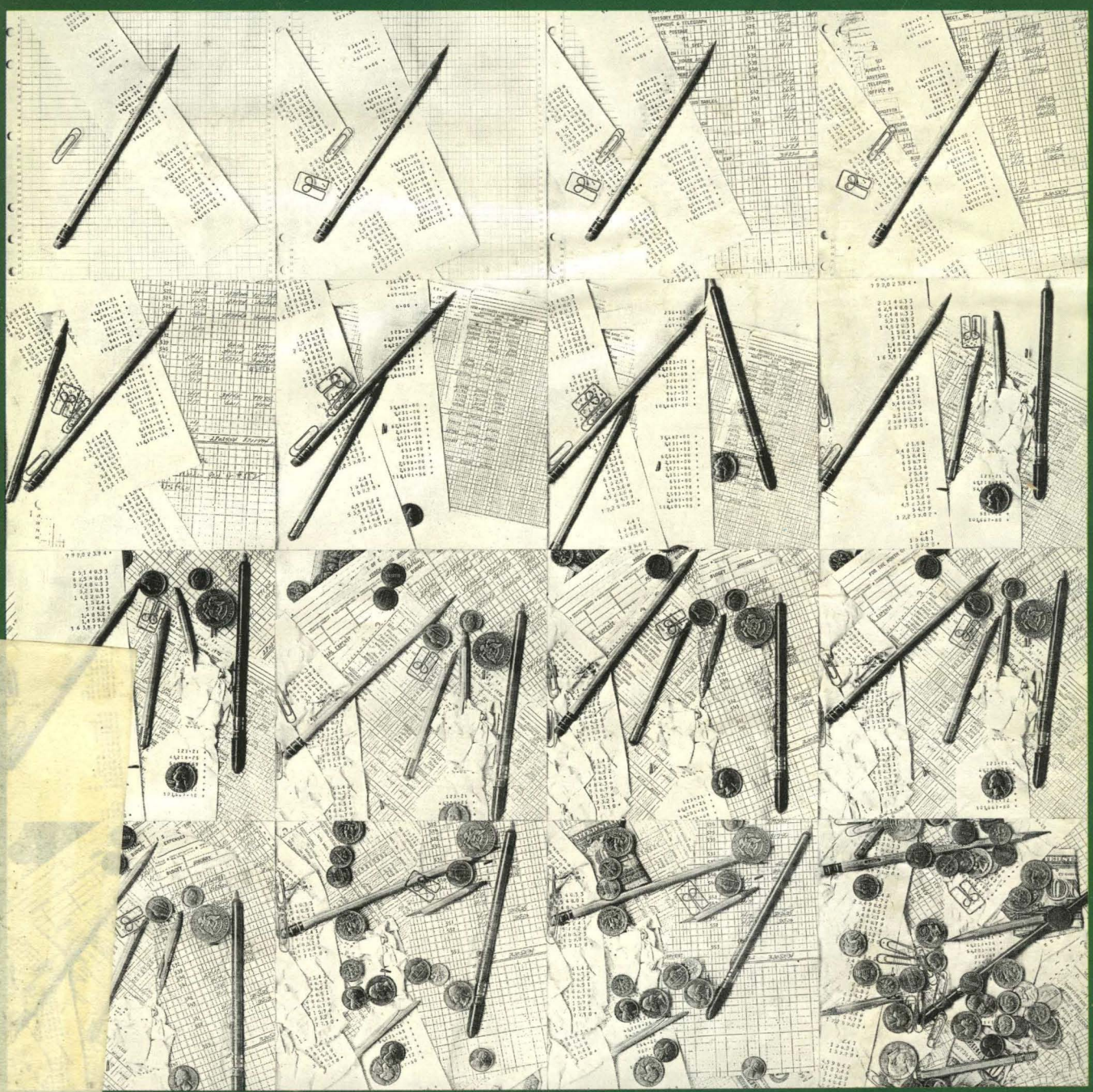
DATAMATION 75®

October

UNCOVERING HIDDEN SAVINGS AND EXPENSES



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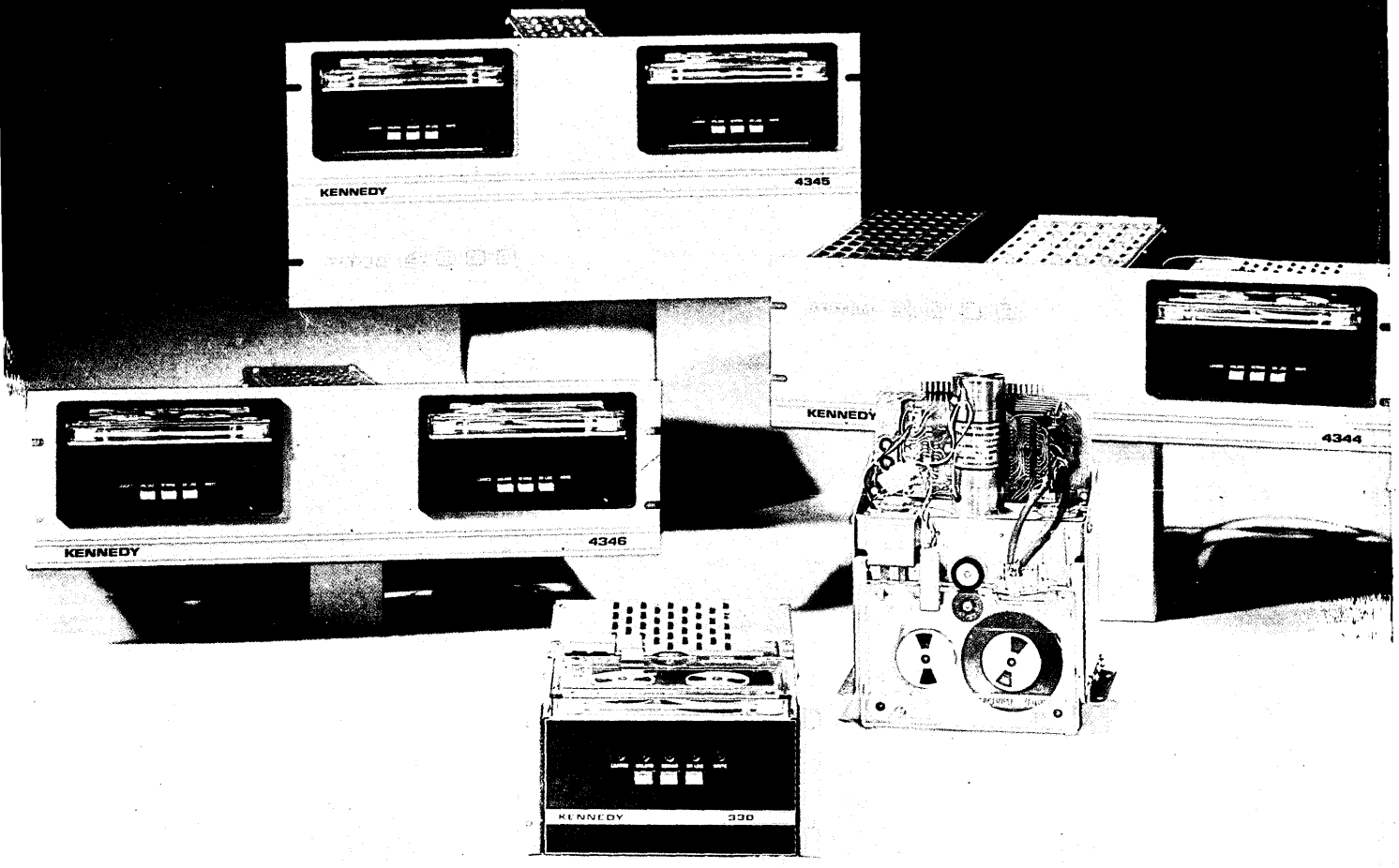

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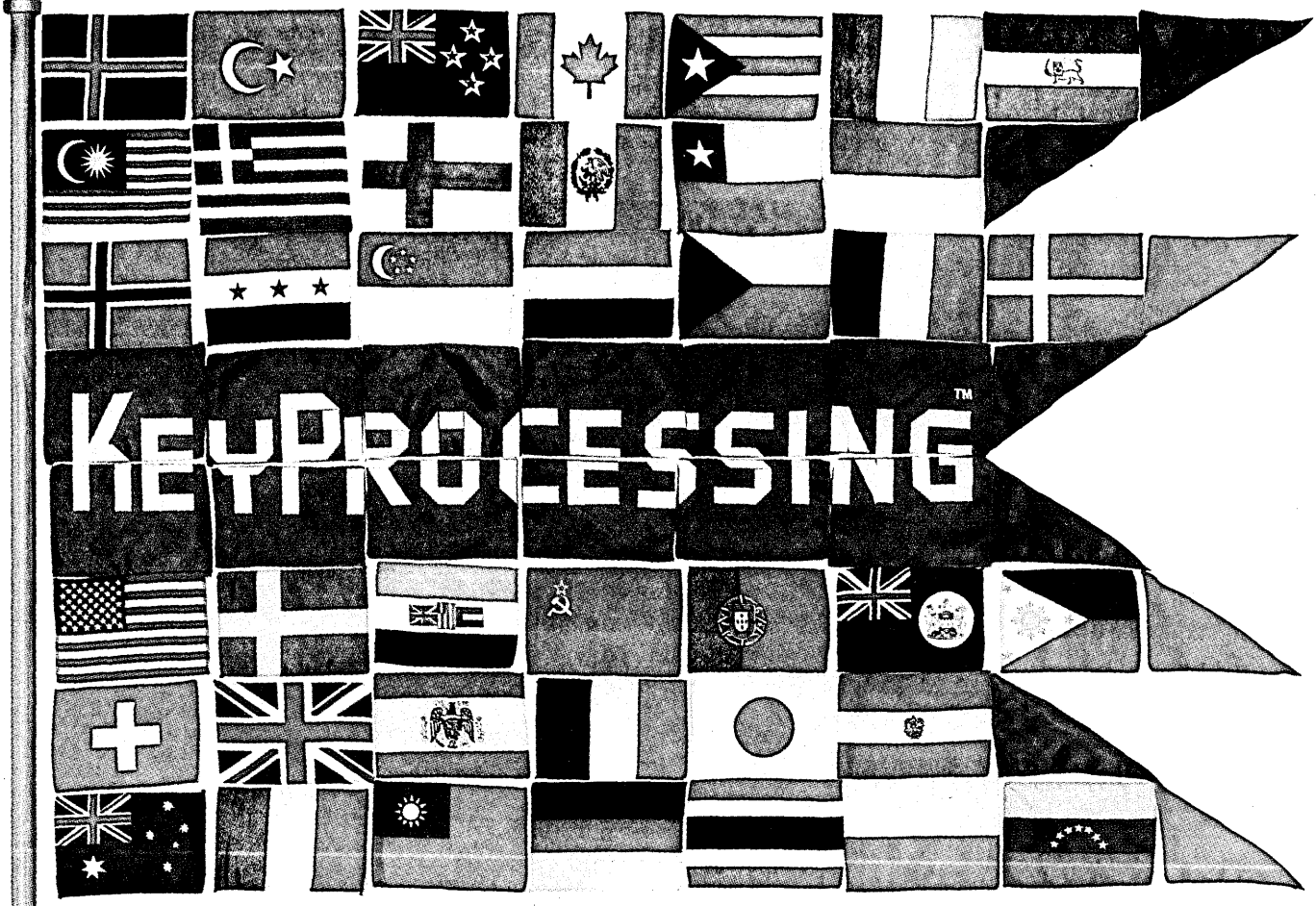

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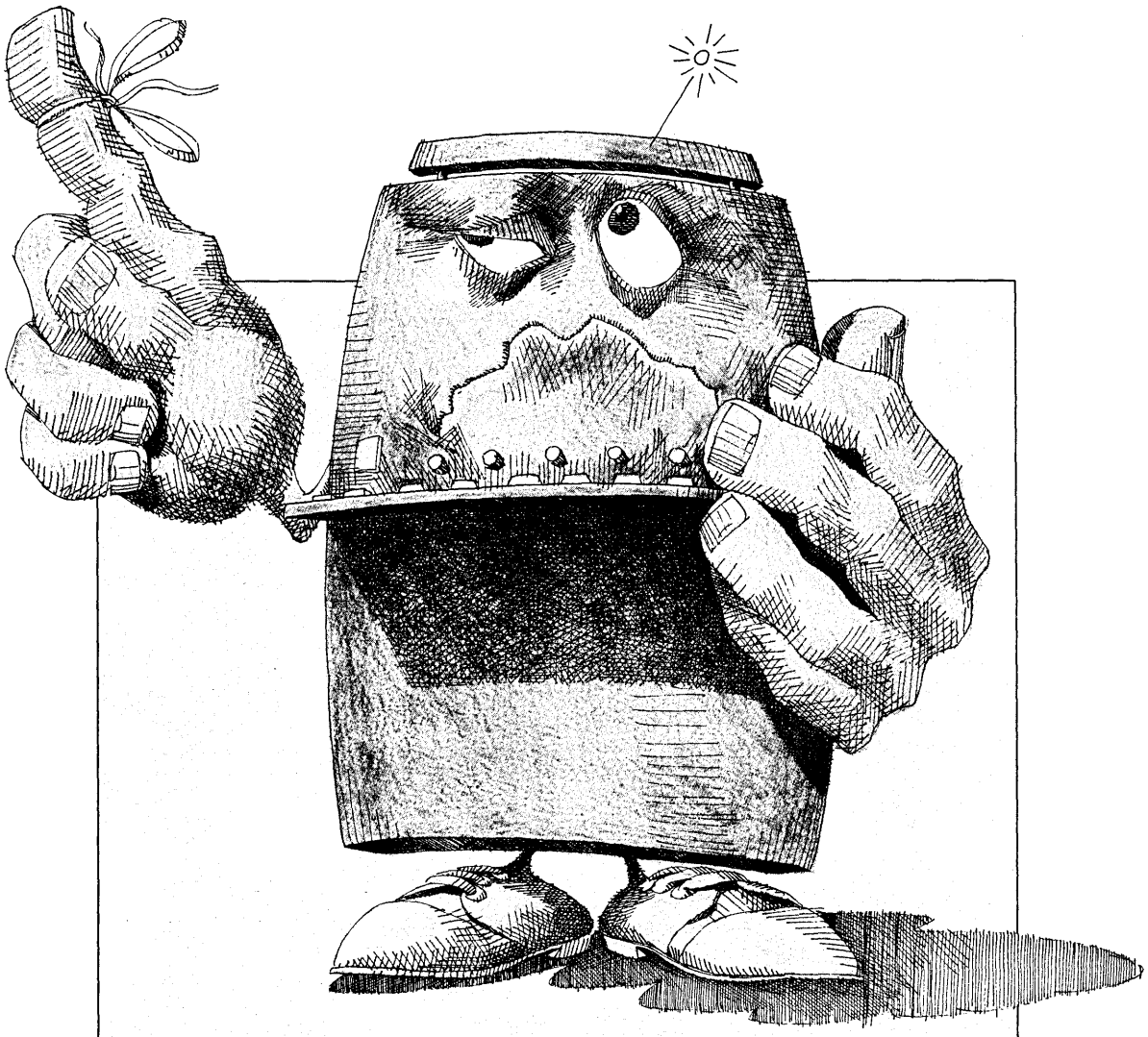

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VOLUME 21 NUMBER 10 This issue 120,600 copies OCTOBER 1975

FEATURES

NEWS IN PERSPECTIVE

DEPARTMENTS

ABOUT THE COVER Uncovering the surprises, both good and bad, in budget planning is a series of successive steps in the process of closer scrutiny. Our design in black, white and money green is by Barbara Benson.

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Circulation audited by Business Publications Audit

BPA

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DATAMATION is published monthly on or about the first day of every month by Technical Publishing Company, 1301 South Grove Ave., Barrington, Illinois 60010; Arthur L. Rice, Jr., Chairman of the Board; James B. Tafel, President; Gardner F. Landon, Executive Vice President. Executive, Circulation and Advertising offices, 35 Mason Street, Greenwich, CT 06830, (203) 661-5400. Editorial offices, 1801 S. La Cienega Blvd., Los Angeles, CA 90035. Published at Chicago, Ill.

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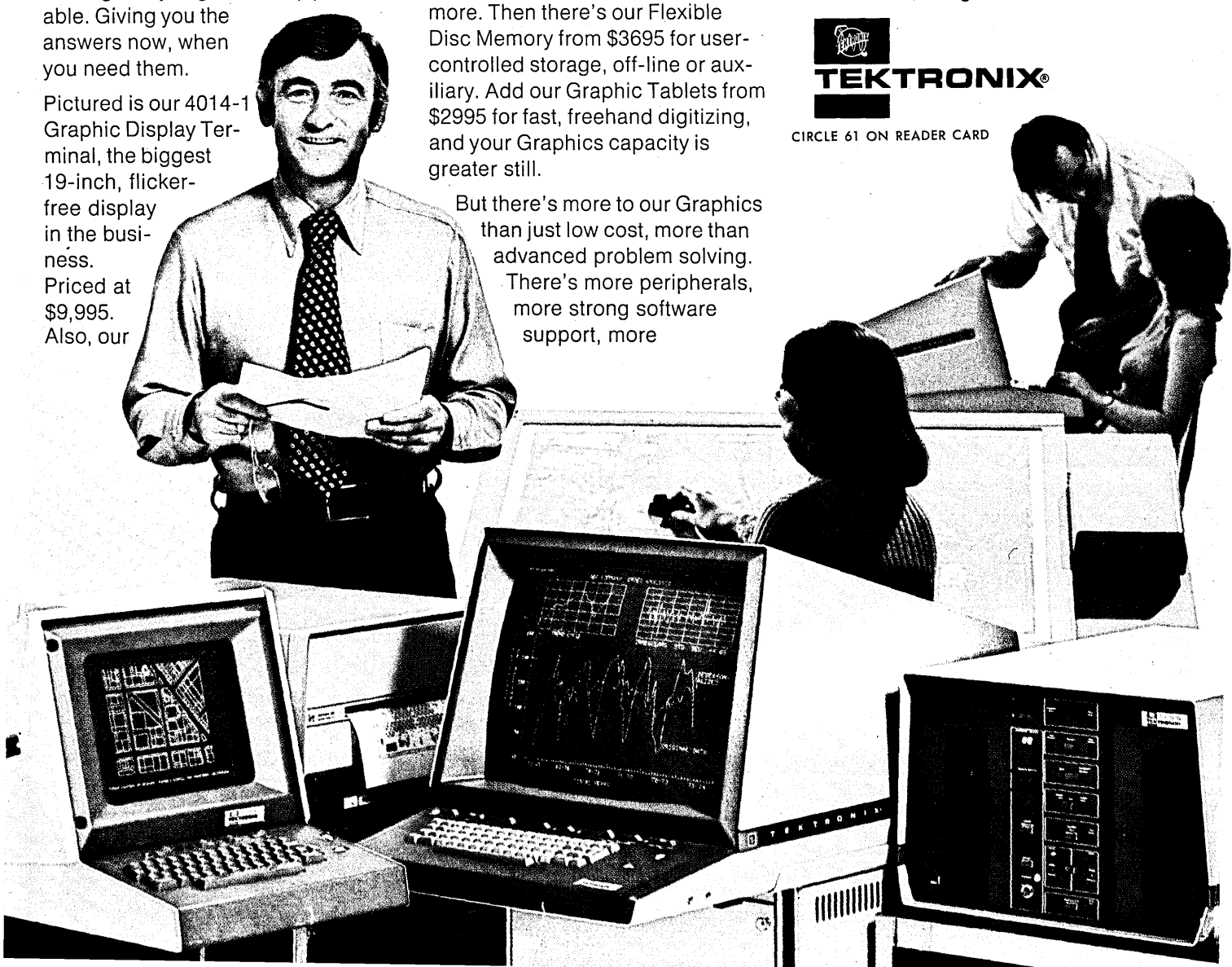

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letters

Repeal the PL/I draft

After years of effort, the Draft Proposed American National Standard for Programming Language PL/I has been issued by the Computer and Business Equipment Manufacturers Assn. (CBEMA). It is a 380 page book. It is written as a single algorithm expressed in a uniform metalanguage which has been especially created for the standard and is defined in the standard.

The standard is intended to be precise and unambiguous and the committee has gone to great pains to achieve this goal. The committee concluded that the necessary level of precision could not be reached by writing in English but instead felt it necessary to devise a new metalanguage specifically for the purpose of defining PL/I.

As it stands, the standard cannot be understood without first learning the metalanguage. The committee knows that the standard will be incomprehensible to most of those who will use PL/I to program. They claim, however, that it can be understood by those who must implement the language, that is, by those who will create PL/I compilers.

If a standard is to achieve its basic purpose of facilitating interchangeability, it must have a precision appropriate to its use. Imprecision or ambiguity in a standard works against its usefulness. Consequently, we can applaud the committee's desire and efforts to achieve a level of precision for the PL/I standard superior to that of earlier language standards. However, in its search for precision, the committee has moved so far toward abstract and algorithmic statement and so far from common English as to sacrifice the ability to be understood by those who must accept and use it.

In spite of the vast effort put into this standard, in spite of our need for a standard to govern PL/I, and in spite of the need for language standards to be precise and unambiguous, I suggest that this Draft Standard be rejected on the grounds that it is comprehensible to very few, that this incomprehensibility is not necessary to the standardization of PL/I, and that a useful language standard must be comprehensible to a substantial portion of those who will use it to program and who have to refer to it.

The public comment period for the Draft Standard has ended. The only action available to those who wish to oppose this standard is to request the organizations which represent them to ANSI to vote against final approval. I urge those concerned to do so.

ERIC A. WEISS
Springfield, Pennsylvania

Mr. Weiss is manager of Planning and Administration of Sun Services Corp., the computing subsidiary of Sun Oil Co. Among the seven textbooks he has authored or edited are "The PL/I Converter" (1965) and "Computer Usage/Fundamentals" (McGraw-Hill, 2nd ed., 1975).

. . . An immediate reply

I must take exception to Eric Weiss' comments on the PL/I standard.

1. He states all the reasons why the standard should be precise: The FORTRAN and COBOL standards are ambiguous; PL/I is not.

2. Einstein's Theory of Relativity was once similarly branded as unintelligible—only a handful of individuals were acquainted with the notation used in his original paper. His theory and the notation survived, and simplification and oversimplifications to explain the theory abound.

3. The Vienna Definition Language used in PL/I is cumbersome to read, but it is precise. There exist computer programs which check VDL statements for consistency and completeness.

May I suggest that Mr. Weiss take the opportunity of reading the standard for its *content*. Peripherally, it will help to bring him technically up-to-date.

ERIC H. CLAMONS
Phoenix Computer Operations
Honeywell Information Systems, Inc.
Phoenix, Arizona

Don't burn that sheepskin yet

Carl Hall ("Evaluating Prospective Employees," August, p. 32) . . . belittled the importance of a college degree in the interviewee's professional profile. In fact, he states: "a computer science degree actually has a negative correlation with a person's preparedness for dp work." . . .

To be sure, our industry is populated with many persons with degrees whose actual productivity and professionalism leave much to be desired. However, the attaining of a college degree does show two important characteristics of the employment candidate:

The ability to set his sights on a long range goal and to attain it.

The ability to put up with a lot of "manure" on the way to a goal and to succeed in spite of it.

These characteristics are important in our industry. Many system development efforts are both of long duration and characterized often by irrational demands and prejudices on the part of

(Continued on page 8)

The IBM 704: First in the Hearts of its Users, Anyway

SAGE was before the 704

I enjoyed Mr. McLaughlin's excellent article on the IBM 704 (Aug., p. 45). Your readers may be interested in knowing that the indexing scheme used was actually developed for the AN/FSQ-7 Project, better known as the SAGE air defense system. The 704 was the first commercial use of the Branch and Index instruction. I believe that the index register concept dates back to Williams work at Manchester Univ. and to the Datatron of Consolidated Engineering Corp. The SAGE index scheme, including the Branch and Index instruction, is covered in U.S. patent 2,914,248. The inventors are Harold D. Ross, Bernard L. Sarahan, Morton M. Astrahan, Bennett Housman and Walker H. Thomas.

MORTON M. ASTRAHAN
IBM Research Division
San Jose, California

Electro-Data was first

IBM did not have the first commercially available computer with index registers. The first one was the Datatron, built by Electro-Data Corp. which was later absorbed into the Burroughs Corp.

JOHN BOLSTAD
Stanford Univ.
Stanford, California

The fate of the "last" one

The junk man came and took the 704 away. [The one in the August story . . . ed.] The machine was sold intact by our man to a dealer in Dallas. The eventual fate of the hardware is uncertain—probably scrap silver and copper.

We got rid of the machine at just the right time. Power company rates rose sharply this summer and we are able to operate with about 15 tons less air conditioning. The 7094 is working fine; it's really a wonderful machine and should take care of us for a long time.

EUGENE USDIN
Southwestern Computing Service, Inc.
Tulsa, Oklahoma

P.S. Last week I picked up a spare motor generator and power distribution units for the 7094, giving us a 100% set of spares. I found them at

(Continued on page 8)

letters

the system users.

A lack of a degree may indicate the candidate possesses a negative trait—an inability to communicate. It is difficult for a person to attain a degree without being able to communicate his thoughts satisfactorily, both in writing and orally. (This is, unfortunately, not true of most high schools.) I have personally found that non-degreed persons often lack communications skills. I also believe that the primary reasons for failures of dp development efforts are the lack of well written, comprehensive documentation, and the failure of project management and project personnel to express their thoughts clearly through the medium of the spoken word. . . .

MARK H. WALLIS
Vice President
Unicorn Systems Company
Los Angeles, California

Software certification

I want to thank you for bringing the forthcoming SRI report on software certification to everyone's attention (Editor's Readout, July, p. 35). I am especially interested since it bears directly on the operations of the Quantum Chemistry Program Exchange.

QCPE disseminates computer software to some 1,500 worldwide members in the area of calculational chemistry. We put the software through a rather simple-minded certification procedure. All we require is that a prospective contributor's program generates the same results that the author claims for it, using the sample input he provides, but on a different computer. We don't say the program is correct; we simply say that it will reproduce results.

I suspect that a major scientific calculational system can never be looked upon as completely certified. There may be a high probability that a system is bug-free, but any statement stronger than that seems to me somewhat noncredible. To my mind, the degree to which a system is certified would be some function of the number of problems successfully run through the system. . . .

For dp systems where the number and types of processes can be counted explicitly, it may be more reasonable to talk of a "completely certified" system than is the case with large, scientific calculational systems. However, because a given dp system is certified under a given compiler, on a particular OS, and in a specific environment, this does not imply the system is considered certified in a completely general sense.

Two questions which haunt the whole effort are "how certified is Certified?" and "how much certification can I buy for how much money?" . . .

RICHARD W. COUNTS
Quantum Chemistry
Program Exchange
Indiana University
Bloomington, Indiana

The SRI report, "On the Feasibility of Software Certification," is scheduled for review in an upcoming issue.

A long count

In reference to the information on EFTS (July, p. 90), please be advised that there are 12 Federal Home Loan Bank Districts, not 120 as indicated. It also stated that the network would be "ultimately capable of supporting electronic funds transfer services throughout much of the U.S." The "ultimately" may be a long time coming since there are no present plans to develop such a nationwide network. However, there is no technical reason that could not be done at some future time.

MARVIN J. SENDROW
Contract Administrator
EFTS Switch Project
Federal Home Loan Bank Board
Washington, D. C.

The number 120 was a printing error which however appears corrected later in the news story. ❋

The IBM 704 . . .

a metal salvage yard in Attalla, Ala. They had a complete 7094 and were wrecking it to get at the gold contacts. A scene one would expect to read about in Gibbon. Or Spengler.

One less bell

Several of us SHARE old-timers were discussing the 704 article recently. And we all agreed that the convert instructions Amdahl was so fond of were not on the 704. They first showed up on the 709.

. . . a lovely, touching story for those few of us who were around in those days, heard the bell, tried to figure out how to test the drum's bearings, and walked the carpeted floors (static wasn't a problem). When they unplug the 7094, I want to be there!

PHILIP H. DORN
New York, New York

The author replies: To set the record straight, or at least unbend it a little, the concept of registers has been around at least as long as the 1949 Univ. of Manchester machine's "B lines." In keeping with the industry's lack of concern for its history, the records of the development from there on are difficult to find. Very likely, the first commercially available computer with index registers was the Datatron line from Consolidated Engineering Corp. (which was later named Electro-Data Corp., and finally was bought out by Burroughs).

According to John Alrich, a project engineer on Datatron, Dr. Harry Huskey brought the idea from the Manchester group to Dr. Ernst Selmer, Datatron's architect. It seems certain that Datatron machines with one "B" register were delivered about a year before the first 704 was installed. So far, it's still a toss-up as to which company's line had floating-point hardware first; friends at Burroughs are looking through closets now to help clear up that point.

In response to Mr. Dorn's comment, Dr. Amdahl agrees that his memory slipped in attributing table look-up instructions to his 704; he had intended them for the 704 but the schedule was too tight and they first appeared on the 709.

And we blushed to admit that our typewriters slipped in misspelling John Backus' name. Sorry, John, we really knew better.

Finally, IBM's files did yield another old picture of the 704 for SHARE old-timers and other aficionados. Here it is.

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people

What He Always Wanted to Do

When we last left L. Edwin Donegan, Jr., he was a captain without a ship: his RCA computer division had been scuttled by RCA corporate management in 1971. Donegan, a man accustomed to responsibility and the corporate high life—he once headed IBM's Service Bureau Corporation and had been thought of highly-enough at RCA to have been under consideration for that firm's presidency—had found suddenly that he had little to do.

He resigned and went to that mysterious pastureland peopled by many former top computer executives and from which they seldom return: Donegan became a consultant. But now, Donegan is back in the industry, this time running Keydata, the pioneering time-sharing firm.

"I feel I've been at bat three times," says Donegan, and he adds quickly with a laugh: "But this isn't the third strike."

The quick Irish wit and the boundless enthusiasm are obviously still there, but there is a more pressing question about Donegan: does he have the business acumen to make Keydata a winner?

There is some information already available that hints at the answer to that question. Donegan has been at the helm of Keydata for a year and a half now and in that time he has moved the 10 year old firm out of a chronically-ill financial position to a position of steadily increasing sales and profits. The firm logged a record $13.3 million in sales in its last fiscal year and $450,000 in profits. He joined the Watertown, Mass., firm as president in July 1974.

"Where do we fit in the industry?" asks Donegan rhetorically. "Our biggest customer has traditionally been the small guy, the first time user who doesn't want dp in his plant. We're keeping that base and I don't foresee a time when our users will be able to do any better than us."

Keydata also has its large and sophisticated users, too, but usually they use the time-sharing service as an enhancement to their in-house dp installation. One big new bright area for the firm is manufacturing applications. In a sense, manufacturing applications represent a natural follow-on for Keydata's distribution applications where the firm's strength has been for years. For instance, once Keydata gets a manufacturer's distribution dp work, the company tries to make it attractive for the user to use Keydata for its manufacturing applications, too.

And how do people feel about Keydata being run by the man who was running RCA when that firm threw in the towel in computers? "At first, I felt there was a certain stigma," says Donegan. "But I found that whenever I talked with a customer he knew who I was and that's always a big plus."

Donegan feels that the passage of time has blunted the negative feelings of the RCA debacle. Moreover, he points out with justification, the RCA base has done well for Univac and that is an indication that RCA's products were strong in the marketplace. Donegan's friends say the whole experience humbled him, but that he is still convinced he could have made a success of the RCA computer operation.

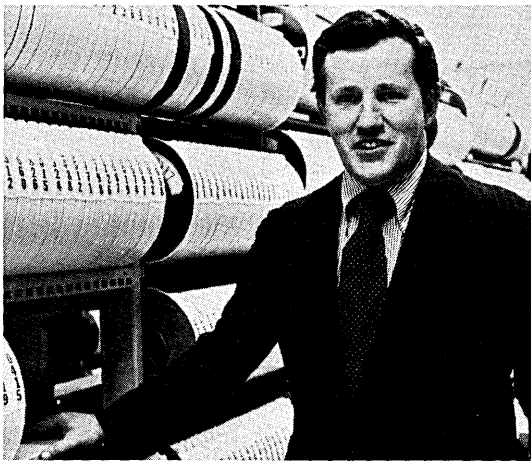
Donegan is something of a zealot on the subject of the computer industry ("I hardly go through a day when I'm not happy I'm in the business"). Unlike most other businesses, Donegan feels the computer industry requires an almost total commitment by the people working in it. He recalls his years at IBM and remembers that everyone he knew at that firm had the attitude that "your life was the computer business."

Donegan's associates say he is almost always "on the job," taking work home with him nights and weekends. He relaxes with a vigorous game of tennis, but he is the first to admit that his business and his hobbies are the same. "I'm not very good at turning the switch off at 6 p.m.," he says.

He feels that his experience at both IBM and RCA was valuable, although unquestionably, IBM has left a bigger mark on the man and, in fact, at RCA Donegan was noted for his IBM style. While he feels that RCA instilled a good entrepreneurial style in its executives, Donegan seems to have carried away with him IBM's method of tackling problems.

"IBM takes a student approach to the business," says Donegan. "The company just overwhelms a problem. At Keydata, I know I can research every element of a problem, so I try to recognize the critical elements and then get some staff work done on those."

Donegan can't stifle his IBM sales training. His easygoing manner begins to leave him when he talks shop which, of course, is Keydata these days. He begins to ignite when he talks about his new company. The enthusiasm builds up slowly but steadily and Donegan is soon a business revival preacher warming up his audience. "You know," he says, "what I've always wanted to do was to run a successful business. And I'm doing it now."



L. EDWIN DONEGAN JR.
experience humbled him

From Work to School

JOHN COOL
First things can be different

First things first means different things to different people. For most, education comes before professional experience. Not for John Cool.

At the age of 20, Cool was Western Regional Service Manager for Packard Bell Computer. On his twenty-second birthday he joined Max Palevsky's Scientific Data Systems. At SDS he started and directed field engineering. He did this for five years. These were pre-Xerox years.

Then he went back to school. He selected Oregon State Univ. in Corvallis, Ore. He chose it, he says, because Corvallis is rural, picturesque, and not too far away from things.

He earned degrees in electrical engineering and computer science at OSU and made some friends who helped

shape the course of his professional life as much as his studies did. These were people who became utility company engineers. Cool became interested in the computing needs of utility companies and found that long life with no down time was the big need. "One second down could cost a utility company thousands of dollars."

So when he got out of school, he purchased a one-third interest in a computer maintenance company called Valcomp (formerly Valley computer) headquartered in Los Angeles' San Fernando Valley. Valcomp's specialty is assuring long operating life for process control computer systems.

Cool didn't spend all his time studying at OSU. He did some teaching too. A professor of his was teaching a course at Oregon State Penitentiary and asked him to give a guest lecture on computers. Cool did and liked the interest it evoked. He decided a regular computer course at the penitentiary would be a good thing. He talked XDS (SDS had by then been acquired by Xerox Corp.) into donating a Sigma 3. He says it was easier talking XDS into donating the computer than it was talking the state of Oregon into accepting it. He still is in contact with some of his former inmate-students.

Valcomp, since Cool bought into it and became president late in 1971, has grown from 10 people and $250,000 in revenues to 25 people and $1½ million in annual revenues. Valcomp was acquired by Tymshare, Inc. in January of 1973.

A Solution Looking For a Problem

ROBERT K. LOWRY
We want them to know what they're getting into . . .

The epithet "a solution looking for a problem," often used to describe a product not well accepted in the marketplace, doesn't bother Robert K. Lowry, cofounder (with George Wells) of Technology Marketing, Inc. at all. In fact, that phrase best describes what the six-year old Costa Mesa, California, firm does. "We offer solutions to problems that companies don't want to, or cannot solve themselves, using a pool of technical talent which few, if any, manufacturing companies could afford to maintain. With technology accelerating at an ever increasing rate, tremendous pressure is placed on production oriented companies, and they are vulnerable because of it. If they can't move a product to market fast enough, at best they've lost their competitive advantage. At worst, they go out of business."

TMI designed eight totally different computers during 1974, possibly more than any other company anywhere, but the products wound up in other, well-known manufacturers' stables. Lowry is no newcomer to the computer industry, having been a cofounder of another successful Orange County computer firm, Microdata. He left Microdata "because I was afraid I might kill it. In those days I knew a lot more about how to be an entrepreneur and get something going than about how to keep it going." Lowry also was on the staff of Decisional Control Associates, later to become Varian Data Machines, and is credited by some with having developed the first 16-bit minicomputer. Lowry tired of conventional roles and, among other enterprises, founded TMI. "We originally thought the company would be product oriented, but when we asked ourselves what markets we knew well enough to survive in, we decided we didn't know a single one. We didn't want to become consultants—a consultant is a guy who borrows your watch, tells you what time it is, keeps the watch, and sends you a bill for it. We're kind of unprofessional consultants. We take full responsibility for a project and guarantee our work."

TMI may yet enter the product field. "We think we'd like to get into the banking business somehow. But we don't know anything about banking. So, we have just recently started a bank. It's going very well—we now have two branches that are worth somewhere around $20 million. Soon we'll take a good hard look at the operation and try to figure out just how our particular talents could be used to improve the bank's operation, and then we'll try to interest other banks."

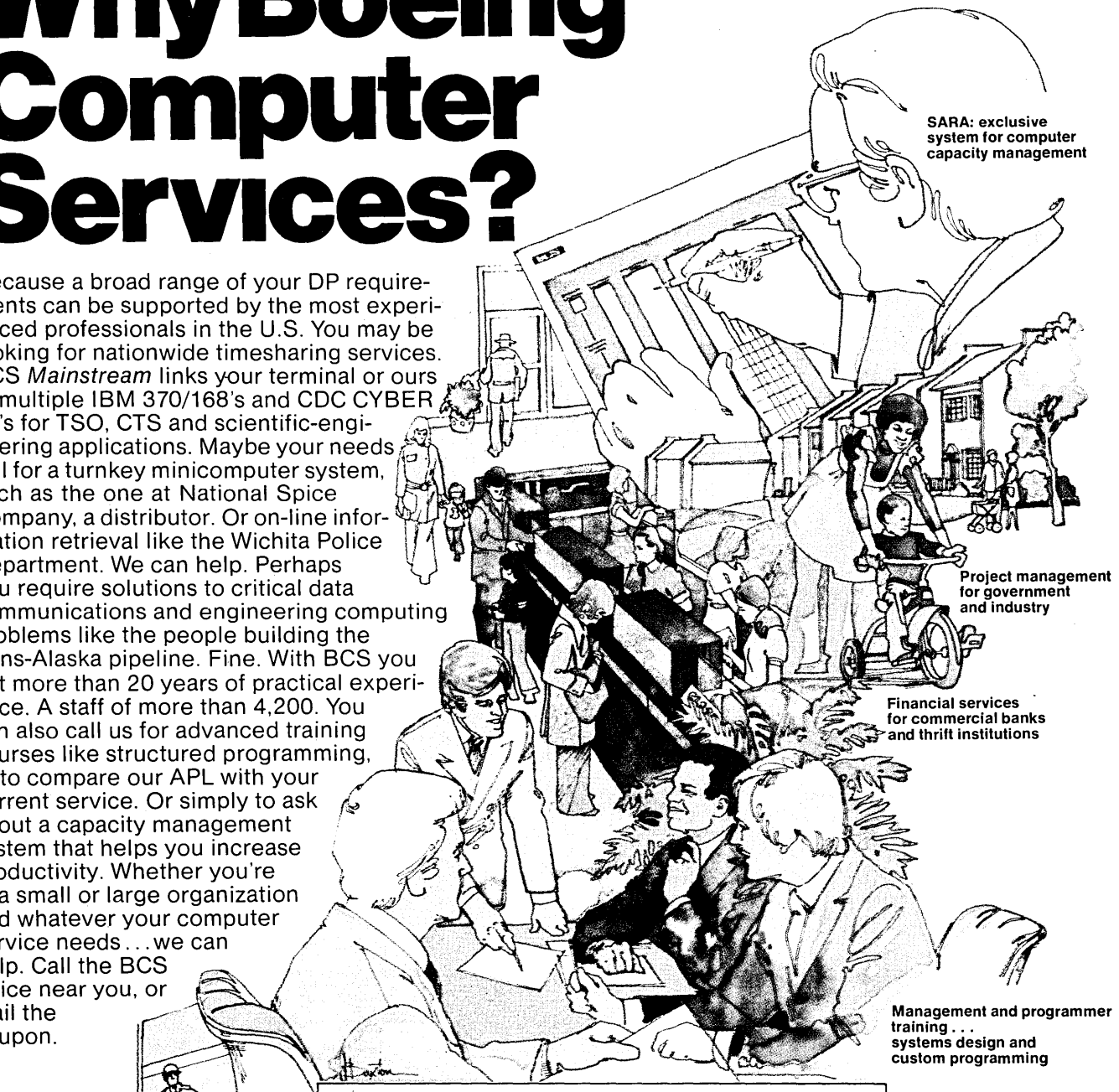
Is there some particular difference in this company that enables it to tackle tough engineering jobs so successfully? "I'd say we hire the best people we can find and then figure out how we can restructure the company to best make use of their talents. And after they've done one type of project, we light a fire under them to do something else—even to become entrepreneurial and step out and do their own thing. You know, people don't fit organizational charts or rectangular boxes very well—even when they're dead. When we think we like someone, we hire them as a consultant—at full consultant rates, just so they can get to know us, and vice versa. We want them to know what kind of place they're getting into."

In New Posts...

GEORGE VOSATKA, former president of Varian Data Machines, was elected senior vice president of General Automation, Inc. . . . HOWARD M. SELLAND was promoted to data processing manager at Aeroquip Corp. . . . DICK H. BRANDON resigned from Brandon Applied Systems, Inc., a company he founded, to "pursue consulting and other interests." . . . BAILEY V. COWART was elected treasurer of Stone & Webster Management Consultants Inc. . . . ROGER K. SMITH was named director of management information systems for Cutler-Hammer, Inc. . . . LOUIS FRIED was appointed manager, corporate management information systems for Ampex Corp. . . . THOMAS J. SWIATKOWSKI was elected assistant vice president in the systems and research department of Marine Midland Banks, Inc. . . . RICHARD SARDELL was appointed director-management information services for Associated Spring Corp., Bristol, Conn. . . . MAJ. GEN. DAVID D. BRADBURN is the new vice commander of the Electronic Systems Div. of the Air Force Systems Command . . . T. DAVID MC FARLAND was named executive director of the Data Processing Management Assn. . . . MARK W. SCHIEDINGER joined Control Data Corp. as vice president, finance, peripheral products . . . JON A. GRIFFIN was named national sales manager, TRW Data Systems. ✲

Why Boeing Computer Services?

Because a broad range of your DP requirements can be supported by the most experienced professionals in the U.S. You may be looking for nationwide timesharing services. BCS *Mainstream* links your terminal or ours to multiple IBM 370/168's and CDC CYBER 74's for TSO, CTS and scientific-engineering applications. Maybe your needs call for a turnkey minicomputer system, such as the one at National Spice Company, a distributor. Or on-line information retrieval like the Wichita Police Department. We can help. Perhaps you require solutions to critical data communications and engineering computing problems like the people building the trans-Alaska pipeline. Fine. With BCS you get more than 20 years of practical experience. A staff of more than 4,200. You can also call us for advanced training courses like structured programming, or to compare our APL with your current service. Or simply to ask about a capacity management system that helps you increase productivity. Whether you're in a small or large organization and whatever your computer service needs... we can help. Call the BCS office near you, or mail the coupon.



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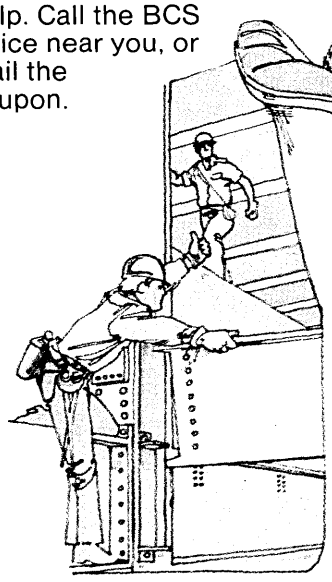
Management and programmer training... systems design and custom programming



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Title _____

Company or Organization _____

Address _____

City _____ State _____

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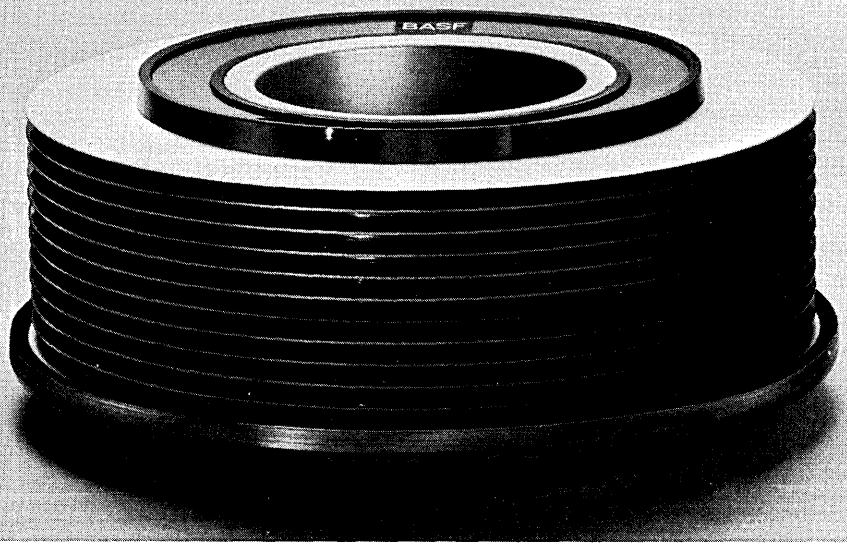
BCS BOEING COMPUTER SERVICES, INC.

P.O. Box 708, Dover, New Jersey 07801 ☐ (201) 361-2121

Better than you need, because someday you could need it.

The BASF 1246 Mod II pack.



Because all double-density disk packs conform to certain industry standards, you might think they're all equal. They aren't. The important difference is the extent to which a manufacturer is willing to go in order to *exceed* industry standards. Because there may be times when your disk pack will have to survive excessive head loading, temperature variations, extended use, and other unexpected trials, we make a pack that will go the extra distance for you. Let's look at a few superior points of the BASF 1246 double-density pack.

The binder that won't quit

As you probably know, magnetic coating doesn't stick to the aluminum disk all by itself. We use a special binding agent to produce an incredibly strong bond. The disk is sealed to prevent oxidation, so you can be sure that the coating won't peel or flake off.

Our own coating process

At this high level of packing density, it is even more important to monitor the thickness of coating deposited on the disk. The problem is compounded by the necessity for progressively varying the coating thickness from the outside toward the inside of the disk, because packing density is greater as the circumference decreases. In addition, unlike conventional disk packs, double-density disks must be magnetically oriented, which calls for even more sophisticated technology. For these reasons, we've discarded conventional coating methods in favor of an exclusive process using our own BASF-designed equipment.

A polished performance

Following the coating operation, we use our own exclusive polishing process to achieve optimum surface regularity. Here again, we're dealing with a double-density medium in which the heads fly much closer to the disk surface than in conventional disk packs. With our new polishing process, we've been able to achieve a surface measurably smoother than the industry norm . . . so flat that the possibility of a head crash being caused by uneven disks is completely eliminated. We might mention here that the coating and binder formulation, combined with coating and polishing techniques, all are important factors in achieving surface hardness, which is the ability of the coated surface to survive excessive or extended head loading.

Achieving balance

Like any rapidly rotating object, a disk pack will behave strangely if not perfectly balanced. In our precision balancing operation, any weighting required is screwed into place, which eliminates the potential for shifting inherent in a conventional adhesive weighting system.

And to make sure . . .

We test our 1246 disk packs to standards much tighter than those of the leading equipment supplier. If anything unpleasant should happen, we'd much prefer it happen here than on your drive. As a regular procedure, we do scratch tests to check coating thickness, impact tests to determine head crash resistance, detergent tests to check resistance to wear and temperature variations, and drop tests to make sure balance and alignment don't shift during shipment. We test to make sure our 1246 disk packs are error-free.

Finally

Our 1246 costs no more than other double-density disk packs. You're already paying for BASF quality . . . you might as well have it. For more information on the 1246 or other BASF disk packs or cartridges, write to BASF Systems, Crosby Drive, Bedford, MA 01730 . . . or call our nearest regional office: in Los Angeles, (213) 386-7023; in Chicago, (312) 343-6618; and in Clifton, NJ, (201) 473-8424.

You're already paying for BASF quality, you might as well have it.

BASF

CIRCLE 12 ON READER CARD

LOOK AHEAD

THE IBM 5100--FIRST OF A FAMILY

There is more to IBM's 5100 portable computer than meets the eye. General Systems Div. is hatching a whole new family of small computers styled around the 5100, all to be marketed by a special dedicated sales force. As of now, the 3100 is slated as the next to come. Among those most interested in the 5100 are minicomputer manufacturers making small control computers, who are eyeing the new equipment apprehensively. One of the first sales of the 5100 was to Digital Equipment Corp.

Elsewhere, the grey giant has delayed its 370 upgrade announcement, but the project--called the E Series internally--is still scheduled to go. Essentially, the plan is to soup up memories of the lower end of the 370, with the new models to be called 118, 128, 138 and 148.

AMDAHL CORP.: HOW FAST IS FASTER?

People who have run jobs through the new Amdahl 470 computer report a mixture of speed comparisons. At the first installation of this LSI machine--NASA's Institute for Space Studies--they're saying the Amdahl computer is 2.5 times faster than an IBM 158. NASA's Paul Schneck, pleased with the performance in the first few months of usage, looks for even higher throughput when NASA goes to VM.

But another organization on the East Coast, a publishing company which asks not to be identified, says its benchmark job ran only 10% faster than a 168-3. They're currently running under MVT and wish to stay with that system, but the Amdahl people say they think the benchmark would run faster under virtual.

The Univ. of Alberta, in Edmonton, is in line to get delivery of a 470 late this month (see p.123). Jerry Gabel, systems programming manager, says the 470 was 30 to 40% faster than a 168-3. The test was a simulation designed to learn the response times for a varying number of terminals, from 50 to 150, along with the elapsed time for a batch stream and the cpu time taken to do the various batch jobs. Both the response and elapsed times improved on the 470 as more terminals were simulated, but performance suffered above 100 terminals as the system began thrashing.

FLOPPIES: PRICE EROSION EASING

An end to drastic price cutting in the fiercely competitive flexible disc drive market is in sight. That's the observation of marketeers at Magnetic Peripherals, Inc., Hawthorne, Calif., who say they've noted a degree of stability within the last three months. The company, a joint venture of Control Data and Honeywell, sells its model 9400 floppy drive for about $400 in large quantities. Three years ago, some suppliers were talking of a $700 price tag for their offerings.

Studies by the company indicate the 14 major suppliers in that business will ship between 60,000 and 75,000 drives to oem markets in 1976. That would double this year's expected shipments of 30,000 to 35,000. The studies also show that some 200,000 units will be shipped in 1980, with as few as five suppliers holding about 80-90% of that market.

Magnetic Peripherals, which recently harvested orders for some 50,000 units to be shipped over the next three to five years to Honeywell, Data General and Burroughs, now plans to set up a second production line in Oklahoma City. Its facilities in Hawthorne, sold recently to aerospace manufacturer Northrop Corp., will be moved later to a second location--possibly in the eastern U.S., but Europe is not being ruled out.

DAVID STRIKES BACK

Tiny Qume Corp., Hayward, Calif., printer manufacturer, has taken its legal stand in a David and Goliath court confrontation with giant Xerox Corp. and its subsidiary, Diablo, Inc. (September, p. 107). Xerox is suing Qume for alleged trade secret misappropriation and patent infringement. Qume, on Aug. 29, countersued charging two counts of antitrust violation, one of unfair competition and one of patent abuse. Robert Schroeder, Qume president, explained the last count as "abuse of patent laws."

LOOK AHEAD

Qume already has won a minor scrimmage in what looks like a long ballgame (trial date has been tentatively set for June of 1976). In a Sept. 9 hearing, U.S. District Court Judge Charles B. Renfrew denied from the bench a Xerox petition for a preliminary injunction to keep Qume from inducing Diablo employees from revealing trade secrets. "That amounts to asking for an injunction against illegal activity," said Schroeder. Next step in the legal go-round is a status conference before Judge Renfrew in November.

AUSTRALIA'S FIRST IS A MINI

The first Australian-made computer will be a mini--the model CM-202, a 16-bit machine developed by Computer Manufacturers Australia, of Artarmon, New South Wales, which sells Honeywell 316-based key-to-disc data entry systems in that country. The CM-202, with 16K of semiconductor memory expandable to 64K in 16K increments, and priced at $7,500, was announced early in September by the 84-person company. It plans to make 20 to 30 a year, some of which will be incorporated into its shared processor line. Next offering would be a CM-203, with a 25% increase in processing speed over the 202's single precision add of 1.9 microseconds, double precision of 2.8, multiply of 4.6 and divide of 8.4 microseconds.

BUY NEW, SAYS USED DEALER

In a strange switch, IBM is becoming a used computer dealer, after a fashion, while some of the bona fide used computer dealers are specializing in selling new IBM equipment. To wit: IBM won't guarantee customers a new 370/158 anymore, while Continental Information Systems Corp., Syracuse, will. The turnabout is explained by the fact that Continental has order positions from IBM for new 158s, while IBM is getting returns of 158s. Moreover, the new equipment can be more valuable to customers who can take advantage of investment tax credits which can surpass $200,000 for a 158. Continental figures it will move more than $16 million of new 158s this year.

CDC: NEW ASSIGNMENTS FOR THE LOAN COMPANY?

Control Data has been saying that the appointment this month of veteran computer executive Paul G. Miller to the presidency of its financial subsidiary Commercial Credit Corp. coincides with a plan by Commercial Credit to offer data processing related services. Miller, who joined CDC in 1957, had been president of its marketing company. Part of the plan may be the installation in the subsidiary's 800 loan offices of CDC's computer assisted instruction network, called PLATO. Terminals would be used in the training of loan clerks during the day and in offering self-enhancement courses to the public in the evening. There's a vigorous "courseware" program under development at both CDC and the Univ. of Illinois to run on the PLATO network. An announcement may be made early next year.

The financial subsidiary also is being considered as an avenue into the small business market where, in addition to financial services, it would offer data processing services--perhaps even a small business computer. There are some at CDC who think there would be interest in a version of the company's Cyberdata key entry system, announced last month for distribution in the U.S. It's a System 17-based product the company has been selling overseas for two years.

WHERE HAVE ALL THE PICKETS GONE?

More than a year after it started, a strike by Burroughs customer engineers against the corporation's New York financial branch (June, p. 18) was still going but maybe not as strong as it was going at its height when picketing was active at 35 sites, including user installations. A spokesman for the New York Federal Reserve Bank, a big Burroughs user, said in mid-September that he hadn't seen a picket in "a week or two" although picketing had been continuous for "a couple of months."

The strike started on Aug. 26, 1974. In late September representatives of the union, Local 3 of the International Brotherhood of Electrical Workers, Burroughs, and a New York State mediator were meeting three days each week.

(Continued on page 140)

STARAN translates billions of bleeps into undersea pools of oil.

Before risking millions of dollars for offshore drilling rights, exploration teams have to spend hundreds of hours recording sound waves reflected from the ocean floor.

But the job of processing these billions of bits of data can drown even a powerful scientific computer. That's why energy companies are evaluating Goodyear's STARAN® associative parallel array processor.

Ordinary digital computers process only one or a few discrete points of an image at a time. But the STARAN system combines content addressability with parallel array arithmetic to process an entire hydrophone array, consisting of thousands of data points, at once.

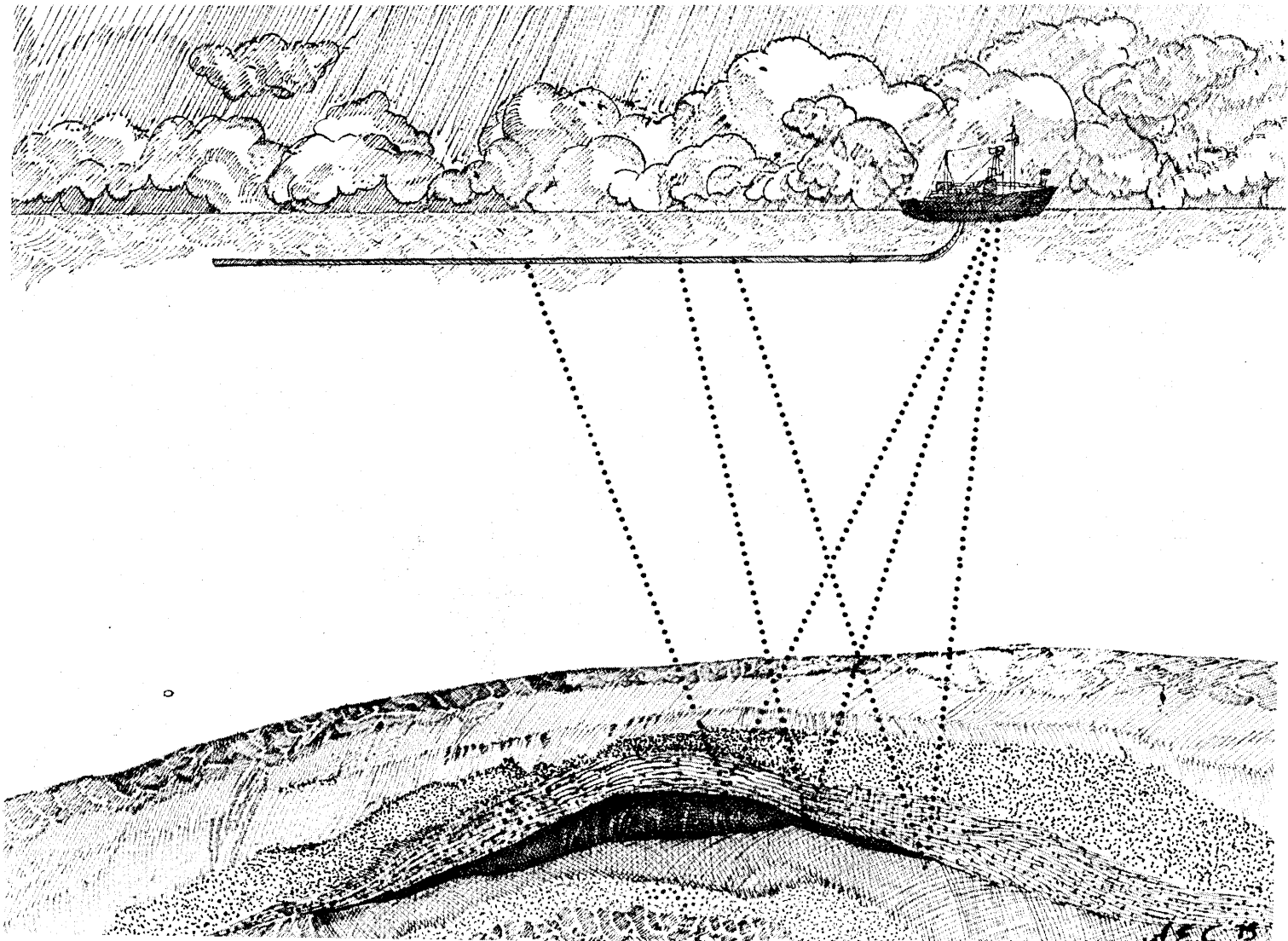
And because this unique capability dramatically speeds operations, massive improvements in throughput are possible. That's why the STARAN processing system is unmatched in its ability to solve problems requiring operations on many similar data streams or high-speed searches of many similar file records.

So before you invest a lot of money in a processing system, invest a little time. Look into STARAN. The more severe your requirements, the more money it may save you.

For complete information, just write to Wayne Brubaker, Goodyear Aerospace Corporation, Akron, Ohio 44315. Or call him at (216) 794-3631.

CIRCLE 72 ON READER CARD

GOODYEAR
AEROSPACE



silent 700
electronic data terminals

Texas Instruments "Silent 700" programmable data terminals:

A price you can afford. Performance you can count on. And copy you can keep.

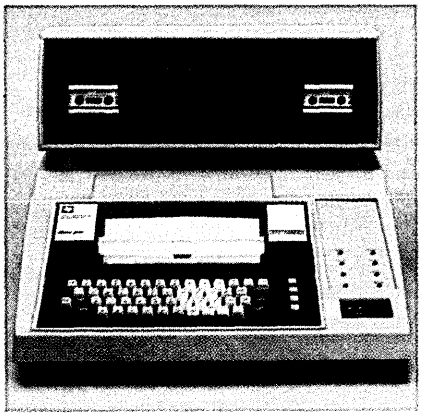
"Silent 700*" Model 742 programmable data terminals offer a lot more than mere intelligence for business management systems.

They give you a complete terminal package in locations where most business information is generated and used . . . such as remote offices, warehouses, stores or hospitals.

A quiet, self-contained thermal printer gives you a retainable audit trail of transactions for easy reference, routing and filing.

The simple TICOL language lets you generate your own user programs on the terminal itself, with no separate equipment or central computer support required.

And the same terminal package holds all the communications features and options you need to move data to and from your computer or other terminals.



Versatile "Silent 700" programmable data terminal offers easy operation and powerful options for many business management systems.

Cost-effective performance

Standard in each "Silent 700" programmable data terminal is the microprocessor and memory capacity to handle most user applications.

For applications requiring increased capacity, additional memory with a more powerful TICOL language can be added as an option in the same terminal package.

Dual magnetic tape cassettes let you store your programs and data conveniently, for later transmission to your computer.

And combined with these powerful performance features are quiet 30-characters-per-second printing speeds and communications features that help reduce over-all system costs.

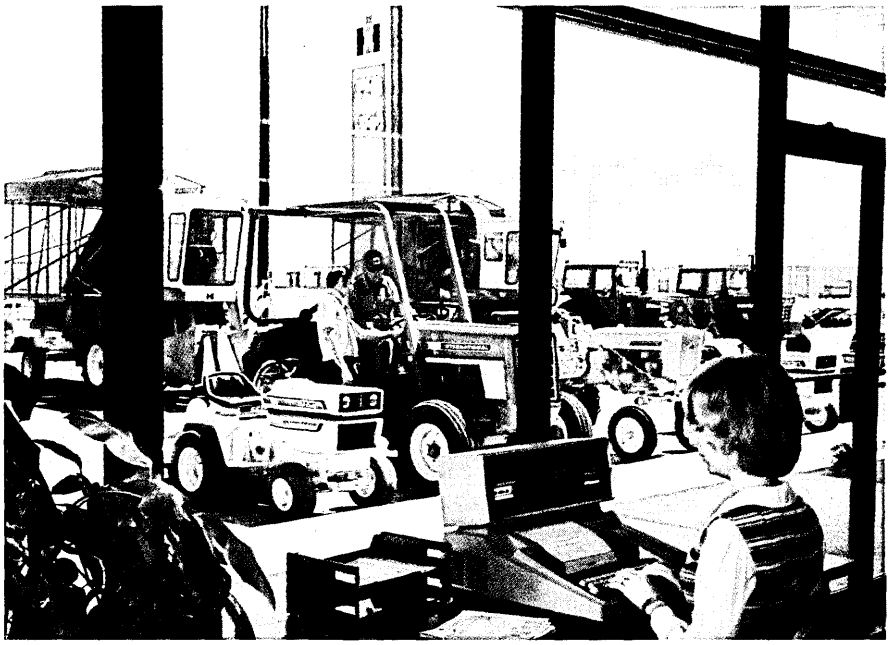
Improving man's effectiveness through electronics

Systems network adaptability

If your business system involves tying your Model 742 terminals together in a complete communications network, TI offers the Model 700 TPS* Terminal Polling System.

Designed around the TI Model 960 Series minicomputer, the TPS automatically calls remote "Silent 700" data terminals, collects data stored on the magnetic tape cassettes, and logs the data on magnetic tape in a format readable by a host computer.

This scheme gives users a complete, cost-effective data capture network for distributive data processing and communications.



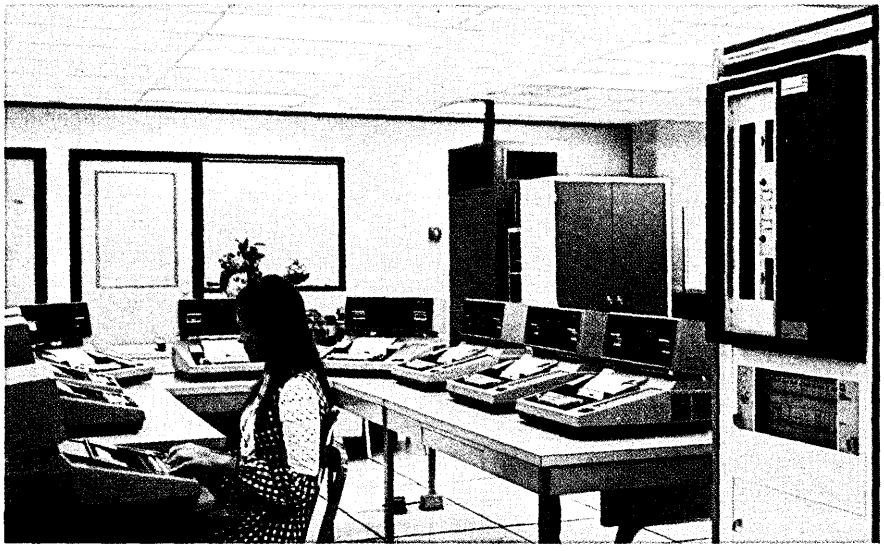
International Harvester dealers throughout the country use "Silent 700" programmable data terminals for quick, economical management of inventory and accounting data.

International Harvester found more . . .

International Harvester, which recently selected a large quantity of these models for use by its dealers for remote data entry and local processing in Service Parts Inventory Management and Dealer Accounting Data Services, has this to say:

"The TI terminal answers International Harvester's needs — simplicity of operation, nationwide service and the capacity to fill our dealers' requirements at a moderate price."

International Harvester dealers throughout the country will benefit from reduced information transmission time, better control of warehouse parts inventory and smoother daily operation with continually up-to-date information.



Model 700 TPS Terminal Polling System links the TI 960 Series minicomputer with "Silent 700" terminals for a complete data network.

What's your application?

If you're interested in an affordable solution for your distributive data processing and business management systems needs, contact the TI problem-solvers at the nearest office listed below. Or, write Texas Instruments Incorporated, P.O. Box 1444, M/S 784, Houston, Texas 77001. Or, call Terminal Marketing at (713) 494-5115, ext. 2126.

We'll show you how to get performance you can count on, backed by dependable service, at a very affordable price.

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TEXAS INSTRUMENTS
INCORPORATED

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calendar

OCTOBER

38th Annual Meeting, American Society for Information Science, **Oct. 26-30,** Boston. Sessions on planning for a national information policy, teleprocessing, information networks, microprocessors, special interest group meetings, professional education workshops, and more than 100 exhibits will explore the technological, social, and economic impact of the conference theme, "Information Revolution." Fee: $70, member; $90, nonmember; $10, student. Contact: ASIS, P.O. Box 19448, Washington, D.C. 20036, (202) 659-3644.

8th National Data Processing Congress, **Oct. 27-31,** Sao Paulo, Brazil. Sponsored by SUCESU, Brazilian Society of Computer Users, this conference will take place concurrently with the 1st Latin American Seminar on Data Communication, sponsored by technical committee TC6 of IFIP. An audience of 3,000 will participate in the technical program, covering computers in business, computer networks, financial, industrial, and business applications, among others. Simultaneous translation in English and Portuguese. Fee: $100. Contact: SUCESU, Av. Paulista, 1159, cj. 1404, CEP 01311, Sao Paulo, Brazil.

Business Systems/Products Show, **Oct. 28-30,** New York. Exhibits and seminars will focus on telecommunications, word processing, calculators/computers, and records management, with emphasis on the use of this equipment in the office environment. Admission to the exhibits is free, by invitation; conference sessions are $35 each, with discounts for multiple registrations. Contact: Joseph Doblmeier, Convention Management Associates, P.O. Box 32, Carle Place, N.Y. 11514, (516) 997-7513.

Canadian Computer Show and Conference, **Oct. 28-30,** Toronto. Nearly 10,000 persons are expected to view displays of computers, peripheral equipment, and software, and participate in morning conference sessions organized by the Toronto chapter of the Canadian Information Processing Society. Topics will include data base systems, communications and security, and data switching networks. Conference fee: $60. Admission to exhibits by industry invitation cards. Contact: Derek A. Tidd, Industrial and Trade Shows of Canada, 481 University Ave., Toronto M5W 1A7, (416) 595-1811.

National Micrographics Assn. Mid-year Meeting, **Oct. 28-31,** New Orleans. A "Fundamentals of Micrographics" seminar for newcomers to the field will be held the first day; the following days will feature technology sessions on "Micrographics Focuses on the Future." The program is organized on two tracks—one covering general micrographics equipment and applications, and the second on computer output microfilm and data processing. Fee: $75. Contact: John B. Bidwell, Conference Dept., NMA, 8728 Colesville Rd., Silver Spring, Md. 20910, (301) 587-8444.

NOVEMBER

Electro-Optics '75 and International Laser Exposition, **Nov. 11-13,** Anaheim. About 6,000 persons are expected to attend the exhibition and technical program designed to explore recent developments and trends in these fields. Displays include components for design, manufacture and use of computer systems, infrared systems, image sensors, information displays, etc. Technical sessions, workshops, and seminars will be of special interest to electro-optical and laser engineers, designers and physicists. Fee: with proceedings, $65; without proceedings, $30. Contact: Donna Jernigan, ISCM, 222 W. Adams St., Chicago, Ill. 60606, (312) 263-4866.

Minicomputers in Government and Industry Conference, **Nov. 17-19,** Washington, D.C. Sponsored by the American Institute of Industrial Engineers, this meeting will focus on minicomputer technology and applications. Speakers include presidents of major mini manufacturers; a General Accounting Office report on minicomputer usage will be presented. Fee: $295, teams $195. Contact: Dept. PCIS, AIIE Seminars, P.O. Box 25116, Los Angeles, Calif. 90025, (213) 826-7572.

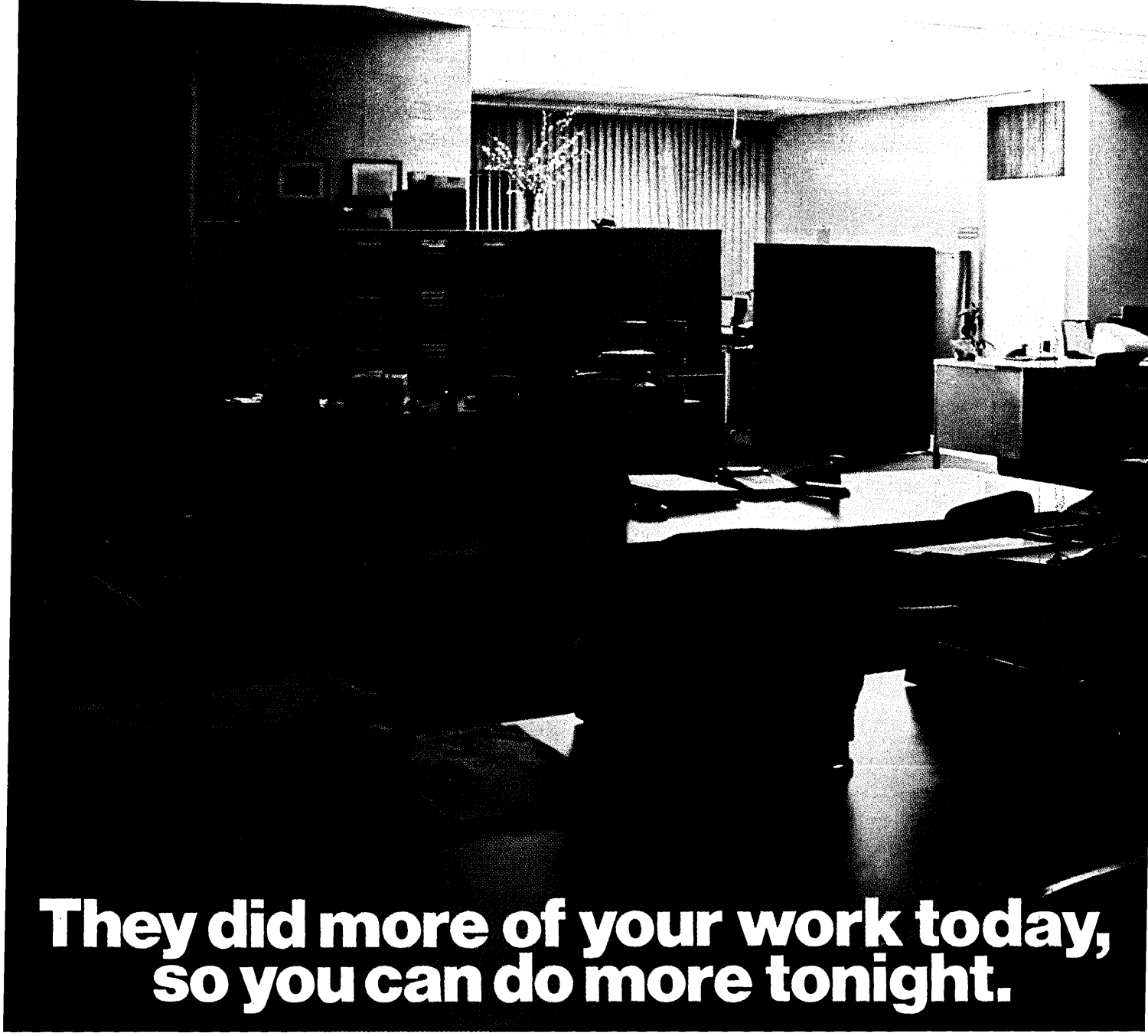
2nd Annual Computer Security Conference & Workshop, **Nov. 17-19,** New York. The latest developments in data and software security, fraud and embezzlement, dp auditing, privacy, and personnel security will be among topics discussed during this meeting sponsored by the Computer Security Institute. Risk managers, dp managers, security officers and systems analysts are the target audience. Fee: $295, members; $445, nonmembers. Contact: John C. O'Mara, Computer Security Inst., 43 N. Boston Post Rd., Northboro, Mass. 01532, (617) 393-3666.

5th Symposium on Operating Systems Principles, **Nov. 19-21,** Austin, Texas. Program for this conference, sponsored by SIGOPS-ACM and the Univ. of Texas, will cover operating system design, networks and multiprocessors, security and protection, proof techniques, analysis of algorithms, and the HYDRA operating system. Fee: $55 to $75, depending on membership. Contact: A. Ambler, Dept. of Computer Sciences, Univ. of Texas, Austin, Texas 78712.

DECEMBER

National Telecommunications Conference, **Dec. 1-3,** New Orleans. Forty-two sessions and nearly 250 papers will explore the theme, "Communications—Nucleus of a Nation." A tutorial short course (separate fee, $25) will deal with microprocessors and their impact on communications, and there will be a panel discussion on women in communications engineering. Other major topics include social implications of technology, technology forecasting, space communication, satellite systems, environmental monitoring, and regulations. The conference is sponsored by the New Orleans section and Communications Society Board of the IEEE. Fee: (includes luncheon and banquet) $55, member; $65, nonmember; add $10 after Nov. 15; $5, student. Contact: H. B. Ashe, So. Central Bell Telephone Co., 3500 N. Causeway Blvd., Rm. 710, Metairie, La. 70035, (504) 831-4242. ❋

Conferences are generally listed only once. Please check recent issues of DATAMATION for additional meetings scheduled during these months.



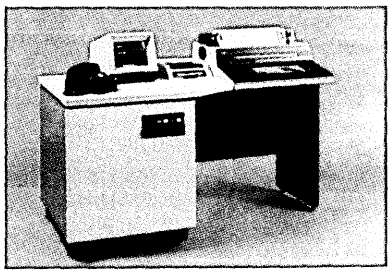
They did more of your work today, so you can do more tonight.

The new MDS System 2300 lets the people who create your workload handle some of the load.

System 2300 is an intelligent programmable terminal which gives you the efficiency of document preparation and *simultaneous data entry,* where the data originates.

Your programmed instructions are displayed in plain English on the 2300 CRT and guide the operator through forms preparation. The result is properly prepared data waiting for automatic transmission to your central processor. Data and forms are prepared in *a single, error-free operation* on System 2300 by your existing clerical personnel.

At night the 2300, in unattended mode, sends selected disk stored data to your Network Controller or CPU. And processed results are delivered to your terminals overnight. System 2300 can satisfy your local, central and network objectives. It can do it faster, more accurately and with greater flexibility than any previously available system. With intelligent data entry and document preparation handled remotely during the day, you reduce the processing load on your computer center.



Currently installed 2300's are demonstrating remarkable productivity gains in applications such as invoicing, purchasing, order entry, inventory control and management reporting.*

System 2300 comes from the Data Entry specialists, and is backed by one of the finest support teams in the industry. With System 2300 you can consolidate your data management resources, increase operating efficiency, reduce central computer usage, and make a significant contribution to your bottom line. By stretching your 8-hour day into 24 hours of productivity.

Ask your local MDS representative to show you how System 2300 can reduce your workload so you can do more work. Call (201) 540-9080 or write Mohawk Data Sciences Corporation, 1599 Littleton Road, Parsippany, NJ 07054. We'll get back to you overnight.

*Documentation available on request

MDS®

Mohawk Data Sciences

CIRCLE 27 ON READER CARD

THE NEW SYCOR 440

SYCOR INC

Clustered data entry and concurrent processing with shared files...$677 a month.

The Sycor 440 System: the newest addition to our family of compatible intelligent terminals.

Our new distributed processing system lets you perform data entry and inquiry/response concurrent with background processing. So you don't need multiple systems to do multiple jobs. At $677 a month (for four keyboards, communications, cassette, and a five mb disk on a three year lease, with maintenance) you can perform all these functions—plus many more you never thought possible at such a low price.

Intelligent data entry.

You can save time and money by catching operator errors as they happen, prior to transmission to the central computer site. And reduced errors mean greater operator productivity, lower communication costs and reduced mainframe processing.

Field editing. As soon as you get the system, you can implement our basic data entry package. Without any fancy programming.

TAL II. To extend the 440's power, use our new data entry language, TAL II. This easy-to-use, high-level language lets you customize data entry programs. Instructions are also provided for arithmetic operations, conditional data entry, range checking, table look-up, equal/compare and a host of other intelligent features.

Shared file access.

The 440 system lets you share and access files locally, reducing investments in telephone communications and central CPU resources.

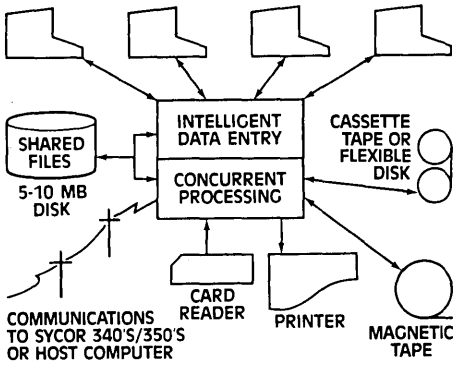
Data entry made easy. Now each operator, at her own display, can make use of current data in shared files to support data entry functions. For reduced keystrokes and lower error rates.

Inquiry/Response. File look-up is made simple with up-to-date information on-site, using the 440's own file management and disk storage capabilities.

System modularity.

Design your own system with a variety of options and peripherals.

Supports from 1 to 8 displays. Each is controlled by the Sycor processor and is capable of performing tasks independent of other displays.



Choice of 5 and 10mb disks. Store and retrieve programs, shared files, and data at remote locations.

Wide variety of peripherals. And to complete our system configuration, choose from matrix and line printers, computer-compatible tape drives, card readers, and a variety of communications options.

Compatibility.

There's full software compatibility with our Model 340 and 350 stand-alone terminals. Keyboards are also compatible.

Programming. One program fits three different systems—340, 350 and 440.

Communications. Communicate with the mainframe, emulating IBM 2770, 2780 or 3780 protocols. Or use the 440 as a polling station at your central computer site to receive and transmit data to remote 340s, 350s, and 440s.

Concurrent processing.

And best of all, while data entry is being performed in the foreground, you can be doing other jobs concurrently in the background. Jobs that can save you time and money. Jobs like:

Remote job entry. Use the 440 with its card reader and 300 LPM printer for large-scale remote job entry. And since the system contains a CRT and a keyboard, you don't pay extra for them.

Multi-terminal printer support. Each display can interleave print data to one printer as the data is being entered. So, you don't need a separate printer for each display.

Report generation. Sycor-provided programs let you produce all sorts of management reports—sales analysis, inventory, or billing—at the same time as you are performing data entry.

File maintenance. And the Sycor 440 allows you to do editing, sorting, updating, and file transfer in a background operation.

The lowest-priced distributed processing system.

When you consider all the advantages of our 440 system, and then consider its low monthly cost, we think you'll agree: it's the best system in the industry.

For more information on the new Sycor 440, or any of our other intelligent terminal systems, contact your Sycor representative, or write our corporate offices.

SYCOR

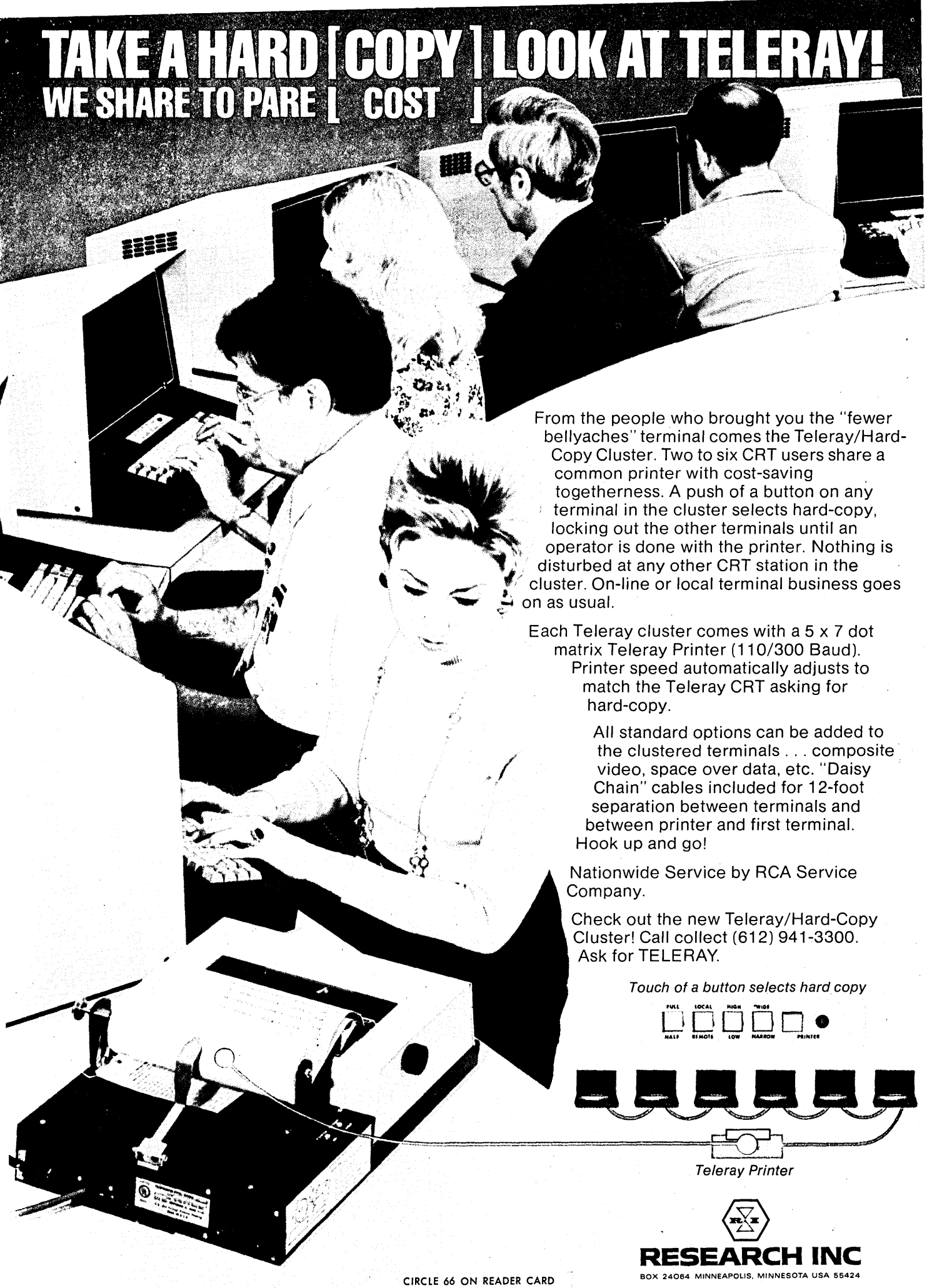
... applying intelligence to remote processing.

CORPORATE OFFICES: Ann Arbor, Michigan 48104 (313) 971-0900. DISTRICT SALES OFFICES: Atlanta (404) 455-3070 • Boston (617) 890-7290 • Chicago (312) 297-5200 • Cleveland (216) 741-4840 • Columbus (614) 888-8657 • Dallas (214) 521-6710 • Denver (303) 458-0794 • Detroit (313) 355-5770 • Greensboro, N.C. (919) 274-2964 • Hartford (203) 529-1100 • Houston (713) 785-2953 • Indianapolis (317) 788-1577 • Kansas City, Mo. (816) 842-7799 • Los Angeles (213) 640-0120 • Miami (305) 592-1533 • Milwaukee (414) 257-3780 • Minneapolis (612) 854-2309 • Newark (201) 773-7400 • New York (212) 371-9050 • Philadelphia (609) 665-1170 • Pittsburgh (412) 922-3350 • Portland, Ore. (503) 227-5672 • San Francisco (415) 349-6626 • St. Louis (314) 878-0090 • Washington (703) 527-0200. CANADA: Sycor International Ltd.; Ontario and Quebec.

CIRCLE 60 ON READER CARD

TAKE A HARD [COPY] LOOK AT TELERAY!

WE SHARE TO PARE [COST]



From the people who brought you the "fewer bellyaches" terminal comes the Teleray/Hard-Copy Cluster. Two to six CRT users share a common printer with cost-saving togetherness. A push of a button on any terminal in the cluster selects hard-copy, locking out the other terminals until an operator is done with the printer. Nothing is disturbed at any other CRT station in the cluster. On-line or local terminal business goes on as usual.

Each Teleray cluster comes with a 5 x 7 dot matrix Teleray Printer (110/300 Baud). Printer speed automatically adjusts to match the Teleray CRT asking for hard-copy.

All standard options can be added to the clustered terminals . . . composite video, space over data, etc. "Daisy Chain" cables included for 12-foot separation between terminals and between printer and first terminal. Hook up and go!

Nationwide Service by RCA Service Company.

Check out the new Teleray/Hard-Copy Cluster! Call collect (612) 941-3300. Ask for TELERAY.

Touch of a button selects hard copy

Teleray Printer

RESEARCH INC

BOX 24064 MINNEAPOLIS, MINNESOTA USA 55424

CIRCLE 66 ON READER CARD

source data

SOURCE DATA provides information on books, courses, references, reports, periodicals, and vendor publications.

books

Structured Programming Textbook
(SR20-7149) 102 pp.

Structured Programming Workbook
(SR20-7150) 202 pp.

IBM, Data Processing Division,
1130 Westchester Ave.,
White Plains, N.Y. 10604
(Nov., 1974)
$30 the pair

It is interesting how new ideas mature in the computer field. Ideas are produced in great profusion within our research laboratories, universities, and industrial facilities. Some small fraction of these are written about and published in magazines and journals. A fraction of that fraction matures sufficiently to be of some actual use. These are recorded in textbooks, handbooks, and on video tapes for use in instructing the journeymen who daily practice the art of programming. The third stage of maturity sees the ideas embedded in compilers, operating software, and industrial programming standards so they can become commonplace throughout the field (and so their introduction can be controlled and managed).

It appears that structured programming has reached the second stage. The *Structured Programming Textbook* is designed for self-study. The Workbook is about twice as thick, and if one spends the 20 hours of self-study called for by the text, he will have a good grasp of the subject.

Most of the articles on structured programming published up to now have attempted to sell structured programming as a concept to the reader. The debates have been endless since 1968. This text assumes the debate is over, and that you want to know how to use it and what it will do for you. This text accomplishes that aim very well.

After a short introduction, the first half introduces structure charting and a companion language called "Pseudo Code." It is apparent from the start that structure means discipline. It is also apparent that quite a bit is gained from following the recommended disciplines. It *is* possible to separate crisply the control flow from the arithmetic associated with producing the answers. Furthermore, it is possible to make that control flow easy to read, and with some practice, rather easy to write. There is even a chapter with assignments specifically aimed at writing structured code in COBOL and in PL/I.

The book closes with a chapter on top-down design. This is much weaker than the rest of the book, clearly indicating that designing in the new architecture is not nearly as mature as putting the results of those designs down on paper.

I have a common complaint about all the texts I've seen on the subject—the examples chosen are small, the I/O involved is so trivial as to be almost nonexistent, and exceptions, restart, recovery, and audit trails are not discussed at all. This may be because the basic work derives from the college community which has little experience in such production oriented matters, or because the new techniques are mature enough to handle in-core processing, but are not yet ready to attack the more complex file structures and data base constructs.

I for one am sufficiently intrigued by the progress made to date that I'm waiting anxiously the announcement of compilers which are flexible enough to accept local structured programming standards, and provide diagnostics when they are violated.

—**R. L. Patrick**

Mr. Patrick is a multitalented dp consultant, and one of DATAMATION's contributing editors.

Health Information Systems Evaluation
(Proceedings of the Symposium, Aug. 15-17, 1973, Aspen, Colo.)

Russel C. Koza, ed.
Colorado Associated University Press,
Boulder, Colo., 1974
352 pp. $10

This symposium proceeding's topic is relevant and important. Far too little emphasis is placed on evaluation of health computer systems and their various applications.

The first part is comprised of an overview by Denise A. Klein and an evaluation of technological innovations by Jay Goldman. In discussing a broad spectrum of views on health information systems, Ms. Klein makes the telling observation: "Few authors whose books and articles I examined question whether health information systems are desirable, or whether there is any relationship between health information systems and improved health care delivery."

Part Two consists of five papers on evaluation methodologies and particular experiences. These papers deal with establishing a functional ongoing project in both administrative and clinical application areas. Much can be gained from these authors' experiences.

The third and last section is devoted to the impact of health information systems and evaluation experiences. A fine dissertation by Homer Schmitz explains his experience at Deaconess Hospital; the actual evaluation is well documented. A paper by Douglass Williams describes what the Kaiser-Permanente Information System went through and emphasizes the importance of an overall plan. John Gall's experience at El Camino Hospital gives some "truth" and "fiction" cost justifications, and he adds some useful caveats. A summary by Herbert Isaacs pulls the various papers together.

These proceedings do address the point of health information systems evaluation, and thanks must go to the editor, Russel C. Koza, Ph.D. of the Univ. of Colorado School of Medicine, Div. of Health Administration, for putting these practical and factual papers at our disposal.

—**Marion J. Ball**

Prof. Ball is director of the health sciences center computer systems and management group, and an associate professor of biometrics, at Temple Univ., Philadelphia.

BOOK BRIEFS . . .

Privacy, Security and Computers

by O. E. Dial & Edward M. Goldberg
Praeger Publishers, 1975
169 pp. $14

Subtitled "Guidelines for Municipal and Other Public Information Systems," this book has been prepared primarily for city officials and other "concerned citizens." Packed with results of extensive studies regarding the threat to privacy involved in governmental and business dp systems, the volume includes planning information, a discussion of special problem areas, and specific examples of existing municipal ordinances and regulations on dp systems.

Issues in Business Data Processing

Elias M. Awad, and Data Processing Management Assn., eds.
Prentice-Hall, Inc., 1975
361 pp. $7.95 (paperback)

This easy to read book is a compilation of articles by noted authors emphasizing day to day operations and applications in business dp. Suggested as a supplement to introductory texts, this volume includes such chapters as: "What Use is a Computer?," "Optical Readers and OCR," "Point of Sale and the Grocer," and "The Computer as a Threat to Individual Privacy." Other items covered are program prepara-

tion, minicomputers, real-time dp, management information systems, dp management (with a look at personnel selection), and a look into the future.

Systems Simulation—The Art and Science

by Robert E. Shannon
Prentice-Hall, Inc., 1975
387 pp. $14.95

This text presents the process of designing a simulation model, running experiments with it, and analyzing the results. The author declares at the outset that the entire process is basically an intuitive one and therefore few firm rules and outlines exist. Designed for courses in engineering, management science, computer science, or business administration programs, the book offers a careful definition of terms, abundant references, and well-documented case studies.

Advanced Applications for Pocket Calculators

by Jack Gilbert
Tab Books, Blue Ridge Summit, Pa., 17214 (1975)
304 pp. $8.95 ($5.95 paperback)

Packed into this unpretentious-looking volume are mathematical and scientific problems and examples that range well beyond the simple calculations usually described. The book offers detailed programs for all types of calculators, including 4-function, scientific, programmable, electronic slide rules, metric converters, and business units, and discusses specific calculators of manufacturers such as Hewlett-Packard, Texas Instruments, Bowmar, Rockwell, Casio, etc.

Personalized Data Base Systems

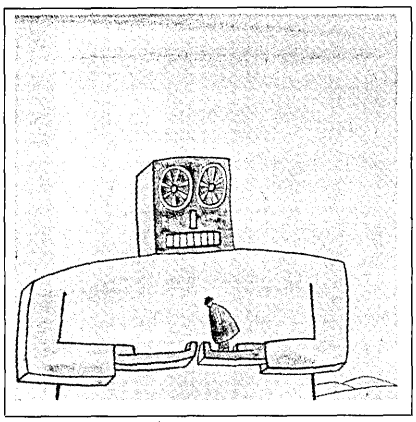
by Benjamin Mittman & Lorraine Borman
Wiley & Sons, 1975
312 pp. $18.95

Beginning with an overview of computer-based information retrieval systems, the authors present comprehensive case studies of the Remote Information Query System (RIQS) currently used by Northwestern Univ. Advanced computer science students as well as research workers in medicine, the social sciences, university administration, and other disciplines are likely to be interested in the variety of applications available through RIQS, and may be able to adopt some of the techniques presented here when choosing their personalized information retrieval systems.

Introduction to Computer Data Processing

by Margaret S. Wu
Harcourt Brace Jovanovich, Inc., 1975
460 pp. $11.95

This book captures the reader's attention with well-designed graphics and a lighthearted use of illustrations to emphasize key points. Intended as an introductory course, it presents an overall view of the computer and its applications, and fundamental concepts of hardware and software. The well-researched material is presented clearly, and as traditional topics such as number systems, minicomputers, problem analysis for business dp, programming languages (these chapters cover FORTRAN, COBOL, and PL/1), documentation, and current and future problems are discussed, a number of sidebars are included as highlights. These incidentals demonstrate the impact of computers on everyone's life, such as computer programs to classify tv shows, diagnose heart disorders, match kidneys for transplants, write poetry, catch speeders, assist teachers, and control colors of fabric dyes.



State Government Systems

The 1974-75 edition of *Information Systems Technology in State Government* surveys activities of state information systems in the 50 states plus Quebec. This useful report presents a computer application inventory by state agency, and an inventory of computer configurations, communications, and data entry equipment for each agency. Numbers and types of personnel, funding and expenditures, data security and privacy, training, coordination and control, difficulties experienced by dp management, and plans and documentation are among the report features. Prime contacts for each state are also listed. Price: $15 (discounts for quantity orders). NATIONAL ASSN. FOR STATE INFORMATION SYSTEMS, P. O. Box 11910, Lexington, Ky. 40511.

Directory of Suppliers

Profiles of 780 companies that supply all types of products and services of interest to computer users are presented in the 160-page *Directory of Suppliers,* reprinted from the July supplement to *Datapro 70.* Standardized entries include each company's location, size, management, financial status, product line, and sales and service organization. The entries are arranged in a comparison chart format for ready reference. Price: $25. DATAPRO RESEARCH CORP., 1805 Underwood Blvd., Delran, N. J. 08075.

Insurance Software Catalog

EDP Software Catalog details information on 200 software packages from 67 software and service companies. The majority are for use in the insurance industry. Prices, payment methods, brief descriptions, language used, core storage and operating system required, availability of documentation, and companies using the package are among the details supplied. Price: $25 ($15 to LOMA members). LIFE OFFICE MANAGEMENT ASSN., 100 Park Ave., New York, N.Y. 10017.

WATS Advantages

The growth in new WATS (Wide Area Telecommunications Services) installations is related to the increased rates of other common carrier services. The advantages of WATS as a cost-effective alternative to domestic long distance calls and to other services are evaluated in the revised report, *WATS: From the User's Perspective.* The "interim" AT&T rate increase of March 1975 is taken into account. Price: $40. CENTER FOR COMMUNICATIONS MANAGEMENT, INC., Ramsey, N.J.

FOR DATA CIRCLE 220 ON READER CARD

Microform Readers

The *Auerbach Guide to Microform Readers and Reader-Printers* provides detailed specifications and functional capabilities of about 45 of the most prominent readers, reader-printers, and enlarger-printers. The report also presents a tutorial and market overview, plus a search chart list of more than 200 devices from some 60 manufacturers. A directory of suppliers is included. Price: $19.95. AUERBACH PUBLISHERS INC., 121 N. Broad St., Philadelphia, Pa.

IEEE Index

Technical papers and documents of relevance to the computer community —some published elsewhere, some institutional reports, some original mate-

You already have everything you need to keep our keyboards clean.

Getting any keyboard dirty is easy.

From that point on, things become more difficult. Because the contacts on mechanical keyboards are very sensitive to contamination. And, if the dirt hasn't already gotten to them, the cleaning process might.

MICRO SWITCH makes the cleaning process easy. All it takes is a bucket of hot, sudsy water. And maybe a brush.

Because MICRO SWITCH has solid-state keyboards. Designed around Hall effect chips that are completely encapsulated, they're impervious to just about any contaminant you can name.

So things like dirt and coffee can't get in. And neither can a bath in hot, sudsy water.

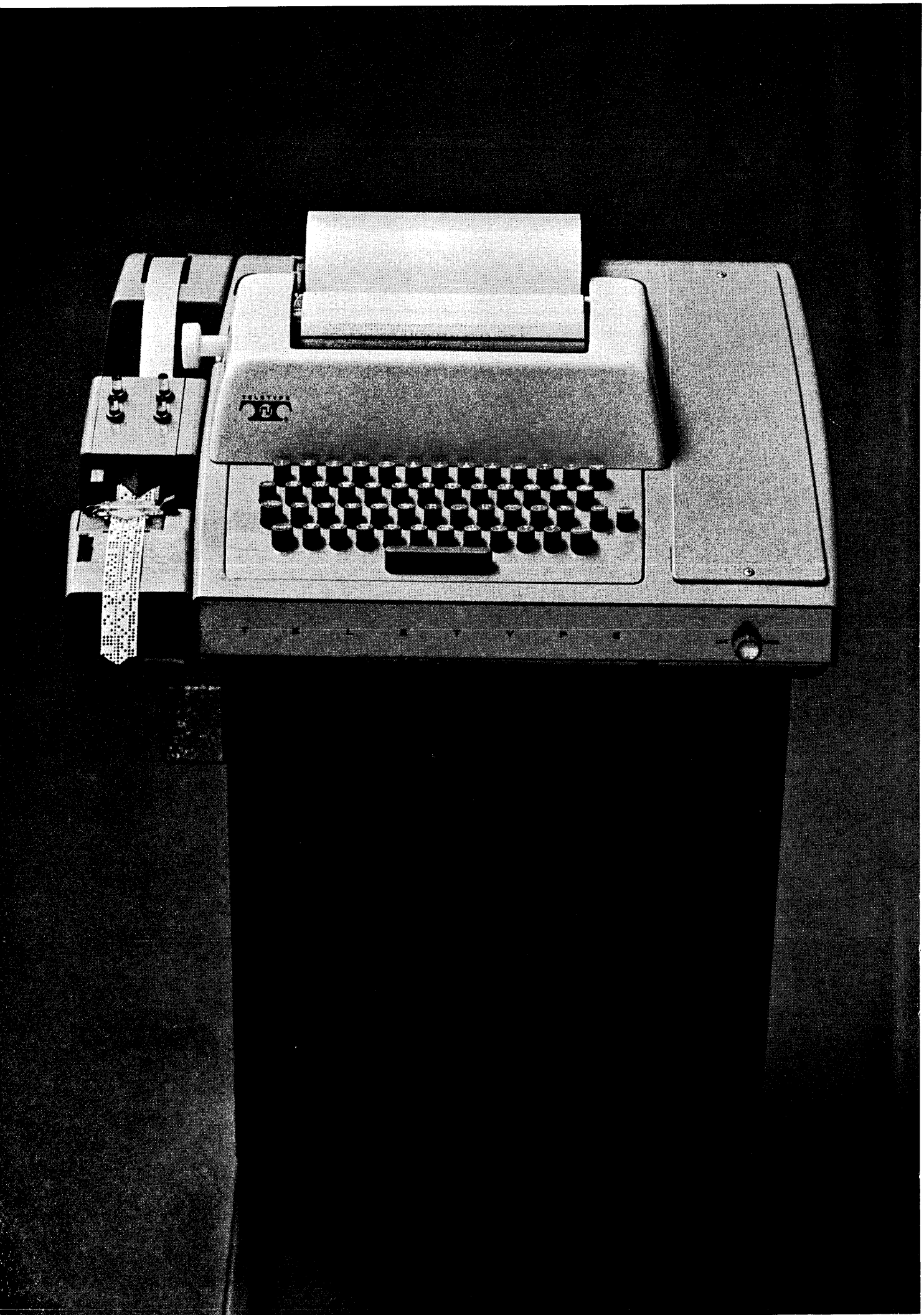
It makes your equipment maintenance a lot easier. And, in the long run, can substantially reduce service costs. Besides giving you a keyboard with all the built-in reliability of a solid-state design in the process.

If you'd like more information on MICRO SWITCH keyboards, call, toll-free, 800/645-9200 (in N.Y., call 516/294-0990, collect) for the location and telephone number of your nearest MICRO SWITCH Branch Office.

You'll see a line of keyboards that work like a dream. And wash like a coffee cup.

MICRO SWITCH
FREEPORT ILLINOIS 61032
A DIVISION OF HONEYWELL

MICRO SWITCH products are available worldwide through Honeywell International.
Circle 6 for Data, 7 for Salesman call.



$969.*

Get an ASR terminal from us for less than a KSR terminal from someone else.

Compared to our competitors' KSR terminals, the Teletype® model 33 ASR's price is unbelievably low.

For example, our $969 ASR includes as standard many of the features others charge extra for. Features like paper tape reader and punch, answer-back, even-parity generation, automatic carriage return and line-feed (if you need it), as well as a pedestal.

The ASR version sends and receives automatically at 100 words per minute using standard one-inch paper tape. It's also compatible with most mini-computer and communications systems. This compatibility is just one reason why over 500,000 model 33's have already been sold.

There's another big reason for our popularity. Flexibility. You can double the data transmission capacity of the model 33 with a simple wiring option. Called "full duplex," this option permits simultaneous sending and receiving.

If you think our $969 price tag is rock bottom, you're wrong. We've got KSR's for as little as $693* and RO's starting at $584.* So whatever your mini-computer operation, don't pay a maxi-price for a data terminal.

Service? As much or as little as you need. You tell us and we'll come up with a plan that suits you to a "T." No matter where you are. Or what you need. But when you come right down to it, you won't need much service. Because the model 33 is one of the most dependable terminals in the industry. We set all the standards. And we live up to our name.

The model 33. It's what you need. At a price no one can touch.

For more information, write or call: TERMINAL CENTRAL, Teletype Corporation, 5555 Touhy Ave., Skokie, Ill. 60076. (312) 982-2000.

TELETYPE

source data

rial not intended for publication—comprise the IEEE Computer Society Repository. The first cumulative Repository index covering 1966 through 1973 contains an author and subject index of about 1,600 papers, reports, and documents. Updates to the 135-page index are planned; currently about 300 entries are added per year. Price: $12 for members; $16, nonmembers. IEEE COMPUTER SOCIETY, 5855 Naples Plaza, Long Beach, Calif. 90803.

Used Computer Market

With the economy forcing rethinking of dp budgets, this report on the used computer market from 1970-75 is most timely. Fluctuations in the market, analyses, and price information on a variety of general purpose computers are featured. Special attention is given to IBM 360 equipment. Price: $95.

Published also by this company is the quarterly *Computer Price Guide*, a "blue book of used computer prices." Current retail asking prices are listed for used computers. Price: $3 single issue; $10 yearly. TBI COMPUTER SALES, 75 S. Greeley Ave., Chappaqua, N. Y. 10514.

vendor literature

Office Automation Systems

Interrelationships between this vendor's word processing typewriters and other office systems are diagrammed on a guide sheet. Typing, editing, phototypesetting, printing, and communications systems can be accessed from a single keyboard. Information stored on both card and cassette can be merged onto the same document. Other compatible systems can also be connected, such as photocomposing units, high speed printers, and the Redactor communicating typewriter which in turn provides access to other communicating typewriters, computers, Telex-TWX, and mailgram networks. REDACTRON CORP., Hauppauge, N.Y.

FOR COPY CIRCLE 221 ON READER CARD

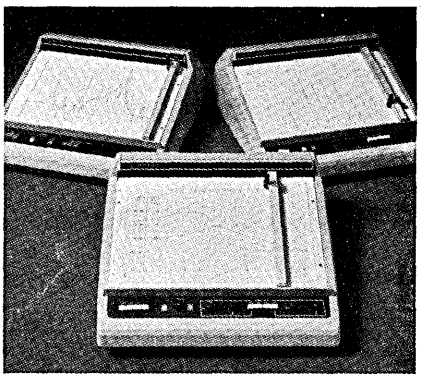
Information Retrieval System

The "IQ" (Information Quick) information retrieval system is described in a 28-page brochure. The vendor claims the system handles complex, multiple files and data bases such as TOTAL; formats simple reports automatically; generates complex reports, summary reports, notices, checks, matrix reports, and files for conversion; performs computations and selections; and does table lookup. Actual coding is shown in the brochure, and overall capabilities, price, delivery, and support are detailed. Versions range from $9,000 to $15,000. THE MANAGEMENT GROUP, INC., Waltham, Mass.

FOR COPY CIRCLE 223 ON READER CARD

Oem Recorders

Strip chart recorders, XY recorders, and graphic plotters for oem applications are described in a 6-page brochure. A choice of options is available with each. HEWLETT-PACKARD CO., Palo Alto, Calif.



FOR COPY CIRCLE 226 ON READER CARD

Understanding the economic impact of a Kodak COM installation.

The most cost-effective approach to COM is a lot easier to find now because of a Kodak service called PRINTCOM. It lets Kodak actually premeasure the savings you can expect, using your own cost figures, when you put a Kodak KOM-80 microfilmer to work in your EDP environment.

The PRINTCOM terminal.

During PRINTCOM analysis, we input as many as 300 of your cost variables into a PRINTCOM terminal and get back a detailed financial analysis of your immediate savings and of your long-term savings potential.

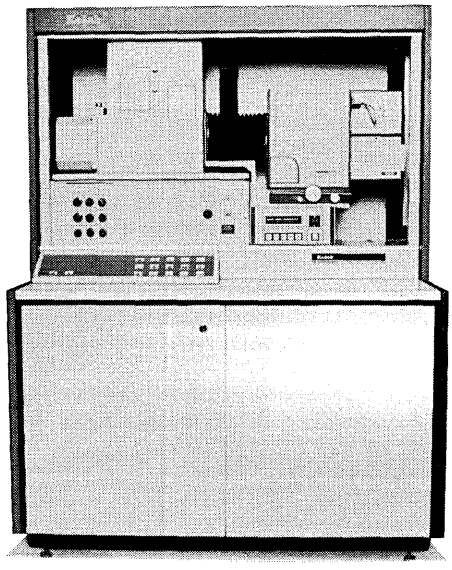
You will find this information invaluable, particularly in light of the emphasis being placed on return on investment.

Beyond PRINTCOM, Kodak is putting a great deal of effort into COM research. Some of this effort and investment has already paid off in technological improvements and versatile software programs Kodak can provide to its users.

A case in point is our new INFO-LINK I software package. It does away with the need for new application programs each time a microfiche job goes 'live.' It's just one more way Kodak can help you maximize your savings in the EDP environment.

The closer you are to COM, the sooner you should check with us. For an informative view of microfilm and the computer, write today. Eastman Kodak Company, Business Systems Markets Division, Dept. DP5840, Rochester, N.Y. 14650.

Kodak



Kodak KOM-80 microfilmer. For top throughput speed with high reliability.

source data

Remote Batch Terminals

This vendor's Series 500 intelligent remote batch terminals are described in a packet of information which includes system description, customer support program data, installation and maintenance procedures, software, and available options. The system includes a processor, a line printer with 300, 600 or 1,200 lpm, a 300 cpm card reader, and a 50 Kbps communications controller. It is plug compatible with IBM, CDC, Univac, Burroughs, and Honeywell remote batch terminal systems. SINGER-M&M COMPUTER INDUSTRIES, INC., Orange, Calif.

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Conference Cassettes

A catalog of ACM cassettes containing selected presentations from recent ACM conferences such as the November '74 San Diego conference, features such topics as structured programming, virtual memory, data bases, large scale software, dp management, and the Turing Award Lectures from 1972-74. Most of these edited presentations are not available in proceedings, and each speaker has reviewed his recording for accuracy. THE ASSOCIATION FOR COMPUTING MACHINERY, Chicago, Ill.

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Facsimile System

A "Bell-Wringer" cost comparison 8-page brochure on the Rapifax 100, "the world's fastest (35-second) facsimile transceiver system," compares costs between this product and mail, wire, phone, messenger, Telex, TWX, and in international communications, between Rapifax and Slow Fax, and Telex. A chart also shows transmission costs for one-minute interstate communications between 34 major cities. RAPIFAX CORP., Fairfield, N.J.

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Dp Equipment Maintenance

An illustrated 12-page brochure describes this vendor's geographic, equipment, and user/vendor capabilities. With more than 1,200 employees in 160 U.S. cities, Sorbus claims to be the largest independent dp service organization in the nation and a pioneer of third-party maintenance. According to the brochure, the firm services more than 52,000 pieces of equipment (from over 50 dp equipment companies), from unit record equipment and terminals to peripherals and complete computer systems, at more than 15,000 user locations in the country. SORBUS INC., King of Prussia, Pa.

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Tape Units

This vendor's tape units, formatters, and controllers are described in a 4-page catalog. Specifications are presented for the 9-track incremental transport, synchronous/asynchronous recorder, vacuum column unit, two cartridge transports, format control unit, buffered tape formatter, and magnetic tape controller. KENNEDY co., Altadena, Calif.

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Metric Calendar

Designed to familiarize people with the metric system, metric theme calendars with detachable cartoon "mini-posters" compare metric and "customary"

units. Prices range from $4 apiece for 1 to 9, to $2 each for 1,000 or more. AMERICAN NATIONAL METRIC COUNCIL, 1625 Mass. Ave. NW, Washington, D.C. 20036.

Micrographics

An 18 minute audio-visual program featuring 80 color slides and standard cassette presents micrographics applications in government, law enforcement, manufacturing, education, finance, medical, and consumer uses. Handling, dissemination, and storage of records and information are discussed. Price: $100 per package. NATIONAL MICROGRAPHICS ASSN., 8728 Colesville Rd., Silver Spring, Md. 20910.

Measurement and Control

An illustrated 18-page brochure, *Using RTP*, describes this vendor's RTP line of computer-direct analog and digital I/O measurement and control equipment. The product is self-contained, plug-compatible, and may be used in local or remote applications. The RTP design concepts are described and typi-

(Continued on page 159)

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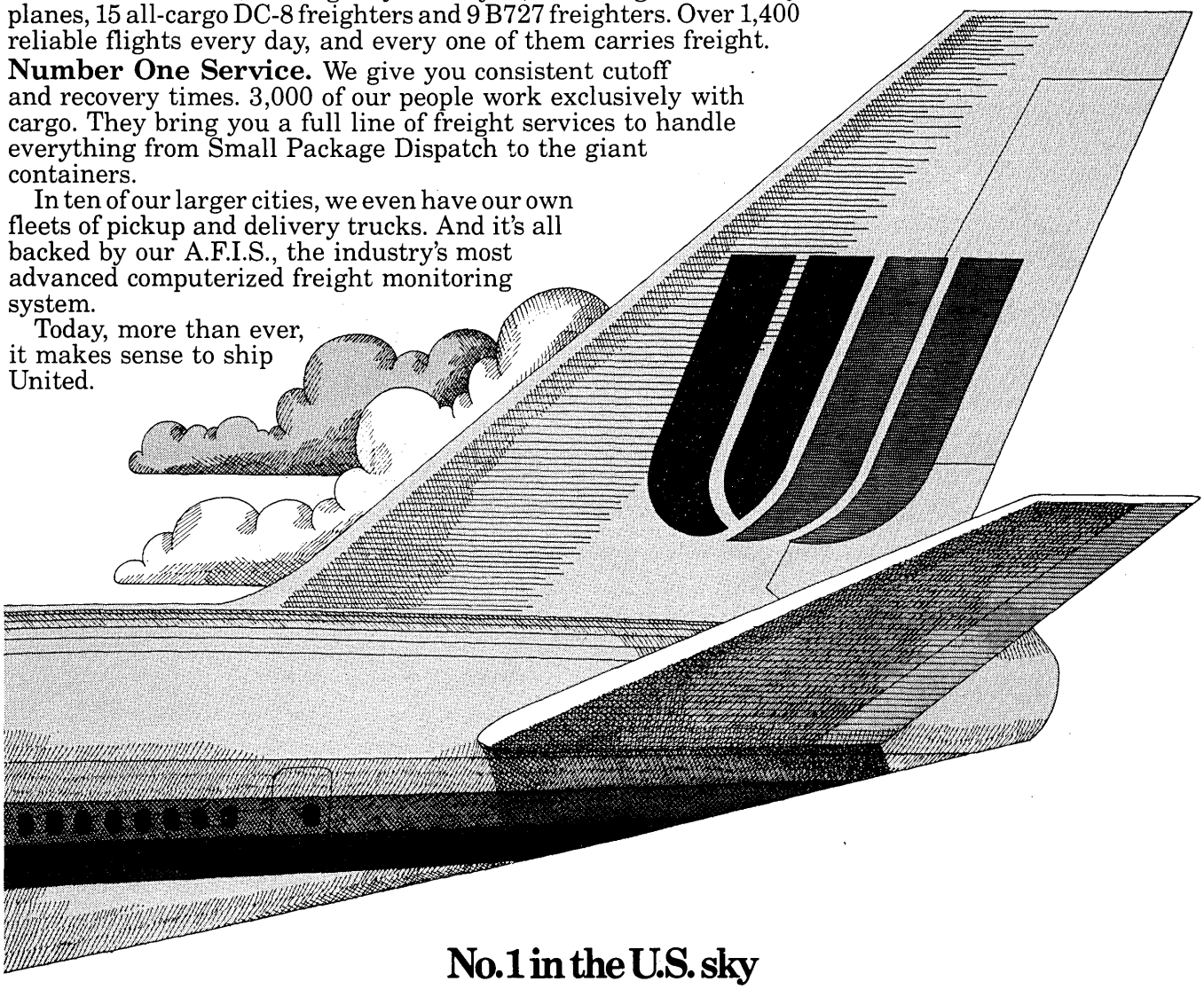

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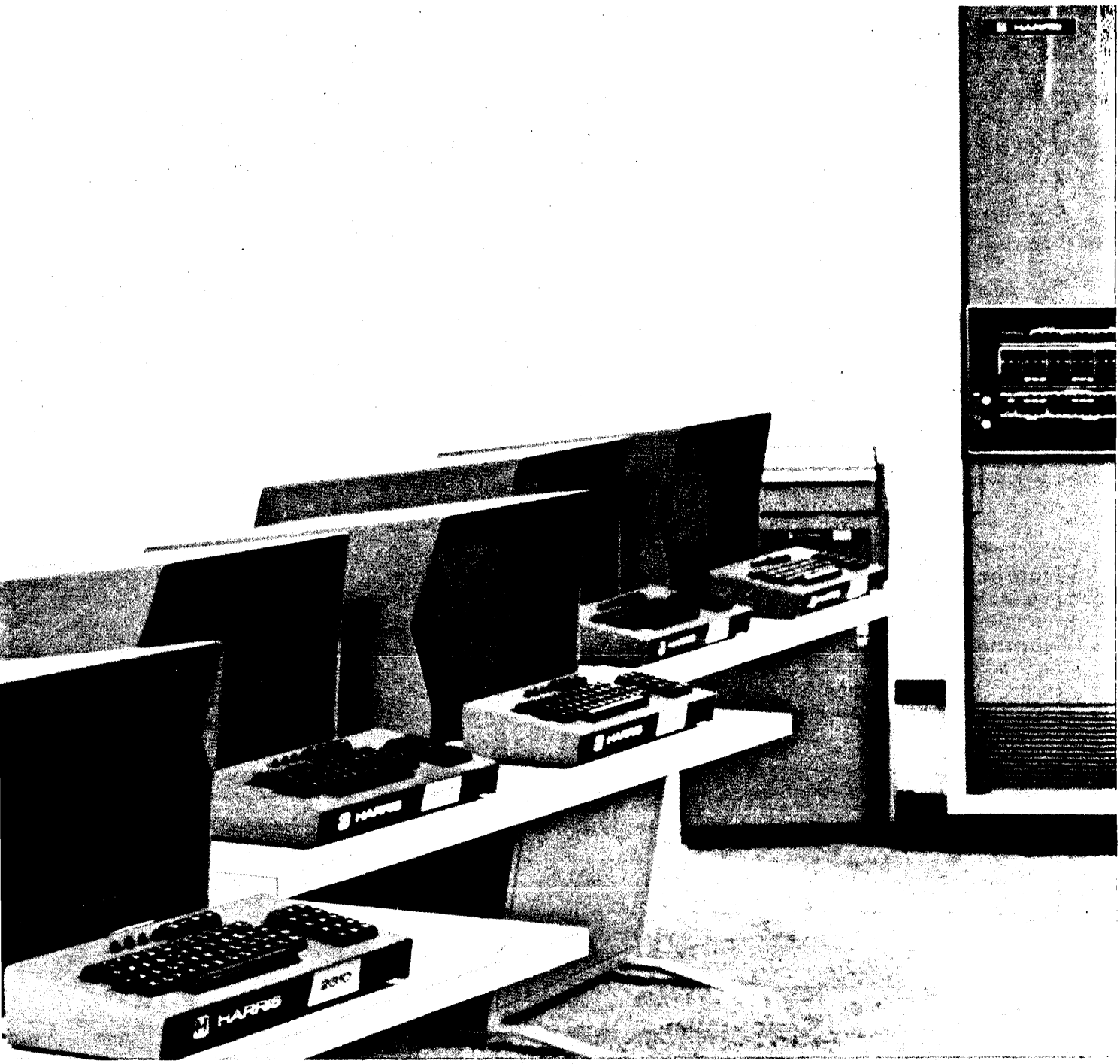

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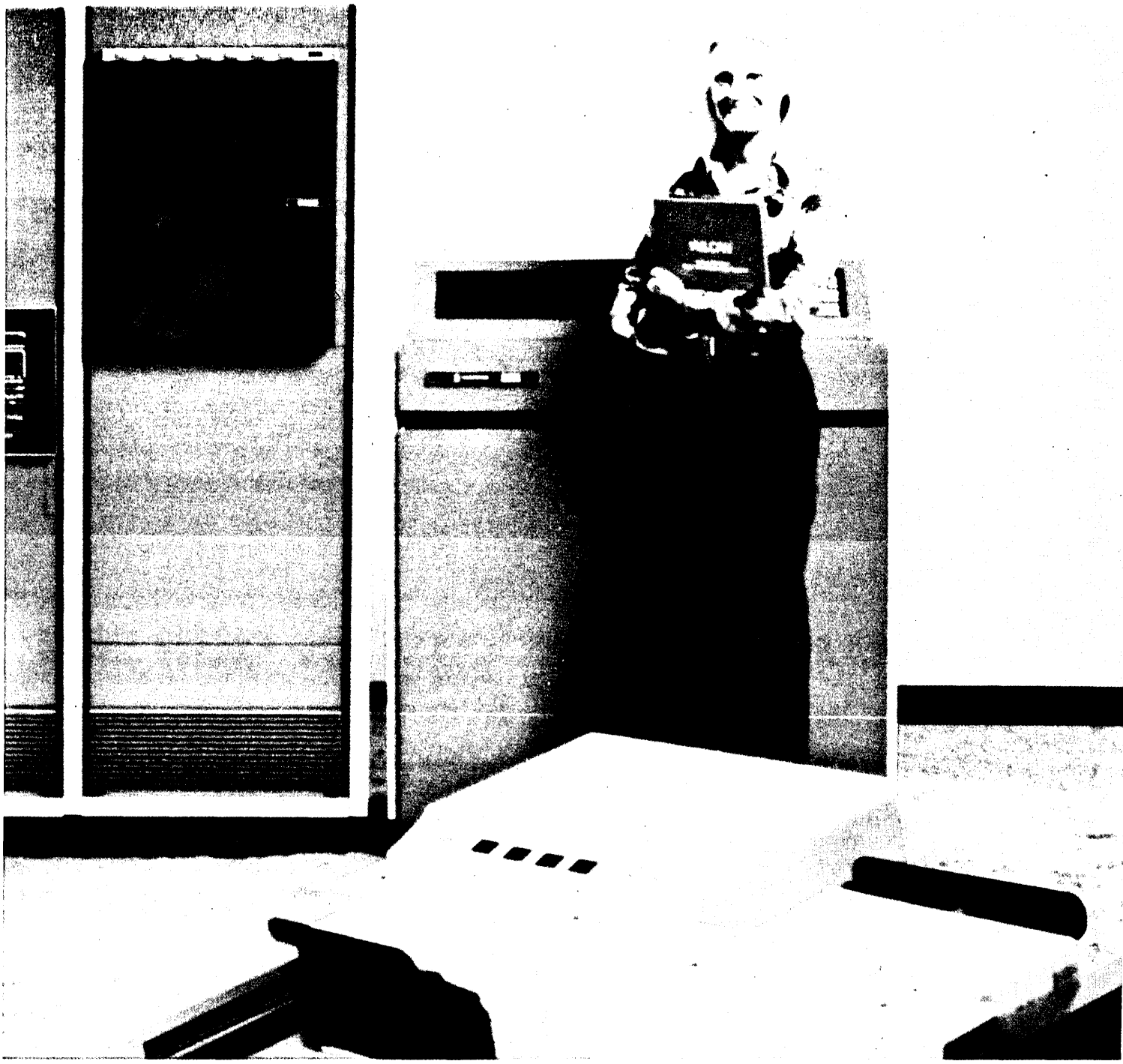

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HOW TO JUSTIFY THE COST OF OUR 580 TO YOUR BOSS.

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"Young man, I've forgotten more about our company's terminal requirements than you'll ever know. For your information good looks don't mean a hill of beans around here.

"But quality does, Sir. And the 580 is as exceptional inside as it is outside. I might mention that some of our competitors came to a similar conclusion about this terminal.

"They did, did they? And just which of our esteemed competitors lays claim to knowledge as vast as our own?

"Well, NCR, Computer Automation, Microdata and Modcomp all use the 580. To name just a few, Sir.

"NCR, hmmmm. Tell me more about this machine.

"Yes Sir! First of all the production standards are impeccable. Seven days burn in at elevated temperatures plus AQL and CQL programs which mean a triple quality check. Quite remarkable when you're producing 1000 units a month.

"Please continue Mr.....

"Bascomb, Sir. Well, standard features include a numeric pad, XY addressing and full cursor controls. Not to mention the sharpest, most readable screen in the industry!

"I see. And just how much is this 580 going to cost me Mr. Bascomb?

"$1795,* Sir. And we can get an optional 2-year warranty for only $100. Really quite reasonable when you consider...

"Yes, yes, yes. Tell me Bascomb, how's your croquet game?"

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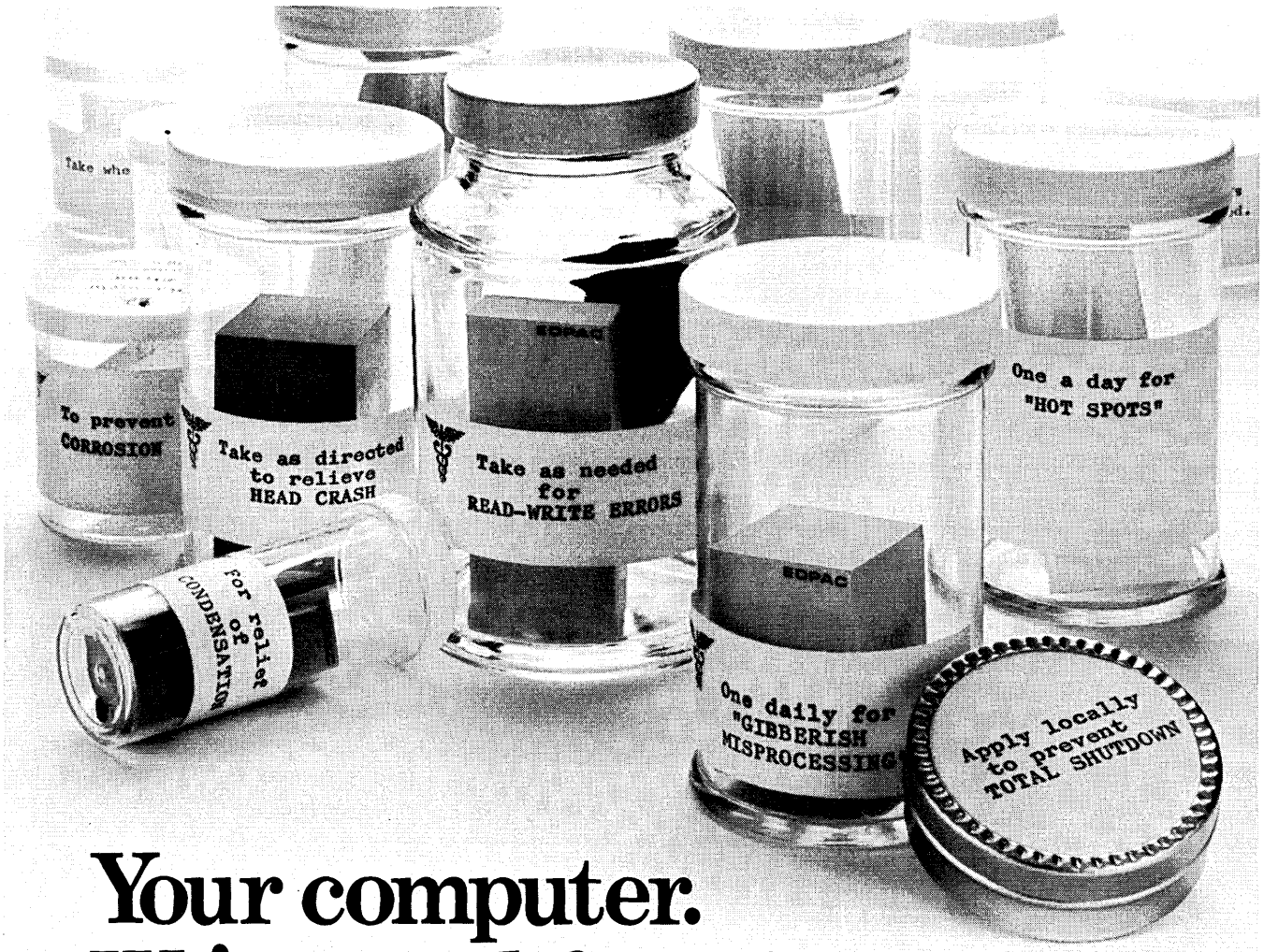

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By down to size, we mean at least a *75% reduction in manpower requirements,* time schedules and more important an overall reduction in budgets.

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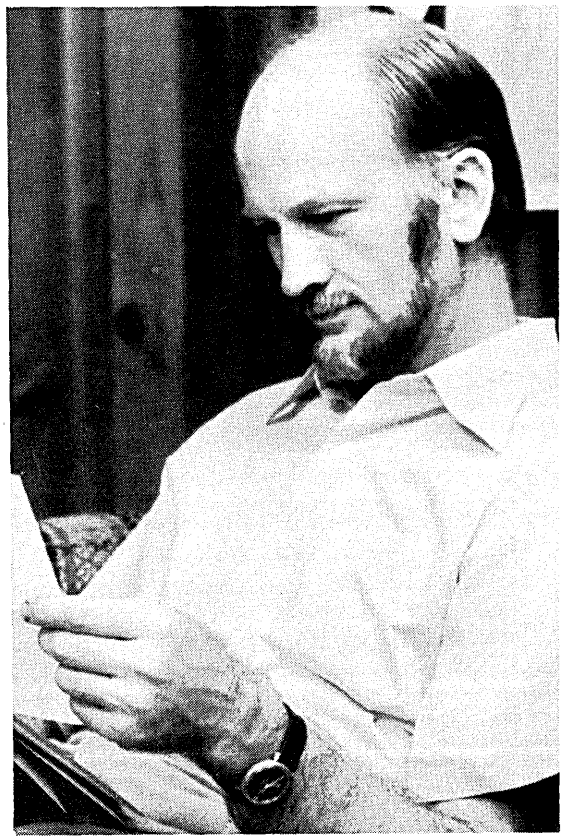

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This text is specifically designed for the student beginning FORTRAN computer programming. Simply and intelligently illustrates how computers can solve many non-mathematical problems.

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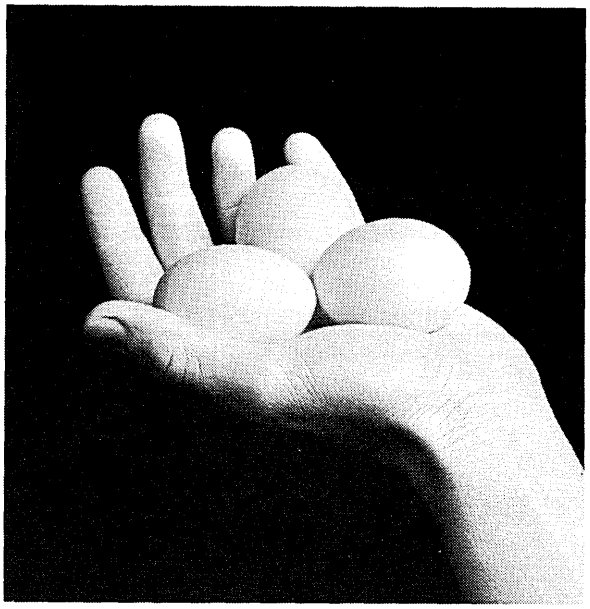

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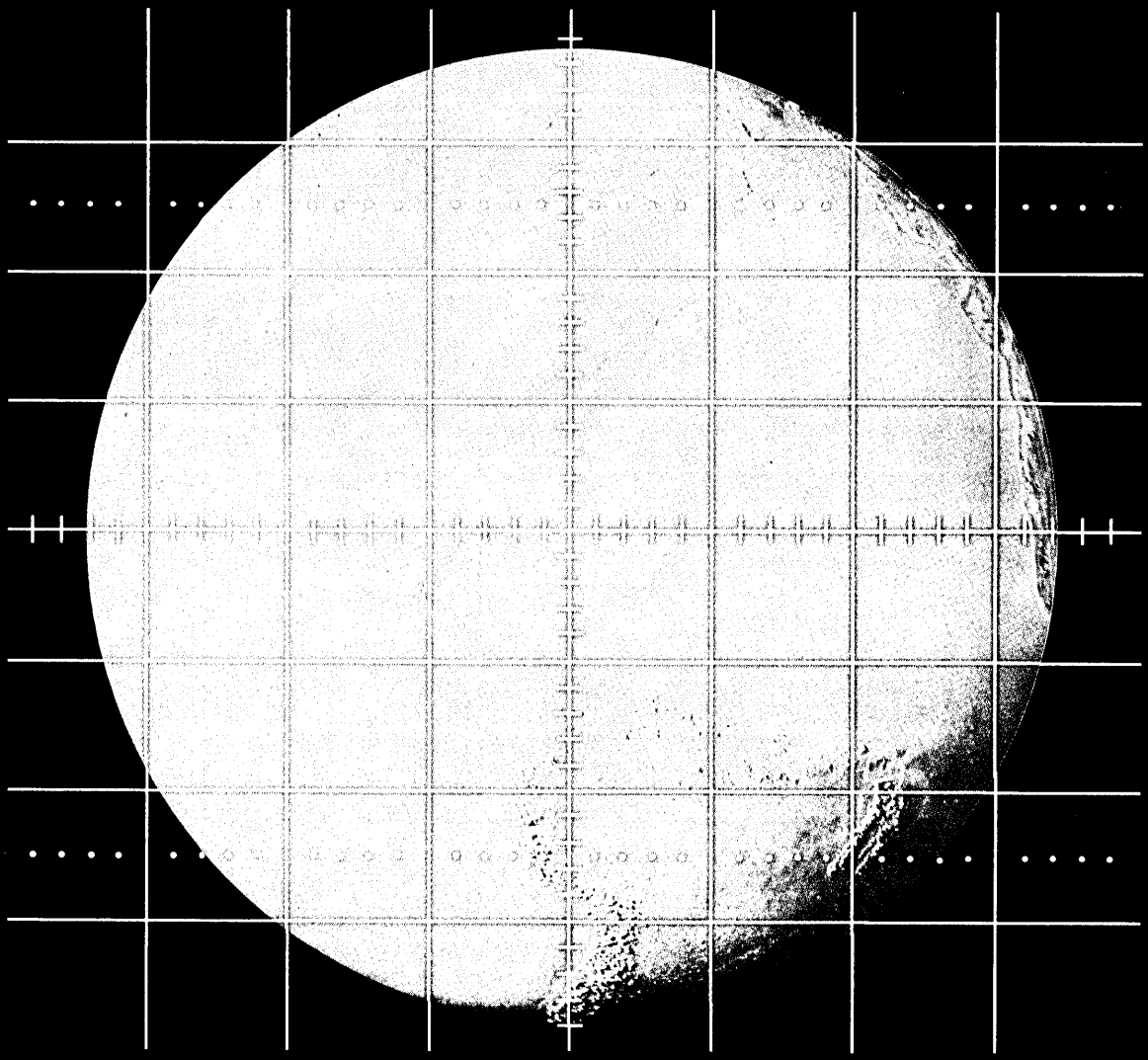

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In fact, the Singer-M&M service group provides national and *international* service coverage with over 2400 representatives in the U. S. and more than 2,000 in key areas throughout Canada, Europe, and the Far East.

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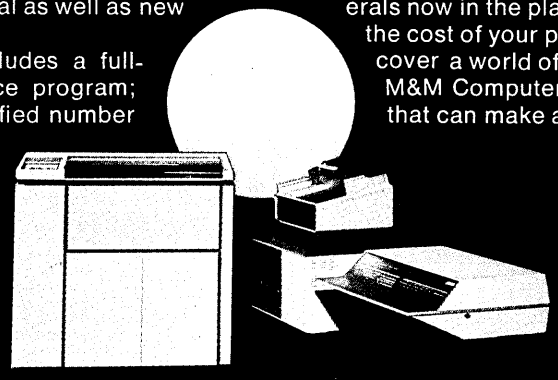

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Editor's Readout

Richard A. McLaughlin, Associate Editor

Privacy, Like Other Rights, Isn't Free

1984 is coming.

Probably not by 1976, but it may well appear by 1977. "1984" of course is not Orwell's prediction but U.S. House of Representatives Bill 1984, also known as the "Comprehensive Right to Privacy Act." In some circles it's known by less polite names.

It could cost your data processing operation a lot of money. It could cause you to convert every program that touches a file with personnel information. It might even cause you to add some hardware. It doesn't have to.

Fortunately there is every likelihood that even casual interest on the part of the dp community can bring us a more reasonable version of the bill. Congressional representatives and agencies of the federal government for once are casting about in some of the right places for help in improving proposed legislation. They are opening up three channels to the dp industry and have begun to ask semi-specific questions concerning the potential impact of the legislation. They are not always the right questions, and some are asked prematurely, but they are being asked.

What the bill would do to you

HR1984 would apply to the private sector, and to state and local governments, the kind of restraints on the use of personal data imposed on the public (federal government) sector by the Privacy Act of 1974, PL 93-579. However, its application is not being limited to credit reporting agencies — who are covered by the Fair Credit Reporting Act — nor to inter-company data transfers nor to the sale of personal data. It very definitely includes your company's personnel file.

That's one, only one, of 1984's flaws. It defines its coverage as pertaining to information systems and then says: "the term 'information system', means the total components and operations of a recordkeeping process, whether automated or manual, containing personal information and the name, personal number, or other identifying particulars; . . ." That covers a lot of ground.

Congressmen Goldwater and Koch, 1984's sponsors, are not trying scare tactics to get a reaction. Goldwater has even gone so far as to say he hopes 1984 never passes. But it's safe to say that with the growing public awareness of the privacy issue, some similar kind of legislation will become law. The Congressmen have asked for help in understanding the dp problems which will be created by the passages of such legislation. In fact they sent out a thousand or so questionnaires soliciting information.

The article in this issue by Robert C. Goldstein, "The Costs of Privacy," studies the costs of complying with the draft legislation. It shows that the costs of handling a file containing information about individuals could go up very dramatically, even by more than 50%. An increase of 10% seems to be a minimum. And that doesn't count conversions.

The extra costs and effort of fixing and living under the provisions of the legislation proposed would be worth bearing if in fact someone's personal liberties would be enhanced or his rights protected. But they may not be. Privacy laws as we know them do not guarantee privacy. They do not give the individual the right to stop the flow of information about him. Instead they give him the mechanism for challenging the accuracy of the data — if he can find out who is giving it out.

Several things must be done about HR1984 or bills like it, including: (1) in-house use of personal data, as in personnel files, must be exempted from some of the provisions; (2) better definitions of such things as "information systems" must be found; (3) in some cases, less expensive means should be sought for complying with the intent of the law; and (4) somehow we ought to develop a way for the law to actually protect our privacy.

One method of getting some privacy protection has been used in credit reporting. A data user such as a department store is required to inform the data subject that credit has been refused due to a report from the ABC Reporting Agency at such and such an address. (The U.S. Fair Credit Reporting Act still reportedly has some big loopholes concerning that notification, and the onus is still on the individual to get the record straightened out, whether or not he wants the data released in the first place. But the Credit Act at least tries to let the subject know who is reporting on him. So far, HR1984 does not.)

What you can do to the bill

The thing to do for dp managers and others who care about the problem is to determine what the privacy bill might cost in terms of their operations, and how reasonable its provisions are in the first place. Consider what it means to you as a person as well as a dp professional. Then use one of these three open channels for squawking:

(1) *The Privacy Protection Study Commission.* (Its dp-knowledgeable vice-chairman is Dr. Willis Ware of Rand; DATAMATION readers can send comments directly to his home address at 1115 Georgina, Santa Monica, Calif. 90402. And Willis listens.)

(2) The bill's sponsors, *Congressman Barry Goldwater Jr.*, Room 1134, Longworth House Office Building, Washington, D.C. 20515, (202) 225-4461 or *Congressman Edward I. Koch,* (202) 225-2436. (Those 1,300 or so firms and individuals who answered the Congressmen's dp privacy questionnaire should especially consider amending their responses after reading the Goldstein article. It's not too late.)

(3) *The Dept. of Commerce* is preparing yet another questionnaire on the subject. This one includes more cost-of-processing questions. It's to go to 3,500 or more companies chosen at random from Dun & Bradstreet tapes. This questionnaire is soon to be released by the Office of Management of the Budget, OMB. If you receive one of these 60-question jobs, please consider well the impact of the proposed legislation. Then answer carefully and completely.

One other suggestion. The Koch-Goldwater questionnaire was developed and mailed before the creation of the Privacy Commission. The returns are in but not processed. As mentioned, Commerce's questionnaire is just being mailed. Wouldn't it be best for both sets of responses to be turned over to the Privacy Commission? The Commission needs the data, and is undoubtedly capable of doing its own analysis without any other agency's helpful pre-screening.

Big Brother is watching all of us, and no matter what we do it seems we will come under closer and closer scrutiny. Okay, he's watching; let's at least try to keep him honest.

Moving From The 370 To The 360

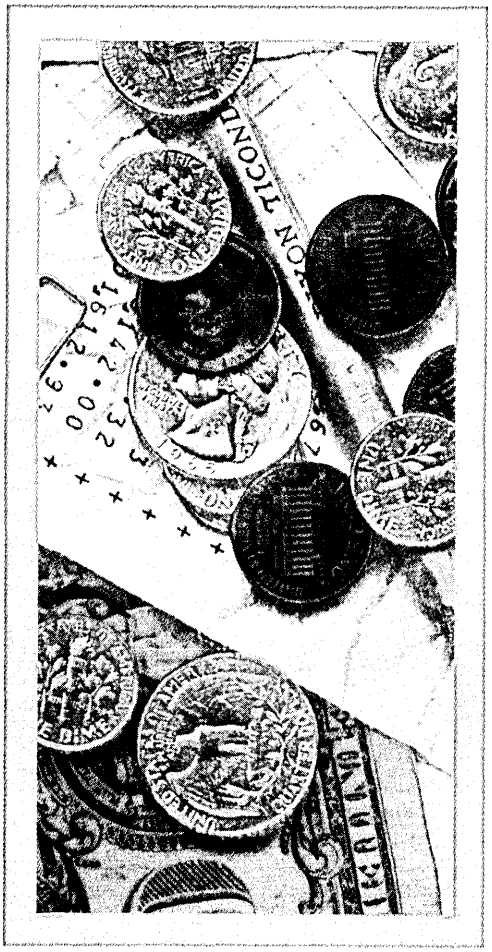
by Ira Freireich and Donald Harder

A third party lease, plus peripherals and software from independents, yield six-figure savings.

The recent recession has forced dp management to search for the most efficient way to utilize their limited budgets. Software system improvements such as spoolers, more efficient sorts, resource utilization monitors, and optimizing compilers are helping. Measurement tools to aid optimum utilization of existing equipment are getting more attention, allowing users to reduce equipment and limit expansion to only specific hardware needed. And renewed interest has centered on the secondhand computer market.

The hardware market is seeing a retrenchment from the "bigger and better" craze. As a consequence of the current state of the economy and present hardware costs, attention is being directed to "obsolete" equipment. Management now suspects the transition from the 360 to the 370 was not the giant step they expected. The 370 does present new ideas and many enhancements. Limited fixed storage is increased through the implementation of virtual storage, which helps solve storage problems found in many large installations. The 370 makes several new operating systems available to support virtual storage capabilities, and greatly improves the limited 360 communication capability.

One main justification for upgrading to the 370 was to provide management with these latest technological advancements. However, management has since discovered that the cost of using these technological advances is high, both in dollars and in conversion effort. A careful appraisal of the specific needs of an installation may reveal



that 360 equipment will handle the workload at a much more attractive cost. Such an approach is enhanced by the probability of an equally expensive conversion effort from either the 360 or 370 to any future system.

S. D. Leidesdorf & Co. investigated lower cost alternatives to a 370/145 at a medium-sized data center, which resulted in replacing the 370 with a 360/50.

Although each installation considering such a move has its unique circumstances to consider, a description of the investigation guided by Leidesdorf and the subsequent conversion plan may serve as a useful guide.

When the 145 was purchased and installed in May 1972, it replaced a 360/40 handling a growing workload including: payroll, general ledger, general office accounting, internal bookkeeping, accounts receivable, and some other processing as required. These systems were processed on the 360/40 under DOS with POWER for spooling. Programming was mostly COBOL, and a few applications were in FORTRAN, BAL, and RPG-II. Several Autocoder programs were being run under 1400 simulation. Normal operations were 2 to 2½ shifts per day, six days per week.

As expected, the 370/145 decreased operations by almost one shift per day, leaving room for expansion and new applications. The increased performance of the hardware was expected to provide all the capacity necessary for some time to come. Little consideration was given to rewriting existing applications or changing to a vs operating system. The 1400 emulator was implemented on the 370/145 to continue processing Autocoder programs.

With the tightening of the economy in mid-1973, upper management requested a review of the dp budget. The economies requested would reduce an-

nual expenditures for computer services by approximately 10 to 15%.

A review of the installation was undertaken to locate areas where economies could be effected. Attention was given to efficient use of personnel, analysis of leased software, reduction of hardware costs, and a detailed review of existing applications. With hardware expenditures almost 50% of the budget, special attention was given to them.

Two major considerations were evident at the beginning of the evaluation. First, the owned 370/145 cpu had a resale value of approximately 65 to 75% of its original price; and second, 360 equipment was available at 15 to 25% of the 370's original price. If processing could be run on the 360, an obvious financial savings would result.

The 370/145 was operating under DOS and POWER. Remaining system resources were devoted to running two batch partitions for application programs. Detailed data on the resources used by each application was necessary to develop a proper understanding of how effectively these resources were being used. Also needed were statistics showing the demands on the system during the workday.

Data concerning resource utilization for each application was gathered from systems and programming documentation. A summary was prepared by application showing individual modules within the system, I/O volumes, and average running time. A side benefit was the thorough review of systems documentation which uncovered omissions and discrepancies.

Would the workload fit?

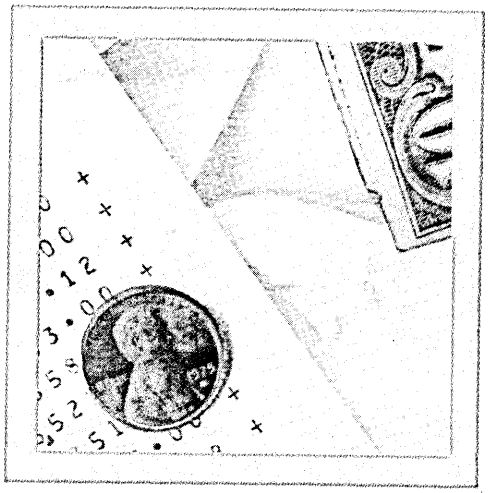
There are several system resource monitoring packages available that purport to analyze daily workload by capturing data on system usage. The packages reviewed, including DOS Job Monitor from Westinghouse and MURS from Boole & Babbage, performed substantially the same data capture. Several non-IBM spooling packages, GRASP (Software Design, Inc.), SPRINT (Jason Data Services), and ASAP (Universal Software, Inc.), were also investigated because of their system accounting facilities. These spooling packages have many useful features not in POWER and provide better spooling performance than POWER.

GRASP was selected because it furnished many system accounting reports and was a more comprehensive spooler. The GRASP reports provided data concerning run times, and core and peripheral requirements for application programs. Collected over a period of time, the reports also reflected how the daily workload varied within a production cycle.

The reports found most useful were the "GRASP System Utilization Report" and the "Resource Usage Histogram." The Utilization Report collects and reports data on specific applications. Data on core usage and time duration were used to verify initial estimates and also proved useful later when comparing 360 and 370 machine performances.

The Resource Usage Report showed how the peripheral resources were being utilized since each device was shown separately. The report can be produced for any time interval desired, day, week, month, etc. By varying the interval, it provides a perspective on short and long term usage. The histogram clearly showed which peripheral units were either being overworked or underworked.

From data collected in these studies, an accurate picture of the installation's current workload was produced, without which the requirements for any hardware alternative could not be considered. The data demonstrated clearly that the 370/145 was being poorly utilized. Data on applications systems indicated that few problems were being encountered with either core size or



peripheral requirements. Peripherals—including tape, disc, and unit record equipment—had an evenly distributed workload and were not overloaded.

The cpu usage, however, was poorly balanced, with one of two batch partitions being used much more heavily than the other. An analysis of the reports suggested that with a balanced load between the two partitions and with two additional tape drives, a cpu less powerful than the 370/145 could handle the current workload and still provide room for growth.

The change has its costs

Every alternative equipment configuration required some conversion, so consideration was given to those costs. Specific amounts were allocated for removal, installation, and transportation of hardware; for generation of a new operating system and handling the 1401 programs; for buying outside time for tests and parallel runs; and for bonuses to key personnel at project completion as incentives. The assumption was that the investigation into replacement would not include any redesign of application systems; if redesign were necessary, additional development costs over and above conversion costs would have to be included.

Initial alternatives were as broad as possible and included enhancing current hardware as well as eliminating all hardware. Corporate management eliminated certain alternatives, for example, facilities management. Some alternatives actually reviewed were:

1. to eliminate installed hardware and use an outside service bureau.
2. To replace the computer with a remote terminal to a service bureau and process all work through the terminal.
3. To reduce the requirements by eliminating several application systems while currently replacing the hardware with a smaller system. (Management vetoed any reduction of services to clients, thus restricting this alternative.)
4. To exercise purchase credit options and purchase installed equipment, thereby reducing out of pocket costs.
5. To replace certain components of the system with less costly hardware from alternate vendors while maintaining processing capabilities. (Since the 145 could not be replaced by another vendor's machine without considerable systems and programming conversion costs, non-IBM mainframe alternatives were eliminated. Reliable plug compatible peripheral equipment to replace equipment leased from IBM, however, was an excellent way to reduce costs. Minimum savings in the 10-15% range were readily available. Tape replacements from Telex and Control Data Corp. were considered, and disc replacements from ITEL, Memorex, Control Data Corp., and CalComp were investigated.)

The decision

The most attractive alternative was to substitute 360 hardware. The selection criteria of substitute hardware had to include financial savings as well as support for the current workload and provision for expansion to support future development. Therefore, the used computer market was investigated for processors and peripherals.

Compatibility between the 360 and 370 made this alternative particularly attractive. No major software conversions would be required; all application systems would be transferred unchanged and only the operating system and the 1400 emulator would require conversion.

Other factors weighed when considering the use of 360 equipment included: (1) support, (2) technical advancements, and (3) personnel attitudes.

DOS support is no longer available from IBM; technical support must be obtained from other sources. A conversion to OS was ruled out due to the major effort for its installation and the probability that OS support might also be withdrawn by IBM.

A major advancement introduced on the 370 was virtual storage capability. A commitment to non-VS technology in an industry moving towards virtual memory is not to be taken lightly. The major advances in this area will probably never be available to the 360 user. Virtual capability however is a requirement in only a limited number of situations. Most small to medium size installations are not heavy communications users and do not need unlimited amounts of core storage. With this in mind, the 360 option becomes more viable. A non-virtual system was feasible at this installation.

Systems, programming, and operations personnel consider any conversion to older equipment as a downgrade. The dp industry has advanced so rapidly that many concepts and skills learned in the recent past may no longer be useful. Personnel are very concerned about attaching themselves to an installation which has committed to an already five year old technology for five more years.

To ease any personnel problem, the entire dp staff was actively involved in planning some part of the conversion, or in long range planning for such future developments like data bases and on-line systems. Convinced that this was a practical, cost-effective approach to data processing in today's economy, personnel fully supported the plan. Management was also convinced of the soundness of converting to the 360. It was considered not a negative downgrade but rather a positive and professional solution to a serious problem of rising computer costs.

Analysis of all data indicated that from an economic and technical standpoint, a 360/50 would be the most logical choice as a replacement for the 370/145.

Dealing

Upon reaching this decision, price quotations were requested from several dealers in the used computer market. Through the well-known dp grapevine, word spread that a 370/145 was for sale and a 360/50 needed as a replacement. Calls were received daily from dealers trying to place the equipment.

Purchasing in the used computer market is completely different from obtaining equipment from a manufacturer. Site preparation assistance and installation planning was minimal, as was the time spent by the dealer establishing the individual needs. The user must have intimate knowledge of his own needs; the greater the understanding of the present installation and requirements for the new system, the smoother the conversion.

After narrowing the field to three dealers, negotiation was the next challenge. Prices were comparable but not fixed. While certain areas are more negotiable than others, the negotiator may be overwhelmed by options available. And, of course, the better the negotiator, the better the deal. In addition to equipment prices, shipping, removal, and insurance costs were negotiable items. A form of performance criteria was also placed in the contract.

During negotiations with ITEL, the third party lessor finally chosen to supply the 360, it became evident that IBM-manufactured peripherals could not be discounted at as high a percentage of original price as the cpu. The equipment specifications were therefore modified to permit plug-compatible peripherals. This required sending out additional requests for bids and negotiating with other companies. Bids were finally accepted from Potter for second-generation tape drives, which incidentally operated at greater speed than those attached to the 370.

Different methods of financing were also available. Straight fixed term rental, full payout lease, purchase of the central processor and lease of peripherals, and outright purchase were considered. Each of these had several sub-options. The method finally decided upon was outright purchase.

Controlling the conversion

After agreement on the 360/50 was reached, a conversion plan was created. The plan was based on getting as much as possible done prior to installation so that the removal of the 370 and installation of the 360 would be accomplished smoothly and with minimum down time. Reviews of electrical requirements, available space, and cooling requirements were made and compared to the existing site to determine changes needed. Several layouts were discussed well in advance to avoid rushed and crowded designs later. Since some 360 equipment is larger than the 370 equivalent, the physical move route was laid out and the movement simulated to spot areas of possible complications. A representative was sent to inspect the 360 equipment and its maintenance records before shipment. Letters acquired from IBM guaranteed maintainability.

Shortly before installation, a meeting was held with all vendors to plan the best method for coordinating the various groups doing the installation. The site layout, cables, electrical and cooling requirements were all rechecked and finalized.

Planning for the software conversion was directed towards having all applications and the operating system ready to run when the 360/50 was

"We resuscitate free of charge."

installed. A site was located whose 360/50 closely matched that of the planned installation, and was used for generating an operating system and libraries, parallel testing, and for timing several applications systems.

Lack of a 1400 emulator, available on the 370/145 but not on the 360/50, was a problem. Several 1400 simulator packages were investigated, including CIDS (an IBM Type 3 program) and SIM14 (from Dearborn). The possibility of rewriting 250 existing 1400 programs was rejected due to the expense. Consideration was given to converting 1400 to COBOL but this too was rejected due to a tight schedule and the absence of many source decks. The Dearborn SIM14 package was finally selected as the most suitable simulator for our needs.

Overall project control was maintained on a wallboard, with critical phases and target dates listed chronologically. A phase not completed by its target date was highlighted on the board with reasons stated, and the method for insuring completion was noted. Periodic meetings with responsible individuals were scheduled to insure that any problems were accounted for and solved.

Efforts to have everything ready before conversion were quite successful. By closely controlling preparations during the preceding two months, all responsible individuals felt confident that the installation would be done on time, even without a parallel operation period. The new equipment was scheduled to arrive well in advance of the installation date. Each vendor was asked to deliver on a different day so that no conflicts would arise. The unit record equipment was delivered and installed over the weekend preceding the weekend the 360/50 was installed. Since the card reader and printer are mechanical devices, they are prone to adjustment problems, so an additional shakedown period was thus provided. The additional cost of installing this equipment on the 370/145 and then again on the 360/50 was considered worthwhile compared to the prospect of having everything but the card reader or printer up and running on schedule.

The conversion was scheduled for the weekend of January 25-26, 1975. Five full days were allowed for removal of the 370/145 and installation of the 360/50 beginning Friday, January 24. Since the computer room has limited space, conversion had to be done serially with no possibility of parallel operation.

During actual removal and installation, it was mandatory for all responsible individuals to be present or on call. No matter how carefully the plan is established and how strictly maintained, situations may occur that require immediate action. In our case, the particular "monkey wrench" was an improperly installed electrical connector for the cpu. The problem was resolved in a few hours; without immediate action, however, this incident could have caused a major delay.

The conversion proceeded smoothly and was completed by Monday morning, January 27, two days ahead of schedule. Careful planning and full cooperation from all parties made this the smoothest hardware change ever experienced by the data center. By identifying problems beforehand and making allowances for them, the weekend of the actual conversion was nearly problem-free.

It cost less than expected

After installation, the 360/50 performed as expected. Detailed monitoring of system utilization using GRASP accounting reports continued through the next production cycle to compare the 360 performance to that of the 370/145. It was noted that the 360/50 cpu was performing substantially more work during prime shift than the 145. Because of similar peripherals except for faster tape drives, wall clock job durations were comparable and in some cases reduced. The overall system throughput was increased substantially since the addition of two extra tape drives allowed increased multiprogramming operation.

The actual cost of the 360 hardware was substantially less than original estimates. This was due to the substitution of plug compatible tape drives and the carefully executed negotiations with the dealers resulting in a higher price for the 370/145 and a lower one for the 360/50. Software conversion costs were also under the original conservative estimate, primarily because the non-virtual operations on the 370/145 were compatible to the 360.

The data center had started with a 256K 370/145 configuration including six model 3420 tapes, eight 2319 discs, two 1403 printers, and a 2540 card reader/punch. The cpu had been purchased; peripherals were being rented.

It ended with an ITEL package which included a 256K 360/50, eight 2314 discs, and printers and card gear of the same models—plus the eight Potter tape drives. All were purchased. (A second printer remained on an IBM rental agreement.)

The eight Potter drives cost only about one-third of what it would have cost to apply the considerable purchase option credits to the price of the six IBM drives. In all, though the user installation would like us to keep the actual figures confidential, the entire cpu and peripherals configuration's purchase price, including maintenance, was nearly exactly equivalent to three-year's rental on the 370's peripherals alone. [Not counting the three quarter of a million dollar 145 mainframe. . . . ed.]

The only other costs incurred were for software. GRASP cost us $880/month where POWER had been free; but it did more. SIM14 ran $3,000 for the first three months, then $500/month thereafter. In comparison to the major savings in hardware costs, these figures prove insignificant.

Several large projects in the planning stages include establishing a large financial data base system on the 360/50. Current system utilization reports show comfortable room for expansion to service this and other future plans.

The 360 as an alternative to the 370 may not be viable for every 370 installation to reduce costs, but in many cases, examining the possibility of using "obsolete" equipment is well worth the time and effort expended. ✲

Mr. Freireich is a consultant in Management Advisory Services at S. D. Leidesdorf & Co. Before joining that firm, he held a position at Longines Symphonette which involved justifying hardware configurations, and he has also been a systems engineer at Honeywell Information Systems.

Also a consultant in Leidesdorf's Management Advisory Services, Mr. Harder previously worked in data processing functions at Longines Wittnauer.

Burning Down The Data Center

by H. A. Chadwick

Some catastrophes can destroy a business without leaving a mark on its buildings or dp center. Insurance against most of them can be acquired, but only if the broker understands dp.

It's Monday evening. You've been relaxing. Howard Cosell has just used three words in close juxtaposition, two of which even you don't know. The telephone rings, and your night supervisor says "I think you better get down here. We've got a fire."

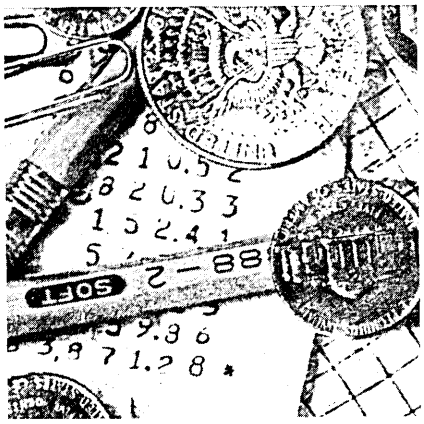
You rush to the computer center and identify yourself to the Fire Chief. He assures you that there is no question that he will save the structure.

You only half-hear him. "Save the structure?" What about the equipment, the mainframe? What did the heat do the tape library? What do I, do we, do for income till we're back in operation? What about the leased equipment? Are we liable for it?

A bit melodramatic? Sure. It's an old insurance-selling technique. In life insurance, it's called "backing the hearse up to the door." For dp we call it "burning down the data center." Of course, that is the way it *does* happen. Should it happen to you, those questions will race through your mind. The time to answer them is now.

As you've noticed, one of the drawbacks to being in the data processing industry is that no one outside of it seems to know anything about it, and this has a direct effect on dp insurance. Insurance brokers are generally uninformed about dp. Before a broker can do his job correctly, someone is going to have to teach him about the operation, its terminology, its myths and realities. That someone is you.

Worse, besides teaching the broker about your business (as a tip in selecting your broker, the right one is going to *ask* to learn), you are going to be forced to learn something about insurance, at least as it applies to data processing. Insurance buying may be one of those duties that has so far not fallen to you, for which small mercy you are probably grateful, but if someone in dp management is not involved



in the buying process, there is a very strong chance that it is being bought incorrectly.

If we're going to talk about the specialized kind of insurance affecting dp, we're going to be forced to talk a little about insurance in general. Sorry, we can't avoid it.

Within the insuring mechanism are the means for transferring almost all kinds of risk—"almost," because some risks are simply not insurable (such as making a profit from your business) or are left to the government because of their special nature (usually a risk that the government helped create in the first place such as war or nuclear reaction).

Just as there are a variety of things that can affect a data center, so are there different kinds of insurance to treat those things. Included are Workers' Compensation, Automobile, Property Damage, "Time Element," General (or Public) Liability, and "Errors and Omissions."

These broad general aspects of insurance (known collectively as "property and casualty insurance") have many subdivisions. Fortunately, a dp operation is not a unique proposition in some of those areas, and we can touch on them lightly.

Workers' Compensation is not a problem to a dp operation. The work is not especially hazardous, the employees are of a higher than average caliber.

In itself, Automobile insurance is not generally a problem. There is one slight peculiarity affecting use of autos by dp people. Since those people are not regularly "on the road," they will tend to use their own private vehicles for their occasional business trips. If they are involved in an accident while on company business, the company could be held liable for damage caused by a vehicle *it did not own* and could not insure. The company will share in the protection of the employee's personal insurance and that may be woefully inadequate.

The solution is an inexpensive coverage known as "Employer's Automobile Non-Ownership" which may be added to the policy covering the company's vehicles, endorsed to the company's public liability insurance policy, or even purchased as a separate policy. As an additional benefit, this coverage will include the use of hired cars.

Special property damage

A dp operation does present an insurer with a number or challenging areas of exposure, however. The fragileness of the equipment itself makes it subject to major damage from many sources that would not present a problem to equipment of a more substantial nature like a drill press or lathe. Perils that can cause damage include things such as fire, lightning, wind, hail, smoke, explosion, vehicle damage (if this sounds implausible, my files contain a copy of a claim draft issued in the past year for equipment damage resulting from a truck striking a build-

ing), aircraft (talk to the people at Applied Data Research about their 1969 incident), leakage from protective equipment such as automatic sprinklers, the friendly attention of strikers, rioters or vandals, collapse of buildings, water from broken pipes, flood, earthquake, and damage from the bursting of things such as boilers.

There are separate kinds of insurance that cover each of the above. Most insurers will combine them in some way. Collectively, such policies are known as "named peril" policies because they cover only losses from the perils they name. If damage occurs from a peril *not* among those named, there is no coverage.

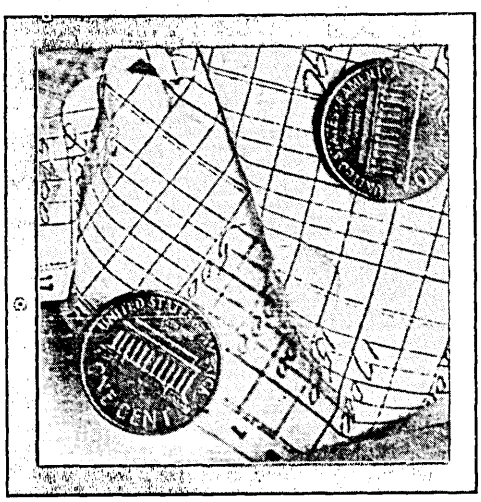
Better protection is offered by policies known as "all risk." They are not truly "all risk" of course. They begin by saying something like, ". . . against all risks of direct physical loss or damage except. . . ." It is in the "except" that the "all" disappears. The "except," the "exclusion," will vary from policy to policy. An obvious rule is "the fewer exclusions, the better." The danger in the rule is that it can lead to overbuying. Some exclusions are acceptable. Safely excluded are things that should not be insured in the first place such as wear and tear (an expense of doing business), things better insured by a more specific form of insurance such as employee dishonesty (covered under a bond), or perils which seem remote to the individual circumstance such as flood if a center is in a desert location.

About the perils of flood and earthquake: While most areas of the U.S. are located near "fault lines," only the West Coast is really feared by underwriters. If you are on the West Coast, earthquake insurance is a must. Since the underwriters are reluctant to write earthquake insurance there, be prepared for a difficult placement task and high rate. Elsewhere, earthquake insurance is written freely and at low rates. This is probably a pretty good indication that it is not as essential; but since one of the principles of risk management is "don't risk a lot for a little," if it can be bought cheaply, buy it.

Flood is much the same story; where it is needed, underwriters don't want to provide it. There is one difference. Many so-called "all risk" forms include unacceptable exclusions dealing with water, limiting the coverage to little more than leaking pipes. Between such leakage and an absolute "flood" (meaning existing bodies of water overflowing their usual boundaries) there is a considerable gap. Some policies simply exclude "flood" and thereby cover all water damage except a flood. If your "all risk" policy is not that broad, it may be necessary for your broker to buy separate flood coverage (which will be separately priced, too), not to protect against a real flood, but simply to make up the deficiency in your water damage protection.

Having mentioned the "underwriter," perhaps the term should be explained. The underwriter is the one to whom your risk of loss is transferred by the payment of your insurance premium. Like a bookie, an underwriter sets the terms of the "bet," the odds (rates), and the size (policy limit). We share one other characteristic with bookies: we are not gamblers. If we do our job correctly, the "house" wins.

The other party to the insuring transaction, the broker, is your representative. Even when he is an "agent" of the insurance company with the power to commit the insurers to a risk, he is only rarely the employee of the



underwriters.

Anything that can happen to the dp equipment can happen to the department's general office equipment, and a few things extra, as well. No one may have yet burglarized a mainframe, but lots of typewriters get stolen. Since an "all risk" policy will include "burglary," this in itself is a good enough reason to buy "all risk" on the office furniture and equipment.

After buying insurance against the right perils, the second most important consideration in protecting dp equipment is correctly valuing it for insurance purposes, and making sure that the policy will pay off on that valuation basis. The basic valuation approach in property insurance is "actual cash value *on date of loss*," meaning cost of a like-new item at that time, less actual depreciation. Please note, we are talking about *actual* depreciation, not the figures used in tax computations.

An "actual cash value" valuation will give you the *used* value of your equipment. If you have been amortizing it, and adjusting the amortization for the effect of inflation, and if you can be satisfied with a used machine, and if you can find one, then "actual cash value" will serve your needs. On the other hand, if your plans to amortize yielded to the needs of plant expansion, if you want and need to have a new machine, then the valuation approach that must be written into the policy is "replacement cost without deduction for depreciation." This valuation is written relatively freely. It will force you to buy a greater amount of insurance and thereby increase your cost, but is well worth it.

A caution: some underwriters, having given the more liberal "replacement cost" valuation in the past, now draw back a little. The valuation may be limited to replacement within a specified time (such as 90 days) or to *exactly* the same item. If a better item is available that replaces the destroyed equipment in function, your policy ought not to restrict you from buying it.

In any event, whichever valuation approach is taken, remember that inflation is going to render your insurance inadequate unless you increase its amounts on a regular, frequent basis. There are endorsements available that increase the amount automatically by a set percentage every three months, but since these percentages don't coincide with the rate of inflation, and the endorsement may lead to a false sense of security, their worth is dubious.

The answer lies in regular increases in amount of insurance to track the rate of inflation. Any good broker will keep in touch with his clients regularly; on a risk as important as a dp center, a schedule of quarterly meetings should be instituted. These meetings would deal not only with adequacy of insurance on currently owned property, but would explore your plans for adding equipment, whether you are adequately insured for the risk during shipping, and how much additional insurance will be needed to cover the added property.

This latter point is not just a ploy to sell more insurance. Some property insurance policies stipulate that a percentage ratio of insurance limit to value insured must be maintained. This stipulation, known as the "coinsurance clause," reduces loss payments in direct proportion to the "under insurance," the amount under 100% insured. Adding equipment without the knowledge of the broker will leave not only that new equipment uninsured, but may weaken the value of the insurance (by lowering the percentage ratio of insurance limit) on the already-insured hardware.

Your regular meeting with your broker would not confine itself to property insurance. Just as the acquisition of new equipment can distort your property protection, so other changes in your business can affect other insur-

ances or require changes in your coverage, and your plans should be discussed.

Media is more than mediums

Even more sensitive to damage than your equipment is your media. The predecessors to media in business, the valuable papers and records of a business, are insured under a coverage known as "Valuable Papers." This is an "all risk" form, providing replacement cost valuation. The replacement cost valuation includes the cost of replacing the destroyed record. If the record is not replaced, the policy will pay only for the cost of the blank material.

The standard "Valuable Papers" coverage is suitable to the protection of media provided the underwriters will endorse the policy or agree in writing that the words "valuable papers and records" include all electronic data processing media. Given a readily available "all risk" form with an acceptable valuation clause, the only problem in correctly insuring media is establishing the actual value of the recorded media. This is a mind-boggling job that is best divided into two parts: deciding what media really must be reproduced, and then setting a value on it. While all of our files are valuable or at least dear to our hearts, not all the ancestral tapes since the commencement of business really need be maintained. If you can't bring yourself to dispose of them, at least remove them from the premises so they will be available for reconstruction purposes should a catastrophe destroy the tape library. If their only value once removed is for use in a catastrophe, they can be left uninsured.

If the old media has some value beyond the simply historical, Valuable Papers insurance automatically covers records temporarily located off-premises up to 10% of the "on premises" limit. This "temporary" limit can be made permanent, and be increased, if the 10% is not enough.

That media to be saved can be valued. One starts with the cost of the blank medium, then adds to that an assigned portion of the general overhead of the operation to produce what amounts to the intrinsic value of the record. This value still does not account for the cost of producing the raw data and, unless your cost accounting records are unusually detailed, that portion of the value will be little more than an estimate. Generally, an acceptable practice has been to produce the intrinsic value of the record and then add a set percentage such as 25% or 50% of that value to cover the raw data production cost. It is not a very exact method but it has served a number of insureds quite well in time of loss.

"I wish, McCullough, that you'd give a little more thought to your work and a little less to your working conditions." © DATAMATION ®

Time element: staying in business

Accounts Receivable as recorded on your media can present a special problem. If the records can be reconstructed, the cost of the reconstruction will be borne by the Valuable Papers and Media coverage. If the records cannot be reconstructed, the amounts receivable will be lost. To cover this risk, in addition to Valuable Papers and Media coverage, Accounts Receivable insurance should be bought. This coverage is designed to pay you the difference between the amounts you actually collect after a loss of receivable records, and the amount you could normally expect to collect. Because the very records needed to determine the exact amount to be collected are destroyed, the actual adjustment of the loss involves the trending of receivables over as long a period as possible (putting the growth rate of the business against receivables on this date last year, less usual bad debts, etc.). This presents an additional argument for keeping old records off premises.

When disaster occurs, assuming that you have correctly insured your equipment and media, there will still be down time. Though you have the financial means to acquire new replacement equipment and to pay for reproducing necessary records, still the reconstruction of the premises, the purchase, delivery and installation of the equipment, and the reproduction of the media will all take time. During that time, the center is not going to be earning. During that time, expenses will continue. Rent, leasing fees on undamaged leased equipment, mortgage payments, salaries to key employees, municipal taxes, all will continue even though your operation may be halted for a month or two. If you are a service bureau, your customers need to be serviced. If you are operating the data processing department of a general business, the business must continue.

The best solution to this problem is to have as little down time as possible. A disaster plan with provisions for use of compatible configurations located as near to the center as possible is a must.

Even with the disaster plan, making do in a time of catastrophe is not an easy or an inexpensive matter. Substitute facilities are not going to be available to you during your usual business hours. If your staff is going to use the

Before a broker can do his job correctly, someone is going to have to teach him about the operation, its terminology, its myths and realities.

facility, you will incur an unusual amount of overtime expense or nighttime bonus salary costs. The operation of the substitute facility possibly will require their staff *and* yours. There are incidental costs, such as the costs of transporting people to and from the substitute facility, subsidizing minor out-of-pocket expenses of staff, and hiring extra staff to bring the operation up to pre-disaster level while the regular staff is struggling to carry on the operation. To meet these expenses, a kind of insurance known as "Extra Expense" insurance is available. It pays the *extra* costs of maintaining operations when a disaster has occurred.

In spite of disaster plans, there will be times when an operation will go down and no amount of substitute facilities will allow it to continue as if no disaster had occurred. When this happens, there will be an inevitable loss of earning capacity of the business. An insurance known as "Business Interruption Insurance," offered in addition to Accounts Receivable insurance, deals with this. The majority of Business Interruption Insurance available pays on an actual loss sustained basis for loss of profits, and for expenses that continue during the shutdown. If proving the loss, which is necessary for payment, sounds terribly complex to you, you're right.

An alternate form of Business Interruption Insurance is available from some fewer insurance companies (all of them write the basic form). This form is known as "Valued Business Interruption" or "Per Diem Business Interruption." It is not an actual loss sustained form. Rather, it establishes a total limit of loss payment for the entire shutdown and a "sub"-limit to be paid per day. Given the relatively short down times that seem to occur in dp and the difficulty of proving a "traditional" business interruption loss, this per diem form of insurance is emerging as an accepted way of providing Business Interruption Insurance on dp operations.

A caution: in writing coverage for as specialized a risk as a dp center, underwriters will sometimes limit the protection to interruption arising out of equipment on which *they provide* the property damage insurance, or even more commonly, to property owned by the insured. Since damage to leased equipment insured by the equipment owner will halt operations as quickly as damage to owned equipment insured by you, such a limitation is unacceptable.

The problem actually goes beyond equipment. A service bureau was forced to sue its insurer to collect an interruption claim arising out of damage to air conditioning equipment owned and controlled by the landlord (the service bureau was a tenant). The Chairman of the Board of that service bureau said recently that, while he had been successful in his suit, the legal costs had rendered his win largely a Pyrrhic one.

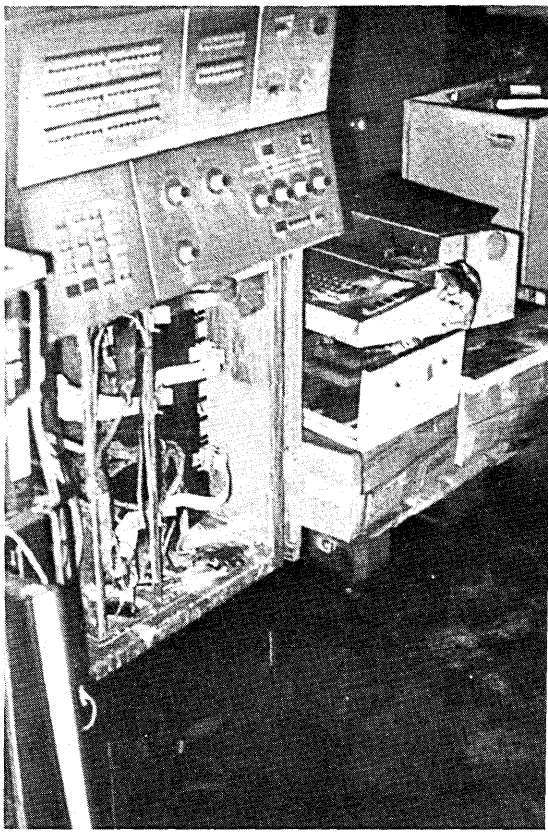
If you are operating the dp area of a general business, there is an additional concern. It is very common to extend the general business insurance to include your area or simply to believe that somehow it is adequately covered by the plant insurances. The odds are that the plant insurance will be deficient for your dp area in the perils insured against, in the clause stating how property will be valued, and perhaps even in the amount of insurance purchased. The plant Business Interruption Insurance, and Extra Expense Insurance, may contain limitations stating that they will pay for interruptions of business arising out of the destruction of dp media for only a very short time. This limitation would be entirely acceptable to your insurance broker or corporate insurance manager if he were thinking of the main operation of the business, and your operation could very well have been overlooked.

More special problems: liability

Beyond the destruction of your own property and the loss that you can suffer through the reduction in assets and the curtailing of income, your assets are also subject to a threat from outside sources. You are liable for damages for bodily injury or property damage of others arising out of your negligence. The General Liability policy arranged for your firm undoubtedly covers these exposures. Claims that may not be covered by your policy can still bankrupt your firm. The processing of data frequently involves the processing of private information about people. It is conceivable that your processing can give rise to suits alleging libel or defamation of character. Perhaps even to suits based upon invasion of privacy. These claims are not covered by *Bodily* Injury but they are covered by an extension of that policy which is known as "*Personal* Injury."

Claims for injury to your employees are not covered under your General Liability policy because your Workmen's Compensation policy covers their injuries. With the various mechanisms of Fair Employment Practice Acts available to disgruntled employees, it is conceivable that actions of yours may give rise to "Personal Injury" suits against you by your employees or ex-employees. These suits are not covered by Worker's Compensation but they can be covered by the Personal Injury coverage extension provided your broker requests it.

While your General Liability policy covers property damage to property of others, it does not cover property damage to property of others in your care, custody, and control. If you lease



Insurance may cover the list price of the machine and the reconstruction of the building. Will it cover extra employees, outside time, freight, reconstructing files? What about lost customers, lost orders, and rent on undamaged equipment?

equipment and it is damaged through your negligence, your General Liability policy will not defend you nor pay the claim. There are several ways of resolving the problem. Generally, your leasing company will offer you the equipment including insurance. Because the leasing company has the bargaining power of a great deal of insurance to place, it will usually obtain a more advantageous rate on the insurance than you can obtain if you were to insure just your equipment. If the leasing company offers you the right to

buy insurance on the leased equipment as a discharging of your responsibility for that equipment, it is worth at least comparing with the cost of buying your own insurance. In the event you elect to buy your own insurance, the leased equipment can be added to your property insurance policy just as if you own the equipment, provided that the leasing company is named as an additional insured as respects its interest in the items of leased property. This latter is the less desirable of the two ways.

Errors and omissions

Assuming that you have adequately protected yourself against Bodily Injury, Personal Injury, and Property Damage, if you are a service bureau, you are still not completely protected against suits by others. Since your errors in processing data can cost your customers a great deal of money, they will sue to collect their losses. The suits will be based neither upon Property Damage, Personal Injury, nor Bodily Injury, and will not be covered by your General Liability policy.

There are several insurance companies providing Data Processors Errors and Omissions coverage. If you are a service bureau, the coverage is essential. When your broker arranges the coverage, he must determine whether the insuring agreement is adequate. As an example, one very fine insurer limits its Errors and Omissions form to errors occurring in the processing of *financial* records. If your customers use you entirely for financial record processing, this is perfectly adequate, but if you run other programs, you are not covered for them. Assuming that the coverage does not limit itself to financial records, the insurance companies' definitions of what is "data processing" must be examined. At least one major underwriter defines data processing as *not* including systems analysis or computer programming, and errors arising out of these sources would not be insured claims.

There remains one area of potential catastrophe, the dishonest employee. Employee Dishonesty Coverage, commonly known as a bond, can provide cash reimbursement for his thefts. While it is possible to buy coverage in differing amounts on those employees with the most opportunity to steal, it is better to buy a single amount covering all employees.

If you are a service bureau, it is possible that your dishonest employee may steal from your customer rather than from you. Among some service bureau people specializing in financial programs there are very strong fears that an employee of theirs may decide to run a few extra paychecks when they are processing a payroll. The Employee Dishonesty coverage does cover property of others in your care, custody, and control but it values items such as paychecks at their intrinsic worth, that is their value as a printed piece of paper not for the cash they can be used to obtain. If you wish to be covered against the loss of your customers funds, it will be necessary to have an underwriter agree to value the checks not as blank paper but as money. Obviously, he is going to charge a great deal more for this than if he were valuing it simply as printed paper.

Cutting the costs

Paying for all this insurance is not going to be cheap, but it need not be back-breaking either. Just as there is a risk management rule that says "don't risk a lot for a little," there is a corollary that says "don't spend a lot to insure a little." The use of deductibles in writing your Property Damage Insurance, your Business Interruption Insurance, and your Errors and Omissions Insurance will greatly reduce costs. It is better to "self insure" the first $1,000 or $5,000 of damage than to leave any area totally uninsured to reduce expense.

There are other ways of keeping cost down such as taking advantage of the leasing companies more advantageous insurance rates if they are offered to you, or asking your insurance broker to study the Property Rating Schedule which determines your rates (to see if there are conditions such as lack of "no smoking" signs, use of ordinary trash receptacles in the bursting room, and similar things that could be easily corrected and which may have a much greater effect upon your fire rate than you realize). The installation of protective devices such as Halon systems, smoke detectors, and automatic sprinkler systems involves the expenditure of more dollars, but these devices will pay for themselves over a reasonably short time and, more important, protect you against any interruption of operation.

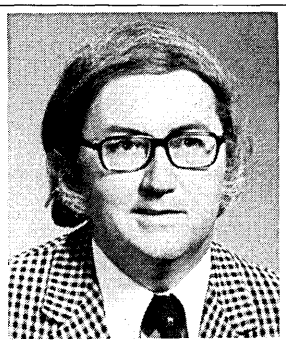
If a new data center is planned or an expansion of the existing one is being discussed, your insurance broker should be involved. He can call upon the safety engineering services of your insurance company to obtain advice on how to build or expand in a way to keep your insurance costs down.

It's obvious from this text that the insurance broker is the key to properly protecting your operation. As a professional, you have a right to expect him to identify all of your exposures to loss, and to obtain coverage at a reasonable cost. As a minimum, coverage must be purchased in the amounts specified and the broker must be willing to learn about your business and to keep close enough contact to keep coverages up to date.

There is nothing wrong in letting more than one of these agents compete for your business. The ground rules in doing this are that they should be told they are competing, and asked to name the insurance companies they will be using so they don't collide in their dealings.

Having selected the right broker, the question remains: Which insurance company? The broker is going to have his own strong ideas about this. If I were the broker and were capable of setting aside my inherent prejudice in favor of my company, I would settle on one of these: The Insurance Co. of North America, an imaginative insurer providing adequate forms; Fireman's Fund American, capable, and provides an excellent Errors & Omissions form for processors of *financial data*; St. Paul Insurance Co., a first-rate company that pioneered many of the coverages discussed here (although it might be necessary to discuss their definition of data processing in Errors & Omissions, and to be careful to note what their Business Interruption coverage did *not* apply to before accepting the forms; The American Home, an innovative, imaginative insurer with skilled underwriters in the data processing area; and the Chubb Group of Insurance Companies (about which modesty forbids comment). There may be others, these are my choices.

If you pick the right insurers, that is your brokers and your underwriters, they can do a good job protecting you from catastrophe but only if you will take the time to explain your operation and your needs to them. ❋



A senior underwriting officer with the Chubb Group of Insurance Companies, Mr. Chadwick has been in the insurance business for 25 years. He has written chapters on dp insurance for "Computer Law Service" (Callaghan & Co. 1972) and "The Systems Manager's Handbook" (Dow Jones-Irwin Co., 1975). He is also the originator of Chubb's "Electronic Data Processor's Errors and Omissions" insurance coverage.

The Costs of Privacy

by Robert C. Goldstein

It's too late to ask "Will my company be affected by privacy legislation?" More appropriate questions now are "How will we comply?" and "How much will it cost?"

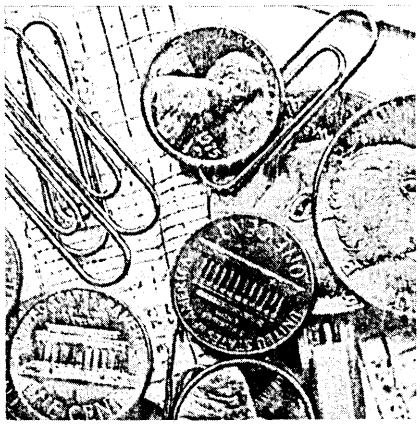
Data processing professionals should no longer wonder whether their work will be affected by privacy considerations, but rather how to deal with the controls that are certain to be imposed. The first legislative steps to protect privacy have already been taken in most industrialized countries, and in the U.S. alone, more than 125 bills are currently pending. Some existing and proposed legislation would affect only public sector data banks or those in particular fields such as law enforcement or credit. However, it now seems safe to assume that any organization that maintains records about individually identifiable people —even its own employees—will soon operate in a regulated environment.

Given this situation, the appropriate questions are not "Should there be privacy legislation?" or "Will my company be affected?" but "What specific steps will my installation have to take in order to comply?" and "How much will it cost?"

As a start in answering these questions, an analysis of the costs of six personal data systems (application systems involving the use of data about individuals) is presented here using a privacy cost estimation model. The data systems included two in law enforcement and one each in medicine, credit, insurance, and personnel applications. Major characteristics of each system are shown in Table 1 (page 66), along with some privacy costs as computed by the model. These computations were made using requirements imposed by the 1974 Federal Privacy Act. Although this act applies only to personal data systems operated by federal agencies, it may indicate the type of regulation likely to be imposed on the private sector as well.

A major contribution to the privacy conversion cost figures comes from the requirements dealing with physical security. The security costs vary relatively little across the six systems studied. In each case, the objective is to make one installation secure, and the cost of doing this does not seem to vary much with the size or use of the system.

The second major conversion cost is associated with training the operators and users of the system in privacy-oriented procedures to be followed. There is nothing particularly unusual about the handling of this requirement, except that it is sometimes surprising to discover how many individuals have access to a system, and therefore must be given this special training. The situation is complicated by the fact that many users of a system may not be employees of the organization operating the system. This raises important questions about who should give the training, who should pay for it, and who should be responsible for enforcing the training requirement.



The programming needed to develop some of the capabilities required by the regulations is also significant, accounting for as much as one-third of the total conversion cost.

People costs go on and on

For ongoing annual costs, the major impact appears to be associated with requirements that involve maintaining the accuracy of the data base and handling complaints from data subjects about the contents of their records. Looked at from the resource dimension, the critical items are clearly executive and clerical time. Those resources most closely related to computers — data storage, processing, communications, and programming— do not account for a significant proportion of the overall cost of privacy except in two limited areas which will be mentioned later.

The 1974 Act and most other regulatory proposals include a requirement that personal data be maintained in an adequate state of accuracy and timeliness (a certain fraction of the records in a system will "expire" each year.) Two parameters are crucial in determining the impact of this requirement: the number of records that will be rechecked each year and the amount of time expended on each check. For a typical system, about 10% of the records would expire each year, and 90% of these would be rechecked rather than dropped.

Using the very conservative assumption that only 15 minutes of clerical time would be expended rechecking each record—very likely an unrealistically low figure—this requirement will account for between 26 and 45% of the total annual privacy cost for the more typical commercial systems. This requirement is also largely responsible for the fact that altogether "clerical tasks" are expected to absorb roughly 50% of the annual privacy cost for all of the systems studied.

Complaints about an individual's record would be handled, it is assumed, by executive, rather than clerical, personnel through a hearing process. Some such high-level, formal process seems indicated by the requirements in the act dealing with the accuracy of records and by the costly procedures that are specified for cases where a subject's complaint is not resolved to his satisfaction.

The impact of this requirement depends on the number of complaints received per year, and the amount (and cost) of executive time expended on each. An estimated one to two hours would be devoted to each complaint. Assuming the volume of complaints to be at an annual rate of 0.2% of the number of records in the system, this requirement alone would be responsible for between 27 and 43% of the annual privacy cost for the typical commercial system. It is the greatest ongoing drain on executive time also; it is responsible for almost all of the 12-44% of annual privacy

Estimated Privacy Costs for

System	Data Subjects (thousands)	Characters in Data Base (thousands)	Users	Transactions per Year (thousands)	Development Cost (thousands)	Old Annual Operating Cost (thousands)	Privacy Conversion Cost (thousands)	Annual Privacy Cost (thousands)
1 Medical	1,000	3,500,000	50	2,500	$ 726	$ 4,000	$ 474	$ 1,623
2 Law Enforcement #1	1,500	32,000,000	5,000	110	$ 86	$ 477	$ 504	$ 1,051
3 Law Enforcement #2	31	19,000	5,000	55	$3,000	$ 2,000	$ 281	$ 154
4 Credit	35,000	3,500,000	500,000	10,000	$ 800	$14,000	$1,408	$10,166
5 Personnel	10	20,000	45	50	$ 200	$ 340	$ 141	$ 33
6 Insurance	3,300	3,600,000	60,000	12,500	$5,000	$12,500	$ 523	$ 1,846

*The figure is unusually high because the installation was new and the transaction volume had not yet built up.

Table 1. If privacy regulations like those of the 1974 Privacy Act were applied to the private sector, costs to typical commercial users would look like these figures—the most oppressive of which appear under "Annual Privacy Costs." Several assumptions were made, including the following:

(1) Although the total costs of making an installation secure should not be written off against complying with privacy legislation, numbers under "Privacy Conversion Costs" assume nearly the total cost rather than incremental costs because these firms had done little to secure their systems.

COSTS OF PRIVACY

cost attributable to executive tasks. Needless to say, the results are very sensitive to variation in the complaint volume parameter.

The requirements providing for subject-initiated inquiries about the existence, content, and use of his record can claim arbitrarily large resource commitments. In particular, for most systems, provision of immediate, on-line response to such inquiries would be quite expensive. The results described in this article were obtained assuming these inquiries would be collected and processed in weekly batch runs, which very much reduces the cost.

Real-time aficionados, who may find this approach objectionable on principle, should consider the additional opportunities for ensuring that data is given out only to the data subject himself, and for detecting fraudulent inquiries that result from a *mailing* of the response rather than handing it out over a counter. It is to be expected, in addition, that most of these inquiries would be received by mail, making the need for on-line response highly questionable.

Computers and stamps

The two requirements where computer time is a significant factor are those dealing with checking the authorization of each access to a record, and retroactively notifying all past recipients of a record that it was erroneous or has been disputed by the subject. (This is a big user of computer time because of the need to search the usage log to identify the past recipients.) These requirements are not expensive for all systems, but they were for the credit and insurance applications studied, applications which are probably most typical of the large commercial systems that are becoming increasingly common.

Although dp expenses are a large fraction of the total only for the insurance company, in absolute terms, these requirements create a demand for roughly three hours of additional computer time per day for both credit and insurance systems.

Postage and related mailing expenses would be a significant factor if personal data system operators are required annually to notify each subject of the existence of his record—a requirement not included in the 1974 Act. With millions of data subjects recorded in many systems, it does not take very long for the cost of generating and distributing a mass notification to become very large. Of our six systems, the only ones not affected are the personnel system where a (marginally) free intra-company mail system is available, and the insurance company, which can include privacy-related notifications and requests with regular policy-holder mailings.

The 1974 Act substitutes a requirement for responding to inquiries from a person (data subject) for a requirement specifying blanket notification. Of course, the unit cost of processing an individual inquiry is far higher than that of issuing a general notification, but this may be compensated for by the smaller numbers involved. For the systems studied, the point where the costs were equal proved to be when inquiries were made on 7-14% of the records on file. Although these numbers may seem low, the little data that is available suggests that less than 1% of the subjects of a system would be likely to initiate an inquiry in any given year. Thus, in this as in many other areas of information processing, it appears that an "exception reporting" approach is more cost effective.

Before leaving the subject of communicating with data subjects, it should be mentioned that many systems do not currently maintain *full* address information as part of each individual's record. For these, any communication with subjects would be impossible without adding additional data to each record and going through what would appear to be a very expensive data collection activity.

Must it all be done?

It may be worthwhile to look at the implications of these results for those involved in producing and using information processing equipment, as well as for those people responsible for enacting regulations. It is very important to realize that existing regulations cover only a relatively small fraction of the total spectrum of personal data systems and that there is still time to allow some of the considerations reported here to influence the final form of the regulations in areas yet to be covered.

Taking the legislative viewpoint first, ideally one would like to select a portfolio of requirements on the basis of a cost-benefit analysis. However, in this case as in many others, it is extremely difficult to quantify the benefits. Thus, this analysis has concentrated on the cost side and its results suggest that for most personal data systems, most of the proposed requirements can be implemented at relatively nominal cost. One reasonable strategy, therefore, might be to take these requirements as proposed, and concentrate attention on assessing the importance of the few requirements that appear expensive. A word of caution is needed, however. Many of the requirements interact with each other in ways that allow the elimination of one to drastically reduce the effectiveness of others. Thus, great care must be exercised in picking and choosing from among any of the complete packages of regulations.

The vendors can help

It has already been observed that a relatively small part of the total privacy cost falls in areas of direct concern to suppliers of data processing equipment. Usage logs are inevitably

Six Personal Data Systems

Annual Privacy Cost as Percentage of Old Annual Operating Cost	Annual Privacy Cost per Business Transaction	Annual Privacy Cost per Data Subject	Percentage of Annual Privacy Cost Attributable to: Clerical Tasks	Executive Tasks	Mailing	Data Storage and Processing	Additional Computer Processing (hours per week)
41%	$0.65	$1.62	46%	44%	4%	0%	3.79
220%	$9.55*	$0.70	52%	27%	3%	10%	0.63
8%	$2.80	$4.97	47%	43%	0%	1%	0.06
73%	$1.02	$0.29	57%	33%	1%	5%	13.45
10%	$0.66	$3.30	54%	12%	0%	5%	0.01
15%	$0.15	$0.56	57%	14%	1%	23%	12.66

(2) "Annual Privacy Cost" depends on how many records must be updated each year. Typically, 10% of them would expire, and 90% of those would be updated. Assuming a low estimate of 15 minutes of clerical time to check each record, this still accounts for 26-45% of the total annual cost.

(3) Assuming a low annual complaint rate of 0.2% of the number of records stored, processing complaints would still account for 27-43% of the "Annual Privacy Cost." Most of this might be spent on executive time, since 1-2 executive hours per complaint is assumed.

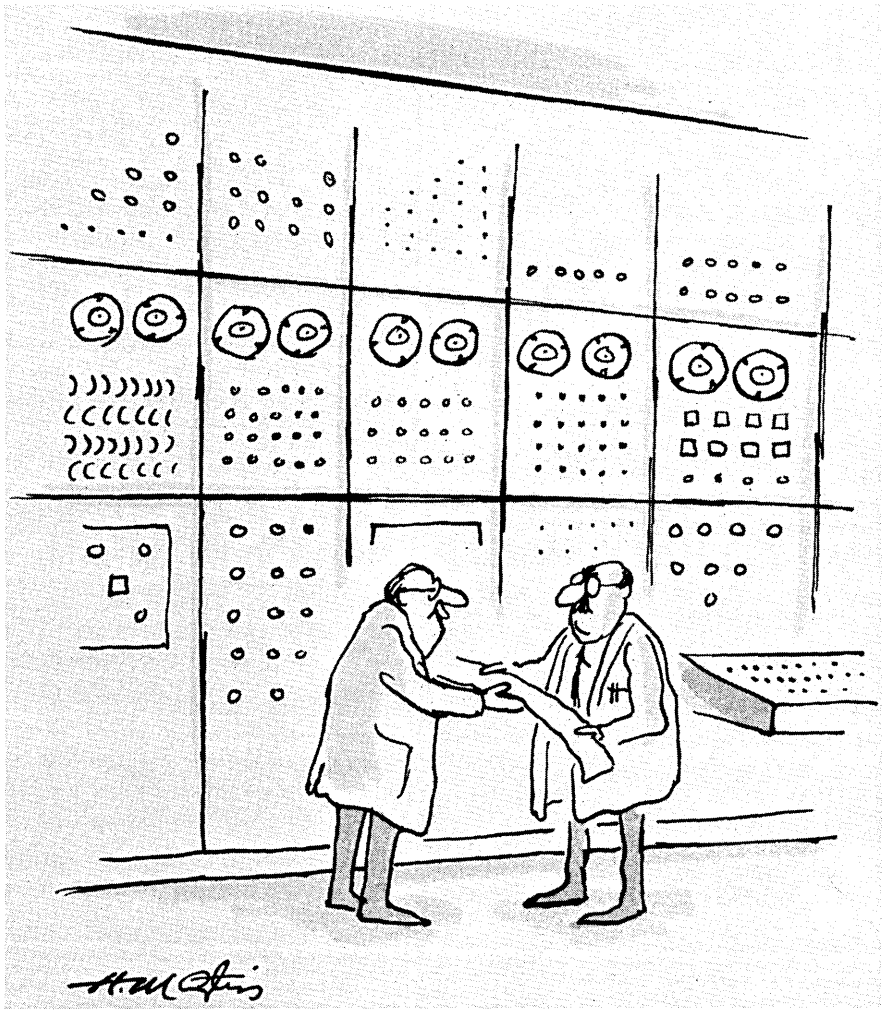
going to be large for large systems, and since this is one of the pivotal proposed requirements, it seems unlikely that it is going to be eliminated. Thus, access mechanisms might be developed for files more sophisticated than the one proposed here, or new storage devices that would permit the various kinds of access required of the usage log without a lot of sorting and searching.

Aside from this, there are two implications of privacy regulation that should be of concern to equipment suppliers. The first is that much of the protection envisaged by these regulations disappears unless it is possible to identify reliably the individual making a request. The traditional user ID's and passwords are obviously not sufficient. In addition, it is very clear that efficient techniques will be required for controlling access to information at levels below that of an entire file. This capability exists in a few systems today but is not widely available and tends to be expensive.

The biggest challenge to the computer industry in these results, however, clearly does not lie in reducing even further an aspect of the total cost that is already relatively low. The really promising approach would be to look at the areas that are expensive for other reasons, to see if techniques can be found for reducing some of these through automation.

One area of potential improvement is the handling of inquiries by data subjects. Since only a very small number of highly structured inquiries are permitted to data subjects, it is not inconceivable that an unattended, interactive system could be developed for this purpose. In fact, it would be trivial except for two considerations: the need for positive assurance of the identity of the inquirer, and the need for an interactive system so easy and foolproof to use that it would be accessible to the average man on the street. Something along the lines of the 24-hour, self-service teller stations now used by some banks might be suitable.

Training is another good candidate for automation, not only because it is expensive, but because many of the people to be trained do not work at the same location, nor even for the same organization, as the operators of the system. The cost and logistical problems associated with this situation might be solved by having the computer administer the training using computer assisted techniques. It would also monitor the training activity and automatically reject inquiries from persons who had not completed the instructional program. This approach seems particularly attractive since this training is not just a one-time occurrence. Although the bulk of the training activity would take place



"Do you realize that without computers it would be impossible to assess the impact of computers on our society?"

upon enactment of the regulations, there would be a continuing need to train new users and to provide refresher courses for old ones.

There are several things that the operators of personal data systems can do to reduce the impact of privacy regulations. One obvious approach would be to try to influence the shape of the final regulations. Data system operators certainly have every right to make their views known along with other interested parties. However, the social climate in the industrialized world certainly seems to be running strongly in favor of privacy protection. Users can also apply pressure to the suppliers of their equipment for

About the Privacy Cost Model

We have constructed a model for estimating the impact of a set of privacy regulations on a personal data system. The development of this model required a determination of exactly what the operator of such a data base would have to do to comply with the regulations. This naturally led to the question, what regulations? Numerous alternative proposals have been made, and clearly the model should not be restricted to only one or a few of them. In fact, one of its major uses should be the comparison of different regulatory schemes.

The first step in our project involved analyzing a large number of proposed and enacted regulations to determine the specific operational requirements contained in each. A list of 20 requirements was compiled such that any of the regulatory proposals could be characterized as some combination of the 20. As shown in Table 2, the requirements fall into four general categories.

Once the specific requirements had been determined, the next step was to determine exactly what would have to be done to comply with each. An analysis was carried out in terms of various attributes of a system such as the size of the data base, the volume of transactions, and the number and type of users. Structuring the model in terms of these attributes makes it possible to apply it to a particular data system by simply filling in the appropriate attribute values. Some attributes are used to choose from among alternative paths in the model according to whether the system possesses on-line inquiry capabilities, for example, or whether or not a generalized data management package is used.

Therefore, there are two kinds of input to the model, a list of the regulatory requirements to be analyzed, and a description of a particular personal data system in terms of values for each of the attributes used by the model. The first level of output from the model consists of estimates of the incremental amounts of various resources needed to meet each requirement. Incremental resource demands are calculated in order to provide an indication of what *new* costs would be incurred specifically because of the privacy legislation, and to avoid the probably insolvable problem of deciding what share of certain costs should be attributed to privacy, and what to other objectives. The impact model also distinguishes between conversion costs which are incurred only once to bring a system into compliance with the regulations, and ongoing costs which must be added to "pre-privacy" operating costs.

The general resource categories which are considered are: manpower, data storage, information processing, data communications, and capital (which includes various items of equipment and supplies). Each of these categories is broken down into several subdivisions.

Proposed Privacy Requirements

The operator of a Personal Data System shall:

Subject Access Requirements	Subject Control Requirements	Data Usage Requirements	Operating Procedure Requirements
• Notify each subject of the existence and content of his record.	• Notify each subject whether he is obligated to provide data.	• Check the authorization of each request for data.	• Assure the accuracy and completeness of all records.
• Respond to inquiries from data subjects concerning the existence and content of their records.	• Obtain the consent of the data subject for each use of the data.	• Maintain a log of all accesses to personal data.	• Include any additional data needed to give a fair picture.
• Respond to inquiries from data subjects concerning the uses of their records.	• Obtain the consent of the data subject before transferring data to a less protected system.	• Include the data subject's statement with any release of disputed data.	• Store a subject's statement of dispute with his record.
• Respond to complaints from data subjects concerning the accuracy of their records.		• Send the subject's statement to all past recipients of disputed data.	• Protect against threats and hazards to the security of the data.
		• Assure that any system to which data is transmitted will provide adequate protection.	• Train all users in appropriate privacy procedures.
		• Notify the subject before data is released in compliance with legal process.	• Assure that his system meets all of the requirements.
			• Publish a description of his system where it will be seen by most data subjects.

Table 2. These are the requirements most often proposed in privacy legislation. Not all of them are included in the Privacy Act of 1974, but the cost model used here can accommodate all of them, and hence might be a useful tool in evaluating privacy bills.

hardware and software products that will facilitate compliance with the regulations. There are a number of items, particularly in the access control area, that have been technically feasible for some years, but have not been included in systems due to lack of user demand.

One particular product that promises a significant impact on some costs would be the generalized data management package. Such packages should reduce the amount, and hence the cost, of programming needed to meet the various requirements. They should also make it easier to produce the "ad hoc" programs that would often be required by the system auditing people, and would make it easier to certify that a particular system does, in fact, comply with the regulations.

Operators of personal data systems can also attempt to reduce the impact of privacy regulation by passing the costs on to someone else. As the numbers in Table 1 indicate, it should be possible to design a system so that the incremental privacy cost per transaction is relatively small. This will be particularly true for large, heavily used systems.

Finally, organizations that maintain only a small amount of personal information or a lot of data that they don't use very often may find that such activities become quite expensive under the proposed regulations. This may lead some organizations to stop maintaining their own files of personal information and rely instead on large service bureau personal data systems that could protect the data at lower cost. Whether the concentration of personal data into a few large systems might increase or diminish individual privacy is a complex question on which one can only speculate.

In summary, while many proposed privacy requirements can be implemented at nominal cost, there are a few which appear to be quite expensive. However, there are some possibilities for reducing these costs through new, but not very exotic, technology, as well as through new organizational and legal arrangements. There is little doubt that privacy protection will become a feature of all data systems containing personal information, and the time is now at hand to discuss exactly what protection should be provided and how. ❋

Once the resource demands of each requirement have been computed, they are converted to money amounts using factors appropriate for the specific installation, and are then aggregated by resource and by requirement. This enables the quick identification of high-cost requirements and of resource areas experiencing heavy demands. It can be seen that applying the model to a new data system requires only the provision of values for all of the relevant attributes, while adding a new requirement involves actually inserting additional equations into the model to describe its resource usage.

As an example of how one particular requirement is handled by the model, consider the requirement that a log must be kept of each disclosure and use of personal information. In analyzing this requirement, it is helpful to bear in mind the ultimate uses to which the log will be put since these will affect its optimal form and structure. This log will certainly be the major reference for complying with the requirement that data subjects be allowed to inquire about the usage of their records. Thus, it must be searchable by data subject. In addition, the log would be a useful aid to the system auditors. It would probably be the only way, for example, of detecting an improper inquiry by someone who is known to the system as an authorized user. To accomplish this, it would be necessary to be able to scan the log looking for various access patterns.

Since a usage log entry must be made for every transaction (other than routine housekeeping), it should clearly be as compact as possible. A record format consisting of five 4-character fields can suffice using suitable encoding schemes. The five fields would identify the subject, the date and time of the inquiry, the inquiring organization and individual, and the purpose of the inquiry.

Log entries will be written in chronological order as transactions are processed. However, they will normally be retrieved by subject identification. This suggests that they must be written on a machine-readable medium to permit later reordering; a magnetic tape unit will probably be the best choice on a cost-effectiveness basis. (Using reasonably conservative tape densities and blocking factors, a single reel of tape would hold about 500,000 log entries, corresponding to two weeks of operation for even the busiest systems studied during this project.)

The resource demands for meeting this logging requirement include programming time to develop and maintain the necessary programs, some additional processing associated with each transaction to write the log entry, and additional scheduled computer runs for sorting and merging the partial log tapes. A dedicated tape drive may also be required.

The impact model contains roughly one equation for each resource used by a requirement. The portion of the model dealing with the usage log contains six main equations, corresponding to use of the following resources: conversion programming, annual (maintenance) programming, off-line data storage, immediate processing, scheduled processing, and capital equipment. As an example, for a batch-oriented system, the equation for scheduled computer processing would look like this:

SCPR = NTRN*TCPU*IWUL
+ 250*SORT(NTRN/250,SLOG)

The symbols are defined as follows:

SCPR: scheduled computer processing needed

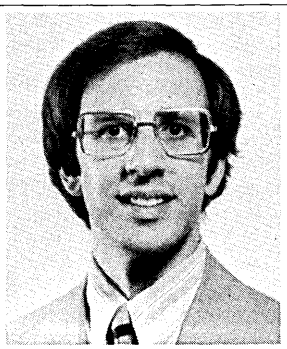
NTRN: annual transaction volume

TCPU: average instruction execution time for computer used

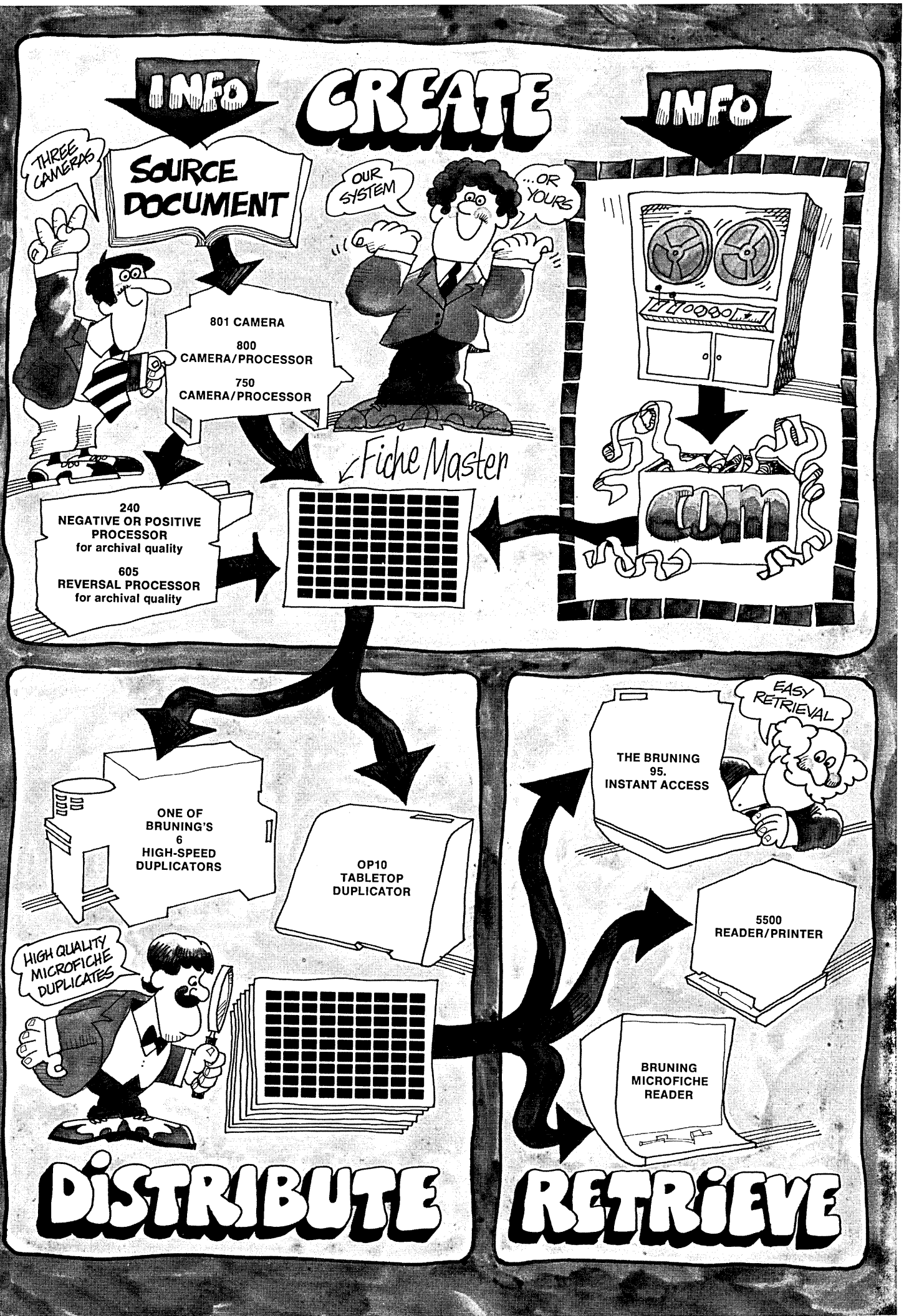
IWUL: number of instructions required to write a usage log entry

SORT(a,b): a function whose value is the time required to sort a file of *a* records of average length *b*.

The first part of the equation is the additional time required to log each transaction as it occurs. The last part reflects the time taken by the daily sort of the latest additions to the log.



Dr. Goldstein is an assistant professor of accounting and management information systems at the Univ. of British Columbia in Vancouver. Previously, while on the research staffs at MIT's Project MAC and at the Lawrence Livermore Laboratory, he worked on the design of very large computer systems and advanced approaches to data base management.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CIRCLE 29 ON READER CARD

On Diginurds

by S. A. White

Although they affect every computer system and concept, these entities defy measurement and analysis, and thus are becoming increasingly less well understood.

During World War II, fliers experienced unexplainable malfunctions which they were eventually able to attribute only to the operation of entities called gremlins. Now electrical engineers and computer scientists have begun to discover analogies to those entities, which have come to be known as nurds. Learned colleagues in the field of inertial navigation have presented two papers on the subject. Dr. D. T. Friest first published on the basic theory of nurds [1], and R. R. Miltenberger extended the knowledge in the field [2]. This paper presents additional material observed over a period of years in both laboratory and operational environments.

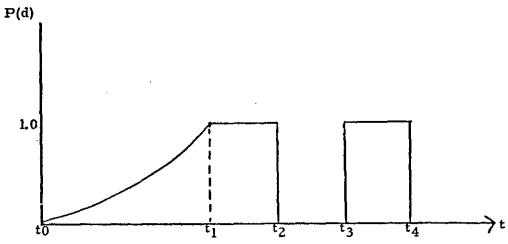


Fig. 1. Probability of existence of diginurds in a given piece of equipment vs. time.

Nurdologists have come to recognize nurds as being capable of permeating all things, e.g., theory as well as fact. Nurds which have been responsible for all otherwise unexplainable computing system erraticity are labelled binurds. These are in turn subcategorized as von Neumann nurds (which muddy up concepts) and diginurds (which sabotage equipment). Diginurds attack the basic logic of a computing structure and effect a transmutation of logic functions. The resulting logic functions have never before, to the author's knowledge, been classified.

The transmuted logic (or, more accurately, illogic) functions are IF, MAYBE, ALWAYS/NEVER, and WHAT. It is extremely important to note that at any particular logic node, the presence of these illogic functions may be treated as a time-varying (i.e., nonstationary) random variable. That is, at random instants, conventional logic (AND/OR, NAND/NOR) may be transmuted to diginurd illogic.

A summary of the distinguishing characteristics of diginurd illogic is in order here. The IF gate provides a proper output subject to the conjunction of two states: (1) nothing critical is passing through it, and (2) nobody critical is watching. If either the data being processed is important, or if a knowledgeable critic is observing, the pattern of the IF gate output defies rational explanation. The behavior is best attributed to a whimsical diginurd playing billiards with electrons inside the semiconductor material.

The MAYBE gate differs from the IF gate in its performance, which is more insidious. Its performance is best described by: maybe it'll behave as an IF gate. . . . and maybe it won't. Never would one dare to demonstrate a piece of equipment to a customer when that piece of equipment has an IF gate, but one never knows whether or not that piece of equipment has a MAYBE gate.

The ALWAYS/NEVER gate is characterized by the wrong output being present ALWAYS, or, conversely, the right output is present NEVER, no matter what is done. . . . and nobody knows why. Less understanding is yet to come.

The least understood gate is the WHAT gate. Its name is derived from the reactions of those who view its performance, usually "what?" or other examinations which hardly seem suitable for recording in a scholarly paper. Typical of outputs which WHAT gates produce are: +5 volts output when the only inputs (including signal and power) are −5 volts; ramp-type functions which cause 'scope displays to resemble a tv picture with lost vertical synch; a pulse train at a frequency totally unrelated to any other frequencies in the system.

Diginurds are very time sensitive. The probability of diginurd existence is indicated by the curve in Fig. 1.

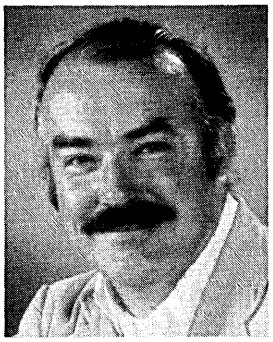
The time t_0 is the time of the first hardware fabrication of the project. Testing commences at time t_1; in utter desperation a consultant is called in at time t_2; at time t_3 the customer arrives for the acceptance test; and at time t_4 the program is abandoned.

Of course, the occurrence of t_4 is consistent with the observations of Friest and Miltenberger: both time and money have been exhausted by then.

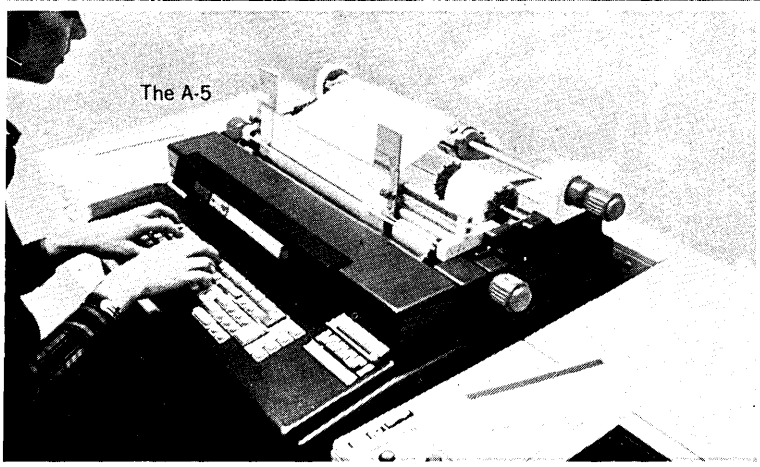
Extensive data collection programs now in existence are intended to aid in quantifying diginurd behavior patterns, however, the results were not available for this paper as the appearance of diginurds invalidated all numerical results.

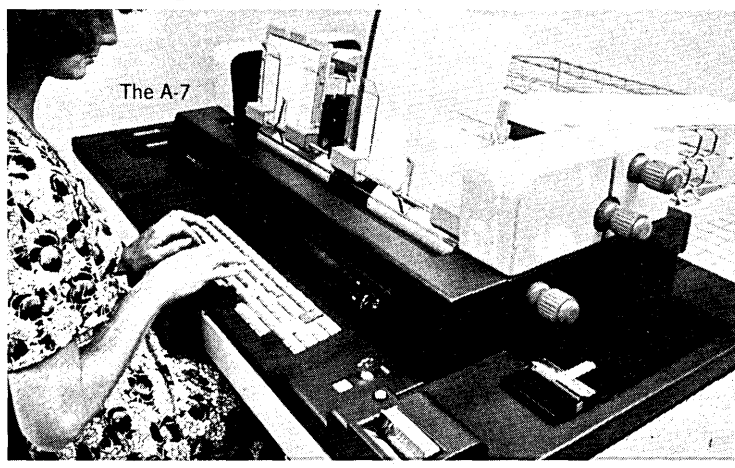
References

1. Friest, D. T., "The Theory of Nurds," March 1970.
2. Miltenberger, R. R., "The Universal Principle of Pacification," Feb. 1973.



Dr. White first became interested in diginurds while studying inertial navigation, microelectronics, and digital signal processing systems at Rockwell International's Autonetics Group, where he has worked for 16 years. He is presently investigating related phenomena as a digital systems group leader in Autonetic's Electronics Research Div.





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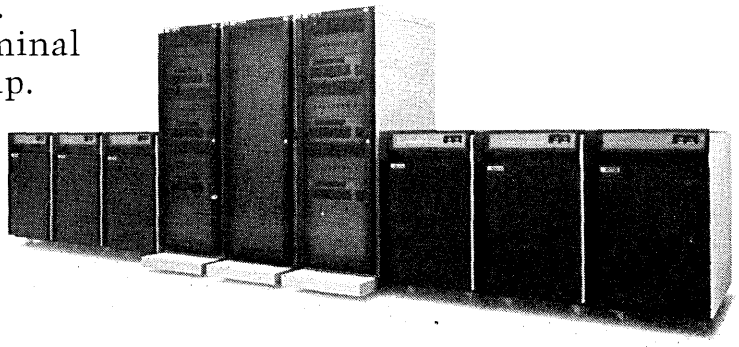

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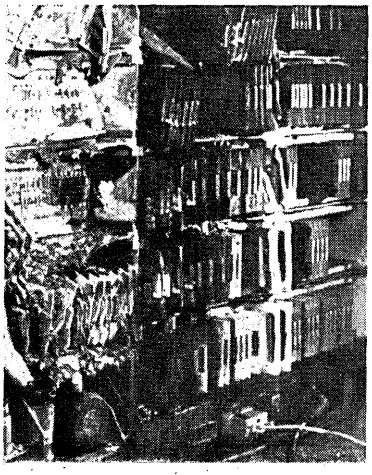

to evacuate a room before the extinguishing agent can go to work.

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.

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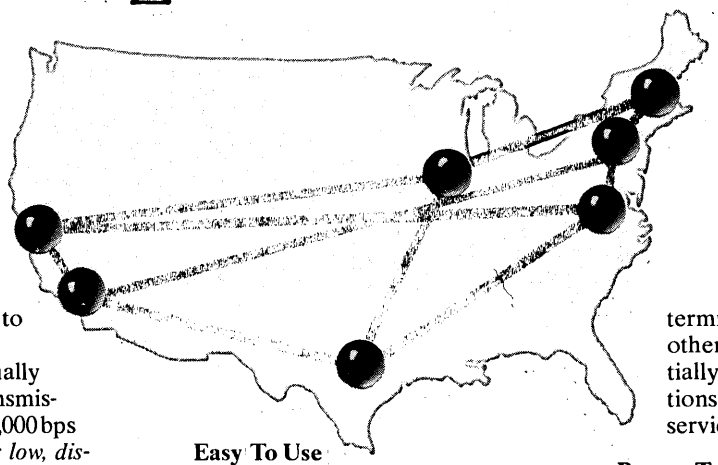

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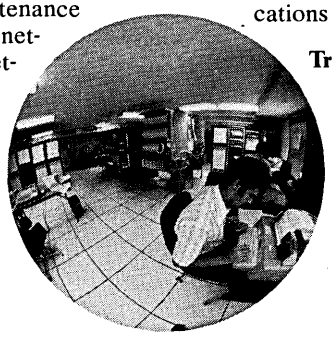

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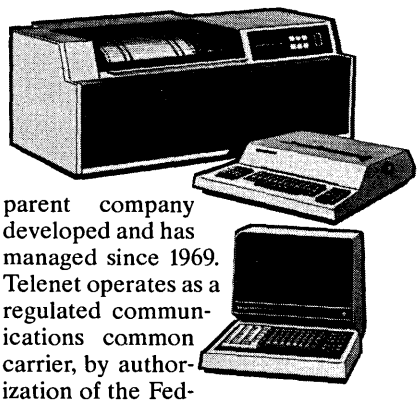

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Backing Into an Information System

by Matthew J. Orkins and Stephan F. Weiss

When a comprehensive system to handle everyone's reporting needs proved too tough to build, separate systems to handle each individual's needs were done instead. The results were the same.

WANTED: *Comprehensive information system for a paper products plant in northeastern Pennsylvania. System must satisfy day-to-day control needs of first level supervisors and long range planning needs of top level management. It must be usable by hourly employees, line managers, accountants, industrial engineers, and corporate staff.*

SCOPE: *This plant employs about 2,000 persons. Activities include forestry service, wood procurement, paper manufacture, conversion of paper into national brand name household products, and distribution of finished product.*

RESOURCES: *One dp manager, two systems analysts, one terminal operator, four keypunch operators, one Data 100 terminal connected by 4800 baud modem to an IBM 370/168 located at corporate headquarters, and a dozen* RPG *systems developed offsite to handle specific payroll and accounting functions.*

TIME FRAME: *Results, capable of measurement in reduced cost, improved quality, and increased productivity, to be achieved immediately.*

Although not appearing in any newspaper, the preceding "classified ad" summarizes the expectations of plant management at Charmin Paper Products of its new dp staff a few years ago. In total, these expectations sound like a job for Mr. Phelps and his "Mission Impossible" crew. In cases like this, the textbooks and journals advise the would-be information mogul to revise the expectations of top managers—to let them know that nothing happens immediately, that a genuine integrated information system must be carefully planned to the last detail before design work can begin, and that any overlooked detail can upset the entire system. Further, these top managers should be informed that their commitment to this system is essential and that most of the plant's managers will be extensively involved in planning for it.

At Charmin, the dp group (all three of them) was caught between two diametrically opposed goals—the desire for a totally integrated system, and the need for instant results. As might be expected, "professional dp" considerations won out, and we began to develop a comprehensive information model for the plant. This visual, flowchart model was constructed by identifying all existing information sources, flows, interactions, uses, and reports through a series of interviews with managers of the various parts of the plant. We expected that the end result would tell us what we had, what information was needed on what reports, and how to move from the existing RPG pieces to the new information system.

Unfortunately, after two months we realized that the study was not working. Even as the study progressed, new information needs appeared and old needs that had been desperately important faded away. At first we concluded that the plant managers were not taking the study seriously and were too shortsighted to analyze their long term needs carefully. Further experience, however, forced us to conclude that the fault was in our approach.

The problem was that the plant's information needs are extremely complex and constantly changing. Yesterday's problem of increasing production becomes today's problem of poor quality which will become tomorrow's problem of energy conservation. In this situation it is not possible to achieve permanent problem definition, and, as a result, there can be no permanent problem solution.

Since the accepted approach looked extremely impractical at this point, we decided to reconsider the problem from the point of view of satisfying the plant managers. Would it be possible to design a manufacturing information system without a master plan? If it could be done, we could use independently developed systems as the foundation for eventually constructing a management information system (which would tie the independent systems together). Each system or subsystem could be evaluated on its own merits; only if justified in terms of cost reduction or profit improvement would it be designed and implemented.

In this approach, a "system" would be designed to handle only one area of concern in a specific part of the plant. Examples include: quality control in papermaking, production information such as volume of product manufactured, operating efficiencies, and scrap generated in paper converting; downtime reporting in the pulp mill; and plantwide cost reporting. Working in this way, from the bottom up, we would meet the plant expectation of immediate results and satisfy a need on our part for measurable achievement.

The risks

We recognized there were risks in working from the bottom up including the risk of neglected detail and the risk of building files that either do not contain the data required in reports or that cannot be tied together for higher level reporting. To minimize these risks, we decided to store all information collected, and to store it on-line in its most basic form, so that any data would be available at any time. This way our information system would be designed around information and not around reports. This design would allow us to create independent data banks which could later be interfaced to satisfy a virtually infinite variety of information needs. These files would solve an immediate plant problem and later evolve into parts of a true manufacturing information system.

The basic storage format decided on consists of: record identification, data origin identification, and data. A typical record looks like the following:

Record Identification
Unique Origin Identification:
- *date*
- *shift*
- *time*
- *line*
- *team*
- *operator*

Information

The data entered into this record format is primarily numeric, such as date, time, operator number, and shift. The

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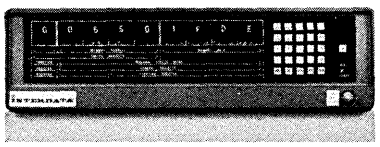

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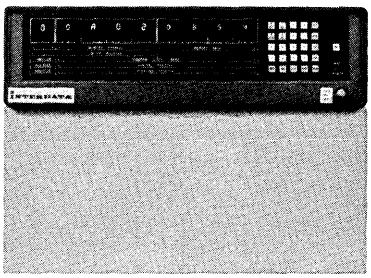

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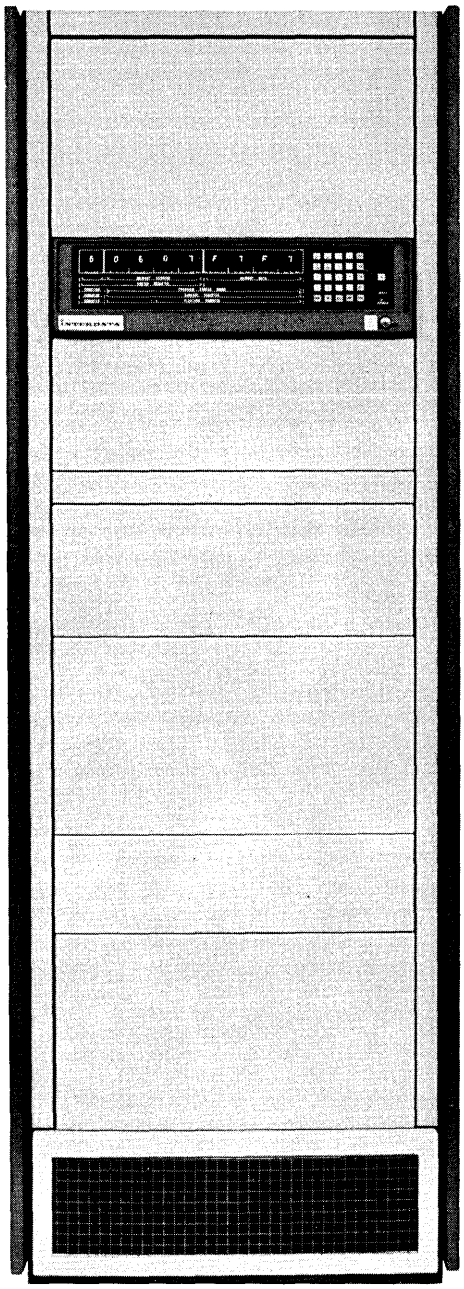

Interdata's 8/32 Megamini is the industry's most powerful 32-bit minicomputer. It is an unequalled combination of power, flexibility and reliability compactly packaged.

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Interdata offers a family of 16- and 32-bit hardware and software designed to be compatible throughout—from the low to the high end of the product line. Our Common Assembly Language enables you to go up or down in performance ranges always knowing your Interdata software will work.

Hardware.
From the beginning, Interdata built its minicomputers with a microprogrammed architecture, using the same architectural principles as the companies who build large-scale machines. As a result, our big machine architecture offers you 360/370-like instruction sets. Multiple registers. And the ability to scale-up from our 16-bit minicomputer to our one-megabyte, 32-bit Megamini.

With Interdata comes component compatibility which minimizes your inventory and guarantees interchangeability. Whether you use a 7/16, 7/32 or 8/32, you get the same front panel, power supply, memory, and same family of peripherals. Also, when you choose Interdata hardware, you can be sure anything you buy from us today is compatible with what you bought from us yesterday—or will buy from us tomorrow.

Plus software.
Interdata makes operating systems for the systems builder. Not only do they take advantage of the hardware, but they optimize the use of systems software and the human user. In addition, both the 16-bit OS and the 32-bit OS are completely compatible at all user interfaces—namely, file structure, supervisor calls, operator commands, etc.

To help the user build his system, Interdata offers a variety of higher level languages. These include: FORTRAN V—a very well-known version of FORTRAN extended for system construction. MACRO CAL (Common Assembly Language)—a macro-assembler which guarantees application program compatibility across the family. And BASIC—a simple, easy-to-use language.

Equals EASYWARE.
Interdata's philosophy has always been to make the hardware—the least expensive part of a minicomputer system—work the hardest. Our software then provides the tools which make it easier for you, and your people, to use our systems to solve your automation problems.

That's why we call it EASYWARE.

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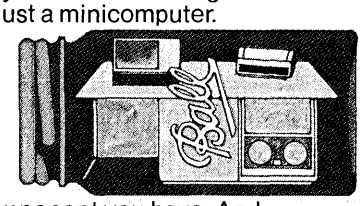
Mini-DBMS+

Unique new minicomputer hardware/software combination provides tool for developing sophisticated data base management system—plus.

Big in a small way.

Sometimes you can do amazing things with just a minicomputer.



If, that is, you know how to get the maximum out of every hardware and software component you have. And you're willing to make an extra effort at the conceptual stage of design.

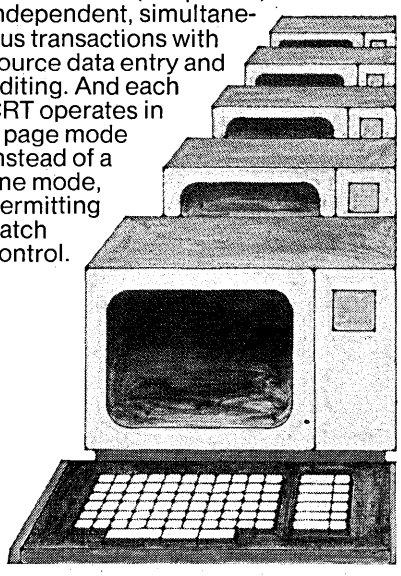
Introducing DASL™

DASL (for Data Access System Language) is a good example. And the result is a breakthrough in the application of minis: a sophisticated (novices need not apply it) new tool for putting together an efficient minicomputer-based data base management system. Indeed, a flexible, highly capable, comprehensive business and accounting system that gives you Eclipse performance from a Nova-based (and priced) configuration.

What it's all about.

DASL is unique for a lot of good reasons.

First, you enter all data at its source through a CRT, so it's simple, easy and fast (no more edit lists!). You can design your own forms right on the screen. Each (of up to 16) CRT allows independent, simultaneous transactions with source data entry and editing. And each CRT operates in a page mode instead of a line mode, permitting batch control.

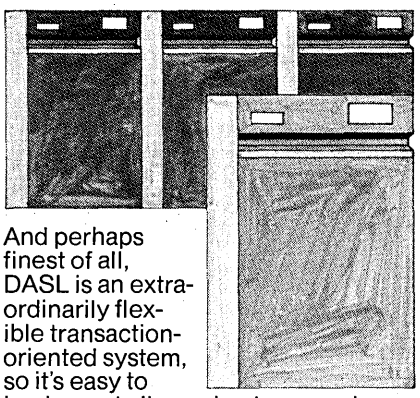


Second, DASL does everything on line—data is entered in real-time, and files are updated in real-time. Third, all input data is thoroughly checked before being entered into the system. Fourth, every valid entry is written on mag tape for a complete audit trail. Finally, it's a stand-alone operation—the entire system is dedicated to your application, so there's never any need for data links to a larger CPU.

The finer points.

DASL is new, but it's built around field-proven operating systems. It uses Ball Computer Products' Disk Operating System, for example (now 4 years old and in release 1.6) and takes full advantage of its error-checking and speed features.

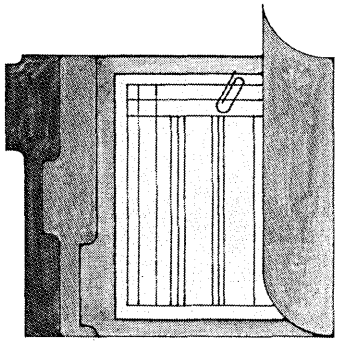
DASL has over 250 commands, supports up to 400 MB of on-line storage and utilizes an efficient and powerful ISAM file access technique.



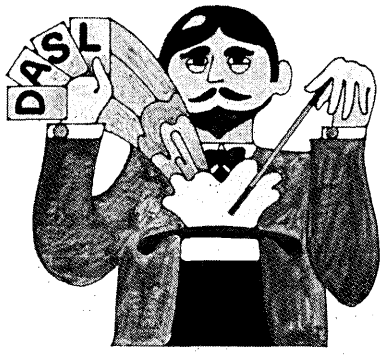
And perhaps finest of all, DASL is an extraordinarily flexible transaction-oriented system, so it's easy to implement all your business and accounting functions.

No fancy footwork.

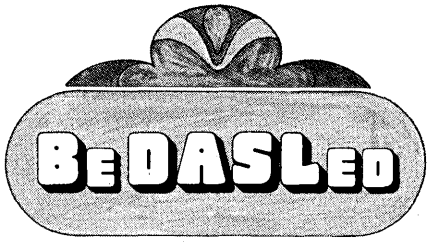
We've built our reputation on exceptional systems design, strong technical support and unmatched service



backed by a company more than $300 million strong. So when you think about it, it shouldn't surprise you at all that a breakthrough like DASL should come from a company like Ball.



After all, we've been doing amazing things with minicomputers for years.



Gentlemen:
Send me more information on DASL, the new minicomputer tool I can use to build my own business system.

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We have had only one problem, explaining that this new flexibility is not the result of some technological breakthrough at IBM.

BACKING INTO

down time reporting record, which is typical of other records, has all those elements; its "information" section consists of a three-digit numeric code describing the reason for down time plus a numeric entry for the number of minutes out of operation. Using this format, we make certain that we have maintained the maximum possible combinations, since many records types will share identification data and can be readily combined.

To keep storage as simple as possible, we decided to maintain the information for each system in its own "old-fashioned" sequential disc file, with periodic purges to tape. It takes less expertise to maintain independent sequential files than to use data management packages involving direct access, hierarchical logical trees, and special languages. We have also found it cheaper since we are not paying the overhead of the data management package and the people needed to support it. We call our approach "raw data storage" to distinguish for the user that the information has in no way been altered, augmented, or summarized.

At first glance, using sequential files which may contain more identification than information appears to be extremely inefficient. Our experience is that doing this uses more storage than many other more complex data storage schemes, but makes extremely efficient use of human resources. Storage is reasonably inexpensive, while qualified data processing personnel are often difficult to acquire and never seem to have enough time or just the right background. By using simplified structures we can keep data storage, data entry, and report writing tasks independent of each other and minimize people's time involvement.

When designing a new system, we first determine the data required. Our objective is to collect this data as quickly and as accurately as possible. Since errors and delays are a direct function of human involvement, the ideal data collection system would bypass people. However, most of our data is collected manually and we want the first person who has access to it to record it. In the quality assurance lab, for example, the technician performing a test is the first person to know the result and he records the information. To make this as easy as possible, we try to tailor the data collection process to the needs of the person supplying the information. We use keypunch forms, optical mark forms, or remote terminals depending on which best suits the user.

Charmin has three Four-Phase data entry systems which presently support 25 terminals through the plant. The Four-Phase systems are used to edit and store data which is later transmitted to the central site cpu. Whether this system or one of the other data entry devices is used makes little difference to the person originating the data, as that employee usually works only with a preprinted report form.

To reduce time spent collecting information, to minimize clerical transcription errors, to get the data to the computer in the shortest possible time, and to preserve the data in its most basic form, we believe that the initial entry should not be modified, except for cursory error checks, and should never be copied.

However it's entered, the data is fed to the computer exactly as submitted. If this input is not in the format needed by the system, the computer reformats it.

After reformatting (if required) the information is edited for validity. The reformat and edit functions are kept in separate programs, so that a change in data collection device or recording format forces changes only to the simpler reformat program. All errors discovered by the edit program are returned to the user in the most explicit form so that the problem can be discovered and corrected with a minimum of lost time.

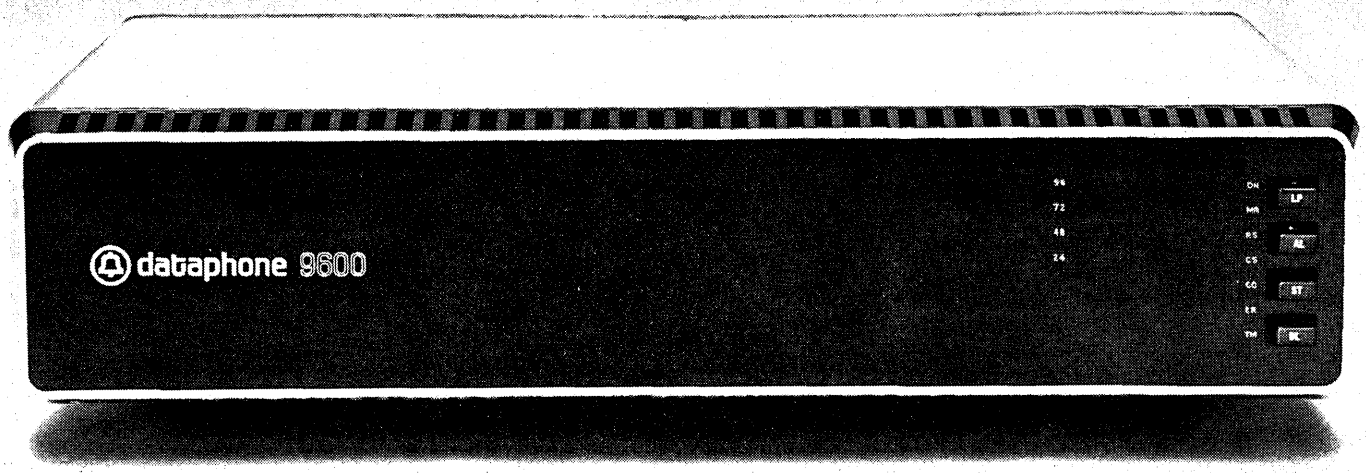
All valid data is then passed to a file maintenance program which stores new data, and makes any necessary changes or deletions to previously stored data. When making corrections the user does not submit "change" cards which compensate for the erroneous entry, but resubmits the entry as it should have been. This can be done since each piece of information is stored with its unique identification. Any data on the disc can be changed in this way. The disc usually contains a minimum of one month's data; older data is stored by calendar year on tape.

Preparation of reports is the final task to be considered. Up to this point, we have only made certain that the basic data is available for manipulation. When a report is specified, the

Charmin's paper plant in Mehoopany, Pennsylvania, employs about 2,000 persons in aspects of production ranging from forest management to the distribution of finished products (including the squeezable toilet paper). The plant is backed up by a data processing staff of eight people.

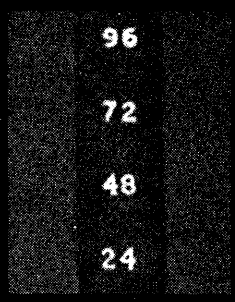
How fast your business moves depends on how fast your data moves.

With that in mind, the Bell System introduces the Dataphone 9600™



Slow data can kill a fast moving business. So we've developed a way to keep your data moving as fast as you do. It's the new Dataphone® 9600 data set from the Bell System.

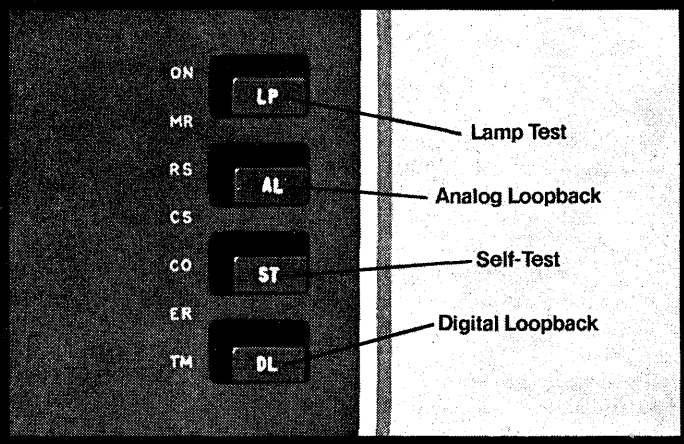
It transmits and receives data at 9600 b.p.s. That's obvious. What isn't so obvious is the other speeds at which it operates.



Multiplexing. In addition to one 9600 b.p.s. channel, it's capabilities include: one 7200 and one 2400 b.p.s. channels, two 4800 b.p.s. channels, one 4800 and two 2400 b.p.s. channels or four 2400 b.p.s. channels (on private line using type D1 High Performance Data Conditioning).

Adding to the versatility of the set is a choice of two startup times: 147 milliseconds in the switched carrier mode, or if you're really in a hurry, 8 milliseconds in the continuous carrier mode with switched request to send.

Self-testing. To help avoid downtime, a four button test panel provides you with comprehensive fault-isolating capabilities. While seven status lamps efficiently monitor operations and assist testing.



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Bell System

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user details which information is to be used, how it is to be combined, and what the report is to look like. This is done just as he would provide written instructions for a clerk. The analyst determines which files hold the required information, extracts the appropriate data through a previously written general purpose extract program, and feeds the data to the newly written report generation program. This process is so straightforward that report preparation programs involving multiple data files have been moved into production the day after the report specification was approved.

It works

We have designed and implemented a number of raw data systems in the past two years, and our approach is definitely working. We did start with isolated files and are now preparing integrated reports from multiple files. Our largest independent data file contains 350,000 80-character records, while a typical monthly file averages about 30,000 records.

The typical file is updated daily. Reports totaling about 4,000 print lines are prepared daily in a second job step which contains 16 report preparation programs and associated sorts. This report writing job which contains a mixture of PL/1 and RPG programs (really) is run on an IBM 370/168 (MVT, OS, HASP) using about 50 seconds of cpu time. Since the programs are small, the core required for each job step is less than 100K including I/O buffers. In fact, an average PL/1 program contains less than 100 source statements. This is possible since each program prepares only a single report.

The typical report is prepared automatically at predetermined intervals (daily, weekly, monthly), covers key factors only, and is either a summary or exception report. Departmental reports combining data from two or three files are typically a page in length. These reports can be brief because all the backup detail is kept on tape. Since the detail can be accessed whenever required, we need not print routine detailed reports "just in case" the data might be needed later. These detailed reports are produced by one-time programs in the format required by the user. We have found general purpose inquiry languages to be ideal for this purpose, and now use MARK IV almost exclusively for it.

These detailed backup files have proven useful for several other reasons. First, they provide storage for data which must be kept to meet corporate or government regulations. Second, they provide excellent source data for special projects of a statistical or operations research nature. Finally, they are so simple in structure that casual programmers outside the dp group can access them and generate their own reports.

As we expected, new systems now take less time to develop. A system for data editing, updating, data extraction, and report writing using the down time input previously described was produced at about the following rate, using PL/1:

	Statements	*Days*
Edit	*146*	*2½*
Update	*83*	*¾*
Extract	*46*	*½*
Report Writers (9)	*224 (each)*	*2 (each)*

In addition to realizing development time savings, the preliminary studies take less time since interactions between users are reduced; we don't have to force all potential users to agree on one report that contains all the information any of them may ever need. We also save time in debugging and implementation since each program is small and single purpose; somehow ten 100-statement programs which each prepare a single report are easier to manage than one 1,000-statement program preparing ten reports.

We had worried that there would be a tradeoff, that providing this degree of flexibility would condemn us to endless maintenance. Fortunately, this fear has proved groundless and we have seen a trend to less maintenance for the same reasons of program simplicity. If major changes are required, old programs are simply scrapped.

An additional, and perhaps surprising, benefit is that the system we converted to use raw data—those financial systems existing before this project was begun—are now less expensive to run. Reductions have been in the 5-30% range annually. This results from printing fewer lines due to fewer and shorter routine reports, using less core and cpu time due to smaller and simpler programs, and being largely able to eliminate reruns.

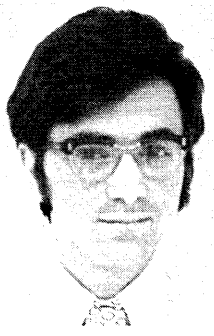
Acceptance of this simple approach has been readily achieved. Users appreciate spending less time collecting information, having all data readily available, having maximum flexibility in reporting, and getting projects underway quickly. Top management enjoys receiving comprehensive key factor reports and keeping the dp group small. The dp group enjoys being able to handle all phases of system creation, completing projects at frequent intervals, and taking a "can do" approach to user change requests. Further, as the staff turns over, new analysts will find easily comprehended systems written in common languages with techniques that require no special training.

We have had only one problem, explaining that this new flexibility is not the result of some technological breakthrough at IBM.

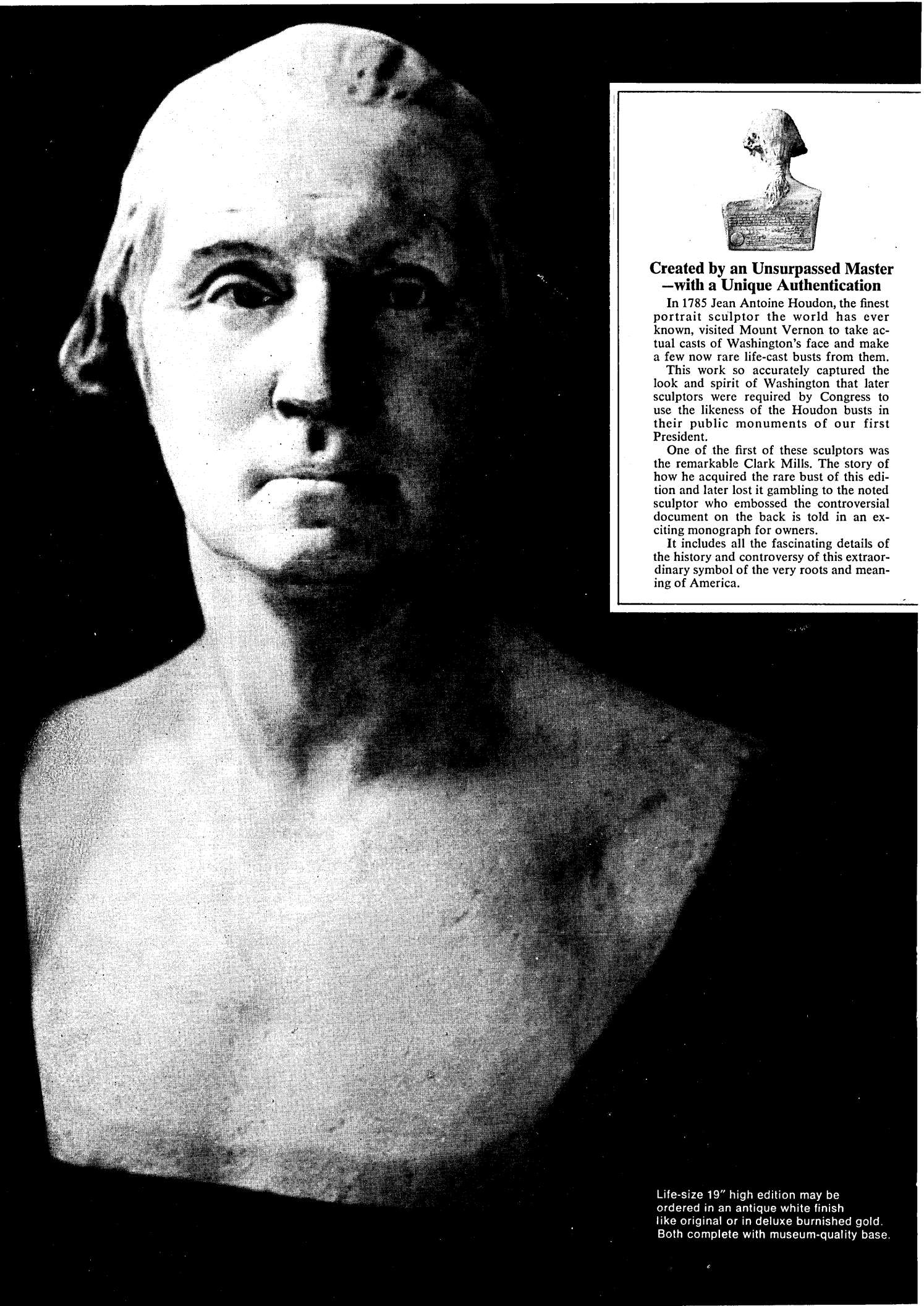
Someday an MIS

We intend to continue building a piece at a time until the files contain all the information for a management information system. There are nine modules in Charmin's plant (purchasing, inventory, etc.) about which management requires four basic kinds of information; maintenance, quality, production, and usage. We have already integrated production, quality, and down time reporting for some of the modules. We have completed some reports correlating quality and production in separate areas. And by continuing to collect data and construct systems to satisfy day-to-day control needs of the nine first level managers, we will automatically be building toward more capability for higher level reporting, coming closer, month by month, to satisfying all the requirements listed in that "classified ad." ❋

Before coming to Charmin as a systems analyst three years ago, Mr. Orkins held positions in systems design at RCA and in engineering at Ingersoll Rand. He has a master's degree in computer science from Pennsylvania State Univ.



Mr. Weiss' education was in operations research. He spent two years working on corporate systems at Procter and Gamble, Charmin's parent company, and has been a systems analyst at Charmin for the last two years.



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A Multilingual System.

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A virtual memory Prime 300 is like having up to 31 separate computers in one box. So there's a lot of computing muscle available to tackle just about any mix of applications. Users can develop real-time application software, execute batch command files, use the system as a sophisticated calculator via immediate-mode BASIC, handle data base management, even develop microprograms for the Prime 300's writeable control store or other microprogrammable devices.

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To give you an idea of how versatile the Prime 300 is, we have put together three starter systems. Each provides a different price/performance balance. And, thanks to Prime's unique Computer User Plan, each can be easily upgraded as workloads increase.

You can select a small system for up to four users built around a 300 with 64K byte main memory and 6M byte moving head disk for $44,000. Or a system for up to eight users we call "The Personal Archive System," that features four diskette units for loading and unloading individual user files, a 12M byte work disk and 300 processor with 128K byte memory, for only $68,000. For 31 users you can get a system with 512K byte main memory, 60M byte moving head disk, and asychronous multiline controller for $165,000.

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Any of these starter systems can be easily and economically expanded. You can add main memory up to 512K bytes. Attach a total of eight 60 million byte disks, four 12 million byte disks and eight diskettes. Add multiple printers and tape drives. Mix terminal types and speeds. And support it all with exactly the same operating systems and language processors you started with.

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Convince yourself that no other system on the market can match the Prime 300's price, flexibility and ease of use. Find out how the Prime Computer User Plan makes a Prime system easier to buy, use and upgrade than any other. A comprehensive demonstration can be arranged by contacting any Prime sales office or by writing to Prime Computer, Inc., 145 Pennsylvania Avenue, Framingham, Massachusetts 01701.

PRIME

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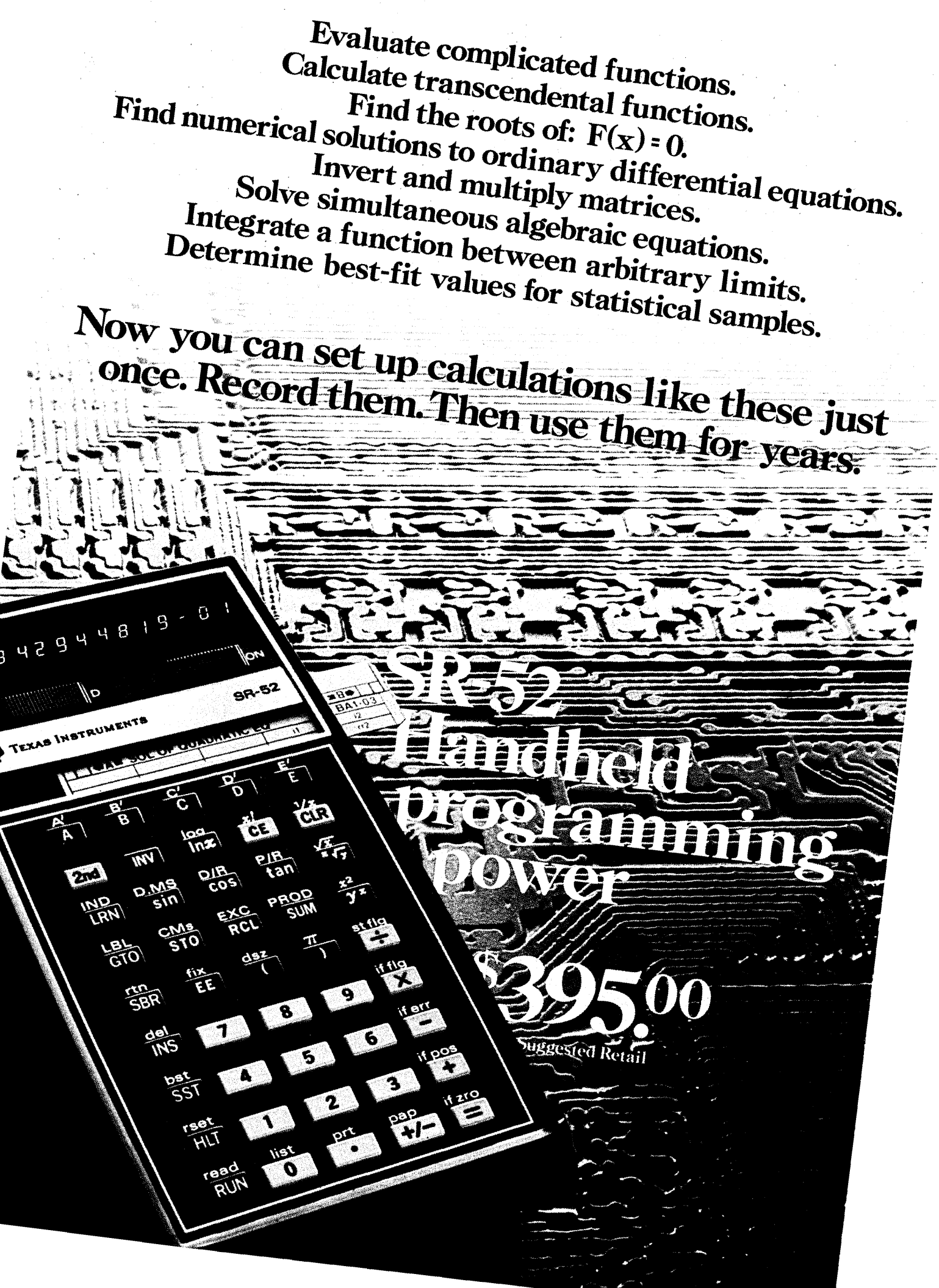

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Stretching OS Utilities

by Label Klahr

Using standard IBM utility programs as building blocks is a simple, fast, and efficient way to construct special tools.

Utility Programs are often taken for granted. They either work or they don't. The biggest problem may be in getting people to use them properly, for they are an important resource. There is an element of pity in the innocent novice who proudly displays his latest COBOL card-to-tape utility. But there may be a greater waste in a management decision to purchase or develop a software package that is not really needed. This situation can occur when a projected software task is found to be just a little too much for an existing utility program.

A common reaction to this situation is to look outside the system, either to a commercial package from an independent vendor or to an in-house package to be designed and programmed from scratch. While each of these alternatives bears its own merits, too frequently a third, system-supported alternative is overlooked. This alternative approach uses standard utilities as building blocks to create new system tools. Where an available system function performs the basic need but lacks important details, these details can sometimes be supplied by a minor program which will work together with the utility to expand its capabilities. The utilities can be entered dynamically by the user program; they can be invoked with tailored JCL procedures, or they can be combined with both JCL and a user program.

Several examples of this approach are in current production on the IBM 360/67 at the Information Sciences Div. of the Rockland Research Institute in Orangeburg, New York. In some instances, they predate available commercial packages, and do not have some newest features, but they get the job done reliably and satisfactorily. Taken as a group, these three systems provide the basics for program library management. They allow convenient use of source libraries, provide easy tape backup of source and load module libraries, and automate tape scheduling to ensure several generations of tape as redundant backup.

Recent years have seen rapid growth in the use of source program libraries and a growing number of library management packages to support them. The experience with source libraries at ISD attests to the dramatic difference this technique can provide.

At a time when alternative systems were not generally available and the use of source libraries was not widespread, this Source Statement Library was considered a radically new approach that had to overcome long established habits and attitudes. The card-oriented staff was at first reluctant to surrender their cards, but a change was inevitable. The rapid expansion of the installation generated an increasing volume of cards. The card volume reached problem proportions, burdening the card reader, the card interpreter, and even the RJE lines. The advent of source libraries dramatically reduced or eliminated the card-related bottlenecks, and the programming staff soon recognized the new methods as a convenience rather than a hindrance.

Source library management

The Source Statement Library was the key to this successful conversion. The SSL was quickly implemented, easily documented, and readily learned by the staff. It is a modest system in comparison to current software, but it satisfies the essential requirements in a way that stood the test of programmer acceptance and conversion, and it continues to support current library needs.

SSL is a simple merger of JCL and OS utility programs combined with JCL procedures. It is based on the IEBUPDTE utility program and uses the control cards and general concepts documented in the OS utilities manual. But IEBUPDTE relegates file definitions to the flexibilities and complexities of JCL. This approach simplifies the program, but renders the important file definitions inconvenient, if not impossible, to many programmers. SSL removes the burden of JCL considerations from the programmer by attempting to define the source library protocol of routine program development and debugging. JCL to support this protocol is formed into OS JCL procedures, made general by the use of symbolic parameters, and placed in the system procedure library.

The system recognizes two basic functions: library update and test-update/compile-debug. The test-update/compile is similar in function to facilities available on many compilers but sorely lacking on most OS compilers.

The general update function is implemented with a procedure descriptively named NEWDECK, since it is used to create a new source deck on the disc-resident source program library. This procedure will also conveniently copy a source deck to create a new version on the library for development or debugging. The technique is especially valuable when compared to the previous unit record punch/interpret chore.

The test-update/compile function is implemented by simply adding a source update step to the existing OS compiler procedures. This allows programmers to use source libraries in the same way that they had used their card decks. The new procedures are easy to use because their names are similar to the familiar compiler procedures, except for one identifying character. The JCL parameters are also easy to remember because the same two parameters are used for all source library procedures. These parameters specify the program name and the library which contains the program.

The group of procedures is completed by two general purpose procedures; LISTDECK to list a source deck from the library, and TESTDECK for test-update without compile. This latter procedure is used when the updated deck is to be processed by a program other than a standard compiler.

Interestingly, the basic SSL system consists solely of JCL and OS utilities with no additional programming. The single exception was an ENQ monitor which was subsequently needed to control multiprogramming access to the libraries. Although JCL provides this protection with DISP=OLD, this parameter is overly restrictive in that it locks out contention for the duration of the entire job. Frequently this is considerably longer than the time required for the actual update.

Maintenance of the source libraries in the form of backup and compress is performed in conventional OS manner by the proper OS utilities as is listing of members. These functions are enhanced by programs called COPYEM and BUMPVOL.

BUMPVOL is another example of how

a small program can link JCL and utilities to extend the power of the system. The name refers to the program itself, but is also used to describe the resulting system for automatic perpetual tape scheduling. The program rotates a predefined pool of tapes after each production use, so that the system will allocate a different tape for the next production run. The last volume is removed from the end of the list and bumped to the front of the list, hence the name "BUMPVOL." Previously created tapes remain available for the duration of the predefined cycle; the oldest tape is then reused. Individual tapes can be identified symbolically by relative location or manually from system listings.

The BUMPVOL system relies heavily on a combination of OS tape allocation and the system catalog, which is used in a slightly nonstandard manner. The basic record in the system catalog contains the name and location of individual files. The location consists of the device type, one or more volume serial numbers, and possibly a tape data set sequence number. This number refers to the relative position on the tape, and is used by BUMPVOL only in a special case. This volume serial number is of specific interest here.

The catalog entry for a multivolume data set will contain a list of serial numbers of the volumes on which the file resides. OS allocation handles this list in a way which is different for tape than for direct access devices. For tape, the system will mount only one device at a time, unless parallel mounting is requested. Since it is not always desirable that the first tape volume in the list be mounted first, the system can be made to begin mounting from the end of list. This mounting sequence is taken when the JCL refers the system to another data set for volume information.

BUMPVOL makes use of this allocation alternative, together with a slightly different interpretation of the list of volume serial numbers. Instead of describing a single file which spans several volumes, the list is assumed to describe several distinct copies of the named data set, each copy existing on one of the specified volumes. Furthermore, in some cases, the named data set does not even exist as a real file (see COPYEM, below). In this case, the data set name is actually a symbolic pointer to the tape volume. This use is valid for system utilities such as IEHMOVE where the DD statement is used only for volume allocation, and not for data set identification. As one observer put it, BUMPVOL uses the OS catalog "as a work file."

Before using BUMPVOL, a "pool" of tapes is created by cataloging the pool name as a multivolume data set. Then the application JCL may retrieve a tape from the pool by referring to the pool name on the DD statement. The system allocates the last volume in the list. The BUMPVOL program is included as a separate job step to follow the application step. After the application program has executed, BUMPVOL rotates the list of tape volume serial numbers and places the revised list into a CATLG control card file. IEHPROGM is entered dynamically to uncatalog the old list and recatalog the new list. Thus, the next run of the application will find a fresh tape allocated by the system from the end of the list. The current tape is now at the head of the list and can be retrieved by a standard DSNAME reference.

When the application/BUMPVOL combination is run at regular intervals, each tape pool will always contain a current copy of the master file, with several progressively older copies as backup. The older copies can be identified from a listing of the catalog, or they can be retrieved automatically by specifying the volume sequence number in the VOL parameter. This number identifies the relative position within the list of the volume to be mounted.

Several BUMPVOL variations allow more intricate scheduling. For applications where the tape is to be kept after use rather than to be scheduled for reuse, the ARCHIVE option will remove the volume from the list.

Some applications place a group of related data sets on a single tape. The tape data set sequence number is then used to identify the relative location on the tape. Only one pool is catalogued for the entire group of data sets. This pool does not refer to an actual data set, but serves only as a pointer for the group. Special synchronization is required for each tape so that each data set is written in proper sequence before the "pointer pool" is rotated. The JCL to identify a particular data set is also more complicated. For these reasons, a special Backup/Restore monitor was written to allow backup of data bases with this method. The monitor controls the sequence of the files on the tape, and dynamically links to BUMPVOL at the proper time. In addition, the monitor solves the JCL problem by allowing the console operator to enter simple parameters to specify a particular file. From these parameters, the monitor creates the proper JCL. The job thus created is either placed on a HASP internal reader, or else waits for an OS reader.

The BUMPVOL tape pools are also used in conjunction with a powerful extension of the backups known as the Vault system. This system combines BUMPVOL with a tape copy utility to create periodically a redundant copy of each master tape pool. These Vault tapes are kept for archival storage in an offsite vault. They are created less frequently than the master pool, so they cover a greater time span with resultant greater archival value in addition to the basic disaster protection of offsite storage. The tape copy utility copies an entire tape volume, including all data sets on the tape. The Vault pool contains enough tapes to allow three cycles before a tape is reused. One set of Vault tapes is stored in the computer center, outside of the machine room; another set is stored in the offsite vault; and the third set is in the tape library ready for use.

Disc/tape utility

While SSL facilitated the creation of source deck libraries, and BUMPVOL made tape pools a routine concept, there remained one missing link to the completion of a comprehensive backup system. This missing link was a disc/tape utility for program libraries. While OS did contain a utility, IEHMOVE, for this basic function, it was oriented to the single data set rather than a general system. The IEHMOVE control card required the volume serial number of the output tape as well as the data set sequence number where multiple data sets were to be put on a tape. These were reasonable requirements for a one-time copy of a specific data set, but not for a general backup system where the tape volume serial number would change for each run, and where even the data set sequence number could change.

The simplest alternative was to keypunch a deck of IEHMOVE control cards, one card for each library to be copied. The deck would have to be repunched each week, and a single keypunch error could necessitate reruns and cause confusion. Personnel would have to be dedicated to this periodic maintenance task. Although this manual procedure was not uncommon even in otherwise sophisticated shops, a more automatic procedure was desired, and previous experience with dynamic invocation of OS utilities provided a ready solution.

The solution was a simple monitor to control IEHMOVE. This control program was named COPYEM. It dynamically created the IEHMOVE control card, linked to IEHMOVE to perform the actual copy operation, and then monitored the results of one data set copy before going on to the next. To allow use of a rotating tape pool, the tape JCL would refer to the catalogued pool name instead of the specific volume serial number. OS allocation would then refer to the previously rotated catalog entry and retrieve a fresh

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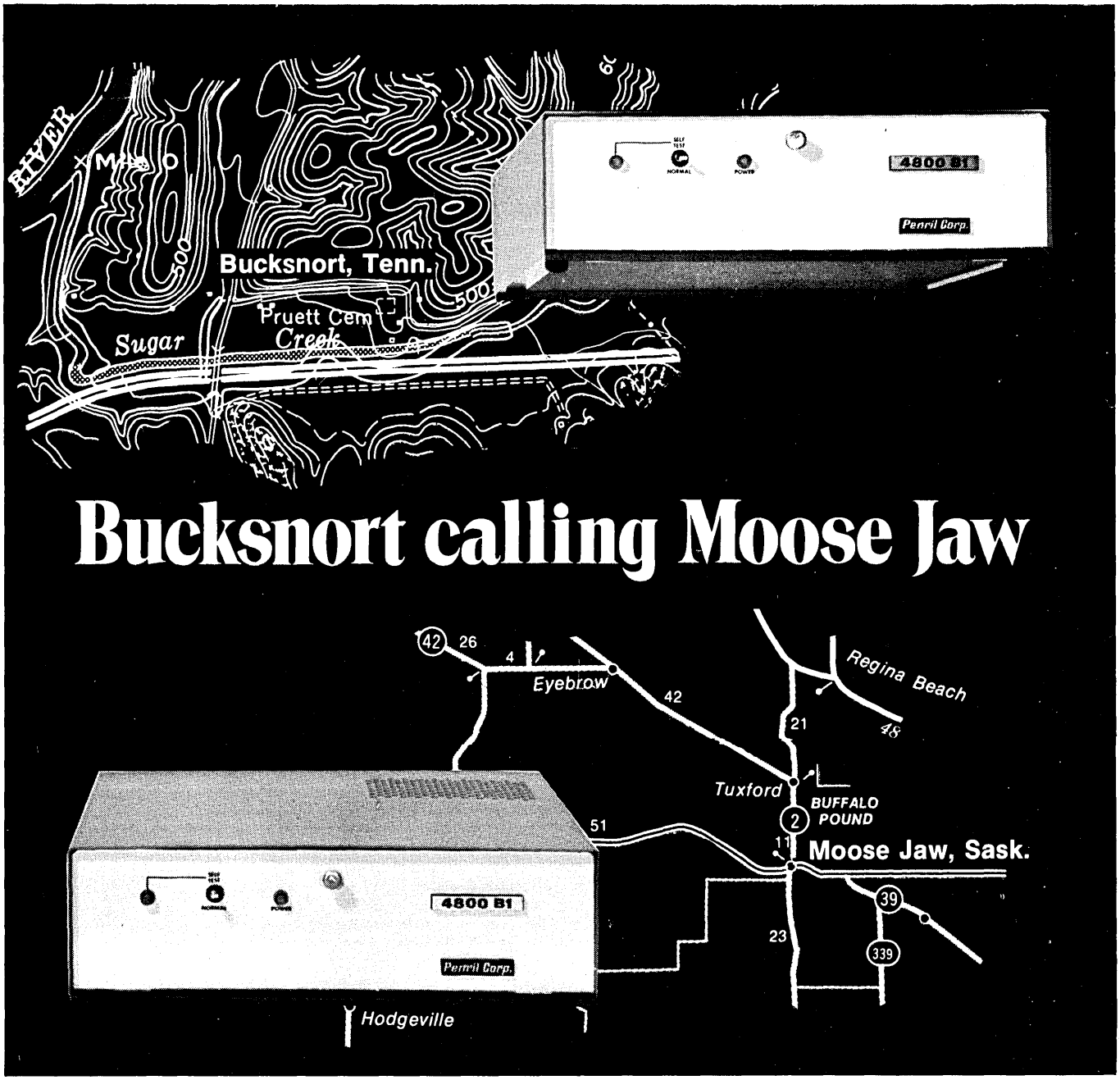

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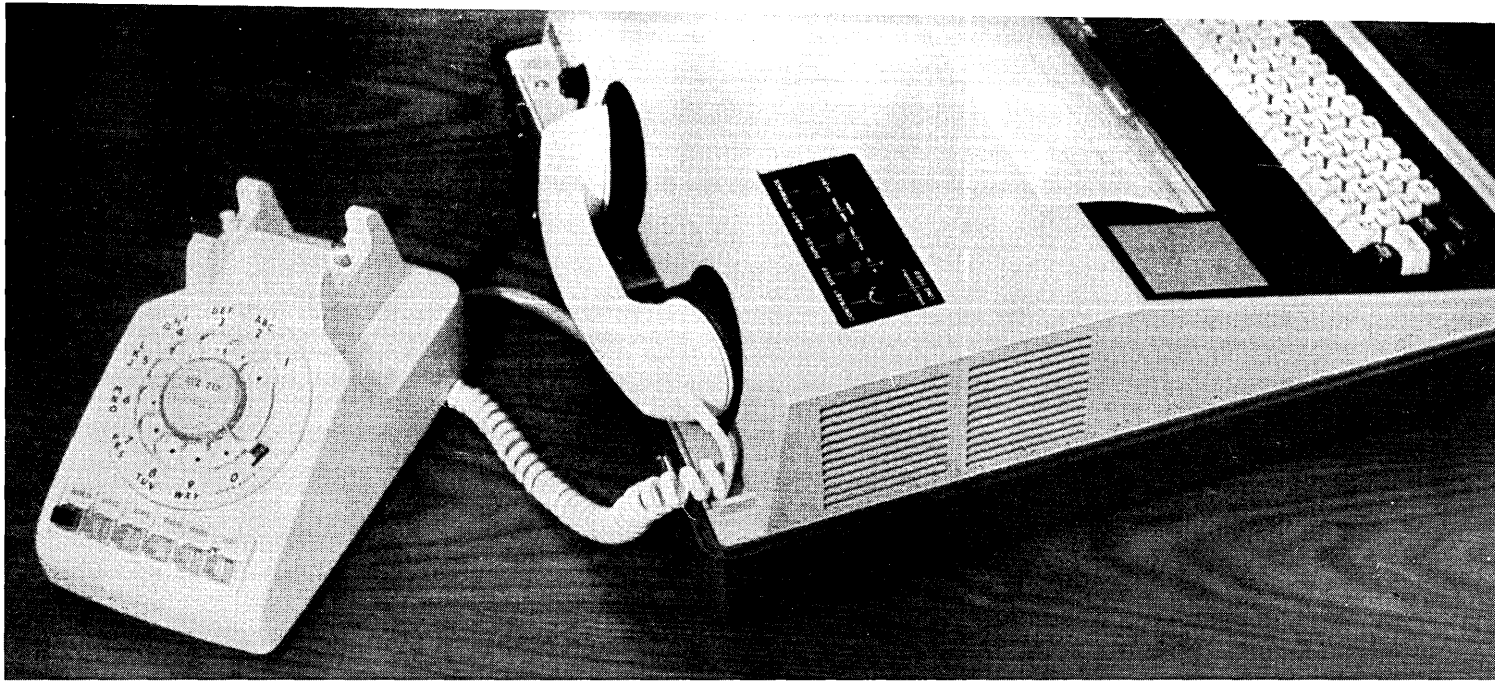

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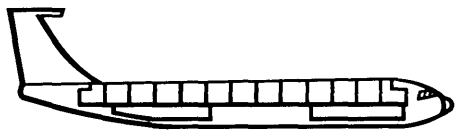

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volume. After tape allocation by the system, COPYEM would obtain the volume serial number of the current tape (from the Job File Control Block). This serial number was placed in the generated control card image for IEHMOVE, together with the DSNAME of a data set to be copied and the correct data set sequence number as determined by the program.

The integrity of the data set sequence number is of prime importance since it controls the location of the data set on the tape. For this reason COPYEM verifies the IEHMOVE return code after each data set copy and determines if the sequence number for the next copy operation is to be incremented.

COPYEM is driven by a list of data set names to be copied. The list is in card form, with one name per card. From this card COPYEM generates the complete IEHMOVE control card. This minimal input format simplifies the addition of new data sets to the backup system, since only the DSNAME is keypunched into the input card. As with BUMPVOL, this system assumes that one tape volume is sufficient to contain the entire output.

After COPYEM has copied all data sets from the input list to tape, BUMPVOL rotates the tape pool, preparing it for the next run.

COPYEM is basically a simple text manipulation program, so it was coded in a higher level language, PL/1. Because the program interacts with the system to read the JFCB and again to link to IEHMOVE, two assembler language subroutines were required to accommodate the PL/1 linkage conventions. These techniques have become common by now in many OS installations, so the need for these subroutines is not a major problem. Even where these control blocks and linkages have not been used before, the necessary information is readily available in the appropriate manuals. The small investment in time required to "learn the ropes" will pay generous dividends since these techniques will prove themselves invaluable in any number of new applications.

Improving backup

COPYEM has had a long and useful life, allowing department heads to sleep at night secure in the knowledge that their systems were adequately backed up. But there were shortcomings, largely because of the nature of IEHMOVE. Although this utility eased the JCL requirement by using volume allocation DD cards instead of the normal data set allocation statements and by allowing disc/tape copying, it could not compare in performance with other utilities. The amount of time required to dump large data sets precluded frequent backup or restore and restricted scheduling. In addition, recovery from IEHMOVE tapes was clumsy in that a single program could not be loaded from tape without restoring the entire library.

There was also a flaw in the numbering scheme for the data set sequence number. The number was controlled by the IEHMOVE return code, but the return has redundant meaning and is a poor indicator of whether the copy was successful or not. A code of 4 could mean that the data set was unloaded successfully. Unfortunately it could also mean that the copy operation could not begin at all! The very success of the COPYEM/BUMPVOL system meant increased usage with a resulting need for improvement.

Fortunately, an improved tool is available in the VS version of IEBCOPY which is capable of disc/tape copy, which the previous versions were not. It also outperforms IEHMOVE by a wide margin and allows selection of a single member from tape without restoring the entire data set. However, IEBCOPY lacks the freedom from JCL that IEHMOVE has. It is restricted to partitioned data sets and will not process other data set organizations.

The answer was again minor programming, this time needing only changes to COPYEM. Instead of linking to the utility, new OS jobs are created on the HASP Internal Reader from JCL generated by the program. For each input DSNAME card, a separate job step is created to copy the data set to tape. To handle sequential or other format data sets, a new DSORG parameter was added to the COPYEM control card. When this parameter is recognized, the appropriate copy utility (IEBGENER or IEBISAM) is specified on the JCL which is passed to the Internal Reader.

The change to IEBCOPY resulted in a more powerful system. The increased performance allows large data sets to be backed up more frequently, and the ability to select a single program for restore is a valuable feature. But even more important than these particular improvements, the conversion demonstrated the flexibility that is available when existing utilities are "stretched." The building-block, modular approach lends itself to replacement of the basic modules as needs change or as new software becomes available. And, once the convenience of "stretching" utilities has been shown, each user will probably envision new applications to suit the needs of the particular installation.

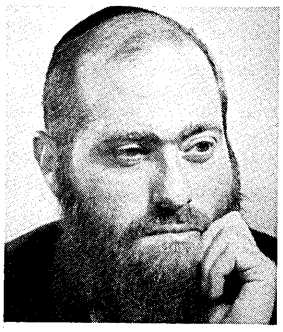
Further proof of the adaptability lies in the circumstances of the COPYEM rewrite. It was at this point in the development of the system that a commercially available utility program was seriously considered and subjected to in-house evaluation and comparison. The commercial package was indeed impressive and had distinct advantages, but the usual tradeoffs made a decision difficult. Because converting COPYEM was only a minor project, the rewrite was undertaken as an interim solution. The new version performed so well that the other package, although never officially rejected, was not purchased.

Obvious but uncommon

These ideas are just samples of this approach. Other programs used include a VTOC maintenance program which generates SCRATCH cards for IEHPROGM, and a PRUNE procedure which combines IEBCOPY and IEHPROGM for pruning unwanted members from libraries. This combination is a safety measure to insure that a program is never scratched by IEHPROGM unless it has been successfully copied to tape by IEBCOPY.

The idea of using OS utilities in this manner is not new, for certainly JCL procedures are routine in OS installations, and even dynamically linking to the utilities is a standard technique which is fully described in the utilities manual. It is somewhat surprising that this type of software tool is not more commonly used, if not for complete systems, then at least for simple quickie projects. But even if this technique is used for simple projects which develop as the needs arise, they could well accumulate into a package that rivals the features of a complete custom programmed system.

So the next time your utility program does not seem to fit the task, why not try to "stretch" it to fit? You may never take utilities for granted again. ❋



Since 1967, Mr. Klahr has been in systems programming in the Information Sciences Div. of the Rockland Research Institute. While there he has worked on a patient data base for state mental hospitals and specialized in JCL and utilities. His original training, which he claims somehow led him to software design, was in Talmudic Law.

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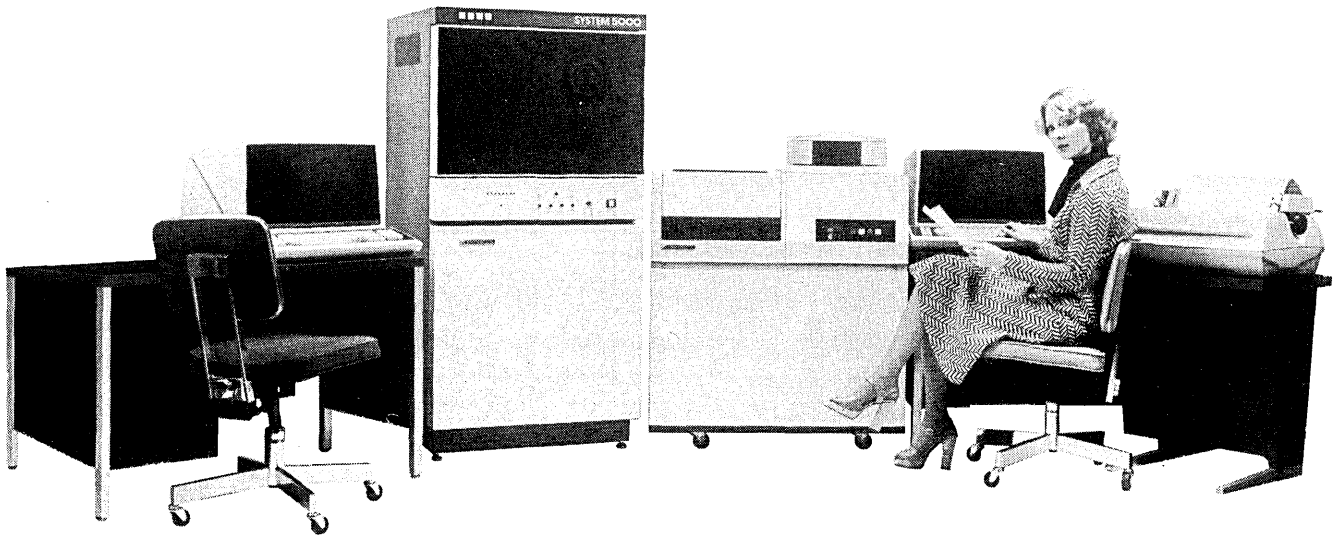

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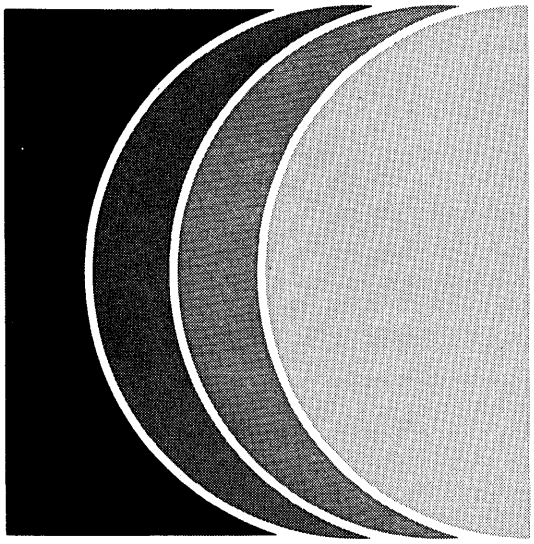

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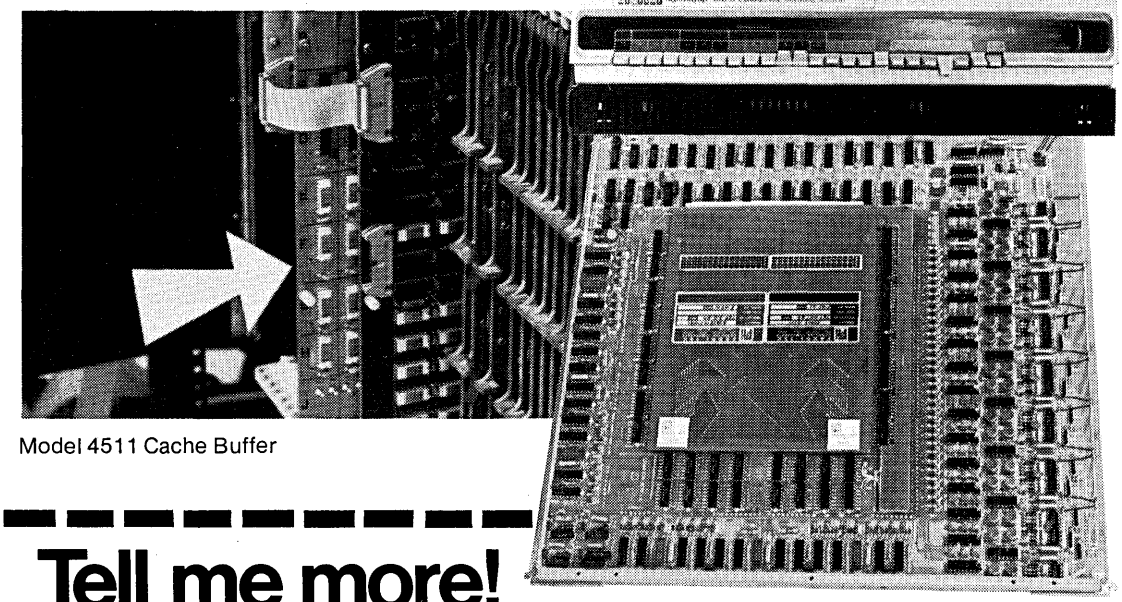

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APL Goes Commercial

The APL75 congress proved that it takes more than four days of continuous rain in normally sunny Italy to dampen the spirits of APL enthusiasts. Its 330 aficionados came from all over the world, from Mexico to the U.S.S.R., and from Finland to Israel, with the majority from the U.S., Italy, France, and West Germany. Nineteen countries were represented.

The international group was warmly welcomed by the town of Pisa, home of both the Leaning Tower and CNUCE (Institute of the National Research Council, the APL75 host and also the largest nonprofit computer center in Italy). In fact, with regional elections being held just two days after the conference, some of the local politicians welcomed the congress more warmly than necessary, using the opening session to give political speeches to their specially invited "guests."

APL75's technical program has already been judged one of the finest collections of quality APL works ever compiled. The only subject limitation made on submitted papers was that they be of interest to those working with APL. The result was a true statement of what is being done with APL today. Topics covered state of the art presentations such as "What's Wrong with APL?," language extensions, language theory, and the full gamut of user applications from "Interactive Analysis of Time Series" to "Hospital Administration of Large Numbers of Multi-Trauma Patients."

An APL Hardware/Software Exhibition ran concurrently. Participating companies were APL Europa (U.K.), Burroughs, Digital Equipment Corp., Research Inc., and Tektronix (all U.S.), Olivetti (Italy), IBM-Italy, Sotelem (France), and SYSMO/MCM (France/Canada).

Two special meetings were also held. One was a joint committee meeting with representatives of three IBM user groups, SHARE, SEAS (the European counterpart of SHARE), and GUIDE (which is international and therefore has no special counterpart). The second meeting was for persons interested in STAPL, an APL technical committee affiliated with ACM. (STAPL's members are for the most part North American, but Garth Foster, the first chairman of the APL committee within SHARE and STAPL's present chairman, spoke expressing the organization's interest in encouraging new members from other areas.)

During the two meetings, an important question arose: Who is most qualified to lead in the development of APL? Should it be the users? What role should the vendors play? The idea that IBM be the APL spokesman is unacceptable not only to the users but also to the hardware and software companies making money on APL. On the other hand, allowing the users to call the shots could result in many different APL's, an undesirable situation for all involved.

A possible solution is that the leadership role be assumed by a STAPL-like organization or by STAPL itself. This idea seemed to be well received as over 100 APL75 participants attended the STAPL meeting.

APL finds itself at a critical stage in its growth. Initially the language was thought of as an amusing toy, later as the black sheep of the computer family.

Although these thoughts have not yet died out, the facts seem to dispel them. For instance, APL is one of the six programming languages supported by IBM. At the joint IBM users' meeting, Curt Bury, in charge of APL marketing within IBM, quoted items from the May/June issue of *Think*, an internal IBM publication, saying that "every IBM division relies on the language in some way" and "the balance has shifted from scientific to commercial users."

In support of the latter assertion, approximately 25% of the installations represented at APL75 (not including vendors) were commercial users of APL. Also, for the next international APL congress ("Putting APL to Work," APL76, Ottawa, Canada, Sept. 22-24, 1976), particular emphasis will be placed on commercial applications.

APL has come quite far from the original Iverson Notation. The role of APL in the field of education and research has been fairly well established. The fact that it is rapidly becoming more widely used in the commercial and industrial sectors indicates how diverse it really is. As expressed by Ken Iverson at the opening session, "I believe we really should work toward the day when APL is not even mentioned. That when one says, 'write me an expression for that,' the response will just naturally be in APL."

—Ellen Klein

Ms. Klein, one of the organizers of APL75, has been working on APL for several years at CNUCE in Pisa.

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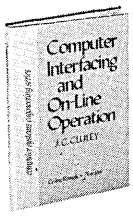

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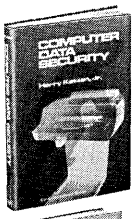

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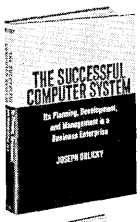

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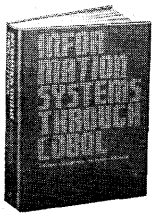

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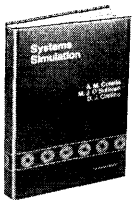

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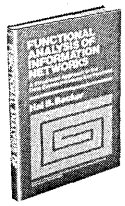

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CIRCLE 32 ON READER CARD

IBM and the structure of the industry

Give the Marketplace Time

The July "News in Perspective" finance article by W. David Gardner (p. 78) provides data for some interesting observations about the competitiveness of our industry as well as the "leasing problem." The article represents Mr. Kenneth G. Bosomworth, President of International Resource Development, as believing that companies which lease most of their old equipment have a built-in interest in keeping that equipment out on lease generating revenue. And that specifically in the case of IBM, "any new product introductions which disturb the leasability of the more-than-five-year-old equipment will have a severe impact on the profitability of the leasing operation." This appears to be a case of an owner of a resource with a vested interest in wanting it naturally to generate the maximum total revenue.

In a noncompetitive market, a firm with funds invested in its own products which are out on lease can be expected to devote no resources to R&D and to resist technological innovation. That IBM and, for that matter, AT&T invest a significant portion of revenues in R&D suggests that at least they perceive their marketplace to be highly competitive. Those phenomena called "software houses," "leasing companies," "plug-to-plug compatibles," "replacement memories," "independent common carriers," and "other telephone companies" are all examples of this competition.

That a large number of the entries in these enterprises have failed is unfortunate for the investors, but the consumer has benefitted. The flexible, responsive, innovative, efficient, and well capitalized have survived. (Incidentally, the failure rate among new businesses in this industry is significantly lower than for our economy as a whole.)

Mr. Gardner attributes to Bosomworth the observation that "by lowering the lease-to-purchase multiplier on its equipment, IBM can make life difficult for the competition, specifically leasing companies." Right on marketplace! Had the ratios not been higher in the past, there would have been no leasing companies. Pricing decisions are risk decisions at best. When the capital markets judged that IBM's pricing decisions (lease-to-purchase) were so conservative as to create an opportunity, leasing companies were formed to take a slightly higher level of risk. The consumer benefitted by lower prices, more choices and, again, by having IBM forced to toe the line.

The article suggests that "only IBM knows when it will choose to obsolete its equipment and it won't tell." In a noncompetitive marketplace, a firm that owns most of its own product will obsolete it only in high expectation that it can significantly increase revenue and profits by doing so. To the degree that IBM has obsoleted its own products, it must perceive the market as competitive. The article attributes to the Justice Dept. the argument that "there is no risk of technological obsolescence assumed on the part of IBM since the firm, in the word of one of its top executives, controls the '. . . timing of new technological insertion . . .'." However, a good historical case can be made that IBM has never obsoleted a product voluntarily. Almost every major line has been obsoleted by a competitor or potential competitor. The 650 had been made technologically obsolete by the UNIVAC Solid-State 80/90 before the introduction of the 1401/1620. The 1401 had the H-200, etc.

The article says the "problem is what should be done, if anything, about leasing which is good for some of the people all of the time and all of the people some of the time, and all of IBM all of the time."

To the degree that there is a problem, I am satisfied that in the long run, it will be eliminated by the normal operation of the marketplace as long as there is a free flow of capital and an economic environment which permits and encourages technological innovation. The problems in the equity markets of the past two years notwithstanding, there still appears to be a free flow of capital within our economy as a whole and in our industry in particular. There is certainly no corner on technological innovation. While some major competitors have decided that they had fatter fish to fry, Amdahl and Cray have demonstrated that capital will still flow to a good idea.

So much for the long run. That still leaves us with the short run. Like most people, I would like an economic system that did not have short run inequities such as artificially high prices, unemployment, recession, and inflation. There is not yet evidence that such a system exists. In the meantime, we need to be wary of sacrificing long term equilibrium by overresponding to short term inequities.

Let's not succumb to the appeal of short-term solutions. We should give the marketplace time to function.

—William Hugh Murray

In data processing since 1954, Mr. Murray is experienced as both user and programming development manager.

The Software Monopoly

An antitrust decision or consent decree settlement which does not address the problem of competition in software will not help users. The dissection of IBM is secondary to that issue (and therefore my comments are not specifically directed against IBM).

We have seen hardware technology continue to advance at a rapid pace but the systems architecture seems to stay the same. Have you wondered why? The answer is *software*. As long as the structure of system software is fixed, innovation in system architecture is limited. This year's dp systems continue to look like last year's systems. Is vs on the IBM 370 really different from os on the 360, or IBSYS on the 7090? In fact, even the Burroughs MCP software system dates back almost ten years and is described in the Lynch et al patent granted in 1968.

The most significant reason for this situation probably lies in the history of software building by manufacturers. It's just not in the manufacturers' interest to produce optimum system software. It might result in the manufacturer selling less iron. And it's definitely a business hazard. Design and development of an operating system is a massively expensive labor-intensive task which is almost impossible to budget. They won't do it unless the marketplace forces them to, and there just isn't any forcing competition in systems software in the marketplace.

The solution to the software building problem brings us to a real issue facing the industry today — — monopoly and restraint of trade in software. We have a small but significant competitive market in applications packages. There is very little competition in sorts and compilers, almost no competition in data communications access methods, and no competition in operating systems. And unless the U.S. antitrust lawyers understand the significance of this, we'll have even less competition in the future.

I believe it is essential that software be recognized as a relevant submarket and that vigorous antitrust effort be directed toward the establishment of a competitive software submarket. Only then will we have innovation in systems architecture which will sustain healthy growth and technical advancement of the computer industry.

—C. Donald Berteau

Mr. Berteau is a holder of one of the early software patents.

Banking

EFT: To Consumers It's Mostly a Lot of Plastic

But to bankers, it's mired in legal and regulatory confusion

Richard D. Hill, chairman of the American Bankers Assn.'s Payments System Policy Committee is a natural target for questions as to exactly what EFT (Electronic Funds Transfer) really is.

He decided to seek help from Webster. "According to Webster," said Hill, "an eft is a newt. A newt is like a snake. A snake is like a worm. Therefore, EFT could be called a can of worms."

Hill probably was thinking of the legal and regulatory confusion surrounding EFT development (see related story). To the consumer, a more fit definition might be "worms encased in plastic." To him the most obvious manifestation of EFT is the proliferation of plastic cards giving him access to his bank account at a variety of locations.

The cards, and the services to which they are key, come in a variety of names and colors. There's California Money in Los Angeles; Cash Plus in Wisconsin; Money Service in the Cleveland area; Instant Bank Key in Georgia; Bank-in-a-Billfold in Nebraska, to name a few.

National BankAmericard Inc. spent some nine months and considered some 5,000 names before selecting ENTREE as the name for its new asset card by which consumers can make purchases or obtain cash from their funds on deposit.

But not B of A

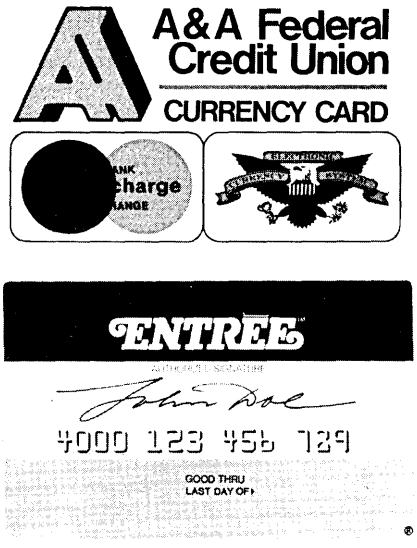
NBI was expecting "as many as seven" of its member banks to begin issuing ENTREE cards this month. One of these is Columbus National Bank in Columbus, O., which said it would begin issuing the cards Oct. 13. NBI declined to name the other starters but did say that Bank of America, its largest member, is not one of them. The company said "at least twice" as many banks as start this month will be ready to launch the program early next year.

NBI anticipates that the new cards will be accepted for cash at more than 45,000 banking offices and for purchases at 1.5 million merchant sites in the U.S. and more than 100 other countries.

The new program will use BASE 1, the nationwide automated message switching communication system operated by NBI for BankAmericard transactions, and BASE II, an electronic draft transmission system NBI uses for interchange of transactions between banks.

Definition of functional requirements for a modular software, hardware and communications system which individual members can use to operate a range of automated teller machines, customer-bank communications terminals (CBCT's) and point-of-sale terminals has been completed. NBI said it is capable of interfacing with similar systems owned by retailers and switching messages with competing systems should that prove desirable.

While the Bank of America has not yet decided whether it will participate in NBI's asset card program, it has been operating a debit card system of its own on an experimental basis in the southwestern portion of Los Angeles' San Fernando Valley. The area has a population of 250,000 and 11 B of A branch offices.



Electronic Currency System's Currency Card (above) and National BankAmericard's new ENTREE, are among the newest additions to the world of the plastics, showing up for the first time this month.

Young, affluent and educated

Dr. Kerry P. Curtis, a B of A vice president, described the experiment at the ABA's Payment Systems Policy conference in San Francisco last month. He said the area was selected because its population is generally "upper middle income, younger, and college educated." The program, started last May, uses NCR 7700 self service financial terminals installed in one shopping center and three Ralphs supermarkets in the area.

"Results so far are mixed," Dr. Curtis said. "Usage rate has climbed steadily to 2,500 transactions per machine per month (excluding balance inquiries)." He said the bank's goal of 3,000 transactions per machine per month should be reached by the end of October. The bank issued 48,000 plastic debit cards which enable customers to make cash withdrawals, transfer funds among accounts, and make utility bill payments without the need for any back-office paper entries. Using a BankAmericard, customers can also get cash advances.

Dr. Curtis said approximately 12% of the bank's checking account customers had used a machine at least once by early September. "Two customers averaged 100 uses and that's one per day."

The terminals are controlled by an NCR Century 101. Dr. Curtis said the hardware and the software are functioning well and attributes this, in part, to the care taken to assure that the hardware and software would mesh with the bank's main system.

He said cost was the most negative finding in the pilot. He set cost per transaction at $1.25, a figure which startled many in his audience who would have preferred to live with a 25 cent figure quoted by an earlier speaker, Robert I. Lipp, executive vice president, Chemical Bank, New York City, as cost per transaction for a similar but hypo-

thetical system.

Dr. Curtis said one component of the cost and something which creates operational problems as well, is the fact that the machines are visited once each day, Monday through Friday, by an armored car which is met by two bank employees for removing deposits and replenishing the cash supply. This means a rigid schedule. "Armored car people don't like to be kept waiting." It also means the cost of the armored car service and the cost of the time of two employees.

A possible way to avoid this problem, Dr. Curtis suggested, would be to arrange to use the same armored car service used by the store. B of A is looking into this kind of arrangement for the future.

And what of the future? Because the pilot has "clearly proved" that the service is not cost effective, there is no plan to expand it. "If we do start any other systems it probably will be of a pilot nature." The bank will continue to operate the San Fernando Valley system "to continue testing and development, learning all we can." These terminals will stay in, said Dr. Curtis, "unless the Supreme Court tells us to take them out."

Dr. Curtis declined to comment on whether the in-place service would cause a conflict should B of A elect to take part in NBI's asset card program.

NBI's closest competitor, Interbank Card Assn., which licenses Master Charge, has announced plans for a nationwide debit card system but hasn't released details.

Teller at Broadview Savings and Loan in Cleveland displays a card which enables holders to complete financial transactions at 50 Pick-N-Pay supermarkets via IBM 3600 remote terminals (above). NCR 770 self-service terminals (below) are servicing Bank of America customers at three Southern California supermarkets.

From the inventor

But a Master Charge currency card of a sort is expected to begin appearing this month from another source. The cards will be issued by credit unions, savings and loans, and other business firms licensed by Electronic Currency Corp. of Los Angeles whose president, Dr. Melvin E. Salveson, lays claim to having invented the Master Charge system.

Dr. Salveson said he developed the idea for the Master Charge system between 1962 and 1966 when he was president of Santa Monica Data Center, a retail oriented service bureau which did a lot of accounts receivable processing. "I decided our whole credit organization system was archaic."

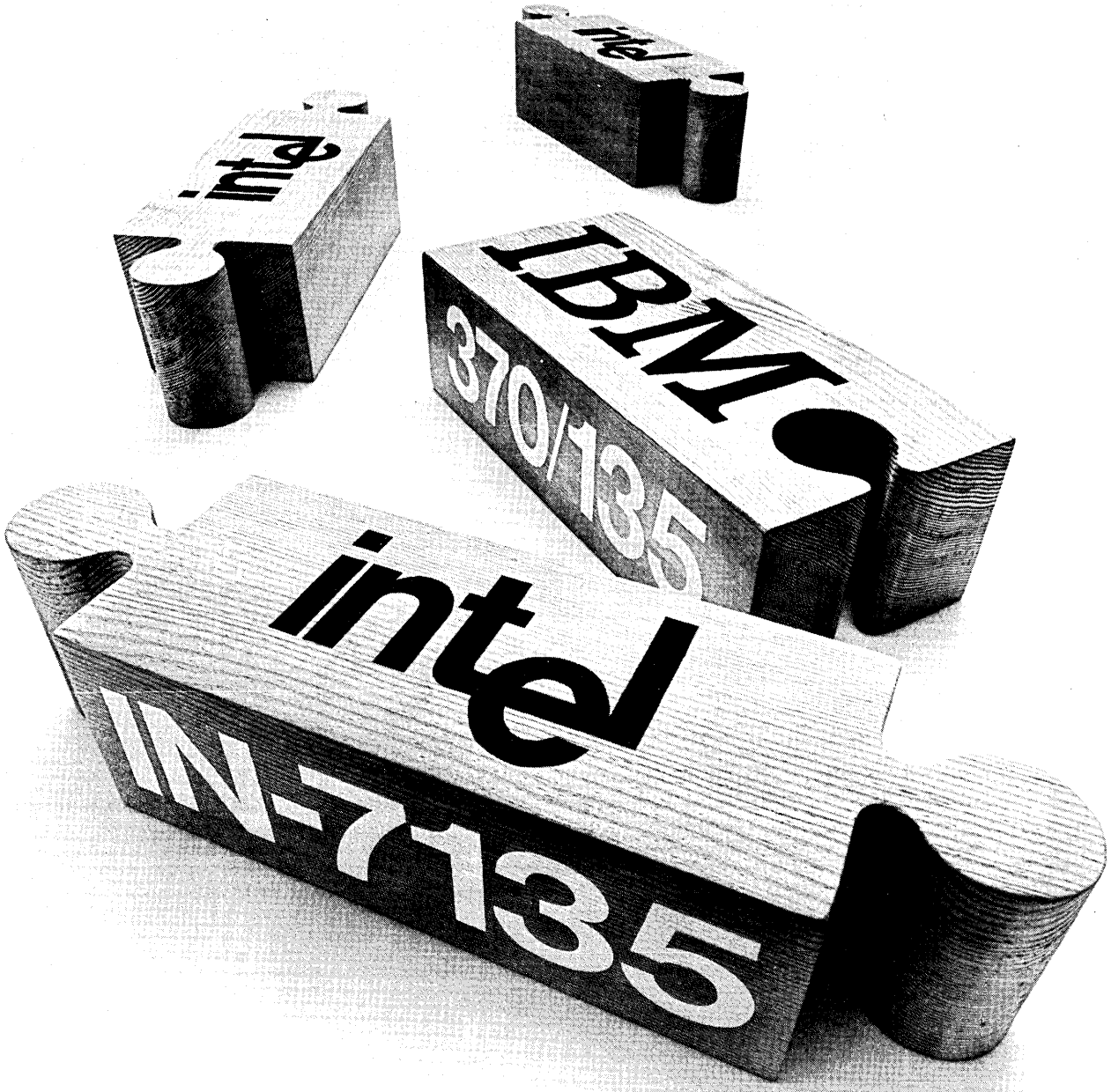
BankAmericard was around then, he recalls, but it hadn't gone nationwide. He took his ideas to United California Bank, Wells Fargo Bank and the Bank of California which became the first Master Charge banks and subsequently was asked to develop a system for Western States Bankcorp. which launched Master Charge. "They said they would use my system but without me," said Dr. Salveson.

He settled a dispute over this with the California Bank Card Assn. in 1967, he said. He claims the settlement not only gave him the rights to use the Master Charge logo but requires Interbank to promote his cards and to clear their transactions through the Master Charge system. In mid-September Salveson said he was "in negotiations" with Interbank over clearing arrangements. He said he had 10 credit unions signed up and was ready to begin issuing cards this month. Responses indicating interest had been received from some 6,500 credit unions, savings and loans, and other businesses, he said.

Any business could use his card as long as it maintains a sufficient bank balance. Cards could be issued to employees who could access this balance for expensable items.

Has a mag stripe

Dr. Salveson said his card will feature the crossed circles of Master Charge in a box in the lower left hand corner and the Electronic Currency Systems' eagle in the right hand box. The logo or symbol of the issuer would go across the top half. The card will have a mag stripe



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which Master Charge does not, enabling them to be issued at unattended teller terminals.

How do customers take to the cards and terminals? Many speakers at ABA's Payments Systems conference called this area of EFT the most publicly acceptable. Said Paul Riecks, second vice president, Equitable Trust Bank, Baltimore, "Automated tellers are past the backlash. They have a mature place in the payments system." His bank has 26 Docutel machines installed, on-line, in 24 branches.

So far the thrift institutions are out in front in the use of what they call Remote Service Units (RSU's—the commercial banks prefer the term customer-bank communications terminal or CBCT).

First Federal Savings & Loan Assn. of Lincoln, Neb., which started it all by installing remote terminals in two Nebraska supermarkets in 1974, now has a subsidiary, TMS Corp. of The Americas, which has franchised an EFT program to five other S&Ls in four states and the District of Columbia. TMS calls

EFT: Everybody's A Rule Maker

At a session titled "Catalysts for Change" at the American Bankers Assn.'s Payments Systems conference last month, Ernest T. Baughman, president of the Federal Reserve Bank of Dallas said the greatest catalysts would be technological and competitive, not regulatory.

At the same conference bankers were carrying around a hefty, just published book called "The Banker's EFT Handbook." Among other things, this book cautions that of all major factors influencing the growth of electronic funds transfer developments by commercial banks, legislative and regulatory actions have the greatest potential for altering the course and velocity of EFT change even more than the cost of technology or initiatives by thrift institutions and other competitors.

Prepared for the ABA by Arthur D. Little, Inc., as part of a $300,000 multi-state EFT strategy study, the handbook admonished: "Restrictive legislation could bring a halt to much EFT activity." It goes on to note that "legislation or regulation need not specifically ban EFT activity to have this effect; changes which affect the economy of EFT, procedural requirements, or treatment of customers could have an identical impact."

Whatever the degree, legislative, regulatory and legal ramifications are impacting EFT development and there are a lot of them. In addition to Congress and the courts, bankers have to contend with such regulatory bodies as the Comptroller of the Currency, the Federal Reserve Board, the Federal Deposit Insurance Corp., the Federal Home Loan Bank Board, and 50 state banking agencies. And, in mid-September they were looking forward to contending with the National Commission on Electronic Funds Transfer, created by Congress in August 1974 and long unnamed. William Weber, counsel to the Senate Subcommittee on Financial Institutions, who admitted he was being considered as a candidate to become executive director of the commission, told the ABA conference there were only "a few technical details" holding up naming of the committee and that the naming probably would occur "in a week or two."

Legislation is the answer

Weber noted that "Congress, at least the Senate has gone underground." He was referring to the demise in committee of Senate Bill 1899 which would have limited installation of remote teller terminals to a financial institution's home state and no more than 25 miles from its headquarters or 10 miles from a branch. A House bill which would impose a 90-day moratorium on additional teller installations was still alive last month but Weber said he feels "the chances that Congress will legislate anything substantial in the near future are not very great..." But he believes legislation is the answer. "It's a problem created by statute years ago. Whatever the courts do can create an unfortunate precedent. It's a problem we (Congress) created and a problem only we can resolve."

The problem is archaic branching laws and the big question of whether or not electronic teller terminals are branches. There's a lot of difference of opinion here.

The Comptroller of the Currency ruled they are not (July, p. 109). The Comptroller was taken to court by the Independent Bankers Assn. and District Judge Aubrey E. Robinson, Jr. decreed that electronic tellers do constitute branches. This case now goes to the Circuit Court of Appeals.

A year in appeal

Russell C. Browne, Advisor for Payment Systems for the comptroller's office said he thinks the full appeal process could take about a year. "I see a two year time frame before we have a clearly defined legal decision in the court," he told bankers at the payments systems conference. "If you're holding your breaths there may be some element of legislative relief before relief comes from the courts."

Browne emphasized that Judge Robinson's ruling only affects national banks in the area of his court's jurisdiction. However it is, and will continue to be even as the appeal is being argued, used in numerous other court tests of the status of remote banking terminals.

New York state's banking board has ruled that remote teller terminals are not branch banks, so all financial institutions chartered by that state—savings and loan associations and savings banks as well as commercial banks—are free to install such facilities subject to only a few restrictions. The main restriction is that the terminals handling deposits or withdrawals cannot be located so close to competing facilities that the result is "unsound or destructive competition." All applications must be approved by New York Superintendent of Banks John G. Heimann.

And the Federal Home Loan Bank Board continues to grant permission to Savings and Loans to install the remote tellers. George Oram, director, office of management systems and administration for the board, told the ABA payments system conference, "We have 13 such systems operating and they're all ages and levels. Shopping centers look good (for sites for the terminals) and we've learned that supermarkets are one of the best things you can do."

In Illinois the future of remote tellers could be decided this month. A federal judge has set Oct. 20 as a ruling date in a suit brought against Continental Illinois National Bank and Trust Co. by the state's banking commissioner. Illinois is a non-branching state. Continental Illinois is charged with circumventing the non-branching laws with installation of remote teller units in supermarkets. The Illinois decision will be a precedent for the county's other non-branching states.

And there is legislation pending or enacted concerning EFT terminals in 33 states. Piggy banks might be simpler. **—E.M.**

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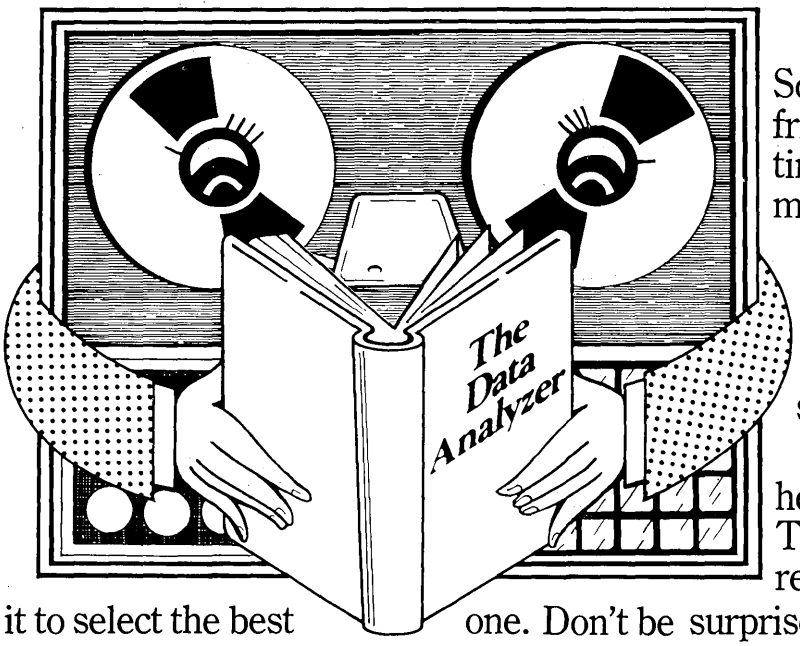

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In California, where California Federal Savings and Loan Assn. became the second thrift institution in the nation to go the RSU route, it has added six supermarkets to the five that have had terminals since early this year (February, p. 81). The service, called "California Money" must be popular. One customer who had applied for the service, wondering why she hadn't received her card yet, asked at her branch. She was told that, because of the unexpected demand, there was a six to eight week wait. Cal Fed, by mid-September had issued 35,000 California Money Cards.

"Sweeping the country"

In Milwaukee, Gerald Levy, president of RSU, Ltd., a service organization formed by 21 Wisconsin Savings and Loans to offer a system called "Cash Plus," said he believes that the use of RSU's soon will be "sweeping the country." Cash Plus uses terminals in 12 Jewel Food Stores in Wisconsin. The system was designed by the data processing department of Midland Bank of Milwaukee.

In the Cleveland area, the Broadview Savings and Loan Co. and Pick-N-Pay supermarkets have combined to offer THE MONEYSERVICE (not to be confused with Nebraska's Money Service). This system uses IBM 3600 remote service units in more than 50 Pick-N-Pay stores.

The commercial banks are there too. Continental Illinois National Bank & Trust Co. has remote service facilities installed in 62 Dominick's Finer Foods Inc. in metropolitan Chicago. It has offered 300 Chicago area correspondent banks the opportunity to participate in the facilities. Currently the services are limited to check-cashing authorization but the facilities have the technical capability of performing a wide range of banking services. Whether or not they will be able to offer them awaits a federal district court ruling (see related story) expected Oct. 20.

In Atlanta, Ga., Citizens & Southern National bank is offering its on-line service called Instant Bank Key, to other banks in seven Southeastern states.

From Wells Fargo

Again in California, Wells Fargo Bank is due to put into operation this month a statewide retail terminal network that will verify checks written on any California bank or charges on any of five major credit cards.

The terminals, cards and systems are coming thick and fast. They're expensive. Usage, bankers agree, is the key to cost effectiveness. Lipp, with the hypothetical configuration he described at the Payments Systems conference, was predicating his 25 cents per transaction figure on a volume of 80,000 transactions per year.

So, the installers of systems are promoting and educating and taking the advice of another Payments System conference speaker, consumer advocate, Jean Judge, and adapting to the "consumer nature of the retail environment."

Dr. Curtis of B of A said that before the San Fernando Valley pilot went into operation, the bank staged a week-long demonstration in which the public was allowed to play with the system. Play money was used interspersed with certificates for free groceries at Ralphs. Riecks of Baltimore Equitable Trust said they promoted their automatic teller machines with . . . "Try our machine and get a Big Mac."

Youth is a key too. B of A picked a "younger" population for its experiment. Lee Paulson, vice president of management systems for Lucky Stores Inc., Dublin, Calif., in offering bankers attending the Payments Systems conference "a retail dp man's outlook on EFT" warned: "Consider the young customer. The young customer is computer oriented . . . likes and accepts the computer . . . will expect its use. It's like indoor plumbing. It's the convenience, prestige and public image that counts, not the return on investment."

Like the railroads

Paulson sees the retailer/bank relationship in EFT development as analagous to the railroads. "We're working at the other end and we'll meet someday in the great conceptual Utah and hope both ends fit."

Paulson believes EFT "in its ultimate sense" is still 10 years away, primarily because the software has not been adequately developed. "There are lots of people out there looking at what this market means to them in terms of service and equipment sales but, until we know what we want . . ."

One thing bankers and regulators who addressed the Payments Systems conference clearly don't want is mandatory sharing of terminals by banks. They were unanimous in the opinion that there are circumstances which will dictate sharing such as with terminals in retail stores but they don't want to see it forced where, as Russell C. Browne, advisor for Payment Systems, Office of the Comptroller of the Currency, put it, "it would look like a monopoly and smell like a monopoly."

Melvyn S. Klein, of Arthur D. Little, Inc., in describing for the conference a multi-state EFT strategy study his firm did for the ABA, noted that in "one-half of our interview we were involved in an 'it' discussion and everybody is talking about a different 'it'." By it, of course, he meant EFT and right now it probably looks to the typical consumer that "it" is an awful lot of plastic.

—Edith Myers

Conferences

Focus on Budgets at NY Conference

New York was the appropriate backdrop for INFO '75. It was not the city's magnificent hotels, expensive restaurants and lavish shows that underscored the general spirit of the end user-oriented conference and exposition, but the fact that New York City was teetering on the brink of bankruptcy.

During the computer event, the city was saved from default—for a time, at least—and the whole idea of belt-tightening, retrenching, and budget cutting spilled over into the exhibits at the New York Coliseum and the sessions at the Americana hotel.

"Almost everybody here is out to save a buck," said one long-time computer convention goer. "They're still fascinated with the latest technology, but only when it will save them something. And the users aren't just being tight because it's fashionable either. They're under pressure back home at their installations to hold the line."

With that general feeling in mind, there was something for everyone at INFO '75, Sept. 8-11. The exhibitors were generally peddling products, ideas and material designed to fit the pocketbook of the budget conscious computer user and his management executives. The sessions tended to serve the same goal.

Attendance up

Surprisingly, in the sluggish economic atmosphere the show attracted more conference registrants than last year—about 2,150 vs. 1,800 last year. Attendance at the exhibits was also up slightly to 11,300.

One speaker, Joseph Navarro, argued that vendors often skirt real reasons why users should go to new systems and in their places offer pie-in-the-sky rationales. "Dp's promises-to-performance ratio traditionally has not been very good," said Navarro.

The speaker, who is associate director at the Center for Computer and Management Sciences at Rutgers Univ., noted that user requirements change constantly and they soon grow to fill the new system's capabilities.

"You do not eliminate personnel by bringing a system up," said Navarro.

news in perspective

INFO '75: Despite a sluggish economy, second annual INFO '75 attracted more persons to both the conference and exhibit than in 1974. Conference registration was 2,150 and exhibit registration 11,300. That compared with 1,800 and 10,800 the year before.

"The elimination of a coding clerk out of a user shop may often mean the addition of another keypuncher of data entry at the computer center."

No money saved

Another speaker, Michael Aherne, described a case history at a large state university that developed a payroll, budget and personnel system that somehow failed to save money. "There was no intention to save money, so none was saved," said Aherne, who is vice president of Integral Systems, Inc., of Flemington, N.J. "The definition of the systems function was out of control; the system was grandiose, designed to be everything to everybody; and, so, relative to its predecessor, it cost a lot more."

There were other sound reasons for developing the system and Aherne indicated these were achieved in the system—the computer staff site was overworked; a more effective system to comply with federal requirements was needed; a more comprehensive information system was needed to improve all university data processing costs and services.

However, Aherne added, no specific party was designated to ride herd over the cost area. Aherne's firm was called in after the project was underway and he found that considerable time had to be expended to convince various user areas that much of the hoped-for improvement could not be achieved.

Another speaker who attracted much attention was Norman Weizer, director of Univac's software strategic planning. Weizer, who discussed "fourth generation" software, predicted that there will never be a repeat of OS/360 again; that is, manufacturers will not make users swing over to an entire new mode of operation when new hardware is delivered.

Weizer said: "You have too much money invested in your current application to permit them to be scrapped and completely rewritten to run on the new equipment."

Buy now

The speaker went on to say that the fourth generation software trends were already apparent in some of the new software and system development. "All of the major mainframe manufacturers are showing their primary direction for fourth generation software by their pattern of software announcements and enhancements," said Weizer. "If you remain current, you may have several minor conversion efforts which will be more of an annoyance than a problem. However, if you remain static for three or four years you may find that the conversion to the new generation will be very painful."

Weizer also raised some warning flags for users. On the subject of assembly level languages Weizer urged users to phase them out of existence as soon as possible, primarily becuase they will not be supportable in native mode in the new generation. He noted, however, that he expects there will be emulators for assembly languages.

Because of the easy-to-use fourth generation software, end users will come to look upon the computer as a simple device like the typewriter or the calculator. "If something fails," said Weizer, "it had better be fixed quickly and not require redoing a lot of work."

On the same program, another Univac official, Basil Iwashyna, predicted that the need for applications programmers will "vastly diminish" as computer technology improves.

All in all, INFO '75 was deemed a success by most who attended either as exhibitors or as attendees. More than half the show's exhibitors had signed up for next year's show—in November in Chicago—by the time the show was over.

IBM created more interest than usual at its booth when its General Systems Div. introduced the 5100 small computer during the show. The booth was busy after the announcement.

Another new feature of the show was a "selectronic directory," a method whereby a show goer checked off items of interest to him and then received a computer printout back listing the booths with material of interest to him. Show officials said the system helped make show goers more "highly qualified" at the booths they visited.

—W. David Gardner

ACH's Meeting Public Resistance

The three national associations closely concerned with Automated Clearing Houses (ACH's) are taking stock of ACH developments in Washington this month at the first Automated Clearing House Conference.

The conference has been described by James H. Jarrell, president of the National Automated Clearing House Assn. (NACHA) and vice president, Trust Company of Georgia, "designed to educate bankers on all aspects of the ACH movement."

At an earlier conference, the American Bankers Assn.'s Payments Systems Policy conference last month, it appeared evident that education of bankers is not enough, that a lot of customer education is needed too. Speaker after speaker, including Jarrell, called the

ACH aspect of Electronic Funds Transfer (EFT) as the aspect meeting most customer resistance.

ABA, with NACHA and the Bank Administration Institute, is sponsoring this month's conference which, appropriately, has several sessions scheduled devoted to marketing the concept.

Consumers are apprehensive

The heart of ACH operation is preauthorized debits and credits which eliminate the need for checks. Peter Shuck, director, Washington Office, Consumers Union, told the Payments Systems conference what most attendees already knew: that numerous surveys have determined that consumers are satisfied with the paper system and they fear paperless entries will mean loss of control over personal finances; loss of ability to play the float, proof of payment problems, loss of ability to stop payment, a threat to personal privacy, and a question of security against theft or error.

Walter Connolly Jr., president, the Connecticut Bank & Trust Co., Hartford, Conn., quoted what he called "one of the best summations of consumer apprehensions" he'd ever heard. It came from a respondent to an ABA survey. "If they put my pay check in my account automatically and then take the money for my bills out automatically . . . what do they need me for? I don't want them running my whole life."

Of earlier sins

Dr. Anthony Oettinger, director of Harvard's Program on Information Technologies and Public Policy, told the conference that much of the existing apprehension is "earlier sins coming home to roost." He blames what he calls "the computer error syndrome" as resulting from "overblown claims of the past." He called these claims—EFT is coming and will be the be all and end all—"the propagation of science fiction."

The phrase "our computer did it," said Dr. Oettinger, "is not a response but a cop out, one that gives solace now at a great price in the future."

"And as for the privacy shibboleth," he said, "enough! The easiest way to get into any system today is still to go and pick up the cash and bribe somebody. Electronic fraud is far more expensive than bribery."

Jarrell feels the consumer, over the next few years, "will be confronted with economic incentives, both positive and negative, to raise his level of acceptance of prearranged payments. The negative incentive is likely to come in the form of higher per item charges for writing checks." He said two forces will work to bring this about. "First, the cost pressure associated with processing checks will force banks to pursue more realistic pricing of checking account services than is the case today. At the same time, as the lower cost, more efficient electronic services become more acceptable payment alternatives, banks will naturally begin offering incentives to induce customers to opt for the prearranged method of payment."

"So," said Jarrell, "it is not unreasonable to speculate that, by 1980, a prearranged, electronic payment will cost the bank customer considerably less than will a check."

The Automated Clearing House movement got started in California in 1968 with the formation of SCOPE (Special Committee on Paperless Entries). This committee's efforts led to California's ACH, first to go operational in October of 1972. It processed no transactions in its first month and was up to a grand total of 12 in the second month. Activity in the early months of California's and the other ACH's that followed, was slow.

But, noted Jarrell at the Payments Systems Conference, things have picked up in the last year. Total ACH transac-

tion volume went from 5,000 items per month to 200,000 items per month in one year's time.

NACHA, formed in July 1974 when California and Georgia had the only ACH's, now has 21 members including nine with operational ACH's. These nine offer service to some 5,000 banks and process items from 700 companies. Jarrell said three other ACH groups have signaled their intent to join NACHA and will be granted membership at a board meeting this month. Some 10 other groups, he said, have indicated that their future plans include NACHA membership.

The NACHA president conceded that "private section ACH entries are "coming along slowly" but said "government payment programs appear to be gaining a full head of steam. The Air Force payroll program is now operational in 11 Federal Reserve zones and will be operational nationwide by year-end."

The direct deposit of Social Security payments will be available nationwide through the paper check system this month, and, after a "somewhat slow" start in Georgia, "appears to be gaining momentum as it moves across the country. The conversion of these paper check payments to ACH electronic entries will not only enhance the program from an operational standpoint, but it will also improve the regulatory provision under which the program operates."

The initial conversion to ACH paperless entries is scheduled to begin in Georgia in February 1976 and will move to all parts of the country during the rest of 1976.

"The ACH is not a pipe dream, not a lead balloon, but an emerging reality," said Jarrell. So, for the guy who wondered, "what do they need me for," maybe he'll have to settle for just being allowed to consume. **—E.M.**

Antitrust

IBM Tells High Court It's a Broad Market

In a brief to the Supreme Court, IBM endorses a broad market share definition of the computer industry and warns that any narrow definition of market share "would establish a novel and dangerous precedent which would permit the intrusion of judicial regulation into the free interplay of economic forces with serious ramifications for the remainder of the industry."

While IBM was specifically addressing the definition of the peripherals industry established in an early U.S. District Court decision that favored the Telex Corp. over IBM, the argument has relevance, too, in another case, the ongoing IBM-Justice Dept. case. The recent brief was filed by IBM, which urged the Court to leave standing an appellate decision which reversed the earlier U.S. District Court decision and favored IBM.

In the brief, IBM is urging the Supreme Court to decline to hear Telex' final appeal.

The decision could form a precedent in market share definition of the computer industry that could be an important weapon in other IBM antitrust cases in which the firm is a defendant. In its antitrust defense, IBM depicts the industry as being peopled by several hundred firms in vigorous competition with one another.

" . . . it is a fundamental misuse of the Sherman Act to look at anything less than all the competition which significantly constrains a firm's behavior," the IBM brief stated. "That is why it is particularly wrong to focus upon the offerings of a particular supplier and exclude from consideration many competitive alternatives."

Little is new

Generally, the IBM brief adds little to its past defenses in its suit against Telex. IBM argues that the Telex petition asking the Supreme Court to review the case "ignores the district court's findings against it and patches together a series of magazine articles, speeches and other non-record sources into a statement of 'facts' which is . . . wholly inconsistent" with the earlier court records.

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CIRCLE 10 ON READER CARD

IBM also sought to knock down Telex' contention that the appellate decision permits IBM to monopolize the entire peripherals market (July, p. 71). IBM supported the idea that the industry is competitive enough and IBM's market share not dominant enough to control the entire peripherals market.

"The fact is," the IBM brief stated, "that petitioners (Telex) did not, and could not, prove that IBM had monopoly power in any meaningful part of the edp industry or the dangerous probability of securing such power."

In addition to the main issue of antitrust, IBM also supports the earlier ruling against Telex in the amount of about $20 million for misappropriation of IBM trade secrets.

Mainframers

Amdahl's Fast 470: Two More on Way

Shipment of the third and fourth computers has been scheduled by Amdahl Corp., Sunnyvale, Calif. This follows initial shipments earlier this year to NASA's Institute for Space Studies in New York City and to the Univ. of Michigan.

Dr. Gene M. Amdahl, founder and board chairman, said the company expected to ship the third unit to Texas A&M in September and one to the Univ. of Alberta, Edmonton, this month. Plans are to ship two or three more before the end of the year.

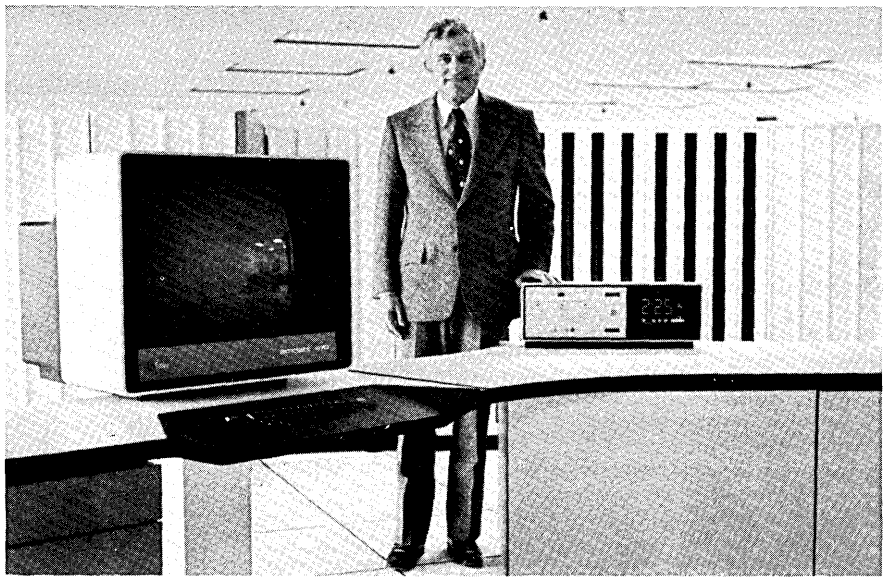
At the Univ. of Michigan, a decision was scheduled for the beginning of this month on whether to accept the two megabyte Amdahl 470V/6 or to retain the two-megabyte 370/168 installed last January. This decision was to come at the end of a two-month performance and reliability evaluation period, and the sentiment seemed to favor the Amdahl machine.

Prices of the two machines were said to be comparable, and the winning system would be purchased, not leased.

Performance tests by the Michigan staff looked favorable. A number of user jobs had been run, according to Dr. Allan Emery, associate director of the Computing Center there. "One of those that I ran was a crystallographic structure problem for the chemistry department," Emery said. "That job on average was 2.03 times as fast," meaning a 100% improvement over the 168.

"One part of it was about 1.85 (85% faster), and another part was about 2.27."

He adds that another job ran as slow as about 1.2, prompting him to want to run the job some more to see why it ran so slowly. "We expect, from the collection of measurements we have so far, that the overall advantage won't be less than 1.5 and more likely be somewhat higher than that."



IT'S ON THE WAY: Dr. Gene M. Amdahl with the Amdahl 470V/6. Five-year-old company spent $40 million shipping first model, but now has enough funding to carry it through until cash flow is reversed.

Emery said the reliability, too, has been good. There were some initial glitches, but these reportedly were repaired quickly. Speaking of the Amdahl team there at the installation time, he says, "Their responsiveness and their ability to identify problems and fix them—not with a temporary patch, even—has been most impressive."

In addition there reportedly was no unexpected problem in getting the system up and running under the university-developed operating system. The so-called Michigan Terminal System, a virtual operating system written about nine years ago for the 360/67 and subsequently modified for the 168, runs also on the 470V/6. Their subroutine linkage conventions match those of OS, says Emery, so they can use compilers and various other language processors that are normally run in an OS environment.

"We essentially made no changes in going from the 168 to the 470. No changes at all as far as the users are concerned, and within the system the main change was the machine check error recovery code."

It helped, perhaps, that the Michigan team had been in contact with the Amdahl group since the early design stages of the machine. "In fact," said Emery, "there are a couple of features in the machine that are there as a result of early discussion with the Amdahl design people."

Finally, Emery reports no problems with the "zoo of I/O equipment" they have, which includes gear from Memorex, Itel, Storage Technology, and IBM, as well as equipment made at the university.

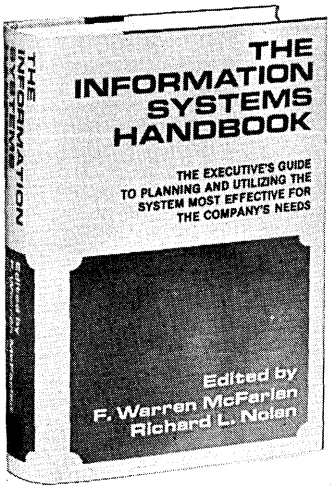
As reported earlier (June 1974, p. 114) the Amdahl computer is being manufactured in Japan by Fujitsu, Ltd., the largest investor in the American company. Dr. Amdahl said Fujitsu is performing almost 80% of the manufacturing, concentrating on the parts that have a high inventory value and thus relieving Amdahl Corp. from having to finance that aspect of the manufacturing. Assembly is then completed in Sunnyvale. Most of the parts, however, are shipped to Fujitsu from the U.S.

The company, formed in October 1970, went through more than $40 million before shipping its first system. But Dr. Amdahl says it now has sufficient funding to carry it through until the cash flow is reversed.

Much of the initial funding went into the development of a real memory system, production of which has been suspended and replaced by the virtual model. A growing percentage of the prospects with whom the company has talked are said to be interested in the virtual system rather than the real memory, although only about half of those users are running in the virtual mode. Quipped Dr. Amdahl, "Virtual is supposed to magnify real memory, but instead it just magnifies the need for real memory."

Prices of the Amdahl computer, which includes the mainframe, main memory a minimum 16 channels, console, and power distribution unit, are said to be equal to or a little less than those for a 370/168. A one-magabyte system with 16 channels is priced at $3,650,000. **—Edward K. Yasaki**

THE INFORMATION SYSTEMS HANDBOOK



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Each chapter was written by an authority in the field and, to further increase the authoritativeness of the entire work, each chapter was also reviewed by both businessmen and academicians. The forty chapters have been grouped into six sections which cluster related groups of issues and mirror the organization of the data processing department. The first two sections deal with the broad responsibilities of the data processing executive as a member of the top management team and as an administrator of a major function. The third section deals specifically with the problem of manpower administration and development. The fourth section focuses on the methods and tools for evaluating the technical alternatives facing the organization. The fifth and sixth sections deal respectively with the issues relating to the development of new applications and managing the computer operations activity.

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news in perspective

Interconnection

Commission Asks for Direct Connection After Showing that Certification Works

Opponents of the telephone company's stand on interconnection look to the state of New York with broad smiles these days.

The reason for their pleasure is the action of the New York Public Service Commission (NYPSC) late this summer in endorsing the idea of certifying independently-made terminals and connecting them to the interstate telephone network through a simpler, cheaper protective coupler than the one now specified by the phone company.

The endorsement was contained in a lengthy statement submitted by the commission to the Federal Communications Commission which is considering two proposals that would make independently-manufactured terminals—data as well as voice—vastly more appealing to users of the dial-up network. These proposals represent the latest attempt—in a battle that has been underway at least seven years since the FCC's Carterfone Decision—to eliminate AT&T's "foreign attachment" restrictions.

Hard evidence

Besides commenting on the two proposals pending before the FCC—one from California, the other developed largely by the FCC's chief engineer—the New York PSC also produced the first hard evidence that certification really works.

In 1972, the state commission allowed the Rochester, N.Y., Telephone Co. to adopt a program for certifying independently-made terminals of all types—modems, telephones, PBX, answering units and other "ancillary devices" — and connecting them to the intrastate dial-up network through simple, cheap protective couplers. In its statement to the FCC, the New York commission analyzed the results produced by the "Rochester Plan" during more than two years of operation, and concluded that "the telephone network has been protected adequately against technical degradation."

This language is particularly significant because for years AT&T has been arguing that much greater and more expensive protection than that provided by the Rochester Plan is necessary to protect the telephone net against harm from independently-made terminals.

It now appears virtually certain that New York will adopt a greatly-liberalized interconnect program for its intrastate network. It already has put out for public comment before Nov. 3 a proposal to establish a certification program by all telephone companies operating within the state in which independently-made modems as well as main station telephones and PBX's would be eligible for certification. Once approved, they could be connected to the network through the Rochester Telephone Co.'s network protective device (NPD). The NYPSC also asked for direct connection of certified ancillary devices used as extensions to main station equipment.

This proposal seems likely to start a bandwagon rolling through the other states, particularly since California has already adopted a certification and direct connect program for its intrastate network (June, p. 121). Once a number of states jumped aboard, the present interstate restrictions on foreign attachments would become largely meaningless, since the phone company's customers access the interstate network through

intrastate circuits. Thus, the FCC would have to adopt conforming regulations, and that in turn probably would make it necessary for all the remaining states to fall into line.

Actually, there is substantial sentiment within the federal commission and its staff favoring adoption of a more liberal policy *before* a large number of states do so. One reason is that a federal plan, adopting uniform certification and interconnection procedures, would discourage the states from marching off in different directions and creating unnecessary red tape, as well as extra expense, for users and suppliers. Another reason is that by acting sooner rather than later, the feds would have more to say about the specific certification and interconnection procedures finally adopted at both the state and federal levels.

Another view

While Ma Bell's hold on the dial-up terminal market seems to be on the verge of slipping significantly, some sideline observers remain skeptical. They believe that the phone company, even if forced to accept substantial lowering of the interconnect barrier, will nevertheless be able to retain its competitive advantage.

These observers point out that the New York commission, in its statement to the FCC, recommended exclusion of telephone company-provided terminals from any certification program finally adopted by the feds. The New York PSC also said the states should be allowed to develop their own intrastate programs as "alternatives to" any federal program. Furthermore, the New York commission argued that "it is essential" for the FCC to "specifically authorize telephone companies as alternative certifying agents."

Too much leeway

The basic concern of the skeptics is that this approach would give the states too much leeway. Many state commissions, they argue, are overly sympathetic to AT&T's point of view, and so the result could be a "new" interconnection program so loaded with technical and administrative obstacles that independent manufacturers and dial-up network users wouldn't be any better off than they are now.

One counter-argument is that each intrastate network connects directly to the interstate system, so the FCC would have at least some control over state plans. The New York PSC, in its statement, recognized this by saying that "any alternative plan adopted within a state would, of course, be subject to FCC approval when conforming interstate tariffs are filed."

Another counter-argument is that a big percentage, if not a majority, of the nation's data terminals are located in New York and California, the states whose commissions are generally considered most independent of telephone company domination.

A big boost

In any event, even if "alternative" certification/interconnect plans did enable the telephone company to hold on to some of its present competitive advantage, the New York commission's statement has clearly given Ma Bell's adversaries a big boost, by:

—endorsing the central idea underlying both of the plans now pending before the FCC: the testing of independently-made terminals against a set of uniform technical specifications, developed jointly by all interested parties rather than just the phone company, and explicitly stated in public.

—providing objective evidence, based on the Rochester Plan, that AT&T's present interconnect requirements are more complex and expensive than they have to be. The Rochester program offers "a substantial cost advantage over the expensive Bell interface devices,"

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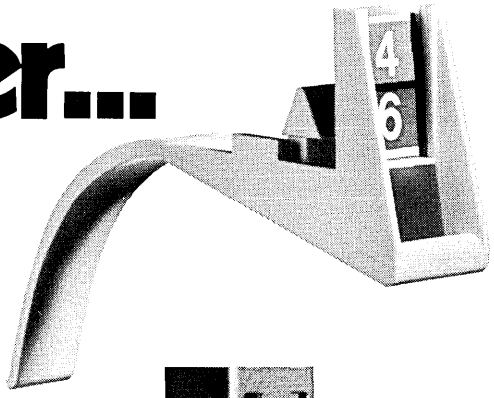
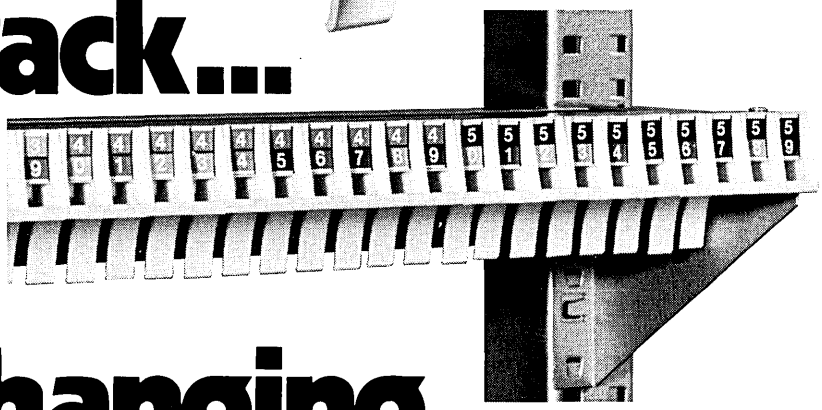
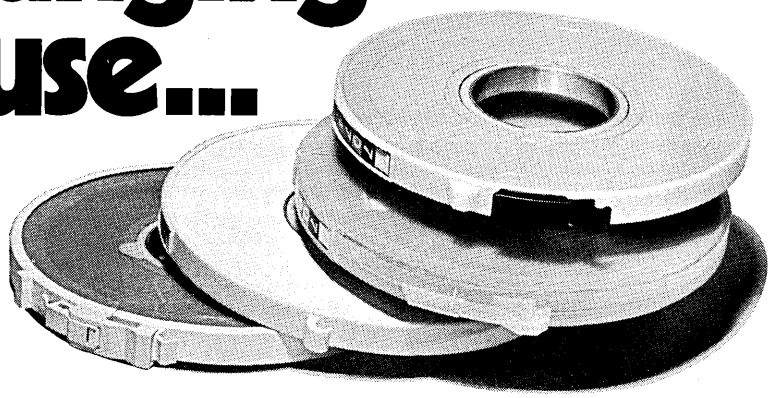


and this rack...



and any hanging tape you use...



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says the New York PSC at one point in its statement. "In the case of answering devices, the consumer pays non-recurring charges of $20 for installation of the network protective device, and about $20 for certification costs. The only recurring charge, for the NPD itself, is $1.40/month. Compare the latter figure with the $3.10 recurring charge for Bell's GTS coupler, the cheapest interface for answering devices offered by New York Telephone."

Something for everybody

The New York commission's statement performs one other service for proponents of more liberal interconnection that may be less obvious. It lays the basis for a program which, if adopted by the FCC, would enable both the phone company and the states to carry away at least some spoils from the battle, and could prevent either or both from going to court. One observer calls the plan "a bitter pill wrapped in a candy coating."

For the states, the chief benefit would be the right to establish alternative interconnection plans. AT&T, meanwhile, would remain the certifying agent for many if not most customer-provided terminals, and its own devices would remain outside the program.

Once such a policy was in operation, it seems likely that the interconnect restrictions would be liberalized further. As one source inside the New York PSC puts it, "We believe it's better to take several small steps rather than a few big ones."

Although the commission believes the NPD is necessary for all other types of customer-provided terminals, the source adds, "This is how they feel right now, officially." He indicated that if, as seems likely, New York adopts the NPD as the interface between all customer-provided terminals, it will soon become apparent that even simpler protective couplers can be used to interface some kinds of terminals.

In its statement to the FCC, the New York commission said, "a fundamental conclusion suggested by the . . . experience with the Rochester Plan is that companies other than those in the Bell system are capable of developing relatively inexpensive devices which provide effective protection of the telephone network against several substantial technical harms. In our view, it is obvious that an effective measure for encouraging the technical innovation necessary to reduce the cost of such protective interfaces is absolutely essential."

"We suggest," the commission continued, "that the program ultimately adopted by the FCC should provide for the certification of protective interfaces developed by independent manufacturers. These could then be used in connection with PBX's, key systems, or other devices to whatever extent the certifying authority finds proper."

Conceivably, if the FCC adopted this approach, it could lead to use of NPD's even simpler and less expensive than the one specified by Rochester Telephone and ultimately to development of acceptable protective components, built into the terminal's innards, which would eliminate the coupler as a separate element and produce direct connection at no extra cost to the user.

—Phil Hirsch

International

Braille Statements For the Blind

Blind bank customers of Lloyds Bank in England are receiving statements in Braille only a day or two longer than the normal service for sighted customers.

The credit goes to a new computer based technique for producing the statements devised by Dr. John Gill, a Research Fellow at Warwick University. Prior to Dr. Gill's system, Braille statements were provided only on request and took so long to produce that the value of the information was severely limited.

Under Dr. Gill's system, magnetic tape data supplied by the bank is input to a Xerox Sigma 5 at the university and a linked Braille printer embosses the batch of statements within minutes. At the same time, the line-printer produces a copy in ordinary characters so that the blind customer can discuss the statement with his local bank. To insure confidentiality, the data supplied by the bank does not include a depositor's name and address.

The program to convert the print-image format to the Braille format is written in Fortran IVH. As well as changing the format, the program also checks that the input data is in the correct fields and that the final balance is correct. If there were an error, the Braille statement would be suppressed and an error message would be output on the line printer.

The program automatically detects which bank office the statement is for and whether it refers to a current, savings or deposit account.

"Conversion to Braille is not as simple as might first appear," said Dr. Gill,

"since Braille is not a one for one conversion of ordinary text. For instance, in English Braille, the numbers are the first ten characters of the alphabet preceded by a numerical sign. Braille consists of cells made up of a maximum of six dots giving 64 possible combinations."

The Braille statement is embossed directly on manila paper using a Braillemboss which is a Teletype-compatible terminal operating at 10 characters per second. The Braillemboss was developed and built by the Sensory Aids Evaluation and Development Center at the Massachusetts Institute of Technology.

Dr. Gill has been working on text translations for the blind for five years. With a staff of one programmer and one typist, he fills requests for up to 10 copies of such things as minutes for meetings, recipes, washing machine instructions, and instructions for taking birth control pills. They also provide detailed maps of such things as railroad stations.

"We get more requests than we can cope with," said Dr. Gill. There are 113,000 blind people in England.

Dr. Gill based his translation programs on an MIT published program for American Braille. "This was in COBOL. We translated it into FORTRAN and adapted it for English Braille. There is more difference between American Braille and English Braille than there is between spoken American and spoken English."

Of his development of the program for Braille bank statements, Dr. Gill said: "It is easy to forget that many blind people have to depend upon sighted persons reading their financial papers to them. Prompt bank statements in Braille will reduce their dependence on others and give them direct and speedier access to their own financial affairs. It is good to think that we have achieved this in Louis Braille Year, which is marking the 150th anniversary of the Braille alphabet."

Lloyds Bank provides the Braille statements to their blind customers at no extra charge. **—E.M.**

Dutch Firm Bowing Out of Unidata

N.V. Philips, the huge Netherlands electronics concern, last month finally gave up the dream of being a world force in the general purpose computer market by announcing it would withdraw from Unidata. And in the process it may have spelled the end of the European dream for its own pan-European computer giant.

The long aborning Unidata partnership was formed in 1973 by West Germany's Siemens, France's Compagnie Internationale pour L'Informatique (CII) and Philips. Rather than a company, it has been a contractual arrangement in which the three firms divided marketing territories, development and other responsibilities in an effort to provide the European computer-using industries with an alternative to IBM's colossal offerings on the continent. Management of the partnership was by committee.

Earlier this year, one partner, CII, had upset the already shaky partnership by agreeing to merge with Honeywell-Bull. Despite continuing protests from CII that it would continue the Unidata relationship, the marketplace simply did not believe it. Sales by Unidata had already slowed during the months of rumor preceding the merger announcement and afterwards, they almost dried up.

Forced by CII

L. E. Groosman, a spokesman for Philips and Unidata, said in a recent interview: "CII forced us to announce these measures. After May 12 (when the merger agreement formally was announced) the order intake for the Unidata 7.720 dropped sharply." Philips was the developer of this small general purpose machine—the low end of the Unidata line. It will stop manufacturing them "after we deliver the 160 machines ordered".

Groosman expects that Siemens and CII will take over the Philips marketing commitments for the line in Holland, Belgium and Scandinavia, where that firm ran the Unidata sales offices. He also believes that Siemens will do as it says and take over the support of the full 7000 line.

Philips itself will continue with its extensive line of minicomputers, office computers, small business computers, (including the 450 system marketed under the Unidata banner), bank terminals and data entry equipment. (Nearly 20,000 of its small office computers are in or on order worldwide.) This equipment accounted for the bulk of Philips data systems sales of 550 million guilders (roughly $206 million) a year and, says Groosman, operated at breakeven. Its own general purpose line (P-1000) and more recently the Unidata effort cost the firm 1.2 billion guilders ($450 million) in unrecovered costs over the last dozen years. In each of the last five years alone, it reported some $200 million guilders ($75 million) in unrecovered costs.

Philips did not take the withdrawal lightly since over the next two years it will be forced to lay off a large number

of the 2,500 employees directly affected—a situation of grave import in Holland where labor laws are tough. Some will be relocated within the company, but it simply cannot absorb most of them. The labor unions and workers' councils must approve before Philips can bow out, but Groosman indicated that a "complex, extensive" memo had been filed with them to support the decision.

—Angeline Pantages

Communications

Queuing up for Packet Service

Ever since he was a graduate student at MIT, Dr. Lawrence G. Roberts has been intrigued with the idea of getting computers to work together. The main problem, he once told an interviewer, was communications. And he decided that

DR. LAWRENCE G. ROBERTS
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in two months of service

"communications became more effective with packets than through pipes."

Roberts pursued his concept after he left MIT's Lincoln Laboratory to join the Defense Dept.'s Advanced Research Projects Agency (ARPA) where he conceived and managed the development of the ARPA network, a packet switching computer communications network. That network was to become the model for a commercial packet switched communications network that was put into operation late last summer by Telenet Communications Corp. Roberts, now president of Telenet, said the initial system which interconnects seven cities began operations with five customers in August and was expected to grow to 10

by the end of last month.

There is a "substantial" queue of customers waiting for service, Roberts says.

The company expects to be serving nine more cities by next November, and "well above" 24 by the middle of next year, says Stuart L. Mathison, the Telenet vice president. This is a greater number than was promised in the company's original plan. The affiliate of Bolt Beranek and Newman, Inc., Cambridge, Mass., filed for authority to operate the network with the Federal Communications Commission in October 1973. It completed the installation of its seven-city network in May of this year and filed its tariff of charges with the FCC last August. The original seven cities are Boston, New York, Washington, Chicago, San Francisco, Los Angeles and Dallas. Palo Alto, Calif., Kansas City and a location on Long Island are among the extra sites likely to be added to the original target of 24 locations.

Second round completed

The company last month completed its second round of financing with the sales of $1.3 million on common stock to five organizations: Bolt Beranek and Newman, Inc., Time, Inc., Bessemer Securities Corp., The Palmer Organization, and Lehman Brothers, Inc., Telenet's investment banker. Earlier these organizations had invested $2.1 million in the company.

Telenet is developing interface software for IBM 2780 and 3780 batch terminals, 3270-class terminals and Burroughs and Honeywell host computers. The batch terminal support is expected to be available late this year and the 3270 software "shortly thereafter," says Mathison. The company already interfaces with some 50 models of buffered and unbuffered terminals, and Digital Equipment Corp. and IBM host computers.

International Packet Services

Western Union International (WUI) hopes soon to offer a commercial packet switched service between the U.S. and Europe. The plan was advanced significantly through a recent authorization by the Federal Communications Commission to provide a dedicated packet switched service between the U.S. and the United Kingdom for the Defense Dept.'s Advanced Research Projects Agency.

In its request to the FCC for permission to offer the ARPA project, WUI alluded to the commercial service in a statement by its vice president for tariffs, P.H. Sach:

"Through this experimental service, WUI, ARPA, the U.S. government, and the overseas entities will acquire expanded knowledge of the technical parameters of ... packet switching technology. If the experimental service is provided for its full two-year term, WUI believes it will reveal answers to many of the technical questions which must be pursued prior to any further development of international packet switching, including the adaptability of the SIMP (satellite interface message processor) for commercial application and whether the SIMP should properly be located at the earth station or the carrier's (i.e., WUI's) operating center."

An ARPA spokesman says the new service will be the first trans-Atlantic application of packet technology. The U.K. terminal will be operated by University College, London, one

Interfaces

Customers with autobaud or synchronous terminals (up to 1200 bps) interface to the Telenet network directly, or through a multiplexor ("Telenet access controller," or TAC). For synchronous terminals, special interface software, developed by Telenet, is used. It resides in the customer's host computer or in a programmable communications controller (the 3704 and 3705 are the only ones currently supported).

A customer pays 60 cents for each kilopacket of data transmitted (a packet contains 1024 bits, or 128 ASCII characters), plus a sliding scale of installation and monthly charges for each access port leased on the Telenet central office (TCO) computer. In addition, customers may have to lease an access channel (dial-up service is also available), and a Telenet access controller.

in the Works at WUI

user of Britain's Experimental Packet Switched System (EPSS), a newly-developed data net operated by the British Post Office. Apparently, one aim of the ARPA experiment is to study the problems involved in transmitting messages between two packet networks.

Dedicated circuit

Messages will flow between the ARPA network and University College over a half-duplex, 50 kbs dedicated satellite circuit obtained by WUI from Comsat. Up to six terrestrial circuits, operating at 9.6–50 kbs, will be able to access the satellite link through a SIMP located at Comsat's Etam, W. Va., earth station, and facilities will be provided for transmitting on a point-point as well as multipoint basis.

The test is scheduled to last two years but will be "reviewed" after the first year, said the ARPA spokesman.

"It is important that the (ARPA) experiment have a sufficient duration to permit proper operational experience," said WUI's Sach in his letter to the FCC. "Consequently, WUI proposes to operate the service through simulation from its operating center to the earth station, up to the satellite and back to its center . . . for a period of two months if ARPA cancels service prior to 14 months . . . or for one month if ARPA cancels after 14 months." ❋

Flat Rate Service Studied by Datran

The Wyly Corp.'s Data Transmission subsidiary (Datran) is studying a new, switched data communications service in which it would offer unlimited transmission time at a specified speed for a flat monthly charge.

The new service basically would encompass any two terminals connected to the specialized carrier's Datadial switch. A customer also could communicate with compatible terminals hooked up to other systems—for example, AT&T's Digital Data Service (DDS) or dial-up networks and Western Union's TWX/Telex or broadband exchange services. The customer could communicate with a different terminal on each call without paying a premium and could also send the same message simultaneously to a number of different points.

Datran officials refused to comment on reports late this summer that the study was underway. But it was understood that the company was thinking about charging $210 a month for 110 bps service, $250 for 300 bps and $800 for 1200 bps. Higher speeds were also being considered, according to sources.

Needs FCC blessing

Whether the new service will be offered is reported to depend on the re-

sults of a market study underway and on what happens when Datran asks the Federal Communications Commission for its blessing, since objections from competitors are virtually certain.

Datran also is likely to announce a high-speed facsimile service within the next few months. It would be capable of transmitting a standard 8½ x 11 in. page of text in a minimum of 25 seconds, at a price of 40 to 50 cents a page for volume users. And it's understood the company would charge one monthly fee covering the equipment, circuit and a specified number of transmitted pages. Thus, there would be no additional charge except if the customer transmitted more than the minimum number of pages.

In addition, the fee would apply collectively to all of a particular user's terminals, rather than to each one separately. A customer, therefore, would be able to transmit from a number of low-volume locations without paying extra.

The terminal for the new service is said by sources to be a digital facsimile machine developed by Dacom, Inc., Sunnyvale, Calif., which includes Datran-developed communications circuitry. It operates over a 9600 bps channel and, among other features, offers a simplified, pushbutton-controlled call setup procedure.

Facsimile copies produced by the terminals provide three print resolution levels—"express," "quality," and "fine detail." Datran and Dacom officials declined to say anything about the service and terminals.

Overseas service

Meanwhile, Datran was expected to be on the verge of announcing a joint agreement with RCA Globcom to provide the first occasional use, multiple access, all-digital transmission service between the interior of the U.S. and overseas points. A source close to the negotiations said late last summer that he expected the two companies to begin the service before the end of this year, provided the FCC goes along.

The Datran-RCA offering reportedly would allow transmission at 2400, 4800 and/or 9600 bps. Later, lower speeds may be added. Datran plans to provide either private or switched access channels to RCA's international gateway in New York, the source said.

Earlier, Datran officially announced that 12 more cities will be added to its network by mid '76. Eighteen are now connected, and the network extends coast-to-coast. Five of the 12 new cities will be connected by the end of this year: Atlanta, Denver, Hartford, Mil-

News in Perspective
BENCHMARKS . . .

Think Small: The small systems end of IBM's computer line "will play a very, very important part in our future growth," says Frank T. Cary, chairman and chief executive officer. The company, which last month introduced the portable (50 pounds) model 5100 computer for desk-top work for statisticians and engineers and continues to announce more applications packages for its System/32 machine, will be introducing more products at the small systems end, Cary told a meeting of securities analysts last month in Chicago. He also told the analysts that market reception to its model 3800 laser printing system and model 3850 mass storage system has been "fantastic, far exceeding the company's expectations." He announced the formation in the Data Processing division of a new market planning unit to chart the division's long-term growth and of a market support organization to develop market programs. These activities previously were done by industry

waukee and Phoenix. The other seven are Cincinnati, Indianapolis, Miami, Minneapolis, New Orleans, Portland and Seattle.

—P.H.

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marketing and systems marketing groups within the division.

More worries for Xerox: Trying to sell off its mainframe computer business is not Xerox Corp.'s only worry according to indications in a new study by the New York City research firm, Frost & Sullivan Inc. The study says "the squeeze is on" for manufacturers of copying and duplicating machines. It also says Xerox market shares are projected to slide to 52% by 1980. The report said the number of impressions made by duplicating machines will increase from 365 billion this year to 500 billion by 1985, but "the 37% increase is a slowdown when compared to the 65% gain for the previous decade."

$4 Million Settlement: Memorex Corp. will have to shell out $1 million, Laurence L. Spitters and other former directors and current directors, $2.9 million, and the accounting firm of Arthur Anderson, Inc., $100,000 as a result of a U.S. District Court Judge's approval in Santa Clara, Calif., of a final settlement of a Memorex stockholder class action charging accounting misrepresentations. The full settlement will be paid into an escrow fund and distributed to qualifying employees after fees and expenses are deducted. Memorex, according to a proxy statement, has insurance covering current and former officers up to $5 million. The events leading to the settlement began in 1971 when Memorex agreed to cease certain accounting practices the SEC charged were misleading. The SEC dropped a suit it had filed but this suit spurred several stockholders' suits that were eventually combined into a class action. The cost of Memorex' share in the settlement has been expensed in prior financial periods and will not affect company earnings, according to company president, Robert C. Wilson.

Consolidation Question: Suits against Wangco by Ampex and Kollmorgen Corp., both charging tape drive patent infringement may be consolidated. A federal judge in Los Angeles will consider the consolidation possibility Oct. 20. Both suits involve the same magnetic tape transports, according to Wangco attorneys. Both Amco and Kollmorgen have asked Wangco to buy licenses to patents they claim on capstan jobs. Kollmorgen's patent covers apparatus for advancing magnetic tape "... through small discrete and uniform increments." The Ampex patents claim to protect motor speed controls and other items on the drives. One of the listed inventors of the Ampex patents is Dr. Ben Wang, Wangco president, and formerly an Ampex engineer.

Microprocessor Agreement: Anticipating a half-billion dollar annual market for microprocessors by 1980, Rockwell International and National Semiconductor have agreed to exchange technical data and tooling to ensure that each has a second source for its products. Rockwell's microprocessors are made by the huge industrial concern's Microelectronic Device Div. in Anaheim, Calif. National is a 16-year-old semiconductor company located in Santa Clara, Calif. In their announcement of the agreement the two firms said, "The complexity of microprocessors makes duplicating the original designs of others costly and time-consuming. This, coupled with the application aid required, demands an agreement under which tooling, software and technical support data are exchanged to assure rapid availability of products." Rockwell and National are considered the No. 2 and 3 companies in the $90 million microprocessor market. Intel Corp. is considered the leader.

If you sell a data processing service, do what Reynolds and Reynolds did.

One of the largest on-line information services companies considers three factors most important in rating terminal suppliers: hardware reliability, service support and reasonable economics.

Reynolds and Reynolds is the leading data processing service for automobile dealers. They chose us because, quite frankly, we offer more than machines.

Since 1972, our sales, service and engineering team has worked closely with Reynolds and Reynolds executives and systems planners to provide the proper match between equipment and application, hardware and software and people and systems. Nearly 450 of our EDT 300s and 33s are part of Reynolds and Reynolds' new system called VIM II.

The specific terminal configurations in VIM II were put together for particular applications. Reynolds and Reynolds wanted—and got—configurations that matched job requirements with no wasted cost.

And their customers for accounting and inventory services got what they wanted—an easy-to-use system that delivers what they want when they want it.

We assure operability of all our terminals through centralized diagnostic and local maintenance services, and Reynolds and Reynolds people like that. The way Termicare® provides over-the-phone diagnostic help also appeals to this nationwide leader in providing accounting and inventory services for auto dealers. One toll-free call gets immediate response from Termicare and assistance from the closest of our 400 service locations.

Reynolds and Reynolds describes its VIM II terminal system as the best in the business. And that has a lot to do with why they deal with us.

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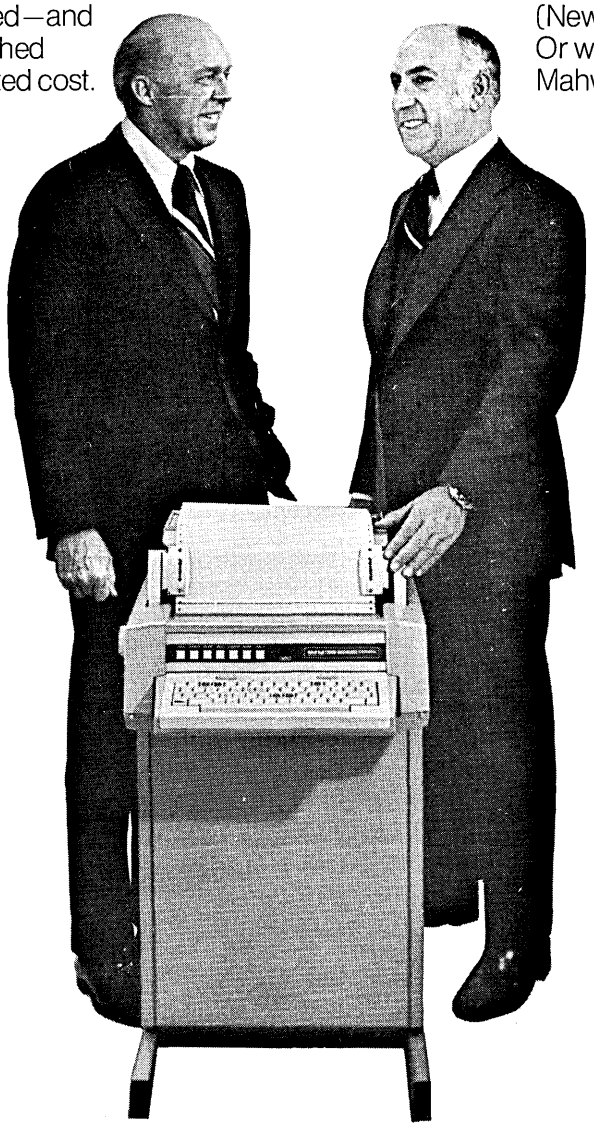
A business like ours is not about to do business with anyone but the best."
Robert H. Meyer,
President Reynolds & Reynolds.



"We offer Reynolds & Reynolds a lot more than just machines."
Z.V. Zakarian, President
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western union data services company

News in Perspective
BENCHMARKS . . .

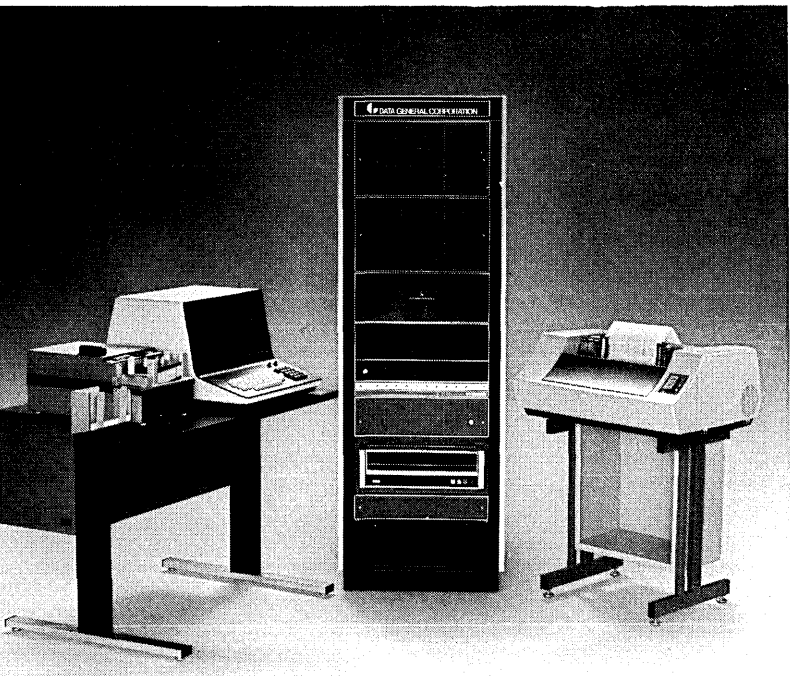
In and Out: Minicomputer maker General Automation, Anaheim, Calif., is having a bad year—reporting losses of $2.5 million and having to abandon an advanced - technology silicon - on-sapphire microcomputer line earlier in the fiscal year. Last August four of the company's outside directors and its president Raymond Noorda voted to fire Lawrence Goshorn as chief executive of the company. The vote was taken after Goshorn had announced that Mr. Noorda was resigning. At a later meeting, Goshorn was able to convince the dissenting board members to change their vote and Goshorn has taken over as president and chief executive. His new strength has enabled Goshorn to revamp the company's marketing and sales efforts and he said that since he became more active in the company's management, its sagging orders have been reversed and the company's backlog is now at a record $29 million. And it has a new microcomputer line—this time based on MOS technology.

Software Dispute: Computer Automation Inc.'s move into the small business computer end user market (Sept., p. 127) has a new hurdle. Datapoint Inc., a Texas terminal and small data processor firm, has filed a trade secrets theft suit against a group now employed by CAI which sold CAI the software package that was to be its entry-key to the small business systems business. Datapoint charges that the group, headed by Ivan D. Socher who now is heading CAI's new commercial systems division, "actively sought Datapoint trade secrets for the purpose of copying Datapoint systems." Socher formerly was chief executive officer of Computer Advances Ltd. of Johannesburg, South Africa, which was a distributor of Datapoint hardware and of software produced by Datacom, a TRW subsidiary. Datapoint alleges that software sold to CAI belonged to Datapoint and Datacom. Computer Automation has filed a separate suit charging Datapoint with "deliberate, malicious, and oppressive . . . interference" to prevent it from bringing small business products to market.

CASE FOR COM: The same amount of information in this foot-high stack of conventional computer printout is in the four sheets of microfiche held by John W. Bowyer, Jr., manager of systems and data services with International Harvester's truck division which recently took delivery on a computer output microfilm system from the 3M Corp., first organization to sell laser beam recorders.

Mergers: The Minneapolis manufacturer of terminal systems, minicomputers and peripherals—Data 100 Corp.—completed its acquisition of Iomec, Inc., Santa Clara manufacturer of disc drives, tape drives and printers. The price was 80,000 shares of Data 100's common stock which was selling in September for about $8 a share . . . **Pertec Corp.,** the oem peripherals manufacturer, signed a letter of intent to acquire financially-pressed **Computer Machinery Corp.** for about $8 million in Pertec stock. Pertec had broken off merger talks in late August with the key to disc manufacturer, but changed its mind two weeks later on Sept. 19 . . . **Memorex Corp.,** Santa Clara, announced it will acquire an 11% ownership in **Computer Communications Inc.,** which makes communications products and offers pro-

You can own your own Fortran number cruncher for less than $40,000.



The problem with most FORTRAN computational systems is that they're so expensive only a few companies can afford to own them.

So Data General makes a complete FORTRAN IV system that you can own for only $36,300.

You get a lot of computer system for the money. A Nova® 2/10 with 64K bytes of core, a CRT, 2.5 megabyte disc, 150 cpm card reader, 165 cps printer. Which should be enough to get anybody started.

If you're planning to do a lot of one-shot jobs, you'll want to use FORTRAN IV. Because it compiles as fast as it executes. But if you're going to be running the same job over and over, you may want to spend some more and get a FORTRAN 5 system. Our FORTRAN 5 puts out incredibly efficient, fast-executing programs. Because the compiler globally optimizes the code.

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And no matter what language you decide to work in, you won't have to change the way you work. Our computers will adapt to you. Which means you can go single or multi-user, batch or interactive, local or remote, or with dual operations, any two of the above.

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gramming services. The agreement follows a deal by Memorex to buy at least $2.5 million worth of CCI's CC-80 communications processors for sale by Memorex on an oem basis.

Training for Retailers: NCR Corp. has acquired Learning Systems Development Corp., Cincinnati-based supplier of training materials for the retail food industry. The company provides a series of self-instructional courses dealing with checkout security, the reduction of checker errors, grocery stocking, bagging, price-marking, store safety and customer courtesy. T. H. Biggs, NCR's assistant vice president, corporate education, said the widespread use of electronic systems in retailing has created an increased demand for educational materials.

Moving Out: In the early 1970s, heyday of a booming plug compatible IBM add-on memory market, Ampex Corp. consolidated its scattered Culver City, Calif., plants into a huge 300,000 square foot building in suburban Los Angeles' Marina del Rey. This fall, with much of the plant's end user activities moved to northern California, the company was preparing to sell the plant to the U.S. Postal Service for $10.3 million and lease more modest quarters in El Segundo, about seven miles away. The company's president Arthur Hausman said funds from the sale will be used to reduce its debt.

Mini Group Chartered: The Minicomputer Industry National Interchange has been chartered as a non-profit association, following some two years of planning. Described by its founders as "A professional association which will concern itself with all areas of minicomputer systems, equipment, software and techniques, it is structured to accept individual members, corporate user members, and manufacturer members. Its stated goals are to provide a forum where new ideas, concepts, equipment and techniques and other appropriate matters can be examined and discussed by knowledgeable and interested professionals and where these persons can establish criteria for communication within their field; to provide a mechanism for the exchange and interchange of minicomputer experience; to provide a central source where actual and potential minicomputer users and other interested parties can turn for information and assistance; and to establish a meaningful dialogue between manufacturers and users. Initial sponsors include manufacturers, users, and systems houses. The group's president pro-tem is Jon David, head of Systems RDI Corp., Fort Lee, N.J. Headquarters have been established at 2460 Lemoine Ave., Fort Lee, N.J. 07024.

Continuous Forms Continue to Earn: A report by International Data Corp. titled "Continuous Forms Paper Market" indicates that general-purpose computer site central batch printers used more than $1.1 million worth of continuous forms in 1974 and are expected to use in excess of $2 billion by 1980. The report covers the paper, ribbon, and forms handling equipment market. It showed that, while only one-third of the money spent in 1974 was for stock forms, this type of sheet represented 62% of the paper used, while custom sheets accounted for 38% of the usage. The report said 4% of the sheets used were carbonless and 4% were labels.

Science Fair Broadened: Students from high schools who build computers and write programs are welcome at the 1976 National Computer Conference Student Computer Fair, as usual. But so are all other types of student interests in computers. Dr. Sema Marks, chairman of the fair which will be held June 7-10 in New York with the annual National Computer Conference, said the entry categories will be broadened to include computer art and music, short stories, science fiction and poetry. Even elementary students are invited. They're being asked to submit drawings of a computer. "We'd like students to create new computer tools for home or school use, produce a work of computer art, or design and implement a computer game," says Dr. Marks who is director of academic computing at City Univ. of New York. Among the prizes are a computer kit and a subscription to the magazine *Creative Computing*. Entry rules, application forms and additional information is available from Dr. Marks at CUNY, 33 West 42nd St., New York 10036.

Keyboard-to-Storage Market: Keyboard-to-storage data processing equipment sales are now at a $250 million-a-year sales level, says a Frost and Sullivan Inc. report. The study says this sales level will reach $7.5 billion between now and 1984. "The half-million keypunches will eventually be supplanted by keyboard-to-storage equipment," says the research firm. Keyboard-to-storage systems include keyboard-to-disc, keyboard-to-storage terminal, and intelligent terminals. ❊

LOOK AHEAD

(Continued from page 18)
A union spokesman said some agreements had been reached; that the union had compromised some of its claims but none on major issues such as wages and car mileage allowance. Burroughs pays the CE's 6 cents per mile. The union spokesman said "We'll accept whatever the government accepts." The IRS accepts 15¢ for the first 15,000 miles and 10¢ for every mile above that. The union said the company "hadn't given an inch."

GIVE A COMPUTER FOR CHRISTMAS

With the price of just about everything (except electronic calculators) going up, a computer with a price tag of $180 might make an attractive Christmas gift this year. Actually the $180 figure is the low end of a range of kit and assembled configurations of the Altair 680 being introduced this month by MITS, a small Albuquerque firm whose Altair 8800 has recorded an unprecedented 5,000 sales since its shipments began in January of this year. And it was an expensive machine at $429 in kit form or $621 assembled.

The 680 does go as high as $390 assembled but this version is complete with front panel controls and indicators. For $180 a buyer gets a kit which includes a processor, printed circuit boards, and 1,000 bytes of memory. Power supply, front panel, and a carrying case bring a kit up to $293. The company will market via mail order (just fill out a coupon and include your credit card number) and retail stores. Shipments begin late this month, just in time for the Christmas rush.

ALL IN THE FAMILY

For those who think IBM's emphasis on excellence is not a tradition, please take note: The new Miss America, Elaine Godin of New York, is from the IBM family, so to speak. Her father is John Godin, a manager at IBM World Trade Corp., Mt. Pleasant, New York. Miss Godin, who has a perfect 4.0 average at Skidmore College, speaks fluent French and Spanish and has a working knowledge of Greek, Latin, German and Russian. She is an accomplished pianist and played her own composition at the Miss America finals at the Atlantic City Convention Hall. All this led one computer wag to remark with a smile that he will file charges of unfair business practices against IBM if Miss Godin appears at IBM's various computer convention exhibits.

RUMORS AND RAW RANDOM DATA

Retailers in California have been evaluating a unique EFT proposal by an individual who wants to offer a network on an entrepreneurial basis. Whoever he is, he's maintaining a low profile but retailers, both supermarkets and department stores, are intrigued...Data General's on again-off again effort in semiconductor LSI is on again. There may be an announcement soon on a low-end machine...IBM should be announcing a new word processing system shortly after the start of the year...News that some of the underdeveloped countries are starting to use computers: DEC just did a $3.8 million deal in Bolivia...Honeywell is selling a machine called the System 6 in Australia. Manufactured by Nippon Electric in Japan, it is being marketed by accounting machine men rather than computer specialists...Never look a gift computer in the mouth department: A Data General Nova has been donated to the Southern Maine Vocational Technical Institute, near which Data General is building a new plant. But the donor was Entrex which, in its data entry systems, now is using computers manufactured by Digital Computer Controls. No matter, the Southern Maine Vocational Technical Institute is delighted to have the minicomputer...One reason the infighting for the $2.7 million California State University and College System was so fierce is the feeling that the order will open up other instructional use orders at colleges across the country. DEC won the California order, bidding 19 PDP-11/45s. Closest competitor was Hewlett-Packard, the traditional leader in the instructional use field.

Tally's other end of the line.

A serial printer that starts you on the road to reliability. Start at 120 characters per second and stay for a fine family of printers up through 400 lines per minute.

Tally has a new, low cost, 120 character per second, 132 column, multicopy serial printer that's backed by Tally's tradition of outstanding print quality and unyielding hardware reliability. The latest addition to Tally's growing family of data processing printers for minicomputer, business system and communication terminal applications. The new Series 1000.

It employs a unique needle printing technique that minimizes moving parts. Head movement is digitally controlled—no springs or clutches to adjust or break.

Microprocessor electronics. A 9x7 matrix font gives clearly defined characters. There's a full year warranty on the print mechanism.

It handles forms from 4 inches to 15 inches wide. For positive paper advancement and positioning, there's tractor engagement above and below the print line. And for easy system integration, Tally offers a parallel interface to emulate other printers and a serial communications interface.

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digitally controlled print head advancement

dual tractor paper engagement

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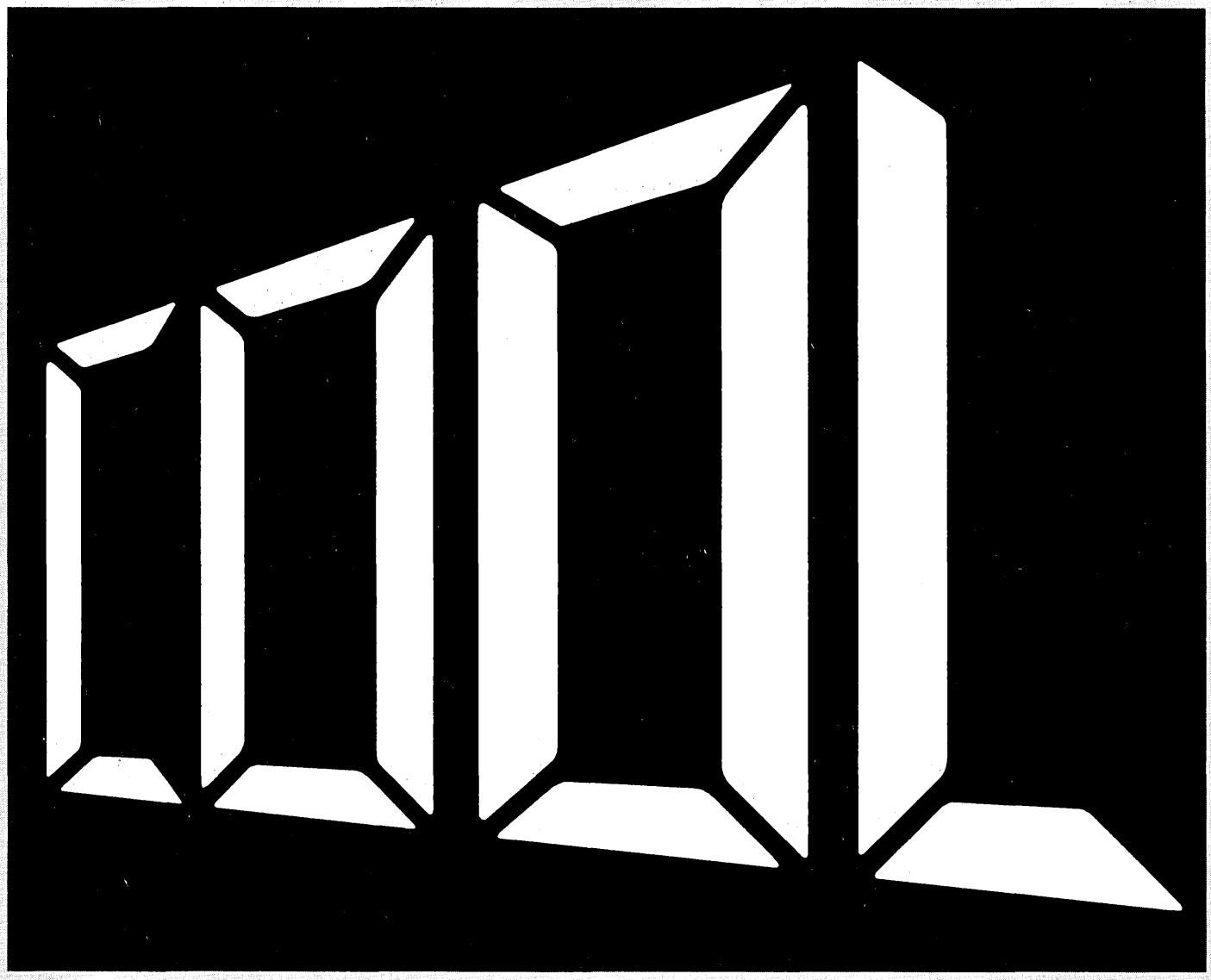
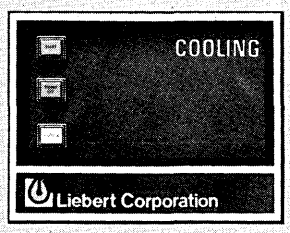
CIRCLE 56 ON READER CARD



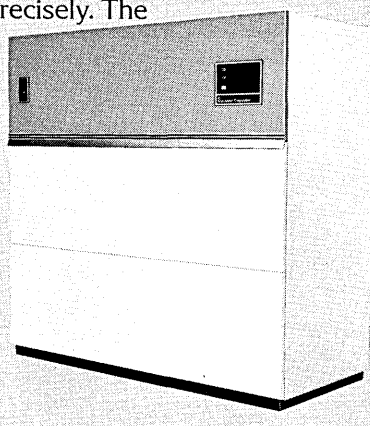
An advanced computer room air conditioning system that tells you exactly how it's feeling.



Introducing Deluxe System/2 with Precision Control Readout (PCR-2). It tells you at a glance whether all systems are functioning properly. Or that specific attention is needed to keep your computer room air conditioning system at peak efficiency. And, while PCR-2 tells it all—precisely. The rest of the Deluxe System/2 does it all—precisely.

With these features:

Economical, quiet semi-hermetic compressors. Low maintenance. Low operating speed. Long life. Low failure rate. Infra-red humidification system adds clean pure water vapor to a precise level. Instantaneous response to system demands. Exclusive large face area A-frame cooling coil for highest cooling efficiency.



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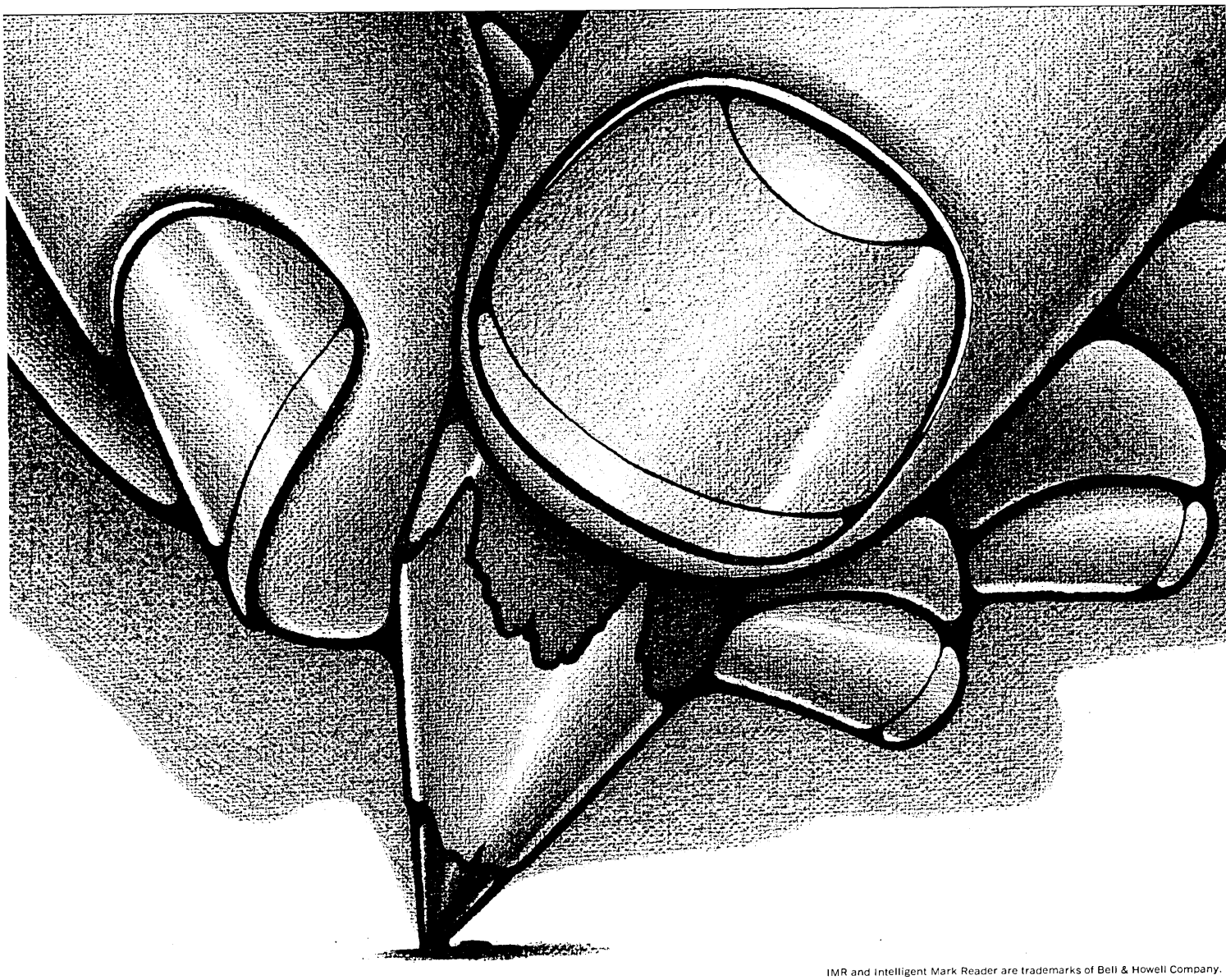

Bell & Howell's Optical Mark Readers. The beauty of the system is in the simplicity behind its data entry concept. Our OMR reads a pencil mark from a source document directly into computer-ready information. It requires no special skills, no manual keying, no duplicate transcribing and no cumbersome manual edit procedures. And the bottom-line savings are dramatic.

A simple case underlines the point. A telephone company in California installed a Bell & Howell Intelligent Mark Reader terminal to process trouble reports and dispatch repair crews. As information is received on the phone, a tab-card trouble report is marked by pencil, placed in the IMR terminal, and automatically checked for errors. The information is then reformatted and transmitted to a central computer where the data is routed to the appropriate service center. The IMR terminal takes 3 hours to provide 100% error-free data entry. The same job originally required 40 hours manual keying, with an unknown error factor. The per-installation salary savings are about $1000 a month. Valuable connect-time requirements dropped from 15 hours monthly to one hour—a savings of around $170 a month per installation. Think of these savings for every one of 28 installations!

Our Optical Mark Readers are up, running and saving in thousands of installations all over the country—doing jobs such as inventory control, order entry and trouble reporting. Our OMR can save you a lot of time and money, too. It's as simple as that.

For a brochure describing our OMR products, fill out the coupon and mail.

Let's see how simple it is to start saving time and money. Please send me your brochure.

☐ I'd like a representative to call.

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BELL & HOWELL

Business Data Products Division, 360 Sierra Madre Villa, Pasadena, CA 91109. 213-796-9381.

hardware

Off-line

Bell Labs is claiming a major advance in the fabrication of integrated circuits with the development of Electron Beam Exposure System, or EBES. By using a beam of electrons to generate the microscopic patterns from which ICs are manufactured, EBES can produce the master patterns for them faster, more reliably, with fewer defects, and at a lower cost than existing photographic systems. Because electrons have a smaller equivalent wavelength than light, a much "sharper" writing beam can be generated. The EBES technique focuses to a spot 20 millionths of an inch in diameter, about one-hundredth the width of a human hair. The newly patented technique can mean much denser (and therefore cheaper) circuitry in the near future.

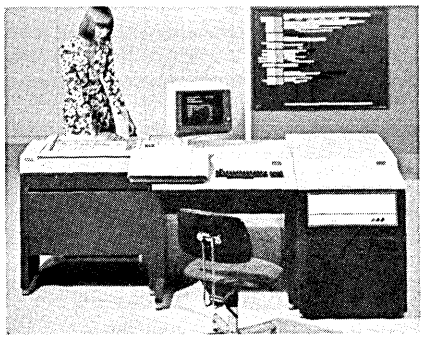
With the proliferation of serial printers in recent years, International Data Corp., Waltham, Mass., thinks we may be on the threshold of a new type of equipment: Matrix Character Recognition (MCR) equipment, as an alternative to more expensive ocr equipment. Says an IDC researcher: "Unlike currently available readers, the logic involved in the recognition of matrix characters would simply be the opposite of that used to generate the characters--dots would be sensed rather than printed." The cost might be several thousand dollars, compared to tens of thousands for currently available ocr equipment.

A military-qualified microcomputer made from commercially-available LSI microprocessor chips is being tested at Hughes Aircraft Co., Culver City, Calif. The 16-bit mini contains 50 common avionics and military system instructions and operates at half a million instructions/second throughout the temperature range required for military applications.

To more aggressively compete against surface transportation shipping, United Airlines airfreight sales personnel are being equipped with terminals that can be used to obtain precise cost comparisons at prospective customer locations. Specific distributions and certain cost items are input to the remote computer. Within seconds, an analysis is received. Let's hope United is reversing the phone charges....

Small-scale System

Nixdorf has introduced an "Americanized" version of its 8870 computer system in the U.S. market it feels could satisfy the business data processing needs of 60% of U.S. businesses. Prospective buyers will have to scrutinize the machine closely to convince themselves it's not a U.S. design—fully



90% of the parts are U.S. (particularly the peripherals). "No other country manufactures such high quality, low-cost peripherals as you do," stated Heinz Nixdorf, president of the parent German firm, at the Chicago announcement.

It's clear that the 8870 rubs shoulders with S/32 and S/3 offerings, (at least in price) and Nixdorf feels the 8870 will compare very favorably, especially with the S/32 because of the lack of a removable disc storage device of any reasonable capacity on the IBM machine. Other competitive advantages would seem to be a multi-talented operating system capable of supporting 16 crt terminals, each doing a different application job in the $40-80K price region, sole-source application software responsibility, and a large and growing user base in major U.S. corporations. Currently there are 38 sales and services outlets in the U.S., and one in Toronto, Canada. NIXDORF COMPUTER INC., Chicago, Ill.

FOR DATA CIRCLE 241 ON READER CARD

Laser Communications

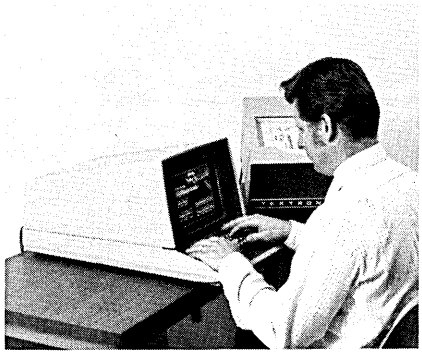
The model 741 Long Range GaAs Laser Data Communicator System transfers data over line of sight distances up to 15 miles at bit rates up to 1.544 megabits per second using an infrared coherent laser beam. The system is offered as a low cost, license free alternative to microwave. Applications include multichannel telephone (24 channels PCM) or high speed computer

product spotlight

Graphics Terminal

Tektronix' introduction of a graphics terminal priced in the range of a purely alphanumeric crt terminal should tell something of the price sensitivity of this type of product. If users (and oem's) won't purchase a terminal priced at $2,995 ($150/month on a two year lease), one can draw the conclusion that a rapid growth in graphics usage is still some years in the future.

The 4006-1 is compatible with most mainframe computers and can be used with RS232 A, B, and C (CCITT-V24) interfaces. Data rates are selectable in eight steps between 75 and 4800 baud. The screen capacity of 2,590 alphanumeric characters provides as much



information as most alphanumeric crt's. In the alphanumeric mode, the 4006-1 prints 35 lines of 74 characters using 5x7 dot matrix images and drawing from a 63 character set of ASCII. In the graphics mode, there are 1K x 1K addressable points, with 780 in the Y dimension viewable on the screen. Hard copy capability is included in the 4006-1, using the 4631 hard copy unit with a plug-to-plug interface. Off-line storage can be provided by the 4923 digital cartridge tape recorder. Unlike other terminals from this manufacturer, the 4006-1 has no pedestal and is a small desktop unit weighing in at 42 pounds. First units go to the field this month. TEKTRONIX INC., Beaverton, Ore.

FOR DATA CIRCLE 240 ON READER CARD

How To Train Your Programmers in Assembler Language for $15 Per Student

During the last three years, we have developed and published two books on System/360-370 assembler language—one for DOS, one for OS. These books are so effective that most DP professionals can learn assembler language from them using the books alone. In fact, as you will see later, I guarantee it.

Once a programmer finishes our assembler language text, he is more productive. Why? Because he can quickly find the statement that caused a program check . . . regardless of the language he's using. Because he can write and use assembler language subprograms. Because he can maintain and develop complete assembler language programs . . . even ones that use ISAM or direct files. Because, for the first time, he understands what is happening as his programs execute . . . he's independent, he's in control.

4 Reasons Why These Books Are Effective

1) These books were written by an expert from industry, Kevin McQuillen. He's been a DP manager, consultant, and manufacturer's rep so his books are chock full of solid, practical, real world advice.

2) Kevin selected the content of these books based on an analysis of the tasks normally required of an applications programmer. That's why these books contain everything of use to the average programmer and very little that isn't. That's also why the books give substantial coverage to job control language. The DOS book covers DOS and DOS/VS; the OS book covers MFT, MVT, VS1, and VS2.

3) The books are organized in the most effective way possible for a programming course. Quite simply, a complete subset of BAL is presented in the first three chapters of the book. After this, all material is organized by function (debugging, table handling, subroutine linkage, etc.). As a result, the student always sees the relationships of the parts.

4) Each book contains dozens of complete program listings. They start with card-to-printer programs and end with programs that create and retrieve direct files. In between there are listings for routines and programs that perform code translations and input validations, set up the linkage between mainline modules and subprograms, load and use tables in storage, create and retrieve sequential and ISAM files, and so on. In our experience, these listings, more than any other factor, determine whether or not a course is effective. And they are the missing ingredient in most assembler language courses.

How You Can Use These Books

When you order these books, you will have several options as to how you use them. If you don't really have a training program, you can simply pass the books on to your programmers. If they have the aptitude for BAL programming (as they probably do), this by itself should accomplish your training objective.

If you want more control than that, you can set up a progress schedule for each student and assign a senior programmer to be available for questions. To test mastery, you can assign problems from the book or actual production jobs. When a student writes and tests the required programs, you will be convinced of the effectiveness of our books.

If you have an existing training program in assembler language, the quickest way to increase its effectiveness is to give our book to all students. Because our books contain dozens of complete program listings, they quickly improve coding techniques. Because they provide detailed procedures for testing and debugging, they quickly improve debugging efficiency.

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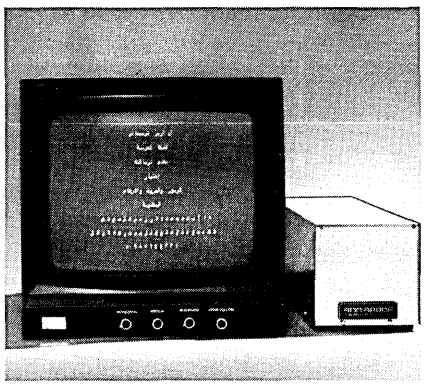
hardware

data transmission. Installation is said to be quick and easy with each unit supplied complete with alignment base and telescope. Alignment takes about 15 minutes. Virtually all types of digital data inputs can be accepted. Each transmitter/receiver is priced at $2,500. AMERICAN LASER SYSTEMS, INC., Goleta, Calif.

FOR DATA CIRCLE 242 ON READER CARD

Arabic Crt

Manufacturers contemplating entry into the middle eastern dp market will find the Q620 crt controller from this manufacturer interesting. It generates 64 Arabic characters, including numerals and upper/lower case, allowing the user to transcribe the Arabic Language in an 80-character by 24 line display. Design features allow characters which must connect to do so. Ascenders and descenders are provided and a command function places a Nuqta (•) over the character when desired. The display is written from a five-level CCITT serial data source at 50 baud. The single quantity price of the Q620 controller is $2,325. ANN ARBOR TERMINALS, INC., Ann Arbor, Mich.



FOR DATA CIRCLE 243 ON READER CARD

Secure Terminal

A secure intelligent communications terminal designed for heavy duty commercial, military, and government applications has been developed. The cryptocompatible teletypewriter operates in full-duplex mode to provide remote communications and data I/O functions at 40 cps. The terminals are "Tempest Approved," meaning that the lack of electromagnetic radiation emanating from the unit makes it impossible to monitor by outside sources. An optional message header formatting function is offered as a means of speeding message preparation and reducing the workload of communications center personnel. The message header formatter generates ACP 127, JANAP 128 and other formats, stores up to 200 plain language addresses and routing indicators, etc. An integral microprocessor makes it possible to tailor the device to meet special requirements. Prices range from $14-16K depending on configuration. COMPUTING DEVICES CO., DIV. OF CONTROL DATA CANADA, Ottawa, Canada.

FOR DATA CIRCLE 244 ON READER CARD

S/3 Protective Cover

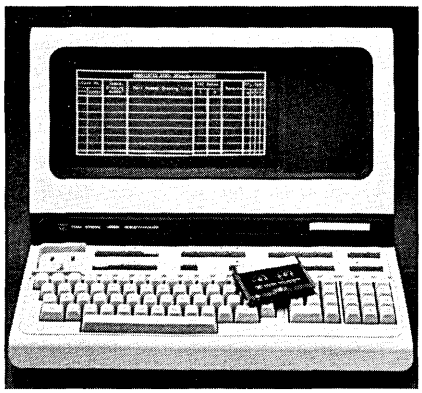
There's no sense in exposing your IBM System/3 to water and dirt damage when the machine is powered down, reasons this manufacturer, who has developed a set of vinyl covers for the system. Cover sets are available for all models of the System/3 and System/32. Each main box on the computer gets its own cover with a typical model 10 set costing $170. An IBM Data Recorder Cover is $25. S/3 SUPPLY CO., Rutherford, N.J.

FOR DATA CIRCLE 246 ON READER CARD

Crt Terminal

Miniaturized versions of 3M's very successful DC300A data cartridge and associated drives have been incorporated into the 2644A, a logical extension to the 2640 introduced last year (see Nov. 1974, p. 146). Thus, the 2644A becomes something else—and H-P has come up with a name for it: a "Mini Data Station."

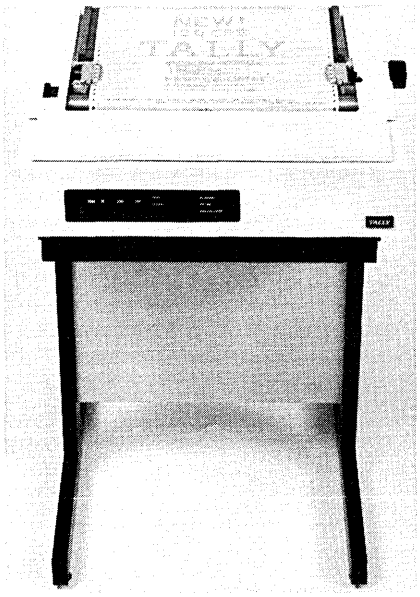
The twin cartridges provide 220,000 bytes of mass storage and will enable the 2644A to routinely handle on a standalone basis many operations normally requiring connection to a computer. For data entry, forms can be stored on one mini-cartridge and selectively retrieved in seconds. Program preparation, editing, tape copying, and tape-to-printer operations are all within the standalone capabilities of the microprocessor controller. Protected fields, video high-lighting, and elaborate editing capabilities made the 2644A a joy to use during a demonstration. Prices start at $4,400 in quantities of six. HEWLETT-PACKARD CO., Palo Alto, Calif.



FOR DATA CIRCLE 245 ON READER CARD

Serial Printer

The 1120 is the first in a new series of dot matrix serial printers, with additional models rumored to be waiting in the wings. The 1120 prints at 120 cps across 132 columns using 9 x 7 dot image characters. Other features include a new needle printing technique, microprocessor oriented electronics, cartridge ribbon, and tractor engagement above and below the print line. An original copy plus four carbons are generated by the 1120, with form widths from 4-15 inches accommodated. The print character set is all upper case, and the unit is said to be silent enough for office duty.



The 1120 is offered both to end users and oem's, with specific mini controllers due for introduction sometime next year. Unit prices for the 1120 start at $2,575. Production deliveries begin before year end. TALLY CORP., Kent, Wash.

FOR DATA CIRCLE 247 ON READER CARD

Modem

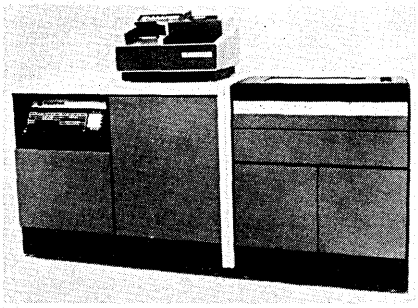
All large-scale integration is the principal feature of these three modems, the LSI-48, LSI-72, and LSI-96. Multiply the model number by 100 to get the baud rates. The products might just be the first LSI units offered to end users, and the development is a significant one. In field tests, the company states that new series has proven superior to all other modems, even its own. The bit error rate at 9600 baud was equal or better than one in 10^6 at a signal to noise ratio of 22 db on typical channels; at 7200 bps it is equal to or better than 10^6 at a signal to noise ratio of 19 db; and at 4800 baud it is equal or better than 10^6 at a signal to noise ratio of 15 db. Prices range from $2,500-3K for the LSI-48; $3,400 to $4K for the LSI-72; and $4-5K for the LSI-96. PARADYNE CORP., Largo, Fla.

FOR DATA CIRCLE 248 ON READER CARD

hardware

Remote Batch Terminal

Small to medium volume batch users requiring emulation of IBM 2780/3780 protocols are the focus of the 1606, an expandable 16-bit minicomputer driven remote batch terminal. Complete with the byte-oriented processor, 2000-4800 baud synchronous communications interface, 300 lpm 64-character set chain printer, and 150 card per minute reader, the 1606 rents for $820/month on a 1-year lease. Standard printer features include 12-

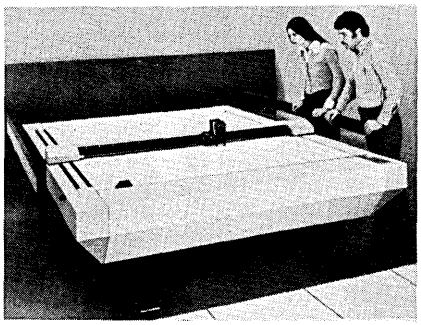


channel carriage control loop, 132 print positions, 6 or 8 lines per inch, EBCDIC and ASCII characters. Options include a 300 cpm reader and a static eliminator and paper/puller stacker for the printer. The 1606 includes provisions for IBM's SDLC communication protocol designed into its hardware. Flexible disc support is offered to provide mass storage autoload, intermediate storage, and I/O spooling capabilities. Deliveries are underway. HARRIS CORP., Dallas, Texas.

FOR DATA CIRCLE 249 ON READER CARD

Plotter

The 430/201 flatbed plotter is intended for applications requiring smooth line quality. Lines drawn at any angle across the 54 x 76-inch surface, including curved lines, do not exhibit step functions because plotting is performed in the line segment mode



rather than incremental mode. The resolution is .001-inch, the repeatability is ±.004-inch, and the maximum speed is 24 ips. A digital servo closed loop positioning system controls the pen assembly to ensure drift free plotting. Options include multi-pen assemblies

hardware

(four or eight pen), a precision paper advance system, a scribe tool attachment, and a symbol printer. On-line versions of the 430/201 are priced starting at $37K; off-line models are also available. BROOMALL INDUSTRIES, INC., Broomall, Pa.

FOR DATA CIRCLE 250 ON READER CARD

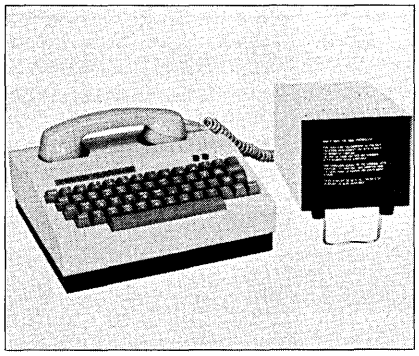
High-speed S/3 Printer

The hot little System/3 processor need no longer be constrained by printer performance. A high-speed (200-760 lpm) line printer can now be attached to the Model 6, or as a second printer on models 8, 12, and 15. No additional IBM hardware or software is required and the size of the supervisor is not changed. The FAST PRINTER handles multi-part forms, has 132 print positions and uses a 64 character EBCDIC character set. Additional features include full line buffering, electronic forms control, and a low number of electronic components. Options include special character sets, upper/lower case, boldface accented characters, and custom software for unique printer applications. Prices range from $8,300 (200 lpm, 64 characters) to $14,900. APODICTICS INC., Ann Arbor, Mich.

FOR DATA CIRCLE 251 ON READER CARD

$225 Crt Terminal

A 5" crt terminal is now available for this manufacturer's Telecomputer and Data Line Monitor product lines priced at only $225, likely the lowest the industry has ever seen. The terminal operates at 300 baud and weighs in at around 20 pounds. The 5" monitor is offered as an alternative to the 12" screen past products were equipped with. DIGI-LOG SYSTEMS, INC., Horsham, Pa.



FOR DATA CIRCLE 253 ON READER CARD

Data Entry

CMC considers the 1800 system one of the most significant products in its history—and it has more keystations installed around the world than any of its competitors. The chief virtue of the 1800 is that it allows the user to more closely fit the hardware and software to actual requirements. For example, the mix of core memory and disc capacity needed to optimize the handling of particular applications can be strictly specified. The system can be tuned to adapt to day-to-day operating priorities, and the user can start out with just a few keystations and grow all the way to 64 with corresponding small increases in software and hardware overhead.

Disc storage for 25,000 80-character records is standard, expandable to 150 thousand records. A second disc unit can be specified to double this amount to 300 thousand records. The processor is expandable in 8K byte increments to 160K from 64K to accommodate up to 64 keystations. A 10 keystation system sells for $86K and rents for $1,650/month on a three year lease. COMPUTER MACHINERY CORP., Marina del Rey, Calif.

FOR DATA CIRCLE 254 ON READER CARD

Univac Add-on Memory

Plug compatible add-on memory is now available to Univac 494, 1106, 1108, and 1110 users—a $6 billion market of installed systems. Principal features include 32K word modularity, reduced floor space requirements, and dramatic improvements in maintainability (mean time to repair). Interleaving is provided between 32K word banks, and two access ports give dual access capability. The 4000 series memory is expandable up to 256K words. The cycle time is 1 or 1.5 usec per word for 1106 memory and 750 nsec for 494 and 1108 memory. A 64K chunk for the 494 or 1108/1110 is priced at $2,350/month on a three-year lease, $2,250 for 1106. IMPERIAL TECHNOLOGY, INC., El Segundo, Calif.

FOR DATA CIRCLE 252 ON READER CARD

Personal Development

So your job is bugging you and you'd like to tell your boss about it somehow —but don't know how to go about it with a modicum of subtlety? Buy an Ant World for your desk. The clear

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4. Call-in, call-out on same line	YES	NO	YES
5. Maximum monthly usage charge	NO	NO	YES
6. Average call set-up time	11.1-17.6 SEC	11.1-17.6 SEC	0.8 SEC
7. Billing increment	60 SEC	60 SEC	1 SEC
8. Detail billing*	YES	NO	YES
9. "Camp-on" call back	NO	NO	YES
10. Automatic blocking of unauthorized in-bound calls	NO	NO	YES
11. Abbreviated dialing	NO	NO	YES
12. Highest transmission rate (BPS)	3600-4800	3600-4800	9600
13. Clear-to-send time	150-200 MS	150-200 MS	0.2 MS
14. Guaranteed error rate performance	NO	NO	99.95% ERROR FREE SECONDS
15. Non-blocking switching	NO	NO	YES
16. Automatic and manual dialing	YES	YES	YES
17. Out-of-service indicator	NO	NO	YES
18. Automatic circuit testing during call set-up	NO	NO	YES
19. Automatic calling standard feature	NO	NO	YES
20. Loop-back testing standard feature with all services	NO	NO	YES
21. Two-way simultaneous data transmission	NO	NO	YES
22. Standard RS-232 interface	YES	YES	YES
23. Minimum monthly usage charge	NO	YES	NO
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hardware

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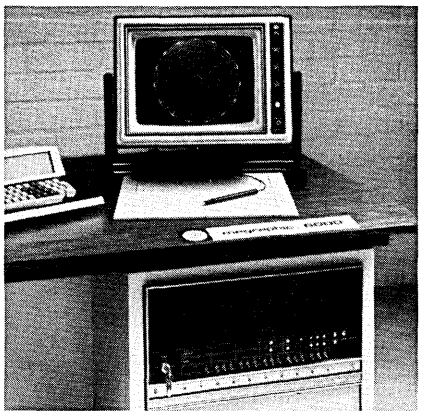
FOR DATA CIRCLE 256 ON READER CARD

Graphics System

The MEGRAPHIC 6000 will probably top the Christmas list of a large number of graphics users this year. For $16,800, a user gets a Nova 2/4 mini with 8K of memory, 19-inch display, and full ASCII keyboard housed within a data desk. The heart of the system is a graphics processor capable of displaying 6000 flicker-free points and/or vectors with a full screen resolution of ±.05%. The unit operates from a core based display list that accepts either two-word absolute vector or single-word relative vec-



tor elements. With a worst case graphics memory loading of less than 43%, the processor is said to leave ample memory cycle time for significant computation, data acquisition, and transfer.

Software includes a full set of FORTRAN and BASIC applications routines. Typical delivery is approximately 45 days. Options include a hardware character generator, an interactive data tablet and a real-time clock. MEGATEK CORP., San Diego, Calif.
FOR DATA CIRCLE 255 ON READER CARD ✲

Numb with enormous ennui,
a Univac went on a spree,
  spun all of his dials
  in lecherous smiles
of yellowish lights, and typed "Whee!"
—Gloria Maxson

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CIRCLE 19 ON READER CARD


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software & services

Updates

Minicomputer users should be apprised of a new publication, "MINICOMPUTER SOFTWARE QUARTERLY", a quarterly directory of programs available from software firms, mini users, colleges, consultants, software vendors, accountants, etc. Each program is described, including resource requirements, language, number of modules, operating system, interactive or batch operation, price and terms, updating provisions, warranty, training, and organization to contact. A listing of typical users and uses of each product is also provided. The charter subscription price is $75/year. Applied International Management Services, Wayland, Mass.
(For data circle 257 on reader card)

Microprocessor development activity has reached the point that Tymshare, Inc., Cupertino (Calif.) based computer services company, has put assembler/simulator software on its time-sharing network for two more popular microcomputer sets: the Texas Instruments TMS1000 and TMS 8080 and for the Motorola M6800. Tymshare also has software aids for Intel, Rockwell, and National Semiconductor microprocessor and microcomputer sets.

Conventions may never be the same again if this idea from Computer Sciences Corp. catches on. At the Postal Forum meeting held at the Washington, D.C., Hilton Hotel last month, CSC's Infonet time-sharing service was connected to closed circuit television to provide delegates with instant access to any messages or important announcements simply by turning the in-house tv sets to a certain channel. It's claimed this is a first.

Remember HAL, the sensitive computer in the movie "2001: A Space Odyssey" who ran amok and killed all but one of the astronauts on a mission to Jupiter? Well, it's also the name given to a PL/1-like language that will be used in the NASA space shuttle on-board computers. Implemented on IBM 360s and the Univac 1108, input forms can be either one or two dimensional, and the compiler produces two-dimensional output listings.

For The Record: One of the first customers for the Univ. of Windsor's OASIS Data Base/Data Management system is North Dakota State Univ. and not the Univ. of North Dakota as we were originally informed.

Compiler Generator

The name COGENT will sound familiar to oldtimers, but that second generation language is dead, having been retired from IBM's roster of programming languages. *This* COGENT is a brand new machine independent compiler generator that will principally interest medium to large companies involved with the manufacture of computing equipment, distribution of specialized systems, and development of general purpose software packages.

COGENT accepts language definitions including both syntax and semantics and outputs a compiler suitable for translating programs written in that language to the assembly language of the target machine, it's claimed. Compilers developed using COGENT may run interactively, and actual applications may execute interpretively if desired. Invalid language statements are recognized and error diagnostics generated.

COGENT can run on a variety of machines and is currently implemented on an IBM 360/370 time-sharing system (requiring something less than 256K bytes of storage) and a Hewlett-Packard 21MX mini where 24K words are used. COGENT is sold as a licensed product with a minimum fee of $32K. This includes implementation of co-

Cobol Preprocessing

The following two packages, ACTION-9 and MODFILE, are COBOL preprocessors. A number of these have enjoyed varying degrees of success in the marketplace (some for a considerable length of time), but these two seemed especially well documented and thought out—at least as presented to us. The interested reader may wish to get information from both companies and compare packages.

software spotlight

ACTION-9

This package is available to IBM 360/370 OS, VS, and DOS/VS users only. Eight parameter cards are used to generate a skeleton program, with the "magic" contained in the ninth card—hence the name ACTION-9. This card endows the program skeleton with those functions that make it unique. This step is divided into two separate functions: inserted logic (where the perform statements are to be inserted), and programmer-added logic, the instructions that are performed by the inserted logic. The programmer is provided with a shorthand language for doing this rather than having to do it in "straight" COBOL. ACTION-9 develops two basic logic paths; sequential updates, and report. Sequential update develops the file matching and related facilities required to update, while the report logic develops the facilities required to read a control file and recognize the sequence breaks. Report logic is used for reports, report extracts, edits, ISAM updates, and all other programs not involving sequential updates.

The program is supplied in the form of a PTF-type tape (familiar to any 360/370 systems programmer) and is priced at $30/month or a dollar a day, including supporting documentation. BISCO INC., Paramount, Calif.

FOR DATA CIRCLE 230 ON READER CARD

MODFILE

MODFILE is a machine independent COBOL preprocessor supplied in source code form. It, too forces a consistent programming discipline by organizing target programs into common organization formats. It's claimed that the increase in analyst/programmer productivity is at least 25% because many of the tedious coding chores are automatically handled by the package. A modular file matching package provides for sequence checking of as many as six files with low sequence detection. Both sequential and indexed sequential processing logic is generated. Control break detection of one to 10 control levels with branching to the appropriate user-defined routine as the control breaks are sensed is featured. MODFILE is invoked through the user's choice of four copy statements. The package also provides exits to standard paragraph names. To management, the significance of all these techniques is that they are intended to make the programs more reliable, more efficient, and much easier to maintain by other programmers. MODFILE is priced at $975. DIVERSIFIED ENGINEERING, INC., Richmond, Va.

FOR DATA CIRCLE 231 ON READER CARD

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More IMS and TOTAL installations have chosen ASI-ST to implement data base applications than any other product. ASI-ST's dominance in data base environments is easily explained:

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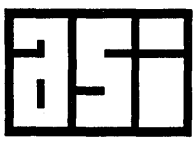
- Includes automatic positioning which permits users unfamiliar with data base structures to easily obtain information.
- Supported in both batch and on-line environments.

IMS users such as *American Airlines, Dow Chemical, TWA, American Can, The Hartford, Union Carbide*; and TOTAL users like *Combustion Engineering, Northwestern Mutual Life, Anheuser-Busch, Corning Glass Works, Eli Lilly* and *Holiday Inns* are a few who agree ASI-ST and data base belong together. In addition, ASI-ST provides an unequalled return on investment by maximizing the productivity of both man and machine. Since ASI-ST fully supports conventional data files as well as relational data bases, these benefits are not restricted to IMS and TOTAL users. To obtain more information contact:



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Poor software quality is most often due to incomplete design of the system. The requirements of your end-user often go astray as they're translated into system specifications. The resulting programs contain many logic errors. This leads to cost and schedule overruns.

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GENT on a specific system, personnel training in its use, documentation and maintenance, and a one year warranty. VIRTUAL MEMORY SYSTEMS, Orinda, Calif.

FOR DATA CIRCLE 232 ON READER CARD

On-line Payroll/Personnel

Some installations are beginning to implement on-line payroll/personnel systems—and it's not because they have excess computer time available. Such systems offer management additional flexibility in an ever changing business environment by making it possible to obtain up-to-the-minute status reports on salaries, income taxes, department totals, etc.

The Online Payroll and Personnel System is such a program, developed at the First National Bank of Maryland and offered through IBM as an Installed User Program (IUP). It uses two 3270 intelligent terminals and is designed for use with the DOS/VS monitor and the Customer Information Control System/Virtual Storage (CICS/VS). Using the 3270, a payroll department can enter a variety of dollar-related data for each employee, such as changes in salary and stock purchase deductions, awards received, charitable contributions, and hours worked. Users can retrieve current pay period and year-to-date data for an employee, a group of employees, or the entire company. Additionally, the program can be used to produce reports at specified intervals or on request; prepare payroll checks on a weekly, bimonthly or monthly basis; and complete income tax forms. Security of the information is ensured by assigning an I.D. number to each operator, allowing them access to various portions of data in the system. The system maintains a log of every transaction, including the operator's and terminal's identification numbers and the time of occurrence. The program is available under license for $780/month. The charge is waived after 12 consecutive monthly payments. IBM CORP., White Plains, N.Y.

FOR DATA CIRCLE 233 ON READER CARD

360/20 Conversion

CS-TRAN 20 is offered installations planning to convert 360/20 assembler programs so that they'll run on other 360 and 370 models. Included in the package are a multiphase program, a set of assembler macros, and a set of execute time subroutines designed to lessen the conversion effort. Processing features include conversion of halfword ADCONS, literals, and instructions to fullword format. Base register support is provided, as is conversion of BAS/BASR to BAL/BALR, HPR linkage to console routines, etc. Full diagnostic listings of programs are produced and translator card input and/or output can be read from or directed to tape or disc. Approximately 30K bytes of storage, card reader and punch, line printer, and one word of DASD storage are required. The license fee for CS-TRAN 20 is $175/month for a minimum of one year. C-S COMPUTER SYSTEMS, INC., New York, N.Y.

FOR DATA CIRCLE 234 ON READER CARD

Medical Package

The Patient Billing and Accounts Receivable System (PBAR) is written in RPG II for use on two of IBM's small machines, the System/3 and System/32. Thus, according to its developers, the package is not restricted to medium and large medical facilities, but can be cost justified for use at the clinic and medical group levels. A comprehensive family/patient master file is featured, with information on up to nine dependents as well as insurance company data and financial information. PBAR also provides for use of the RVS (Relative Value Studies) procedure files and the ICDA (International Classification

software & services

of Diseases) file for diagnosis.

Three basic forms are used to record data input: the patient registration, patient encounter, and payment adjustment forms. From this input PBAR produces a daily receipts register, doctors daily activity report, statements in a "super-bill" format, insurance claim forms, aged trial balance, delinquency listing, delinquent notices, professional practice analysis by doctor, diagnosis analysis by doctor, and automatic or manual fee setting. The 16K system requires a minimum of 5 megabytes of disc storage. The price is $9,600. OCCIDENTAL COMPUTER SYSTEMS, INC., North Hollywood, Calif.

FOR DATA CIRCLE 235 ON READER CARD

Mini Emulation of Univac 1004

Remote batch operation using a Data General Nova or Eclipse series minicomputer is possible with the UN1004 package. The program operates in less than 4K (16-bit) words of the mini's storage and the Univac mainframe won't know that it's not talking to a genuine Univac 1004 batch terminal. The DG RTOS or RDOS operating system is required.

Full operating system support for all standard peripherals is claimed, including disc and magnetic tape. Under RDOS the terminal program can operate in a foregound/background mode. The UN1004 package operates at transmission speeds up to 9600 baud. It's priced at $1,500 and includes relocatable binary instructions on paper tape, source code on 9-track magnetic tape, and an instruction manual. GAMMA TECHNOLOGY, Palo Alto, Calif.

FOR DATA CIRCLE 236 ON READER CARD

Calculator Software

The potent little HP-65 programmable calculator is being outfitted with sets of application software that should make it a very good competitor against full fledged computers. Now available for the hand held device are programs for machine design, statistics, and electrical engineering.

MACHINE DESIGN PAC I contains 35 programs to aid machine designers with problems in dynamics, vibration, linkages, cams, gears, springs, power transmission and machine geometrics.

FOR DATA CIRCLE 237 ON READER CARD

STATISTICS PAC II contains 31 programs in general statistics, distribution functions, curve fitting, analysis of variance, test statistics, probability, quality control and queueing theory. This is the second set of programs in statistics for the machine.

FOR DATA CIRCLE 238 ON READER CARD

EE PAC II is a set of 27 programs to assist microwave circuit designers in making microwave measurements, designing transistor amplifiers, computing transmission line properties and certain system properties, and performing difficult related mathematical operations.

FOR DATA CIRCLE 239 ON READER CARD

Each pack of programs sells for $45 and is supplied on 40 prerecorded magnetic cards, an operator's manual and pad of blank programming pads. There are now 14 application packs for the HP-65 for use in the fields of finance, mathematics, statistics, electrical engineering, chemical engineering (thermodynamics and transport processes), stress analysis, surveying, medicine, aviation and marine navigation. HEWLETT-PACKARD CO., Palo Alto, Calif. ✲

source data

(Continued from page 34)

cal configurations shown. COMPUTER PRODUCTS, INC., Fort Lauderdale, Fla.
FOR COPY CIRCLE 229 ON READER CARD

courses

Computer Basics Self-study

A 20-hour home-study course, *Computer basics for Management,* is designed to give the manager a fundamental understanding of computers and dp. Covered are information files, equipment and programming, conversion to a dp system, computer techniques, and advanced systems. This course is one of five in the Management and the Computer Program home-study series; others are *The EDP Feasibility Study, Quantitative Aids to Decision Making, Management Information Systems,* and *Managing the Human Element in EDP.* Price: $55 each ($50 AMA members). AMERICAN MANAGEMENT ASSN. EXTENSION INST., 135 W. 50th St., New York, N.Y. 10020.

New Series Courses

Brandon has added some new titles and expanded some old ones in its continued offerings of courses for the dp community for the current year. *Series A* now includes "How to Structure Unstructured Code," "How to Develop a Computer Hardware Plan," "How to Develop a Business System Plan," and others. *Series B* offers "Dp Career Structures and Development," "Computer Contract Negotiation," "Effective Verbal Communication," "Dp Organizational and Management Assessment," and more. New York, Chicago, San Francisco, and Washington normally host these courses, with Denver and Hartford sometimes included. Prices depend on the number of days of instruction and vary from $215 to $450 (with one at $495). These series courses and others are available in-house also, at a fixed fee. BRANDON SYSTEMS INSTITUTE, INC., 1611 N. Kent St., Arlington, Va. 22209.

Communications Seminars

Advanced technical and management personnel who plan to implement a new data communications network or integrate a new system into an existing network, or who are trying to improve performance from their existing configuration, may be interested in a three-day seminar given by John E. Buckley, "Data Communications System Management." This seminar will be held in San Francisco (Oct. 8-10), Toronto (Oct. 27-29), Chicago (Nov. 17-19), and Washington (Dec. 8-10). Price: $450, which includes course materials and luncheons. DATAPRO RESEARCH CORP., 1805 Underwood Blvd., Delran, N.J. 08075.

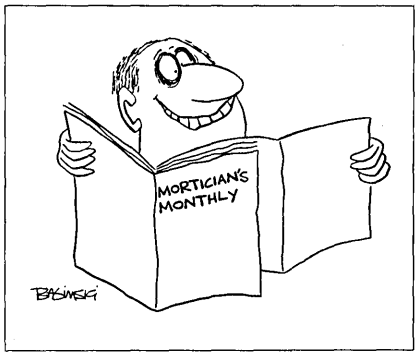
Computer Contracts

A 2½ day seminar-workshop, "Legal Tools for Computer Contracting and Protection," is intended to help achieve smooth, litigation-free procurement and marketing transactions. Topics covered are defining the scope of work contracted for; acceptance tests, warranties, and remedies; taxes; software protection and patent infringement provisions; security requirements; arbitration; and the lawyer's role in these transactions. Conducted by Roy N. Freed, attorney and author of *Computers and Law—a Reference Work* (now in its fourth edition), the course is scheduled for New York (Oct. 22-24), San Francisco (Nov. 12-14), and Chicago (Nov. 19-21). Price: $325, with discounts for more than one registrant of the same company. THE CONFERENCE CO., 797 Washington St., Newton, Mass. 02160.

source data

Computer Equipment Directory

A monthly listing of used (and some new) computer equipment, peripherals, and supplies and services for sale, can be found in *The Computer Equipment Directory*. Buyers and sellers list items free of charge, and may code their ads if they wish so they will not be directly identified. The publication does not act as a broker, and buyers and sellers can deal directly with each other. Price: $75/yr. THE COMPUTER STORE, INC., P.O. Box 2621, Framingham Center, Mass. 01701.



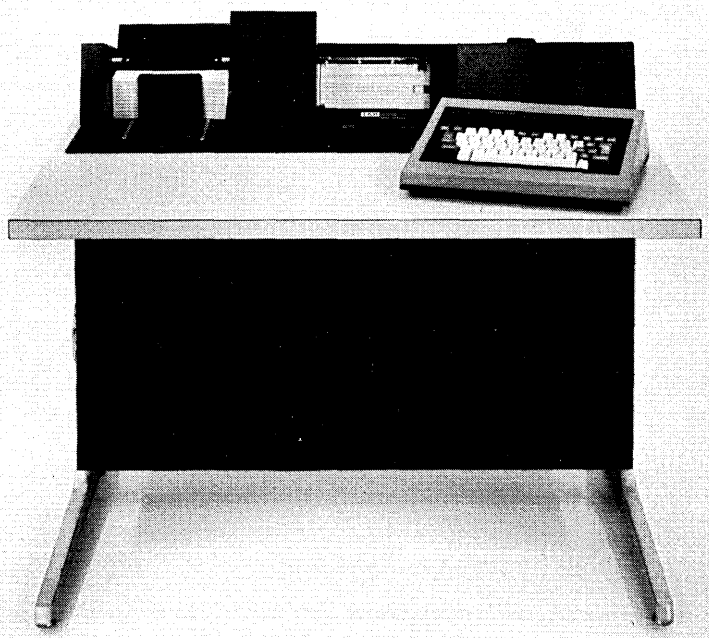
Medical Computer Field

A quarterly newsletter, *Medical Computer Current,* offers information on computers in medicine. Original articles, excerpts from articles in other magazines, book reviews, new products, meeting announcements, and updates on innovations in the field are featured. (The publisher is also the vendor of a medical information system.) Available free of charge. SPECTRA MEDICAL SYSTEMS INC., 1121 San Antonio Rd., Palo Alto, Calif. 94303.

Packaged Software Reports

Software packages for small computer users are evaluated in the monthly newsletter, *Packaged Software Reports.* Packages from IBM, Burroughs, NCR, other small business computer users, and special packages in health care, insurance, or banking, for example, will be covered. The first issue (October) includes "How to Select Software Packages" and an analysis of the IBM System/32 Manufacturing Management Accounting System. Subscription: $42/yr. MANAGEMENT INFORMATION CORP., 140 Barclay Center, Cherry Hill, N.J. 08034. ✻

If you punch cards, read cards or do anything else with cards, we want to talk to you.



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Let's talk:

☐ Interfaces.

☐ Special requirements.

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☐ Send more information.

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CIRCLE 63 ON READER CARD

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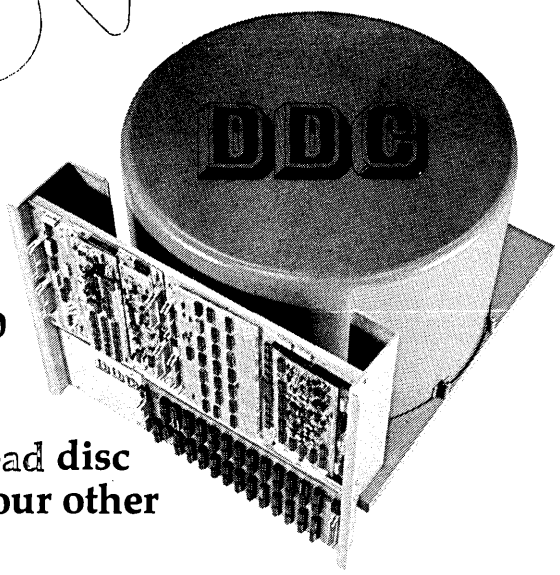

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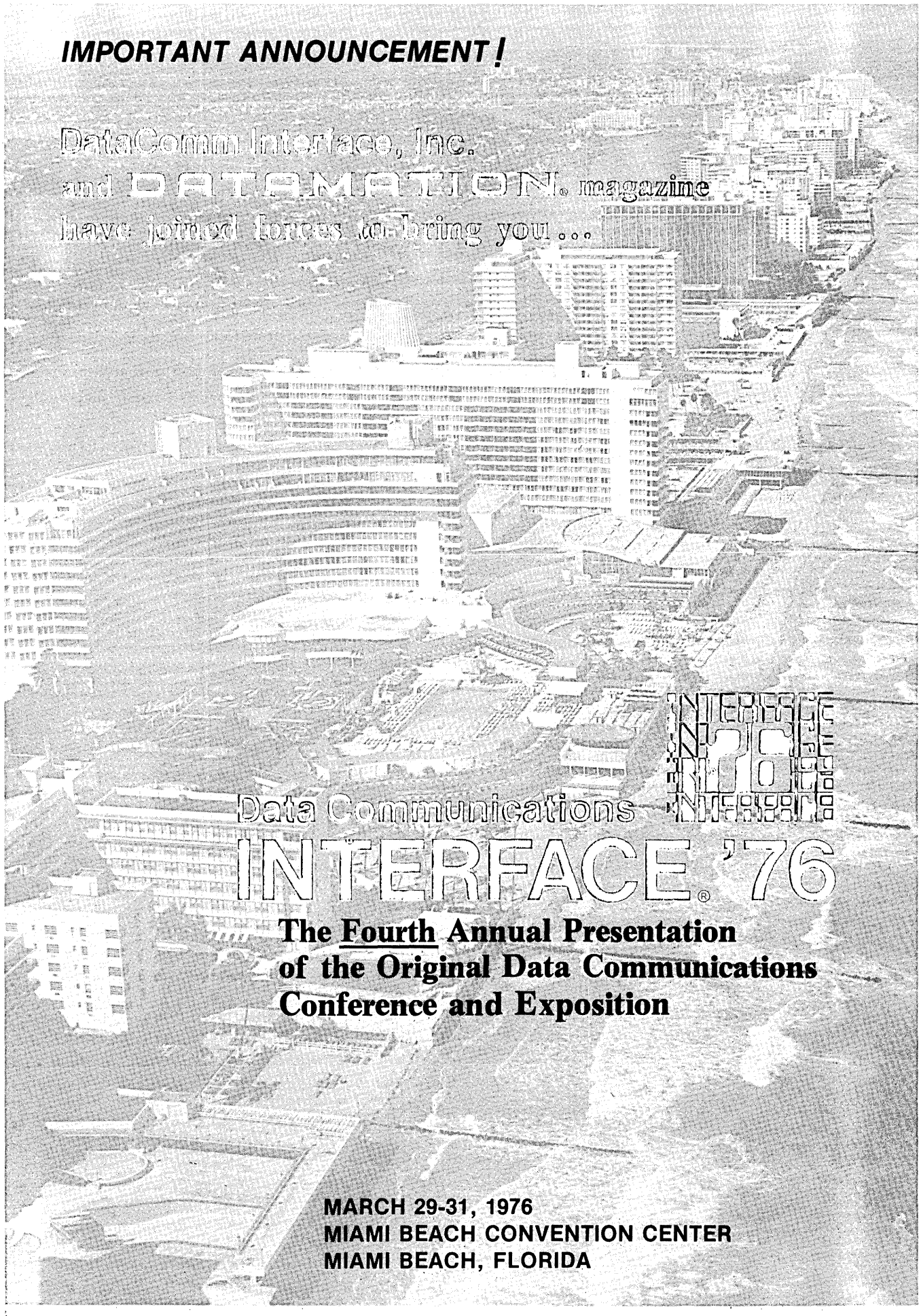
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Fourth Year Has Winning Combination

DataComm Interface, Inc. — the originators and sponsors of Data Communications INTERFACE '73, '74, and '75 — and DATAMATION magazine — the most prestigious, informative, and widely read publication in the field — together will bring you the INTERFACE '76 Conference and Exposition during March 29-31, 1976 at the Miami Beach Convention Center in Miami Beach, Florida. This powerful combination of conference expertise and editorial excellence means that, for attendees and exhibitors alike, INTERFACE '76 will be the most comprehensive and productive data communications event we've ever held.

New Enlarged Program

Already the joint staffs of INTERFACE '76 and DATAMATION — together with representatives of datacomm users and suppliers, and consultants from industry and academe — are hard at work on program details. The program itself will be greatly expanded. To keep you current on the datacomm advances which have occurred with dizzying speed during the past year, we're going to broaden considerably the scope of the sessions. We'll have more topical sessions and speakers... new approaches to fundamentals...new presentations and formats...more "bottom-line" solutions to datacomm problems.

Old Favorites Back, Too

You've told us what activities you liked in past INTERFACE conferences, and we hear you. We'll have updated versions of such popular sessions as our dual Workshops. The Product Workshops will supply in-depth information on the latest data communications equipment and services together with practical advice on evaluation and selection. The Methods Workshop will deal with the methods, systems, and procedures needed to plan, implement, and manage a data communication network.

Another popular event from INTERFACE '73, '74, and '75, the Applications Sessions, will return with panels of experienced users detailing their successes in operating datacomm systems in many specific industries and application areas. The Highlight Sessions will address topical issues that are likely to affect individuals and organizations working in today's datacomm environment.

The Little Red DataComm Schoolhouse

There are no exams and no report cards at the DataComm School, but there sure is a lot of knowledge to be gained on the basics and fundamentals of data communications. This conference pleaser from INTERFACE '75 will be repeated at INTERFACE '76 — with additional material. It's designed especially for newcomers, experienced datacommers who want to brush up, and managers and executives from other areas who want to get a handle on the exciting field of data communications.

Exhibits Unlimited

A great conference also means great exhibits. As in the past, INTERFACE '76 will have a dazzling array of the latest datacomm products and services from the industry's leading suppliers. You'll have a once-a-year opportunity in one place to evaluate the hardware, software, and systems that make things happen in data communications. You'll see the tangible results of millions and millions of dollars of research and development — all on display for INTERFACE '76 attendees.

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If you're a present or prospective datacomm user, an EDP generalist, or a communications specialist — if you're a supplier of datacomm products and services — if you're a datacomm consultant — if you're a member of financial or general management — if you're none of the above, but just plain interested in data communications, then you belong at INTERFACE '76.

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Many previous attendees told us they liked New Orleans as the site for INTERFACE '75, but would prefer a change of scenery for '76. So we've come up with Miami Beach. We're sure you'll agree that sun-drenched Florida is not hard to take during cold, blustery March.

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Maybe they should break-up Datamation

When we realized that DATAMATION is by far the best read and most circulated EDP publication, that it carries more advertising pages, accounts for more advertising dollars—and even has more advertisers than anybody else... it made us wonder if they might try to break up DATAMATION. So we asked ourselves, "How would they do it?" And with our characteristic enthusiasm and thoroughness we began to explore the whole idea.

First we looked at editorial and advertising. But we quickly concluded that if we *separated* editorial from the ads and kept advertising sales, we'd lose control of *one thing* that makes advertising in DATAMATION worthwhile. Our editorial product.

Scratch one.

Next we thought, "Split national from international." Frankly, we thought we had a winner until we realized that without our international editorial and circulation our U.S. advertisers would miss a big chunk of their international market.

Scratch two.

But we came up with one more idea. Separate our OEM readers from our End-User readers. This was a loser on three counts. 1. To begin with, without our End-User readers, many advertisers would miss their most important market. 2. Manufacturers who sell OEM *only* couldn't advertise to sell End-Users on products built with their sub-systems. 3. Without our OEM readers, manufacturers who need to reach *both* OEM and the End-User market would be out of luck.

But maybe breaking up DATAMATION isn't really the problem. Because the thing that puts DATAMATION so far ahead of its competition is within easy reach of any EDP publication. To be No. 1 with EDP professionals all you have to do is put out the best editorial product. We work hard at it year in and year out.

Of course, DATAMATION won't sit by while other EDP publications are trying to be first.

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This forum is offered for readers who want to express their opinion on any aspect of information processing. Your contributions are invited.

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The Professionalization Of Programming

With some trepidation we join the discussion of programmer professionalism. Our reluctance stems from the complexity of the whole issue (what *is* a professional, anyway? for that matter, what's a programmer?). Our reluctance also stems from a feeling that in any dispute all the contesting parties will have something to gain and something to lose from a final resolution, or even from a balanced statement of the issues.

Other occupations have faced similar issues when professionalizing as a result of technological revolutions. With these other occupations—medicine, engineering, architecture, etc.—it's clear that part of the impetus for professional practitioners came from the consumers of the professional services, people who demanded some sort of guarantee of quality, or at least minimum standards of performance. We don't want doctors who kill us with unneeded surgery or with unsterilized knives; we don't want engineers who kill us with underdesigned steam boilers or bridges; and we certainly don't want computer programmers who kill us with "just one bug" in a program to pilot our car on the Interstate—or even inconvenience us with an incorrect and incontestable electric bill. So from us, the consumers, the clamor arises for the guarantees that professionalization seems to provide.

On the other hand, professional aspiration has usually come from the would-be professionals themselves. Doctors, lawyers, plumbers, and similar proprietors of sacred mysteries, quickly learned that while professional status may have held them to certain standards, it also rewarded them handsomely for their efforts. If *certification*—an affidavit testifying to adequate training issued by the practitioners' established colleagues—is combined with *licensing*—the granting by a government agency of the exclusive right to practice a skill—professional practitioners could just about name their own terms.

Along with the combination of certification and licensing, after all, goes a restriction on the entry of new members into the profession, and such restriction can never hurt the present practitioners in the supply-and-demand competition

for higher compensation. Not all professions, of course, have been equally successful in so restricting the influx of new members, but the stronger the certification/licensing requirements, the better the control over members. In the U.S., we seldom see unemployed physicians.

Physicians, of course, have been the most successful of all in taking advantage of this aspect of professionalism. There are aspects to computer programming which indicate that the prospects of an average programmer's income of $80,000—available mostly to sons of programmers through admission to alumni-controlled programming schools—is not an idle daydream. Like the doctor, the programmer has in his hands something of enormous value, which in many respects is a complete mystery to its owner. We may ignore doctors when we're healthy, and even laugh at the AMA's antics, but when we get that pain in the gut, we'll obey every command and pay every fee until that pain goes away. Indeed, this may be even more appropriate in programming than in medicine, for, if you don't go to the doctor at all, your chances of getting well through the "wisdom of the body" are considerable, but there have been few authenticated cases of "spontaneous remission" among, say, faltering operating systems.

As useful as a comparison to physicians may be (and however attractive because of snob appeal), the analogy has some drawbacks. For one thing, physicians, lawyers, pharmacists—the original models for our ideas of "professionals"—trace their origins to small independent artisans and entrepreneurs. They were originally, and very often still are, small businessmen, with clients or customers.

Programmers, on the other hand, don't have clients—at least not in the conventional sense. They are more likely to have managers. In other words, programmers are employees rather than independent businessmen.

This organizational characteristic of programmers seems to us the critical factor in any discussion of programmer professionalism. It's critical, first of all, because some of the "goodies" which go along with professional standing—monopoly control of admission into the occupation, large salaries, and final say over what is a good programming job and what isn't—are highly desirable for programmers as employees, but highly undesirable for their managers and employers. Other features, such as personal legal liability for the services rendered, could be advantageous to employers but not to the professional employees.

A related consequence of being a professional employee, therefore, has to do with supply and demand. Entrepreneurial professionals tend to learn very quickly the advantages of restricting the supply of new professionals—hence the reliance on state-enforced but peer-administered licensing.

Employers, on the other hand, have always wanted a reservoir of unemployed or underemployed workers—to keep down their wages and prevent them from getting uppity. There is no reason to believe that the employers of programmers, professional or otherwise, have significantly different concerns. However, computer programming is not precisely unskilled labor—or shouldn't be—so employers, while they may not relish the idea of peer-licensing, do have to support, and therefore ultimately pay for, a certain level of "professional" competence.

Certification vs. licensing

Precisely this need for minimum standards of competence makes the issue of professionalization, particularly certification, so critical from the employer's perspective. In a field as

vague and rapidly changing as programming, some aspects of professionalism are definitely in the employer's interest if other aspects can be downplayed or eliminated altogether. Some organizations therefore lobby for certification but *not* for licensing. Certification, with advantages for employers in reflecting some established levels of competence, does not carry with it the same dangers as licensing, with its potential for drying up the reservoir.

The distinction between certification and licensing is well understood in practice. Would-be certifying agencies have staked out their first, tentative claims to the right to guarantee a programmer's competence. Although real-world types may disagree, schools of computer science are closely attuned to the needs of industry and are veritable beehives of activity designed to advance their place in the certification sweepstakes. But are universities in a position to certify—or

"...prospects of an average programmer's income of $80,000—available mostly to sons of programmers through admission to alumni-controlled programming schools—is not an idle day-dream."

just to give certificates? They may grant elaborately engraved pieces of paper testifying to this or that, but how much will such certification mean?

The simple truth is that we don't know how to turn out "professional" computer programmers. We do not even know how to recognize one if he or she happens to pass through our curriculum. There's no sense in the professors being ashamed of this—nobody else knows either.

On the other hand, schools of computer science are in an awkward position if they don't stake out exclusive claims to programmer certification. The pressures from employers —if not from the programmers themselves—for some sort of guarantee of standard education and minimum standards make the question not "will programmers be certified," but "who will do the certifying," and therefore who will emerge as the dominant, organizing force in programming. This question, still very much unresolved, will shape the future of "professional" programming.

A program survey

Since certification—if not licensing—of some sort seems inevitable, can we predict what might happen when it comes about? Suppose we have constructed the perfect certification instrument. What would happen if it were applied to the present day programmer population? As a partial answer, we conducted a survey of nine programs, obtained from industrial clients, which are "typical programs that have been in production for at least six months, closer to your best than your worst."

One of the programs was written in FORTRAN, one in ALGOL, three in COBOL, and four in PL/1. In total, they represent 6,110 lines of code, for an average size of 679 lines. We subjected each program to a critical two-hour reading, after which an average of 16.8 hours of labor went into revising or rewriting to overcome the discovered deficiencies. Through this reading, we discovered 42 "serious" errors—that is, errors deemed likely to result in costs exceeding one month's salary for the programmer who wrote it. These "malpractice" errors—causing reruns, inefficiencies, operating difficulties, lost business, underbilling, incor-

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rect paychecks, false predictions, and the like—may suggest why programmers are not generally independent entrepreneurs.

In other words, each "production" program, "nearer your best than your worst," contained about five errors, or seven per 1,000 lines of code. The rewritten codes were generally, though not universally, shorter and faster. The reduced size of the source code was matched by a 19% reduction in core storage usage and a 45% reduction in running costs—from $894 to run each job once, to $491.

Though there are any number of less easily measured aspects of good programming, these figures begin to show the dimensions of the condition of programming expertise today.

From the survey results, we can see that if the perfect certification procedure were put into practice, we could expect only a small minority of programmers certifiable. Why? Because if we are to certify anything at all, it would have to include the ability to write code that is at least free of serious errors most of the time. Would we certify an ophthalmologist who, nine times out of ten, induced partial blindness when removing a cinder from a patient's eye? or a plumber who, seven times out of eight, left 30 centimeters of sewer water in the basement?

From this study, from our classes with experienced programmers, and from conversations with dozens of clients, we see no indication that even a substantial minority of today's programmers can produce an error-free program for production even most of the time. We can only conclude that true certification would prove a stunning disaster for the present population of programmers.

Maximizing incompetence

But this was merely an exercise in supposition. Even if by magic the perfect certification instrument were to be constructed, it is unlikely that anyone would dare to use it. Historical examination of certification in other professions indicates that certification standards would be lowered to the practice now prevailing in the industry. Such "grandfather clauses"—whether implicit or explicit—could damage prospects for significantly better programming than we are doing today. Instead of minimum standards of competence, we could well be certifying maximum standards of incompetence.

The signs are unmistakable that the average programmer is nowhere near a level of programming competence that is within reason to expect. Most regret this sorry condition but have few ideas of what to do with it. Yet there are signs that tomorrow will be better. The early successes of even the most primitive structured programming seem to indicate that more significant steps will soon follow. Moreover, the striking success of experiments with programming teams indicate that preoccupation with the individual programmer may be a retarding force in programming progress.

But who is examining the question of how to certify future behavior that we now understand in the most partial way? Who is studying the qualities that will be needed in the programmer of 1980 instead of 1960?

—Philip Kraft and Gerald M. Weinberg

Dr. Kraft is assistant professor of sociology at the State Univ. of New York at Binghamton, and has authored several papers on programmers and a forthcoming book, "The Sociology of Computer Programmers."

Mr. Weinberg is president of Ethnotech, Inc. and has been a professor of human science and technology. He has authored several books, among which is "The Psychology of Computer Programming."

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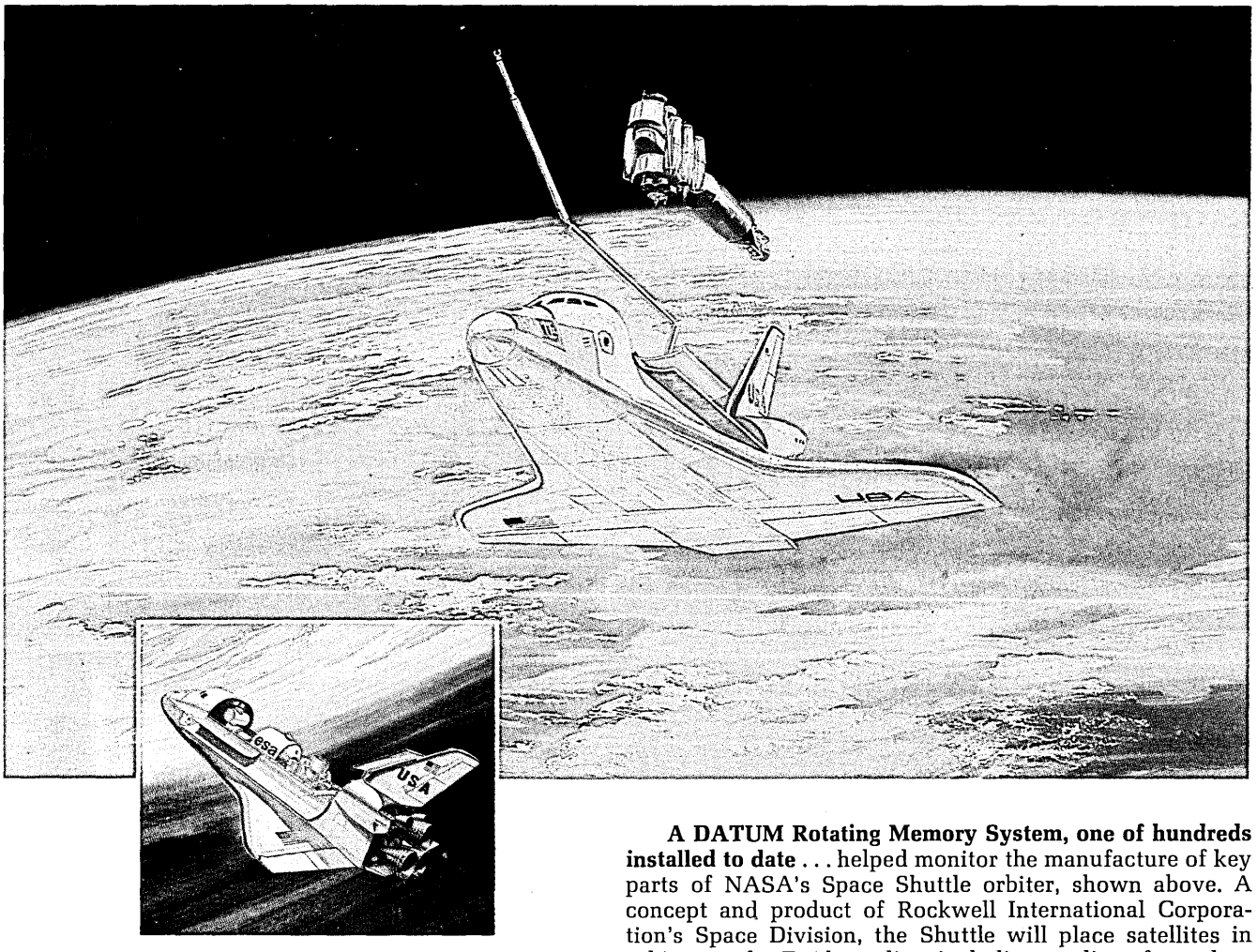

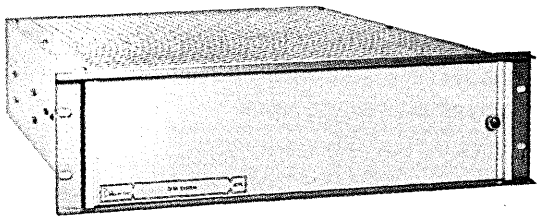

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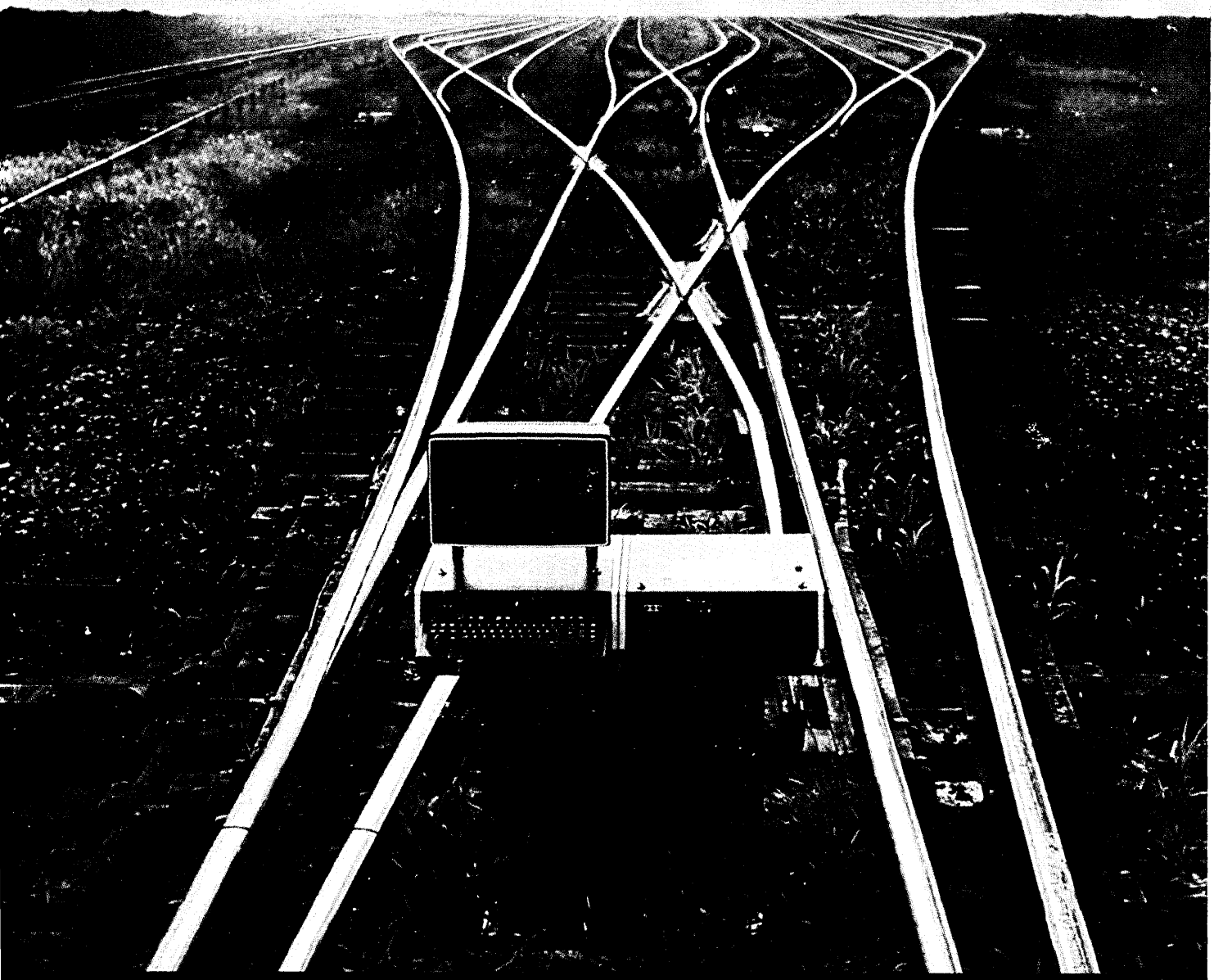

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