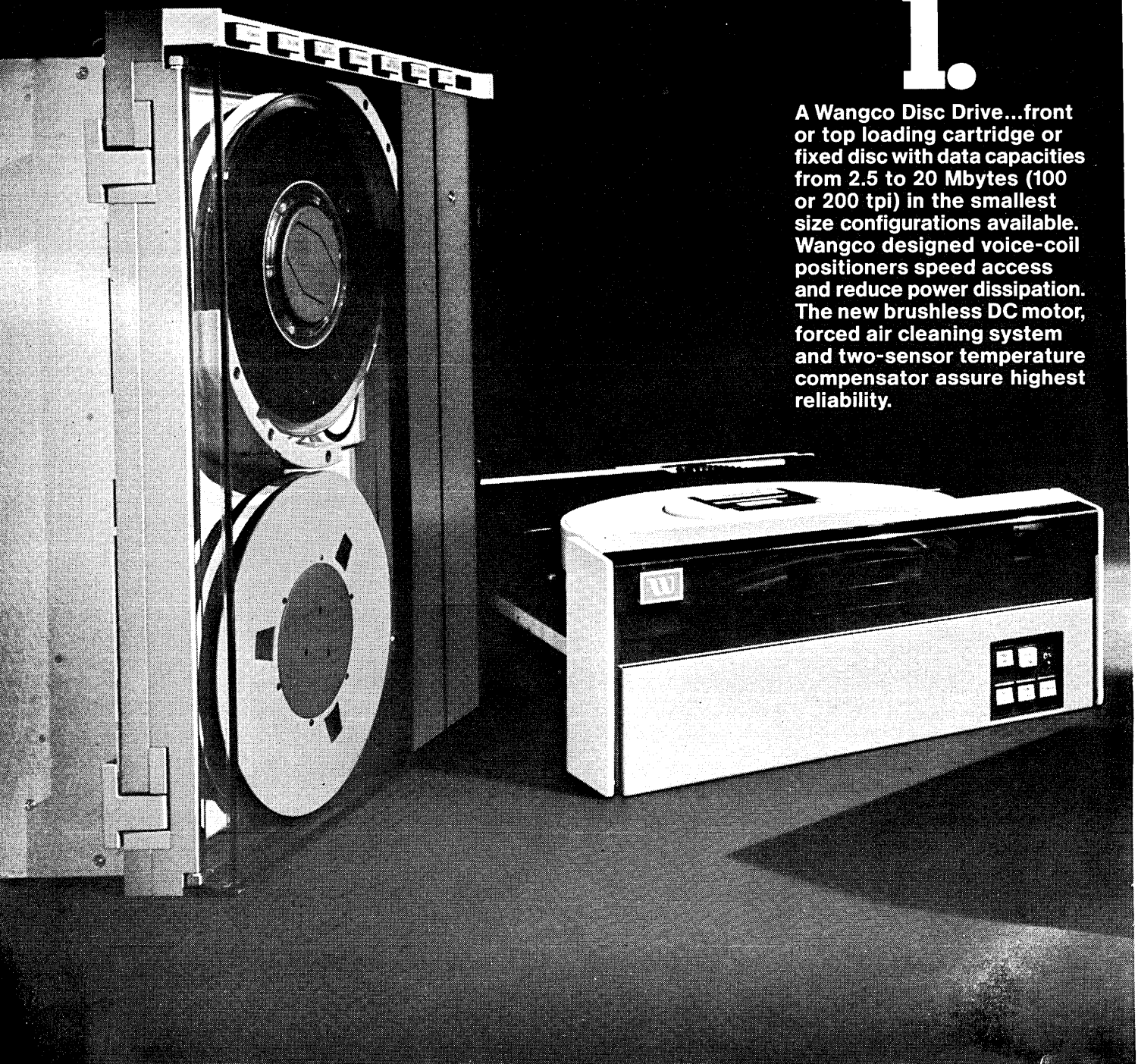

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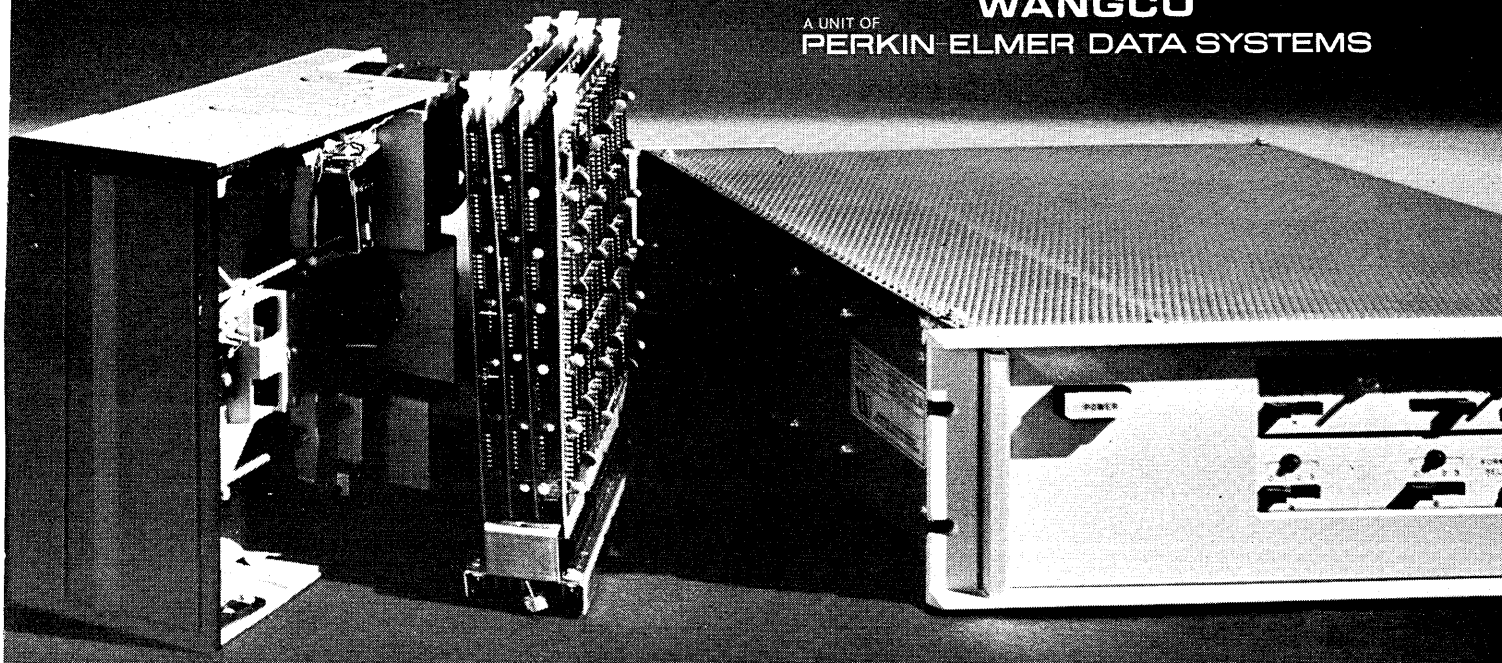

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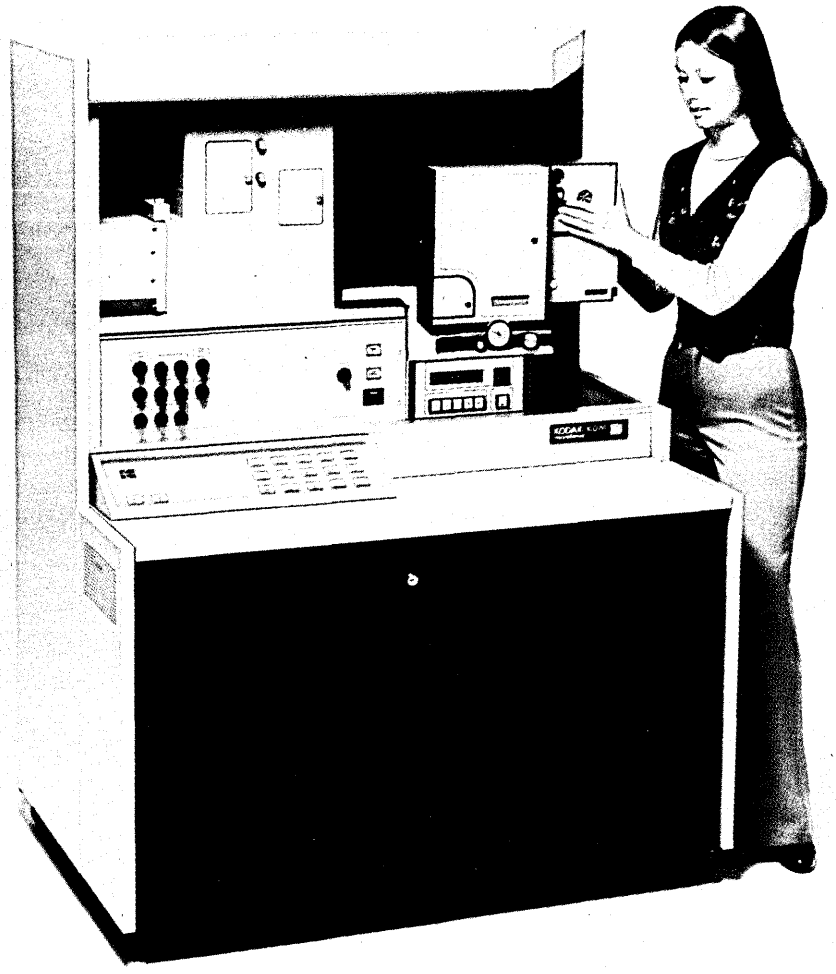

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On the DP Road to Southeast Asia

"We are witnessing the birth of regional awareness."

With understandable satisfaction, J. Costa of the Intergovernmental Bureau for Informatics (IBI) was winding up the first Southeast Asia Regional Computer Conference, SEARCC 76, on September 9, after four days of deliberating and socializing in Singapore's amiable tropical ambience.

"Many new friendships have been struck."

F. Kohli, chairman of the organizing committee and a SEARCC 76 prime mover, was touching only one of the many benefits of the conference for its 341 delegates from 19 countries, who also heard a familiar mix of invited talks and synopses of written papers.

SEARCC 76 attracted computer men and women from a huge sector of the Eastern Hemisphere. From 4,000 miles down under, Australia sent the second-largest delegation (59). Breaking with recent stay-at-home austerity, India sent an impressive 22-person contingent from some 3,000 miles west. And a handful of delegates came from Japan, 3,000 miles north.

The largest delegation turned out from Singapore. The host city-state also furnished an efficient multiracial administrative staff who kept conference events running smoothly and dispensed insider tips on entertainment, sightseeing, and shopping. Singapore's Computer Society was a cosponsor of the event, along with those of Hong Kong, Australia, New Zealand, Japan, Iran, and India. (IBI and UNESCO contributed financial support.)

The Telecommunications Authority of Singapore provided an on-line delegate registration and query system that used Univac, Data 100, and Hewlett-Packard equipment.

Substantial delegations came from nearby Malaysia, Thailand, and Indonesia. And 15 made the 10,000-mile trip from the U.S.

The distances involved are formidable enough to challenge the organizing talents, professional zeal, and expense budgets of seasoned conference circuit riders in America and Europe. So what was it that drew the impressive turnout in Singapore?

The search for regional identity—and pride—was undoubtedly a compelling personal motivator. But the strongest stimulus for holding the conference—and probably the reason for the handsome attendance—was a more pragmatic belief that computer technologies are the natural pace-setters for general economic development.

Delegates were told by D. Chevion of Israel's Ministry of Finance (and a former IFIPS vice president) that recent U.N. data showed a constant relationship between countries' per-capita GNP and their total number of computers.

The big question for the computer people of developing nations was "if we computerize more, will that help our GNP move up to its 'proper' position on the U.N. graph?" Examining that hopeful proposition may have been what SEARCC 76 was all about.

However, taken at face value the statistics aren't all that encouraging. Dr. Chevion also pointed to a World Bank study that showed developing countries behind 1:10 in wealth, behind 1:60 in computerization, but ahead 3:1 in population.

And he cited another recent study by the SILT committee of SHARE indicating that developing countries' "share" of world per-capita GNP will actually go down over the rest of the century by a few percentage points. The richer countries will get even richer faster than the poorer countries will get richer.

> Computers don't produce wealth. Does that make them a luxury?

Still, the growth may be rapid in absolute terms, and developing countries are being perceived as interesting markets for the developed nations.

A powerful case in point: In drumming up interest in its new *Asian Wall Street Journal* (first issue: Sept. 1), the prestigious publisher pointed to the facts that between 1969-74 real GNP grew four times as fast in East Asia as it did in the U.S., and today East Asia's trade with the U.S. exceeds America's trade with the entire European Economic Community.

Is this technology necessary?

Kohli spelled out some practical reasons why developing countries can indeed look to computerization as a way to accelerate their general economic growth.

"Basically, societal systems are more complex than physical systems," he said. Developing countries face basic survival challenges: poverty; technology education; transportation; agriculture, food handling, and nutrition; population and family planning; rural-to-urban migration; employment; and on and on.

This creates a high-risk environment for government decisions. A decision to allocate scarce natural and human resources to promote industrial rather than agricultural productivity could critically affect a country's social "bottomline" for a decade.

From his own India, Kohli draws a real example: a five-year-old program to optimize process control and reduce required levels of fuel reserves saved enough fuel in just one year to pay for the whole cost of computerization.

Thus there is a stress on computers as decision aids in developing countries, and a large portion of the conference proceedings dealt with integrated software systems, data base management techniques, "what if" modeling, and distributed processing.

Leapfrog, anyone?

A notion that seemed to occur to nearly everyone was the possibility that developing countries might be able to "leapfrog" decades of computer evolution and somehow land on the high side of modern technology. Several speakers did express hope that developing countries could avoid having to go down some of the technological blind alleys now so well illuminated by hindsight.

But the emphasis was not on leaping ahead, or even playing catch-up in computer technology. Instead, proceedings focused on ways of transferring knowledge from more to less advanced countries and applying it to

local problems. Several speakers stressed that primary goals of technology transfer ought to be the promotion of self reliance in the receiving country, along with international sharing of resources and expertise.

One session was devoted to analyzing the proper role and actual performance of international organizations in speeding the transfer of technology. Highest marks went to professional societies, including SEARCC 76 cosponsors IBI and IFIPS and benefactor UNESCO, along with the Association for Computing Machinery (ACM) and local computer groups.

Other organizations—the World Bank, various national governments, and the Ford Foundation—also drew credit for contributions of expertise, equipment and money to local projects.

Lowest marks went to mainframe manufacturers. After all, observed more than one delegate, these firms are multinational by nature and should be interested in stimulating the use of their products. Mainframe manufacturers could do a lot more in the critical area of training, it was felt, although IBM drew praise for its educational centers.

The "Company Confidential" stamp was seen by at least one delegate as a death warrant for technology transfer in such critical areas as the automation of manufacturing processes and the automation of software system design.

To stand up for the other side of those criticisms, an earnest defense of manufacturers as the most effective purveyors of know-how in practical applications came from the conference floor, to considerable applause.

> The "Company Confidential" stamp is seen as a death warrant for technology transfer.

And even with the shortcomings of formal "technology transfer," the situation *is* changing. The rate of change may not match expectations, but things are happening.

Make or buy, Indian style

Speakers from India surprised many delegates by discussing its little known national policy of manufacturing its own minicomputers. DATAMATION was told that, of some 300 installed Indian minis, about one-third have a "Made in India" label. Given the country's high level of competence in computer theory—coupled with its experience as a low-cost "offshore" electronics assembler—the step to local manufacturing seemed to be a natural one. The step is expected to soon provide a cost effective computer industry big enough to meet the country's relatively modest demands.

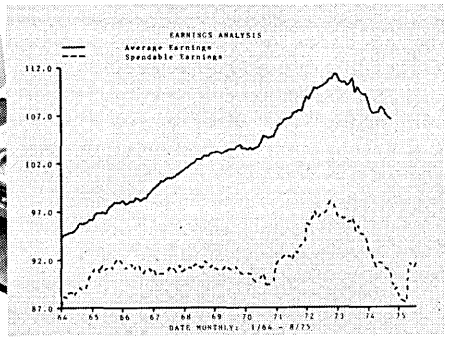
India does not plan to manufacture big computers. But—to anguished warning outcries from several Australian delegates—Indian spokesmen announced that they were ready to take the plunge and begin to manufacture their own components, including LSI chips.

The main thrust of the Indian government's computer policy is creation of data processing supercenters linked by message concentrators and switching devices to distributed networks of minis. The first of three projected supercenters was opened last year in Bombay with an assist from the U.N.

India's national computer centers will also serve as focal points for technology and management training. Another hoped-for by product of the centers is an internationally competitive software industry.

To advocates of an Indian software industry, everything seems to add up perfectly. Software development is not capital-intensive. The rapidly growing software-to-hardware ratio in modern systems, together with the rising cost of software skills, have created an inter-

ULTRAPLOT... something to talk about



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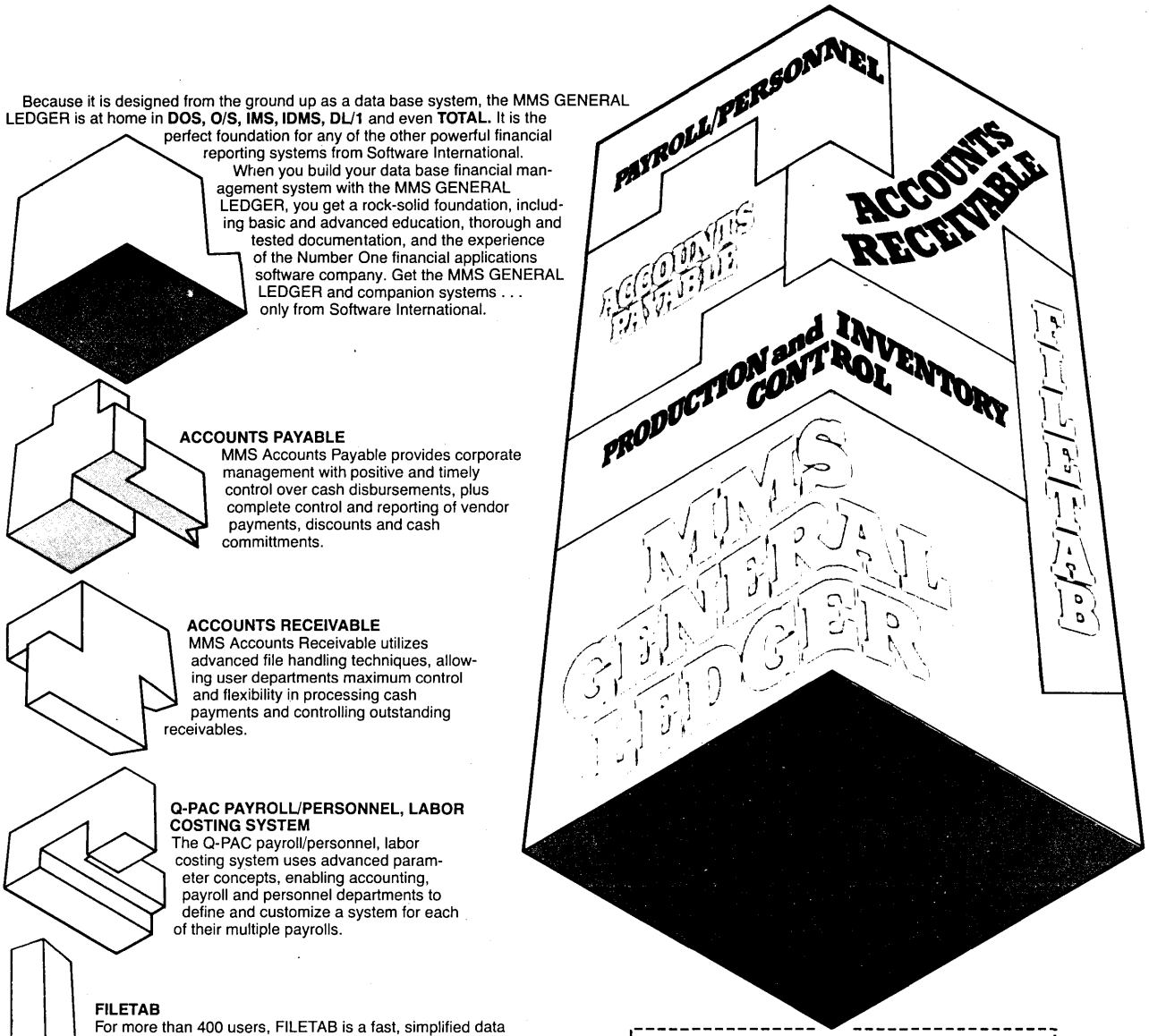

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national software market. And, as one speaker put it, there is no software knowledge gap in India.

Along with other developing countries, India is keenly interested in reversing the "brain drain" of its best talent to jobs with American and European manufacturers. Thai, Indian, *and* Israeli speakers agreed on the need for professionally challenging situations to keep local talent at home. But not at home all the time: national isolation and technology inbreeding were also blamed for contributing to the brain drain.

Not a "cable in the sky"

If SEARCC 76 delegates got the impression that modern computer technology has created anything that can serve as an international equalizer, it is data communications.

> If anything can serve as a national equalizer, it is data communications.

Less than a month before the conference opened, the world's latest satellite communications system had become operational in Indonesia. It's a 40-station regional system, and it appears to be a textbook case of leapfrogging over decades of hassling with telephone networks, undersea cables, and endless contention between voice and data communications priorities.

The Univ. of Hawaii's professor N. Abramson, reviewing the evolution of satellite communications, charted a dramatic decline of installation costs.

Total per-circuit lifetime costs, he told delegates, went from $22,800 in 1965 to $600 in 1975, and is on its way down to $250 by 1979. The numbers include costs for building, launching, and insuring the satellites. At the same time, the cost of earth stations is dropping, too. Intelsat's 30-meter stations cost $3,000,000 each in 1965. This year, RCA's five-meter Alaskanet stations cost $37,000.

Abramson ticked off a list of planned future systems—including three by Japan, plus Arabian, Latin American, Indian, European, and more U.S. systems, and one for communicating with airplanes.

But Abramson expects the satellite game to get a brand new set of rules in 1979 with the launching of the Satellite Business System (SBS) satellite. The system will probably be able to communicate with tens of thousands of rooftop and other small earth stations in worldwide networks of the 1980s. Each of these stations can be viewed as a new kind of peripheral device.

It was pointed out that the SBS system—a joint project of IBM, Comsat, and Aetna Life—will be especially appropriate for developing countries, where tall buildings tend to be high-density centers of technology and business activity.

However, Abramson said, the communications revolution will not begin in earnest until users stop thinking of satellites as point-to-point "cables in the sky." Think "packet broadcasting," he advised, and take full advantage of the fact that messages are received simultaneously by all points in the system.

Properly designed modular systems involve moderate startup costs. And they offer another important political advantage: no country has the power to deny use of the system to other countries in the region.

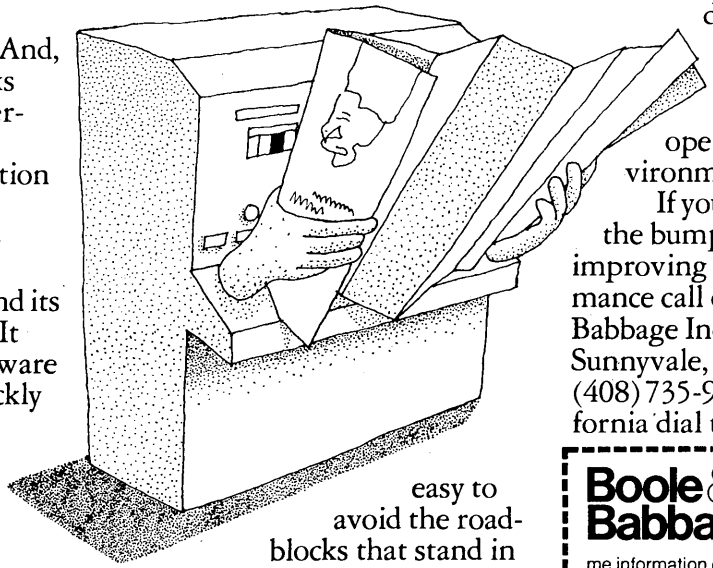
The "first" won't be the last

Finally, Robert Iau, president of the Singapore Computer Society, gaveled into history the first regional computer conference ever sponsored by IFIPS with the words: "There definitely will be a SEARCC 78."

—Bill Orr

Mr. Orr is the principal of his own firm, which is located in Santa Monica, California, and provides marketing communications services to firms doing business in Southeast Asia.

CUE/DSO, a better roadmap to improved system performance.



There are a lot of ways to get around in your system. And, there are a lot of roadblocks along the way that slow performance.

CUE/DSO (Configuration Usage Evaluator/Data Set Optimizer) is like an overgrown roadmap that lets you see how your system and its resources are performing. It isolates hardware and software bottlenecks so you can quickly and easily improve system throughput.

CUE/DSO measures and plots CPU, channels, devices, SVCs, queues, head movements, VS paging and lots more. It gives you specific information on disk volumes, data set organizations and head movements between data sets.

With all this information it's easy to avoid the roadblocks that stand in the way of increasing your system's performance. It also helps you establish a solid base of utilization so you can accurately project when you'll need new equipment and gives you the documentation you need to justify the expense.

And, CUE/DSO operates in the OS/VS environment.

If you want to avoid some of the bumps along the road to improving your system's performance call or write Boole & Babbage Inc., 850 Stewart Drive, Sunnyvale, California 94086, (408) 735-9550. Outside California dial toll free 800-538-1872.

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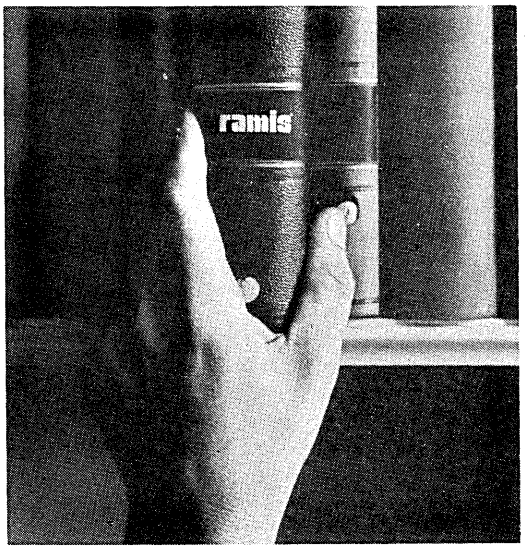
Phone _____ Operating System _____

CIRCLE 102 ON READER CARD

RAMIS REPORT # 6

How to choose a comprehensive DBMS



To be truly comprehensive, a DBMS must satisfy the needs of both data processing and management staffs. It must permit programming analysts to develop systems using conventional programming languages like Cobol or a nonprocedural English-like language. It must also permit management staff to tap corporate data bases without putting unnecessary pressure on the DP department.

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DD6

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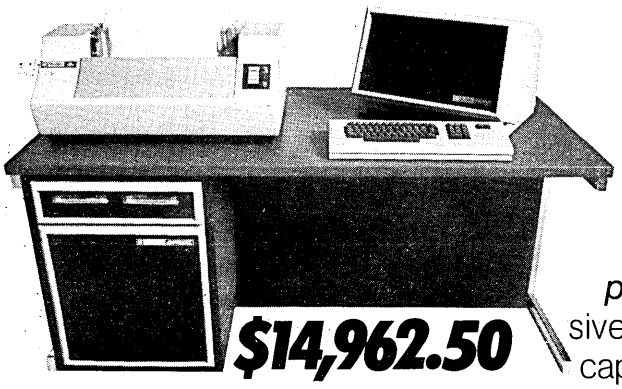

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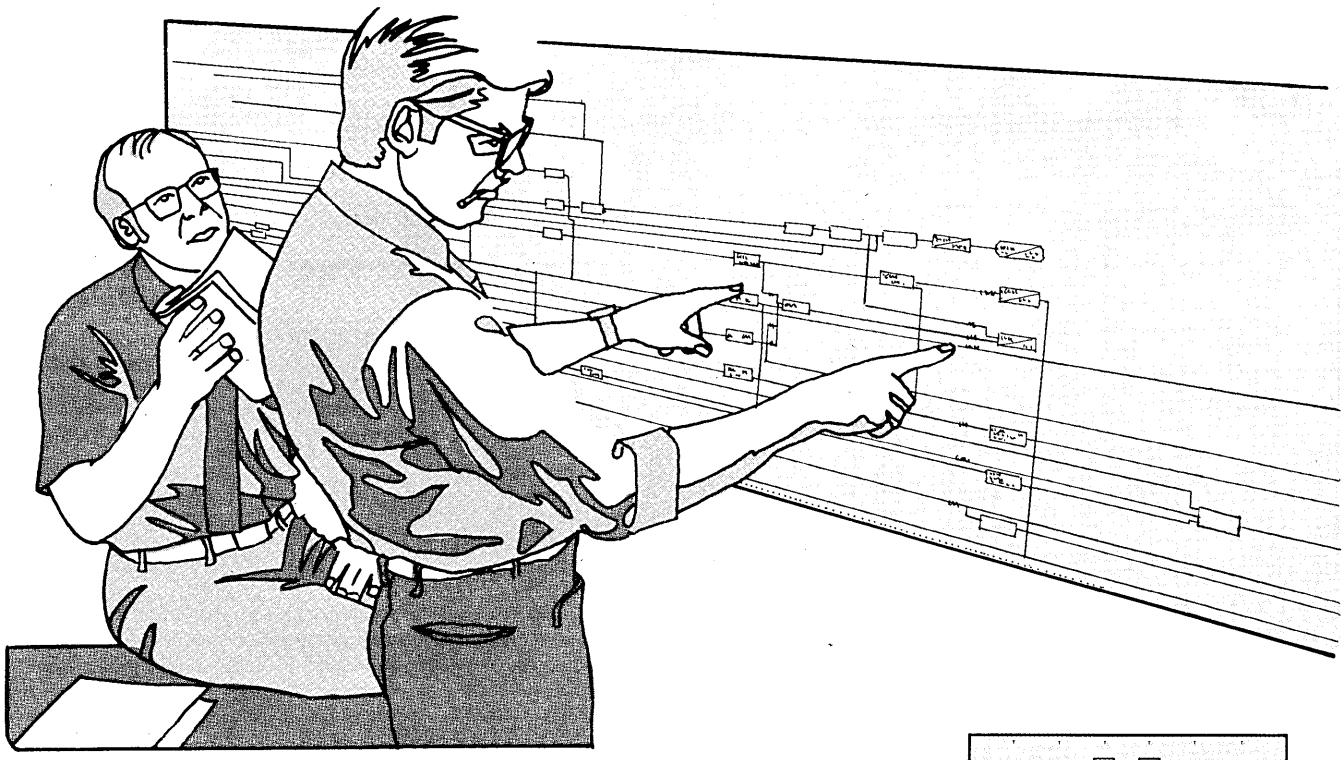

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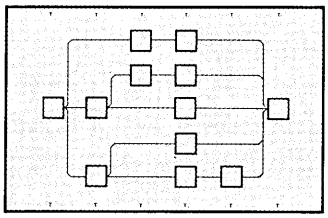
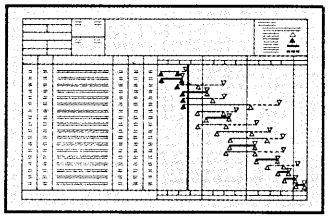
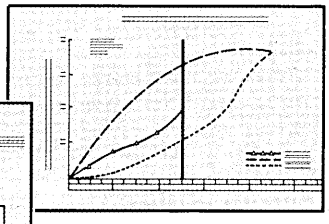


Time Scale Networks

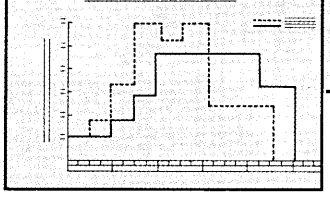
Gantt Barcharts



Cost Graphs



Manpower Graphs



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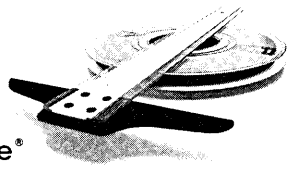

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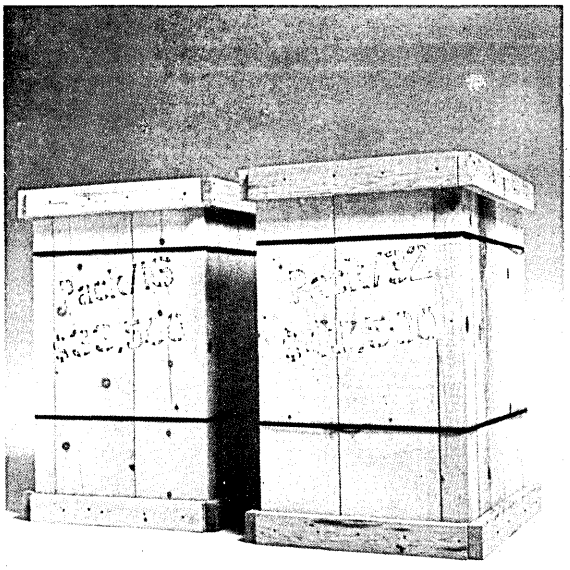

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User Ratings of Software Packages

by Herbert L. Gepner

Here's how the users feel about 250 popular software products.

There are now several thousand separately priced software packages on the market. Packages are available to handle almost every conceivable computer function, at prices ranging from less than $50 to more than $100,000. Some of these packages can probably save you many times their cost, while others will only waste your time and money. Some widely advertised packages have hundreds of satisfied users, while others have none.

Data processing executives are increasingly recognizing the many potential benefits of proprietary software packages, and it's easy to understand why. The costs of in-house programming efforts are climbing beyond all reasonable bounds, and it's difficult to recruit and retain enough competent programmers and analysts.

What's more, dp managers are becoming increasingly aware that there's real money to be saved by using "mass-produced" software wherever practical —and reserving the talents of their in-house programming staffs to concentrate upon the more specialized projects that involve unique requirements or particularly high returns.

Due to the "unbundling" moves by most of the computer makers, much of the manufacturer-supplier software that once was "free" is now offered at significant additional costs. As a result, computer users now have far more incentive to "shop around" for the best values for their software dollars.

Before putting his money on the line for a software package, a buyer deserves to know—and should demand to know—how well the product is performing in other user installations. In an effort to make this kind of information conveniently available to software purchasers, DATAMATION and Datapro Research Corporation have just completed their second annual joint survey of software package users.

Ratings of one or more software packages were supplied by just over 2,500 installations responding to a questionnaire mailing. A total of 3,659 individual package ratings were actually collected during the project, but not all of them were used. (If fewer than three installations reported on a product, we did not feel confident enough of the results to report them.) There were fully 250 packages rated by three or more sites, and each of those is reported on in the following pages.

Many more installations returned questionnaires than returned package ratings, which is quite logical since not all sites have acquired software products. Actually, the split between the "haves" and the "have nots" was almost exactly equal, with 50.7% of the sites (2,635) reporting that they had acquired software or budgeted for software acquisitions.

Those which did report proved that the software package industry is big business. The average amount spent by these installations on software in 1975 was calculated to be $14,561. The projected spending for 1976 averaged $18,285. And 1977 budgets averaged $22,393. Thus the average amount grew more than 25% from 1975 to 1976, and will go up more than 22% for next year. From this, it's clear that the proprietary software industry is a healthy one and that its products are finding steadily increasing user acceptance.

Detailed results of the survey described in this article are contained in "User Ratings of Proprietary Software," a DATAPRO 70 report available for $12 from Datapro Research Corporation, 1805 Underwood Boulevard, Delran, New Jersey 08075; (609) 764-0100.

How they were rated

The users were asked to rate the software packages they were using as "excellent," "good," "fair," or "poor" in each of seven subjective categories: Overall Satisfaction, Throughput/Efficiency, Ease of Installation, Ease of Use, Documentation, Vendor Technical Support, and Training (if applicable).

We then converted the collective user ratings for each package into a weighted average rating for each category. In a straightforward manner similar to most college grading systems, each user rating of "excellent" was weighted as 4, "good" as 3, "fair" as 2, and "poor" as 1. Then the weighted average was calculated by dividing the sum of the products by the total number of user responses in each rating category.

It seems reasonable to assume that people who decide to acquire a software package will tend to be biased in its favor. To help offset this effect, we gave equal weight to ratings submitted by prospective users who reported that they *rejected* a package after thoroughly testing it. Also, since the reliability of a consensus of user opinions tends to improve as the number of participating users increases, we've included the number of users who actually rated each package in the presentation of the results.

Thus, by reading the listings that follow, the prospective software buyer can determine, with a considerable degree of confidence, the principal strengths and weaknesses of 250 popu-

This year no fewer than 38 packages from 27 vendors qualified for the Software Honor Roll, a 52% increase over the 25 packages that qualified in 1975. Since the total number of user ratings received this year was slightly smaller than in the 1975 survey and the overall level of user satisfaction was about the same, the only reasonable conclusion seems to be that the number of truly high-quality software packages in widespread use has increased dramatically during the past year. Clearly, this is good news for prospective software buyers.

Special recognition should go to the nine vendors that placed two or more packages on the 1976 Software Honor Roll. Software Design Inc. is the proud supplier of three of the Honor Roll packages: EPAT, GRASP, and FMAINT (now incorporated into a new package called FLEET). DNA Systems, Inc. also placed three packages on the Honor Roll: CYTOS, 1130/FORTRAN, and 1130/SORT. Companies with two packages on the list include Applied Data Research, Dylakor Software Systems, IBM, Oxford Software, Pansophic Systems, Universal Software, and Westinghouse Electric.

The makeup of the 1976 Software Honor Roll deserves a few comments. Nineteen of the 25 packages on last year's Honor Roll earned the same distinction again this year, and four of the 1976 Honor Roll packages (CYTOS, DIOPEN, DISKPLAY, and FMAINT) were Honorable Mention packages last year. The 1976 Honor Roll is again dominated by "system" packages (as distinguished from packages for specific applications), with 33 of the 38 packages falling into the systems category. And, as in 1975, most of the Honor Roll packages are relatively simple products with straightforward functions.

There has, however, been a significant breakthrough in the composition of the 1976 Honor Roll. Last year, despite the strong industry emphasis on data base management systems, not a single DBMS was able to satisfy the Honor Roll criteria (although several came very close). This year, things are different. Three data base management systems—Cincom's TOTAL, Cullinane's IDMS, and Hewlett-Packard's IMAGE—all earned places on the Honor Roll, and Burroughs' DMS-II achieved Honorable Mention. Thus, it appears that user satisfaction with data base management systems is increasing, and that it is entirely reasonable to judge these complex products by the same standards as the simpler packages. ❋

THE 1976 SOFTWARE HONOR ROLL

Package	Vendor
ALLTAX*	Management Information Service
ASAP*	Universal Software, Inc.
CA-SORT II	Computer Associates, Inc.
CYTOS	DNA Systems, Inc.
DFAST	Oxford Software Corporation
DIOPEN	IBM Corporation
DISKPLAY	Boole & Babbage, Inc.
Disk Utility System*	Westinghouse Electric Co.
DYL-250*	Dylakor Software Systems, Inc.
DYL-260	Dylakor Software Systems, Inc.
EASYTRIEVE	Pansophic Systems, Inc.
EPAT*	Software Design Inc.
Fast/Dump/Restore*	Innovation Data Processing, Inc.
FMAINT	Software Design Inc.
1130/FORTRAN*	DNA Systems, Inc.
GRASP*	Software Design Inc.
IDMS	Cullinane Corporation
IMAGE	Hewlett-Packard Co.
IMSL Subroutine Libraries*	IMSL, Inc.
LIBRARIAN*	Applied Data Research, Inc.
LOOK	Applied Data Research, Inc.
Minicomm	Informatics, Inc.
Optimizer II*	Capex Corporation
PANVALET*	Pansophic Systems, Inc.
RELO-PLUS*	Universal Software, Inc.
RPG II (360/370)*	IBM Corporation
SAS	SAS Institute, Inc.
SLICK	NCI, Inc.
Software 1040	SAB, Inc.
1130/SORT*	DNA Systems, Inc.
SPSS	SPSS, Inc.
SYNCSORT*	Whitlow Computer Systems, Inc.
Teleprocessing Interface (WESTI)*	Westinghouse Electric Co.
TFAST	Oxford Software Corporation
TLMS	Gulf Computer Sciences, Inc.
TOTAL	Cincom Systems, Inc.
UCC 1 (TMS)*	University Computing Co.
WATFIV*	University of Waterloo

*Honor Roll package for the second year.

HONORABLE MENTION LIST

Package	Vendor
ADPAC II	Applied Data Systems
Autotab II	Capex Corporation
CIMS	BMS Computer Inc.
COBOL	Burroughs Corporation
COBOL	NCR Corporation
DMS-II	Burroughs Corporation
DOS/MVT	Software Pursuits, Inc.
DOSSIER	Computer Concepts, Inc.
DUCS VI	CFS, Inc.
F-LE-E	Goal Systems
GBASWIFT	GBA International
Installment Loan System	Florida Software Services, Inc.
MAC-PAC-3	Arthur Andersen & Co.
PROCON	Nichols & Co.
TERMINAL	Parallel Data Systems, Inc.
XBASE	DNA Systems, Inc.

lar software packages as judged by their users. What's more, in the many cases where two or more products from a given vendor are rated here, the prospective customer can learn quite a bit about the vendor, too.

In an effort to determine whether user satisfaction with proprietary software is increasing or decreasing, we compared the overall weighted average user ratings earned by all the packages rated in this year's survey with the same figures from last year's survey. Here are the results:

Category	1975	1976	Difference
Overall Satisfaction	3.3	3.3	0
Throughput/ Efficiency	3.1	3.1	0
Ease of Installation	3.1	3.1	0
Ease of Use	3.2	3.2	0
Documentation	3.0	2.9	−0.1
Vendor Technical Support	2.9	2.9	0
Training	2.8	2.8	0

As you can see, there was remarkably little change in the user consensus. The slight downward drift in the Documentation rating is probably too small to be of any real significance. As in 1975, Software users exhibit a fairly high level of Overall Satisfaction with the products they are using, but tend to be somewhat critical of the associated Training, Vendor Technical Support, and Documentation.

Modifications and pricing

When shopping for a software package, one of the most important questions is whether the package will need to be modified to satisfy the user's specific requirements. About 19% of the packages reported on had to be modified by the vendor; 22% were modified by the user; 63% required no modification. In many cases both the vendor and the user made modifications, which explains why the percentage figures total more than 100%. As expected, modifications were far more frequently required for applications software than for systems software.

Of course, a second very important consideration is price. The pricing information was added to the package ratings by DATAMATION's staff after many ear-flattening hours on the phone with vendor representatives. Most software firms cooperated fully with us. Where they were not able to give purchase prices, such as when the price differed depending on the version acquired, suppliers provided price ranges. For those software producers who, by some stroke of circumstance or planning, were never able to provide answers or return our repeated calls, we have annotated the software ratings in our own way.

If you're shopping for a particular type of software package, you can maximize the value of the information in this article by grouping the user ratings of all the relevant packages into a "sublist" that facilitates direct comparisons. As an example of this straightforward comparison technique, we've listed the ratings of all the popular data base management systems in Table 1. In addition to the three DBMS products that made the Honor Roll (IDMS, IMAGE, and TOTAL), you can see that several others were highly regarded in one or more of the rating categories and might well be even more suitable for use in certain installations. Computer Information Management's Datacom DB, for example, received the highest user rating of any DBMS in the important Throughput/Efficiency category but failed to satisfy the Honor Roll criteria primarily because of a subpar rating in Documentation. Conversely, IBM's GIS, DL/1, and IMS were the three DBMS products rated lowest in Overall Satisfaction by their users.

How Users Rate the Popular Data Base Management Systems

Package & Vendor	No. of users reporting	Weighted Average User Ratings* Overall Satisfaction	Throughput/efficiency	Ease of installation	Ease of use	Documentation	Vendor technical support	Training
ADABAS, Software AG	4	3.3	3.3	3.3	3.5	2.0	2.8	2.5
Datacom DB, CIM	8	3.3	3.4	3.0	3.4	2.3	3.4	3.1
DBOMP, IBM	48	3.0	2.6	2.4	2.7	2.5	2.7	2.4
DL/1, IBM	29	2.6	2.4	2.3	2.4	2.4	2.5	2.6
DMS-II, Burroughs	5	3.8	4.0	3.6	3.6	2.8	3.0	3.2
GIS, IBM	7	2.4	2.1	2.1	3.0	2.7	2.6	2.3
IDMS, Cullinane	17	3.8	3.3	3.4	3.6	3.0	3.6	3.5
IMAGE, Hewlett-Packard	11	3.6	3.3	3.7	3.2	2.8	2.9	2.7
IMS IBM	33	2.9	2.4	2.2	2.5	2.8	2.8	2.9
INQUIRE, Infodata	6	3.2	2.2	2.7	3.0	2.5	2.8	2.6
Model 204, CCA	3	3.7	3.3	3.3	3.3	2.7	3.3	2.7
SYSTEM 2000, MRI Systems	21	3.0	2.3	2.9	3.5	2.4	2.7	2.1
TOTAL, Cincom Systems	113	3.5	3.1	3.4	3.4	2.8	3.0	2.8

*All weighted averages are based on a scale of 4.0 for Excellent.
Table 1.

The honor roll

As in last year's survey, the packages that received outstandingly high ratings from their users were accorded special recognition. To earn a place on the "1976 Software Honor Roll," a package had to be rated by *at least six users* and satisfy the following somewhat arbitrary but useful criteria: 1) a weighted average rating of at least 3.5 in Overall Satisfaction, and 2) a weighted average rating of at least 2.8 in every other rating category except Training (which was excluded because formal user training is neither offered nor required for many of the simpler packages).

"Honorable Mention" status was awarded to packages that met the Honor Roll rating criteria but were *rated by only three to five users,* since the smaller sample sizes meant that we could not be quite as confident about the superiority of these products.

While it can be very helpful to know what current users think about the strengths and weaknesses of a software package, the key question is always how well the package can satisfy your own particular requirements. In this article, you'll find three tools to help you answer that question. First, the ratings should aid you in pinpointing the packages that are meeting the test of user satisfaction. Second, the Reader Service number listed for each package will bring you more information from its vendor. Third, the Vendor Index which follows the package listings will make it easy for you to go directly to the source. We hope you'll use all three tools, and that they'll help you to get a better return on your software expenditures. ❋

Mr. Gepner is software editor of **DATAPRO 70** and managing editor of **Datapro Directory of Software** at Datapro Research Corporation, Delran, New Jersey. He was previously manager of real-memory software support for the Marketing Division of RCA Computer Systems, and he worked in the IBM Software Product Testing Lab in Poughkeepsie, New York.

Users' Ratings of Software Packages

The list that follows summarizes the survey results on 250 proprietary software packages rated by three or more users. The rating in each category is expressed in terms of the Weighted Average calculated on a scale of 4 for "excellent," 3 for "good," 2 for "fair," and 1 for "poor."

Honor Roll and Honorable Mention packages are highlighted in color.

Accounting IV
Informatics, Inc.
General ledger and reporting; interfaces payables and receivables.

Users reporting	5
Overall satisfaction	2.8
Throughput/efficiency	2.8
Ease of installation	2.0
Ease of use	2.5
Documentation	3.0
Vendor technical support	2.0
Training	1.7

Price: $15,000—$40,000.
CIRCLE 301 ON READER CARD

Accounts Payable
Burroughs Corp.
Generalized accounts payable system.

Users reporting	5
Overall satisfaction	3.0
Throughput/efficiency	2.8
Ease of installation	2.8
Ease of use	2.8
Documentation	2.2
Vendor technical support	2.0
Training	2.0

Price: $1,400.
CIRCLE 302 ON READER CARD

Accounts Payable
Honeywell Information Systems, Inc.
For Honeywell Model 58 and Level 62 systems.

Users reporting	7
Overall satisfaction	2.9
Throughput/efficiency	2.6
Ease of installation	3.1
Ease of use	2.6
Documentation	2.9
Vendor technical support	2.9
Training	3.0

Price: $800.
CIRCLE 303 ON READER CARD

Accounts Payable
Infonational, Inc.
In ANSI COBOL *for most mainframes.*

Users reporting	12
Overall satisfaction	3.0
Throughput/efficiency	2.3
Ease of installation	2.5
Ease of use	2.9
Documentation	2.7
Vendor technical support	2.9
Training	2.3

Price: $15,000.
CIRCLE 304 ON READER CARD

Accounts Payable (S/3)
IBM Corp. GSD
Generalized accounts payable package for System/3.

Users reporting	23
Overall satisfaction	2.8
Throughput/efficiency	2.5
Ease of installation	2.7
Ease of use	2.8
Documentation	2.7
Vendor technical support	2.2
Training	1.9

Price: $150—$200/month (license fully paid in 12 months).
CIRCLE 305 ON READER CARD

Accounts Payable
McCormack & Dodge Corp.
In ANSI COBOL *for most mainframes.*

Users reporting	11
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	2.8
Eaes of use	2.7
Documentation	3.3
Vendor technical support	3.0
Training	2.7

Price: $16,000 (DOS)—$18,000 (OS).
CIRCLE 306 ON READER CARD

MSA Accounts Payable
Management Science America (MSA)
In ANSI COBOL *for use on various mainframes.*

Users reporting	4
Overall satisfaction	1.8
Throughput/efficiency	1.8
Ease of installation	2.0
Ease of use	2.0
Documentation	1.8
Vendor technical support	1.5
Training	1.3

Vendor would not release price.
CIRCLE 307 ON READER CARD

Accounts Payable
NCR Corp.
Generalized accounts payable package for Century Series computers.

Users reporting	13
Overall satisfaction	2.8
Throughput/efficiency	2.7
Ease of installation	2.8
Ease of use	2.8
Documentation	3.0
Vendor technical support	2.9
Training	3.0

Price: $250 plus $10/month, lease only.
CIRCLE 308 ON READER CARD

Accounts Payable
Software International Corp.
Data base-oriented system for any IBM *360/370 with 64K and two discs.*

Users reporting	8
Overall satisfaction	3.0
Throughput/efficiency	3.2
Ease of installation	3.0
Ease of use	2.8
Documentation	2.6
Vendor technical support	2.8
Training	2.8

Price: $10,500 permanent license.
CIRCLE 309 ON READER CARD

Accounts Receivable
Honeywell Information Systems, Inc.
For Honeywell Model 58 and Level 62 systems.

Users reporting	3
Overall satisfaction	2.0
Throughput/efficiency	1.7
Ease of installation	2.7
Ease of use	2.3
Documentation	2.3
Vendor technical support	3.0
Training	0

Price: $800.
CIRCLE 310 ON READER CARD

Accounts Receivable (S/3)
IBM Corp. GSD
Generalized IBM *System/3 accounts receivable package.*

Users reporting	11
Overall satisfaction	2.6
Throughput/efficiency	2.5
Ease of installation	2.2
Ease of use	2.6
Documentation	2.6
Vendor technical support	1.9
Training	1.4

Price: $105—$130/month (license fully paid in 12 months).
CIRCLE 311 ON READER CARD

Accounts Receivable
NCR Corp.
Generalized accounts receivable package for Century Series.

Users reporting	10
Overall satisfaction	3.2
Throughput/efficiency	2.8
Ease of installation	3.0
Ease of use	2.9
Documentation	3.6
Vendor technical support	2.4
Training	2.9

Price: $250 plus $10/ month, lease only.
CIRCLE 312 ON READER CARD

Accounts Receivable
Software International Corp.
In ANSI COBOL *for* IBM *360/370.*

Users reporting	4
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	2.5
Ease of use	2.0
Documentation	3.0
Vendor technical support	3.0
Training	2.8

Price: $22,500 permanent license.
CIRCLE 313 ON READER CARD

ADABAS
Software AG of North America, Inc.
Data base management system for IBM *360/370 (any operating system), Univac 9000* (DOS), *Siemens.*

Users reporting	4
Overall satisfaction	3.3
Throughput/efficiency	3.3
Ease of installation	3.3
Ease of use	3.5
Documentation	2.0
Vendor technical support	2.8
Training	2.5

Price: $80,000 (DOS)—$120,000 (OS).
CIRCLE 314 ON READER CARD

ADPAC—II
Applied Data Systems (or ADPAC Corp.)
Business-oriented higher-level language and compiler with a report program generator feature.

Users reporting	4
Overall satisfaction	3.8
Throughput/efficiency	3.8
Ease of installation	3.5
Ease of use	3.5
Documentation	3.3
Vendor technical support	3.3
Training	2.3

Price: $30,000 3-year license (no purchase).
CIRCLE 315 ON READER CARD

ALLTAX
Management Information Services (MIS)
COBOL *subroutine for performing tax calculations.*

Users reporting	32
Overall satisfaction	3.6
Throughput/efficiency	3.3
Ease of installation	3.4
Ease of use	3.3
Documentation	3.4
Vendor technical support	3.4
Training	3.0

Vendor would not release price.
CIRCLE 316 ON READER CARD

AMIGOS
Comten, Inc.
Replacement for IBM*'s* ISAM *access method on* IBM *S/360 or 370.*

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	3.0
Ease of use	2.7
Documentation	3.0
Vendor technical support	2.7
Training	3.0

Price: $595/month, rental only.
CIRCLE 317 ON READER CARD

APL
Digital Equipment Corp. (DEC)
Algorithmic programming language for use on PDP *series.*

Users reporting	4
Overall satisfaction	3.0
Throughput/efficiency	2.3
Ease of installation	2.7
Ease of use	3.0
Documentation	2.3
Vendor technical support	2.0
Training	2.5

Price: $1,500.
CIRCLE 318 ON READER CARD

ASAP
Universal Software, Inc.
Spooling supplement for IBM *360/370* DOS *or* DOS/VS.

Users reporting	47
Overall satisfaction	3.5
Throughput/efficiency	3.6
Ease of installation	3.4
Ease of use	3.4
Documentation	2.9
Vendor technical support	3.0
Training	3.0

Price: $2,900 2-year license (no purchase).
CIRCLE 319 ON READER CARD

ASI-ST
Applications Software Inc.
High-level user language for updating, retrieval, and report generation; interfaces with IMS *or* TOTAL DBMS.

Users reporting	7
Overall satisfaction	3.0
Throughput/efficiency	3.1
Ease of installation	3.3
Ease of use	2.7
Documentation	3.0
Vendor technical support	2.6
Training	3.3

Price: $12,000—$35,000.
CIRCLE 320 ON READER CARD

AUTOFLOW II
Applied Data Research Corp.
A system and program development tool for documenting whole systems and individual source programs.

Users reporting	18
Overall satisfaction	3.1
Throughput/efficiency	3.0
Ease of installation	3.1
Ease of use	3.2
Documentation	2.9
Vendor technical support	2.9
Training	3.0

Price: $6,500—$20;000 permanent license.
CIRCLE 321 ON READER CARD

Auto Report (S/3)
IBM Corp. (GSD)
Feature of IBM *System/3 Disc* RPG *II program product.*

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	3.3
Ease of use	3.3
Documentation	3.0
Vendor technical support	2.5
Training	1.0

Price: $16/month (Models 8 & 10); bundled on Models 12 & 15; (no purchase).
CIRCLE 322 ON READER CARD

Autotab II
Capex Corp.
A financial modeling, reporting, and analysis language designed for non-programmer use.

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	3.3
Ease of installation	3.5
Ease of use	4.0
Documentation	3.5
Vendor technical support	3.5
Training	2.5

Price: $12,000—$13,250 permanent lease.
CIRCLE 323 ON READER CARD

BACIS
IBM Corp. DPD
Budget accounting information system for IBM *360/370* DOS *systems.*

Users reporting	4
Overall satisfaction	2.5
Throughput/efficiency	2.3
Ease of installation	1.8
Ease of use	2.5
Documentation	2.5
Vendor technical support	3.0
Training	2.3

Price: $330/month (license fully paid in 12 months).
CIRCLE 324 ON READER CARD

BASIC
Digital Equipment Corp. (DEC)
Various versions to complement DEC *operating systems.*

Users reporting	4
Overall satisfaction	3.3
Throughput/efficiency	2.8
Ease of installation	3.8
Ease of use	3.8
Documentation	3.0
Vendor technical support	2.5
Training	1.0

Price: $750.
CIRCLE 325 ON READER CARD

BASIC (360/370)
IBM Corp. DPD
For time-sharing use under ITF *or* TSO.

Users reporting	4
Overall satisfaction	2
Throughput/efficiency	2.5
Ease of installation	1.5
Ease of use	2.0
Documentation	2.5
Vendor technical support	1.5
Training	1.5

Price: $385/mo. BASIC VS (no purchase)
CIRCLE 326 ON READER CARD

BASIC
MITS
BASIC *processor for Altair microcomputers.*

Users reporting	4
Overall satisfaction	3.3
Throughput/efficiency	3.3
Ease of installation	2.8
Ease of use	3.3
Documentation	2.3
Vendor technical support	3.0
Training	3.0

Price: $75—$200.
CIRCLE 327 ON READER CARD

BHAS
Burroughs Corp.
Burroughs' hospital accounting system.

Users reporting	6
Overall satisfaction	2.8
Throughput/efficiency	2.8
Ease of installation	3.0
Ease of use	4.0
Documentation	2.8
Vendor technical support	3.0
Training	2.8

Price: $11,000.
CIRCLE 328 ON READER CARD

Bit-Facs
American Valuation Consultants, Inc.
Total fixed assets management system with report generation capabilities; operates in OS, DOS, *or* VS *environment.*

Users reporting	7
Overall satisfaction	2.7
Throughput/efficiency	3.0
Ease of installation	2.7
Ease of use	2.7
Documentation	2.7
Vendor technical support	3.0
Training	2.4

Price: $13,000 (DOS)*—$15,000* (OS).
CIRCLE 329 ON READER CARD

BMD (or BioMed)
Univ. of California at Los Angeles (UCLA)
Statistical computing for medical and other applications.

Users reporting	8
Overall satisfaction	3.4
Throughput/efficiency	2.7
Ease of installation	3.3
Ease of use	3.0
Documentation	3.6
Vendor technical support	2.6
Training	2.7

Price: $76—$86 only (the charge for making a copy).
CIRCLE 330 ON READER CARD

BOMP
IBM Corp. GSD
Bill of material processor for System/3.

Users reporting	51
Overall satisfaction	3.3
Throughput/efficiency	2.8
Ease of installation	2.8
Ease of use	3.1
Documentation	3.4
Vendor technical support	2.8
Training	2.4

Price: $59/month (no purchase).
CIRCLE 331 ON READER CARD

BOMP
NCR Corp.
Bill of material processor for Century systems.

Users reporting	4
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	2.5
Ease of use	2.8
Documentation	2.5
Vendor technical support	2.3
Training	2.0

Price: $480 plus $20/month, lease only.
CIRCLE 332 ON READER CARD

Budget Accounting
NCR Corp.
Budgetary management accounting tool for Century systems.

Users reporting	3
Overall satisfaction	2.0
Throughput/efficiency	1.7
Ease of installation	1.7
Ease of use	1.7
Documentation	2.3
Vendor technical support	2.3
Training	1.7

Price: $360 plus $15/month, lease only.
CIRCLE 333 ON READER CARD

Budgetary Accounting (S/3)
IBM Corp. GSD
System/3 budget preparation and accounting system.

Users reporting	3
Overall satisfaction	2.7
Throughput/efficiency	2.7
Ease of installation	2
Ease of use	3.3
Documentation	2.0
Vendor technical support	2.0
Training	3.0

Price: Public Budgeting & Financial Accounting — $330/month (license fully paid in 12 months).
CIRCLE 334 ON READER CARD

CalComp Plot Libraries
California Computer Products, Inc. (CalComp)
A library of plotting subroutines for use with host computers and CalComp plotters.

Users reporting	6
Overall satisfaction	3.7
Throughput/efficiency	3.3
Ease of installation	3.4
Ease of use	3.7
Documentation	3.2
Vendor technical support	2.5
Training	2.7

Price: $500—$1,500.
CIRCLE 335 ON READER CARD

CAS/CPA
Boole & Babbage, Inc.
Total system, program usage, and cost accounting system for OS *and* OS/VS *environments.*

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	2.7
Ease of use	3
Documentation	2.3
Vendor technical support	3.3
Training	3.0

Price: $9,500.
CIRCLE 336 ON READER CARD

CA-SORT II
Computer Associates, Inc.
Replacement sort/merge utility for IBM *S/360 or 370 users; formerly marketed as* PAN*SORT *by Pansophic Systems.*

Users reporting	18
Overall satisfaction	3.8
Throughput/efficiency	3.8
Ease of installation	3.8
Ease of use	3.7
Documentation	3.2
Vendor technical support	3.3

Training	3.3

Price: $5,500 (DOS) — $7,000 (OS).
CIRCLE 337 ON READER CARD

CFO-II
IBM Corp. DPD
Insurance contract maintenance system for IBM 360/370 DOS or OS systems.

Users reporting	5
Overall satisfaction	3.4
Throughput/efficiency	2.8
Ease of installation	2.4
Ease of use	3.2
Documentation	3.2
Vendor technical support	2.5
Training	2.3

Price: $346/month (no purchase).
CIRCLE 338 ON READER CARD

CHAMP
Business EDP Services, Inc.
Modular memory management system to serve data communications networks of varying sizes.

Users reporting	4
Overall satisfaction	3.5
Throughput/efficiency	3.3
Ease of installation	3.5
Ease of use	3.3
Documentation	2.5
Vendor technical support	3.5
Training	2.7

Vendor would not release price.
CIRCLE 339 ON READER CARD

CICS
IBM Corp. DPD
Data communications monitor; versions exist for 360/370 DOS, DOS/VS, OS, and OS/VS systems.

Users reporting	161
Overall satisfaction	2.9
Throughput/efficiency	2.7
Ease of installation	2.3
Ease of use	2.6
Documentation	2.6
Vendor technical support	2.8
Training	2.7

Price: $588/month (DOS)—$866/month (OS/VS) no purchase.
CIRCLE 340 ON READER CARD

CIF
NCR Corp.
Central information file system for banks.

Users reporting	6
Overall satisfaction	3.3
Throughput/efficiency	2.7
Ease of installation	2.8
Ease of use	3.3
Documentation	2.7
Vendor technical support	2.3
Training	2.2

Price: $430 plus $20/month, lease only.
CIRCLE 341 ON READER CARD

CIMS
BMS Computer, Inc.
Job accounting and system performance monitors for IBM, DOS, OS, or their VS counterpart systems.

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	3.0
Ease of installation	3.3
Ease of use	3.0
Documentation	3.3
Vendor technical support	4.0
Training	—

Price: $2,500—$4,750.
CIRCLE 342 ON READER CARD

COBOL
Burroughs Corp.
Standard Burroughs COBOL compiler.

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	3.3
Ease of installation	3.7
Ease of use	3.7
Documentation	3.0
Vendor technical support	3.0
Training	3.0

Price: $50/month, (no purchase).
CIRCLE 343 ON READER CARD

COBOL
Digital Equipment Corp. (DEC)
Several versions to complement DEC operating systems.

Users reporting	3
Overall satisfaction	2.0
Throughput/efficiency	1.7
Ease of installation	2.7
Ease of use	2.7
Documentation	2.7
Vendor technical support	2.0
Training	2.0

Price: $7,000.
CIRCLE 344 ON READER CARD

COBOL (S/3)
IBM Corp. GSD
An ANSI subset without Sort or Report Writer.

Users reporting	6
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	3.3
Ease of use	3.3
Documentation	3.0
Vendor technical support	3.2
Training	3.3

Price: $85-$90/month (no purchase).
CIRCLE 345 ON READER CARD

COBOL (360/370)
IBM Corp. DPD
Includes DOS, OS, and counterpart VS versions.

Users reporting	116
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	3.2
Ease of use	3.5
Documentation	3.4
Vendor technical support	2.9
Training	3.1

Price: $236/month (OS/VS)—$141/month (DOS/VS) no purchase.
CIRCLE 346 ON READER CARD

COBOL (1130)
IBM Corp. DPD
Subset version for IBM 1130.

Users reporting	23
Overall satisfaction	3.1
Throughput/efficiency	2.9
Ease of installation	2.8
Ease of use	3.0
Documentation	2.6
Vendor technical support	2.4
Training	2.0

Software bundled.
CIRCLE 347 ON READER CARD

COBOL
NCR Corp.
Standard NCR ANSI COBOL processor.

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	4.0
Ease of installation	4.0
Ease of use	4.0
Documentation	3.7
Vendor technical support	3.7
Training	3.0

Price: $90/month, lease only.
CIRCLE 348 ON READER CARD

Comput-A-Charge
Value Computing, Inc.
Job accounting and billing, written in ANSI COBOL; runs on most mainframes.

Users reporting	7
Overall satisfaction	3.1
Throughput/efficiency	3.1
Ease of installation	3.1
Ease of use	3.0
Documentation	2.6
Vendor technical support	2.9
Training	2.3

Price: $6,000 (DOS) — $9,000 (OS).
CIRCLE 349 ON READER CARD

COS-300
Digital Equipment Corp. (DEC)
Commercial operating system for DEC Datasystem 300s.

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	3.7
Ease of installation	3.7
Ease of use	3.7
Documentation	2.3
Vendor technical support	2.0
Training	3.5

Price: The new version, COS-310, is bundled.
CIRCLE 350 ON READER CARD

COTUNE II
Capex Corp.
COBOL program analyzer for debugging of source programs; supports COBOL F and all versions of ANSI COBOL.

Users reporting	4
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	3.0
Ease of use	3.0
Documentation	3.0
Vendor technical support	3.0
Training	3.0

Price: $6,500—$7,500 permanent lease.
CIRCLE 351 ON READER CARD

Coursewriter III
IBM Corp. DPD
Used for computer-aided instruction course preparation on 360/370 under DOS or OS.

Users reporting	3
Overall satisfaction	2.3
Throughput/efficiency	2.5
Ease of installation	2.3
Ease of use	3.0
Documentation	2.0
Vendor technical support	2.7
Training	3.0

Price: $231/month (DOS) — $317/month (OS) no purchase.
CIRCLE 352 ON READER CARD

CUE
Boole & Babbage, Inc.
System hardware resource utilization analyzer and report generation system.

Users reporting	11
Overall satisfaction	3.3
Throughput/efficiency	3.4
Ease of installation	3.4
Ease of use	3.3
Documentation	2.6
Vendor technical support	2.9
Training	3.3

Price: $11,500.
CIRCLE 353 ON READER CARD

CULPRIT
Cullinane Corp.
Output processor and report creation system for S/360 or 370 and Univac Series 70 computers.

Users reporting	7
Overall satisfaction	3.6
Throughput/efficiency	2.7
Ease of installation	3.9
Ease of use	3.3
Documentation	2.6
Vendor technical support	3.1
Training	2.9

Price: $20,000.
CIRCLE 354 ON READER CARD

CYTOS
DNA Systems Inc.
Conversational operating system for IBM 1130 and compatible systems.

Users reporting	8
Overall satisfaction	3.8
Throughput/efficiency	3.5
Ease of installation	3.6
Ease of use	3.6
Documentation	3.0
Vendor technical support	3.6
Training	3.0

Price: Consolidated with TSO at $8,000 one-time lease.
CIRCLE 355 ON READER CARD

Data Analyzer
Program Products, Inc.
Information retrieval and reporting on any IBM 360/370; has interfaces for IMS and TOTAL.

Users reporting	11
Overall satisfaction	3.1
Throughput/efficiency	3.0
Ease of installation	2.8
Ease of use	3.0
Documentation	2.8
Vendor technical support	2.9
Training	2.9

Price: $16,000 (DOS)—$18,000 (OS).
CIRCLE 356 ON READER CARD

Datacom DB/DC
Computer Information Management Co. (CIM)
A data base management system for the IBM S/360 or 370, using relational data base concept with inverted file structures; DC is an adjunctive telecommunications monitor system.

Users reporting	8
Overall satisfaction	3.3
Throughput/efficiency	3.4
Ease of installation	3.0
Ease of use	3.4

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Documentation	2.3
Vendor technical support	3.4
Training	3.1

Price: $29,500—$35,000.
CIRCLE 357 ON READER CARD

DATAMACS
Management and Computer Services, Inc. (MACS)
Creates test files for COBOL *programs on* IBM *360/370.*

Users reporting	4
Overall satisfaction	2.0
Throughput/efficiency	2.8
Ease of installation	2.8
Ease of use	2.0
Documentation	2.5
Vendor technical support	2.8
Training	2.0

Price: $6,500—$11,600.
CIRCLE 358 ON READER CARD

DBOMP
IBM Corp. DPD
Data base organization and maintenance processor utility for 360/370.

Users reporting	48
Overall satisfaction	3.0
Throughput/efficiency	2.6
Ease of installation	2.4
Ease of use	2.7
Documentation	2.5
Vendor technical support	2.7
Training	2.4

Price: $115/month (no purchase).
CIRCLE 359 ON READER CARD

DBOS
General Automation
Disc/drum-based operating system for SPC-16 *minicomputer.*

Users reporting	3
Overall satisfaction	2.3
Throughput/efficiency	2.0
Ease of installation	2.7
Ease of use	3.3
Documentation	2.0
Vendor technical support	2.0
Training	4.0

Price: $1,500.
CIRCLE 360 ON READER CARD

DFAST/VS
Oxford Software Corp.
Allows 360/370 DOS *and* DOS/VS *users to automatically allocate and share disc space.*

Users reporting	21
Overall satisfaction	3.7
Throughput/efficiency	3.6
Ease of installation	3.6
Ease of use	3.6
Documentation	2.9
Vendor technical support	2.9
Training	2.9

Price: $5,625—$9,375.
CIRCLE 361 ON READER CARD

DIOPEN
IBM Corp. DPD
Disc file utility for 360/370.

Users reporting	9
Overall satisfaction	3.6
Throughput/efficiency	3.4
Ease of installation	3.4
Ease of use	3.6
Documentation	3.3
Vendor technical support	3.4
Training	3.0

Price: $54/month (license fully paid in 2 years).
CIRCLE 362 ON READER CARD

DISKPLAY
Boole & Babbage, Inc.
Volume table of contents (VTOC) *analyzer that sorts and prints listings of data files and all pertinent disc-related information.*

Users reporting	6
Overall satisfaction	3.7
Throughput/efficiency	3.5
Ease of installation	3.7
Ease of use	3.7
Documentation	3.2
Vendor technical support	2.8
Training	2.0

Price: $495.
CIRCLE 363 ON READER CARD

DISKTAB
Donovan Data Services
Disc utility program for IBM *1130 and compatible systems.*

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	3.7
Ease of use	2.0
Documentation	2.0
Vendor technical support	2.7
Training	2.5

Vendor would not release price.
CIRCLE 364 ON READER CARD

Disk Utility System
Westinghouse Electric Corp.
Disc-to-tape, etc., utility for use with IBM *360/370* DOS *and* DOS/VS.

Users reporting	117
Overall satisfaction	3.8
Throughput/efficiency	3.9
Ease of installation	3.8
Ease of use	3.7
Documentation	3.5
Vendor technical support	3.3
Training	3.2

Price: $2,500.
CIRCLE 365 ON READER CARD

DITTO
IBM Corp. DPD
File copy/file management utility.

Users reporting	36
Overall satisfaction	3.3
Throughput/efficiency	3.1
Ease of installation	3.4
Ease of use	3.5
Documentation	3.4
Vendor technical support	2.8
Training	2.7

Price: $71/month (DOS)—$81/month (OS) (license fully paid in 2 years).
CIRCLE 366 ON READER CARD

DL/1
IBM Corp. DPD
Data base management system for IBM *S/370* DOS/VS.

Users reporting	29
Overall satisfaction	2.6
Throughput/efficiency	2.4
Ease of installation	2.3
Ease of use	2.4
Documentation	2.4
Vendor technical support	2.5
Training	2.6

Price: $346 (DOS/VS)
CIRCLE 367 ON READER CARD

DMS-II
Burroughs Corp.
Burroughs' full-blown data base management system.

Users reporting	5
Overall satisfaction	3.8
Throughput/efficiency	4.0
Ease of installation	3.6
Ease of use	3.6
Documentation	2.8
Vendor technical support	3.0
Training	3.2

Price: $12,000—$24,000.
CIRCLE 368 ON READER CARD

DOCS
CFS, Inc.
A display operator console support program which allows the direction of SYSLOG *input and output to one or more display units.*

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.5
Ease of installation	3.0
Ease of use	3.7
Documentation	2.3
Vendor technical support	3.0
Training	—

Price: $5,670.
CIRCLE 369 ON READER CARD

DOS
Digital Equipment Corp. (DEC)
Disc-based operating system support for COMTEX *communications on* DEC PDP-*11.*

Users reporting	7
Overall satisfaction	3.2
Throughput/efficiency	2.5
Ease of installation	2.8
Ease of use	2.7
Documentation	2.7
Vendor technical support	2.4
Training	3.0

Price: $1,700.
CIRCLE 370 ON READER CARD

DOS
Hewlett-Packard Co.
*Disc-based operating system for H-P 21*MX *and 2100 series.*

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	3.3
Ease of use	2.3
Documentation	2.3
Vendor technical support	2.0
Training	2.0

Price: $2,500.
CIRCLE 371 ON READER CARD

DOS/MVT
Software Pursuits Inc.
Replacement for IBM *360/370 Disc Operating System; features 12-partition support.*

Users reporting	4
Overall satisfaction	4.0
Throughput/efficiency	4.0
Ease of installation	3.7
Ease of use	3.8
Documentation	3.3
Vendor technical support	4.0
Training	3.3

Price: $500/month, rental only.
CIRCLE 372 ON READER CARD

DOS/RS
Dearborn Computer Leasing Co.
IBM *S/360 and 370* DOS *replacement with six-partition and* POWER III *spooling support.*

Users reporting	6
Overall satisfaction	3.7
Throughput/efficiency	3.7
Ease of installation	3.0
Ease of use	3.7
Documentation	2.7
Vendor technical support	3.2
Training	2.7

Price: $5,000—$12,500 permanent lease.
CIRCLE 373 ON READER CARD

DOSSIER
Computer Concepts, Inc.
IBM DOS *or* DOS/VS *program library file descriptor system for core-image and/or relocatable libraries.*

Users reporting	4
Overall satisfaction	3.8
Throughput/efficiency	3.3
Ease of installation	4.0
Ease of use	3.5
Documentation	3.3
Vendor technical support	3.3
Training	3.0

Price: $2,150 99-year license.
CIRCLE 374 ON READER CARD

DRS
Aeronautical Research Associates of Princeton, Inc. (A.R.A.P.)
Modular data management retrieval and reporting system for batch or interactive operation; versions available for 360/370 and various minicomputers.

Users reporting	4
Overall satisfaction	2.8
Throughput/efficiency	2.3
Ease of installation	2.8
Ease of use	2.7
Documentation	2.3
Vendor technical support	3.5
Training	3.8

Price: $2,300—$65,000.
CIRCLE 375 ON READER CARD

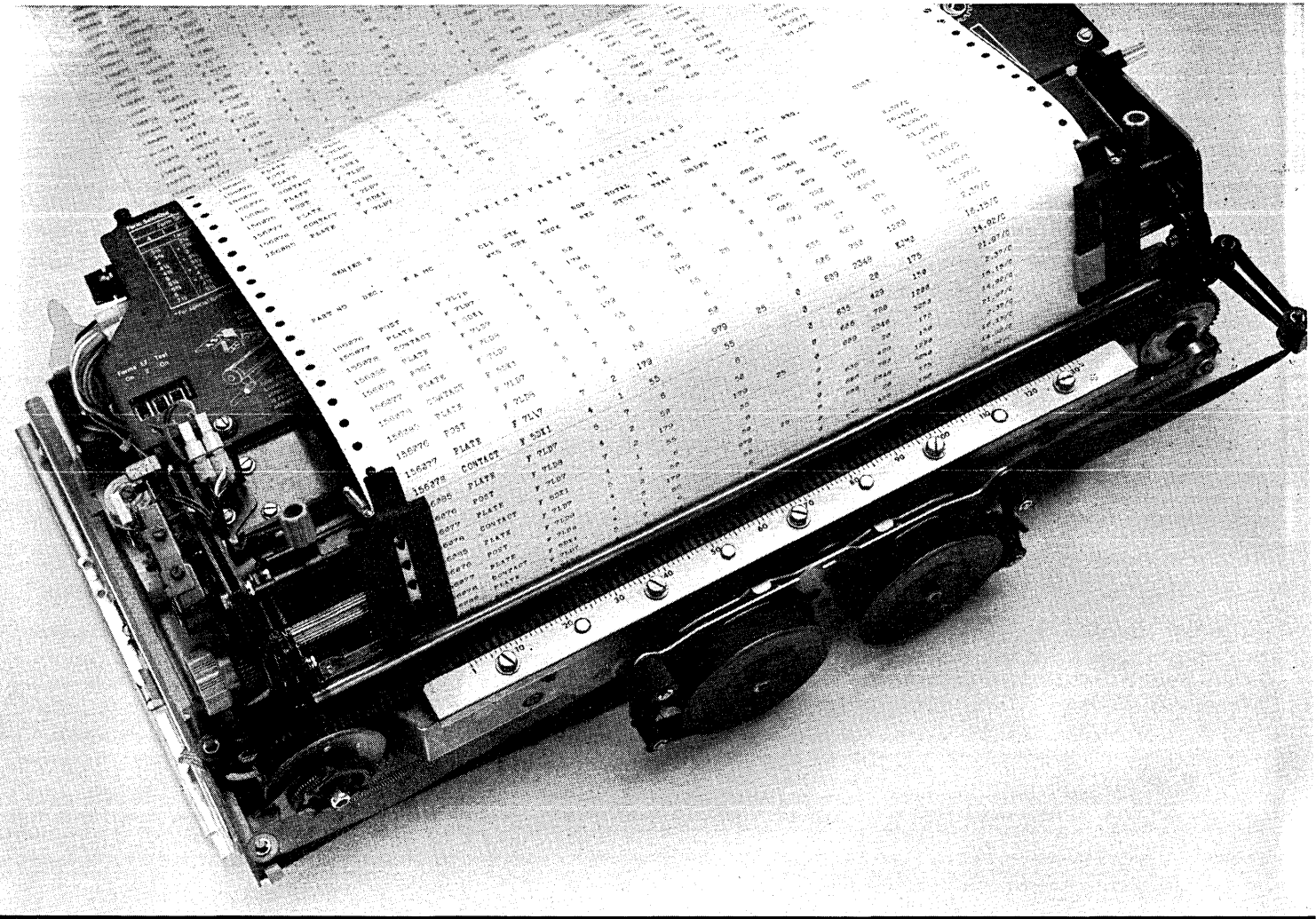
DUCS VI
CFS, Inc.
Display unit control system that contains an access method providing support for 2260s and remote or local 3270s.

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	3.7
Ease of installation	3.0
Ease of use	3.3
Documentation	3.0
Vendor technical support	3.7
Training	2.0

Price: $2,025.
CIRCLE 376 ON READER CARD

DYL-250
Dylakor Software Systems, Inc.
File maintenance and label printing utility for IBM *360/370.*

Users reporting	19
Overall satisfaction	3.5
Throughput/efficiency	3.2
Ease of installation	3.7
Ease of use	3.3



The Teletype® model 40 OEM printer. When you look at it from price and performance, you'll find it difficult to look at anything else.

The fact of the matter is simply this:
We don't think any other printer can even come close to the model 40.

And that's no idle boast. Not when you consider the facts.

Consider: Where else can you get a 132-column, heavy-duty impact printer that delivers over 300 lines per minute for less than $2000, or an 80-column printer for under $1400?

The big reason behind the model 40's price/performance advantage is our unique design. Even though it operates at speeds of more than 300 lpm, wear and tear is less than you'd find in a conventional printer operating at considerably slower speed. Fewer moving parts and solid-state components add up to greater reliability and reduced maintenance.

Here's something else to consider: Where else can you get a printer that delivers the kind of flexibility and reliability the model 40 offers?

For complete information, please contact our Sales Headquarters at: 5555 Touhy Ave., Skokie, Ill. 60076. Or call Terminal Central at: (312) 982-2000.

TELETYPE

The Teletype model 40 OEM printer. Nothing even comes close.

Teletype is a trademark and service mark registered in the United States Patent and Trademark Office.

CIRCLE 64 ON READER CARD

Documentation	3.2
Vendor technical support	3.3
Training	2.6

Price: $2,950.
CIRCLE 377 ON READER CARD

DYL-260
Dylakor Software Systems, Inc.
Data management and report writing system for IBM *360/370.*

Users reporting	55
Overall satisfaction	3.8
Throughput/efficiency	3.6
Ease of installation	3.8
Ease of use	3.3
Documentation	3.1
Vendor technical support	3.2
Training	2.9

Price: $8,000—$13,450.
CIRCLE 378 ON READER CARD

EASYTRIEVE
Pansophic Systems, Inc.
Information retrieval and reporting system for IBM *360/370 and Univac Series 70.*

Users reporting	60
Overall satisfaction	3.6
Throughput/efficiency	3.4
Ease of installation	3.6
Ease of use	3.6
Documentation	3.1
Vendor technical support	3.1
Training	2.6

Price: $12,500 (DOS)—$15,000 (OS).
CIRCLE 379 ON READER CARD

EDOS
The Computer Software Company
A replacement operating system for IBM DOS *users with many extended operating system features including* DBMS *support.*

Users reporting	31
Overall satisfaction	3.2
Throughput/efficiency	3.2
Ease of installation	2.9
Ease of use	3.2
Documentation	2.9
Vendor technical support	3.1
Training	2.8

Price: $225/month, lease only.
CIRCLE 380 ON READER CARD

ELIMN8
Informatics, Inc.
Eliminates need for IBM *5444 disc drive as system disc for System/3 Model 10.*

Users reporting	4
Overall satisfaction	3.5
Throughput/efficiency	3.5
Ease of installation	3.0
Ease of use	3.5
Documentation	2.5
Vendor technical support	3.0
Training	3.0

Price: $2,000.
CIRCLE 381 ON READER CARD

Environ/1
Cincom Systems, Inc.
General-purpose data communications monitor for multiple online user terminals und applications; runs on IBM *S/360 or 370.*

Users reporting	18
Overall satisfaction	3.1
Throughput/efficiency	3.1
Ease of installation	3.2
Ease of use	3.1
Documentation	2.3
Vendor technical support	2.5
Training	2.5

Price: $22,250—$76,000.
CIRCLE 382 ON READER CARD

EPAT
Software Design Inc. (SDI)
Keeps track of physical tape volumes on IBM *360/370 under* DOS *or* DOS/VS.

Users reporting	42
Overall satisfaction	3.5
Throughput/efficiency	3.4
Ease of installation	3.3
Ease of use	3.3
Documentation	3.2
Vendor technical support	3.0
Training	2.9

Price: $295/month, lease only.
CIRCLE 383 ON READER CARD

EPIC-Budgetary/Finance
IBM Corp. DPD or GSD
One of a series of program products for schools that run on 360, 370, System/3, and 1130 systems.

Users reporting	3
Overall satisfaction	2.0
Throughput/efficiency	1.3
Ease of installation	2.0
Ease of use	2.0
Documentation	2.7
Vendor technical support	2.3
Training	2.0

Price: $121/month (DOS or OS) (no purchase).
CIRCLE 384 ON READER CARD

EPIC-FAST
IBM Corp. DPD or GSD
Another school-oriented program product (see above description).

Users reporting	4
Overall satisfaction	1.5
Throughput/efficiency	2.0
Ease of installation	1.5
Ease of use	1.5
Documentation	1.8
Vendor technical support	2.3
Training	2.0

Price: $104/month (DOS or OS) (no purchase).
CIRCLE 385 ON READER CARD

EPIC-SOCRATES
IBM Corp. GSD or DPD
Another school-oriented program product (see above description).

Users reporting	20
Overall satisfaction	3.2
Throughput/efficiency	2.6
Ease of installation	2.4
Ease of use	2.9
Documentation	2.5
Vendor technical support	2.5
Training	2.2

Price: $192/month (DOS or OS) (no purchase).
CIRCLE 386 ON READER CARD

Extracto
Aquila BST (1974) Ltd.
Data management information retrieval and reporting system wtih multiple file handling capabilities.

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	3.0
Ease of use	3.3
Documentation	2.3
Vendor technical support	2.3
Training	3.0

Price: $500/month, rental only (Canada)
CIRCLE 387 ON READER CARD

EZPERT
Systonetics, Inc.
Computerized, automated PERT *chart control system for use on* IBM *360/370, Univac, Honeywell, Burroughs, and* CDC *systems; written in* FORTRAN IV.

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	2.7
Ease of installation	2.0
Ease of use	3.0
Documentation	2.7
Vendor technical support	3.3
Training	3.3

Price: $37,000—$45,000.
CIRCLE 388 ON READER CARD

Fast/Dump/Restore
Innovation Data Processing, Inc.
Disc-to-tape dump/restore utility for IBM *360/370* OS *or* OS/VS.

Users reporting	27
Overall satisfaction	3.8
Throughput/efficiency	3.8
Ease of installation	3.8
Ease of use	3.8
Documentation	3.1
Vendor technical support	3.2
Training	3.2

Price: $2,000—$4,000.
CIRCLE 389 ON READER CARD

FATS
Innovation Data Processing, Inc.
Scratch tape and tape data set verifier for use on IBM *360/370* DOS, OS, *and* VS SYSTEMS.

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	4.0
Ease of use	4.0
Documentation	3.3
Vendor technical support	—
Training	—

Price: $1,300—$2,000.
CIRCLE 390 ON READER CARD

FCS
University Computing Co. (UCC)
Financial information storage and retrieval system for use on IBM *360/370 (all operating systems) and Burroughs computers.*

Users reporting	9
Overall satisfaction	3.0
Throughput/efficiency	2.6
Ease of installation	2.3
Ease of use	2.7
Documentation	2.3
Vendor technical support	2.7
Training	2.8

Price: $30,000 (DOS)—$40,000 (OS) for commercial sales.
CIRCLE 391 ON READER CARD

FICS
Management Science America (MSA)
Data base-oriented financial control and reporting system for banks and bank holding companies; runs on IBM *360/370, Burroughs, and Honeywell* COBOL *systems.*

Users reporting	7
Overall satisfaction	3.0
Throughput/efficiency	2.3
Ease of installation	2.5
Ease of use	3.0
Documentation	3.3
Vendor technical support	3.2
Training	2.8

Vendor would not release price.
CIRCLE 392 ON READER CARD

Fixed Assets (S/3)
IBM Corp. GSD
Generalized fixed assets accounting system for System/3.

Users reporting	7
Overall satisfaction	3.4
Throughput/efficiency	3.0
Ease of installation	3.3
Ease of use	3.4
Documentation	2.7
Vendor technical support	2.8
Training	2.7

Price: $140/month (license fully paid in 12 months) for 3741 direct attachment.
CIRCLE 393 ON READER CARD

Fixed Assets Accounting
McCormack & Dodge Corp.
Specialized accounting system for use on IBM *360/370.*

Users reporting	18
Overall satisfaction	3.2
Throughput/efficiency	2.8
Ease of installation	2.8
Ease of use	2.8
Documentation	3.1
Vendor technical support	2.8
Training	2.2

Price: $21,000.
CIRCLE 394 ON READER CARD

MSA Fixed Assets
Management Science America (MSA)
For 64K or larger IBM *360/370 or Burroughs B3500 or larger* COBOL *systems.*

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	2.3
Ease of use	3.0
Documentation	3.3
Vendor technical support	3.0
Training	3.0

Vendor would not release price.
CIRCLE 395 ON READER CARD

F-LE-E
Goal Systems
Replacement linkage editor for IBM *S/370* DOS/VS *systems.*

Users reporting	3
Overall satisfaction	4.0
Throughput/efficiency	4.0
Ease of installation	4.0
Ease of use	4.0
Documentation	4.0
Vendor technical support	4.0

Training —
Price: $40/month, lease only.
CIRCLE 396 ON READER CARD

FMAINT
Software Design Inc. (SDI)
Now an option to new FLEET *system; replacement for* IBM's MAINT *utility.*

Users reporting	8
Overall satisfaction	3.6
Throughput/efficiency	3.9
Ease of installation	3.6
Ease of use	3.9
Documentation	3.5
Vendor technical support	3.0
Training	3.7

Price: FLEET is $225/month, lease only.
CIRCLE 397 ON READER CARD

FOCIS
NCR Corp.
Financial On-line Central Information System for Century Series.

Users reporting	3
Overall satisfaction	4.0
Throughput/efficiency	3.7
Ease of installation	3.7
Ease of use	3.7
Documentation	3.0
Vendor technical support	2.0
Training	2.3

Price: $4,000 plus $100/month, lease only.
CIRCLE 398 ON READER CARD

FORESIGHT
Foresight Systems, Inc.
Statistical forecasting system written in FORTRAN.

Users reporting	4
Overall satisfaction	3.0
Throughput/efficiency	2.0
Ease of installation	3.0
Ease of use	3.5
Documentation	2.3
Vendor technical support	3.0
Training	2.8

Price: $25,000.
CIRCLE 399 ON READER CARD

FORTE II
Burroughs Corp.
Disc file management system for Burroughs B 1700 and up; Version II generates COBOL *source code as well.*

Users reporting	23
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	2.8
Ease of use	3.2
Documentation	2.6
Vendor technical support	2.3
Training	2.2

Price: $11,000.
CIRCLE 400 ON READER CARD

FORTRAN
Digital Equipment Corp. (DEC)
Available in various versions to support DEC *computers.*

Users reporting	18
Overall satisfaction	3.1
Throughput/efficiency	3.1
Ease of installation	2.9
Ease of use	3.0
Documentation	2.5
Vendor technical support	1.9
Training	2.4

Price: $800.
CIRCLE 401 ON READER CARD

1130/FORTRAN
DNA Systems Inc.
For IBM *1130 and compatible systems.*

Users reporting	22
Overall satisfaction	3.7
Throughput/efficiency	3.3
Ease of installation	3.4
Ease of use	3.6
Documentation	3.0
Vendor technical support	3.2
Training	3.0

Price: $1,495 one-time lease.
CIRCLE 402 ON READER CARD

FORTRAN (S/3)
IBM Corp. GSD
Subset FORTRAN *compiler for System/3.*

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.3
Ease of installation	3.7
Ease of use	3.7
Documentation	2.7
Vendor technical support	2.3
Training	1.0

Price: $110—$120 month (no purchase).
CIRCLE 403 ON READER CARD

FORTRAN (S/7)
IBM Corp. GSD
Subset FORTRAN *compiler for System/7.*

Users reporting	3
Overall satisfaction	2.3
Throughput/efficiency	2.7
Ease of installation	2.7
Ease of use	2.3
Documentation	2.0
Vendor technical support	2.0
Training	2.5

Price: $94/month (no purchase) for standalone S/7 version.
CIRCLE 404 ON READER CARD

FORTRAN (360/370)
IBM Corp. DPD
Includes DOS, OS, *and* VS *versions.*

Users reporting	13
Overall satisfaction	3.0
Throughput/efficiency	2.9
Ease of installation	3.0
Ease of use	3.2
Documentation	2.9
Vendor technical support	3.0
Training	4.0

Price: $400/month (no purchase).
CIRCLE 405 ON READER CARD

GBASWIFT
GBA International
Data communications monitor for IBM *360/370* DOS *and* DOS/VS *users.*

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	3.3
Ease of installation	4.0
Ease of use	3.7
Documentation	3.0
Vendor technical support	3.0
Training	3.0

Price: $7,500—$20,000.
CIRCLE 406 ON READER CARD

General Ledger
Burroughs Corp.
Generalized general ledger accounting system.

Users reporting	7
Overall satisfaction	2.9
Throughput/efficiency	2.9
Ease of installation	2.9
Ease of use	2.9
Documentation	2.1
Vendor technical support	1.6
Training	2.0

Price: $1,400.
CIRCLE 407 ON READER CARD

General Ledger
Certified Software Products
A flexible general ledger and financial reporting system with multiple-company facilities, for IBM *System/3.*

Users reporting	3
Overall satisfaction	2.0
Throughput/efficiency	2.0
Ease of installation	2.7
Ease of use	1.7
Documentation	1.3
Vendor technical support	2.0
Training	2.0

Price: $1,500—$4,200.
CIRCLE 408 ON READER CARD

General Ledger
Financial Technology, Inc.
Financial information general ledger system for IBM *360/370, S/3; and Burroughs B 1726/-B 3500 systems.*

Users reporting	3
Overall satisfaction	2.5
Throughput/efficiency	3.0
Ease of installation	3.0
Ease of use	2.5
Documentation	2.5
Vendor technical support	2.5
Training	2.0

Price: $12,000—$17,500.
CIRCLE 409 ON READER CARD

General Ledger
Infonational, Inc.
In ANSI COBOL *to run on most mainframes.*

Users reporting	7
Overall satisfaction	3.0
Throughput/efficiency	2.3
Ease of installation	3.1
Ease of use	3.1
Documentation	2.3
Vendor technical support	2.4
Training	2.7

Price: $30,000.
CIRCLE 410 ON READER CARD

General Ledger (S/3)
IBM Corp. GSD
Generalized package to run on IBM *System/3.*

Users reporting	14
Overall satisfaction	3.1
Throughput/efficiency	2.6
Ease of installation	2.8
Ease of use	3.0
Documentation	2.9
Vendor technical support	2.1
Training	2.0

Price: $70—$150/month (license fully paid in 12 months).
CIRCLE 411 ON READER CARD

MSA General Ledger
Management Science America (MSA)
In ANSI COBOL *to run on most mainframes.*

Users reporting	16
Overall satisfaction	2.7
Throughput/efficiency	2.2
Ease of installation	2.2
Ease of use	2.5
Documentation	2.8
Vendor technical support	2.2
Training	2.3

Vendor would not release price.
CIRCLE 412 ON READER CARD

General Ledger
NCR Corp.
Generalized system for use on Century Series computers.

Users reporting	17
Overall satisfaction	3.2
Throughput/efficiency	3.1
Ease of installation	3.2
Ease of use	3.4
Documentation	2.9
Vendor technical support	2.6
Training	2.5

Price: $250 plus $5/month, lease only.
CIRCLE 413 ON READER CARD

General Ledger
Software International Corp.
In ANSI COBOL *to run on most mainframes.*

Users reporting	19
Overall satisfaction	2.7
Throughput/efficiency	2.4
Ease of installation	2.5
Ease of use	2.6
Documentation	2.4
Vendor technical support	2.7
Training	2.2

Price: $25,500 (DOS) permanent license.
CIRCLE 414 ON READER CARD

GIS
IBM Corp. DPD
Management information system; a forerunner to IBM's IMS.

Users reporting	7
Overall satisfaction	2.4
Throughput/efficiency	2.1
Ease of installation	2.1
Ease of use	3.0
Documentation	2.7
Vendor technical support	2.6
Training	2.3

Price: $520/month (OS), $907/-month (VS)*, (no purchase).*
CIRCLE 415 ON READER CARD

GIS (Guidance Info. System)
Time Share Corp.
School curriculum guidance system; runs on Hewlett-Packard 2000 series.

Users reporting	4
Overall satisfaction	3.3
Throughput/efficiency	3.3
Ease of installation	3.0
Ease of use	3.3
Documentation	3.5
Vendor technical support	3.5
Training	3.3

Price: $1,900—$9,000, lease only.
CIRCLE 416 ON READER CARD

Introducing The compact 1 from number 1:

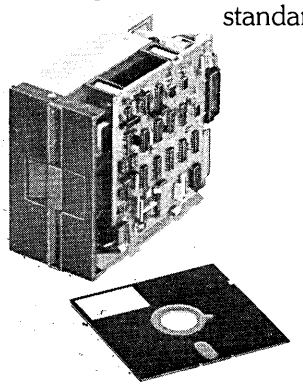
The minifloppy™ from Shugart

Give your system the performance of a floppy at a cassette price. Gain the random accessibility, mechanical reliability and data integrity of a flexible disk in a more affordable size. Go minifloppy.

This little half-pint is half the size, half the cost of a standard floppy but Shugart packs a lot of proven technology into that itty-bitty box (3.25" x 5.75" x 8.0").

The same proprietary glass bonded ferrite/ceramic read/write head and recording technology used in 40,000 standard-sized Shugart floppy drives give the SA400 minifloppy dependable data integrity—$1/10^8$ soft errors, $1/10^{11}$ hard errors. You'll be hard pressed to find that integrity in any cassette. You won't get 110 K byte storage capacity at 125 K bit/second data transfer rates either.

Special minifloppy drive features include direct drive stepping motor actuator, DC servo-controlled spindle drive, and less power dissipation than any standard floppy.



The minidiskette media is just like the standard flexible disk, only smaller. Available in hard or soft sectored formats from several media sources, it shares the same oxide formulation, technology and technique of manufacture. Protective jacket is just 5.25" square.

The Shugart minifloppy drive keeps data safe, too. Positive media interlock prevents minidiskette damage. Our standard write protect circuitry prevents loss of recorded information.

Low power consumption of only 15 watts in continuous duty and 7.5 watts in standby produces low heat and eliminates noisy fans.

Whether you build word processing equipment or an entry level microprocessor system, an intelligent calculator or a hobby computer, the Shugart minifloppy drive can help you bridge the price/performance gap between cassette and standard flexible disk.

The gap is gone. So put the minifloppy drive to work in your system before your competitor does. Write, call or run to Shugart for complete OEM information.

The leader in low-cost disk storage.

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435 Indio Way · Sunnyvale, CA 94086 Phone (408) 733-0100
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Europe Sales/Service: 3, Place Gustave Eiffel, Silic 311
94588 Rungis, France Phone (1) 686-00-85

™Minifloppy and minidiskette are Shugart trademarks.

GPSS
IBM Corp. DPD
Simulation language; IBM 360/-370 DOS and OS versions available; has PL/1 interface.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	3.0
Ease of use	3.0
Documentation	2.7
Vendor technical support	2.0
Training	2.3

Price: $63/month (no purchase).
CIRCLE 417 ON READER CARD

GRASP
Software Design Inc. (SDI)
Spooling enhancement to IBM 360/370 DOS and DOS/VS; two versions available.

Users reporting	81
Overall satisfaction	3.5
Throughput/efficiency	3.5
Ease of installation	3.6
Ease of use	3.5
Documentation	3.1
Vendor technical support	3.2
Training	3.1

Price: $220—$900/month, lease only.
CIRCLE 418 ON READER CARD

HCS/Accounting
IBM Corp. DPD
Hospital patient accounting and billing on S/370 DOS/VS systems with CICS/DOS-Standard.

Users reporting	11
Overall satisfaction	2.5
Throughput/efficiency	2.2
Ease of installation	1.9
Ease of use	2.5
Documentation	2.0
Vendor technical support	2.2
Training	1.9

Price: $109/month (DOS/VS)—$800/month (OS/VS), (license fully paid in 12 months).
CIRCLE 419 ON READER CARD

ICES
McDonnell Douglas Automation Co. (MCAUTO)
Integrated civil engineering system; also referred to as COGO (ICES).

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	2.0
Ease of use	3.0
Documentation	2.7
Vendor technical support	3.0
Training	2.5

Price: ICES executive plus one engineering application package, $10,000—$100,000.
CIRCLE 420 ON READER CARD

IDMS
Cullinane Corp.
Data base management system for IBM 360/370 and Univac systems.

Users reporting	17
Overall satisfaction	3.8
Throughput/efficiency	3.3
Ease of installation	3.4
Ease of use	3.6
Documentation	3.0
Vendor technical support	3.6
Training	3.5

Price: $40,000.
CIRCLE 421 ON READER CARD

IMAGE
Hewlett-Packard Co.
Data management system; versions available for H-P 1000, 2000, and 3000 series computers.

Users reporting	11
Overall satisfaction	3.6
Throughput/efficiency	3.3
Ease of installation	3.7
Ease of use	3.2
Documentation	2.8
Vendor technical support	2.9
Training	2.7

Price: $4,250—$6,000.
CIRCLE 422 ON READER CARD

IMS (Inventory Management System)
Honeywell Information Systems, Inc.
An inventory management system that provides bill of material processing and related functions on Honeywell Series 2000, 6000, and 60 systems.

Users reporting	12
Overall satisfaction	2.8
Throughput/efficiency	2.7
Ease of installation	2.2
Ease of use	2.8
Documentation	2.9
Vendor technical support	2.2
Training	2.8

Price: $2,925 (invent/BOMP for /62)—$18,075 (MRP for /66).
CIRCLE 423 ON READER CARD

IMS
IBM Corp. DPD
Data base management system for 360/370 OS and OS/VS.

Users reporting	33
Overall satisfaction	2.9
Throughput/efficiency	2.4
Ease of installation	2.2
Ease of use	2.5
Documentation	2.8
Vendor technical support	2.8
Training	2.9

Price: $646/month (OS)—$808/month (OS/VS), (no purchase).
CIRCLE 424 ON READER CARD

IMSL Subroutine Libraries
International Mathematical & Statistical Libraries, Inc. (IMSL)
Math and statistical subroutines, available for most general-purpose computing systems.

Users reporting	18
Overall satisfaction	3.5
Throughput/efficiency	3.2
Ease of installation	3.4
Ease of use	3.2
Documentation	3.6
Vendor technical support	3.5
Training	2.5

Price: $980—$1,220 one-year, lease only.
CIRCLE 425 ON READER CARD

INQUIRE
Infodata Systems, Inc.
Data base management and/or information retrieval system for IBM 360/370 OS or OS/VS.

Users reporting	6
Overall satisfaction	3.2
Throughput/efficiency	2.2
Ease of installation	2.7
Ease of use	3.0
Documentation	2.5
Vendor technical support	2.8
Training	2.6

Price: $39,500—$80,000.
CIRCLE 426 ON READER CARD

Installment Loan System
Florida Software Services, Inc.
Multiple-bank installment loan accounting for IBM 360/370, Burroughs, NCR, and Honeywell computers.

Users reporting	4
Overall satisfaction	3.5
Throughput/efficiency	2.8
Ease of installation	3.3
Ease of use	3.0
Documentation	3.8
Vendor technical support	3.0
Training	2.0

Price: $18,700.
CIRCLE 427 ON READER CARD

Intercomm
Informatics, Inc.
Data communications monitor for IBM 360/370 OS and OS/VS systems.

Users reporting	13
Overall satisfaction	2.6
Throughput/efficiency	2.8
Ease of installation	2.1
Ease of use	2.4
Documentation	2.0
Vendor technical support	2.0
Training	2.4

Price: $32,000—$40,000.
CIRCLE 428 ON READER CARD

IPICS
IBM Corp. GSD
Initial production inventory control system for System/3.

Users reporting	21
Overall satisfaction	3.1
Throughput/efficiency	2.8
Ease of installation	2.5
Ease of use	2.8
Documentation	2.2
Vendor technical support	2.9
Training	2.1

Price: IPICS—Modules from $100/month (Inventory Acct.) to $350/month (Production Control); (licenses fully paid in 12 months). IPICS requires BOMP or IRP.
CIRCLE 429 ON READER CARD

IRP (Inventory Req. Proc.)
IBM Corp. GSD
Inventory and requirements planning for the System/3.

Users reporting	13
Overall satisfaction	2.0
Throughput/efficiency	2.4
Ease of installation	2.9
Ease of use	2.6
Documentation	2.7
Vendor technical support	2.5
Training	2.8

Price: $90/month (no purchase).
CIRCLE 430 ON READER CARD

JAS/3
IBM Corp. GSD
Critical path method project planning and supervising for disc System/3 Model 8, 10, 12, or 15.

Users reporting	5
Overall satisfaction	3.0
Throughput/efficiency	3.2
Ease of installation	2.8
Ease of use	2.8
Documentation	1.6
Vendor technical support	2.0
Training	4.0

Price: $82/month (no purchase).
CIRCLE 431 ON READER CARD

JASPER
Datachron Corp.
Job accounting and performance analysis for IBM S/360 and 370 DOS, DOS/VS, or EDOS operating system.

Users reporting	4
Overall satisfaction	3.0
Throughput/efficiency	3.5
Ease of installation	2.5
Ease of use	2.8
Documentation	2
Vendor technical support	2.8
Training	3.5

Price: $5,000.
CIRCLE 432 ON READER CARD

Job Accounting (DOS)
Johnson Systems, Inc.
Job accounting and resource measurement for IBM 360/370 DOS or DOS/VS.

Users reporting	17
Overall satisfaction	3.1
Throughput/efficiency	2.8
Ease of installation	2.9
Ease of use	2.8
Documentation	2.6
Vendor technical support	2.4
Training	1.9

Price: $4,000.
CIRCLE 433 ON READER CARD

Job Accounting (OS)
Johnson Systems, Inc.
Job accounting and resource measurement for IBM 360/370 OS or OS/VS.

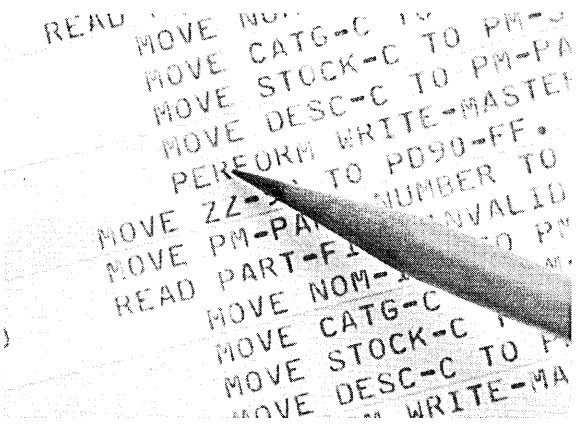
Users reporting	12
Overall satisfaction	2.9
Throughput/efficiency	2.4
Ease of installation	3.4
Ease of use	2.8
Documentation	2.8
Vendor technical support	2.5
Training	2.2

Price: $6,000.
CIRCLE 434 ON READER CARD

Job Accounting
Westinghouse Electric Corp.
Job accounting for IBM 360/370 DOS or DOS/VS.

Users reporting	5
Overall satisfaction	3.2
Throughput/efficiency	3.4
Ease of installation	2.8
Ease of use	3.2
Documentation	2.8

PERFORM



COBOL with ISAM

If you've got the business application, Interdata's got the COBOL. Right now. In stock. Field proven.

We've packaged our ANSI X3.23—1974 COBOL/32 with ISAM—an enhanced file management system which works with COBOL for a wide range of commercial data base applications.

The rich array of ISAM (Indexed Sequential Access Method) utilities provide for the allocation and dedication of up to 32 contiguous files on each of 32 different disc volumes. COBOL acts as the data description and manipulation language. And maximizes transportability while providing interprogram communication with FORTRAN, CAL assembler and other COBOL programs.

Interdata COBOL/32 with ISAM has been working for more than a year at a variety of sites. Such as one of the largest banks in the U.S. A major retail chain. A large hospital group.

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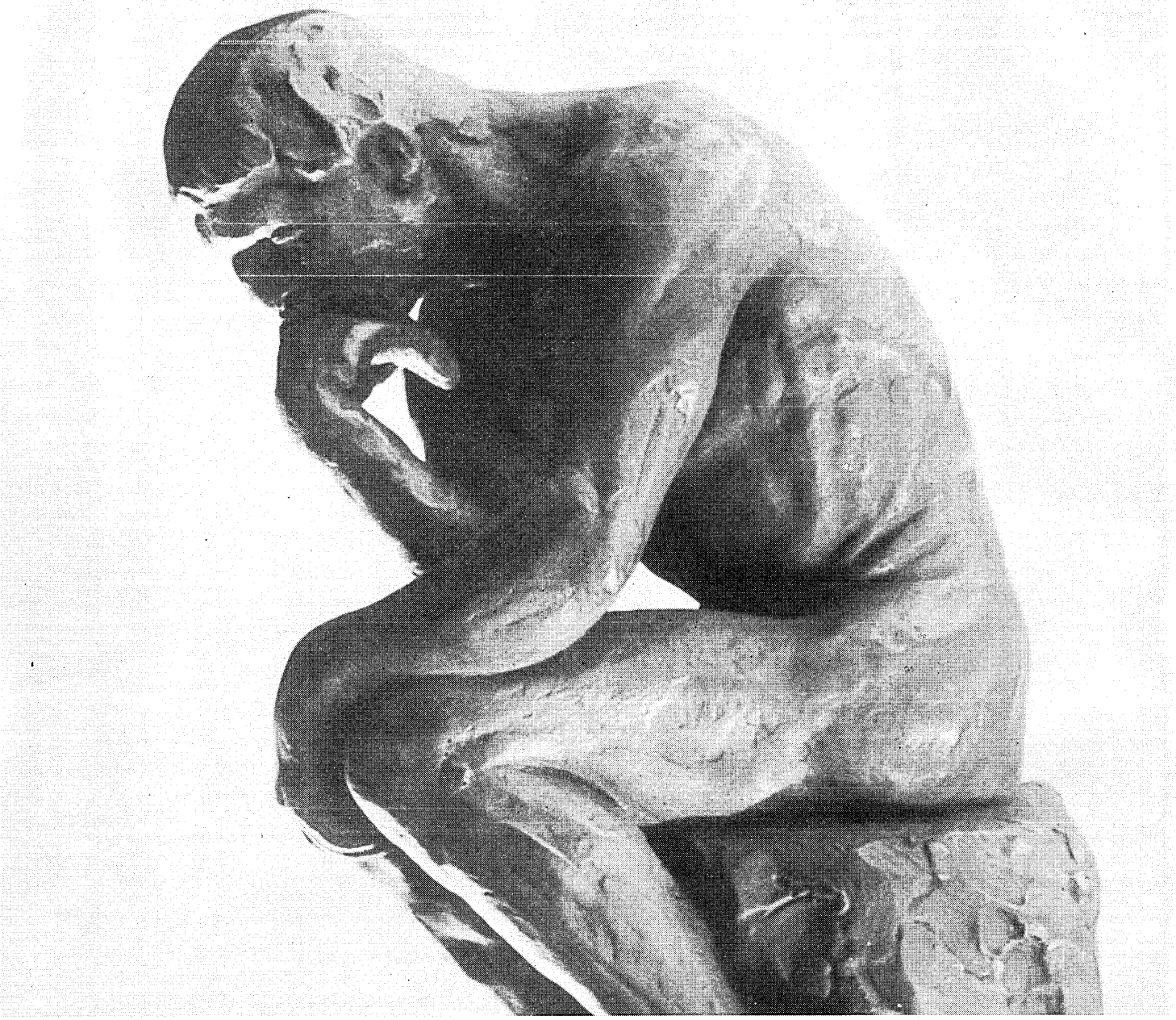
CIRCLE 8 ON READER CARD

When you see what we offer in management information systems, you'll make The Intelligent Choice.



Your company's data processing requirements are as unique as your company's trademark. You need an information system designed exclusively for you—not for the other firm. This means a wide range of high performance products to select from, a knowledgeable staff of representatives to make the ideal recommendations. There must be value, versatility, and the finest service. That means Mohawk Data Sciences. In data entry and data communication equipment, we help you make the Intelligent Choice.

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Post-installation service must be a consideration of any company evaluating new equipment. MDS is synonymous with the highest standards of product service. Our 4000 plus associates worldwide insure that the highest caliber of performance is built into our equipment—the performance you can depend on in your offices.

Solid business solutions can emerge only from facts. Hard-hitting, solution-oriented facts—precisely what you'll receive from your local MDS office. Call or write us soon. We make the Intelligent Choice an easy one.

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MDS INTERNATIONAL SERVICE CORP.
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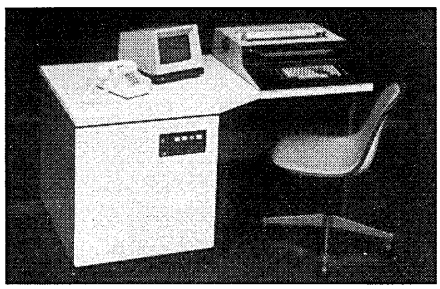


Mohawk MDS Data Sciences
The Intelligent Choice.

MDS System 2300. The System 2300 is an intelligent terminal offering computer-compatible data capture, simultaneous with Document Processing at the source. The 2300 is also capable of RJE Communications.

CIRCLE 27 ON READER CARD

Vendor technical support	2.8
Training	3.0

Price: $1,500.
CIRCLE 435 ON READER CARD

KOMAND
Pace Applied Technology, Inc.
Job accounting and resource utilization measurement system for IBM *360/370* OS *and* OS/VS.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	2.3
Ease of use	2.7
Documentation	2.7
Vendor technical support	2.3
Training	2.0

Price: $5,900—$25,000.
CIRCLE 436 ON READER CARD

Lexicon
Arthur Andersen & Co.
Data dictionary system for IBM *360/370.*

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	2.7
Ease of use	2.7
Documentation	3.0
Vendor technical support	3.0
Training	3.3

Vendor would not release price.
CIRCLE 437 ON READER CARD

LIBRA
Datachron Corp.
Partition CPU *usage monitor for* DOS/VS *users of* IBM *S/370.*

Users reporting	4
Overall satisfaction	3.5
Throughput/efficiency	3.5
Ease of installation	4.0
Ease of use	3.8
Documentation	2.3
Vendor technical support	3.0
Training	—

Price: $2,150.
CIRCLE 438 ON READER CARD

LIBRARIAN
Applied Data Research Corp.
A source program management system with batch and on-line retrieval capabilities.

Users reporting	120
Overall satisfaction	3.7
Throughput/efficiency	3.5
Ease of installation	3.5
Ease of use	3.5
Documentation	3.3
Vendor technical support	3.1
Training	3.1

Price: $4,900—$10,000 permanent license.
CIRCLE 439 ON READER CARD

Life-Comm III
Informatics, Inc.
An administrative and management control system for life insurance companies that runs on an IBM *360/370.*

Users reporting	4
Overall satisfaction	2.0
Throughput/efficiency	1.7
Ease of installation	1.7
Ease of use	2.3
Documentation	2.3
Vendor technical support	2.0
Training	2.0

Price: $227,000—$448,000.
CIRCLE 440 ON READER CARD

LILA
Network Data Processing Corp.
Life Insurance Logistics Automated, in COBOL *for most systems.*

Users reporting	8
Overall satisfaction	3.0
Throughput/efficiency	2.0
Ease of installation	2.1
Ease of use	2.5
Documentation	2.5
Vendor technical support	2.4
Training	2.4

Vendor would not release price.
CIRCLE 441 ON READER CARD

LOOK
Applied Data Research Corp.
A system performance measurement tool for measuring CPU *usage,* I/O *and paging activity, and core utilization.*

Users reporting	6
Overall satisfaction	3.5
Throughput/efficiency	3.2
Ease of installation	3.5
Ease of use	3.3
Documentation	3.3
Vendor technical support	3.2
Training	4.0

Price: $4,800—$6,800.
CIRCLE 442 ON READER CARD

MAC-PAC-3
Arthur Andersen & Co.
System/3 manufacturing planning and control.

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	3.3
Ease of installation	3.3
Ease of use	3.7
Documentation	3.7
Vendor technical support	3.0
Training	3.0

Vendor would not release price.
CIRCLE 443 ON READER CARD

MARK IV
Informatics, Inc.
Data management system for any IBM *360/370; optional interfaces to* IMS, DL/*I, and* TOTAL.

Users reporting	57
Overall satisfaction	3.3
Throughput/efficiency	2.9
Ease of installation	3.4
Ease of use	3.3
Documentation	3.2
Vendor technical support	3.2
Training	3.3

Price: $12,000—$120,000.
CIRCLE 444 ON READER CARD

MAXI-LIBE
Maxima Systems Group
Source program library system for any IBM *360/370 with 32K partition.*

Users reporting	7
Overall satisfaction	3.6
Throughput/efficiency	3.6
Ease of installation	3.4
Ease of use	3.7
Documentation	2.7
Vendor technical support	3.0
Training	2.7

Price: $2,227 (DOS)—$3,197 (OS).
CIRCLE 445 ON READER CARD

MetaCOBOL
Applied Data Research Corp.
A COBOL *metacompiler with a preprocessor and library of preprogrammed procedures.*

Users reporting	8
Overall satisfaction	2.9
Throughput/efficiency	2.9
Ease of installation	2.9
Ease of use	2.8
Documentation	2.5
Vendor technical support	2.9
Training	2.3

Price: $12,000-$21,000 permanent license.
CIRCLE 446 ON READER CARD

Minicomm
Informatics, Inc.
Display monitor that competes with IBM*'s* CICS/*Entry.*

Users reporting	7
Overall satisfaction	3.6
Throughput/efficiency	3.4
Ease of installation	3.4
Ease of use	3.9
Documentation	3.0
Vendor technical support	3.3
Training	2.9

Price: $8,500 (local)—$10,500 (remote)
CIRCLE 447 ON READER CARD

MINI-MIZ
The Automated Quill, Inc.
A generalized accounting, bookkeeping, and management information system with on-line and interactive operating capabilities.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	2.7
Ease of use	3.0
Documentation	2.3
Vendor technical support	2.7
Training	4.0

Price: $7,900—$19,000.
CIRCLE 448 ON READER CARD

Model 204
Computer Corp. of America
Modular data base management system for IBM *S/360 or 370 systems; includes data communications monitoring facilities and utilizes inverted file structures.*

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	3.3
Ease of installation	3.3
Ease of use	3.3
Documentation	2.7
Vendor technical support	3.3
Training	2.7

Price: $83,200.
CIRCLE 449 ON READER CARD

Mortgage Loan System
Florida Software Services, Inc.
Multiple-bank mortgage loan system for IBM *360/370, Burroughs, NCR, and Honeywell computers.*

Users reporting	5
Overall satisfaction	2.8
Throughput/efficiency	2.8
Ease of installation	2.5
Ease of use	2.5
Documentation	3.3
Vendor technical support	3.0
Training	1.5

Price: $15,700—$32,400.
CIRCLE 450 ON READER CARD

MRP (Material Req. Plan.)
IBM Corp. GSD
Materials and requirements planning for use on System/3.

Users reporting	7
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	2.4
Ease of use	2.7
Documentation	2.2
Vendor technical support	2.8
Training	2.6

Price: IPICS—Modules from $100/month (Inventory Acct.) to $350/month (Production Control); (licenses fully paid in 12 months). IPICS requires BOMP or IRP.
CIRCLE 451 ON READER CARD

MTCS
IBM Corp. DPD
Minimum Teleprocessing Communications System; for S/360s as small as Model 30.

Users reporting	24
Overall satisfaction	3.2
Throughput/efficiency	3.0
Ease of installation	2.9
Ease of use	3.0
Documentation	2.4
Vendor technical support	2.9
Training	2.7

Price: $427/month (DOS), (license fully paid in 12 months).
CIRCLE 452 ON READER CARD

MUMPS
Digital Equipment Corp. (DEC)
Time-sharing operating system offering multiprogramming on PDP-15.

Users reporting	3
Overall satisfaction	2.0
Throughput/efficiency	2.0
Ease of installation	1.3
Ease of use	3.3
Documentation	2.7
Vendor technical support	2.0
Training	3.0

Price: $7,500.
CIRCLE 453 ON READER CARD

Municipal Budget Accounting
IBM Corp. GSD
For IBM System/3 Model 10.

Users reporting	3
Overall satisfaction	2.3
Throughput/efficiency	2.3
Ease of installation	2.0
Ease of use	2.7
Documentation	3.3
Vendor technical support	1.0
Training	1.0

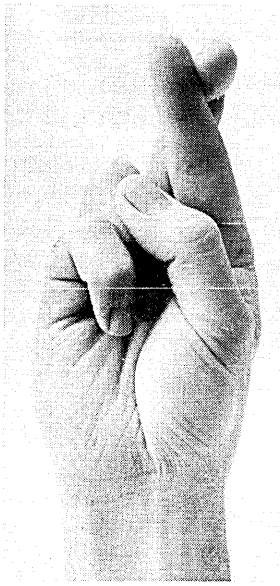
Price: $330/month (license fully paid in 12 months).
CIRCLE 454 ON READER CARD

Congratulations: you didn't have a computer fire again last year.

You're one of the lucky ones.

Unfortunately too many companies last year did suffer major business interruptions due to fires in or near their computer rooms.

What's even more unfortunate is the fact that a lot of the damage, clean-up and downtime could have been avoided.



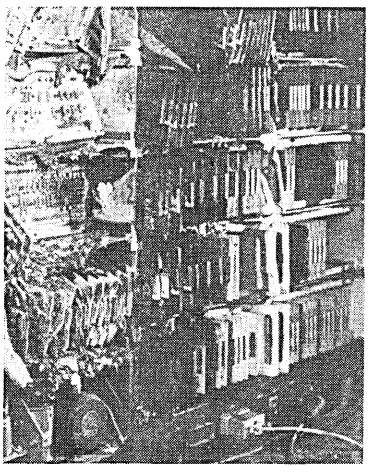
Days of Downtime vs. a Few Seconds of Halon

These companies could have been protected by a high speed Fenwal Halon Fire Suppression System.

The system that snuffs out fires dry. Just seconds after they start.

And lets you get right back to work. No wet mess to clean up.

With some systems you've got



to evacuate a room before the extinguishing agent can go to work.

But because Halon 1301 is harmless to people, it can start snuffing out the flames immediately. Which gives you the fastest jump on the fire.

With ordinary systems there's usually at least 48 hours of clean-up before your computer can go back on line.

With a Fenwal system there's virtually no clean-up, no shorted-out wires. No electrical shock hazards. No damage to tapes or records.

Fenwal's unique, modular system permits rapid agent discharge and easy extension of existing systems.

Why Push Your Luck?

The consequences of a computer fire are a lot more devastating than you might think. Despite all the precautions you take.

At Fenwal we've got documented proof that our Halon Fire Suppression Systems are *the* solution to the damage and downtime of computer room fires.

It's proof you can see for yourself. In a film called "The Fireaters".

We think it will convince you that you need more than luck to keep your computer in business.

To arrange a viewing, call us at (617) 881-2000. Or write to Fenwal Incorporated, Ashland, MA 01721. A Division of Walter Kidde & Co., Inc. Our local, service-oriented distributors are listed in the yellow pages under "Fire Protection".

FENWAL

Nobody in the world has more experience in fire and explosion suppression systems.

FM Approved – UL Listed

NDL
Burroughs Corp.
Network Definition Language that enables the definition and generation of customized controller programs for use on most B Series computers.

Users reporting	23
Overall satisfaction	3.4
Throughput/efficiency	3.2
Ease of installation	3.3
Ease of use	3.4
Documentation	2.3
Vendor technical support	2.5
Training	2.5

Price: $4,000.
CIRCLE 455 ON READER CARD

Optimizer II
Capex Corp.
Optimizes object code of IBM *S/360 and 370* ANSI COBOL *programs under* OS, OS/VS, *and* MVS *systems.*

Users reporting	17
Overall satisfaction	3.6
Throughput/efficiency	3.4
Ease of installation	3.6
Ease of use	3.6
Documentation	2.9
Vendor technical support	3.3
Training	2.8

Price: $6,000—$21,000 permanent lease.
CIRCLE 456 ON READER CARD

OPTIMUS
Universal Software, Inc.
IBM *360/370* DOS *or* DOS/VS *partition usage optimizer.*

Users reporting	5
Overall satisfaction	3.2
Throughput/efficiency	3.2
Ease of installation	4.0
Ease of use	4.0
Documentation	3.4
Vendor technical support	3.6
Training	3.3

Price: $1,200 2-year license (no purchase).
CIRCLE 457 ON READER CARD

Order Billing
NCR Corp.
Order billing system for use on NCR Century Series.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.0
Ease of installation	2.3
Ease of use	3.0
Documentation	3.3
Vendor technical support	2.3
Training	2.0

Price: $480 plus $20/month, lease only.
CIRCLE 458 ON READER CARD

OS/8
Digital Equipment Corp. (DEC)
Tape or disc operating system for batch or interactive PDP-8 *systems (8K or larger).*

Users reporting	17
Overall satisfaction	3.6
Throughput/efficiency	3.2
Ease of installation	3.4
Ease of use	3.5
Documentation	3.0
Vendor technical support	2.4
Training	3.0

Price: $700.
CIRCLE 459 ON READER CARD

PAC II
International Systems, Inc.
Project planning and management control system for IBM *360/370, Burroughs, and Univac systems.*

Users reporting	5
Overall satisfaction	3.0
Throughput/efficiency	3.6
Ease of installation	3.2
Ease of use	3.0
Documentation	2.8
Vendor technical support	3.6
Training	3.6

Price: $16,500.
CIRCLE 460 ON READER CARD

PAN*DA
Pansophic Systems, Inc.
Direct-access space management and control system for IBM *2311 through 3330* DASD*'s on* IBM *360/370.*

Users reporting	4
Overall satisfaction	3.3
Throughput/efficiency	3.3
Ease of installation	3.8
Ease of use	3.5
Documentation	3.0
Vendor technical support	3.5
Training	4.0

Price: $3,900 (OS).
CIRCLE 461 ON READER CARD

PANVALET
Pansophic Systems, Inc.
Program library maintenance system for any IBM *360/370; on-line option now available.*

Users reporting	172
Overall satisfaction	3.7
Throughput/efficiency	3.5
Ease of installation	3.5
Ease of use	3.5
Documentation	3.3
Vendor technical support	3.2
Training	2.9

Price: $4,980 (DOS)—$5,580 (OS).
CIRCLE 462 ON READER CARD

PASS
Personnel Data Systems, Inc.
Automated personnel file management and control system; in ANSI COBOL *for most mainframes.*

Users reporting	3
Overall satisfaction	2.3
Throughput/efficiency	2.3
Ease of installation	2.7
Ease of use	2.7
Documentation	2.3
Vendor technical support	2.3
Training	2.7

Price: $24,500.
CIRCLE 463 ON READER CARD

PAYMASTER II
Comtech (U.S.A.), Inc.
Modular general payroll package that lends itself to individual tailoring on IBM *S/360 or 370 systems.*

Users reporting	5
Overall satisfaction	2.4
Throughput/efficiency	2.4
Ease of installation	2.4
Ease of use	2.8
Documentation	2.2
Vendor technical support	1.8
Training	2.0

Price: $15,000.
CIRCLE 464 ON READER CARD

Payroll
Burroughs Corp.
Generalized payroll system for most B Series computers.

Users reporting	13
Overall satisfaction	2.7
Throughput/efficiency	2.5
Ease of installation	2.5
Ease of use	2.5
Documentation	2.4
Vendor technical support	2.2
Training	2.1

Price: $1,800.
CIRCLE 465 ON READER CARD

Payroll
Florida Software Services, Inc.
General purpose payroll system for IBM *360/370, Burroughs, NCR, and Honeywell computers.*

Users reporting	6
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	2.5
Ease of use	2.5
Documentation	2.7
Vendor technical support	3.4
Training	2.3

Price: $9,400.
CIRCLE 466 ON READER CARD

Payroll
Honeywell Information Systems, Inc.
For Honeywell Model 58 and Level 62 systems.

Users reporting	10
Overall satisfaction	2.9
Throughput/efficiency	2.5
Ease of installation	2.8
Ease of use	2.8
Documentation	2.6
Vendor technical support	2.6
Training	1.5

Price: $800.
CIRCLE 467 ON READER CARD

Payroll (S/3)
IBM Corp. GSD
Generalized payroll system for small-to-medium payrolls; runs on System/3.

Users reporting	32
Overall satisfaction	2.8
Throughput/efficiency	2.6
Ease of installation	2.5
Ease of use	2.8
Documentation	2.6
Vendor technical support	2.4
Training	2.1

Price: $104-$175/month (license fully paid in 12 months).
CIRCLE 468 ON READER CARD

MSA Payroll
Management Science America (MSA)
For any IBM *360/370 or Burroughs B 3500 to B 6700 system.*

Users reporting	41
Overall satisfaction	2.9
Throughput/efficiency	2.4
Ease of installation	2.4
Ease of use	2.7
Documentation	3.3
Vendor technical support	2.8
Training	2.8

Vendor would not release price.
CIRCLE 469 ON READER CARD

Payroll
NCR (National Cash Register Corp.)
Standard payroll system for use on Century Series.

Users reporting	36
Overall satisfaction	3.1
Throughput/efficiency	2.8
Ease of installation	3.0
Ease of use	3.0
Documentation	2.9
Vendor technical support	2.5
Training	2.6

Price: $250 plus $5/month, lease only.
CIRCLE 470 ON READER CARD

Payroll Systems
Wang Laboratories, Inc.
For IBM *360/370 and Honeywell Series 60 computers.*

Users reporting	8
Overall satisfaction	3.1
Throughput/efficiency	2.5
Ease of installation	2.6
Ease of use	2.9
Documentation	3.4
Vendor technical support	3.3
Training	3.1

Price: $20,000—$60,000.
CIRCLE 471 ON READER CARD

PC/70
Atlantic Software Inc.
An automated project planning and resource measurement system with cost forecasting facilities.

Users reporting	10
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	2.8
Ease of use	2.8
Documentation	2.3
Vendor technical support	3.0
Training	2.6

Price: $15,000—$16,950.
CIRCLE 472 ON READER CARD

PCS
Burroughs Corp.
Production control system; runs on most Burroughs B Series computers.

Users reporting	5
Overall satisfaction	3.2
Throughput/efficiency	3.6
Ease of installation	2.8
Ease of use	3.2
Documentation	2.0
Vendor technical support	2.6
Training	2.8

Price: $32,000—$51,000 inc. all modules.
CIRCLE 473 ON READER CARD

PEP
Stockholder Systems, Inc.
Paperless Entry Processing for automatic payment through Automated Clearing House; for IBM *360/370 and Burroughs systems.*

Users reporting	5
Overall satisfaction	2.8
Throughput/efficiency	2.6
Ease of installation	2.6
Ease of use	2.8
Documentation	2.8
Vendor technical support	3.0
Training	2.8

Price: $6,000—$13,000.
CIRCLE 474 ON READER CARD

Personal Trust
General Computer Services
Personal trust management system for IBM *360/370 and Burroughs computers.*

Users reporting	4
Overall satisfaction	3.0
Throughput/efficiency	2.8
Ease of installation	2.8
Ease of use	2.8
Documentation	2.5
Vendor technical support	3.0
Training	3.7

Price: $25,000—$200,000.
CIRCLE 475 ON READER CARD

PI-SORT II
Applied Data Research Corp.
A standalone, self-relocating, fixed-length sorting program for S/360 or 370 DOS *and* DOS/VS *disc sort users.*

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	3.5
Ease of use	3.0
Documentation	3.5
Vendor technical support	2.0
Training	—

Price: $2,000 permanent license.
CIRCLE 476 ON READER CARD

PLAN IV
Capex Corp.
Installation planning, performance evaluation, and management control system with forecasting capabilities for 360/370 OS, OS/VS, *and* MVS *environments.*

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	3.0
Ease of use	3.3
Documentation	3.3
Vendor technical support	3.0
Training	—

Price: $4,750—$6,500 permanent lease.
CIRCLE 477 ON READER CARD

PL/C
Cornell University
A faster PL/1 *compiler for the* IBM *360/370.*

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.3
Ease of installation	3.3
Ease of use	3.7
Documentation	3.0
Vendor technical support	3.0
Training	—

Price: $2,400.
CIRCLE 478 ON READER CARD

PL/1 Optimizer
IBM Corp. DPD
For IBM *360/370; has automatic optimization.*

Users reporting	28
Overall satisfaction	3.2
Throughput/efficiency	2.9
Ease of installation	2.9
Ease of use	3.3
Documentation	2.8
Vendor technical support	2.6
Training	2.5

Price: $210/month (OS or DOS), (no purchase).
CIRCLE 479 ON READER CARD

Plot-10
Tektronix, Inc.
Graphics package for use with IBM *360,* CDC *6000, and* DEC PDP-*10 systems wtih Tektronix display terminals and plotters.*

Users reporting	7
Overall satisfaction	2.8
Throughput/efficiency	2.7
Ease of installation	2.7
Ease of use	3.0
Documentation	2.5
Vendor technical support	3.0
Training	2.0

Price: $125—$1,200 permanent license.
CIRCLE 480 ON READER CARD

PMS
IBM Corp. DPD
Project Management System for IBM *360/370* OS *and* OS/VS.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	2.0
Ease of use	2.0
Documentation	2.3
Vendor technical support	2.7
Training	2.0

Price: $57—$500/month, (no purchase).
CIRCLE 481 ON READER CARD

PNA
NCR Corp.
Project network critical path analysis program for NCR Century Series.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	2.3
Ease of use	2.3
Documentation	2.0
Vendor technical support	2.0
Training	2.0

Price: $500 plus $60/month, lease only.
CIRCLE 482 ON READER CARD

POWER
IBM Corp. DPD
Spooling supplement to IBM *360* DOS; POWER/VS *for* IBM *370* DOS/VS.

Users reporting	7
Overall satisfaction	3.0
Throughput/efficiency	3.3
Ease of installation	3.0
Ease of use	3.3
Documentation	2.8
Vendor technical support	3.3
Training	3.0

VS versions are bundled.
CIRCLE 483 ON READER CARD

PRO
Business EDP Services, Inc.
Generalized source and data file manipulation language used for remote data storage and retrieval.

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.7
Ease of installation	3.7
Ease of use	3.0
Documentation	3.0
Vendor technical support	3.3
Training	2.3

Price: $6,990.
CIRCLE 484 ON READER CARD

PROBE Auditing System
Citicorp (Citibank, N.A.)
A parameterized auditing reporting system written in COBOL *to run on a series of mainframes including* IBM *360/370, NCR Century, and Burroughs B 3500 and up.*

Users reporting	4
Overall satisfaction	3.5
Throughput/efficiency	2.0
Ease of installation	3.3
Ease of use	3.8
Documentation	3.3
Vendor technical support	3.0
Training	3.3

Price: $10,000.
CIRCLE 485 ON READER CARD

PROCON
Nichols & Co.
Project planning and control system for IBM *360/370, Honeywell, Burroughs, and* DEC*system-10 computers.*

Users reporting	4
Overall satisfaction	3.5
Throughput/efficiency	3.0
Ease of installation	3.3
Ease of use	3.0
Documentation	2.8
Vendor technical support	2.8
Training	3.0

Price: $15,500.
CIRCLE 486 ON READER CARD

PROJACS
IBM Corp. DPD
Project Analysis and Control System for IBM *370* DOS/VS *and* OS/VS.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	2.7
Ease of use	3.0
Documentation	2.7
Vendor technical support	2.7
Training	1.0

Price: $210/month (no purchase).
CIRCLE 487 ON READER CARD

PROJECT /2
Project Software Development, Inc.
Network-based project scheduling and control system for IBM *360/370* OS *and* OS/VS.

Users reporting	3
Overall satisfaction	2.7
Throughput/efficiency	2.7
Ease of installation	3.7
Ease of use	2.7
Documentation	3.0
Vendor technical support	2.3
Training	2.3

Price: $1,100—$4,000/month, lease only.
CIRCLE 488 ON READER CARD

PRO-TEST
Synergetics Corp.
Test data generator for IBM *360/370 (all operating systems) and Honeywell Series 200 and 600.*

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.3
Ease of installation	3.0
Ease of use	3.3
Documentation	2.7
Vendor technical support	3.0
Training	3.5

Price: $4,900—$13,900.
CIRCLE 489 ON READER CARD

QUERY
IBM Corp. GSD
Inquiry to a data base via disc; for use on IBM *System/3.*

Users reporting	5
Overall satisfaction	2.8
Throughput/efficiency	2.8
Ease of installation	2.8
Ease of use	3.0
Documentation	2.3
Vendor technical support	2.0
Training	2.0

Price: $50/month (license fully paid in 12 months) for 3741 direct attachment.
CIRCLE 490 ON READER CARD

QUERY5
Azrex, Inc.
User-oriented inquiry/retrieval system wtih report writer capabilities; batch and interactive versions available.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.0
Ease of installation	2.7
Ease of use	3.3
Documentation	3.0
Vendor technical support	1.7
Training	2.5

Price: $10,000—$17,000.
CIRCLE 491 ON READER CARD

QUIKJOB
Systems Support Software, Inc.
File management and report writing system for any IBM *360/370; Versions II and III can handle one or more input files.*

Users reporting	27
Overall satisfaction	3.4
Throughput/efficiency	3.3
Ease of installation	3.7
Ease of use	3.4
Documentation	3.0
Vendor technical support	3.1
Training	2.8

The Four-Phase OEM Business Plan

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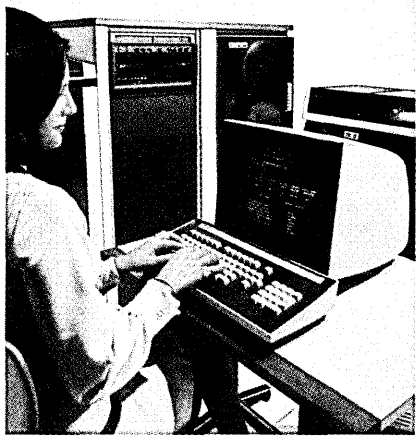
The OEM Question. You've got a great program for wholesale distribution, patient care, inventory control, truck routing or some other display-oriented application. You've decided to market it as a turnkey package. Whose hardware do you choose?

General Answers. As you'll be selling into business/commercial markets, you'll need an OEM partner with ANSI COBOL and system software designed for the business/commercial user. And, to help turn potential customers into actual customers, you'll need an advanced hardware package... display-oriented, transaction-based and designed for cluster configuration. Finally, unless you're handy with a soldering iron, you want an OEM supplier with a nationwide field engineering force to install the systems you sell, as well as to provide local maintenance support to your customers.

Specific Answers. Four-Phase Systems is one of the pioneers (and largest suppliers) of display-oriented transaction processing systems for business and commercial applications. Our unique window into memory architecture puts new data on the screen instantly



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Four-Phase Systems.®

Price: $3,445—$5,445, permanent license.
CIRCLE 492 ON READER CARD

RDOS
Data General
Real-time disc operating system for Nova or Eclipse minicomputers.

Users reporting	9
Overall satisfaction	2.8
Throughput/efficiency	2.7
Ease of installation	2.9
Ease of use	3.0
Documentation	2.3
Vendor technical support	1.9
Training	2.0

Software is bundled.
CIRCLE 493 ON READER CARD

RELO-PLUS
Universal Software, Inc.
To allow cataloguing of a program in core-image library and execution in any IBM 360/370 DOS *or* DOS/VS *partition.*

Users reporting	6
Overall satisfaction	3.7
Throughput/efficiency	3.8
Ease of installation	3.5
Ease of use	4.0
Documentation	3.3
Vendor technical support	3.2
Training	3.3

Price: $2,000 2-year license (no purchase).
CIRCLE 494 ON READER CARD

Reporter
Burroughs Corp.
COBOL *source code report preparation system for most Burroughs computers.*

Users reporting	13
Overall satisfaction	2.5
Throughput/efficiency	3.1
Ease of installation	3.2
Ease of use	3.4
Documentation	2.5
Vendor technical support	2.3
Training	2.5

Price: $3,000—$6,000.
CIRCLE 495 ON READER CARD

ROSCOE
Applied Data Research Corp.
Remote job entry system for OS *and* OS/VS *operating systems.*

Users reporting	15
Overall satisfaction	3.2
Throughput/efficiency	3.2
Ease of installation	2.8
Ease of use	3.4
Documentation	2.8
Vendor technical support	2.5
Training	2.5

Price: $28,000—$35,000 permanent license.
CIRCLE 496 ON READER CARD

RPG II (S/3)
IBM Corp. GSD
Standard RPG II processor for System/3.

Users reporting	59
Overall satisfaction	3.4
Throughput/efficiency	3.1
Ease of installation	3.6
Ease of use	3.4
Documentation	3.3
Vendor technical support	3.2
Training	3.2

Price: $37—$38/month (Models 4 through 10), $85/month (Model 12), $89/month (Model 15); (no purchases).
CIRCLE 497 ON READER CARD

RPG II (360/370)
IBM Corp. DPD
Includes DOS, OS, *and* VS *versions.*

Users reporting	66
Overall satisfaction	3.5
Throughput/efficiency	3.3
Ease of installation	3.5
Ease of use	3.5
Documentation	3.5
Vendor technical support	2.9
Training	3.1

Price: $109/month (DOS), (no purchase).
CIRCLE 498 ON READER CARD

RSTS/E
Digital Equipment Corp. (DEC)
Resource-sharing / time-sharing operating system for PDP-*11.*

Users reporting	22
Overall satisfaction	3.4
Throughput/efficiency	3.0
Ease of installation	3.3
Ease of use	3.5
Documentation	2.6
Vendor technical support	2.2
Training	2.6

Price: $5,500.
CIRCLE 499 ON READER CARD

RSX-11
Digital Equipment Corp. (DEC)
Advanced real-time operating system for PDP-*11.*

Users reporting	29
Overall satisfaction	3.0
Throughput/efficiency	2.8
Ease of installation	2.7
Ease of use	2.9
Documentation	2.1
Vendor technical support	2.0
Training	2.5

Price: $1,500 (S)—$5,500 (D).
CIRCLE 500 ON READER CARD

RT-11
Digital Equipment Corp. (DEC)
Foreground/background disc operating system for real-time PDP-*11.*

Users reporting	19
Overall satisfaction	3.1
Throughput/efficiency	3.2
Ease of installation	3.4
Ease of use	3.0
Documentation	2.4
Vendor technical support	2.0
Training	2.9

Price: $1,250.
CIRCLE 250 ON READER CARD

RTE-II
Hewlett-Packard Co.
*Real-time executive operating system for H-P 21*MX *and 2100 series.*

Users reporting	7
Overall satisfaction	2.6
Throughput/efficiency	2.6
Ease of installation	2.3
Ease of use	2.7
Documentation	2.9
Vendor technical support	2.6
Training	2.4

Price: $4,000-$5,750.
CIRCLE 251 ON READER CARD

RTOS
Data General
Real-time operating system for Nova or Eclipse computers.

Users reporting	3
Overall satisfaction	2.3
Throughput/efficiency	2.3
Ease of installation	2.0
Ease of use	2.0
Documentation	1.3
Vendor technical support	1.3
Training	2.0

Software is bundled.
CIRCLE 252 ON READER CARD

RTOS
General Automation
Real-time operating system for SPC-*16 and* SPC-*16-based systems.*

Users reporting	5
Overall satisfaction	3.0
Throughput/efficiency	3.3
East of installation	3.5
Ease of use	3.8
Documentation	3.0
Vendor technical support	3.0
Training	2.7

Price: $3,000.
CIRCLE 253 ON READER CARD

RTS-8
Digital Equipment Corp. (DEC)
Real-time operating system for DEC PDP-*8.*

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	2.0
Ease of use	2.0
Documentation	2.0
Vendor technical support	2.0
Training	2.3

Price: $500.
CIRCLE 254 ON READER CARD

SAS
SAS Institute, Inc.
Statistical Analysis System for IBM *360/370* OS *and* OS/VS.

Users reporting	6
Overall satisfaction	3.7
Throughput/efficiency	3.0
Ease of installation	3.5
Ease of use	3.5
Documentation	3.2
Vendor technical support	3.2
Training	1.0

Price: $2,500/1-year, lease only.
CIRCLE 255 ON READER CARD

Save-Restore
Oxford Software Corp.
IBM *360/370* DOS *or* DOS/VS *disc utility, library condenser, etc.*

Users reporting	9
Overall satisfaction	3.4
Throughput/efficiency	3.9
Ease of installation	3.3
Ease of use	3.1
Documentation	2.9
Vendor technical support	2.6
Training	3.0

Price: $2,000 (DOS)—$3,000 (DOS/VS).
CIRCLE 256 ON READER CARD

SCHOLARS
NCR Corp.
School automated records system for Century Series.

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	2.3
Ease of use	2.7
Documentation	2.7
Vendor technical support	2.7
Training	2.0

Price: $12,500 plus $80/month, lease only.
CIRCLE 257 ON READER CARD

Score
Informatics, Inc.
Multi-purpose COBOL *program generator for most mainframes.*

Users reporting	6
Overall satisfaction	3.2
Throughput/efficiency	3.3
Ease of installation	3.3
Ease of use	3.2
Documentation	3.0
Vendor technical support	3.0
Training	2.8

Price: $15,000—$17,500.
CIRCLE 258 ON READER CARD

SCRIBE
Honeywell Information Systems, Inc.
School attendance and grade reporting system for Honeywell Series 60.

Users reporting	3
Overall satisfaction	2.7
Throughput/efficiency	2.0
Ease of installation	2.0
Ease of use	2.7
Documentation	2.0
Vendor technical support	3.3
Training	1.7

Price: $3600 (grading/attendance for 60/64)—$7,500 (stud scheduling for 60/66).
CIRCLE 259 ON READER CARD

SLICK
NCI (National Computing Industries), Inc.
Source program librarian for IBM *360/370* DOS, DOS/VS, OS, *or* OS/VS; *also maintains object code,* JCL, *data files, and text.*

Users reporting	18
Overall satisfaction	3.5
Throughput/efficiency	3.6
Ease of installation	3.3
Ease of use	3.5
Documentation	2.9
Vendor technical support	3.1
Training	2.6

Price: $1,950—$2,450.
CIRCLE 260 ON READER CARD

Software 1040
SAB, Inc.
For preparation of personal income tax form 1040; runs on IBM *S/32, S/3, 360/20 (disc), 370 Models 115-135, Burroughs B 1700, and NCR Century Series.*

Users reporting	6
Overall satisfaction	3.5
Throughput/efficiency	2.8

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Ease of installation	3.5
Ease of use	3.2
Documentation	3.3
Vendor technical support	3.3
Training	3.3

Price: $1,600 per year plus volume usage charge.
CIRCLE 261 ON READER CARD

1130/Sort
DNA Systems Inc.
Sort program for IBM *1130 and compatible systems.*

Users reporting	10
Overall satisfaction	3.9
Throughput/efficiency	3.8
Ease of installation	3.7
Ease of use	3.4
Documentation	3.0
Vendor technical support	3.2
Training	3.0

Price: $730—$930 one-time lease.
CIRCLE 262 ON READER CARD

Sort
Digital Equipment Corp. (DEC)
Designed for use with DEC PDP *series computers.*

Users reporting	8
Overall satisfaction	3.1
Throughput/efficiency	3.8
Ease of installation	3.0
Ease of use	3.6
Documentation	2.4
Vendor technical support	2.1
Training	1.8

Price: $330.
CIRCLE 263 ON READER CARD

Sort (S/3)
IBM Corp. GSD
Small sort (disc and/or card version) for System/3.

Users reporting	48
Overall satisfaction	3.4
Throughput/efficiency	3.3
Ease of installation	3.6
Ease of use	3.3
Documentation	3.3
Vendor technical support	3.2
Training	2.8

Price: $10/month (Models 4 through 10), $45/month (Model 12), $47/month (Model 15); (no purchases).
CIRCLE 264 ON READER CARD

Sort/Merge (360/370)
IBM Corp. DPD
Disc-based sort.

Users reporting	105
Overall satisfaction	3.2
Throughput/efficiency	3.0
Ease of installation	3.4
Ease of use	3.4
Documentation	3.1
Vendor technical support	3.1
Training	3.0

Price: $43/month (DOS)—$18/month (OS/VS), (no purchase).
CIRCLE 265 ON READER CARD

Source Program Maintenance (SPM)
IBM Corp. DPD
For IBM *360/370* COBOL *programs.*

Users reporting	7
Overall satisfaction	3.3
Throughput/efficiency	3.1
Ease of installation	3.0
Ease of use	3.4
Documentation	2.6
Vendor technical support	2.7
Training	2.5

Price: $500 (single use charge).
CIRCLE 266 ON READER CARD

SPIRIT
NCR Corp.
Interactive order entry system for NCR Century 8200 and up.

Users reporting	4
Overall satisfaction	2.3
Throughput/efficiency	2.5
Ease of installation	1.8
Ease of use	2.7
Documentation	2.7
Vendor technical support	2.3
Training	2.0

Price: $530 plus $250/month, lease only.
CIRCLE 267 ON READER CARD

SPRINT
Jason Data Services
Spooling supplement to IBM *360/370* DOS *and* DOS/VS.

Users reporting	28
Overall satisfaction	3.3
Throughput/efficiency	3.5
Ease of installation	3.4
Ease of use	3.4
Documentation	2.8
Vendor technical support	2.8
Training	2.4

Price: $3,300—$4,850.
CIRCLE 268 ON READER CARD

SPSS
Northwestern University
Specially modified CDC *version of Statistical Program for Social Sciences from SPSS Inc.*

Users reporting	7
Overall satisfaction	3.1
Throughput/efficiency	3.1
Ease of installation	3.1
Ease of use	2.9
Documentation	3.3
Vendor technical support	3.0
Training	3.0

Price: $750—$5,000.
CIRCLE 269 ON READER CARD

SPSS
SPSS, Inc.
Statistical work in the social sciences on IBM *360/370, Univac,* CDC, *and Xerox Sigma 9 systems.*

Users reporting	24
Overall satisfaction	3.5
Throughput/efficiency	3.4
Ease of installation	3.4
Ease of use	3.5
Documentation	3.7
Vendor technical support	3.1
Training	2.7

Price: $750—$5,000 permanent license.
CIRCLE 270 ON READER CARD

STAT/BASIC
IBM Corp. DPD or GSD
Interactive statistical analysis program; versions available for IBM *360/370 and System/3.*

Users reporting	4
Overall satisfaction	2.5
Throughput/efficiency	2.5
East of installation	2.8
Ease of use	2.3
Documentation	2.3
Vendor technical support	1.5
Training	—

Price: $39/month (GSD System/3)—$50/month (DPD).
CIRCLE 271 ON READER CARD

Stock & Bond Systems
Informatics, Inc.
Investment management and portfolio control, primarily for financial industries; runs on IBM *360/370 under* OS *and* OS/VS.

Users reporting	3
Overall satisfaction	2.3
Throughput/efficiency	2.7
Ease of installation	2.7
Ease of use	3.0
Documentation	2.7
Vendor technical support	2.0
Training	2.3

Price: $17,000—$32,000.
CIRCLE 272 ON READER CARD

STOP
On-Line Software International
CICS *storage protection and debugging aid for* IBM *360/370.*

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.5
Ease of installation	3.7
Ease of use	3.5
Documentation	3.0
Vendor technical support	3.5
Training	—

Price: $5,000.
CIRCLE 273 ON READER CARD

SYNCSORT
Whitlow Computer Systems, Inc.
Efficient OS *or* OS/VS *disc and tape sorting on* IBM *360/370.*

Users reporting	46
Overall satisfaction	3.7
Throughput/efficiency	3.8
Ease of installation	3.5
Ease of use	3.7
Documentation	3.2
Vendor technical support	3.4
Training	3.0

Price: $6,200 3-year license (no purchase).
CIRCLE 274 ON READER CARD

SYSTEM 2000
MRI Systems, Inc.
Generalized data base management system for IBM *360/370, Univac, and* CDC *systems.*

Users reporting	21
Overall satisfaction	3.0
Throughput/efficiency	2.3
Ease of installation	2.9
Ease of use	3.5
Documentation	2.4
Vendor technical support	2.7
Training	2.1

Price: $30,000.
CIRCLE 275 ON READER CARD

TASK/MASTER
Turnkey Systems, Inc.
Data communications monitor for IBM *360/370.*

Users reporting	19
Overall satisfaction	3.3
Throughput/efficiency	3.2
Ease of installation	2.8
Ease of use	3.3
Documentation	2.5
Vendor technical support	2.7
Training	2.7

Price: $19,000 to $28,000 (DOS)—$35,000 (OS).
CIRCLE 276 ON READER CARD

Teleprocessing Interface System (WESTI)
Westinghouse Electric Corp.
Display monitor for 2260 and 3270 terminals on IBM *360/370* DOS *and* DOS/VS.

Users reporting	29
Overall satisfaction	3.7
Throughput/efficiency	3.6
Ease of installation	3.6
Ease of use	3.6
Documentation	3.1
Vendor technical support	3.2
Training	2.8

Price: $8,500—$12,500.
CIRCLE 277 ON READER CARD

TERMINAL
Parallel Data Systems, Inc.
Data communications magnetic tape formatting subroutine for use with IBM *360/370 systems.*

Users reporting	3
Overall satisfaction	3.7
Throughput/efficiency	3.7
Ease of installation	3.7
Ease of use	3.7
Documentation	3.0
Vendor technical support	3.3
Training	3.0

Price: $1,200.
CIRCLE 278 ON READER CARD

TFAST /VS
Oxford Software Corp.
Provides tape management capabilities for IBM *360/370* DOS *or* DOS/VS *systems.*

Users reporting	8
Overall satisfaction	3.5
Throughput/efficiency	3.8
Ease of installation	3.4
Ease of use	3.6
Documentation	2.8
Vendor technical support	2.8
Training	2.3

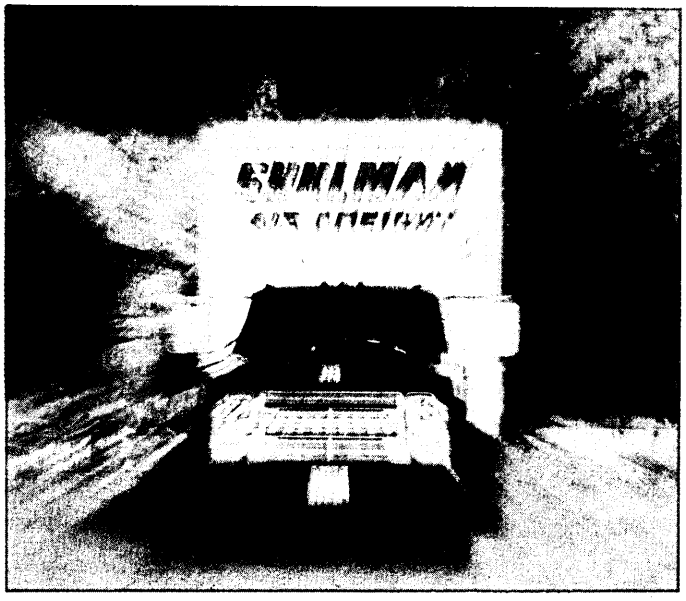
Price: $6,250.
CIRCLE 279 ON READER CARD

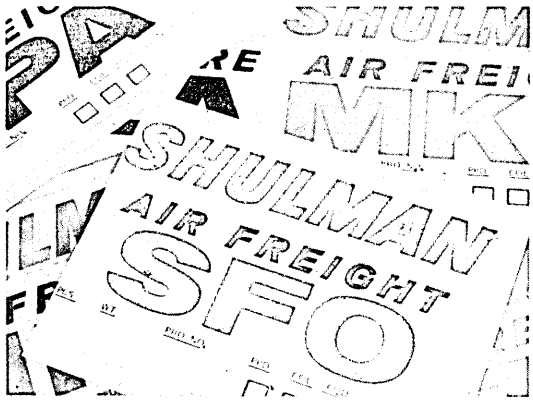
THRIFT
Burroughs Corp.
A thrift industry (credit unions, non-commercial banks, etc.) package for the various B Series computers.

Users reporting	3
Overall satisfaction	2.7
Throughput/efficiency	3.3
Ease of installation	2.0
Ease of use	3.0
Documentation	2.0
Vendor technical support	1.3
Training	2.7

Price: $35,000—$62,000 inc. all modules.
CIRCLE 280 ON READER CARD

For Shulman Transport, a data system that delivers:





INCOTERM.®

More than half a million pounds of freight are moved by Shulman Transport Enterprises on an average day . . . by road, sea and air . . . throughout the world. Approaching $100,000,000 in annual revenues, Shulman is one of the fastest growing companies in the freight forwarding business.

The part of the business that grows the fastest of all is the labor-intensive paperwork needed to move freight.

To meet that challenge, Shulman designed an advanced, transportation-oriented computer facility for corporate headquarters in Cherry Hill, N.J.

But how could they put that computer power to work on the front lines? Where the action is . . . on the street . . . with the driver making freight deliveries?

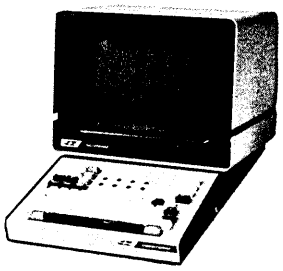
Shulman turned to INCOTERM.

To capture data where the paperwork originates. To cut down the pieces of paper needed. Keep track. Improve service. Get the waybill to the terminal before the freight rolls in.

Shulman's INCOTERM system combines on-line administrative communication and on-line transmission of waybill data. The mainframe computer at Cherry Hill dispatches error free waybills to destination points. At the same time, it picks off needed information for invoicing the customer, and a variety of other management and customer service functions.

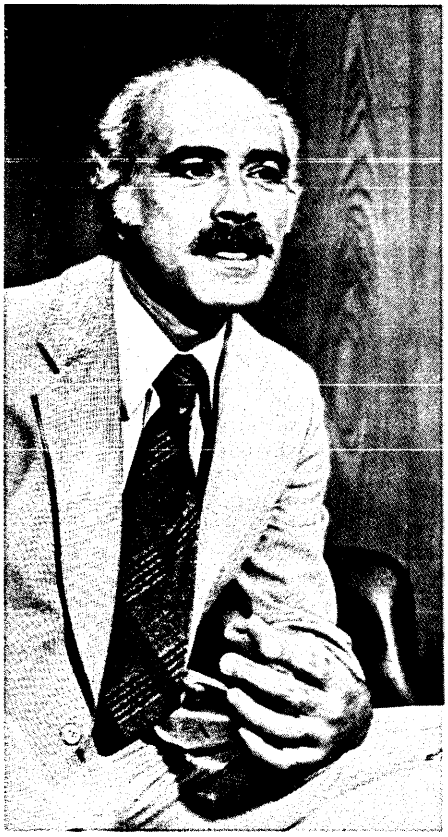
If you'd like to know more about how INCOTERM delivers for Shulman—and can help you as well—please call or write.

More power to your terminal.



INCOTERM® CORPORATION

65 Walnut Street, Wellesley Hills, Massachusetts 02181 Telephone: (617) 237-2100
Sales and customer service offices in major cities throughout the United States and abroad.



"Our new NCR Criterion went in without a ripple. No conversion. No parallel operation. It was just load and go."

Jerry Lindee, Director of Information Systems
Dart International, Los Angeles, California

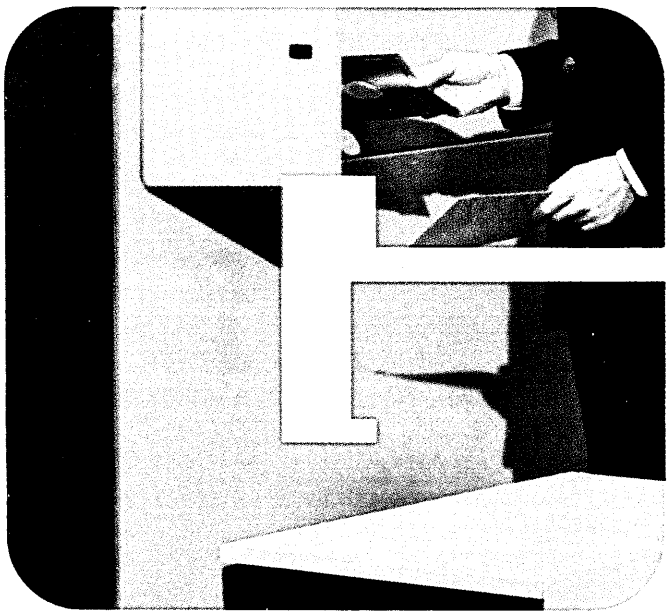
The prospect of a difficult conversion can lock you into a system long after you really need better performance. Unless you have an NCR system.

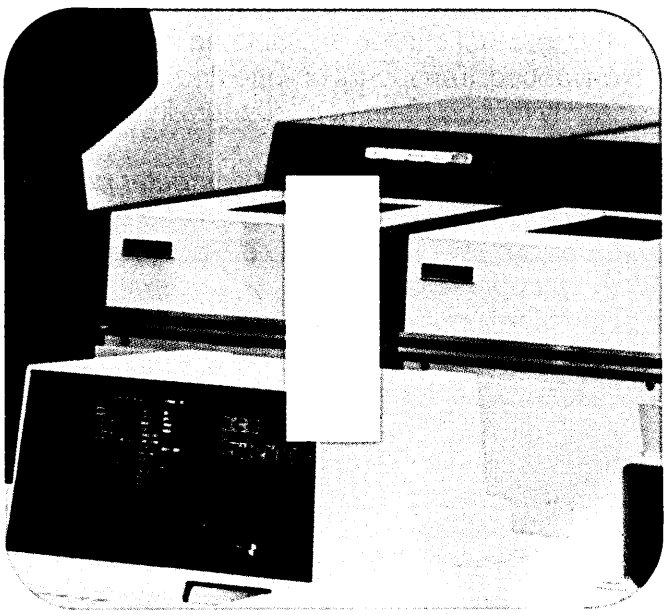
Dart International, specializing in warehousing, consolidation, transportation and leasing, operates realtime 24 hours a day, five days a week. One day the NCR Century went out and the NCR Criterion went in. Five months later, the Criterion is still operating with up to 22 percent more thru-put and a record of 99.95 percent uptime. Quite an accomplishment for the first installation of a new generation.

NCR offers compatibility, not only from model to model, but from generation to generation, from NCR Century to NCR Criterion. NCR designs with your interests in mind.

To find out what the Criterion can do for you, phone your local NCR office. Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

NCR
Complete Computer Systems





TLMS
Gulf Computer Sciences, Inc.
Tape library management system for IBM *360/370* OS *and* OS/VS.

Users reporting	7
Overall satisfaction	3.7
Throughput/efficiency	3.6
Ease of installation	3.3
Ease of use	3.3
Documentation	3.5
Vendor technical support	3.8
Training	3.5

Price: $10,500.
CIRCLE 281 ON READER CARD

TOTAL
Cincom Systems, Inc.
Generalized data base management system for use on a variety of medium-to-large-scale computers and several minicomputer systems as well.

Users reporting	113
Overall satisfaction	3.5
Throughput/efficiency	3.1
Ease of installation	3.4
Ease of use	3.4
Documentation	2.8
Vendor technical support	3.0
Training	2.8

Price: $13,500 (S/3)—$45,000 (OS/VS).
CIRCLE 282 ON READER CARD

Trust System
St. Joseph's Bank & Trust Co.
Written in ANSI COBOL *for* IBM *360/370* DOS *and* DOS/VS.

Users reporting	4
Overall satisfaction	2.0
Throughput/efficiency	3.0
Ease of installation	3.5
Ease of use	3.3
Documentation	3.5
Vendor technical support	3.0
Training	3.0

Price: $17,500 permanent license..
CIRCLE 283 ON READER CARD

TSO
DNA Systems Inc.
Time-sharing operating system for IBM *1130 and compatible systems.*

Users reporting	10
Overall satisfaction	3.5
Throughput/efficiency	3.7
Ease of installation	3.4
Ease of use	3.3
Documentation	2.5
Vendor technical support	3.3
Training	2.4

Price: Consolidated with CYTOS *at $8,000 one-time lease.*
CIRCLE 284 ON READER CARD

TSO
IBM Corp. DPD
Time-sharing option for IBM *360/370* OS/MVT, SVS, *or* MVS; *supports Code and Go* FORTRAN, ITF-BASIC, *and* ITF-PL-*1.*

Users reporting	6
Overall satisfaction	3.5
Throughput/efficiency	3.0
Ease of installation	3.0
Ease of use	3.3
Documentation	3.0
Vendor technical support	2.6
Training	3.0

Package is bundled.
CIRCLE 285 ON READER CARD

TMS (or T2P2)
System Integrators, Inc.
Text editing and typesetting system for the CHI *2130 minicomputer.*

Users reporting	3
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	2.7
Ease of use	3.0
Documentation	1.0
Vendor technical support	2.0
Training	1.5

Price: $65,000.
CIRCLE 286 ON READER CARD

UCC 1 (or TMS)
University Computing Co. (UCC)
Tape management system for IBM *360/370* OS *or* OS/VS.

Users reporting	15
Overall satisfaction	3.5
Throughput/efficiency	3.4
Ease of installation	3.0
Ease of use	3.4
Documentation	2.9
Vendor technical support	3.0
Training	3.0

Price: $11,500.
CIRCLE 287 ON READER CARD

UCC 2 (or DUO)
University Computing Co. (UCC)
Aid for conversion from DOS *or* DOS/VS *to* OS *or* OS/VS *on* IBM *360/370.*

Users reporting	15
Overall satisfaction	3.4
Throughput/efficiency	2.9
Ease of installation	3.0
Ease of use	2.9
Documentation	2.7
Vendor technical support	3.0
Training	3.0

Price: $30,000.
CIRCLE 288 ON READER CARD

UCC 10
University Computing Co. (UCC)
Data dictionary manager and control statement generator for IBM*'s* IMS.

Users reporting	8
Overall satisfaction	3.3
Throughput/efficiency	2.9
Ease of installation	2.5
Ease of use	3.0
Documentation	2.6
Vendor technical support	2.7
Training	2.0

Price: $16,500.
CIRCLE 289 ON READER CARD

UNIS/90
Univac Division, Sperry Rand Corp.
Modular, data base-oriented manfacturing industry control system for Univac 90 and 9400 Series; version available for 1100 Series.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	3.0
Ease of installation	3.0
Ease of use	3.5
Documentation	2.3
Vendor technical support	3.3
Training	3.5

Price: $350/month, lease only.
CIRCLE 290 ON READER CARD

UNIX
Western Electric Co., Inc.
Multi-user time-sharing system for DEC PDP-*11/40 and up; supports several languages; can replace* DEC*'s* RSTS.

Users reporting	5
Overall satisfaction	4.0
Throughput/efficiency	4.0
Ease of installation	3.4
Ease of use	3.6
Documentation	2.6
Vendor technical support	2.0
Training	1.0

Price: $20,000 permanent lease first cpu.
CIRCLE 291 ON READER CARD

Utilities (S/3)
IBM Corp. GSD
(Not further qualified by survey respondents.)

Users reporting	23
Overall satisfaction	3.3
Throughput/efficiency	3.0
Ease of installation	3.5
Ease of use	3.1
Documentation	3.1
Vendor technical support	3.2
Training	3.1

Price: Conversational utilities—$16/month (Models 4 & 6), $10/month (Models 8 & 10), $16/month (Models 12 & 15); (no purchases).
CIRCLE 292 ON READER CARD

Utility Billing
NCR Corp.
For use in gas, water, electric, etc., industries to handle accounting and billing facilities using the NCR Century Series.

Users reporting	3
Overall satisfaction	3.0
Throughput/efficiency	2.7
Ease of installation	2.7
Ease of use	3.7
Documentation	2.3
Vendor technical support	2.3
Training	3.5

Price: $360 plus $15/month, lease only.
CIRCLE 293 ON READER CARD

VALU-LIB
Value Computing, Inc.
Tape library management system written in ANSI COBOL *for use on most mainframes.*

Users reporting	7
Overall satisfaction	3.0
Throughput/efficiency	2.6
Ease of installation	2.7
Ease of use	2.9
Documentation	2.9
Vendor technical support	3.0
Training	3.0

*Price: $4,500 (*DOS/*batch); $7,500—$10,500 (OS).*
CIRCLE 294 ON READER CARD

Versaplot
Versatec
Supports the company's electrostatic printers and plotters on nearly any byte-oriented FORTRAN *minicomputer.*

Users reporting	4
Overall satisfaction	2.5
Throughput/efficiency	2.3
Ease of installation	2.3
Ease of use	2.5
Documentation	2.3
Vendor technical support	2.3
Training	2.0

Price: $2,300.
CIRCLE 295 ON READER CARD

Video/370
IBM Corp. DPD
CRT*-oriented on-line data entry system for* IBM *370.*

Users reporting	7
Overall satisfaction	2.7
Throughput/efficiency	2.4
Ease of installation	1.9
Ease of use	2.8
Documentation	2.6
Vendor technical support	3.1
Training	2.9

Price: $224/month (no purchase).
CIRCLE 296 ON READER CARD

WATFIV
University of Waterloo
Fast, in-memory FORTRAN *compiler for* IBM *360/370.*

Users reporting	11
Overall satisfaction	3.8
Throughput/efficiency	3.7
Ease of installation	3.4
Ease of use	3.7
Documentation	3.3
Vendor technical support	3.1
Training	3.8

Price: $1,200 (commercial customers).
CIRCLE 297 ON READER CARD

Work Ten
NCI (National Computing Industries)
Creates IBM *360/370* COBOL *programs and documentation from standardized input forms filled in by users.*

Users reporting	3
Overall satisfaction	2.0
Throughput/efficiency	2.0
Ease of installation	2.7
Ease of use	1.7
Documentation	2.0
Vendor technical support	1.7
Training	1.0

Price: $12,500—$14,500.
CIRCLE 298 ON READER CARD

XBASE
DNA Systems Inc.
Extended data base support for disc access on IBM *1130 and compatible systems.*

Users reporting	4
Overall satisfaction	3.8
Throughput/efficiency	3.5
Ease of installation	3.7
Ease of use	3.2
Documentation	3.5
Vendor technical support	3.2
Training	3.0

Price: $1,295 one-time lease.
CIRCLE 299 ON READER CARD ❋

DECSYSTEM-20.
It took a minicomputer company to offer hardware this economical.

Not just anybody could have come out with a DECSYSTEM-20.

Because the DECSYSTEM-20 is the world's first general purpose computer to bridge the gap between big-system power and small-system price.

And that means the company that came up with it had to have a lot of experience in both big and small computers. And there is only one company that does.

Digital Equipment Corporation.

To create a DECSYSTEM-20, we took the same approach to computing that's made us the number one company in minicomputers.

That approach says that a computer must first of all be affordable—giving you the most popular computer for the least amount of money.

With the DECSYSTEM-20, this approach meant giving you big system capability at a total system cost of under $10,000 a month.

Our approach to minicomputers also said that a computer must be approachable. Meaning easy to install. Easy to use. And small in size.

With the DECSYSTEM-20, this approach meant giving you a full-scale general purpose system that installs like a dedicated mini. A sophisticated machine that needs no operating staff and can be run interactively by just about anyone. All in a package that takes up about a fraction of the space required by other machines of similar performance.

But, to create a DECSYSTEM-20, we also took the same approach to computing that's made us the leader in large-scale interactive systems for the last eleven years.

That approach says a computer should offer you the kind of powerful software that will give you not simply everything you expect in a big system, but everything you need.

With the DECSYSTEM-20 this

DECSYSTEM-20.
It took a large-scale computer company to offer software this powerful.

approach meant giving you a system with: Powerful, reliable multi-stream batch. Interactive capability to run up to 64 concurrent jobs. Complete higher-level languages including FORTRAN, COBOL, APL, BASIC PLUS, ALGOL, IQL, and CPL. A true demand paged operating system with large user address space for fast throughput. Six megabytes I/O bandwidth. Six megawords per second. ECL logic. A Data Base Management System. A Business Instruction Set. High system availability. Ease of conversion. Its own front-end mini for diagnostics and to run the peripherals.

Up to 1.2 million bytes of core memory. And up to 1.4 billion bytes of high-speed, on-line disc storage.

All of which is how the DECSYSTEM-20 combines the best of the big systems with the best of the small.

DECSYSTEM-20.
It had to be Digital's.

digital
LARGE COMPUTER GROUP

Bridging the gap.

☐ Please send more information on the DECSYSTEM-20.
☐ Please have a sales engineer contact me.

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TITLE _____
COMPANY _____
ADDRESS _____
CITY _____
STATE _____ ZIP _____
TELEPHONE _____

Send to: Digital Equipment Corporation, Large Computer Group, 200 Forest St., Marlborough, MA 01752.
Tel. 617-481-9511 ext. 6885. DS

There's a very thin line between making it or breaking it.

That's important to remember with high-density drives.

The advantages to 6250 CPI recording — like higher data transfer rates and a reduction in library size requirements — are numerous.

But there are also some disadvantages. One of them is the masking by the GCR format. Because of it the only way to get an accurate error listing is through sense byte interrogation. Ask your Graham product technology man why.

Because of unnoticed errors serious degradation in read/write reliability can occur. This is compounded by debris from bargain-priced computer tapes, which don't have the modulus of toughness and durability of Epoch 4.

Get certified error-free Epoch 4. It makes all the difference. Now — and for the future.

GRAHAM MAGNETICS

Graham, Texas 76046

CIRCLE 39 ON READER CARD

Vendor Index

For your convenience in obtaining additional information about the software packages rated in the preceding listings, the full names, addresses, and telephone numbers of the 104 companies that supply them are listed below.

Aeronautical Research Associates of Princeton, Inc. (A. R. A. P.)
50 Washington Rd.
P.O. Box 2229
Princeton, NJ 08540
(609) 452-2950

American Valuation Consultants, Inc.
One North Broadway
Des Plaines, IL 60016
(312) 297-6100

Applications Software, Inc.
21515 Hawthorne Blvd.
Torrance, CA 90503
(213) 542-4381

Applied Data Research, Inc.
Route 206 Center CN-8
Princeton, NJ 08540
(609) 921-8550

Applied Data Systems (aka ADPAC Corp.)
120 Howard St.
San Francisco, CA 94105
(415) 981-2710

Aquila BST (1974) Ltd.
P.O. Box 10,
Stock Exchange Tower
Montreal, Quebec
Canada H4Z 1A4
(514) 866-5841

Arthur Andersen & Co.
69 West Washington Street
Chicago, IL 60602
(312) 346-6262

Atlantic Software Inc.
Lafayette Building, Suite 910
Fifth & Chestnut Sts.
Philadelphia, PA 19106
(215) 922-7500

The Automated Quill, Inc.
3501 South Corona St.
Suite 5
Englewood, CO 80110
(303) 761-2722

Azrex, Inc.
3 Mountain Rd.
Burlington, MA 01803
(617) 272-8750

BMS Computer, Inc.
P.O. Box 3086
Walnut Creek, CA 94598
(415) 938-2620

Boole & Babbage, Inc.
850 Stewart Drive
Sunnyvale, CA 94086
(408) 735-9550

Burroughs Corp.
Burroughs Place
Detroit, MI 48232
(313) 972-7000

Business EDP Services, Inc.
P.O. Box 5445
Tallahassee, FL 32301
(904) 222-8849

California Computer Products Inc., (CalComp)
2411 West La Palma Ave.
Anaheim, CA 92801
(714) 821-2011

Capex Corp.
2613 North Third St.
Phoenix, AZ 85004
(602) 264-7241

Certified Software Products
3140 Harbor Lane North
Minneapolis, MN 55441
(612) 559-5952

CFS, Inc.
P.O. Box 662
Brookline, MA 02147
(617) 731-3474

Cincom Systems, Inc.
2300 Montana Ave.
Cincinnati, OH 45211
(513) 662-2300

Citicorp (Citibank, N.A.)
399 Park Ave., 28th Floor
New York, NY 10022
(212) 559-3256

Computer Associates, Inc.
655 Madison Ave.
New York, NY 10021
(212) 355-3333

Computer Concepts, Inc.
6443 S.W. Beaverton Highway
Portland, OR 97221
(503) 297-4721

Computer Corp. of America
575 Technology Square
Cambridge, MA 02139
(617) 491-3670

Computer Information Management Co., (CIM)
325 Oak Plaza Building
3707 Rawlins St.
Dallas, TX 75219
(214) 526-4280

The Computer Software Co.
6517 Everglades Drive
Richmond, VA 23225
(804) 276-9200

Comtech (U.S.A.), Inc.
321 Commercial Ave.
Suite 207
Palisades Park, NJ 07650
(201) 244-0206

Comten, Inc.
3 Choke Cherry Rd.
Rockville, MD 20851
(301) 948-8000

Cornell University, Dept. of Computer Sciences
Upson Hall
Ithaca, NY 14853
(607) 256-2369

Cullinane Corp.
20 William St.
Wellesley, MA 02181
(617) 237-6601

Datachron Corp.
174 Fifth Ave.
New York, NY 10010
(212) 675-5333

Data General Corp.
Route 9
Southboro, MA 01772
(617) 485-9100

Dearborn Computer Leasing Co.
4849 North Scott St.
Schiller Park, IL 60176
(312) 671-4410

Digital Equipment Corp. (DEC)
146 Main Street
Maynard, MA 01754
(617) 897-5111

DNA Systems, Inc.
1258 South Washington
P.O. Box 1424
Saginaw, MI 48605
(517) 793-0185

Donovan Data Systems, Inc.
666 Fifth Ave.
New York, NY 10019
(212) 586-0055

Dylakor Software Systems, Inc.
16255 Ventura Blvd.
Encino, CA 91436
(213) 995-0151

Financial Technology, Inc.
612 N. Michigan Ave.
Room 716
Chicago, IL 60611
(312) 751-2600

Florida Software Services, Inc.
P.O. Box 2269
Orlando, FL 32802
(305) 831-3001

Foresight Systems, Inc.
1901 Avenue of the Stars
Suite 585, Century City
Los Angeles, CA 90067
(213) 277-2722

GBA International
2247 Union St.
San Francisco, CA 94123
(415) 563-8880

General Automation, Inc.
1055 South East St.
Anaheim, CA 92805
(714) 778-4800

General Computer Services, Inc.
P.O. Box 5148 N.E.
Huntsville, AL 35805
(205) 539-9492

Goal Systems
P.O. Box 24067
Columbus, OH 43224
(614) 882-3867

Gulf Computer Sciences, Inc.
1775 St. James Place
Houston, TX 77056
(713) 627-9320

Hewlett-Packard Co.
1501 Page Mill Rd.
Palo Alto, CA 94304
(415) 493-1501

Honeywell Information Systems, Inc.
200 Smith St.
Waltham, MA 02154
(617) 890-8400

IBM Corporation, General Systems Division
P.O. Box 2150
Atlanta, GA 30301
(404) 256-7000

IBM Corporation, Data Processing Division
1133 Westchester Ave.
White Plains, NY 10604
(914) 696-1900

Infodata Systems, Inc.
5205 Leesburg Pike
Falls Church, VA 22041
(703) 578-3430

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Data Systems

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or Write Perkin-Elmer Data Systems
Tinton Falls, New Jersey 07724

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Infonational, Inc.
P.O. Box 82477
San Diego, CA 92138
(714) 560-7070

Informatics, Inc.
21031 Ventura Blvd.
Woodland Hills, CA 91364
(213) 887-9040

Innovation Data Processing, Inc.
970 Clifton Avenue
Clifton, NJ 07013
(201) 777-1940

International Mathematical & Statistical Libraries, Inc. (IMSL)
7500 Bellaire Blvd., Sixth Floor
Houston, TX 77036
(713) 772-1927

International Systems, Inc.
150 Allendale Road
King of Prussia, PA 19406
(215) 265-1550

Jason Data Services
1871 Johive Rd.
Sebastopol CA 95472
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Johnson Systems, Inc.
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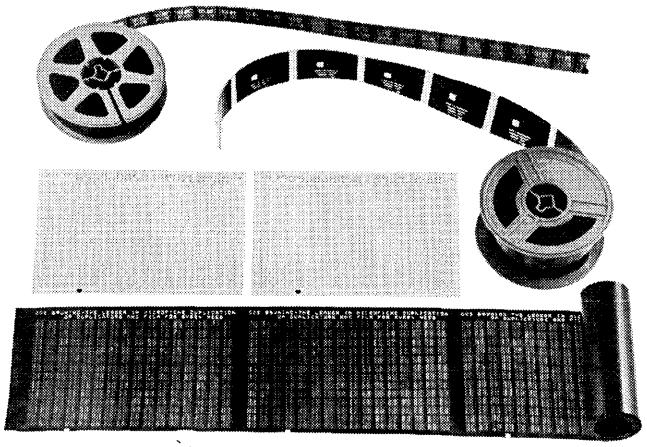

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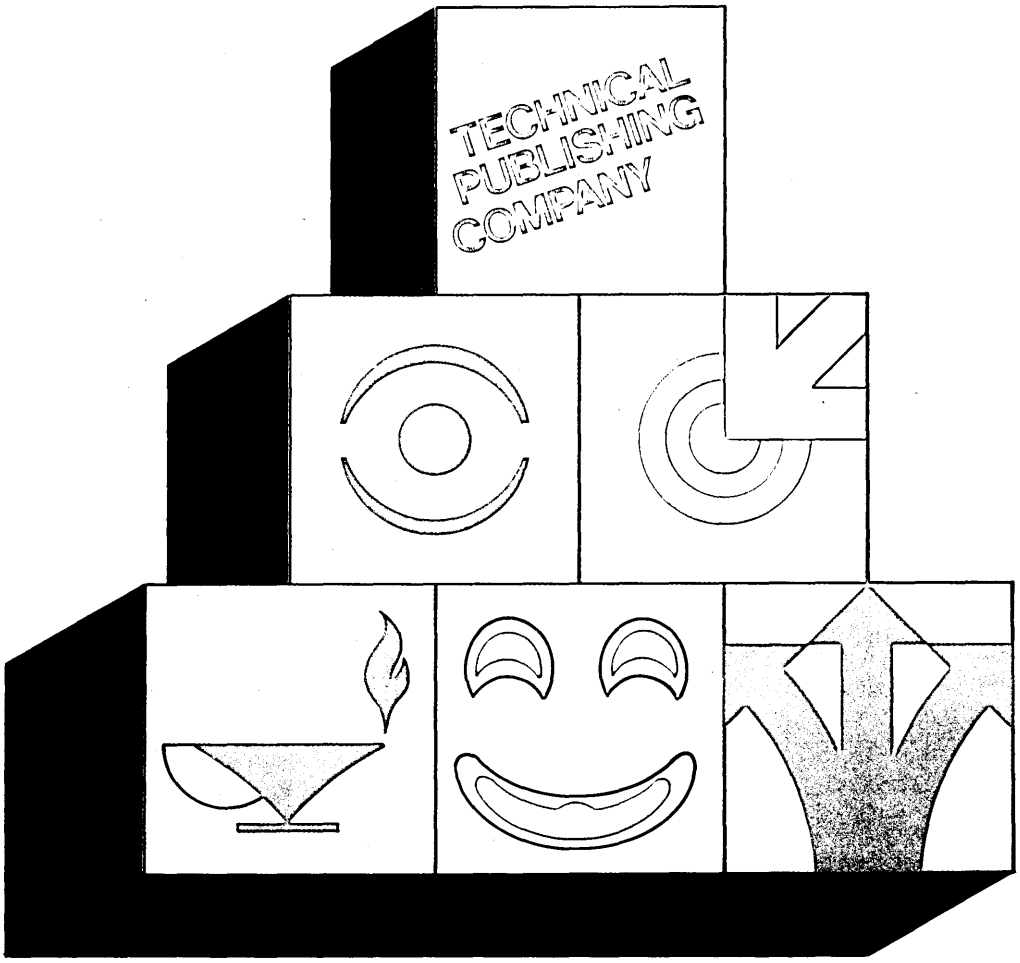

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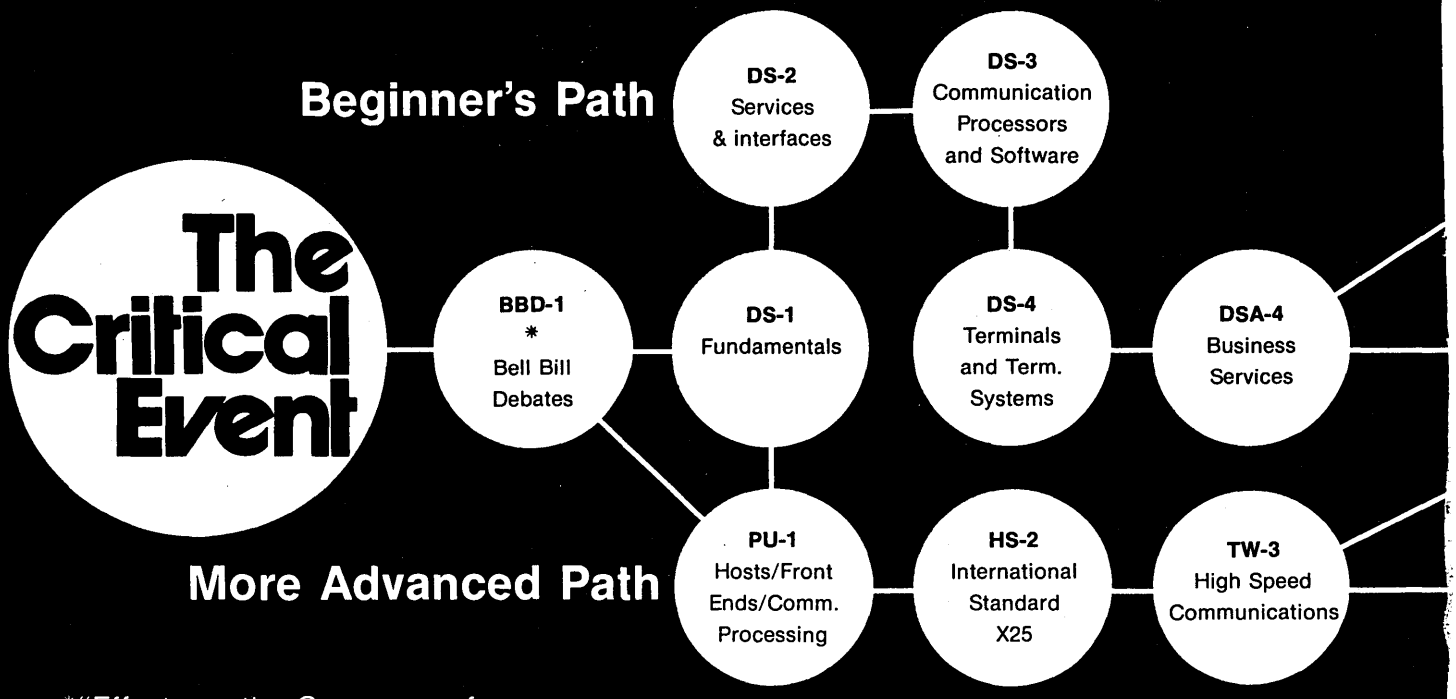

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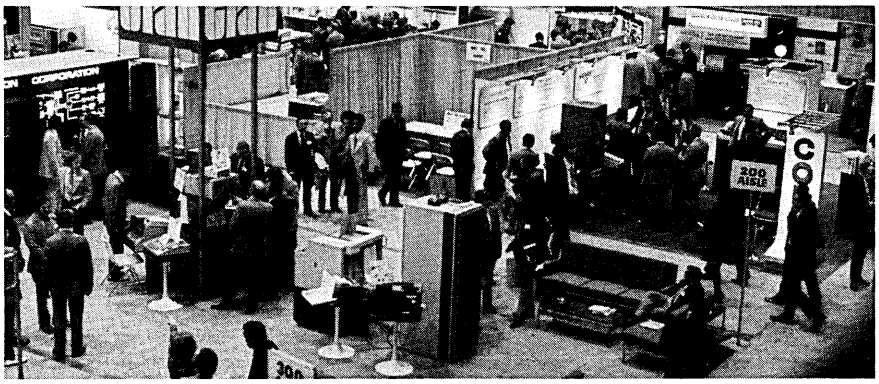

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CIRCLE 107 ON READER CARD

IBM's Series/1 Minicomputers

by Angeline Pantages, Associate Editor

The giant goes to the back of the line in the industry. Will its massive manpower, production, and dollar resources soon make it a leader?

IBM's long awaited Peachtree minicomputer line, announced Nov. 16 in the U.S. and Canada, turned out to be little more than a seedling. The shiny new Series/1, a barebones box that the user can configure to taste, left more questions unanswered than problems resolved.

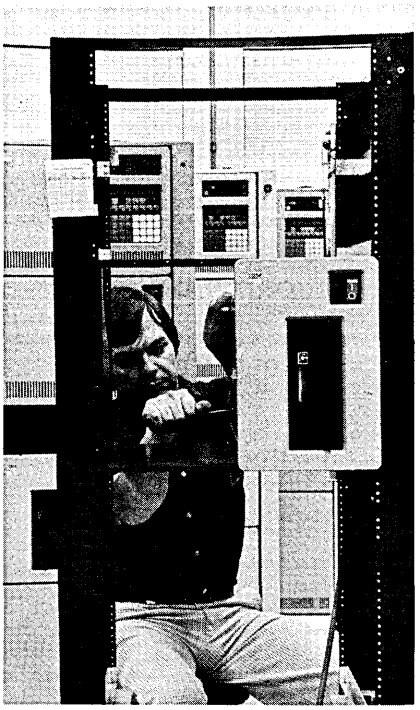
Ironically, on the same day that IBM unwrapped this almost software-less series, Data General was announcing a sophisticated operating system for its minicomputer line. IBM introduced tools; DG offered solutions—a rare day.

IBM introduced two models, the 3 and 5, with a bewildering array of additional attachments. For IBM it is unique in many ways. It is available on a purchase-only basis, with prices ranging from $4,400 for a stripped model 3 with 16K bytes, to $100,000 for the biggest model 5 conceivable. (An IBMer guessed there were at least 1,000 different combinations.) The average price, says IBM, will probably be about $40-50K. As is customary with IBM, there will be no discounts. No matter what.

IBM test marketed the system for eight months before announcing it, and has already delivered systems to customers, including Quaker City Motor Parts, Wilmington, Del., and Citibank, New York. Asked if IBM has checked out this approach with the government's antitrust division, C. B. Rogers, president of General Systems Division, said, "No. Not to my knowledge."

Little programming support

IBM offered almost no programming support but did offer built-in interfaces for "foreign" attachments. IBM's strategy, as delineated by Rogers, is to appeal to the large self-sufficient user who knows his own problems and can do his own programming. The machine will be sold by a small dedicated sales force working out of seven regional offices, but only to prospects qualified by GSD or Data Processing Division sales personnel. IBM will be looking for orders for 20 systems and up: it will only submit proposals for orders that large; anything smaller and the user will have to come to them. IBM is willing to make sales to non-IBM mainframe customers, although it will not actively canvass them. GSD will maintain the Series/1.



IBM is now in the rack business, offering two sizes, 1 and 1.8 meters high by 19 inches wide. A technician is shown installing a model 4964 flexible disc unit, two of which will fit on one shelf of the rack. In the background one can see the control panels for IBM's newest computer series.

The IBM decision to sell to experienced, large quantity users is hardly unusual. Most minimakers have aimed in this direction first. The big companies, while few in number, have the biggest budgets, and with their in-house expertise, are least expensive to support. GSD has been plagued by a profitability less than average within IBM. This is due to high volumes of small systems going to medium and small companies; they need more support per dollar of revenue.

The lack of much programming support has two positive effects. One is the salve to minimakers, who have been diligently developing software for what they once sold as pure iron. Secondly, whether the antitrust case is going well for IBM or not, this consideration must have had weight, since it dovetails so nicely with IBM's other major consideration: the firm is a relative newcomer to the marketplace, so is moving along slowly in determining markets, offering the tool before it gets into the added cost of providing the solution. IBM did the same thing with general purpose computers nearly two decades ago, and its users came to the rescue.

The reason IBM's announcement of iron, and technically not very exciting iron, is significant, is because it is from IBM. While arguments will rage about its technology, one fact prevails. IBM has a cast of thousands backing up its small cadre of salesmen (probably no more than 35 or 40 right now). Besides these resources, it also has thousands of "indirect" IBM salesmen. These are the scores of companies that produce software for the Series/1 ("or tell them to look in the yellow pages," quipped one IBMer.)

Good for applications?

The Series/1 is good for "applications," according to IBM, but the firm never quite said which applications, though the demonstration highlighted a bulk fuel terminal control system. (Badge entry into a terminal moved a toy truck around the mini fuel terminal; the truck's identity, fuel limit, fuel loading, and billing were all determined and accomplished automatically. IBM said the mini could do the same thing for real trucks.) With sensor-based I/O attachments and ruggedized construction

(operating between 33 and 122 degrees Fahrenheit in 10-95% humidity), the mini is obviously oriented toward similar industrial and laboratory applications.

If users feel the Series/1 is a missing link in IBM's Systems Network Architecture, IBM will have regained some of the control it has been losing to other vendors. Citibank, while not configuring an SNA network, is a good example of this. Characterized as a collection of small banks, Citibank is gradually doing away with all big cpu's, a fortune in IBM 370s, and shifting to minicomputers for networks and dedicated applications. It is rapidly becoming the Lawrence Livermore Laboratory for minimakers (one, or in this case, a dozen of everything).

IBM now has a foot back in the door, since Citibank has taken delivery of several Series/1s for use in its correspondent banks and other yet undetermined applications. "A lot more than 20" is all that could be found out about the order. Citibank official spokesmen on the IBM announcement had left town at that time (they will be back), but sources close to the bank gave some major reasons when asked, "Why IBM?"

Overseas factor

"There are 100 minimakers you can deal with in the States, but when you go overseas only a few can offer the maintenance and support where Citibank needs it. DEC is one of the few, but even it has holes in its worldwide coverage that IBM does not." (Citibank has already had support problems with the other minimakers here and abroad.) He concluded, "IBM knows how to build lots of everything, and it understands end users—something minimakers are just getting around to." The hardware is "nothing to write home about," although this mini expert does give good marks for peripherals and reliability to IBM. "The software will come." (More than one operating system is under development.) Production is coming along, too, with 90 units already having been shipped from IBM's Boca Raton, Fla. plant. IBM said that reaching planned production levels will take a year, but that heavy shipments are anticipated by April.

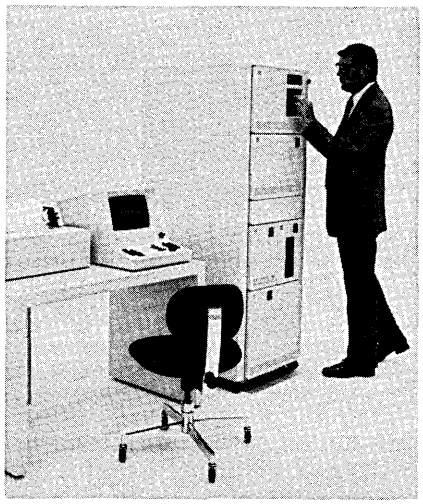
First evaluations of the Series/1 compared to other products has led some to say that price/performance of some models might be equal to those of DEC, DG, and Hewlett-Packard. "Equal to" is not a good condition for the competition, and one can expect they will be working hard to improve the price and quality of support, and to expand geographically to meet the needs of the cream of the buying crop—the multinational. One good thing about Series/1 for competitors is that IBM iron doesn't appear to be a steal. ❋

Blend of the 370 and Many Process Computer Systems

Architecturally, the Series/1 resembles a blend of the 370 and many process computer systems. Four levels of interrupt are provided with a total of 32 general purpose registers. The instruction set is 177-200—plus mnemonics, and includes built-in hardware multiply/divide. Floating point hardware is optional; systems without it handle floating point with a software trap. A 24-bit address structure suggests that someday the machine might be able to handle 16MB of virtual addresses, although at present 128K bytes is the limit. Basic add time for register to register operations is 1.32 usec.

While the Series/1 is microcoded, using 6K or 24K byte ROMS depending on model, the processor's instruction set may not be modified by the user. Microprocessors are used in lieu of hardwiring to provide soft device attachments. Basic technology is standard IBM MOSFET, 2K bytes for the smaller machine and 4K on the larger system. The processors are fairly conventional bipolar with 100-130 logic circuits per module using both IBM circuitry and standard outside components (we noticed TI and Sprague components on the boards). The board size is 9 x 7-inches; the small cpu fits nicely on a single board while the larger model is handled by three cards.

The two processors, model 3 (4953) and model 5(4955) are functionally similar although differing in construction, speed, size and maximum memory available. The model 3 tops out at 64K bytes, memory cycles at 800 nsec and average instruction times are 11.8 usec. The model 5 can go up to 128K bytes cycling at 660 nsec executing instructions at 3.9 usec on average. Both systems can directly address up to 256 devices, have byte-addressable storage with parity checking, include self-contained power supplies, and can transfer data on either a byte or word basis. Data is parity checked by bytes. The I/O channel can handle a maximum aggregate data rate of 1.2 MB for model 3, 1.6 MB for model 5.



To the amazement of many, the Series/1 was announced without a single high-level language to ease user application development. Come to think of it, however, that's the way most mini manufacturers start out, adding software tools as the market demands. But for now, break out the assembler language manuals.

Peripherals include a 120 cps matrix printer, a keyboard display unit, diskettes (2 each handling .5 MB writing on both sides) and 9.3 MB cartridge disc with optional fixed head features. Sensor I/O units may be attached for those interested in handling analog or digital input/output.

Communications are supported by feature cards that can be inserted in the I/O slots of the processor or the processor expansion unit. Line disciplines supported are single and multi-line asynchronous and bisynchronous as well as single line SDLC. Maximum speed is 56K bps available under bisynch single line control, with other types generally topping out at 9600 bps.

IBM has already provided four standard interfaces for attaching devices and indicated that it will engineer (for a fee) an interface for any requested device. Immediately available are interfaces for model 33/35 ttys, integrated digital I/O timers, and customer direct program control for handling 16-bit parallel data transfers.

Software is available for the Series/1 on an extremely limited basis. The control program support, CSP, bundled in the basic price, consists largely of IPS code and a set of programs to drive devices. The primary program product is a package consisting of an assembler, text editor and link editor that is available on license for $90/month for two years. Support for the basic control program adds another $15.50/month, and that's it.

A 64K model 5 with full disc and diskette capability, printer, keyboard/display, and an eight-line bisynch communications adaptor is available for approximately $33K with a monthly maintenance charge of $285 plus $105 for the software. A miniature model 3 with 16K, diskette, printer and sensor I/O capability sells for just over $16K.

—Phil Dorn

Conferences

Info 76: It's Our Kind of Show, Say Exhibitors

Third annual event draws end users of products of information systems

Sandwiched between meat people and soft drink people, the 11,300 attendees of Info 76 in Chicago last month seemed, by and large, to be mainly those people for whom the show and conference was started three years ago—end users of the products of information systems.

Info shared Chicago's vast McCormick place with conventions of the National Soft Drink Assn. and the American Meat Institute. This made for crowded conditions in eating places and in the halls but it didn't dampen the interest of Info attendees in the exhibits and in the more popular sessions.

The 137 exhibitors at the conference represented a cross section of companies selling software, minicomputer based business systems, network information services, word processing equipment and transaction-oriented products. There were others. Honeywell displayed a high speed printing system; Informer showed a system to digitize signatures for display on a crt creeen in bank branches. Manitou showed a method for controlling automatically the use of copying machines in large government agencies. And Codex Corp. and Vadic Corp. displayed modems.

"They're our kind of people," said a spokesman for Datapoint Corp. of San Antonio, Tex. "Many of them are entry level computer users who (unlike such exhibits at the National Computer Conference) are interested in what the systems do for them, rather than in their architecture." A Codex official said it was important to be in Chicago after a long absence, but admitted there weren't too many modem buyers around. The same went for Deltak Corp., of Chicago, which felt its absence would have been noticed. (Its major competitor in video-type educational services, Advanced Systems, Inc., also was at the show with a large exhibit booth.)

General Automation people said the show led the company to a distributor in Dayton for its business systems. The telephone company held the second public display of its model 43 teleprinter, successor to its popular models 33 and 35 teletypewriters. Others felt the show was an important boost to distributors and representatives in the Chicago area.

Next year too

Exhibitors generally were pleased with the audience and were planning to return next year when the exposition will be held in New York city's Coliseum.

Some companies introduced new products. Microdata Corp. announced Reality II, a low cost version of its Reality small business system which differs from Reality only in its configuration limits. Norm Heller, product manager, said that Reality II can grow only to three terminals, three ports, because of its maximum virtual memory size. Main memory can go to 32K bytes. Beyond that a user would have to convert to Reality, he said.

Cost to an end user for the smallest configuration of Reality II is $31,000. Deliveries will begin in December.

Microdata also introduced a matrix line printer with interactive graphics terminal capabilities called Scribe. Introduction of this printer was the result of the acquisition of Applied Computing Technology, now a wholly owned subsidiary of Microdata. The printer is based on a four bit proprietary microprocessor and prints an ASCII 96 character set at a 120 or 165 characters per second rate. The company said it is producing five per month now and expects to get to 100-150 per month within 90 days.

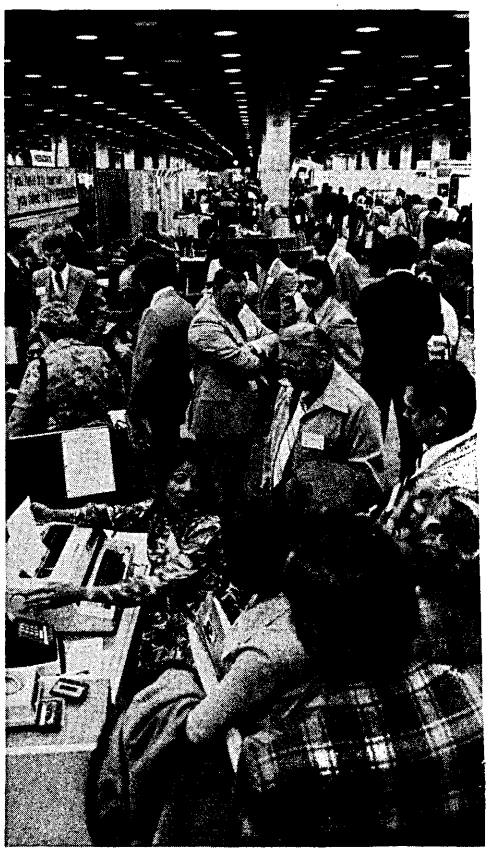
The Commercial Systems Div. of Mauchly-Wood Systems Corp., part of the Information Service Group of Insyte Corp., introduced a new on-line order entry applications package it calls Order. It functions under the Datacom data base management system of Computer Information Management Co. (CIM), a member of the same group. CIM itself announced release 6.0 of Datacom which it says will make Datacom run faster than any other data base management system on the market.

Like 100 programmers

An automated computer programming system was introduced by National Systems Corp. of Chicago. It's called SNAPS. The company claims a systems analyst using the system can command programming power equivalent to 100 programmers.

Many companies reach far for acronyms for their products. SNAPS is supposed to be an acronym for National Systems Automatic Programming System—a bit hard to figure out. But Computer Automation may win a prize. It went to the Swahili language for a name for a new translator package that converts Datapoint programs into its SyFa (Systems for Applications) business oriented language. The translator is called UHURU, the Swahili word for freedom.

Of the 11,300 who toured the exhibits some 2,300 also took in portions of the accompanying conference. Attendance



at the 91 sessions varied from overwhelming to sparse but whatever their size, all seemed interested audiences. There was practically no coming and going during any of the sessions. People apparently knew what they wanted. They went and they stayed to the end, even on the last day and even when sessions ran overtime which several did. And almost everyone was taking voluminous notes.

John Morris, Morris Consulting, St. James, N.Y., chaired a session on "Minicomputer Small Business Systems—What You Need to Know Before You're Committed to One" which drew some 150 people. He wanted to get a handle on his audience before the session started and asked, among other things, how many people were "data processing types?" Only a handful of hands went up. Other questions revealed that the sizes of companies represented ran the gamut and that the predominant type of activity represented was manufacturing. He also learned that a large portion of the companies represented use service bureaus.

Morris told his audience that the minicomputer field "is going completely bananas." He said Digital Equipment Corp.'s sales "are approaching the billion dollar mark and they can't handle all the orders they are getting."

The difference is eleven

He said the differences in staff size that he's observed when companies replace a small batch type operation with an on-line minicomputer based system is "on the average like 11 people. With the batch system there typically would be one data processing manager, two systems analysts, three programmers and five in operations. With on-line 11 people are gone."

Robert Weber, president, STC Systems, Maywood, N.J., told the same audience that size of company is an irrelevant measure in the decision as to whether or not to use small systems. Better, he said, are transaction volume, number of customers and number of inventory items. "Larger and larger companies are moving toward minis for their divisions and order processing."

Up the capability ladder from small business systems was a talk on new mass storage systems.

"Concerns about IBM's capability and market commitment to mass storage systems have risen sharply," David N. Freeman, of the consulting form of Ketron, Inc. said.

The former IBMer noted that IBM's precursor to the 3850 mass storage device was its Data Cell, delivered a decade ago, a device plagued by poor reliability and little acceptance in the market. Also, "IBM devoted little effort to supporting Data Cell, even though full OS support had been promised to users."

Freeman said today's users question whether IBM and other suppliers of mass storage systems "have learned how to field-maintain and software-support their MSS entrants." He noted that concern over these questions arose when IBM slipped delivery on the bulk of their 3850 installations by a year, a move initiated at IBM's request, not their customers'.

MSS shipments

Freeman said IBM is expected to have delivered 50 such systems by the end of this year, although some 700 mass storage systems are said to be on order. California Computer Products had shipped 50 of its automated tape libraries, with 30 on order. Control Data shipped five of its 38500 systems and is understood to have 50 on order; Precision Instruments shipped three of its System 190 laser type system and Ampex Corp. shipped five of its terabit memory systems.

He said this kind of acceptance is slow and the systems are going chiefly to very large users. Also, the systems require the latest versions of various operating systems to which users have been slow to migrate and that they require conversion from existing media. Another factor, Freeman thought, was the emergence of larger capacity disc drives and the trend towards distributed data bases.

Freeman chaired another Info session, on "International Data Communications, 1976."

"A hornet's nest of controversy—generally motivated by corporate economic interest, sometimes by national or nation-bloc political commitments—swirls around international data communications today," he said, "particularly in the area of standards. Within most nations, the victors in the competition for communications monopoly status have long since disposed of the vanquished. Having imposed standards within their nations, the victors now—most reasonably—wish to negotiate various international standards post hoc and pro bono publico . . ."

Freeman cited Japan as having "a rather unique location among the highly industrialized nations, both geographically and technologically," in introducing Shigeo Shiratori of Fujitsu's Data Communications Architecture division who described his company's standardized intra/international High Level Data Link Control (HDLC).

Three key concepts

Shiratori said Fujitsu has introduced a new network architecture and has developed several networks using it. He said there are three key concepts to the architecture. "The first one is separation of the on-line system functions into data processing and data communication control. The second is classification of the data communication control functions. And the third is use of High Level Data Link Control procedures, or HDLC."

He said Fujitsu's architecture is similar to IBM's Systems Network Architecture (SNA) but was developed before SNA and is different in its implementation.

Communications-related sessions generally drew well at Info. An audience of more than 150 heard Erwin Allen of Computer Sciences Corp. describe "Network Information Services Today and Tomorrow."

"Network information services have been especially effective in responding to the challenge of greater productivity by providing the necessary versatility, flexibility, and economy by making the

computer more available," he said.

"NIS is evolving in the direction of a utility concept and it will continue to do so as technological and social conditions permit. The worldwide expansion into homes and offices requires that these services not only be reliable and effective but also that they be easy to use. Even today, many NIS users introducing data, generating programs, performing analysis, obtaining output from a terminal do not have—nor do they desire to have—an understanding of computer technology."

Encouraging the concept

Allen noted that the introduction of minicomputers, intelligent terminals, and similar devices "is encouraging the concept of distributed computing. This concept, based on using dispersed local systems, intercommunicating with the powerful, centralized computers of a large time-sharing network, allows users to select and fit data processing capabilities efficiently and in accordance with specific cost and performance requirements."

The privacy issue was not left out at Info. Frank Sterner, Associate Dean, Krannert Graduate School of Management, Purdue Univ., told a less than overwhelming audience of a study conducted among some 2,000 college students indicating that the majority believed "overwhelmingly" that anyone can get data out of a computer.

He also told of a pilot study being undertaken by the Information Privacy Research Center at Purdue on personnel information systems. The study will cover both organizational practices and employee perceptions and expectations and will use four different basic industries as a sample. It will be pairs of companies including IBM and an as-yet-to-be-named computer manufacturer (two, he said, want to be included); Sears and Montgomery Ward in retailing; General Motors and Borg Warner in vehicle related manufacturing, and TRW and Rockwell International in electronics.

Sterner said 600 employees would be selected on a random basis from each company. First, he explained, questions would be asked of staff members "who know what is being done." Then there would be a series of questions for the same people on written policies and procedures of the organization. Next would come a questionnaire for the employees regarding their perceptions and expectations on both what is being done and policies and procedures as they see them. Sterner said data currently is being examined as a result of a pilot test done with a "moderate sized" midwestern manufacturing firm. A report is due sometime this month.

A related issue, data security, was treated in a session titled "Developing an EDP Security Risk Management Plan." Session chairman Brian Ruder, information systems analyst at Stanford Research Institute, called security risk management "a very new concept . . . a quantification process . . . a ranking of threats and assets."

He's done it

Richard Hoffman, Data Processing Systems and Software Dept., Northwestern Mutual Life Insurance Co., Milwaukee, told how his company had done a risk analysis. He described his company as the seventh largest life insurance company in the United States with 2,000 employees, 114 general agents and 250 people in data processing. They have an IBM 168 and a 158, each with three megabytes of core. Their dp is centralized and they are just starting to put terminals in the general agencies. Their security program was started in April 1974. It was instigated, he said, by the audit committee of the company's board of trustees. The risk analysis was started in April 1975. It involved two full time people. The approach was: first, preliminary preparation, second, risk analysis meetings involving a system analyst and his boss and the user of the system and his boss. The group went through the system file by file, analyzing each risk by risk. What they wanted to find out was the degree of risk, what protection would cost, probability of occurrence. He estimated that, in terms of people time, the analysis cost one hour for each file to prepare for the meetings, ten minutes for each file in the meetings and 20 minutes per file in follow up and reports. This, he said, added up to a total of 3,000 man hours.

"In the beginning of the risk analysis," he said, "everyone was with us but afterward when solutions were being considered data processing management tended to back off."

There were many sessions on data base management systems, management information systems and corporate planning and decision making. For the most part they were well attended. A constant reminder came through in many of the sessions. Max Stokes, manager of Systems Development, Standard Oil Co. of Indiana, summed it up in a session on "Project Pitfalls—Plans, People and Life Cycles Do Not a Successful Project Make." He said we "are not in the computer business, we're in the petrochemical business."

Among 13 sessions on office systems, one on "Trends and Futures in Office Technology" seemed to outpace the early days of computer technology for its heady prognostications. George Simpson, president of Office Management Systems Corp. of New York, predicted that before long computers will be free. At that price, he said, there'll be up to three of them at a work station. He said communicating word processors will allow persons to work away from the office, or at home. "Or," he added, "future offices will be designed so that people can work and live in them." James Fensel, another speaker, told of his use of a Digital Equipment Corp. 310W word processing system that allows him to put everything on disc in his distribution business, giving him virtually a paperless and peopleless company—without copying machines, file cabinets for paper, or accountants.

Fred W. Bach, whose company, Quickborner Team, Inc., designs office buildings, was the last speaker on the panel of four. He said his design of offices of the future "would assume that there would be some people around."

—Edith Myers

Companies

Canada's Consolidated Computer On the Road to Recovery—Again

In its short but stormy eight-year history, Consolidated Computer Inc. has managed to weather a deluge of management and financial tempests. Showered with money problems just three years after its founding in 1968, the Toronto-based manufacturer of data entry equipment was bailed out in 1972 by the generous Canadian federal and Ontario provincial governments, which to date have poured close to $43 million into the financially-worn firm.

Today, thanks to the money from its government mentors and a cozy deal with Fujitsu Ltd. of Japan, the company claims it's on the road to recovery. New CCI president Leslie Sellmeyer sees the company succeeding if it can bolster the management team's "capitalistic instincts. There have been a lot of shocks and problems inside the company," he admits candidly. "We've got to get out of that kind of environment and into running the company with some hard business instincts."

A newcomer to the Canadian dp industry, Sellmeyer left a cushy job at Control Data Corp. in Minneapolis in

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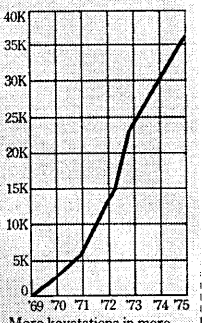

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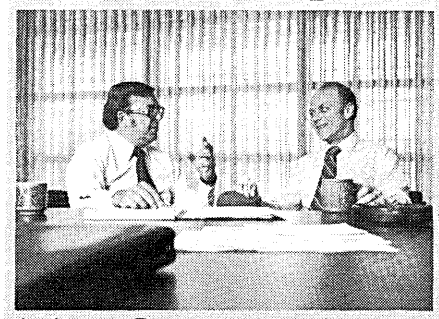

An Account Representative such as Bernard Budnik will see to it that you get the best possible system for your application. He'll analyze your requirements, explain the options, and then help you select exactly what you need from our broad range of systems.

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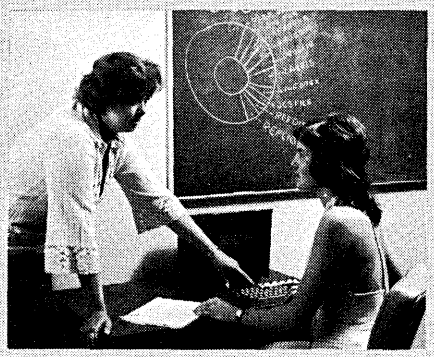

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news in perspective

January 1975 to join Central Dynamics Ltd. as executive vice president. Central Dynamics, a Montreal electronics firm, had had plans earlier in the year eventually to take over controlling interest in CCI. As this plan began to mesh, an influx of CD executives, including Sellmeyer, began to assume new management jobs at CCI.

Deal turned sour

But this management reorganization didn't last too long because the CCI-CD sweetheart deal turned sour and was called off at the last minute, leaving Sellmeyer as president and the federal and provincial governments still holding a 52% stake in the company. With the finalization of the company's debt conversion into equity this month, the governments' interest is expected to escalate to around 60%. Also as part of this package deal, the government has guaranteed $30 million worth of lease financing and made available to the company another $5 million in working capital.

Without this hefty government support, sources close to CCI note, the company could never make it. Anxious to foster its own indigenous computer industry, the Canadian government has apparently pinned most of its hopes on the trouble-ridden CCI. And the dissolution of the Central Dynamics deal has not stopped the government from looking for other potential buyers.

CCI manufacturing v.p. Ron Marsland says the government will continue searching for candidates. "It's certainly been (the government's) objective all

along," he insists, "to divest themselves and only take a very minor equity role."

CCI chief Sellmeyer agrees, adding "it's a fixed strategy that the company will become independent in most areas." But in one crucial area, leasing, he explains, long-range government support will be needed for some time to come.

In the product development area, the company is relying heavily on Fujitsu to expand and enhance its line of Key-Edit data entry systems. Under the new product technology agreement, which was expected to be signed last month, Fujitsu will get a 20 percent interest in CCI in exchange for technical help.

According to Sellmeyer, one of the more fundamental ways this link-up can help the company is by providing "small system components which we have a continuous option on in terms of manufacturing in Canada based on our distributed volume." In this way, he hopes to slowly loosen the tight ties the company has traditionally had with U.S. oem'ers who have over the years supplied CCI with processors, tapes, discs and other assorted peripherals.

One of these system components, a fixed head disc (1.4 and 2.8 megabytes), was developed last year by the Japanese company and is already being used by CCI. Other Fujitsu components being eyed by Consolidated include larger size dynamic RAMs and microprocessors.

Also eyeing display terminals

The company's "long-term requirements," Sellmeyer adds, "will be in the range of various kinds of discs and small computers." And in the short-term, he explains, CCI will be looking for Fujitsu products comparable to the IBM 3741 data entry system.

Switching into another mode, the company next year plans to add this 3741 capability to its traditionally higher priced systems in order to compete more effectively with the similar Datapoint and Sycor lines.

Future product areas the company hopes to get more heavily involved ininclude distributed processing and banking. With "some degree of help from Fujitsu," CCI plans on entering the distributed processing field by late 1977 or early 1978.

For the banking products, Sellmeyer expresses cautious optimism. "I've seen other people take a very big beating in banking terminals," he comments, "so I'm not interested in some sort of attempt at a standard banking terminal offering." What he would be interested in, he claims, is "a specific deal with one of the large charter banks."

Aiming at end users

Getting back to the present and his plans for the company next year, Sellmeyer says this: "The emphasis in operations during the balance of the year will be placed on end user sales in Canada and the U.S. The traditionally unprofitable oem relationships will be corrected or phased out. I'm not going to do wholesale systems deals that are unprofitable," he emphasizes, adding that in 1977 the company will concentrate "much more on end user content."

Sellmeyer also predicts smaller sales for next year "but more quality in financial performance." In the six months ended June 30, 1976, CCI lost $2.5 million on revenue of $13.9 million. For the same period last year, the company lost $5.9 million on $7.1 million in revenues.

Around 30% of Consolidated's $27 million in expected revenues this year will come from oem sales. Breaking that figure down further, Sellmeyer indicates that $18 million of this revenue will come from exports, mostly to Europe and the U.S.

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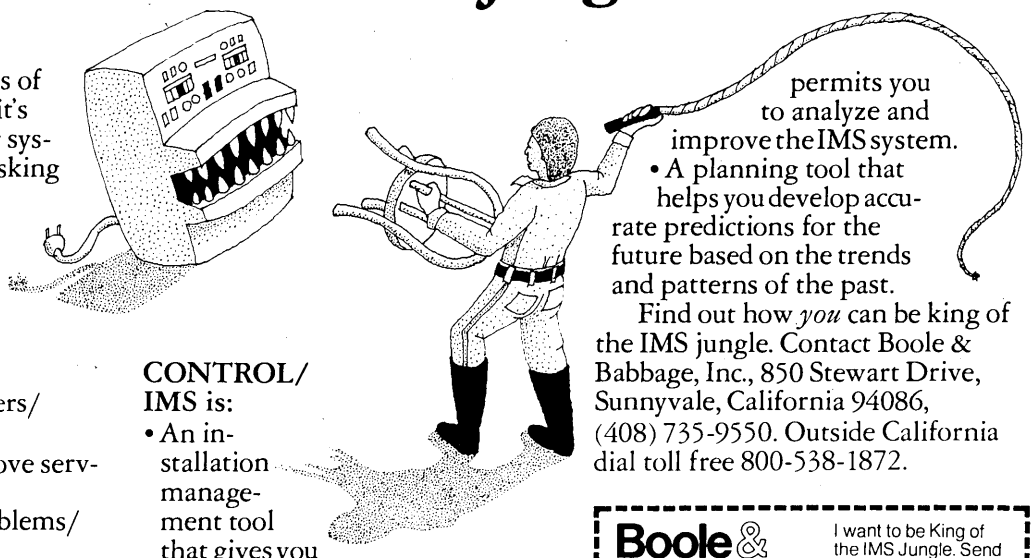

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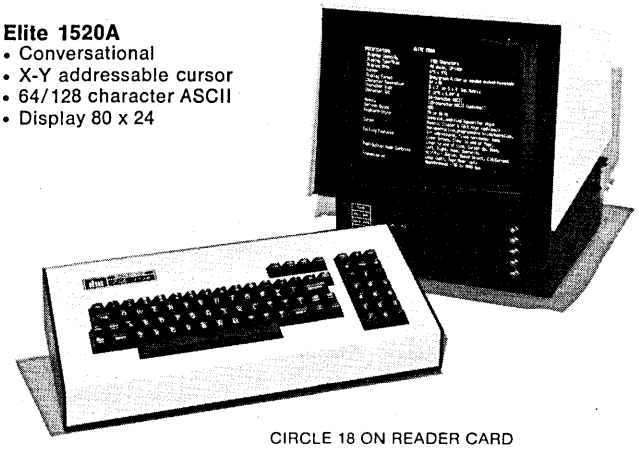

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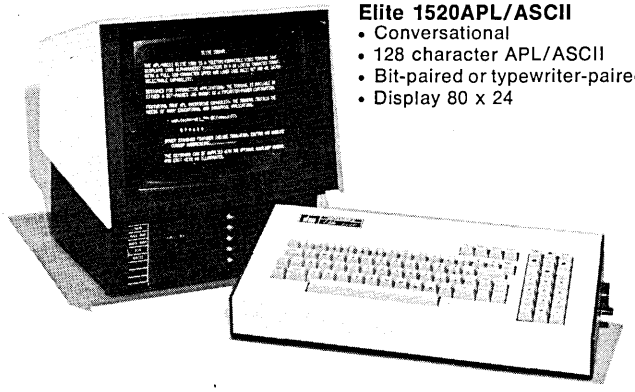

Elite 1520APL/ASCII
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- Display 80 x 24

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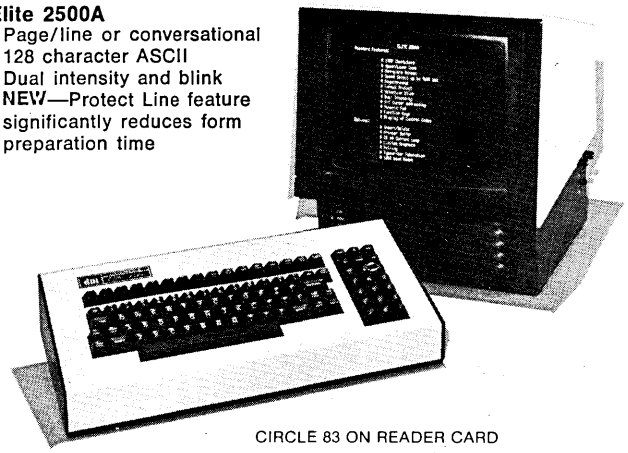

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news in perspective

Discussing his North American game plan for 1977, the CCI chief believes the company "must concentrate its sales activity in the North American end user market. And later, if we can truly qualify as an oemer, manufacturing an interesting product, we'll go out and oem it."

Picking up the pieces

Patrick L. Shannon, CCI's head of North American marketing, claims that CCI's once-troubled North American marketing effort, started up in 1969, is slowly picking up after three years of virtually no activity. The main reason for this he attributes to the company's "very sleek" leasing arrangement which he says has allowed CCI to sell in the North American end-user markets, with loans from two banks backed by the government.

The systems moving the best in this market, he points out, are the smaller Key-Edit 50 and 60 key-to-disc data entry units. (The original Key-Edit 100 hasn't been marketed since 1974.) The high-powered Key-Edit 1000 follows the 50 and 60 in sales, leading Shannon to predict that this system will almost equal the 50 and 60 in sales volume next year.

Outside North America, CCI's main marketing thrust has been in Europe. Started up in early 1970, the European marketing arm was taken over a year later by International Computers Ltd. of London, when the Canadian company ran into financial problems. Under the arrangement, ICL bought up all the assets from CCI's United Kingdom and German subsidiaries.

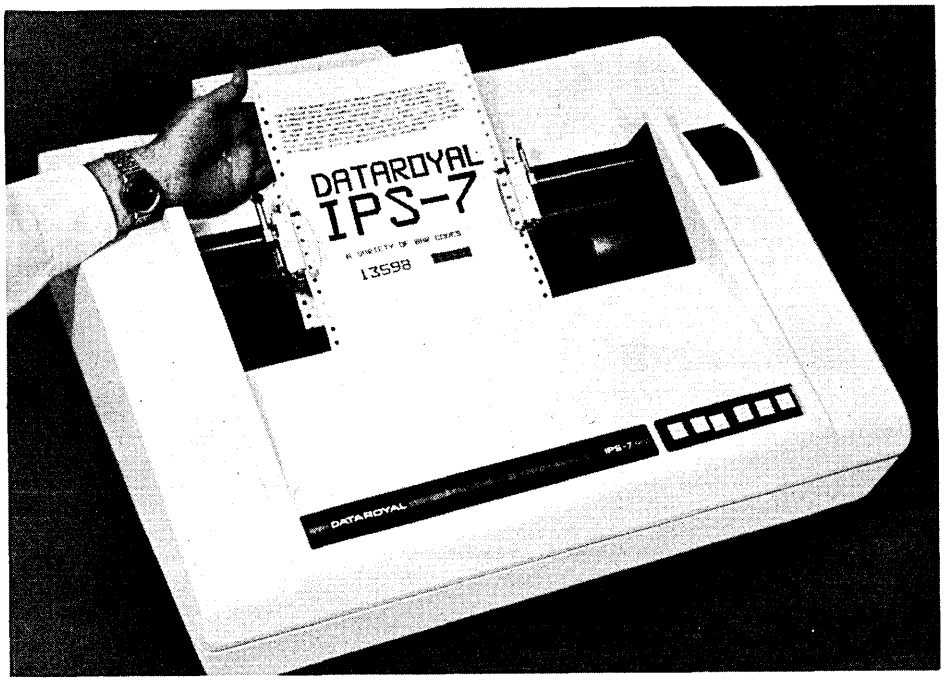
Today, ICL has built up an installed base in Europe of around $50 million. Under the renewed sales agreement between the two companies, ICL is expected to sharply reduce its monthly system orders by as much as 50%—or 10 systems per month, compared to the usual 20.

ICL watchers speculate that the mighty British company, pouring most of its energy into the recent Singer International acquisition, has slowed down on its Key-Edit drive. Not true, says a CCI official who claims that ICL is "actively exploring new market strategies (for the Key-Edit line). They're offering better incentives to their sales people," he maintains, "and really trying to move a lot of equipment."

But despite these rumored troubles with ICL, the company's main hope for salvation and independence from the government is still the inscrutable Fujitsu. "So long as the two companies have this basic love affair," Sellmeyer says confidently, "I can see our natural position with Fujitsu as being a good one, especially in the 1980s as our relationship grows."

Consolidated's manufacturing v.p. Marsland is more cautious in his assessment of the Fujitsu-CCI romance. "If we are aggressive in a positive sense, we can make headway with the agreement. But we have to want it. We have to be hungry. If we take a bureaucratic stance . . . then it's not going to bring us anything. Only time will tell."

—Linda Flato



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Microcomputers

Mini/Micro Show: An Awkward Success

Lower than expected attendance, too many "vendor product pitch" technical sessions, gross imbalances in session space allocation and lack of adequate parking hardly sounds like a description of a successful computer conference, but that is indeed the consensus from both vendor and attendee alike concerning the initial Mini/Micro Computer Conference and Exposition held in late October at San Francisco's Civic Auditorium/Brooks Hall facility.

Where other conferences might have failed miserably under such circumstances, this one did not, mostly due to the exuberance of seemingly everyone

even remotely connected with the minicomputer/microcomputer phenomenon. Where children and entire families loosely roaming the exhibits area would be considered an organizer's disaster at most computer shows, they were welcome at this one. The reason for this is, of course, the fact that microcomputers can now be purchased within the constraints of a family budget with nearly as much power as the $1 million juggernaut of 30 years ago, so the husband (or wife) was attempting to expose the spouse to the fever he or she had contracted.

Serious business went on, too, with most vendors claiming they expected to do business with nearly 50% of their booth visitors—a high percentage of the 6,949 conference attendees. Many companies sent representatives to scout the show and, in particular, attempt to measure the hobbyist computer market. Hobbyist-oriented sessions at the conference were the best attended, and there's obviously money to be made by many in this market, predicted by some to overtake the photography hobbyist market in the near future. No wonder then that such exhibitors as CalComp, DEC, Hewlett-Packard, Intel, National Semiconductor, and Centronics are looking forward to the second edition of the Mini/Micro Computer Conference and Exposition, now slated for late 1977 at the Anaheim Convention Center.

—M.W.C.

Services

Change is Focus of Adapso Talks

Is there a revolution in the data processing industry? Leon Weisburgh, outgoing president of the Assn. of the Data Processing Service Organizations, seems to think so. In his opening remarks at the association's recent 45th management conference, the dp services executive claimed the latest microprocessor advancements signal a revolution, rather than "just a change" for the entire computer industry.

Focusing on this theme of change, the three-day Adapso conference was appropriately held in the "city of the future," Toronto, Canada. Usually a low-key affair, the late October gathering attracted 265 attendees, making it Adapso's second largest management conference. The meeting also featured, for the first time, a small hardware exhibit by six companies.

On the issues of privacy, taxation and electronic funds transfer systems (EFTS), association leaders presented updates on the latest initiatives. As part of its privacy and security effort, the group announced a new position paper which will be turned over to the federal Privacy Protection Study Commission this month. The paper, in the works for several months, spells out the need for the computer services industry to establish self-regulatory standards to protect client data.

On the troublesome taxation front, the association has launched a national program to combat apparent inequities in the state and personal property tax laws. As a bottomline problem for a growing number of dp service firms, the taxation issue has become a focal point of Adapso activity in recent months. What's at stake, Alan C. Rievman, v.p. of finance for National CSS Inc., pragmatically points out, is the "very survival of the data processing services industry."

Analyzing future trends in this industry, International Data Corp. presented figures which indicate that the services segment of the computer industry is very much alive and growing. Service industry revenues in 1975, according to IDC, grew 16% to $4.5 billion.

Despite the unknown impact of distributed processing, IDC forecasts a 20% compunded annual growth rate in revenues for the industry in 1976, 1977 and 1978. Another industry watcher, Quantum Science Corp., for the same time frame, predicts a significantly smaller revenue growth rate of 12%.

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CIRCLE 68 ON READER CARD

news in perspective

Also a key agenda item at the Adapso meeting was the election of a new slate of officers. Heading up the group for 1977 will be Louis E. Pfeiffer, marketing director of A.O. Smith Corp. Other

LOUIS E. PFEIFFER
Adapso president is marketing director with A. O. Smith Corp. of Milwaukee

new officers include: Richard Crandall, president of Comshare Inc., as first vice president; John Imlay, president of Management Science America Inc., as second vice president; and Arthur Kramer, president of Praxa Data Centers Inc., as treasurer. ✲

Antitrust

West Coast Cases: The First is On

The opening bell in the so-called "West Coast cases," in which IBM is charged with antitrust violations by a number of competitors, was sounded solemnly in Los Angeles last month.

Maxwell Blecher, lead counsel for California Computer Products Corp. set the tone. CalComp's $300 million treble damages suit against the giant was the first to come to trial. Blecher both preceded and concluded his day-long opening remarks to the jury of five men and seven women with solemn admonitions as to the seriousness of the case.

"This is an historic and important piece of litigation and possibly the most important private antitrust case to be submitted to a group of men and women," he told the jury in the morning. "The decision you reach in this case may be the most important decision you will be expected to make in your lives."

He concluded by telling them, "the decision you make in this case could impact the entire economy. It could affect the way business is done in this country."

IBM earlier fought the whole idea of a jury trial both before and after jury selection. The company's lead attorney David Boies asked Federal Judge Ray McNichols, who is hearing all of the West Coast cases, to either strike having a jury or to strike the particular jury selected. He contended that all jurors selected appeared to be in one economic classification and did not satisfy a constitutional requirement for cross-representation.

From a pool of 70

The 12 jurors were picked from a pool of 70. McNichols decided they did represent a cross-representation. Jurors include: Edna E. Kindoll, retired from Hydraulic Research Corp., wife of a manufacturing engineer and a Burbank, Calif. resident for 35 years; Rosemary T. Simera, a quality control inspector with National Can Co. and wife of a millwright; Joyce Hill, a recent graduate of California State Univ. with a teaching credential and a 12-year resident of Cudahy, Calif.; Mark Conely, in the distribution department of the Southern California Gas Co. and a 25-year resident of Mar Vista, Calif.; Arvella Staten, a 25-year employee of the City of Los Angeles and currently a window

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cleaner supervisor; Oma Lee Coleman, unemployed, formerly a plastics inspector, and a resident of Huntington Beach, Calif.; Robert Shmabuku, American Airlines clerk and a six-year resident of Cerritos, Calif.; William C. Chicoine of Santa Ana, Calif., a school district custodian; Ernest Padilla of Altadena, Calif., a carpenter for the state and a private contractor; Alberta Keefe, 14-year resident of Chino, Calif., currently unemployed, formerly an assembler for General Dynamics; Alice Padilla of Whittier, Calif., an employee in the will-call mail order department of Sears Roebuck; and Stephanie Tuttle, housewife from Monterey Park, Calif. and wife of an Alhambra school district maintenance man.

If CalComp can win its case it is generally felt it will fare better in appeal because it was tried by a jury. Appellate courts, including the Supreme Court, tend to find it more difficult to reverse a jury decision than one by a judge. Two of the other major West Coast cases, those filed by Memorex Corp. and by Transamerica Computer Corp., also are scheduled to be tried by juries.

In his opening remarks in the CalComp case, Blecher said before an audience packed into a small courtroom and including both Frank T. Cary, IBM board chairman and Lester Kilpatrick, board chairman of CalComp, he would show with his case that "IBM, from 1963 to 1972, purposefully undertook to eliminate, suppress and destroy competition." He said he would show that IBM had damaged CalComp to the tune of $102 million which he called a "staggering sum."

He called this "a case where you can determine IBM's guilt by their own documents" and in the course of the day, he showed the jury blown up versions of some of the "millions of documents" he said he would enter into evidence. These included memos exchanged by top IBM executives, minutes of top level meetings, and internal reports. Over and over he produced documents he said proved IBM's dedication to maintenance of its market share even if it had to sustain "huge" losses to do it.

He showed the jurors a chart labeled "IBM and the Seven Dwarfs," a label Boies objected to saying "colorful words like that have no place in this trial." The judge found the terms acceptable.

He compared IBM's actions to "those of a navy turret gunner" using its arsenal of technological and financial weapons to go after first, systems competitors, later leasing companies and add-on memory firms and finally the plug compatible peripheral manufacturers (PCM) "which is where CalComp got did in."

He said he would show that IBM hurt systems competitors with premature announcement of the 360 line and announcement of some machines in the line when they didn't even exist, just to protect market share. He contended IBM kept systems market share by lowering cpu prices and making up for this with high peripheral prices. When the systems competition was virtually taken care of, he contended, IBM reversed this pricing "trade-off" to the detriment of the PCM's.

Blecher produced a document which showed that IBM had done a study on how much customers could save using PCM products. It showed typical savings with a 360/30 at $23,388 per year or 21%, with a 360/40 at $34,740 or 19%, with a 360/50, $76,711 or 21%, and with big machines, $191,730 or 26%.

He followed this with a document in which IBM declared peripherals "to be a key strategic issue." He said he had another document which defines this as meaning "big headache."

Blecher said he would show that IBM's introduction of the 2319 and 2319B disc drives which put the controller functions partly into the cpu and partly into the

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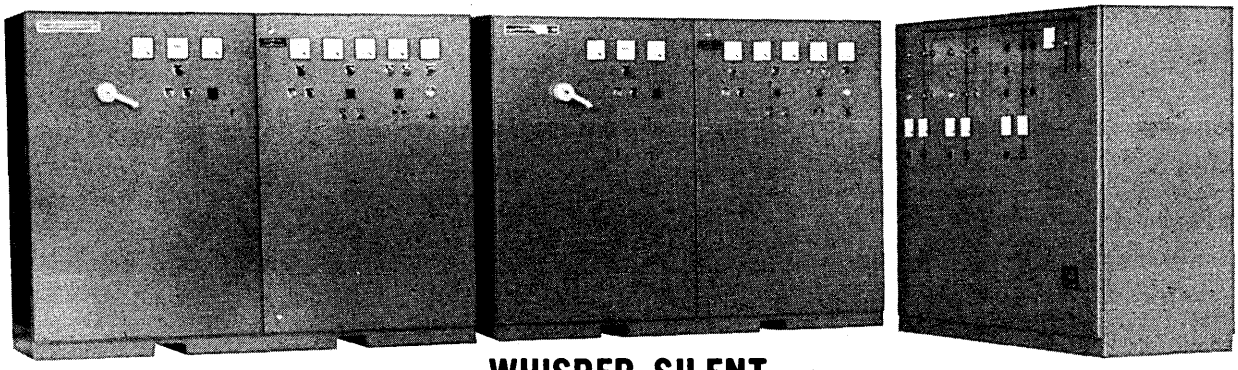

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drives themselves were deliberate acts to lock the PCM's out of the 360 and 370 markets. Even more devastating, he said, were announcements of IBM's Fixed Term and Extended Term plans in 1971 which "were essentially price reductions."

Bank changes mind

He said CalComp had received a letter on Dec. 11, 1971 from United California Bank from which it had notes, saying the bank was willing to convert the debt to stock. The 2319B was announced on Dec. 17. "Three days later we got a call from the bank saying it had no present intention of exercising its right to become a stockholder." CalComp, he said, then approached Lehman Brothers in an attempt to raise $5 million to pay off UCB. It couldn't be done, Blecher said, "because financial institutions feared that IBM was going to eliminate or drastically reduce the profitability of independents in the disc and tape drive markets."

Blecher claimed IBM's "predatory and monopolistic" practices cost CalComp $68 million in lost revenue, and $33 million in loss of profits it would have made for a total of $102 million.

Blecher advised the jury that a civil case is quite different from a criminal case in that it is not necessary to prove anything beyond a reasonable doubt. "You must decide for us if we tip the scale ever so slightly."

Boies said in his opening statement on behalf of IBM that CalComp must prove five major points to win. First, he said, CalComp must satisfactorily define a general purpose computer market. Then, he added, CalComp must prove that IBM has a monopoly position in that market, that IBM achieved that position in a "wrongful" way, that CalComp suffered damages from IBM practices and the amount of such damages.

"If CalComp fails to establish even one of these points," Boies told the jury, "I feel sure the court will instruct you that they have not proven their case."

"Basic beliefs"

Boies described IBM for the jury, its size and its "basic beliefs." The latter he listed as a respect for individuals, a desire to provide the best customer services of any company in the industry, and an emphasis on doing every task in a superior fashion.

He referred to other areas in which CalComp had lost money including a move into consumer products. He illustrated his point with a pink and yellow "rubber duckie" lighting fixture which was one of those products.

Another of IBM's attorneys, Jack E. Brown of Brown and Bain, Phoenix, said he would show that IBM did not damage CalComp. He said CalComp's prices as shown on its product data sheets were like "car sticker prices," higher than the prices actually charged. "These prices were declining before IBM's competitive actions," he said, "and they did not actually go any lower after the action." He said there was speculation that, after IBM announced its Fixed Term Plan on May 27, 1971 there might be some difficulty for CalComp but in fact, CalComp's booking for the following three months was actually higher by 19% as reported in the CalComp annual report dated Sept. 1971.

Brown characterized IBM's introduction of the FTP as "a competitive response to CalComp and other competitors who already had introduced long term lease plans."

Brown said the defense attorneys would bring in IBM employees to tell why IBM is a great company and why they have loyal, dedicated employees and why IBM is so well managed.

At the conclusion of the two days of opening comments, Judge McNichols complimented both sides on the depth and completeness of their preparation.

Before the West Coast cases are over, he may weary of such depth and completeness for he's scheduled to hear all of them. The CalComp case is expected to last for six months. Memorex' is next and its case is said to be even more comprehensive than that prepared by CalComp.

—Edith Myers

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news in perspective

Management

DPMA Makes Good In Las Vegas

Maybe it was the lure of Las Vegas. Maybe it was the program. Whatever it was, the Data Processing Management Assn.'s (DPMA) Info/Expo '76 came off well.

Total attendance exceeded 3,000 and session attendance was tops. The exhibits, on the other hand, were few, and for the most part, ignored except for the magician provided by Management Science America, Inc.

The sessions ranged from the blue sky to the practical. One of the most practical, and best attended, was put on by Harvey Weiss, Harvey Weiss Associates, Denver, Colo. His topic: "Using Risk Analysis Methods to Determine Cost/-Benefit Relationships of Computer Projects."

Doesn't sound exciting but it drew a large and staying audience. Weiss was talking about the probability of success of a computer project, any computer project. "The computer and everything about it has come into its own and stands alone," he said.

Risk analysis, and he was talking about whether to go ahead with a project or not, "is a procedure the result of which is a number which can provide the system developer with a probable rating of success."

"You have to look at the corporate environment," siad Weiss, "what are the goals, what are the development costs, what are the annual running costs . . ."

Most sites, said Weiss, "seem to forget initial costs and how to average this across a system's life expectancy." This he estimated as an average of 20 to 36 months.

"If people are going to be cut," he said, "name them." He also advised questioning the value of making a change. "Ask questions," he urged. "Do you have the talent? Can the hardware and software do the job you are looking at? Are you the first and, if so, are you willing to be a pioneer?"

Pioneering idea

What might be and seemed to be to some a pioneering idea was put forth in a session titled "Obsolescence and Self Assessment," conducted by Paul Armer, a director of On-Line Business Systems of San Francisco. Armer likened talking to people about their possible obsolescence to talking about venereal disease. "Nobody wants to admit he's going down hill."

Armer's was a well attended session with an interested if argumentative audience. He described his own evolving interest in self assessment and a self-assessment study published by the Association for Computing Machinery (ACM), suggesting that DPMA might do well by itself to publish the same test.

A questioner from the audience suggested that the ACM test was directed to ACM members. "Do we need that?" Another member of the audience said, "Maybe not but our people do."

DPMA conferences are reminiscent of small town Rotary club meetings in that all major sessions have an invocation and maybe even a flag salute. The keynote session went one better than any Rotary meeting ever held. There was an invocation, eloquently delivered by C. Richard Brune who is both an ordained minister and a data processing manager, addresses by both the mayor of Las Vegas and one of Nevada's senators, Howard Cannon, and two anthems. One was the "Star Spangled Banner," familiar to all and everyone stood. They sat down when it was over only to tentatively get up when the second went on. No one, even by the last day of the conference, was quite sure what

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that was.

The conference had another patriotic note thanks to one of its luncheon speakers, Charles P. Lecht, president, Advanced Computer Techniques Corp. He was to have addressed the privacy issue of data bases but he chose to talk about "what America is all about." "When you look at the U.S. machine," he said, "other governments are clunkers by comparison." He also noted "the rights of individual citizens are honored here more than anywhere else in the world."

Another DPMA luncheon speaker, Herbert H. R. J. Grosch, took issue with some of the things Lecht had to say. "He's spent too much time in Yugoslavia," said the perennial gadfly Grosch of Lecht. "Maybe we should call him well-traveled Charlie."

Look at privacy

Like most of today's data processing conferences, DPMA's took a look at the privacy issue. Chairman of the session that did this was William A. Fenwick, attorney with Davis, Stafford, Kellman and Fenwick, Palo Alto, Calif. He talked about the federal Privacy Study Commission, saying that it is "the hardest working commission I've ever been associated with," but adding that "its charter is so terribly broad that it cannot possibly carry out its mission."

Fenwick did say he doesn't think there will be any omnibus privacy legislation, either state or federal "within the next two years." He predicted that there is a growing trend in the state sector towards more "cautious legislation" which he feels will give the private sector, as yet unaffected by existing legislation, "some breathing time."

Jack Osborne, director of the Privacy Research Center at Purdue Univ., described their concept. "There is no greater power than information and control of information about individuals," he said. "Our center is going to look at some areas of information policy and attempt to factually analyze and provide some real data on given issues.*

Electronic Funds Transfer

EFT: Other Issues And Legislation

It's a rare conference touching on any aspect of data processing that doesn't have a session on electronic funds transfer systems (EFTS). Only the focus changes a little.

Two conferences last month, Info 76 in Chicago and the Data Processing Management Assn.'s (DPMA) Info/Expo '76 in Las Vegas were the norm. Each looked at EFTS but from a slightly different angle. In Las Vegas, the major concerns seemed to be privacy impact *and* legislation. In Chicago it was the interests of retailers as opposed to those of financial institutions *and* legislation.

George Glaser, San Mateo, Calif. consultant who chaired the Las Vegas session, compared EFTS to the privacy issue as a potential legislative hot potato. "EFT is likely to make privacy look like an also-ran in terms of legislation," he said. "Banking communications raises privacy questions and other questions like consumer rights, interstate commerce, fair trade, and antitrust. Nobody is sure what can be protected or prevented."

He listed the "players" in EFTS as: banks, both federally chartered and state; mutual savings banks; savings and loans; credit unions; credit card service organizations; travel and entertainment card companies, and participating commercial organizations such as TRW and National Data Corp., and retailers, the "sleeping giant."

Another speaker on his panel, Paul Armer, a director of On-Line Business Systems Inc., San Francisco, added another—the federal government. "Branches of the federal government are in competition with one another in EFTS. Banks have been defecting from the fed and if you're paranoid, and I am, you can see the fed using EFT as a way to get them back into the fold."

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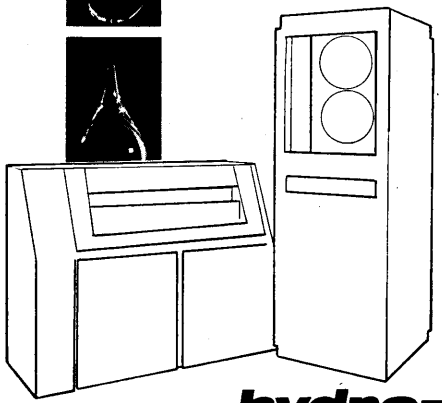

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Four areas of law

Glaser noted that there are four areas of law which bear on EFT. One, he said, is legislation affecting branch banking. "Fifteen states prohibit branch banking." He listed privacy legislation as second, universal commercial code as third and antitrust legislation as fourth.

He talked about the progress of Automated Clearing Houses (ACH's). He said there were 17 in early 1976 handling 4,000 transactions per month. In July, he said, they were experiencing 23 million transactions per month with expectations of 36 million per month by the end of 1976. He told of a "large interregional ACH exchange pilot" which the Federal Reserve Board is spearheading and which is expected to get underway next spring.

Armer believes EFT legislation is needed "to protect the consumer's privacy." He feels EFT "makes it technologically feasible to abuse civil liberties on a major scale because information currently scattered becomes concentrated, accessible, and processable."

David Huemer of National BankAmericard Inc. does not want "heavy legislative control." He said this could lead to misdirection (of EFT efforts) and could adversely impact inflation. Huemer said he believes the consumer's main concern is protection of his money. "What happens if a credit or debit card is lost or stolen."

And Herbert H. R. J. Grosch, an active questioner throughout the DPMA conference, wondered if financial institutions weren't pushing EFT out "of greed rather than necessity."

Glaser responded that there certainly is no crisis but "if they wait . . . ?"

Favorable prognosis

At the Chicago EFT session, Joel Crabtree of Continental Bank of Chicago said he believes the prognosis is good for electronic banking legislation in 1977. Continental is a bank which isn't waiting. It often has been referred to as "the EFT pioneer." Existing laws have been a problem for Continental which is operating in a unit banking state.

He feels this circumstance has contributed to the progress Continental has made in EFT. "Look for innovation in Illinois or Oklahoma (another unit banking state). Don't look to the East Coast or California. We have to do it to survive."

Crabtree said Continental has Addressograph-Multigraph Amcat 1 terminals in 300 Dominick stores, 180 National Tea stores, eight Treasure Island stores, 12 Wieboldt's and one regional amusement park. He said the bank's network handles one million transactions per month and is experiencing 98% up-time. Terminals handle master charge authorization and check approval in from two to five seconds. On the same network, Continental has 14 Docutel automated tellers. One is in its head office lobby and two in a "convenience corner" which is one corner of the four block square the head office occupies. A recent Illinois law permitted banks a second office within 15 feet of the main office and Continental opened one. Five of its automated tellers are there, one outside and four inside.

"We hear a new law is coming which will let us have another office within two miles," Crabtree said with just an overtone of bitterness.

The last two of Continental's automated tellers are inactive now having been shut down Oct. 22, 16 months to the day from when they became operative, because of a federal court ruling that they constituted branch banks and, therefore, were illegal in Illinois.

Two levels

Crabtree looks for electronic banking legislation "at both the state and local

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level" in 1977.

He mentioned that Continental, in addition to its activities in supermarkets and with automated tellers is looking into in-home bill paying via touch tone and transaction telephones. "Our friends in the Post Office are contributing to this with their talk of the 17¢ stamp." Crabtree said in-home bill paying has been placed second in Continental's plans to supermarket terminals and automated tellers because it "represents a quantum leap in customer education."

Customer education and consideration in the evolvement of EFTS was cited by two retailers addressing the Chicago EFT session as being of vital importance.

Bill Bishop, member of the Joint National Assn. of Food Chains/Supermarket Institute Electronic Funds Transfer Committee, urged financial institutions to "let this input in or it's gonna force itself in." He referred to problems the supermarkets are having because they didn't do this in introducing the Universal Product Code (UPC).

Bishop said he knew of 77 experiments involving supermarkets and financial institutions but emphasized that "most supermarkets still believe these are in an experimental phase and they are not 100% committed." He said he had attended a meeting of his committee recently in which the question was asked: what have we learned from these experiments? The answer he said, was complete silence.

Continental's Crabtree said banks are coming to realize that customers want an "arms length" relationship with banks and that EFT fosters this.

Bishop's response to this was "banks want to move functions away from themselves and so do we (supermarkets)." He was concerned about a full debit card. If that happens, he said, "who's gonna keep the paper. We don't want to."

He had a list of things supermarkets want and don't want out of EFTS.

They want: 1. Increased convenience to customers such as in faster service. "The number one complaint of customers is waiting in line. What will happen if we add banking services?" 2. Reduced labor costs. He said supermarkets pay an average of 10¢ per minute to each clerk and this is increasing 10% per year. 3. A system that minimizes disruptions. 4. Reduced check loss.

What supermarkets don't want, Bishop said, are: 1. to increase operating costs, 2. to determine where a person banks, 3. to have to turn away customers and 4. to get too involved with the communications with their customers involving EFT.

Bob Bozeman, vice president of Allied Stores, spoke for the general merchandise retailer of which, he said, there are 250,000 in the country. He said there are five characteristics financial institutions should recognize about general merchandise retailers when they think about involving them in EFTS. These are 1, diversity; 2, a large amount of business done on credit; 3, they're very industrious and ingenious in developing customer traffic; 4, they're good at putting together customer traffic and things to sell and 5, retailers are born negotiators.

"We're proprietary about our customers," he said. "We have 5,000 point-of-sale terminals on our network and we expect to expand threefold in the next few years. We think EFT should fit in some way but we're uneasy. Standardization is up in the air. The question of whose customer is up in the air. It is important that financial institutions understand the retailer better. For the general merchandise retailer EFT is going to be a step by step proposition."

The question of who should pay for EFT services came up repeatedly. Bishop's answer: "The way that's answered probably will determine the success of EFT. We (the supermarkets) probably will favor unbundling the costs and ultimately, to a degree, the customer probably will be asked to pay."

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—E. M.

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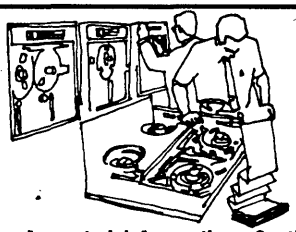

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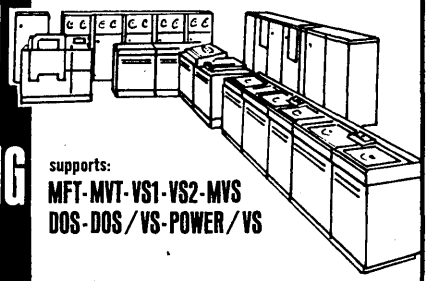

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news in perspective

Communications

Bell Seen 'Wearing People Down' To Capture Markets From A to Z

If American Telephone & Telegraph Co. is Joshua, then the walls of Washington, like Jericho, are going to come tumbling down. The "chiseling away" at those walls, says former telecommunications chief John Eger, has already begun.

"Over time," he predicts, the communications giant "will chip away at competition and at the Federal Communications Commission's rules, getting them to redefine communications and data processing. And more and more, without a change in Congress and without a change in the consent decree, they will have managed to get exactly what they want—a substantial chunk of the telecommunications market in which they will be able to provide telecommunications services A to Z."

In order to capture those A to Z markets, Eger sees Bell doing exactly what it's been doing so successfully for years—"wearing people down." The federal government at all levels is particularly vulnerable to this tried-and-true tactic. Eger explains why: "There are responsible people in government who honestly believe that in a world economy the only way for the U.S. to remain dominant is to build tremendous super powers, great big industries like AT&T that work hand in hand with the government.

"Unfortunately, that view of the world," Eger insists, "is perverse and antithetical to everything we've always believed about capitalism and a free economy and marketplace. But people have a sense of frustration about their government and big business, and the bureaucratic mind is very susceptible to a solution that sounds like it's going to do away with the untidiness of the free enterprise system."

He's unwinding

Eger, an outspoken booster of competition, says he's unable to tap into this bureaucratic mindset. Unwinding from two-and-a-half years as the acting director of the Office of Telecommunications Policy, the 36-year-old lawyer claims he was more than ready to trade in his dark pin-striped business suits for sports clothes and sweaters.

As the executive's communications czar, Eger spent an average of 14 hours a day on the job, which he admits, has left him "physically and mentally exhausted." The change of clothes for the new job—counsel for the Washington law firm of Lamb, Eastman & Keats—has given him a new lease on life. Or so it appears.

But appearances are sometimes deceptive. Having embroiled himself in a series of pot boiling communications controversies, not the least of which was the squabble over the AT&T-sponsored Consumer Communications Reform Act, Eger, some Washington watchers are quick to point out, set himself up to be struck down. Struck down and eased out of a job that some say he could never quite lay claim to.

A native of Chicago and a lawyer by profession, Eger began piling up his communications credentials early. From 1965 to 1970, he worked with Illinois Bell, serving his last year there as business systems project coordinator and liaison to Bell Laboratories Information Systems Center. After receiving his law degree from John Marshall Law School in 1970, he joined the FCC's regulatory ranks, working as a legal assistant

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to chairman Dean Burch.

Nominated by former President Nixon, Eger began his first stint at OTP as deputy director in April 1974. A short five months later, he was tapped to be the acting director, replacing Clay T. Whitehead, the founding director who had resigned.

It was a big job and a big responsibility for the then-34-year-old administrator. "The first few months," he recalls, "I felt a little bit funny about being the acting director . . . But after six months I felt I might as well go ahead and do the job. People expected me to be a director so I couldn't hide in the shadows."

A paper tiger

Stepping out of the shadows and into the spotlight, Eger soon began to confront the realities of his new job. One of the harshest realities he had to face was the severe operational restrictions crippling the executive office he was now running. Because of a "compromise" hammered out under the Nixon administration, the fledgling telecommunications authority, set up in 1970, was little more than a "paper tiger," Eger confesses.

The original proposal would have given the telecommunications office responsibility for coordinating the federal government as user and policymaker. But under Nixon, the now-famous Rostow task force report, which spearheaded the drive for a strengthened executive telecommunications voice, was virtually ignored. As a result, the subsequent Nixon reorganization plan, supplemented by an executive order, transferred the telecommunications role of the Office of Telecommunications Management and related duties of the assistant director of the abolished Office of Emergency Preparedness, to the newly-created OTP.

After all this bureaucratic maneuvering, Eger complains, the office was left with "no decision making authority at all except to coordinate under an executive order." To make the office have teeth, he contends, this executive order "should be translated into statutory authority."

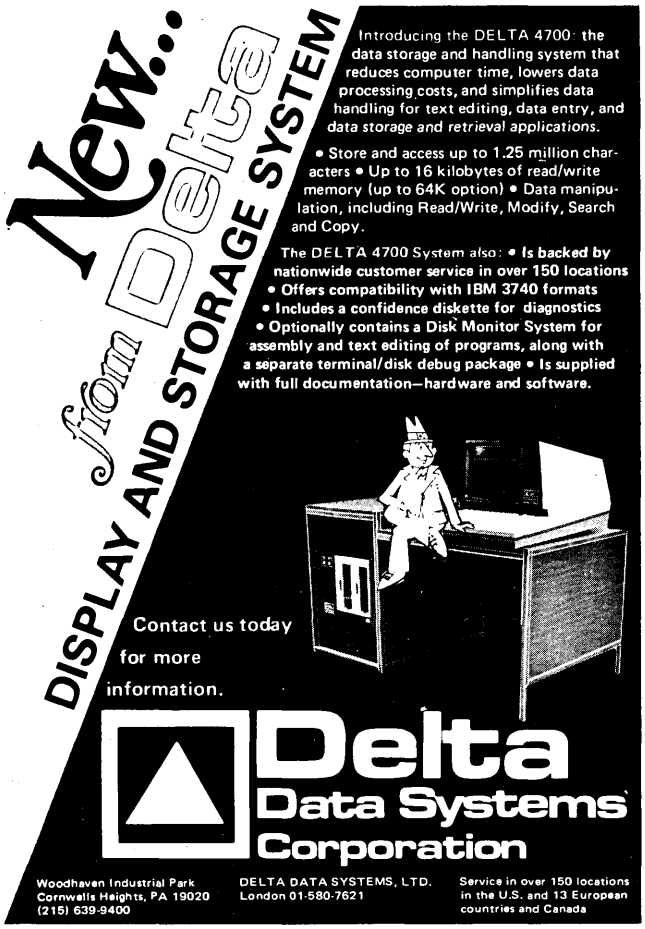
Uith no real power behind it, the ill-fated telecommunications office became a prime target for zealous government revampers who wanted to trim the size of the executive office of the President. One such scheme surfaced early in the Ford administration, when the Nixon backlash hit its peak. At that time, Eger remembers, OTP "was looked upon as a Nixon/Agnew/Whitehead anti-media office."

So Ford, under the advice of his top advisers, decided to take the $9 million office with its 60 employees and "tuck it away in the Department of Commerce." But Congress, alerted to this behind-the-scenes plotting, scuttled the plan by forcing Ford to back down.

Saving an agency

Eger, who had only been at OTP for a couple of months when the storm broke, found himself and his office under the cutting edge of this Sword of Damocles. With the help of the Hill, mainly Sen. John Pastore, Eger manager to save the agency. But maybe not for long as he points out: "OTP will always be in danger until it has statutory authority or as long as nobody is quite sure of the importance of communications in our society and the role of the President in formulating communications policy."

Unfortunately, he laments, "every President has had a different view of communications." Only time will tell what President-elect Carter will do, but Eger is hopeful that the new Democratic administration will be taking a harder look at these crucial issues. "I know



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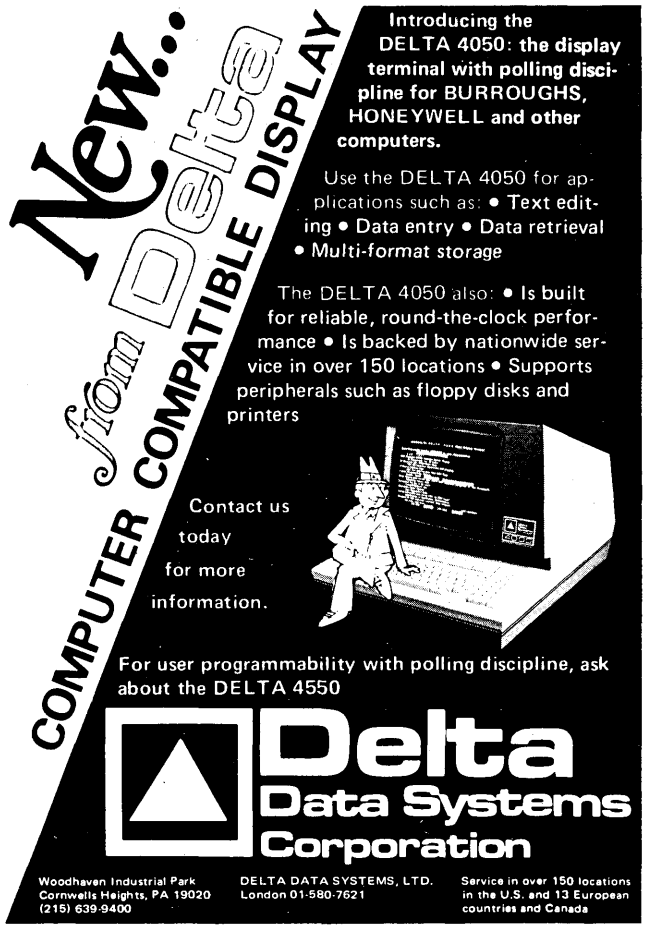

CIRCLE 91 ON READER CARD

Carter is serious about reorganizing government," he explains. "And if he does what Democrats traditionally do—try to use government more effectively—he will probably want to see the executive play a bigger role." This could be "healthy," Eger believes. "Carter could beef up OTP or create a department or independent agency with teeth," he speculates.

Sources close to the Carter team seem to back up Eger's contentions. A telecommunications authority, operating as a department or agency, they claim, will be set up during the next year. During his campaign, Carter evinced considerable interest in these issues, speaking out several times on the Consumer Communications Reform Act (Bell bill) and on the Justice-AT&T antitrust suit, which he apparently intends to support. As further evidence of his communications involvement, he also looked into setting up a communications policy task force in the early days of his campaign.

Procompetitive bill

While Carter has attempted to meet some of the tougher telecommunications issues head-on, President Ford, who has historically taken a lower key approach to these questions, has chosen to pursue the broader problem of regulatory reform. As a member of the President's Ad Hoc Committee on Regulatory Reform, Eger had proposed four pieces of communications legislation which he aggressively tried to get the White House to promote.

JOHN EGER

One of these bills, called the Common Carrier Competition Act, Eger characterizes as a "procompetitive bill," which he admits "is outdated as I look at it today."

The basic thrust of this measure, he explains, was centered around the theory that "monopoly could co-exist with markets for competition." According to Eger, the bill was designed to: deal with the state-federal jurisdictional questions through a supremacy clause; take the regulatory load off certain classes of carriers; and ease the burden of entry in the computer communications field by writing in a marketplace presumption to entry.

But despite Eger's valiant efforts, the bill never got out of the committee. The group, he reveals, "rejected it because it was too early in the year (1975) and too complicated." What he doesn't say is that it was also too controversial to handle so close to an election year.

Bell's reaction

Bell knew this all too well. Catching wind of Eger's proposal, AT&T began to brainstorm its own bill. A tremendous lobbying effort was then set into motion directed at Congress and the White House, as well as all the federal agencies. The White House tactics were perhaps the most interesting, if not the most significant, since they reportedly involved none other than AT&T board chairman John deButts and AT&T vice chairman William Ellinghaus.

On AT&T's White House campaign, Eger ironically quips that "obviously Bell had made their points well. They

CIRCLE 92 ON READER CARD

CIRCLE 93 ON READER CARD

sold their case," he adds, "at every level of government. This is one of their biggest advantages. They have dealt with the government for a long time and nobody understands the structure of government better than AT&T."

However, one of the agencies Ma Bell didn't dare approach was OTP. "Bell gave up right from the start," he says, "with pressuring OTP. They knew that we had our hearts set on competition. So the only way to soften that blow," he reveals, "was for them to check OTP at the Office of Management and Budget, the White House and other agencies to spur the fighting between us."

And it couldn't have worked better. If anybody knows this it's John Eger. Always outspoken and ever-ready to tackle the most complex communications questions, Eger felt he had to counter Bell's moves by taking a strong stand against the competition-thwarting legislation.

Last spring, he vainly tried to rally Oval Office support for his stand. "What I was really trying to do as much as I was trying to get them to oppose the Bell bill," he explains plaintively, "was to get them to adopt the OTP bill—the Common Carrier Competition Act." He failed dismally on both counts.

Trying to save face, he remarks, "I have said publicly that even though I privately thought that I'd like to see the President oppose it (the Bell bill), I knew that for political reasons there was no necessity yet for him to do so. I knew the legislation wasn't going to pass this year."

Houser in the wings

But what he may or may not have known was that the White House, fed up with their Peck's bad boy, already had his replacement waiting in the wings even before he made what turned out to be his final official public pronouncements on the bill. Government sources claim that that replacement, new OTP director Thomas J. Houser, was an early-on White House favorite, having been hand-picked by top AT&Ters close to the chief executive and his coterie of advisers.

"I kind of knew the White House was looking," Eger now sheepishly admits. "I was physically and emotionally drained. I helped them (the White House) define what they needed and did some leg work for Houser. I wanted to get out of there. It was time for me to get out. Some people might say I got pushed, eased out. But I was ready to be eased. It was mutual."

Mutual or not, Eger resigned from OTP early last summer. But not before sounding a sharply-worded warning against the Bell bill. In his June 3 address in Hyannis, Mass., before the Electronic Industries Assn., the competition enthusiast blasted the legislation, calling it a superficially appealing, deceptive and beguilingly titled bill that "will serve more to retard consumer communications than to reform it."

In that speech, Eger's, if not the Administration's, message was clear. "To propose that the development of telecommunications might best be served by a single vested interest, free to regulate the pace of technological growth, and unencumbered by the stimulating effect of aggressive competition is, in my judgment, sheer folly."

When Eger was running the show at the telecommunications office, "there were regular (OTP-Justice) consultations," he confides. "It was no secret," he says, "that it (the AT&T antitrust case) was a subject of considerable concern. It's natural to have a dialogue."

Hoping to stimulate such a dialogue on another level on other telecommunications matters, the ex-bureaucrat continues to speak out on the issues. In trying to psych out Bell's game plan, Eger

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lays out what he believes will be "the next stage of a possible AT&T scenario." Calling the Bell booster bill "a red herring," he claims that in the next phase of AT&T's strategy they will "try to push something similar through the Senate. If that fails," he predicts AT&T will "try to work on the banking committee for an electronic funds transfer system (EFTS) bill. They could also work on the agriculture committee for a rural telecommunications bill or on the government operations committee to try to restructure the government."

Another possible Congressional target is the armed services committee. "Bell certainly can make some very convincing arguments for the need for end-to-end security," he notes.

Bell can't lose

Even if they continue plugging their original bill, Eger feels "Bell can't lose. They can get their legislation passed and get everything. If they can get one of the provisions passed, even the findings . . . that will result in the same thing." A resolution, which Eger says would just extend the timetable, could also prove advantageous to Bell.

"It's a no lose situation for Bell," he reiterates. "They're gonna get ya. They are a big gigantic corporation with tremendous resources that's decided it doesn't like competition." And they're also a big gigantic corporation that's totally committed to getting its way.

Eger fears that the cost to combat Bell will be monumental. It's going to cost us millions and millions, if not billions of dollars in resources," he predicts, "fighting this attempt by Bell to reaffirm its monopoly, not just over the telephone network, but over all future communications which involves the entire computer and data processing industry. It's a fight," he warns, "that Bell intends on pursuing with all of its strength, all of its resources and with all of its knowledge of government and other industries."

Computer inquiry

Eger also worries that the company, working through the FCC's reopened computer inquiry, could get the upper hand. A redefinition of data communications, he insists, "would do nothing but enhance the telephone company's position . . . bringing over time an industry that's healthy and viable and alive and unfettered into that murky, gloppy and monopolistic regulated environment."

The threat is real, and should especially be heeded by the dp industry, he warns. If Congress fails to act and Justice reneges by not forcing a restructuring "then the strongest implications for the rest of the data processing industry are that everything, every product, every service will be regulated. For the user that will mean very little choice. And it's the users and the public who will be the big losers."

Most of Eger's prognostications center around these big losers—the consumers—and the big winners—the corporate behemoth, AT&T. While his predictions on the outcome in this fight to the finish are gloomy, his own personal outlook is optimistic.

Now, after six months of isolation from the bureaucratic mainstream, Eger claims he can look back at his trials and tribulations at OTP and be more objective. And a little bit sorry too. Sorry that he's not in on all the action now that the controversy over these telecommunications issues has really started to heat up.

"I would be naive to say that I didn't have any regrets," he admits candidly. "But I don't feel that I'm out of it completely. I'm still given a platform to speak. Maybe it's not the spotlight but I had that and I don't need that anymore. I spoke my piece—I laid out what I thought were reasonable approaches to solving the problems. So the best thing I can do now is try to contribute by continuing to be a responsible spokesman, calling the shots as I see them."

—L.F.

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The advantage: I&SE experience. I&SE computer service engineers are systems oriented. They're experts at making your entire system work, including the computer.

For full information, phone I&SE's Manager-Computer Service, (602) 264-1751, or write General Electric Co., Section 950-17, Schenectady, New York 12345.

Who's maintaining your computer system?

*INSTALLATION AND SERVICE ENGINEERING DIVISION

GENERAL ELECTRIC

BENCHMARKS

Justice Dept. vs. Bell: A major antitrust case brought by the Justice Dept. against American Telephone and Telegraph Co. has been given the go-ahead after being filed two years ago on Nov. 20, 1974. Federal District Judge Joseph C. Waddy has ruled against an AT&T contention that the Federal Communications Commission has jurisdiction over issues raised in the suit and that it should be dismissed. The judge said his court holds jurisdiction and thus gave the Justice Dept.'s antitrust division the go-ahead to begin years and year of pre-trial work. In its suit, the department seeks to force AT&T to divest itself of Western Electric Co., its manufacturing arm, and of its Long Lines Department, which handles long distance service. In its initial request for AT&T documents in January 1975, the Justice Dept. asked for every piece of paper in the Bell System's possession that was "prepared, sent or received since Jan. 1, 1930," that relates to the issues.

deButts on Bell Bill: AT&T Chairman John D. deButts explained the other day what he feels is the purpose of such legislative activity in Congress as the Consumer Communications Reform Act. In a talk to the Telephone Pioneers of America, deButts said that "accumulating FCC decisions—each arrived at piecemeal but all trending in the same direction—might so thoroughly supplant the principles on which our business is based that we ourselves might have no other choice . . . than to set a different course for ourselves." He said he wanted Congress to decide what "the American people expect of us." He feels that course might be to realign its rates, limit its service responsibility as more and more non-Bell terminals are attached to its lines, and change its R&D priorities, giving more response to competitive pressure points and "relatively less to fundamental systemic improvements of advantage to our entire customer body." He told the meeting that this is what he "might have said" in recent testimony before the House Interstate & Foreign Commerce communications subsidiary, but didn't.

Another Voice in Washington: The Data Processing Management Assn. will open an office in Washington, D.C. in mid-1977 "to give the association a direct line to dp-oriented developments and legislative initiatives originating on Capitol Hill or with any regulatory agencies." DPMA president J. Ralph Leatherman said, "If any legislation is passed, it is less likely to be inconsistent with the needs and aims of the information systems profession." He said it will coordinate with the activities of the Washington office of the American Federation of Information Processing Societies of which DPMA is a member. The association hopes to have selected someone to run the office in early 1977.

Another Carrier: Graphnet Systems, Inc. received Federal Communications Commission approval to launch a data transmission service by leasing 131 circuits from other carriers to create the network. Initially it will be offered in 29 of 50 cities where the company already operates a facsimile transmission service. The company told the FCC it expects to spend about $500,000 a year on leasing costs and that its investment in related equipment will be about $3.3 million over three years. Western Union opposed the application.

Must Improve Service: Canadian remote computer service firms who wish to remain viable will have to incur heavy expenses to improve services, says a study released by Frost & Sullivan, Inc., New York City market research firm. "And such investments will have to be made during an unfavorable market phase ahead," the study says. "Competition from the minicomputer will become significant, and other vendors especially insurance companies are invading the RCS field. The beginnings of a full-blown price war are evident." The study indicates that revenues generated by remote computer services in Canada, at $60 million in 1975, will reach nearly $360 million by 1984, an annual growth rate at more than 21%. But, it indicates that profitability will not parallel the revenue growth.

High Rating for DEC: Users of Digital Equipment Corp.'s large scale computers expressed a higher level of overall satisfaction than the users of any other make of general purpose computers in a survey by Datapro Research Corp. of Delran, N. J. It was the third consecutive year that DEC had placed highest in the survey, which this year involved 1,765 users who operate a total of 2,095 systems, including those of Xerox, Amdahl, IBM, Univac, Burroughs, Control Data, Honeywell and NCR, which placed in that order. In another survey, Datapro found that Data 100 Corp.'s remote batch terminals rated highest in overall performance, followed by those of Computer Machinery, IBM and Sycor. The terminals study drew responses from 250 users who have a total of 1,771 installed batch terminals. The complete survey results, which are published in the November supplement of Datapro 70, are available separately under the titles of User Ratings of General Purpose Computer Systems, and All About Remote Batch Terminals, at $12 per copy, from Datapro, 1805 Underwood Blvd., Delran, N.J. 08075.

Components Firms Merge: Intersil merged with Advanced Memory Systems Inc. in early November, creating a formidable semiconductor manufacturing organization with combined revenues of $72.9 million. The new company will be known as Intersil, Inc. and Intersil's president Orion L. Hoch will be president and chief executive officer. Other directors: Frederick R. Adler, Paul Bancroft III, Robert J. Emmons, Christopher D. Illick and Kenneth J. Thornhill.

Quadrupled Earnings: Applied Data Research Inc., Princeton, N.J. software firm set a revenue record of $3.9 billion in its third quarter this year, up from $2.9 billion a year before. John R. Bennett, president, said income in the third period nearly quadrupled to about $375,000 or 30 cents a share from the 1975 period's $97,734 or eight cents a share. Bennett said the record profit included some $235,000 or 20 cents a share, from continuing operations of the business and $140,000 or 10 cents a share, from a tax loss carry forward.

But No Trophy: Data General shocked Interdata 38-6 to win the third annual Data Bowl flag football game last Nov. 6 at Westboro, Mass. In 1974 and 1975, Interdata defeated its northern rivals 19-12 and 14-6 in the annual classic which features Interdata's twirlers, a color guard, the famed "Drum, Stumble and Bugle Corps," the "Marching Kazoos" and Data General's St. Bernard mascot, Heather. Plus copious quaffing, which led Interdata coach Don Reinhart to explain that his opponents, being the home team, had not partied as heavily as his team. He said, "our players' hands were still shaking during the first half," when Data General took a 32-0 lead. Defensive and offensive stars of the game were Mike Boucher, 6'6" and 230 pounds, and Gary Innamorati, playing his first bowl game, both from Data General. During a post-game party a van belonging to Data General's Skip Stiles was stolen. It contained souvenir Data Bowl mugs and the Data Bowl trophy, which will be replaced. ❋

"We're doing a bigger job with four programmers than we used to with 16!"

By Jim Flynn
Vice President
Administrative Services
McCulloch Properties Inc.
Fountain Hills, Arizona

"We had 1000 programs in a system that was trying to maintain 128 files daily. It was almost unmanageable.

"Our workload had grown to include the servicing of 68,000 installment contracts, maintaining a land inventory of 70,000 parcels, and paying commissions to 1000 salesmen.

"We didn't bother to estimate a new system in Cobol; we knew we couldn't afford it. And the packaged solutions were only piecemeal. We turned to MARK IV.

"With six people and MARK IV we developed a major new system in 18 months—and it's fantastic. It does everything from evaluating salesman effectiveness to paying water bills. It lets users develop their own requests. It provides daily data validation, daily updates, daily reporting and other-period reporting. It permits interrogation on the status of a contract, a salesman record or a lot. In its response to changes or to one-time requests for management information, it's extraordinary.

"We now have three data bases—land inventory, salesmen and contracts—and these four basic application modules:

1. Installment contracts, involving all processing for contract set-up, payment and adjustment application, delinquency and dunning reporting, factoring or contract pledging, and management reporting.
2. Commission payments, covering salesmen's commissions payable and maintenance of salesmen's accounts receivable.
3. Controlling and accounting for land inventory from the time a project is recorded to the sale and deeding of the last lot.
4. Computing of all resultant accounting entries on an installment or accrual basis.

"Now we're doing a bigger job with four programmers than we used to with 16, and the problems we had with the old system are gone."

WHAT IS MARK IV?

MARK IV is the most versatile and widely used software product in the world for application implementation, data management and information processing. Six powerful models (prices start at $12,000) are in daily use on IBM 360/370, Univac 70/90, Siemens 4004 and Amdahl 470 equipment at 1000 sites in 42 countries. Programs in MARK IV require only about 1/10 the statements of Cobol. Users say no other system offers the power, flexibility and simplicity of MARK IV.

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LOOK AHEAD

(Continued from page 18)

BIGGEST COMPUTER SHOW IN HISTORY

Where else but in Texas would you see the biggest computer show in history? That's what AFIPS officials are saying about the National Computer Conference next June 13-16 at the Dallas Convention Center where 250 companies already have purchased 1,060 exhibit booths. That's well ahead of the 943 booths sold last summer at the NCC in New York and the 990 booths at the largest affair to date--the Fall Joint Computer Conference in Las Vegas in 1969. In addition, with the growing interest in personal computers, a commercial exhibit for persons selling to that market also will be held in the vast convention center. It's the complement to a personal computing fair that is being held as part of the 1977 NCC.

Nobody's guessing at the turnout--but it could be big. Dallas, it's noted, is third in the nation in numbers of corporate headquarters, after New York and Chicago. That should provide a large--or at least high quality--turnout to the show and conference.

FOR THE SMALL GUYS

A new California trade organization called the Electronic Assn. of California, staffed by a number of former WEMA executives is definitely non-competitive with WEMA, a 33-year old association of 750 companies, said its president, James Conway, formerly a WEMA vp and Eben Tisdale, formerly vice president, governmental affairs for WEMA and a legislative consultant to the new group. Both men emphasized that the new association is aimed at small companies, generally with fewer than 500 employees. It will offer such services as a credit union, group insurance, and a news letter which many of the big companies which belong to WEMA don't need. Tisdale said he will concentrate on exploring legislation which might affect member firms on the state and local levels.

NBS MAY BE TARGET OF GAO STANDARDS STUDY

Fed up with the government's snail's pace progress in dp standards development, a fleet of auditors at the General Accounting Office has been conducting a major probe into the standards making process. Underway since last June, the study has been looking into the problems federal standards setters are having in getting hardware and software standards out on a timely and enforceable basis.

When presented to Congress early next year, the GAO recommendations may call for a revamping of the supervisory role traditionally held by the National Bureau of Standards. It also has zeroed in on the American National Standards Institute and the Computer and Business Equipment Manufacturers Association. But much of the fingerpointing will be in the direction of the National Bureau of Standards which has been a prime target of criticism for its lethargic standards activity.

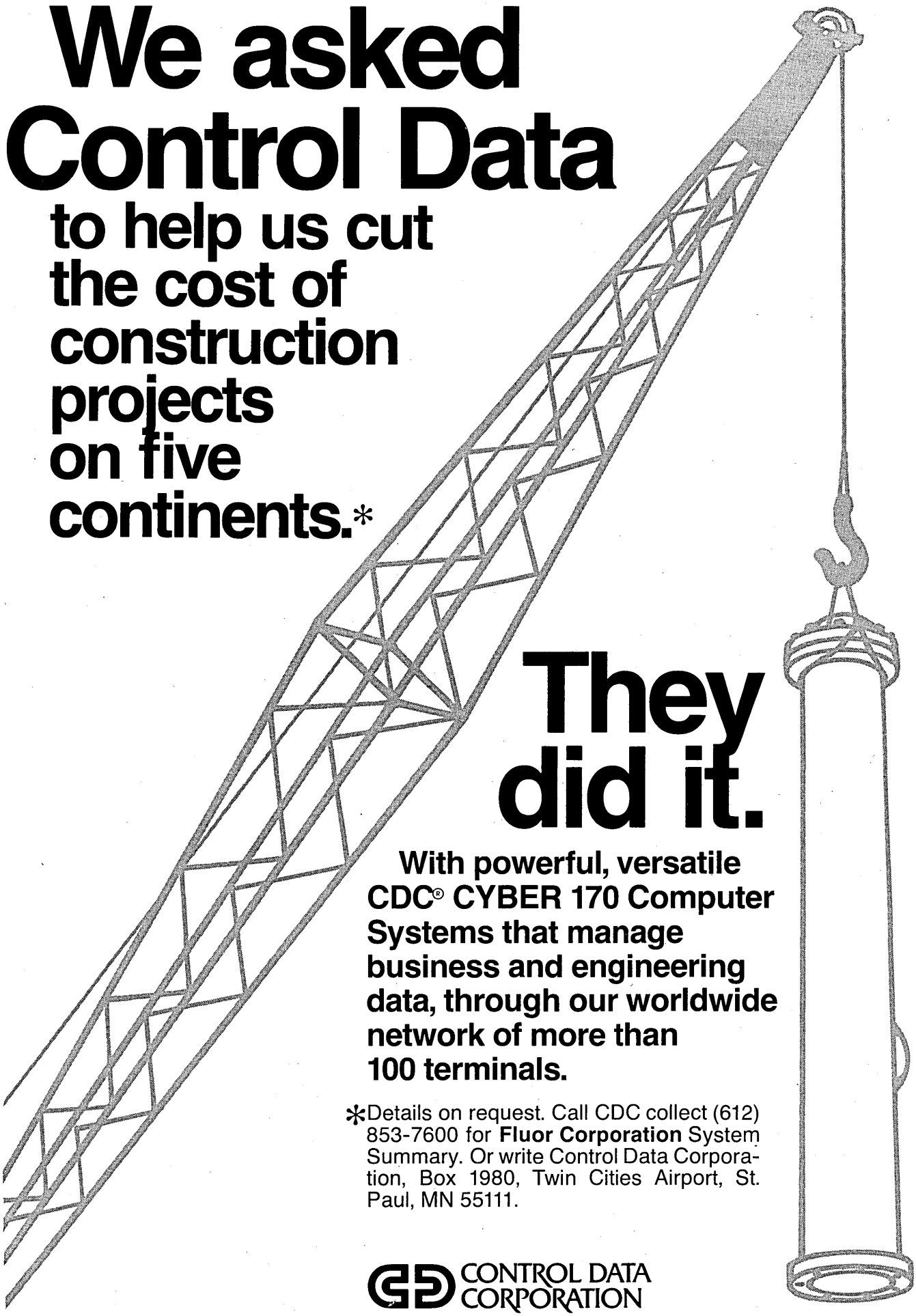
NBS was blasted in a recent report released by the house government operations committee. Pointing to the agency's unsuccessful ten-year effort to develop input/output interface standards, the committee charged that this "dramatic example" of NBS failure in the standards area has hobbled competition and diminished cost savings in federal dp equipment buys.

RUMORS AND RAW RANDOM DATA

Rosebud is the code name for IBM's modified version of Carnation--the 3750 private automatic branch exchange (PABX) marketed in Europe. Rosebud, we hear, could be announced the first quarter of 1977. Competitors still doubt IBM wants to lock horns with AT&T and say that anything announced had better be better than Carnation, which is expensive, aging and doesn't smell so good...Gulliver Technology Corp., Santa Monica, Calif., was late but still first in delivering a non-IBM tape drive with 6250 bpi capability. The first drive was delivered last month to Telefile Computer Products...Data Card Corp. of Minneapolis next month will announce a credit card embossing machine for smaller users--a 400 cards an hour machine that allows users to both emboss and encode at the same time and takes input from a keyboard or 1600 bpi tape. The company makes large machines for big users, but the new unit--the 4000--is the first for smaller users and may sell in the $40,000 price range...IBM in January will discontinue its applications customizer program for System/3 users after deciding that most first-time users now buy the System 32, for which the company provides industry application programs...How does one computernik look at slot machines? Charles P. Lecht, president of Advanced Computer Techniques Corp., New York, described them to a Las Vegas computer conference as "those machines that tell you to insert coin and then reply with 'coin accepted'".

We asked Control Data

to help us cut the cost of construction projects on five continents.*



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CONTROL DATA CORPORATION

hardware

Off-line

Something like the "tattletale" needle installed on race car tachometers to indicate to designers and mechanics how fast the driver really revved the engine, Media Recovery, Inc., of Fraham, Texas has introduced "Shockwatch." It's a little impact recorder for use on disc cartridges that changes colors to indicate whether the disc has been subjected to a mechanical shock or force great enough to cause a malfunction. Burroughs liked the idea so much that it now attaches them to all B9385-3 cartridges.

Lear Siegler has already shipped more than 200 kits to build its ADM-3 crt terminal since entering the computer hobbyist market just six months ago. Other interesting numbers this month: Qume Corp. has shipped its 10,000th daisy-wheel character printer, and Dutch electronics giant Philips has manufactured its 10 millionth mini-cassette dictation cartridge at its Vienna, Austria factory.

Does anyone out there manufacture a device capable of converting digital information from 1/4-inch Philips-type (ANSI standard X3BS/-75-43) cassettes to 9-track 800 on 1600 bpi tape format? If you know of one, you could do John Neal of Control Products, Inc., East Hanover, N.J. (201) 887-9400 a big favor by apprising him of the source or sources.

Do sarcastic fringeheads mind swimming in coastal waters heated to above normal temperatures by nuclear powerplants? According

to the Southern California Edison Company's marine laboratory, a 370/168 was used to help show that sarcastics and other marine life not only do not mind the warmer water, they actually thrive in it.

EFTS Kit

Kits are all the rage among the microcomputer crowd, but now this manufacturer is offering a kit to the banking industry to help them get started in creating electronic funds transfer systems (EFTS). The kit is based on the recently introduced FT-32 financial terminal, and you get 20 of them, complete with integrated 1200 baud modems, card reader and PIN-Pad, and one RC-1500 concentrator/controller configured for two phone lines and connection to a host computer. The FT-32 is said to be simple to install and only requires a telephone drop line. Up to four FT-32s can be clustered on a single telephone drop line. Communication to the host cpu is by standard asynchronous (IBM 2858/2260 and NCR 795/720) or bisynchronous (IBM 3270) protocols. The all-inclusive price for the EFTS-32 Pilot System are $30K for the asynchronous version, and $35K for the bisynchronous model. Deliveries begin early next year. DATATROL INC., Hudson, Mass.

FOR DATA CIRCLE 227 ON READER CARD

Word Processing

This firm may not ever be one of the acknowledged heavyweights in the word processing business, but it certainly is on the right track, considering that it has managed to crack the $10K or less per station level that is required to compete with the likes of Wang Labs. The System I is a single-station unit containing a single diskette capable of storing up to 50 pages of text, a 16-line page oriented video display, and a bidirectional 30 cps printer. Material entered on the display can be printed out while the operator is typing in new material. Information on the diskette can be instantly accessed for insertion and deletion operations. Additional features include automatic carrier return, super and subscripts, simplified repagination, document assembly capability, and an extended processing package that includes automatic centering, decimal tabulation, stop and switch codes, etc.

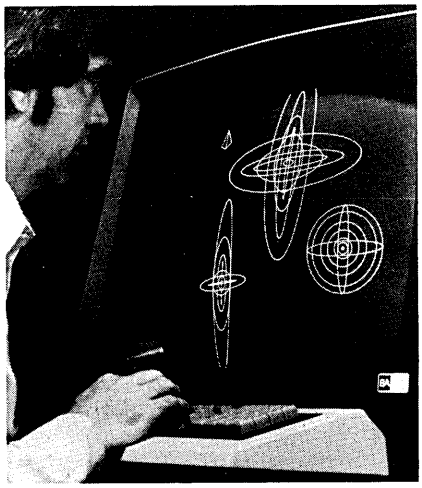
The developers, out of Xerox and Storage Technology Corp., already have offices in Washington, Chicago, San Francisco and Denver, and representation in Memphis, Seattle, Albuquerque, Salt Lake City, and Portland. They claim to have enough venture capital behind them so that staying power is not a major concern, so maybe we're witnessing a new major vendor on the rise. System I is priced at $9,990. The extended word processing option goes for $1,300. NBI, INC., Boulder, Colo.

FOR DATA CIRCLE 229 ON READER CARD

Graphics System

Users couldn't have a wider choice of functions than with the GRAPHIC 7, for the graphics device can be used as a complete standalone system one minute, and as a powerful graphics terminal the next. The RS-232 communications interface makes it compatible with most computers, and if higher speeds are required, a high-speed parallel interface can be fitted. The basic system comprises a 21-inch crt display, terminal controller, and I/O devices such as keyboard, lightpen, and trackball. A read-only memory in the controller contains the Graphic Control Program for handling communications and controlling data entry devices.

Two microprocessors cooperate to tie the package together. The display processor is a general-purpose unit that



operates on 8-bit bytes or 16-bit words, has eight g-p registers, and an 8K 16-bit read/write memory, expandable in 8K increments. The graphic controller uses a 16-bit parallel microprocessor with 40 display instructions, 13 display registers, and four g-p registers. The refresh rates are 60, 40, and 30 Hz. One nice feature of the 7 is a one-button initialize feature that automatically readies the system and allows the operator to immediately communicate with either the host computer or the GRAPHIC 7. Also included are automatic self-test and diagnostics for fault isolation. The product is offered both to oem's and end users, with prices starting at $32,800. SANDERS ASSOCIATES, INC., Nashua, N.H.

FOR DATA CIRCLE 228 ON READER CARD

Isn't MVS marvelous?

Its System Resource Manager (SRM) maximizes the use of hardware based on CPU load, I/O load and performance characteristics of each job.

Unfortunately, SRM makes decisions based on the system's needs, not necessarily yours.

The system may be sluggish because it has run out of page frames, auxiliary storage or a job has gone into loop. Up until now there was no way to find the problem and take corrective action.

Or your most time-critical job may be permanently swapped out of memory and you'd never know it. Even if you did know there's nothing you could do about it.

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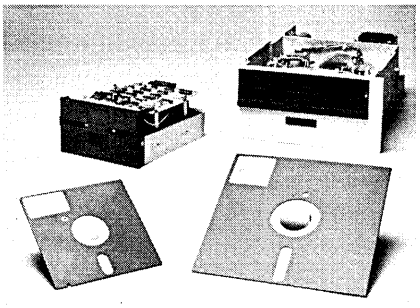
hardware

Mini Floppy Disc

One of the design variations mentioned as a possibility when the original flexible disc unit was introduced by IBM has finally been announced. The SA400 minifloppy disc drive is roughly one-half the size of the standard unit and stores approximately one-third the amount of information. Specific capacities are 89.6 kilobytes formatted and 109.4 kilobytes unformatted. The transfer rate for the SA400 is 125 kilobits/second, and the designers are claiming one in 10^8 soft errors and one in 10^{11} hard errors, which is impressive. The cabinet measurements are



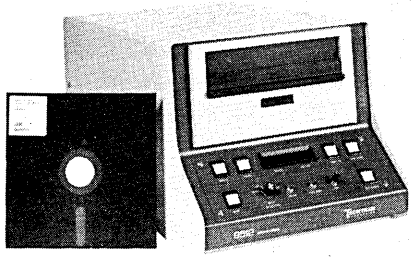
The new SA400 minifloppy and storage medium (left) are compared with the standard size storage components.

3.25 x 5.75 x 8 inches (H x W x D) meaning that it will be easy for product designers to tuck a few of these things into upcoming terminal or associated dp products. A controller for the SA400 was also announced, capable of controlling up to three drives. Single units go for $390, large quantity orders drops the price to around $250 each, and a box of 10 minidiskettes is priced at $45. Deliveries are underway. SHUGART ASSOCIATES, Sunnyvale, Calif.

FOR DATA CIRCLE 230 ON READER CARD

Floppy Disc Systems

The 9512 desk top flexible disc system is really a terminal that features the ability to store, rapidly retrieve, and edit recorded data. Removable media



are used, each with a capacity of 250,000 characters, thus making the 9512 a very low cost on- and off-line storage device. Off-line it can be used for data entry and file retrieval/update, and on-line it's a terminal, with any remote cpu handling all I/O operations and editing functions through an RS-232 interface. Dual connectors are included to facilitate interface to other terminals, minis, modems, or time-sharing systems. The switch selectable data rates range from 110 to 9,600 baud. Additional standard features include track and sector address, high-speed search string, bidirectional skip, selectable stop codes, data editing, etc. It's priced at $2,595. TECHTRAN INDUSTRIES, INC., Rochester, N.Y.

FOR DATA CIRCLE 232 ON READER CARD

$995 Computer

The Sol-20 is one of the more nicely packaged microcomputers introduced to date, and its developers have been smart, we think, to include a standard keyboard into the design to make access to the system easier for non-dp oriented users. It's available in kit form or assembled and includes an Intel 8080 microprocessor, 1K character video display circuit, 1K words of random access memory, 1K words of preprogrammed PROM and a customized 85-key solid-state keyboard. Additional features are an audio cassette interface capable of controlling two recorders at 1200 baud rates, parallel and serial standardized interfaces, a power supply/fan, and cabinet.

Software includes a PROM "personality module" to tailor the machine for specific applications, and a cassette with the high-level BASIC-5 language, plus two video games. It should be remembered as well that there's more software floating around the microcomputer community that runs on the

product spotlight

Data Entry/Management

Not many people knew it, but before the name change to Pertec Computer Corp., Pertec did a good business in manufacturing and shipping data entry systems to both Univac and Scan Data on an oem basis. That's why many people couldn't understand the firm's recent acquisition of Computer Machinery Corp., since the product lines were so similar. It turns out that Ryal Poppa, Pertec president, thought a lot of CMC's sales force, but he wanted them to sell what Pertec had on the drawing boards to the end user market.

What was on the drawing boards was the DREAM Machine, or the XL40. DREAM is an acronym for data retrieval, entry, and management. It was clear that some fundamental advance had to be made in the capabilities of data entry devices, and the XL40 certainly has them. It performs conventional data entry, but in addition, data management and file management functions can also be performed. A new retrieval package called COSAM (COBOL Shared Access Method) permits operators to retrieve files and update records, create parallel but separate transaction files, etc. To keep things moving along, a new tree index structure, IDAM, shortens the time required to access data from disc by going straight to the applicable record.

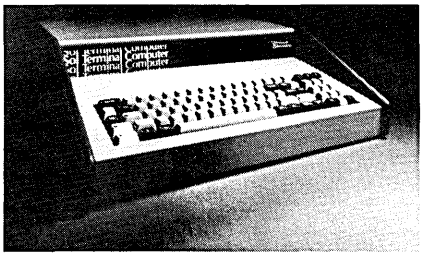
Up to seven keystations are supported by the XL40 with a choice of either keypunch-style or typewriter-style keyboards, and disc capacity is expandable from 4.4 to 35.2 megabytes. Heavy use of microprocessors in the peripheral controllers will make it possible to incorporate IBM's SDLC protocol into the XL40 when the customer requires it. The controller, called the Micro Control Unit (MCU), is a 64K 16-bit semiconductor memory machine for executing an ANSI COBOL instruction subset and the XL/05 operating system for foreground and background control of data entry activity. The multitasking OS controls multiple data entry editing and supervisory control/monitoring while simultaneously overseeing background job stream processing. Password protectors are also part of the XL40.

The manufacturer will concentrate on selling XL40s at the corporate level of relatively large users interested in distributed processing applications. For the time being, sales will be limited to the U.S. and Canada.

A system with five keypunch-style keyboards and 4.4 megabytes of disc capacity leases for $975/month. PERTEC COMPUTER CORP., CMC DIV., Los Angeles, Calif.

FOR DATA CIRCLE 226 ON READER CARD

8080 cpu than for any other microprocessor, so getting the Sol-20 to do what you want shouldn't be a major problem. The pc-form kit for the cpu is available separately for $475. Options



include additional memory, interface expansion, variable communication rates, peripherals, etc. PROCESSOR TECHNOLOGY CORP., Emeryville, Calif.
FOR DATA CIRCLE 231 ON READER CARD

Data Entry

The model 700 key-to-diskette device is priced to compete against the IBM 3741/3742 and is functionally equivalent. Designed for use in centralized, decentralized and remote teleprocessing environments, the 700 is offered in two versions, the 701, a single station unit which can be upgraded to a dual station model 702 by adding a second diskette, keyboard, and tabletop. The two units generate and read IBM-compatible cassettes. One nice feature of

the 700 series is that the operator's crt display is directly above the work area instead of being placed off to one side as on the IBM unit. The crt displays a full 128-character record, eliminating scrolling, and six 40-character lines per operator on both the single and dual station models provide prompting. Model 701s are priced at $4,950; model 702s go for $6,160. TAB PRODUCTS CO., Palo Alto, Calif.
FOR DATA CIRCLE 233 ON READER CARD

$5 Computer

It's just a microprocessor chip, and the design is identical to its siblings, the only real physical difference being its plastic packaging, but we just couldn't let Intel's announcement of 4-bit microprocessors for as little as $5 (in orders of 100 and up) go unnoticed. The products are called the P4004 and the P4040 (which will cost you an additional 50¢ each in the same quantities). Systems houses will want to know that the packaging is molded epoxy dual in-line with the P4040 contained in a 24-pin package and the P4004 in a 16-pin configuration. This makes it possible for Intel to offer MCS-40 microcomputer systems complete with cpu, clock generator, memory and I/O for about $19.25 in 100-up quantities. Maybe the price of microprocessor-controlled sewing machines will drop as a result of all this and every family will be able to afford one. INTEL CORP., Santa Clara, Calif.
FOR DATA CIRCLE 234 ON READER CARD

School/College Computer

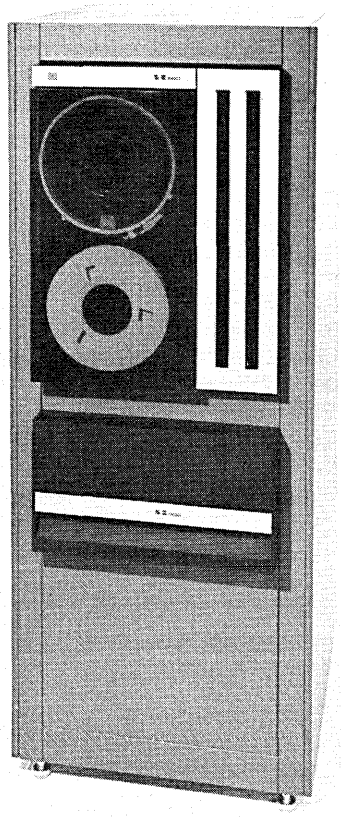
There is absolutely a gaggle of companies preparing for, or in the process of, an attack on the school/college/university market with products incorporating microcomputers, but it would certainly seem that NCR might do well in this market simply because it's so much larger than many of the little firms attempting the task.

The 7200 model VI is what will be used to mount the attack. It includes a microprocessor with 24K bytes of random access memory, of which 4K bytes are used for problem programs. The 7200 features a 9-inch visual display, alphanumeric and numeric keyboards, and a magnetic cassette recorder for storage and retrieval. The option list reveals that a second recorder is available as an option, so conceivably students could busy themselves writing sorts. Programming is done with a special version of BASIC, and there are a goodly number of programs (more than 100) in the NCR BASIC library, including computer science applications, and problem-solving applications for other disciplines. In addition to educational applications, the marketing staff wishes to point out that the unit can also be used in a number of financial and engineering applications. For $6,995 the buyer gets the microcomputer, a reference manual, operator's handbook, BASIC library catalogue, and one-time software license charge. NCR CORP., Dayton, Ohio.
FOR DATA CIRCLE 235 ON READER CARD

6250 bpi Tape Drive

With the level of performance offered by some of the newer minicomputer systems, such as DEC's PDP-11/70, Data General's Eclipse series, and others, we're a little surprised manufacturers haven't offered higher performance tape drives on their systems. After all, even discs can't beat tape drives at sequential file processing, and that's how most files are organized. (Maybe it's a conspiracy so the manufacturers can sell us faster cpu's!)

At any rate, such high performance systems that are used on large scale mainframes are now available for manufacturers and systems houses on an oem basis from STC, a first for the company. The 1900 tape subsystem operates at 75 ips at two densities (1600 phase-encoded and 6250 group coded recording). The transfer rate at the lower density is 120 KB/second, which looks like normal mini rations, but the



transfer rate jumps up to 470 KB/second at the featured density. Up to four transports can be radially connected with the combination formatter/controller. Typical oem pricing at the 100 quantity level is $6,400 each for manual loading units, or $6,800 each for automatic threaders. The formatter/controller sells for $6,580 at the same quantity. First deliveries are slated for next May. STORAGE TECHNOLOGY CORP., Louisville, Colo.
FOR DATA CIRCLE 236 ON READER CARD

Solar-powered Calculator

Why not? Just about everything else has been done with calculators, so maybe the world is ready for a solar-powered, 8-digit, wallet-sized calculator. The Solar I operates without conventional batteries and recharges itself automatically whenever exposed to artificial light or sunlight. An array of

hardware

46 miniature solar cells on the surface of the calculator accomplish the recharging function. Included in the design are signs for memory usage, minus indication and capacity overflow. Additional features include an independent memory register, full floating decimal, automatic square root, automatic constant, change sign key, percent, add-on/discount functions, and the ability to beam back on board the starship Enterprise. The Solar I is priced at $99.95. LITTON INDUSTRIES, Beverly Hills, Calif.

FOR DATA CIRCLE 237 ON READER CARD

370/158 Attached Processor

IBM isn't about to let Itel and Amdahl swipe the bread and butter portion of its installed base without a fight. As the first card played after Itel's Advanced System announcement, IBM has announced an attached processor system for the 370/158 that provides somewhere between 1.5 and 1.8 of the internal performance of the single processor system. The Attached Processor System (APS) can be ordered on new systems or installed in customer locations starting next summer. In addition, IBM has upped the main storage capacity of the 158 to six megabytes, an increase of 50%.

The APS processor unit is designated the 3052, and its function is to share computing, I/O capability, and all of main storage with the host cpu. The price for the performance increase seems reasonable enough: as little as $14,935 on monthly rental, or $452,500 on purchase to nearly double the power of the machine. Monthly rental for an APS out of the box ranges from $52,965 with the minimum memory size (512K) to $92,205 with six megabytes. IBM CORP., White Plains, N.Y.

FOR DATA CIRCLE 238 ON READER CARD

Seismic Processing

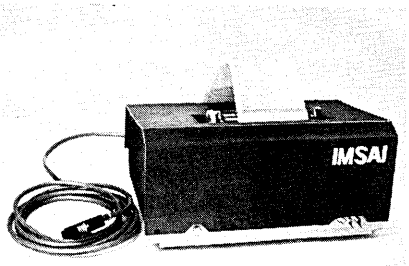
One has to give IBM credit where credit is due. Gray Giant ventured down to the 46th annual international meeting of the Society of Exploration Geophysicists in Houston, Texas in late October to announce the 3838 array processor—right in the back yard of Texas Instruments, which prides itself on its long history of computing products for the seismic processing industry. There's a small catch regarding the 3838: it operates in parallel with a 370/158 or model 168 which, if you don't have one, will set you back something over $1 million. Then you can start thinking about the $17,875 monthly payment for a 256K model 1 3838. But if you're looking for oil you probably have some money already.

The processor contains a standard set of more than 50 specific instructions, including arithmetic procedures (algorithms), and logical instructions for reducing the data. One of the most fundamental operations in seismic data processing is the Fast Fourier Transform, which is accomplished by the 3838 in 2.95 msec for 1K points. Computing is single-precision floating point. First shipments are scheduled for the fourth quarter of 1977. IBM CORP., White Plains, N.Y.

FOR DATA CIRCLE 239 ON READER CARD

Dot-matrix Printer

Available just in time for Christmas is a 44-column dot-matrix printer that is



really offered for this manufacturer's IMSAI-8080 computer, but can be attached to many other microcomputers,

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CIRCLE 110 ON READER CARD

especially if they're Intel 8080 based, it's claimed. The IMSAI might just be the cheapest printer ever offered; it's priced at $549, or $399 in kit form. It interfaces to an 8-bit parallel output port and is supplied ready to install. Additional features include a 64-character ASCII subset, software selectable double-size characters, automatic line wraparound, multiple copies, etc. IMS ASSOCIATES, INC., San Leandro, Calif.

FOR DATA CIRCLE 240 ON READER CARD

370/125 Add-on Memory

The in-7125 is billed as being the first alternative storage system available to

IBM 370/125 users. The in-7125 can take the 125 user from 96K to a full megabyte of memory in 32K-byte modules. Failing modules in the in-7125 can be switched off in 32K increments without loss of on-line operation. All specs are said to equal or exceed stock IBM specifications: access time is 290 nsec (somewhat faster than IBM) and the cycle time of 480 nsec is equal. Some special attention has been paid to the fault isolation aspects of the storage system. A built-in maintenance panel identifies failing memory modules and holds the memory switch on/-switch off controls, and a LED-driven fault location mechanism is also included. Automatic relocation of memory addresses, and chip-replaceable design are featured. Pricing on a 416K addition that takes a 96K system to 512K is $2,047/month, including maintenance. Deliveries are underway. INTEL MEMORY SYSTEMS, Sunnyvale, Calif.

FOR DATA CIRCLE 241 ON READER CARD

Bar Code Reader

The model 9110 is different from most other bar code readers because it offers dual RS-232 connections. This allows it to operate together with a crt or other on-line terminal. The communication between the cpu and the terminal is automatically transferred through the 9110. A scanner is included for reading variable length messages of up to 32 characters in length. The bar code can be bi-directionally scanned at 3-25 ips, and an audio signal confirms a correct read. (Somehow it should buzz if the read was incorrect?) The 9110 is priced at $1,085. INTERFACE MECHANISMS, INC., Mountlake Terrace, Wash.

FOR DATA CIRCLE 213 ON READER CARD

Printer

The printing speed of the NCR 499 data processing system can be increased from the standard 75 to 130 cps with a new printer just made available for it. It's installable on the customer's premises, and the price of only $1,500 seems reasonable enough. For even higher performance, a 300 lpm printer is also available for the 499. NCR CORP., Dayton, Ohio. ❊

FOR DATA CIRCLE 214 ON READER CARD

●

Robots in a factory uprising
considered of no compromising,
and loudly kept stating
to those arbitrating
that dull work was demechanizing.

—Gloria Maxson

FDR-DSF

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software & services

Updates

WYLBUR, the interactive text editing and remote job entry software package developed at Stanford University, is moving to a new home. Users who managed to pry licenses to use WYLBUR raved about it so much that more than 100 installations sprung up around the world. Pretty good for any package, much less one that wasn't actively marketed.

Doing the marketing now is On-Line Business Systems, Inc., San Francisco. Primarily of interest to IBM users of 360/50 or 370/138 systems (and up), perpetual licenses now go for $17,500, or from $600 to $1K per month.

The latest service to be offered on Informatics Inc.'s nationwide data services network is PREMIS, developed by K&H Business Consultants, Ltd., London. The point of interest in the CPM (Critical Path Method) package is that it was developed under contracts from the Dutch Steel Corporation and the Municipality of Amsterdam for a system capable of handling tens of thousands of activities and still be capable of running on something as common as a 370/158. Each activity can have up to 200 relationships and resources, and there's virtually no limit on the length of activity descriptions. With over 100 users worldwide, PREMIS should do well in the U.S. market.

Great Ideas For The New Year Dept.: Why should users have to pay for amount of memory required of any manufacturer's system in order to support the basic (or smallest) operating system? Some systems reserve as much as 90 percent of the systems memory for user activities, while other manufacturers' designs require 90 percent .

Industrial Marketing Advisory Services has been started up in Arlington, Va. The firm provides a computerized clearinghouse for bids and quotes on all types of electrical and electronic products, and that includes data processing equipment. Users dial a toll-free telephone number to start the ball rolling, and IMAS segments them by product category and region before sending them off as sales leads to subscribers. Subscribers pay $60 for 60 leads, which seems more than reasonable. Current subscribers include Ampex, Burroughs, Data General, GE, and hundreds more.

Operating System

Remember when the mini manufacturers were continually being pummeled over the lack of sophistication—or total lack—of software? If anything, it seems that the shoe is now on the other foot, with the mini mob now able to develop operating systems that actually make huge chunks of memory available for user programs! (IBM users take note.) Such is the case with Data General's latest offering, Advanced Operating System (AOS). It's described as being "heuristic," or having an ability to learn, but it seems to us that AOS is better thought of as being dynamic, perhaps the most sophisticated operating system yet run on a mini.

The claims for it are all the "right" ones: simultaneous control of multiple time-sharing, real-time, and batch operations; dynamic management of programs in memory, with sharing of common code and data, load-on-call routines, etc.; complete hierarchical file data management directory structures, file and program protection, device independent I/O, spooled output to non-shareable devices, accounting and error logs, synchronous and asynchronous communications, etc. AOS is process oriented, meaning that a group of program tasks share up to 64K bytes of memory and compete for system resources as a unit. A "process" can be a system program like an editor or a user application program. Users determine whether processes should be permanently resident in memory, preemptable (usually resident but can be swapped), or always swappable. AOS manages the competing processes and schedules each one for memory and cpu time only after determining its user-assigned numerical priority, past behavior, and the length of time it has been waiting. To further optimize memory utilization, a least-recently-used algorithm is used to manage the 2K byte pages memory is logically split into, and to decrease disc I/O as well. Processes larger than 64K bytes are handled as overlays.

Like the processes, data files are organized in a multiple level, family-tree structure. Files can expand without having to be physically contiguous on disc, and a file directory defines and catalogs programs and data, and even assigns access rights by user. Security safeguards by process, file, and system are also part of AOS.

Scheduled for availability sometime in the spring, AOS operates on ECLIPSE S/230 and C/330 configurations with at least 192K bytes of storage, real-time clock programmable interval timer, system console, and disc. The package is bundled, but then it isn't: users must purchase a support package, which includes things like three days of system engineering assistance, for $2,500. There is no subsequent charge for multiple systems of subsequent editions. DATA GENERAL CORP., Southboro, Mass.

FOR DATA CIRCLE 216 ON READER CARD

Information Retrieval

A new buzzword that has popped up lately, that of describing a product as being "user friendly" certainly applies to this product, a data base preprocessor called ROBOT. While a number of these types of packages have been worked on over the years in experimental form (at Rand, System Development Corporation, the National Science Foundation to name a few labs), this is the first product to come to our attention that is so comprehensive. Basically, ROBOT makes it not only possible, but very easy, for a non-dp professional, such as an engineer,

```
NEXT REQUEST.
ROBOT? ARE THERE PEOPLE IN NY STATE?                    Ordinary English
                                                        "yes-no" questions.
YES


NEXT REQUEST.
ROBOT? GIVE ME THEIR AVERAGE SALARY.                    Computation with
                                                        pronoun reference.
THE NUMBER OF HITS IS  54
        SALARY
AVERAGE    9018


NEXT REQUEST.
ROBOT? SHOW ME WHO THEY ARE.

THE NUMBER OF HITS IS  54
 KING
 FRONTERA
 RAEDIGER
 FARRIS
 COLVILLE JR
HOW MANY MORE LINES SHOULD I PRINT?
ROBOT? PRINT EVERYTHING ON THEM.


THE NUMBER OF HITS IS  54
 KING              PUBLIC RELATIONS DIR  011800 M   WHITE PLAINS     NY
 FRONTERA          LEGAL DEPT ASSISTANT  010200 F   NEW YORK         NY
 RAEDIGER          SECRETARY             007200 M   NEW YORK         NY
 FARRIS            CLAIMS EXAMINER       005100 F   ROCHESTER        NY
 COLVILLE JR       ACTUARY               016200 M   ROCHESTER        NY
HOW MANY MORE LINES SHOULD I PRINT?
ROBOT? PRINT STATISTICS ON SALARY FOR ALL NY EMPLOYEES

THE NUMBER OF HITS IS  54                               Multiple computations.
        SALARY
MINIMUM    3010
MAXIMUM   16800
AVERAGE    9018
TOTAL    486990


NEXT REQUEST.
ROBOT? WHAT IS THE AVERAGE SALARY OF THE EMPLOYEES LIVING IN ITHACA?

THE NUMBER OF HITS IS  9
        SALARY
AVERAGE    7823


NEXT REQUEST.
```

doctor, lawyer, to manipulate files and obtain information from a very sophisticated data base. If the product has a potential drawback, it's that ROBOT cannot be used to access more than one data base—it's dedicated to personnel, inventory, etc—but according to the developers, it was absolutely necessary to design the package along these lines in order to do the application *at all*. And certainly there will be many IBM 370 shops where this will not be a particular problem. (The user gets a discount when buying more than one package anyway.)

asi/inquiry

The IMS DB/DC QUERY LANGUAGE

USED BY MORE IMS INSTALLATIONS THAN
ANY COMPETING PRODUCT

ASI/INQUIRY is an IMS DB/DC query language that operates completely as an interactive Message Processing Program. The design of ASI/INQUIRY is such that the *structure of the data base is transparent to the user*. Moreover, one need not have familiarity with DL/1 segment logic or the complexities of multi-pathing. Extremely rapid response time is assured.

MAJOR HIGHLIGHTS

- ☐ End-user oriented
  - —Easy-to-use language
  - —Requires no knowledge of IMS
  - —Comprehensive diagnostic messages
- ☐ Rapid response time for even the most complex queries
- ☐ Dynamic priority scheduling to maximize system performance
- ☐ Availability of default as well as user-defined screen formatting

Recently delivered, Release 2 of ASI/INQUIRY contained a number of major enhancements, including:

- Development of a TSO-supported version
- Full support of IMS/VS secondary indexing
- Open-ended computational facilities
- Ability to SORT display output

In summary, ASI/INQUIRY represents the state-of-the-art product in an IMS DB/DC or TSO-supported IMS environment. It is the only system combining an easy to use language, complete user flexibility, and rapid response time in a single package. If you want to start answering "What if . . . . " immediately, call or write today for further information.

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software & services

Any type of terminal, hardcopy or crt, that is supported by a 370 running any of the more sophisticated operating systems (os and vs for starters) can operate with ROBOT. One can obtain the answer to requests such as "HOW MANY MANAGERS EARNING BETWEEN 18000 AND 24000 LIVE IN ILLINOIS" and ROBOT, together with either the System/2000 data base management system from MRI Systems Corp. or ADABAS from Software AG, does the required processing, tells the user how many people satisfied the conditions of the sort, and, on user request, starts to print out the names. There's even ambiguity checking: in response to the question "WHICH PEOPLE WHO LIVE IN NEW YORK EARN OVER 5500?" ROBOT responds with:

REQUEST AMBIGUOUS, IS IT:
NUMBER 1
PRINT THE NAME OF ANY EMPLOYEE WITH SALARY 5500 AND CITY = NEW YORK
NUMBER 2
PRINT THE NAME OF ANY EMPLOYEE WITH SALARY 5500 AND STATE = NY
PLEASE TYPE A 1 OR A 2.

The marketing policy on ROBOT is almost as interesting as the package itself. The developers, who will admit to trying to "debabelize" the software industry, are going to try to sell the packages as "front-ends" for the data base systems already mentioned (IBM's IMS is not included—too many "problems.") That means going directly to those vendors. Users can get the package for $30K, and one very large corporation is already putting the package through tests. Finally, ROBOT will be offered to time-sharing services vendors, where it should do well, too. A three-month trial is offered, but it's not free—it will cost the user several thousand dollars to set things up. ARTIFICIAL INTELLIGENCE CORP, Kensington, Md.

FOR DATA CIRCLE 217 ON READER CARD

MVS Monitor/Control

The complexity of IBM's most sophisticated operating system, MVS (Multiple Virtual System) is starting to attract the attention of the performance measurement vendors. One of the first products intended to smooth the operation of the system is called Resolve-MVS. Basically, it makes it possible for users to get a clearer picture of what is actually taking place in the system, and provides features for tuning or controlling the system more to the customer's wishes. More than 40 computer operator and authorized TSO user commands are at hand to address specific problems that cause inefficient or sluggish system operation in such problem categories as enqueue conflicts, reserve lockouts, missing I/O operations, page thrashing, job loops, or wait state problems. With Resolve-MVS, it is possible to force jobs out of the system if they are not running as they should, force jobs to be run as soon as possible, ascertain which jobs are actually running, which ones are swapped and waiting for which particular resources, etc. Resolve-MVS operates as a real-time problem program in a 64K region and features optional password protection for all user services. A 21-day free trial is offered, and the system can be rented for $450/month or purchased for $10,800. BOOLE & BABBAGE INC., Sunnyvale, Calif.

FOR DATA CIRCLE 218 ON READER CARD

8080 Basic Interpreter

What's really going to blow the lid off the already red hot microprocessor phenomenon is when users don't have to piece programs together statement by statement using assembler language and can instead use a higher-level language. The fuse has already been lit: here's a BASIC language interpreter for the most popular microprocessor of them all, Intel's 8080 chip. Called BASIC ETC, the interpreter is a variant of the Dartmouth BASIC programming language. For those people not familiar with interpreters, they differ from compilers in that they directly execute program statements, in contrast to the separate machine code program generated by a compiler. One of the big advantages of this approach is that it makes debugging much easier since one only has to mull over source statements.

BASIC ETC uses 8K bytes of memory plus at least 1K of scratchpad memory. Included in the interpreter are string capability for up to 255 characters, N-dimensional arrays, variable precision arithmetic, assembly language sub-routines, direct memory and I/O addressing, 27 error codes, character/line erasure editing, 31 commands and statements, null control (0-25 seconds) and formatted output statements. The product is delivered either in the form of paper tape or audio cassette together with a 32 page user's manual. BASIC ETC is priced at $25. BINARY SYSTEMS CORP., Richardson, Texas.

FOR DATA CIRCLE 219 ON READER CARD

Airlines Data

AIRMARKET is just what its name implies, a data base of information on the nation's domestic airlines that should interest urban planners, airport commissions, business planners, as well as the airlines themselves. Basically the data consists of information collected in a 10% ticket sample of all certified

software spotlight

Systems Design

Now that some progress has seemingly been made in better coding techniques and individual program design (hence the uproar over structured programming), it would seem that one of the more exciting areas for programming progress lies in the automated system design sector. At least the developers of SL/1 think so. About the only thing misleading about the package is its name, Systems Language/1, implying that it's a programming language. It's not, but what it is is even better: a total system to practically automate the generation of large scale programming systems, including documentation.

Written in a combination of assembler and COBOL for IBM 360/370 systems running OS, DOS, or the VS operating system varieties, SL/1 is used to specify the data elements of each external input and output for an entire computer application. The user can even optionally specify the format of the system's master files or allow SL/1 algorithms to do the job. The only other information required to get SL/1 underway is a description of the target computer configuration.

SL/1 automatically designs the entire system and determines what programs are required, including the sorts. The inter-program work files required to pass information between programs is also performed, as are the actual COBOL source programs ready for compilation, all JCL, and all documentation, including flowcharts, record layouts, element dictionaries, edit dictionaries, narratives, cross references, diagnostic dictionary, operating instructions, etc. Fully 27 phases are executed to generate the target programs. Field testing (two years of it) is said to have gotten the bugs out of SL/1 and it is currently usable. It's priced at $60K—which, if the claims made for the package are true—is astoundingly low when compared to what it would cost a number of highly-paid programmers to develop the same package. Monthly lease plans for 36 months at $2,100/month are also available, as is a 90-day trial for $3,900. THORNE DATA PROCESSING, INC., Springfield, Va.

FOR DATA CIRCLE 215 ON READER CARD

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Cleveland	12/9	Atlanta	1/18
Boston	12/14	Kansas City	1/20
N.Y. City	12/14	Charlotte	1/20
Baltimore	12/16	Indianapolis	1/25
Philadelphia	12/16		

CIRCLE 47 ON READER CARD

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route carriers conducted by The Civil Aeronautics Board that shows revenue passenger miles, total passengers ticketed, and each carrier's market share and market ranking for each yearly quarter since 1972 according to mileage and city codes. Subsequent modules to be implemented in AIRMARKET will be of more direct interest to commercial concerns, for it will show the number of people passing through particular buildings at individual airports. How's that for detail? More than 68,000 domestic city pairs are covered in AIRMARKET with detailed carrier information on more than 26,000 of them. Access to the data base, which is run from a 370/155, is offered terminal users for $12 per connect hour plus 50¢/cpu second. THE COMPUTER COMPANY, Richmond, Va.

FOR DATA CIRCLE 220 ON READER CARD

Network Interface

DMEP is used to attach IBM host computers to X.25 Public Packet networks such as Canada's DATAPAC, Telenet in the U.S., or Transpac in France. DMEP operates in either an IBM 3704 or 3705 communications controller and performs the functions required to allow remote terminals attached to the network to be supported by currently operating IBM host software.

The license fee for DMEP is $500/-month including program maintenance and a PTF (program temporary fix) service. Offered as an option is installation at the customer site for $2K plus travel expenses. CAMBRIDGE TELECOMMUNICATIONS INC., Bedford, Mass.

FOR DATA CIRCLE 225 ON READER CARD

Project Management

TELOR II is a project management system developed in France now operational on this vendor's nationwide services network after undergoing testing for approximately four months. Already it has been used in some out of the ordinary applications: Exxon International's tanker department used it to aid in the conversion of an oil tanker to an offshore storage tanker, helping to establish deadlines for getting engineering planning done. TELOR II permits its users to allocate resources, determine the financial impact of changes to the basic project plan, compute the discounted cash flow and internal rate of return. Established network planning techniques are used in the package, including PERT and CPM.

The two components of the package, analysis/time-framing/skeletonization and the reporting/penalties/return on investment phase have separate charge rates: 16¢ per VPU (Virtual Processor Unit) and $1 per thousand I/O records for the former and 11¢ per VPU and $7 per thousand I/O records on the latter. Connect time charges are $5/hour. NATIONAL CSS, INC., Norwalk, Conn.

FOR DATA CIRCLE 221 ON READER CARD

Transaction Processing

The Transaction Processing System (TPS) is the result of three years of development required to implement the design on a DEC PDP-11 mini. It's an interactive application system consisting of a CODASYL subset data base management system complete with a high-level language system for giving it directions. The language, called ISL (Interactive Systems Language) is a free form language said to be much easier to understand and work with than either COBOL or FORTRAN.

There are several subsystems. The transaction dispatching system enables non-computer oriented users to use TPS without having to know or understand anything except their transaction codes and password. The data logger keeps track of all user activity as well as updates on any of the data bases. TPS

WITH DOCS USE YOUR 3277 AS A DOS·DOS/VS CONSOLE!

DOCS—Display Operator Console Support—provides the IBM S/360 & S/370 DOS and DOS/VS user with 3277 display unit SYSLOG support. DOCS is simply installed on any DOS or DOS/VS system with no changes required by the user. All 1052,3210 and 3215 typewriter functions are supported by DOCS with numerous enhancements over a non-DOCS environment. DOCS also enhances DOS/VS operation on S/370, 138, 148, and 158.

DOCS is quickly and simply installed on any system. All that the user need do is catalog the DOCS distribution tape to his Core Image library, define where the DOCS hard copy file is to be located and execute DOCS. Total installation time required is under 10 minutes.

DOCS functions concurrently with EDOS, GRASP, DOS/MVT, DOS/RS, POWER II, ASAP, POWER/VS, and ITEL's DOS/VS executing on a S/360 and will enhance the system operation by providing improved facilities for the use of these packages while DOCS is controlling SYSLOG.

DOCS is available from C F S, Inc. as a licensed program product and may be leased monthly, yearly or on a one-time lease arrangement for $175.00, $1,890.00 and $5,670.00 respectively. All three lease plans include free maintenance for as long as DOCS is installed.

SPEED

DOCS provides significant through-put improvement by the very nature of the speed of the 3277 display unit alone. Operators can even pre-answer messages on the console.

MULTIPLE CONSOLES

DOCS allows from 1 to 16 3277 display unit consoles to be used simultaneously as SYSLOG devices.

MULTIPLE OUTSTANDING REPLIES

DOCS permits messages followed by Reads to the typewriter to remain unanswered without tying up the system. All outstanding Reads are shown in high intensity on the display console(s).

REDUCED SUPERVISOR SIZE & OVERHEAD

DOCS does away with any need for the Console Buffering option in DOS or DOS/VS thus providing a savings in the core required by the users' supervisor as well as greatly reducing significant overhead to the entire system. Experience has shown that total through-put improvement with DOCS installed may approach 10% to 20%.

Send requests for DOCS to C F S. License agreements along with detailed information will be sent by return mail. Inquiries may be directed to:

ELIMINATES DEPENDENCY ON TYPEWRITER

DOCS will continue to operate, and allow the entire system to operate, if the 1052, 3210 and 3215 typewriter becomes inoperable. DOCS spools all typewriter data to a hard copy disk file for later printing thus obviating the need for the typewriter to be on-line at all times. Hard copy is asynchronously provided if the 1052, 3210 and 3215 is available. A hard copy listing is also available through a utility program which the user may execute in any problem program partition to list the hard copy file on SYSLST.

NO USER PARTITION REQUIREMENT

DOCS executes in its own pseudo-partition thus allowing the user unrestricted use of the problem program partitions.

MULTIPLE EXTERNAL INTERRUPT KEYS

DOCS provides a separate External Interrupt key for each partition (replacing the use of the MSG command). This is especially convenient for EDOS users. This function is also useful for GRASP users when communicating with a background partition problem program. A unique interrupt key is provided for each DOS/MVT region.

Mr. Richard Goran
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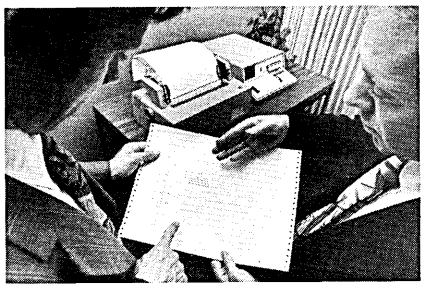
CIRCLE 105 ON READER CARD

runs on any model PDP-11 using the RSTS/E time-sharing operating system. It's priced at $15K (until New Year's day) and comes with a one-year warranty. The user gets the source code (written in BASIC PLUS), and documentation. The developers also offer a data base management system for the PDP-11. INTERACTIVE INFORMATION SYSTEMS, Cincinnati, Ohio.

FOR DATA CIRCLE 224 ON READER CARD

5100 Software/Printer

IBM has announced two more features for the model 5100 portable computer that should make the product more desirable. Now there's a 120-cps, 132-column printer available for it, the



5103 mod 2, for printing on continuous single or multipart paper. The printer is priced at $4,175. But maybe the more interesting news is a print plot/problem solver library that enables the user to use either the 5103 mod 1 or the new mod 2 as a plotting output device, capable of producing most of the common types of graphs, including line graphs, histograms, bar charts and point-to-point plots. The library also allows the 5100, with a serial I/O adapter, to be used with peripheral devices such as absolute vector plotters and storage display terminals. The software sells for $500. IBM CORP., General Systems Div., Atlanta, Ga.

FOR DATA CIRCLE 223 ON READER CARD

Datapoint Software

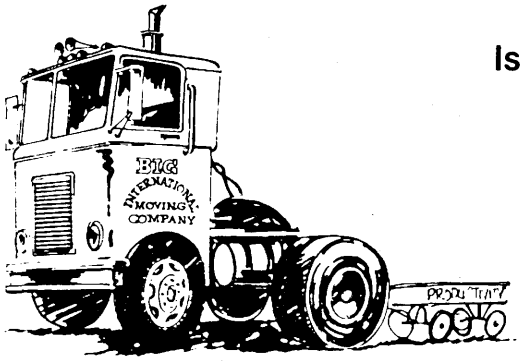
This Canadian vendor has installed approximately two dozen sets of software on various Datapoint Corp. intelligent terminal products north of the border, and is now making them available in the U.S. The products consist of a data entry system, a security system, programming utilities, a Datashare editor, and a partition link system.

The data entry system provides the capability to create an unlimited number of data entry programs—if you want to do such a thing. The program is designed to operate in a multiterminal environment where the same programs can be used simultaneously. Extensive validation and editing can be performed on the input, and no special training or programming skill is required to set the program up. It's priced at $4K.

The security system prevents unauthorized use of the system by means of a two-level password structure. The first password allows an individual or designated terminal to access the main "menu" of program options only. A second password is required to utilize authorized program options. This system is priced at $3K.

The utility package is said to be similar to that offered by Datapoint, but with the advantage that these all operate in Datashare, allowing a user to create a new file; look up an ISAM record using its key; write blank characters into any file; print any files; change constants of a record; delete files, etc. Bundled together in the utility package is a Datashare editor that allows several programmers to work on model 2200 and 5500 systems simultaneously while inserting, modifying, or deleting coding, and a partition link system that essentially makes it possible for any terminal operating in the Datashare partition to access the batch partition in order to run one or more "standalone" functions such as file reindexing, sorts, compilations, etc. The utility package is priced at $4K. At least 48K words of memory are required to implement the partition system. Packages include installation, user training, and a 90-day warranty. FORTREX CONSULTING LTD., Willowdale, Ontario, Canada.

FOR DATA CIRCLE 222 ON READER CARD ✲



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The Marketplace...

advertisers' index

SOFTWARE MARKETPLACE

Allen Services Corporation 190
American Valuation Consultants, Inc. ...192
Applied Computer Research 190
Applied Data Research 189
Atlantic Software Inc. 190
Automated Concepts Inc. 189
Bancroft Computer Systems 191
Computer Systems International Inc. 189
Dataware Inc. 188
Decision Strategy Corp. 191
Dylakor Software Systems, Inc. 190
Eleven Thirty, Inc. 188
Foresight Systems Inc. 192
HENCO, Inc. 191
ICT Corporation 191
Infonational 191
Information Processing, Inc. 192
Insurance Systems of America, Inc. 188
Interactive Information Systems 192
International Management Services, Inc...188
Management and Computer Services, Inc..190
Manufacturing Data Systems Incorporated.192
Mitchell and Gauthier, Associates.....190
National Technical Information Service..189
Occidental Computer Systems Inc. 189
On-Line Software International 189
Software Consulting Services 188
Software International 192
SPSS Inc. 193
System Support Software Inc. 189
John Toellner & Associates 193
Wang Laboratories, Inc. 188, 190, 191
University of Waterloo 189
Westinghouse Electric Corporation 192

DP MARKETPLACE

American Used Computer Corporation ...193
Hofstra University 193
National Computer Rental 193
R.A.I.R. Inc. 193
TransNet Corp. 193
Wintek Corp. 193

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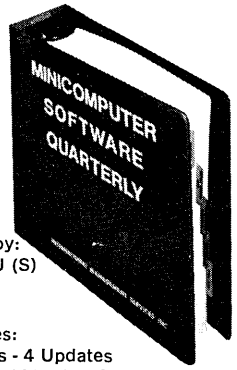

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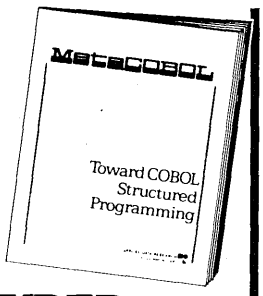

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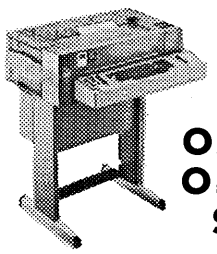

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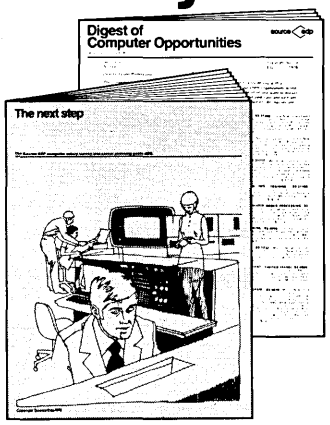

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advertisers' index

AC Manufacturing Company 26
Adage, Incorporated 92
AFIPS 106
†Agfa-Gevaert N.V. 102-HH
Amdahl Corporation 198
Anderson Jacobson 100
Applications Software, Inc. 74, 183
Applied Data Research, Inc. 5
Applied Digital Data Systems Inc. 44, 45
Athana Corporation 29

BASF Systems 82
†Benson 102-I
The Boeing Company 194
Boole & Babbage 102, 154, 177
Bruning Division of Addressograph Multigraph 140
The Bunker-Ramo Corporation, Business & Industry Division 91

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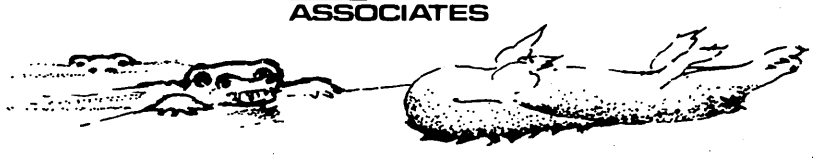

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CIRCLE 200 ON READER CARD

Cable & Wireless, Inc. 114
CallData Systems, Inc. 170
Centronics Data Computer Corp. ... 6
C F S, Inc. 186
†Cii Honeywell Bull 102-T, 102-U
CMC, a division of Pertec Corporation 1
Codex Corporation 37
Computer Automation 47
Computer Concepts 64
Computer Information Management Company 185
The Computer Software Company . 187
Computerworld 167
†Control Data Corporation 102-J, 102-K
Control Data Corporation 175

Data Communications Interface 142, 143, 144, 145
Data Devices International 15
Data General 16, 158
Data-Link Corporation 161
DATAMATION 36
Datamedia Corporation 155
Dataroyal Incorporated 156
Delta Data Systems Company 185
†Digico Ltd. 102-L
Digi-Log Systems, Inc. 180
Digital Equipment Corporation 35, 134, 135
DPF Incorporated 57

Eastman Kodak Company 98
Electronic Memories & Magnetics Corporation 23

Fenwal Incorporated 124
Florida Department of Commerce .. 70
Four-Phase Systems, Inc. 32, 127
Fujitsu Limited 12, 13

General Electric Co. 171
Gilbert Commonwealth 200
Gould Inc., Instrument Systems Division 93
Graham Magnetics 136
GTCO Corp. 69

Hazeltine Corporation 58
†Hewlett-Packard, S.A. 102-Y
Houston Instrument, Division of Bausch & Lomb 46, 78
Hydro-Temp Controls, Inc. 163

IBM 38, 39
IMS Associates, Inc. 95
Incoterm Corporation 131
Inforex 152, 153, 197
Informatics Inc. 66
Informatics Mark IV Systems Company 173

Information Science Incorporated .. 42
Innovation Data Processing 181
Corporation 41
Intel Memory Systems 71
Interdata 107, 121
Itel Corporation 2
Integrated Software Systems

Johnson Systems Inc. 165

Kennedy Co. .....Cover 2
KW Control Systems Inc. 160

LRK Associates 196

Management Science America, Inc. 63
Martin Marietta Data
Systems 40
Mathematica 103
Memorex 151
†Memorex Corporation 102-KK—102-NN
Microdata Corporation 104
Mohawk Data Sciences
Corporation 122
MRI Systems Corporation .....Cover 3

NCR Corporation 132
NCR Special Systems
Division 166
NCR Terminals & Communications,
Inc. 200
Nichols and Company 80
†Norsk Data Electronics 102-FF, 102-GG

O.P.M. Leasing Services, Inc. ...72, 73

Pansophic Systems, Inc. 157
Perkin-Elmer Data Systems 138
Personnel Data Systems, Inc. 162
Norman Powers Associates 195

Quantor 90
Quest Systems Inc. 195

†Racal-Milgo Limited 102-W
RCA Service Company,
A Division of RCA,
Technical Services 159
RJ Reynolds Industries, Inc. 171
RSVP Services 195

†Saab-Scania 102-BB, 102-CC
Sanders Data Systems
Group 9
SDI 159, 161, 163, 165
Shugart Associates 119
†Siemens AG 102-E
Software International 101
Software Module Marketing 4
Source EDP 194
†Stansaab Elektronik 102-P
Stromberg DatagraphiX, Inc. 129
Sycor 84, 85, 86, 87
†System Industries 102-S

Systems Engineering Laboratories
.....20, 21
Systonetics, Inc. 105

Technical Publishing Company 141
Telctype Corporation ....116, Cover 4
3M Company, Data Recording
Products Division 48
TK Enterprises 140
†TRW Data Systems 102-F

United Airlines, Computer Systems
and Communications
Services Division 164
United Technologies 24, 25
Universal Data Systems 10
University Computing Company .30, 31

†The Vadic Corporation 102-O
Varian Graphics 60

Wang Laboratories, Inc. 70
Wangco Incorporated 96, 97
Western Union Data
Services 76, 77
Westinghouse Canada 64
Westinghouse Electric Corporation . 43
Whitlow Computer Systems, Inc. ... 19

Xerox 65, 81

Zeta Research 68

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Below are some of our more immediate needs. Karen Daly would like to hear from you at Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, California 94086. To expedite your application, please indicate on your resume the specific position you are responding to in this ad. We are, of course, an equal opportunity employer.

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You will develop and maintain 470V/6 model-dependent support for each of the SCPs. Incoming maintenance material is reviewed and generated for redistribution to Amdahl customers. An opportunity to evaluate new SCP function and be involved in program development. A detailed knowledge of operating systems internals and concepts is required, along with a working knowledge of operating systems utilities and SMP.

SOFTWARE QUALITY CONTROL

You will generate, apply, and review all software and materials distributed to users. The job provides an opportunity to operate systems in a hands-on environment. Successful candidates will possess a good working knowledge of operating systems components and operation. Additionally, close working familiarity with operating systems utilities, SMP, and assembler language is a must.

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amdahl

This forum is offered for readers who want to express their opinion on any aspect of information processing. Your contributions are invited.

the forum

An Epitaph for Datran

When the Datran Company, one of the new competitive communications entities, filed for bankruptcy in the U. S. District Court for the Eastern District of Virginia recently, more than a company died. A basic American idea may also have lost its hold on life.

The idea was born a couple of hundred years ago along with the notion of individual freedom and a society shaped by its own citizens. With the death of Datran, the Data Transmission Company of Virginia, the idea that ours is a free enterprise economy that encourages competition may have also had a quiet death.

The failure of Datran, said its board chairman Sam Wyly at the company's wake, was "due to continued impediments placed in Datran's path by the American Telephone and Telegraph Company. "Our efforts to continue the business of Datran were made impossible," Wyly said, "by a series of AT&T actions arising from AT&T's determination to eliminate competition in telecommunications."

Datran had a short and an unhappy life. Born in 1968, it was heralded at birth as the harbinger of a new age in computer communications for personal and business use, in homes and offices. Datran was building the nation's first all-digital communications system, capable of transmitting bits of data across the country in less time and for less money than the telephone company could. After a mere five years Datran died, the victim, it is alleged, of a massive overdose of obstruction administered by Ma Bell, who perhaps sincerely believes she must extend her protected monopoly over *all* wire communications to *all* terminal services, and thus reserve to herself the sole right to plug the rest of us into her system on her own terms, at her own pace, at her own price.

Datran is dead and no one cares, except, of course, the few who invested the millions that brought the company to life. No one else cares because no one ever really cares about the failure of a company, or even thinks of a company as having life—of being born and then of dying.

In the impersonal language of the business world companies don't die. They simply fail. Some fail because they are undercapitalized at birth, some because they are created to meet a market that doesn't really exist, and some because they are badly managed and unable to compete. But it seems that none of this was true of Datran. It was born and nurtured with a healthy investment of over $100 million. The market for which it was created is undoubtedly there and eager for the services Datran offered. And Datran management was experienced and astute.

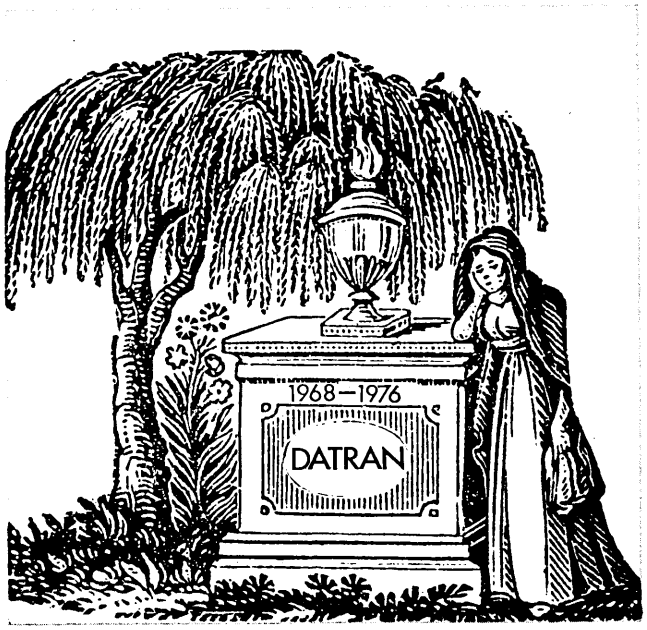
If Datran management failed at anything, it was perhaps in the underestimation of the strength and size of their principal competitor, AT&T, and AT&T's determination to seize Datran's market for itself. This is Datran's belief anyway—and the reason for its $285 million antitrust suit against AT&T.

The actions taken by AT&T, said Datran's board chairman Wyly, included "the improper introduction of services similar to Datran's digital services at rates slashed 40% below Datran's," an action only a rich and powerful, monopoly-based corporate giant like AT&T could take.

Another action taken by AT&T to defeat Datran and anyone else who can raise the capital and has the temerity to go after this market was the introduction of a bill in the Congress that would effectively eliminate all of AT&T's competition. That bill, deceptively labeled "the Consumer Communications Reform Act of 1976," is still alive and well. Only Datran is dead.

More commonly known as the Bell Bill, this legislation would completely eliminate the minor competition that still exists in domestic markets for private lines and terminal equipment. It is a bill that, even more, would permit the total elimination of all future competition except that which the established industry, AT&T, decided to tolerate. The Consumer Communications Reform Act of 1976 is a bill designed to kill all the remaining Datrans and any new Datrans that might emerge.

There is in the tragedy of Datran's death a potential tragedy for us all. And there is a message for us all. The message is that once again, despite the passage of the Anti-Trust Act many years ago, monopoly still threatens to overwhelm competition and thus threatens not simply



young and innovative firms like Datran but the free enterprise system on which our whole society rests.

The message is, further, that this can happen as long as no one is aware, as long as no one perceives, as long as no one listens to what's happening. It can happen as long as consumers, who are the real losers in the unequal struggle between Datran and AT&T, don't understand what is at stake, the freedom to compete. It can happen as long as the people do not realize that despite the determined efforts of the Federal Communications Commission to foster full and fair competition, the AT&T monopoly continues to be the single dominant force in the telecommunications marketplace.

—John M. Eger

Former acting director of the Office of Telecommunications Policy, Mr. Eger is an attorney with the Washington, D.C., firm of Lamb, Eastman & Keats. He is also an advisor to the White House office on Science and Technology policy, and a Datamation Contributing Editor.

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