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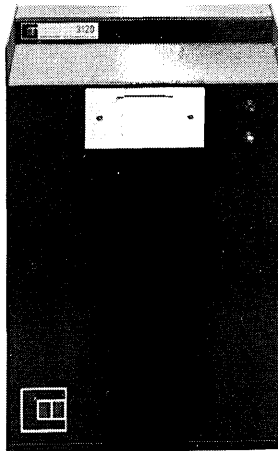
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CI-342

January 15, 1971

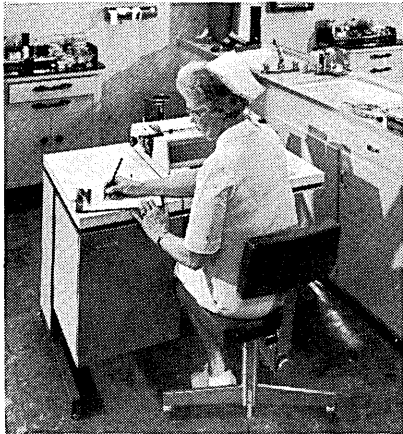
CIRCLE 4 ON READER CARD

1

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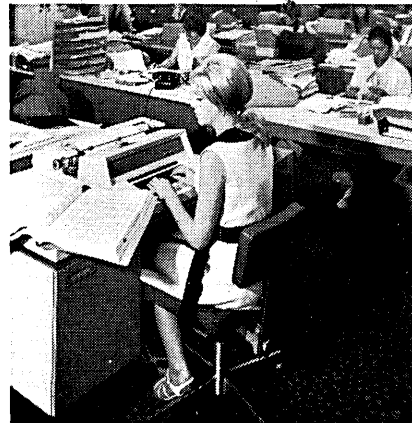
language programming. Anyone can do it.

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DATA MATI ON⁷¹®

JANUARY 15, 1971

volume 17 number 2

T ECHNICAL

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Most of the big manufacturers had something new to sell by the end of the year and evolutionary was the key word.

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About the Cover

Though by the end of the year the lights seemed to be going out all over the fun house, the design by our art director would seem to suggest we examine our angst by what illumination remains. The relief, if any, is definitely bas.

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CIRCLE 48 ON READER CARD

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JANUARY 15, 1971

volume 17 number 2

This issue 112,490 copies

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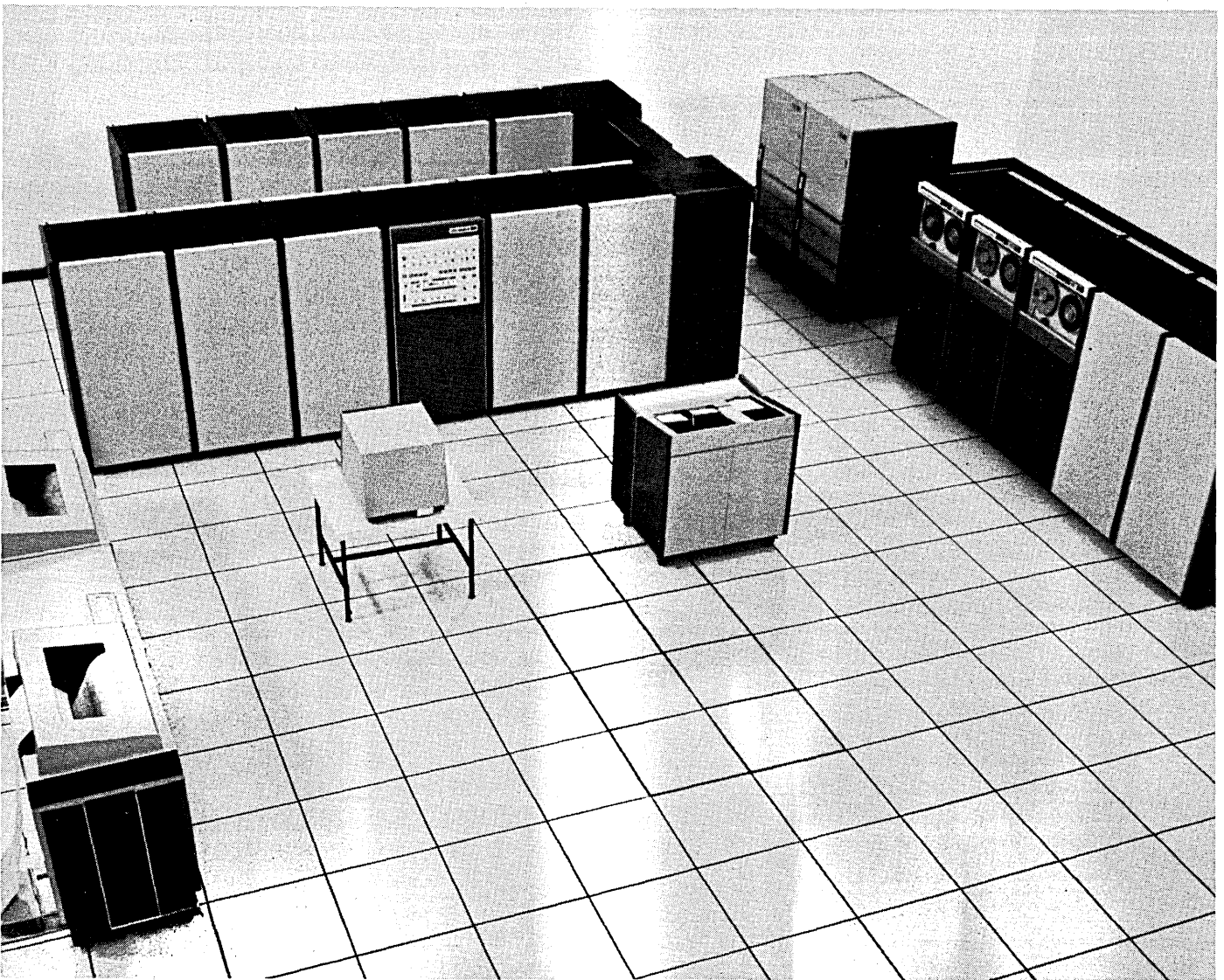
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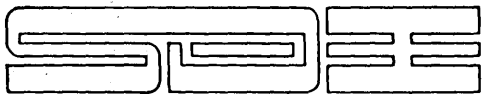
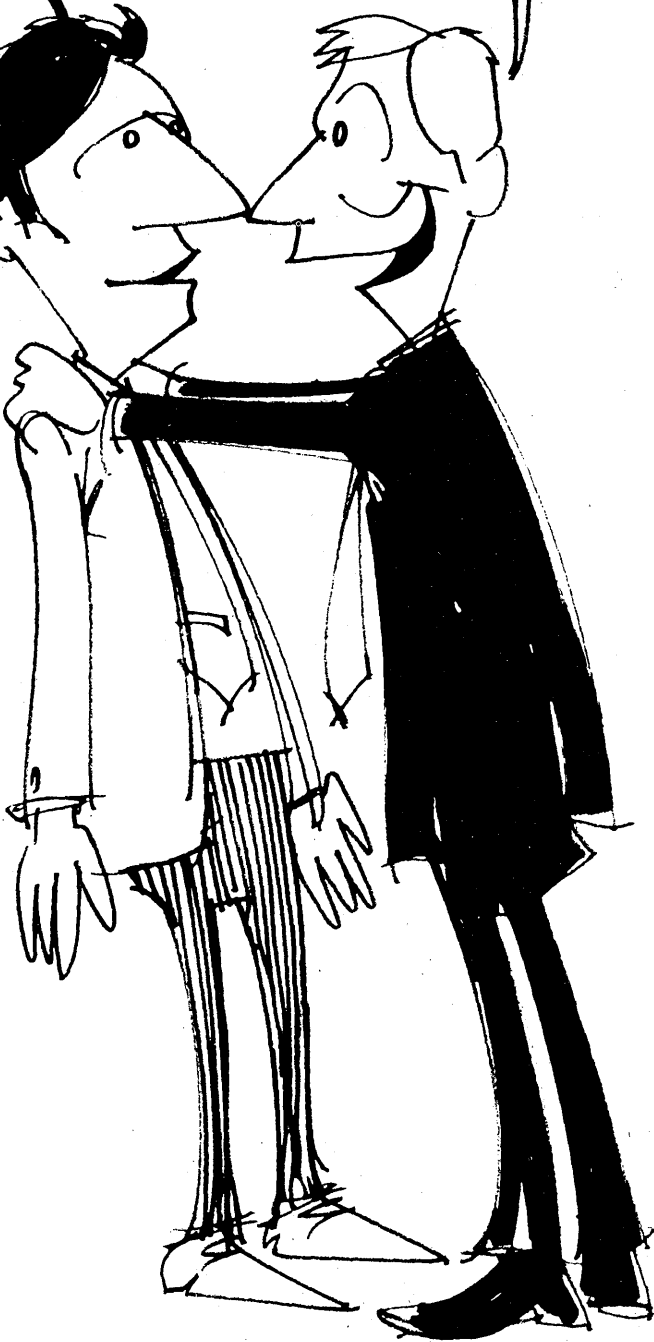
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CIRCLE 51 ON READER CARD



LETTERS

You lose

Sir:

J. N. Lambrecht writes in the Dec. 1 issue (p. 11) that the LGP-30's hexadecimal alpha codes for 10-15 are F, G, J, F, Q, W. The second "F" is incorrect and should be a "K." I suppose this was a typographical error, but still I bet you'll hear from plenty of LGP veterans:

LAWRENCE G. SEABURY
New York, New York

Cassette point

Sir:

I was quite interested in your article covering cassette tape transports in the Nov. 15 issue (p. 40). However, I was disappointed to find that the UCC/Datel-type tape cartridge was not mentioned, since considerable emphasis was placed on the advantages of (1) bi-directional operation and (2) the simplicity and reliability associated with a single capstan.

The Datel cartridge is of a *coaxial* design. The two reels are spring loaded against each other within the cartridge providing constant tape tension at all times. Thus only one capstan is required to drive tape in either direction. The tape changes levels within the cartridge, yet runs in a level, internally guided path across the front of the cartridge.

GREGORY G. VOGEL
Riverton, Wyoming

Dear reader

Sir:

Having given up programming just as FORTRAN was coming into vogue in our small research installation and being one of the last of the old-time paper tape handlers, I have several times told the man who now interprets computer journals for me that I would from then on just send DATAMATION along to him and let him summarize for me anything that I might possibly understand.

However, DATAMATION frustrates me in much the same way as the nontopical articles in those two-week-old *Wall Street Journals* which I receive on circulation lists. I generally start by a peek at the letters and

often get the point of a cartoon. Then along comes an article about a brass and mahogany tide table calculating machine. This is followed by a guide to Houston restaurants (I can't wait for the letters from irate restaurateurs and odd-ball programmers with matching tastes). Several more "quick glances" bring me to an amazing tale about perfect numbers (I stop to reminisce about my days getting to work an hour early in order to run off a few perfect rectangles). Finally, I reach the last pages to find an excellent Forum contribution on programmer training.

By now I have blown my hour's bus ride home, so what difference does it make if I take another half-hour to write a letter to the editor.

CHARLES A. PEIRCE
Boston, Massachusetts

Wendt goes

Sir:

Until my own ox was gored, I believed with Mr. M. R. Leavitt (Letters, Aug. 15, 1970, p. 13) that the public's rights can be preserved only by restricting access to census data far more rigidly than is now the practice. Once again, my liberal preferences have foundered on hard facts.

The results of censuses are not used solely to design appeals to markets. The most fundamental use is in legislative apportionment and classification of districts for "aid." This public use carries with it a need for some mechanism for public review of Census Bureau performance. They have been proved fallible in the 1970 census.

My own community conducts a triennial census and publishes a borough directory, so the official report of a population loss greater than the gain reflected in local figures, gathered concurrently with the federal data, was exposed as a lot of baloney. How was the lapse rectified? Hardly at all! The local canvassers were advised to find those who could assert that they had been missed in the enumeration! A list of federally recognized residents could not be supplied, for regulations designed to protect our individual privacies forbade it!

A sweeping prohibition of access to census information scares me as much as a blanket license to use it. Despite my secretive nature, I'd prefer to have all my census responses made public than to interrupt the feedback in a process that directly affects both my legislative representation and (collective) treatment by administrative agencies.

Ideally, a system would be instituted which afforded appropriate channels for each appropriate use of census information. I doubt that it will happen.

RICHARD E. WENDT, JR.
Edgewood, Pennsylvania

Pitney pitch

Sir:

Your article in News Scene, Nov. 15 (pp. 129-131), on POS systems was rather superficial reportage for such an important subject. While I certainly agree with Mr. Nelson that NCR's announcement of its 280 system was an important event at the NRMA Conference in Miami, describing the atmosphere at their presentation as "hushed reverence" seems a bit excessive. Attendance at the Pitney Bowes-Alpex workshop was about the same size and, I believe, at least as responsive.

Mr. Nelson did discover a maturity in the kind of interest being displayed in POS systems by retailers. A number of them have, in fact, been planning, testing, and implementing the conversion of their stores to the SPICE system manufactured by Pitney Bowes-Alpex. Many retailers have long since passed beyond the window shopping stage, and we are making full-store installations.

DEAN W. ERVIN
Pitney Bowes-Alpex, Inc.
Danbury, Connecticut

Gulp

Sir:

High Technology West's common carrier revenue predictions (Nov. 1, p. 99) are a bit hard to swallow. Although a \$5.5 billion increase is a staggering sum, it only represents a yearly growth rate of approximately 2½%. That is hardly a "jump." In addition, their estimate that 50% of 1980 revenue will come from data communications only leaves \$12.75 billion in revenue for non-data services, when they estimate that for

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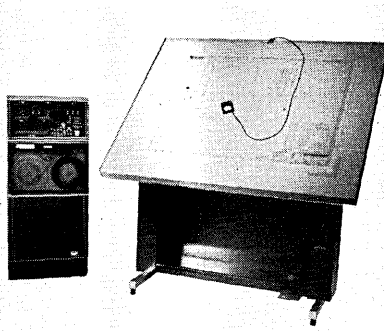
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Letters . . .

1970 it will be \$18 billion (90% of \$20 billion). That implies a *decrease* of 29% in non-data revenues. Either High Technology West needs to go back to the drawing board, or they have been misquoted, or I had better sell my AT&T stock fast!

DENNIS ABSHIRE
Indianapolis, Indiana

Misquote. Editor back at drawing board. Don't sell.

Splitting hares

Sir:

In your Nov. 15 issue News Scene item (p. 139) about Mr. Ferguson's calculation of some new perfect numbers, it was stated that his representation of such numbers as a sum of consecutive integers was believed to be new. While Mr. Ferguson's use of this fact was very clever, the fact itself is not new. It was known to J. Brocius in 1652 (see L. E. Dickson's "History of the Theory of Numbers, Vol. I, p. 13).

In the last paragraph of the same item, it is stated that the Fibonacci numbers were known at the time of Christ. I don't know what Christ you have in mind, but the numbers arose in connection with a problem about rabbits reproducing which appeared in a book by Fibonacci published in 1202 (op. cit., p. 393).

Finally, the item refers to the relationship between the movements of the planets and the Fibonacci numbers. Since these numbers arise in connection with such varied matters as plant growth, polyphase sorting, and the efficiency of Euclid's algorithm, it would be rash to contradict you, but I would be interested in any references you could provide.

PAUL BLACKWELL
Columbia, Missouri

Auer aching bach

Sir:

In reference to T. W. Olle's dissertation "MIS: Data Bases" in the Nov. 15 issue (p. 47), clarification is required for his classification and subsequent text concerning Auerbach's DM-1. (DM-1 should not be confused with a data management system designated SC-1, which Auerbach co-implemented with a client two years ago and which forms a part of the CODASYL report, "A Survey of Generalized Data Base Management Sys-

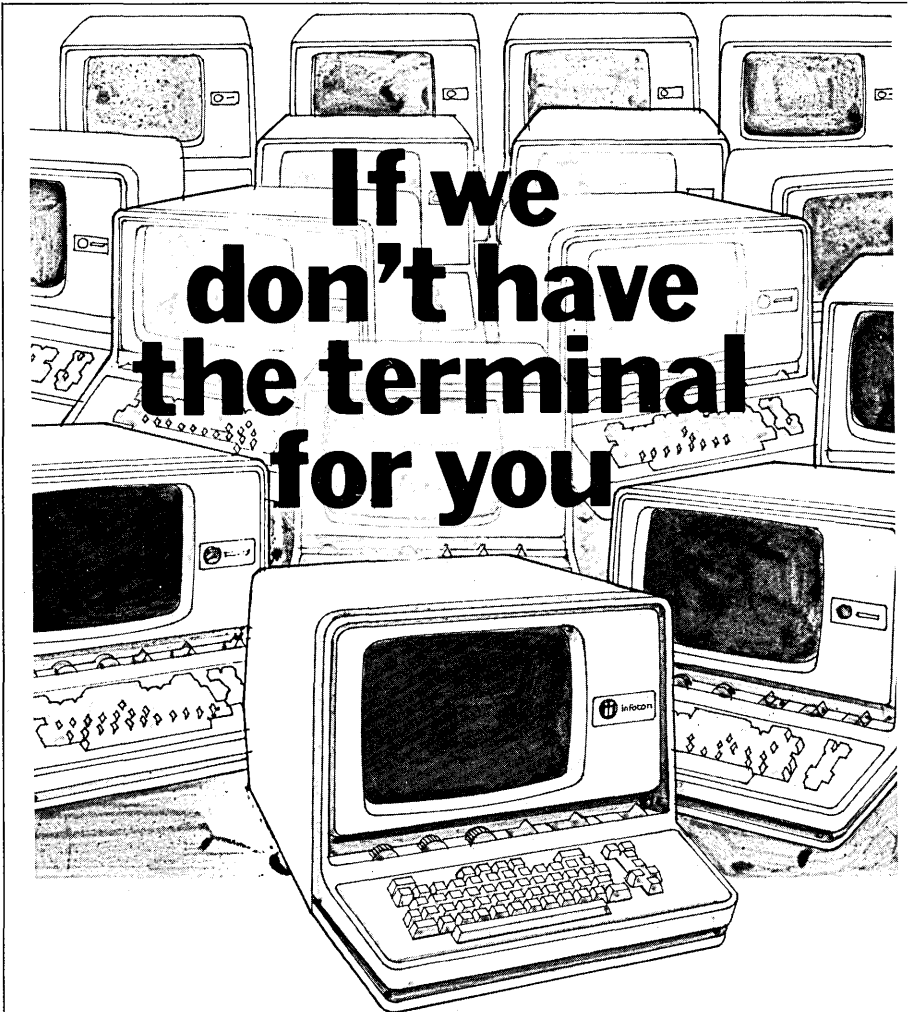
tems," May, 1969.)

The Auerbach DM-1, as currently implemented on the GE-600 series, is inappropriately classified by the author as a purely "host language" system. Rather than constituting a package of fixed data management capabilities, DM-1 is oriented to a set of readily extensible data management facilities serving multifarious users of both randomly and serially organized data.

Some of these facilities, such as the

basic service calls, are characteristic, in the author's terminology, of "host language" systems, while others, such as query or display, are more characteristic of "self-contained" systems. If Dr. Olle's classifications were valid, DM-1 would be suitable for only two levels of users—data administrator and programmer. In fact, the system is designed to service all four levels of users defined by Dr. Olle.

BETTY MORRELL
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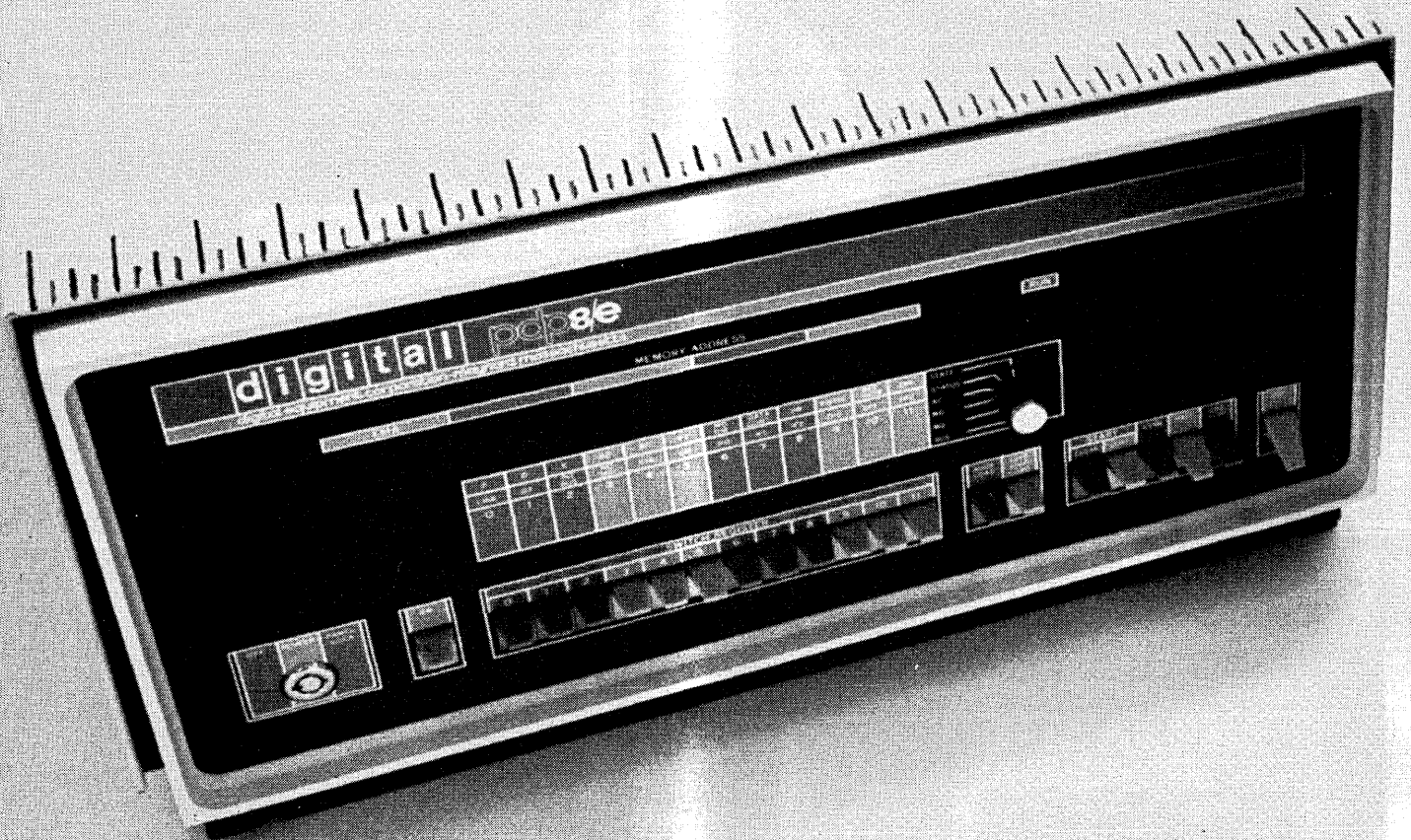
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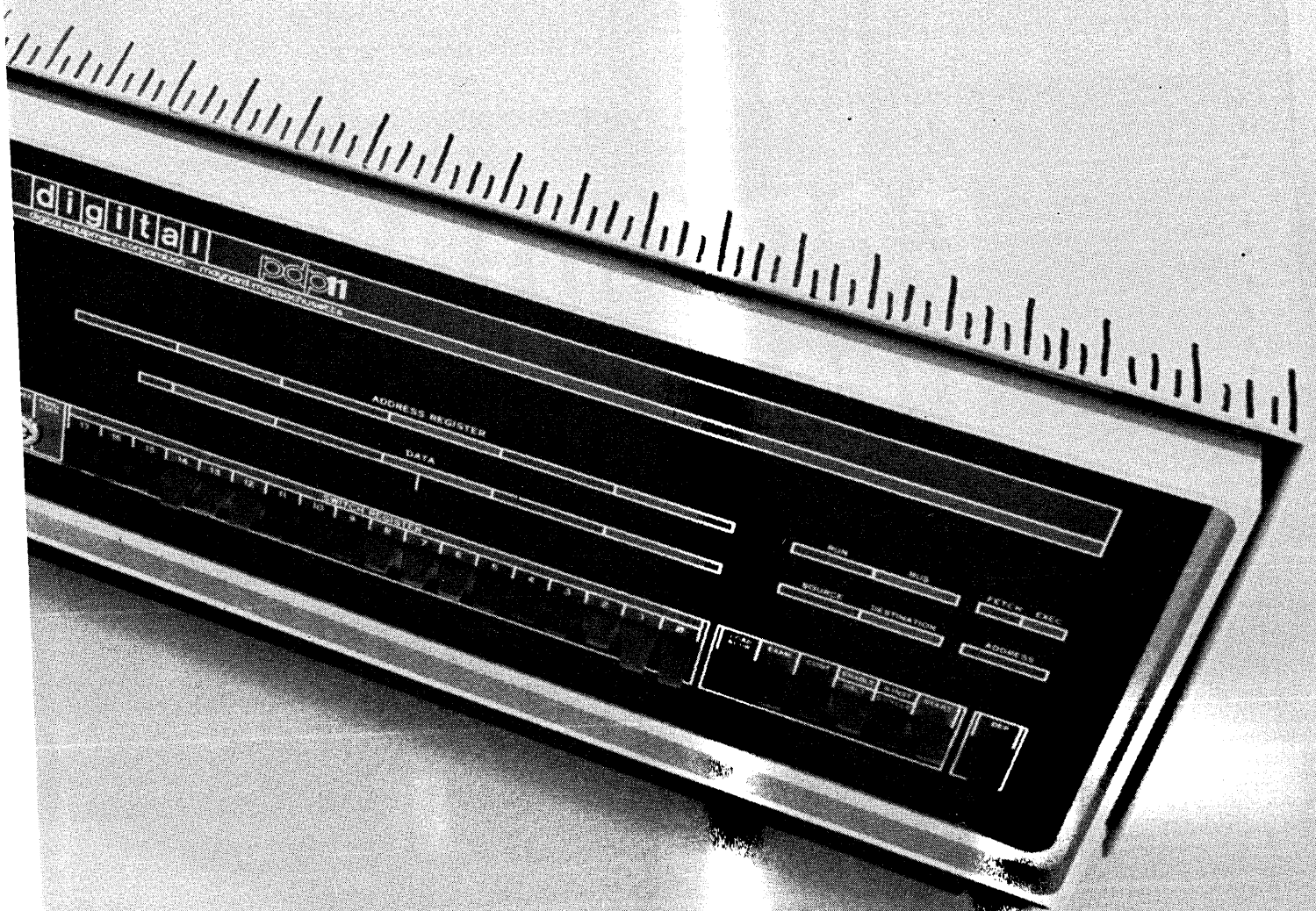
We could go on but you get the point. Sooner or later everyone has to measure up. To us.

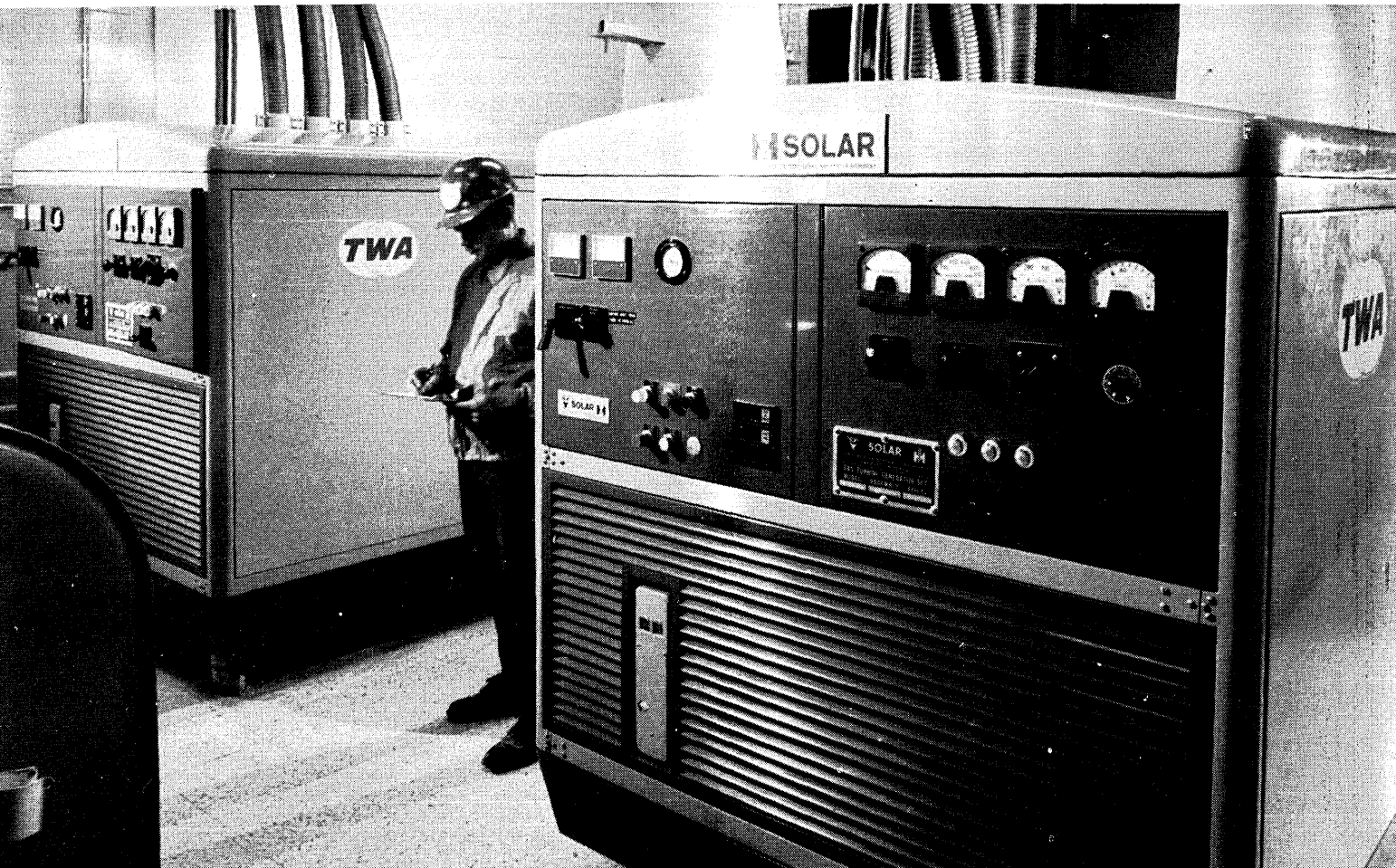
Digital Equipment Corporation, Main Street, Maynard, Mass. 01754 (617) 897-5111.

digital

More than 10,000 mini-computers delivered.

dsticks





Solar gas turbine 750-kw emergency generator sets at TWA's mammoth reservations center, Rockleigh, New Jersey.

computer protector

Most computers must be protected against electrical power failure. Such loss of power can cause malfunction resulting in loss of core data . . . dropped bits of information, altered data or computer error . . . the necessity for recycling program . . . physical damage to the computer . . . time off-line . . . cycling down.

Leading users of computers such as Trans World Airlines, Inc., Bunker-Ramo Corp., the Federal Reserve Bank in San Francisco and the Bell System realize the potentially costly results of utility power failure and, as a back-up, have selected the computer protector—Solar gas turbine generator sets and a “no-break” system.

At TWA's giant world-wide

reservations center, for example, one 750-kilowatt Solar *Saturn*[®] gas turbine generator set charges the “no-break” electrical supply's storage batteries. A second 750-KW Solar unit provides power to the air-conditioning for the temperature-sensitive computers. In addition, the Solar turbine generators furnish power for air conditioning, heating, lighting, other office equipment, water pumps and all additional services required to keep the building housing the computers in normal operation. The electricity the Solar units produce is even more precise than normal purchased power.

Hundreds of Solar gas turbine generator sets, including 800 kw and 225 kw units, are now in op-

eration and are providing reliable emergency power for a wide variety of installations throughout the world. Compact, lightweight, vibrationless, and available in complete modular units, these sets can be quickly and easily installed anywhere from rooftop to basement. And coming soon is Solar's new *Centaur* gas turbine 2000 kw generator set.

For more complete information on these reliable, reasonably priced gas turbine generator sets write: Solar, Dept. T-121, San Diego, California 92112.

SOLAR
DIVISION OF INTERNATIONAL HARVESTER COMPANY

LOOK AHEAD

HONEYWELL SOUNDS
HORN OF PLENTY

Honeywell's cornucopia of new products hasn't dried up yet. Besides the three new machines in the Series 200, we hear there will be more announcements throughout the year. First, watch for two large and powerful machines from the former GE operation in Phoenix. Essentially, these will be extensions of GE's 600 line, but interesting and different enough to merit a new name.

Honeywell's three new Series 200 machines, meanwhile, are expected to be as successful as was its 115 of which more than 300 were delivered last year. These are the 115/2, 1015 and 2015. Also the decision to market Honeywell-Bull's model 58 throughout the U.S. can't help but please the super-sensitive French. The Mod 58 is aimed at the same market as IBM's System 3.

DEC PUSHES PDP-11,
FINDS 16-BITTER SWEET

Digital Equipment Corp., which not long ago spurned 16-bit minicomputers, is preparing now to promote its 16-bitter--the PDP/11--to the head of the class over the company's 12-bit machine, the PDP-8. At least two new versions are in the works: a low-cost model called the 11/05 and a larger, more expensive version tentatively called the PDP-11/40.

Meanwhile, Digital's arch rival down the road in Marlboro, Mass., the Data General Corp., is reliably reported to have already delivered several of its low-cost 16-bit machines, the Nova 200. Originally, deliveries weren't to begin until February.

IBM REALLY ANNOYED
WITH RICHARD STOCK

IBM homed in on Richard Stock with a trade secret, breach of contract suit that will test more poignantly laws involving employees and their mobility than its "compatible" Memorex suit (see page 43). IBM says, in essence, that Stock, who worked on the 3330 disc development, told his supervisor he was going over to Information Storage Systems, Inc., in Cupertino, Calif., to help them with their 3330 discs--and then left with trade secrets and confidential documents. Besides proving document theft, the major issues to be resolved are: the control an ex-employer can exercise over the knowledge in a person's head when he leaves for a job in the same product area, and specifically, the enforceability of the IBM employee contract on non-disclosure.

BENSON IS BACK
IN GIANT-KILLER ROLE

Back on the scene after almost a decade's absence is Bernard S. Benson, a colorful co-founder of Benson-Lehner Corp., who retired to France in 1961. He's part of a group that has brought new financing to General Computer Systems, Dallas maker of a key-to-disc system. Benson, now board chairman, has recorded on a small LP a fable that depicts IBM as a giant feeding and prospering on punched cards.

The 2-yr-old GCS had projected 10 system orders for its current fiscal year, but instead had racked

LOOK AHEAD

IS IBM
GOING DISCOUNT?

SYCOR MAY LAND BIG
PENN CENTRAL DEAL

RAYTHEON SPLITS UNITS,
STEMS FLOW OF BLOOD

RUMORS AND
RAW RANDOM DATA

up 19 worth \$2.7 million at midway point. And importantly, three of eight installations made since last June have been in the U.K., where payment is by cash. Local users include Michigan Blue Shield, Pontiac Motors, Nieman-Marcus, Burlington R.R., and American Express, the latter two also placing follow-on orders.

Sources claim that IBM broke with tradition and offered discounts to keep from losing two Federal contracts: the 10-computer IRS system that went to Control Data and an Aviation Supply Office integrated management system won by RCA. Since IBM lost, it said it would be "inappropriate" to comment. If true, at least on the IRS contract, IBM merely joined a price-cutting crowd; but sources claim IBM is giving "breaks" it hasn't before because of its troubles in winning federal contracts lately.

Everybody laughs when they hear it, but Sycor, Inc., of Ann Arbor, Mich., is dead serious about what could be a whopping order for 300-500 source data entry terminals from Penn Central. Contingent upon performance of four test units in the first quarter, the order could be for \$6-10 million. The deal has been okayed at the trustee level, and fits in with the beleaguered railroad's attempts to improve cost and efficiency of car tracking and control. Says Sycor: every car in the country goes through the Penn Central system at least once a year. It's a 92,000-man company, not about to go under.

Chief units within Raytheon's new commercial computer subsidiary will include portions of its Equipment Division in Norwood, Mass., and Raytheon Computer in Santa Ana. The subsidiary will be headquartered in Norwood and headed by Maxwell O. Paley, an ex-IBMer who was commissioned to look into the company's computer operations. Raytheon's brass in Lexington, Mass., liked "The Paley Report" so well they asked him to come on board. The Santa Ana operation, which once was said to be bleeding the parent company, has been whipped into shape over the past several months, and sales are approaching \$10 million annually. The company won't comment, but we hear, too, that Raytheon is shipping its military computer business to another plant and that Norwood will concentrate on commercial data display systems, data switching equipment and communications.

Taxtronics of New York has dropped a program to prepare individuals' tax returns on-line through three banks. Last year they charged some 4,000 customers \$15-25 per return, but found the cost to them was \$100 per return. Now they'll go on-line only if a customer base of 20,000 to 25,000 returns can be assured . . . Still negotiating for "a lot" of financing, 360 architect Gene Amdahl's Amdahl Corp. of Sunnyvale, Calif. plans to build an "incomparable" computer, more powerful than anything yet announced.

modem with a future

**RFL building block
modems let you upgrade
by changing modules.**

When you rent or purchase an RFL Data Modem, you're protected against obsolescence. You simply change plug-in modules to increase speeds or to meet changing requirements.

But this advanced modular design is only one advantage of RFL modems. We make them for just about every computer, data terminal and time-sharing application. Long experience with industrial applications in a wide variety of fields has resulted in commercial modems of highest quality and dependability, at modest cost. RFL modems let you multiplex up to 8 full-duplex systems on a single circuit, for *substantial* savings. Automatic answering capability is available. New RFL equalizer modules make possible flat delay and/or amplitude char-

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DATA COMMUNICATIONS AND THE DATA MODEM



RFL Industries, Inc.



THE BEST THING ABOUT DATA GENERAL IS OUR LOW MAIN FRAME PRICES. OR SO PEOPLE THINK.

For too long, people have thought of us as a main frame company.

And justifiably.

After all, we have spent the last couple of years producing the Nova line of fully compatible, 16-bit mini computers.

But we're smart enough to know that main frames and low base prices aren't everything.

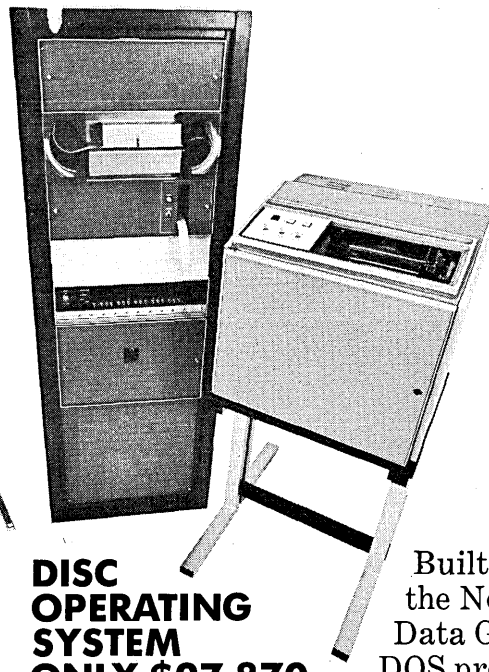
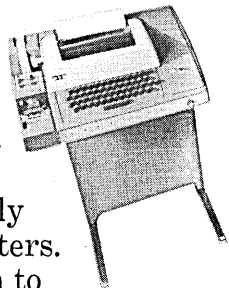
Proven performance is important, too. (We've installed over 850 Nova-line computers so far.)

A strong service organization is important.

Software and peripherals are important.

And finally, the ability to put main frames, software and peripherals together in configurations that meet real-world computing requirements at the lowest prices possible is the most important consideration of all.

And that's what we'd like to talk to you about.



**DISC
OPERATING
SYSTEM
ONLY \$27,870**

Built around the Nova 800, Data General's DOS provides high-speed data processing capability at a remarkably low price. The system priced here includes the Nova 800, 16K of core memory, a 128K, head-per-track disc, Teletype, high-speed paper tape reader, and device-independent software.

DOS supports system software that includes relocatable assembler, editor, linking loader, and ALGOL 60 and FORTRAN IV compilers.

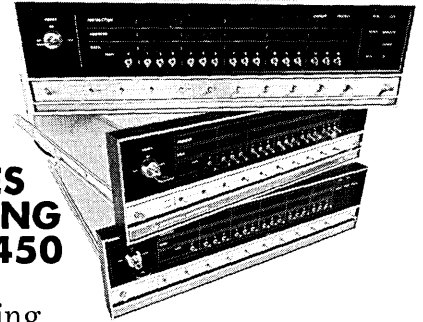
Substituting a 256 K disc adds only \$1,500, and a 365 lpm, 80-column, 64 character line printer costs \$12,900.



MAG TAPE SYSTEM ONLY \$28,035

The configuration priced here includes the superfast Supernova, 8K of core memory (interchangeable with 300 nanosecond monolithic memory), Teletype, 8-channel, 10-bit A/D converter, and a 24 lps, IBM-compatible magnetic tape unit.

This is an inexpensive, easily expandable, on-line data acquisition system that can handle its own data processing, or can prepare data for a larger processor.



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Everything starts with main frames.

And any one of ours can plug into any one of the systems priced above.

What's more, they are all software compatible, mechanically interchangeable, and all run the same peripherals.

□ Nova 1200: First to take advantage of LSI and MSI. It's fast (1200 nanosecond cycle time), reliable, and less expensive than anything else at its performance level.

Price: \$5,450.*

□ Nova 800: Faster, more powerful than the 1200, Nova 800 has a fully parallel central processor and a cycle time of 800 nanoseconds.

Price: \$6,950.*

□ Supernova SC: First to really take advantage of all-monolithic memory, making it the world's fastest mini computer (300 nanosecond add time).

Price: \$11,900.* (\$9,600* with compatible 800 nanosecond core.)

TIME SHARING BASIC ONLY \$17,596

This is the least expensive way to provide a sophisticated, easily-used computing capability for as many as 16 users.

The four-user system priced here includes a Nova 1200 with 12K words of core memory, four Teletypes and interfacing. A high-speed paper tape reader adds \$2,650.

The system uses Data General's fully extended time-sharing BASIC with string and matrix manipulation capabilities.

When not time sharing, the system can use all of Data General's extensive list of software and peripherals.



To find out how little *your* configuration will cost, call or write the nearest Data General office.

To know us is to love us.


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* Main frame prices include 4,096 16-bit words of memory, Teletype interface, and Direct Memory Access data channel.

**1970 was a miserable and confusing year
but by the end there were some reasons
to think the worst was over**

The News: A Year

 The computer industry was a good one to be in last year if you worked for Penn Central or an aerospace firm. Otherwise, things were bad all over—or nearly all over. For the first time in its short history, the industry found itself keyed to the national economy, and the results were the long-predicted shakeout of over-extended companies, and a somewhat sudden decline in available venture capital and theretofore attractive public offerings. A recession was happening.

And Angela Davis happened.

But even though there was alarum and debacle, vitality and innovation continued to characterize many of the events of the computer year, not the least of which was the May announcement that Honeywell intended to buy GE's computer business and create a new company, Honeywell Information Systems. The move was initially greeted with skepticism, but when

**... problems ... compounded
by a whopping
\$71 million suit...**

Honeywell stockholders finally approved the deal four months later, the marriage was committed, for better or worse. After the shock eased, most persons not affected by the resultant personnel reductions felt it a strong competitor, better able to serve user needs by providing a single source for virtually all types of hardware. Even if a few observers might argue that HSI is not yet Number Two, no one could dispute that it now has the broadest product line outside of IBM.

For GE, it marked the end of a long tortuous road toward profitability in the computer business. Though profits were not claimed until the final miles—after the Honeywell announcement—GE's accounting practices were conservative enough to have showed losses where other firms' statements might have indicated profitability. GE's computer operations had been a mixture of successes and failures; most noted recently was the failure of the ambitious and much-touted Tradar system. And the road had got rougher with the disruption of corporate plans by the GE strike and the weak economy. It was a propitious time for GE to give up, and probably a good opportunity for Honeywell to expand its profitable computer operations that had sparked the firm's recent growth.

There were other failures last year. The Big Red Machine learned to its sorrow that the mtbf ratio against it was four to one.

The time was mean for many enterprises. Last year witnessed the expensive failures of two on-line services, Computer Sciences Corp.'s Computicket reservation system and Computer Applications Inc.'s Speedata market information service for the grocery business. Both firms apparently misread their markets as well as their abilities to finance the type of services needed. In the case of CAI, the \$16 million loss in Speedata was certainly a major contributing factor to the firm's liquidation later in the year.

csc wrote off \$13 million for its ill-fated Computicket. The service's former rival, Ticketron, survives, however, perhaps proving that there was sro (for one) in the entertainment ticket reservation business. At the time of Computicket's demise, csc estimated that it would have required another \$10 to \$12 million to make it profitable, and the firm preferred to forego this investment in favor of putting

To Forget

by Aubrey Dahl, Associate Editor, and Angeline Pantages, Special Features Editor

money into its Infonet time-sharing network. But csc had refinancing problems in the fall that were compounded by a whopping \$71 million suit from its former Computicket partners, who contended that csc's action was not in the best interests of stockholders, cited the use of Computicket terminals in csc's new contract for off-track betting facilities in New York, and asked for a reckoning of the \$1½ million insurance claim csc filed after some Computicket equipment was destroyed in a "fire of mysterious origin."

At last report, csc had received its refinancing.

But no wonder Fletcher Jones sold his \$500K house in Beverly Hills.

Two other large system "failures" were recorded in 1970 when United Air Lines canceled its reservations system contract with Univac, and twa called it quits with Burroughs over a similar contract (both were to be showcases for the industry) and sued Burroughs for \$70 million (the in figure last year) for "misrepresentation and breach of contract." Burroughs immediately countersued for \$11.5 million for the balance and interest due on the contract. Both the Univac and Burroughs systems were several years late on the contracts, but the vendor response was that specifications were either unrealistic or, too often, changeable. Both airlines chose IBM's PARS system as a replacement and hoped to be operational in 1971.

Atar Computer Systems, an airline ticket reservation firm that had signed up 11 airlines for its common system for travel agents, also had its problems. The Civil Aeronautics Board tabled the agreement for study, whereupon the 11 airlines withdrew, leaving all parties to proceed individually. Atar hopes to sign them all up again. They believe they have a way to run an airline.

Bad news abounded last year and, not surprisingly, visited Viatron Computer Systems. The firm started off the year with its mind-boggling figure: it was still promising customers a programmable data management terminal that would lease for \$39 a month.

As the year wore on, however, Viatron had other mind-boggling figures to offer: by July 31 the firm had logged losses of more than \$15 million for the previous nine months.

Although the company ran into considerable trouble making its terminals, minicomputers, and optical

**... no one could say
that Viatron had
trouble making news.**

character readers, no one could say that Viatron had trouble making news. In one incident that seemed typical of the company's flamboyant history, Dr. Edward Bennett, Viatron's president and founder, was fired in his own living room by the firm's board of directors.

Dr. Bennett had been predicting that Viatron would be making more than 5,000 terminals a month by midyear, but as the company's problems mounted (some two-thirds of its employees were laid off under an austerity program initiated by new president Dr. Pearson Hunt), production—which did reach 600 units in one month—dropped off to a trickle. Plans for the \$39/mo. version of the terminal were dropped, along with any kind of leasing plan, and prices were boosted. There were few buying customers, however.

(Continued on page 24)

A Year to Forget . . .

Nevertheless, Viatron did get a few hundred terminals out into the field and customer acceptance for the product was high.

And while the companies and their stockholders were being shot down, there were greater troubles elsewhere: Kent State, Jackson State, Univ. of Wisconsin, Isla Vista, as youth's disaffection with the way things are culminated in senseless tragedy.

1970 was the year unbundling began, and IBM got its first glimmer of what it and antitrust pressures had wrought. If unbundling was well timed to do the user the least immediate damage—since he was generally at the tail end of the 360 cycle and had already received the bulk of the support services for “free”—it was also ill-timed, clashing head-on with a tight economy. The projected 10-20% increase in costs did not materialize for many users, partly because of the timing in 360 life and partly because they “did without.” Those who did experience this increase were either victims of their own poor operations and lack of in-house staff, or were caught in the middle of a new project.

The end result was perhaps a worse year than IBM could have anticipated. Sources say it never collected enough in services fees to make up for the 3% reduction in rental that came with unbundling. While IBM didn't expect much from the program products operation, since few had been announced, it pushed the systems engineering force hard. After expending energies to encourage users to sign generally disliked contracts, IBM found many signing but not buying. The SE's scrounged for every contract in IBM's purview, and independents in education and consulting felt the competition to the point of screaming “unfair,” accusing IBM of underbidding or giving priced services away for free.

If it was a demoralizing year for the IBM family, the experts never changed their minds about one thing: unbundling would mean increased revenues for IBM in the long run, just as IBM projected. Consider the deferred user projects, deferred and now pent-up education needs, the advent of 370 shipments, the increasing number of program projects (one user projected his program bill will quadruple in two years). We'll see later whether 1970 didn't actually help IBM reorganize and trim out the fat of the 360s. IBM may falter occasionally, but it doesn't fall.

Something else that didn't fall, thank God, until it was supposed to, was the Apollo 13 moon mission, which had to be aborted in midflight because of a defective fuel cell. And the world sweated out the astronauts' return. The tv picture of the successful landing was the clearest, and certainly among the most beautiful, scenes of a South Pacific sunrise ever seen.

A new era of contracting began last year, led by IBM and Control Data contracts for unbundled services. After years of “faith in the vendor,” the user was being asked to sign a legal document for manufacturer services. He was enraged by what they contained. He called the IBM and Control Data (which copied much of IBM's contract) contracts “nonresponsible” since they would not take liability for failures beyond a bare minimum, stipulated they owned whatever they did for or with the user, offered no performance guarantees, completion dates, or fixed project fees, etc., etc. The users, mostly through in-

dependent efforts, since they are not organized as a pressure group for business dealings, obtained changes. Some were industry-wide and others were negotiated secretly. Objectionable clauses that remained, such as the liability limitation, kept many users, particularly some government agencies, from signing.

A weak but growing trend that resulted was user-written contracts. IBM in particular found itself presented with countercontracts to its standard forms. If the user wasn't successful, at least he used it to negotiate better terms.

Another new kind of contracting hit the scene: RCA's guaranteed conversion contract for converting 360 DOS users to its new series was the first of its kind

. . . domestic shipments of computer hardware were down sharply . . .

among manufacturers. Its intent was to break down the buyer's resistance to and fear of anything not IBM. It offered guaranteed program performance and completion dates and a liability (up to \$45,000). If the industry wasn't impressed by that liability, it was impressed by RCA's daring. A. D. Little, which did a user psychology study for RCA, projected that this effort could lead RCA into facilities management. Late in 1971 we should get the first reports of the strength of the RCA conversion team.

Finally, there was one other contract departure in the new lines. IBM offered a year's warranty on service as well as parts for System/370 processors and memory. Service was previously only 90 days. It was unclear whether this heralded a new long-awaited trend toward warranties in line with equipment price and reliability—or whether it was another move in the IBM plan to discourage a 370 leasing market once and for all. (The purchase:lease ratio is prohibitively higher, maintenance on purchase is higher, and the second user of purchased equipment won't get a warranty, so his costs are even higher.)

Last year was, regrettably, the year in which the hijacking of commercial airliners became a successful means of expressing political dissatisfaction. It reached a harrowing climax when Arab guerrillas blew up three such planes after hijacking them to the Jordanian desert and holding more than 80 passengers as hostages while they bargained for the release of other guerrilla hijackers. Somehow, nobody got hurt.

In the mainframe sales arena, to go on, A. D. Little estimated that domestic shipments of computer hardware were down sharply last year: \$4-4.5 billion vs. \$5.5 billion in 1969. But we're told that most of the six dwarfs posted records equal to or better than 1969, so astonishingly enough the drop was mostly in IBM shipments.

IBM also is said to have missed its sales quota by 35-40%—the worst record in its history. Imminence of the 370 announcement was a major factor, but adverse reaction to unbundling may have helped.

The next shipping cycle, however, was set into

motion in 1970 as IBM, RCA, and Burroughs debuted new lines. NCR moved only with the Century 300, an addition to its much-later-than-360 line. Honeywell and GE plans were stalled by the merger, although a few new products were announced. Univac nearly ran out of 1970 before they made the expected announcement of the long-awaited 1110.

IBM's June announcement of the 360-compatible 370/155 and 165 first emphasized the user and his staggering investment in the 360. If new hardware features over-all weren't impressive, IBM hinted at future possibilities—and some of these unfolded in September with the 145 and its semiconductor memory and integrated disc controller. IBM proved it could lead in drastic changes—that don't impact the user's investment. But for fear of pointing out that it's unbundled, IBM refrained from mentioning how its software will evolve until users have a new operating system and lots of priced program products to take advantage of it.

Besides placating the user, IBM, of course, got back on the sales track. We hear they are ahead of 370 order forecasts, whatever they are, but are holding up recording the net of revenue points until after Jan. 1—so 1971 will be a great year for making sales quotas.

The 155 and 165 impact the 360/50 and 65 severely. For IBM that's good, since *EDP Industry Report* says over half of those two 360 models are purchased, about one-fourth owned by leasing companies. With the high purchase:lease ratio on 370s, the industry is not likely to see leasing on the scale and terms of the '67-'68 period, IBM's not likely to lose as much in rental revenues, and Thomas Watson may never again have to explain: "IBM's gross income and earn-

**...by 1976 there
won't be a plug-to-plug
compatible market.**

ing showed abnormally high rates of growth, primarily because of a major increase in the level of outright sales. . . ."

Plug-to-plug compatible peripheral manufacturers started to do well in the System/360 market, but faced some serious technical and marketing problems in the new 370 line. IBM's announcement of an 800-million-byte disc subsystem replacement for the 2314, called the 3330, challenged the technical capability of some, but at least two independents said they'd have a bigger and cheaper model shortly after IBM did.

There is less optimism about the 2319, announced to go with the 370/145, where the disc controller is tucked into the cpu. Independents would be hard put to build a 2319 replacement drive and an external controller and hope to compete with IBM's price of \$71,400 or \$1550/mo.

The Computer Peripheral Manufacturers Association said this virtually will prevent independents from selling their discs to mod 145 customers. A Memorex marketing man said that if this continues, by 1976 there won't be a plug-to-plug compatible

market.

RCA has countered all the sideswipes taken at its new line and strategy in these pages by revealing that it has over \$100 million worth of orders for the series, and 33% of new accounts are for virtual memory models—an endorsement, it feels, for the concept. If negotiations work out with 360 DOS users switching to RCA, 15% of the new accounts will include guaranteed conversion contracts. 1971 will continue its upward trend, says RCA, and it will capture *at least* 7½% of the market.

Burroughs made no effort to emulate RCA's strategy with its new 700 line, including the 5700, 6700, and 7700. It put all its hopes in the user's love for the Burroughs design and architecture rather than in his disdain for conversion costs. In essence, Burroughs wants to keep its loyal customer base intact and to attract the user who needs a big multiprocessing capability—which neither IBM nor RCA offers. TWA's suit against Burroughs over the maverick B-8300s it planned to use in its big system could create temporary credibility problems for Burroughs, regardless of who's right.

The past year carried on 1969's work in trimming out the weakest of the time-sharing and remote batch firms—or their executives. Wall Street abandoned the glutted subindustry it had helped create. Whoever hadn't been well-financed early in the game or had started out too late (most entrants earned their first revenues in 1969) found no mercy among the financiers. Most who succumbed were small firms or entrepreneurs with grand plans still on paper. A Quantum Sciences report says that those who survived did see an increase in revenues, surprisingly, but not as big as projected. Losses were staggering for most. The general consensus again was that it would be two or more years before profitability could be relatively uniform in this industry—and it would be made through market and application specialization rather than raw time sales.

Specifically General Electric, with its nationwide network announcement, reaffirmed its intention to stay in business. In fact, there are weak rumors that GE may have had some profitable months in '70. Service Bureau Corp., except for an underplayed announcement of a nationwide service from its Cleveland center, was deafeningly still. Leasco Response made noises about doing with 370s what the Call/360 group at IBM originally intended—a mix of time-sharing, remote batch, and batch services. The small businessman's time-sharing service, Keydata, turned the corner into the black after five years and a \$7 million investment (hurrah).

In its first year of going for profit, System Development Corp. came up with a loss of over \$500K, continuing to be a nonprofit organization "unintentionally." However, in the first quarter of its current fiscal year, SDC reported earnings of \$428K, nearly wiping out the previous year's loss. The firm's plans for going public are still in abeyance. But then, come to think of it, lots of firms' plans for going public are still in abeyance.

Lawsuits were still the uniform of the year in 1970 as some were thrown and some were dropped. IBM, of course, was pivotal in much of the litigation. Two companies that had antitrust suits pending against IBM dropped them, each firm with recent history of

financial miseries, each with a recently departed president. Data Processing Financial and General's Harvey Goodman, and Applied Data Research's Dick Jones resigned early in the year and the firms settled their suits six months thereafter, but there was little evidence that there was a definite connection between the two developments. (ADR subsidiary Programatics also withdrew its suit.) ADR's settlement was for around \$2 million (including an agreement for IBM to purchase a minimum of \$600K worth of ADR's Autoflow package), and DPF&C was allowed surcease by IBM from pressures to make payments on its \$22 million debt. With release from the burdens of legal costs, both firms breathed easier, whatever their initial indignance at IBM practices.

Control Data's suit against IBM continues and the present schedule calls for the final demand for the production of documents for the discovery proceedings to be made on Feb. 15, 1971, in Minneapolis. At that time, the judge can either deny the demands and set an actual date for the court trial, or he can extend the discovery time even further. So far, about 140 documents have been produced, but "they're coming in much slower now."

The Justice Department's antitrust suit was filed in New York City and at last report the discovery proceedings are expected to be completed "by next fall." No judge has been assigned to the case in New York and it creeps along. In answer to the original complaint, IBM has asked Justice to define terms and amplify statements, i.e., what's a computer; what's the difference between electronic and electrical; is the stated monopoly of the market based on unit figures or dollar volume?

But IBM now has another competitor to face in court. Xerox Corp., which moved into IBM's domain in '69 when it acquired Scientific Data Systems, made it quite clear last year it doesn't want IBM to reciprocate. When IBM announced its office copier, Xerox responded with a lawsuit charging patent infringement. IBM filed a denial. Attorneys for both sides are "working on it," no date has been set for trial, and neither side would even comment on the possibility of an out-of-court settlement.

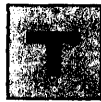
Interestingly, it was said before Xerox filed its suit that IBM was considering a suit of its own against Xerox for antitrust violations in the copier industry but dropped the idea because its legal staff already had its hands full and for fear of being labeled the "pot calling the, etc." But IBM has come close to charging Xerox with attempted monopoly. In its answer to the Xerox suit, the giant from Armonk charged Xerox with misuse of its patent position, "in an attempt to prevent others from entering the plain paper electrostatic office copier field, thereby denying customers a choice as to product and price."

At year's end, an economic upturn was being predicted for 1971, and an even greater one for 1972, but inflation and unemployment continued to rise, philosophical differences within the society, usually a healthy accompaniment, had grown ugly, and the future seemed tentative. Yet, human endeavor is ever astonishing. In this light, it does not seem inappropriate to mention that last year a man with only half a right foot kicked a 63-yard field goal with it to win a football game in the last two seconds.

There's still time. ■

Lots of new computers and peripheral products appeared during the year, perhaps adding up to generation three and a half

Benchmark



For all its faults, 1970 was an eventful year. Almost every major computer manufacturer announced new series of computers. There were bigger and faster discs, smaller and faster circuits, larger main memories, more channels, faster printers. IBM introduced the first all-semiconductor main memory on a large machine and then turned around and used it in a very small machine, its first minicomputer.

We saw the first glimmer of variable micrologic and maybe the last glimmers of some old stand-bys like independent peripheral controllers. Voice response systems and cache memories came into their own, and virtual memories started coming on stronger too. We saw many IBM-compatible peripherals introduced and IBM's reaction to them. The year kept us occupied technologically—as if to keep us distracted from the financial chaos.

And almost unnoticed behind the scenes, the stalwarts of another machine era died. No one, not even Univac, cared enough to save the last Univac I, and few even commented on the passing of the last ERMA, the 1959 bank account processing machine that launched GE into the computer business and ironically died the same year GE's computer division did.

We saw a lot but we were disappointed because we expected more. There was a succession of plays and counterplays, ploys and counterplays, until the announcements finally had revealed the 370 series models 155, 165, and 145, the RCA 2, 3, 6, and 7, the Burroughs 5700, 6700, and 7700, the Gemini series of Computer Operations, the NCR Century 300, xds Sigma 6 and Sigma 9, and the Univac 1110 in all

Changes in the '70s

by Richard A. McLaughlin, Associate Editor

their assembled electromechanical adequacy.

While one cannot overlook the effect that marketing has on computer design, it still must be said that the new introductions tended to have an initial impact that was scarcely heard 'round the world. On the surface, there was little of interest technologically; but on the other hand the new machines were designed to avoid a repeat of the trauma experienced by users in converting to the 360s.

The disappointment almost blinded us to the advances that were made, and some of them were significant. Foremost was the incorporation of semiconductor memory into IBM's 370 line. It appeared as the main memory of the model 145 somewhat as a surprise after the 155 and 165 had been introduced with cache memories and we thought we understood what the rest of the line might look like. Everyone knew that semiconductor memory could be made to work, but few expected that IBM would use it as a main memory this soon, thereby claiming a "first" for machines of the 145's class and giving its explicit blessing to a new technology. The semiconductor memory may yet appear on the 155 and 165 as a replacement for the core memories those machines feature also.

Along with the semiconductor memory came the promise of variable micrologic, of user-defined instruction sets, of optimized machines and languages. But it was only a promise so far, unsupported by IBM in any direct way; still it was there. (It was there some time ago in Standard Computer's machines and some others, but it appears that the feature won't get off the ground in strength till the big company does it too.)

With the coming of this "3 $\frac{1}{2}$ th" generation, a strange thing began to happen to the familiar computer configurations. System configurations of the '60s had evolved to include a full spectrum of equipment that extended from the central processor outward to include memory, peripheral controllers, communications controllers, peripherals, and—at the outside edges—terminals which may or may not have had additional controllers and interfaces.

That spread is now being split. The pieces in the middle are being done away with in two ways. First, some intelligent terminals now have their own controllers built in. That same thing is true, reportedly, even of Paradyne's modem, which, with the addition of a single card, can operate directly on-line to a multiplexor channel without a 270X equivalent controller, making its terminal—wherever it is—operate like an on-line peripheral.

The second way that the controller was done away with was demonstrated in the IBM 2319 disc storage system for the 370/145. Here the controller has been sucked into the central processor and exists partly in microcode rather than in pure hardware.

Pulling the controllers into the processor box looks like a marketing ploy designed to give the independent manufacturers of IBM-compatible peripherals less to shoot for. Economics, not engineering esthetics, dictates hardware design after all.

Another split which seems determined by economics became apparent after several announcements, the split into camps of new large-scale hardware and new small-scale hardware. Burroughs, Univac, IBM, NCR, XDS, and RCA all announced large machines. Computer Operations (Gemini) announced super-scale

Benchmark Changes . . .

hardware. These companies seemed to be aiming for economy through scale. IBM's System 3 model 6 and System 7 seemed, on the other hand, aimed at economy in small-scale through specialization. No one apparently wanted the middle ground.

The hardware bits and pieces and the migrating control logic is interesting, but mostly the 3½th generation is defined by price/performance, one of the few commodities that can be sold in a down market. Both users and manufacturers now have so great an investment in current technology that it is unlikely even the fourth generation or whatever we choose to call the next round will be greatly different from these or from the last series. Inter-generation compatibility is the key and, given that, it is quite likely the generations will be slower in arriving, too. Most likely hardware will come a piece at a time, blending one generation into another as the 2319 disc system blends into the exactly equivalent 2314.

It was less fun to speculate last year.

The software generations are less easy to recognize now too, and by the same economic and marketing arguments we can also expect software advancements to blend into one another. One significant thing to expect will be new packages that make use of the cpu identification numbers put into the 370 series. Since software is an extra cost item, it must be kept proprietary. Maybe it can be made to self-destruct at the end of the license period?

Last year we wondered aloud how people would make use of the ever-decreasing size of minicomputers. In a way, we were given some of the answer in the disappearing controller act. Another part of the answer comes in things like the Mercedes Benz "computerized" fuel injection and ignition system.

Wondering what would be big for next year, we might choose voice *input* systems if we listened to Culler-Harrison, a company that claims to have such a system on the verge of commercial viability. On the other hand, we might point to Computer General's offer of a "laser computer" though we are less certain what that is even supposed to be. Among other things, the "laser computer," promised for April '71, is to deliver an 80% reduction in software costs and 10 trillion bits of holographic memory for \$100K (which works out to .0000001 cent per bit).

It was less fun to speculate last year. When you can't sell machines, it doesn't seem to matter how fast the machines are. 1970 would have been a good year for technology if it had happened in 1969. Advances that were made came at a time when it was difficult to get enthused about new technologies or products, when the news was 6% unemployment rate, and when bankruptcies wiped out some honest and significant endeavors.

1970 was a year of tempering, of self-improving, and this was reflected in the technology we saw as well as in the news we carried. Our industry may one day go back to joyful exuberances and technology for technology's sake. But in 1970 it was not so. ■

**Stock market collapse,
high interest, scarce capital,
budget reductions...
echhh!**

The Money

G The stock market collapse was, of course, the most visible financial tragedy during the year and set the general mood of misery and despair. But the related serious problems—high interest rates, scarce capital for investment, corporate and government budget reductions—had an equally severe impact on most companies.

As for the market, many active issues were well above their lows for 1970 as the end of the year approached. Electronic Data Systems, which had the headline writers in a flurry when it took a dive from about 160 down to 31, was back in the 50s toward the end of the year. It moved 10 points in one day, probably aided by the company's filing for listing on the New York Exchange.

Another swinger was University Computing. From a low of 13½ it recovered to 33, then faltered under the impact of bad earnings reports and was hovering around 20.

Computer Sciences, darling of the short sellers until it sank to 5%, struggled back to two digits and Control Data was back in the 40s from a floor of 28%.

But the old zing still wasn't there for market fans. As one bearish broker said in October:

"Isn't that great the way those software stocks are recovering? Soon it will be time to short them again."

The price of money, whether in the form of bonds or bank loans, was at highs unknown since the Civil War. In January, the prime rate—only available to the big boys with long and flawless records of paying

Troubles of 1970

their bills—was at 8½%. It was reduced in gradual stages during the year, down to 7% by the end of November—but still hardly an inducement to struggling new companies. Besides the tremendous rates, usually only considered by the banks as suitable for us miserable consumers, there was the dreaded compensating balance. This banking technique requires a company to keep perhaps 20% of its borrowed funds on deposit—making them unreachable and, in effect, raising the rate still further since the borrower is paying the full rate on money he can't get at.

Meanwhile, bonds were going at returns like 9½ to 10%, when they could be sold. Rates for this kind of financing were improving, too, near the end of the year, at least for the solid credit risks. In November, AT&T had no trouble unloading a half billion dollars in debt financing, mostly in 32-year debentures paying 8.7%.

It was the shortage of venture capital, though, that marked the biggest change from the glorious days of 1968 and '69 when every disgruntled employee might dream of becoming an entrepreneur. Neither institutions nor individuals with large sums at hand were easily inflamed by stories of concepts and breakthroughs. The only kind of facts that seemed to turn them on had to do with cash flow, rate of return on investment, and highly favorable ratios of current assets to current liabilities.

Topping all these troubles—for every kind of company connected with computers and trying to make a dollar—were the budget cuts. The Defense Depart-

by William J. Rolph, Senior Associate Editor

ment was pretty much out of the market, except for low-cost machines and those that were an integral part of weapons systems. Corporation controllers were expected to find some way to save money and, after they fired all the PR men, they began to ask hard questions about computer projects.

These were apparently some of the main identifiable causes of the slump. What about the effects?

Very few companies—large or small, software, hardware or services—were immune. The effects, and

If the product or service could be offered as a money saver, the vendor had a chance.

the reactions to them, varied according to the type of company, what sort of financing they needed and how much, what markets they were in, whether the things they sold were postponable purchases or not, and many other characteristics. Before considering some by type of company, though, let's look at a couple of examples at opposite ends of the size scale.

A friend of mine had reached the jumping-off point with a new company. He had four prototypes of the product in operation, with full test data gathered. He

Money Troubles . . .

had drawn up a sensible marketing plan. He and the other principals had resigned their jobs—as vice presidents. And then, when they were set to go, the money fell through.

At the other extreme, IBM's nine-month earnings were reported to be up 8.4%. But, as *Forbes* pointed out in the Nov. 1 issue, their earnings from operations were actually down a bit. It was other kinds of income, mainly from the company's portfolio of securities, that accounted for the increase in net.

It's not easy to generalize on the various kinds of companies in between these two, but maybe it's worth a try.

If the product or service could be offered as a money saver, the vendor had a chance. Thus the dealers in used computers reported lots of interest and activity, although most were either so new or so small that no clear earnings picture emerged. The makers of plug-compatible peripherals were in pretty good shape. CalComp, for example, turned in some rosy earnings figures, at least partly because of this portion of their business, although IBM seemed suddenly alert to this threat when they came out with the mainframe-integral controller for the 370. The leasing companies, although falling into this money-saving group, didn't make out so well. First they were victims of the tight money market and then came the 370 with its changed lease vs. purchase price ratio, making life still harder for the leasers.

Two leading candidates for taking the worst beating were software houses and time-sharing companies.

The software people were clobbered by declining government contracts, the main income source for many. At the same time, corporate dp departments,

. . . programmers had to find out where the local office of the state unemployment department is.

feeling their own budget pinch, were not inclined to go outside for work when they were trying to keep their expenses down without resorting to layoffs. Still another problem appeared in some areas—such as southern California, where the aerospace cutbacks reached deep into the programmer ranks: unemployed programmers were out looking for free-lance work at bargain rates, further cutting into the software houses' service jobs.

As for the time-sharing companies, only two that we know of were comfortably in the black. Some were acquired by larger companies, presumably with enough capital and net profit to face losses until substantially more time-sharing customers appear or the rate structure is more attractive. Still other time-sharers just quietly disappeared.

The big mainframe makers reported mixed results, with IBM sort of up—as mentioned before—while CDC and RCA were down for the first nine months of the year. Burroughs, on the other hand, showed nine-month operating earnings up to \$36.8 million from \$30.2 million for the same time the year before.

Some of the relatively brighter segments of this beleaguered industry seemed to be data input, communications equipment, minicomputers, and COM. Data input, in the form of key-to-disc/tape devices, had the money-saving pitch going for it. Modems and other communication products had some anti-phone-company legal decisions to cheer them on. And COM, minicomputer, and facilities management companies were finding new markets to try.

The effect of these slowdowns on people in the computer industry were unique; not since the whole thing got started in the '50s have programmers had to find out where the local office of the state unemployment department is. There were still ads for experienced programmers in the newspapers, but not nearly so many, and the tradition of automatic job-hopping for a raise seemed to be over. A surplus of middle management people also became apparent, with many willing to settle for a job without the vice president title.

Companies about to be launched, or ready for a second round of financing, were languishing—with

Many companies . . . chose 1970 as the time to take some disagreeable write-offs . . .

some folding up and others cut back to skeleton crews, waiting for the turnaround. Bigger companies, with money in the bank, were besieged by small ones wanting to be acquired. Companies with an inventory of products and few or no orders faced the bleak prospect of their stockpile becoming obsolescent while they waited for the orders to come in.

By the end of the year, though, there were a few signs of life—without counting the consistently hopeful predictions of government economists who had been seeing clear signs of recovery all year. Leading the more believable indications was the accelerating decline in money rates. This reduced the fears of corporate collapse that reached their peak with the Penn Central debacle. As the prime rate went down and bonds went up, it seemed a fair bet that the stock market—including the new-issue market—would eventually benefit. All that money previously soaked up by record bond yields has to go somewhere.

And the general absence of euphoria that has in the past characterized this industry may have its later advantages, too. For example, many companies—seeing that they weren't going to make much of a showing in the earnings-per-share race anyway—chose 1970 as the time to take some disagreeable write-offs and get it over with. Many of them also decided that it was time to switch accounting tactics and adopt the more conservative policy of counting research and development costs as they were incurred, rather than hoping to spread them over the future sales of the resulting products.

We'll bet that next year's comparisons look a lot healthier than this one's. Especially since there will be such a crummy set of earnings to use as a basis of comparison. ■

**Is Ma Bell really
Auntie Competitive? Will
Wimmix wither away?**

Washington Circus... Circa '70

by Phil Hirsch, Washington Editor



Telecommunications occupied the center of the spotlight in Washington last year as the FCC immersed itself in domestic satellite operations, specialized data communications services, and foreign attachments.

Elsewhere in Washington's wonderland: DOD finally released an RFP for the World Wide Military Command and Control System, but it was a pale shadow of the originally planned buy; Congress completed action on DOD's FY'71 appropriation bill after reducing the budget for adp personnel by 4.27% and the ADP Operations and Maintenance request by 5.5%; the dp standards effort lurched onward, but not necessarily forward, and federal dp managers talked—even more than in 1969—about the need to coordinate federal software acquisitions.

Possibly the most significant single dp communications story during the year occurred in Ohio, where AT&T rescinded a rate schedule covering "Information System Access Lines." This is a new service category which, in effect, increases communications costs 200-400% for on-line computer users.

Ma Bell's retreat in Ohio was significant because ISAL rates have been proposed and/or adopted in several other states. Affected customers, led by GE, are continuing the fight against ISALS in Illinois. Meanwhile, they're considering whether to ask FCC to enter the picture.

The commission, late last year, ruled in three separate cases that interstate tariffs must be filed for facilities that provide both interstate and intrastate service. ISAL rates have been regarded as intrastate matters so far, even though many ISAL communication channels cross state lines.

In April, the commission tentatively decided that communication common carriers should be allowed to offer commercial dp services, provided they do it through separate subsidiaries. Time-sharing service bureau operators wonder whether this separation can be achieved, given the commission's limited staff and the carriers' multitudinous opportunities to help ostensibly separate dp subsidiaries. After the tentative decision was issued, the commission asked for comments from interested parties. A final decision will be forthcoming after this material has been digested.

April was also the month FCC invited applications from prospective domestic satellite operators. Western Union filed one application, and Comsat-AT&T jointly filed another. Meanwhile, two other matters—foreign attachments and special service carriers—were

generating additional paperwork.

On foreign attachments, the commissioners were told by the National Academy of Sciences that certification of independently made terminal devices is a viable alternative to the present system, which requires foreign attachment users to lease interfaces exclusively from the carriers. NAS added that the choice is a political matter, and deferred it to the commission's superior judgment.

A second analysis, from Dittberner Associates, recommended certifying foreign attachments instead of continuing the status quo, and in addition, proposed a much simpler certification scheme than the one laid out by NAS.

In July, FCC asked for help in evaluating a flood of applications from prospective operators of specialized microwave common carrier systems. The result was a new deluge—128 separate statements—which left the key question as controversial as ever. That question, basically, is whether new companies should be allowed to compete with the established carriers in providing data communications to a rapidly growing market.

Another question facing the FCC is how to determine the costs of digital services to be offered by the established carriers. AT&T and Western Union are each planning hybrid transmission systems which, basically, will consolidate new digital communication services with existing analog offerings. By loading most of the system cost onto the latter, the former services could be offered at rates below those charged by Datran, MCI, and other new entrants. The newcomers, of course, will try to get as much system cost loaded onto the new services as possible.

The two charts accompanying this article provide an overall picture of federal adp expenditures during the past three fiscal years. Based on this record, it seems likely that DOD expenditures during FY'71 (which ends next June 30) will total \$1.60-1.66 billion—i.e., roughly 15-20% higher than in FY'70. Non-DOD adp expenditures seem likely to top \$900 million and may go as high as \$940 million.

According to a knowledgeable source, DOD's FY'71 budget request for adp will be considered a ceiling for FY'72. More or less the same thing was said last year. The result: DOD's final budget request for FY'71, covering personnel, operations and maintenance, procurement, RDT&E, and all other categories, totaled \$1.1505 billion. This was only \$4.6 million above the FY'70 figure. So, the FY'72 budget request probably

Washington Circus . . .

will be only minimally higher. How much Congress will slice off this total is anybody's guess.

Last February, deputy secretary of defense Packard issued a directive aimed at tightening management control over large military adp systems. Plans to acquire hardware and software worth roughly \$100 million were delayed while the military services and agencies reviewed the justifications for these projects, according to guidelines issued by DOD comptroller Bob Moot. They were scheduled to report to Moot last month. A reliable source indicates that the comptroller's shop, within the next few months,

probably will ok procurement of most of the systems which have been held up.

Last year, Wimmix was the major military dp system to reach the bid-invitation stage. Originally consisting of more than 100 separate installations, it was whittled down to a maximum of 35 by the time the RFP was issued. Knowledgeable observers believe this limited commitment will be reduced even further when the House Appropriations Committee considers DOD's FY'72 budget request early this year. Possibly, the buy will be killed altogether. The Air Force's Advanced Logistics System, another big pro-

FISCAL YEAR 1968							DOD's Share of Federal Total (%)
	Army	Navy	Air Force	Defense Agencies	Total	Non-DOD Expenditures	
Total % Equivalent	\$ 284 28.3	\$ 263 26.2	\$ 368 36.7	\$ 88 9.3	\$1003 100	\$ 650	60.7
Salaries	168	136	192	40	536	302	83.6
Rentals	58	57	89	17	221	91	70.8
Contract Services	22	27	31	18	98	105	48.3
Capital Costs	11	19	30	7	67	93	41.9
Other Costs	25	24	26	6	81	59	57.8
Average Cost per Man-year (Dollars)	6774	7234	6808	9166	7000	7173	
FISCAL YEAR 1969							DOD's Share of Federal Total (%)
Total % Equivalent	405 33.2	289 23.7	416 34.2	108 8.9	1218 100	720	62.8
Salaries	216	151	229	45	641	355	64.5
Rentals	73	64	101	23	261	123	73.9
Contract Services	65	27	30	27	149	92	54.8
Capital Costs	17	11	28	7	63	100	38.6
Other Costs	34	36	28	6	104	53	66.2
Average Cost per Man-year (Dollars)	7633	7905	7763	10460	7836	7751	
FISCAL YEAR 1970 (Projected)							DOD's Share of Federal Total (%)
Total % Equivalent	483 35.0	332 24.0	446 32.3	120 8.7	1381 100	820	62.7
Salaries	256	172	244	49	721	412	63.6
Rentals	94	85	116	24	319	98	78.5
Contract Services	55	29	32	27	143	130	52.4
Capital Costs	32	6	23	10	71	122	36.8
Other Costs	46	40	31	10	127	58	68.6
Average Cost per Man-year (Dollars)	8044	8600	8026	10774	8278	8357	

Chart I: Federal ADP Expenditures (All figures in millions unless indicated otherwise)

	FY '70 Request	Congressional Reduction	% Reduction	FY '71 Request	Congressional Reduction**	% Reduction
ADP PERSONNEL						
Army	\$ 68,400	\$ 5,000	7.31	\$ 73,300	\$ 5,000	6.82
Navy	38,000	1,300	3.42	39,000	1,000	2.56
Marine Corps	13,800	100	7.24	13,500	500	3.70
Air Force	101,500	900	.89	103,800	3,300	3.18
Total Budget Request: ADP personnel	221,700	7,300	3.29	229,600	9,800	4.27
Total Budget Request: All Military Personnel (in Billion \$)	24.3842	.8144	3.34	21.0328	.3435	1.63
ADP OPERATION AND MAINTENANCE						
Army	254,200	25,000	9.83	242,900	15,000*	6.17
Navy	150,000	30,000	20.00	150,800	3,800*	2.52
Marine Corps	21,300	2,000	9.39	21,400	4,200	19.63
Air Force	189,900	23,000	12.11	200,300	10,400*	5.19
Defense Agencies	140,400	4,550	3.24	148,300	8,600	5.79
Total: ADP Operation and Maintenance	755,800	84,550	11.19	763,700	42,000*	5.50
Total: All Military O&M (in Billion \$)	21.941	1.0809	4.93	19.512	.1484*	.76

*The House added \$50 million each to the Army, Navy, and Air Force O&M appropriations, to cover "unbudgeted and unforeseen" activities, when the Committee version of the Appropriation Bill reached the Floor.

**These figures reflect reductions made by the House. Past history indicates the Senate won't change them.

Chart II: Congressional Action on DOD ADP Budget Requests (Add 000 to all figures unless otherwise indicated)

curement, is also thought to be in hot water.

Some standards were hammered into final shape during the year—notably an ASCII keyboard arrangement and a credit card specification—but many more were still under development at year-end, including standards for mag tape cassettes, OCR fonts, I/O interfaces, and terminal-communication line interfaces. Even farther back in the pipeline were data descriptive language and system performance measurement standards.

Overshadowing these developments was the replacement of Dr. Herbert R. J. Grosch, chief of the federal standards effort, with Dr. Ruth Davis, a veteran computernik who transferred from NIH, where she headed the Lister Hill National Center for Biomedical Communications. Grosch, who has a habit of saying what he believes, reportedly irritated his boss, NBS director Lew Branscomb, and Branscomb's boss, assistant secretary of commerce Myron Tribus. (Tribus quit, and became a senior vp at Xerox, after Grosch was displaced.)

Besides concerning itself with standards, the Commerce Department also promotes U.S. exports, and last year through this latter activity became much more deeply involved with the edp industry. The basic reason is that in 1969, Commerce Department officials decided computers, peripherals, and

The Air Force's Advanced Logistics System . . . is also thought to be in hot water.

software comprise one of six product areas having the greatest potential for increasing U.S. foreign trade. That decision led to a voluminous survey of the market for U.S. hardware and software in 25 countries. The study, released in September, predicted that total U.S. hardware exports should reach \$1 billion in 1970, and \$2 billion in 1974, excluding shipments by U.S. subsidiaries and licensees abroad. (The study is titled "Global Market Survey—Electronic Data Processing, Peripheral Devices, and Software," and can be obtained from the Bureau of International Commerce, U.S. Department of Commerce, Washington, D.C. 20230.) Commerce has begun calling directly on dp hardware and software suppliers, in the hope of stimulating greater interest in the export market.

Congress finally approved a reorganization bill, after years of debate and after deleting a section that would have established a joint committee on data processing. But even so, plans for a computerized information retrieval system were moving ahead, at least in the House. By the end of this year, it seems likely that system design work will be completed.

Congress enacted a bill aimed at giving consumers freer access to their credit records and making the information more accurate. A related bill, which prohibits the mailing of unsolicited credit cards, also was passed. Meanwhile, Sen. Sam Ervin of North Carolina attacked an Army data bank containing dossiers on individuals and groups involved in peaceful politi-

cal protest activity. The army promised to destroy the file, but Ervin is still suspicious, and his Judiciary subcommittee probably will hold a hearing on the matter early this year.

Sen. William Proxmire tried to restrain DOD's independent research and development program, but was squelched when a House-Senate conference committee decided not to put a ceiling on R&D expenditures. The committee also gave the Pentagon wide latitude in determining the kinds of projects that can be supported with R&D money. But Proxmire and his cohorts succeeded in getting the Defense Production Act amended to require use of uniform cost accounting standards by military contractors. Several dp hardware and software firms are directly affected.

Last fall, Proxmire attacked plans to develop an electronic battlefield. This system, which includes several computers, will ultimately cost the taxpayers \$20 billion, he says. Further discussion is likely this year.

Proxmire was also unhappy about edp procurement. At hearings held by his Joint Economic Committee in August, he complained about the lack of dp standards and the failure to develop interfaces allowing independent peripherals to be integrated into newly acquired systems. Dick Caveney, whose views on this topic are well known by now, was one of the JEC's witnesses. Afterward, Caveney accused IBM of playing dirty pool; by tucking the I/O controller into the System/370 cpu, he said, IBM will keep independent peripheral makers from competing for IBM system business.

Federal efforts to exploit independent peripheral manufacturers' lower prices didn't precisely leap forward last year. The most notable development was the Navy's award of a contract covering several hundred independently made tape and disc units which are plug-compatible with IBM systems. The Veterans Administration also bought some. A similar Air Force procurement fizzled. Late in the year, GSA asked for bids on some 400 plug-compatible tape and disc units.

Another GSA RFP invited independents to bid on a computer system needed by the Commerce Department. The feds hoped this buy would help them determine whether acquiring a system from multiple sources costs less, overall, than buying the entire system from a single manufacturer. But few, if any, independent peripheral makers responded to the RFP.

The National Bureau of Standards also began working on interfaces last year. An engineering task force is exploring ways of interfacing cpu's and tape drives of different makes which are not plug-compatible. Early this year, the group is scheduled to report.

Last year's effort to cut software acquisition costs consisted largely of a GSA-Air Force joint effort to buy a system simulator capable of being used by most federal agencies. But vendors raised so many objections that the buy was canceled.

GSA's next stab at software coordination probably will consist of promoting a payroll package developed in-house. This effort is scheduled to get under way this month. If successful, it could lead, ultimately, to development within GSA of a programming shop serving all federal agencies. ■

Much remains to be done, but a start in grouping companies has been made

Consolidation Mood



The first year of the seventies ended on almost the same note as it had started as far as the development of European computing was concerned. Pressure from the subsidiaries of IBM, Univac, Honeywell and so forth continued to force the indigenous manufacturers on the defensive, and it looked as if this decade was going to prove little better for manufacturers struggling to get a tighter control over their destiny. Then the impossible happened with France's CII, ICL from the U.K. and Control Data reaching agreement to pool some of their know-how.

It was not quite the way that idealists had hoped Europe would solve its computer dilemma through a genuine grouping of companies involving any or all of ICL, CII, Philips from Holland, Siemens from Germany, and Olivetti from Italy. Nevertheless it has been regarded as an important start in a coalescence that might produce an organization with the resources for facing the American giants. But it has taken five years of dickering to reach this stage.

The catalyst for this agreement was the takeover of Bull-GE by Honeywell when GE's computing interests were bought up earlier in the year. It was a maneuver that spelt for the French the final and irrevocable loss of the computing resources that had once existed as the Compagnie des Machines Bull.

The takeover came at a time when CII was very low on morale after a year of bad trading. In fact, it was the year that had been forecast as the year for the start of recovery following the establishment of CII under the now wilting Plan Calcul. The first installations of Iris 50 should be humming away as the foundation for CII's future. But only 50 are on order and the delivery situation is not a topic for enthusiastic discussion. The next processor in the series, Iris 80, is still a development model. Even ICL is pegging away with greater success in France than CII.

The British manufacturer has about 200 installations, mainly 1900 series, in France. More importantly, Siemens is beginning to make some inroads with its 4004 systems, a modification of an RCA Spectra 70 license. In fact, the German company can count the year as its period of real consolidation, with its European installations and order backlog closing in December at over 1,000 systems. Thus there are good reasons for Siemens to be regarded as the emerging dominant manufacturer over the next 12 months, a

position that ICL will be unable to retain unless its much rumoured new hardware lines begin to take a tangible commercial shape soon.

The silver lining of the year was probably software. But even that had a rather extraordinary twist to it in terms of French developments, for the xds Sigma 9 was released with an operating system for commercial applications designed by CII. The connection between the two companies goes back a long way, and is reflected in the architecture of the Iris series. But

IBM's name has been linked with independents . . .

curiously the Iris 80, which seems the closest relative to Sigma 9, is not quite ready.

Apart from such conundrums, the software groups have been developing quite healthily with more established ones such as Computer Analysts and Programmers piling up the profits and younger ones such as Harwell Data Processing earning a big reputation with compiler deliveries and special commercial evaluation packages.

One of the new alliances was between the Informatique Division of Metra International, the consultancy and software group headquartered in Paris, and the Société de Mathématique Appliquées of Canada to form Metra Informatique Canada based in Montreal. The activities span proprietary products such as linear programming, financial decision making models, forecasting, production planning and so on; tailor-made systems in basic software, etc. This should be an important start to new sources of revenue for the French software industry.

Turnover of wholly French software houses at home is \$75 to \$80 million a year. Encouraged by the performance of the top five or six independents, the French government is considering a Plan Calcul for software to make venture capital available and to ensure that major government contracts go outside industry. Perhaps it would provide a consolation for the disillusionment over hardware.

Underlying the idea appear to be fears of a renewed incursion by some American software houses

into Europe. Europe has proved a harsh climate for U.S. firms to get a foothold. But the endeavors in the past have been largely from a flourishing base at home. The stimulus now could be the fading business at home caused by cuts in the public sector. Curiously, no one seems to have made a definitive study of the structure of the software industries on either side of the Atlantic to discover just where the differences in emphasis lie. Price structures certainly vary, as do the categories of users hiring outside help and the type of services in greatest demand.

In the U.K. the independents have formed a soft-

in Europe

by Pearce Wright, European Editor

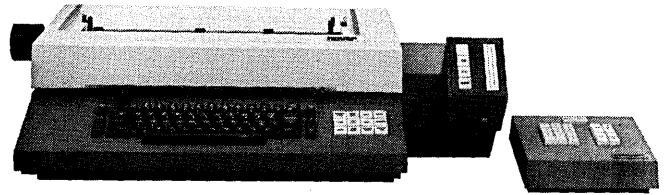
ware houses association, and their lobbying seems to have convinced central government of advantages in seeking outside help.

The big project up for consideration that has produced some interesting bedfellows is the French SOFIA airport control scheme. It is intended to streamline freight and customs handling at Paris airport, and a decision has to be made early in '71. Contenders so far are IBM with a software consortium consisting of Centre d'Analyse et de Programmation, CEGOS Informatique and Société de Réalisation en Informatique et Automation; CII and ICL with Société d'Economie et de Mathématiques Appliquées and Société d'Etudes des Systèmes d'Automation; and lastly Honeywell-Bull on its own.

The fact that IBM's name has been linked with independents is perhaps even more surprising than the absence of Univac's name from the lists altogether. But a last minute bid with the new 1110 is likely, particularly because France is one of Univac's strongholds of 1108 installations.

Time-sharing terminals continued to proliferate over the year probably causing as many headaches as they solved. An indication of the virulence of the epidemic was gained at the first dedicated computer trade show in London in over 10 years. There was hardly an on-site processor in sight. All the data from those hundreds of demonstrations must have been going somewhere.

But the "time-sharing biscuit" award has probably been earned for '70 by one of the embryo ventures of the Miles-Roman empire. The first progeny from this entrepreneurial team is Autonomics Limited, which has aspirations of saturating Europe with terminals for business and commercial users. It includes a 150 lpm printer (to avoid the pitfalls of others in trying to provide a cheap t-s service with teleprinters). A special display enabling up to 64 transparencies stored in the system to be optically projected on the crt tube is an addition. Capital cost to the user for a tailor-made business system is estimated at \$20,000, with a \$3,600 connection charge. Running costs should be about \$9,500 a year. Processing centers, dotted first through the U.K., will be based on Computer Technology processors. With a promise of 56 machines for the first stage of the network, Computer Technology is only one of the mini-makers that had a good year. ■



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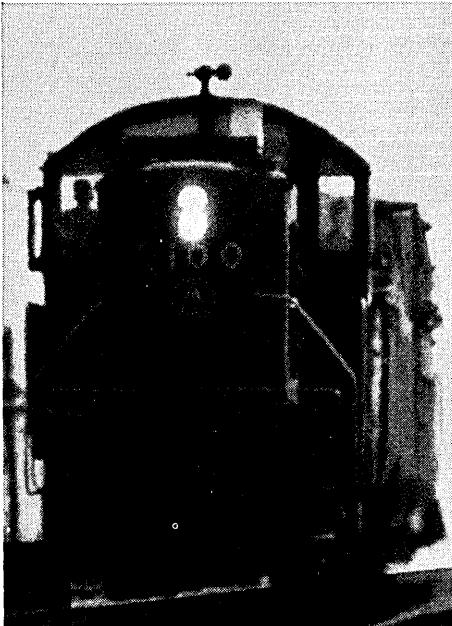
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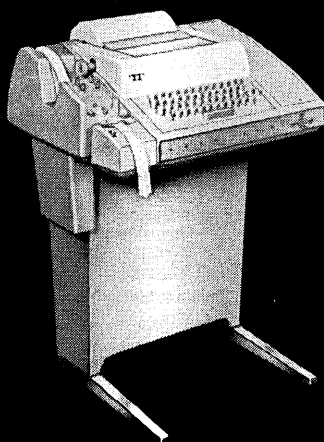
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AMPEX

**FJCC offered many surprises:
high-caliber attendees,
a friendly city, and
Ross Perot with 113 Girl Scouts**

Astro the Show Was

A lot of skeptics went to Houston last November and they were surprised.

The Fall Joint Computer Conference, which in early fall appeared to be foundering with the economy, had somehow righted itself and the general feeling taken away by exhibitors and conferees alike was of satisfaction.

Oh, it wasn't a sudden or miraculous recovery. It was a matter of musical booths for awhile with exhibitors dropping out and coming in at a rapid rate and others switching to larger or smaller spaces. The show, which had 281 exhibitors signed up in mid-August, lost 86 of these but by showtime had picked up enough replacements to wind up with 253.

Products shown ranged from oem items to full-scale computers, but the emphasis was on communications gear, for the name of the game in computing today is getting the user closer to the computer. A surprise was the lack of attention paid the uninterruptible power supply people whose products have been topical lately. But, power shortages haven't affected the West that much. Considerable attention was paid CRT's, cassettes, and the like. Keyboards came on as attention getters when

word got out there was a buyer at the show in the market for 50,000 of them. Not surprising that all the keyboard display people were trying to find out who and where he was.

Plug-to-plug compatibles, as could be expected, elicited interest. One government buyer was looking for IBM-compatible tape drives, comparing all relative features. He had 125 to replace and was under pressure to do so quickly. "It's not a question of if—rather when can I get them and will they work as well."

In a compatibility switch, an Ampex spokesman was boasting that one user was about to sole source his company for extended core memory, tape drive and disc drive, prompting an observer to ask if anyone will ever come up with an Ampex-compatible cpu.

If one aspect of the exhibits stood out, it was a quiet demeanor that seemed to reflect the morbid state of the economy but probably was a result of AFIPS' new regulations against carnival-type capers by the vendors. Yes, the crowd was small in comparison with the past, and the commodious quarters made possible wider aisles which gave the hall an even emptier feeling, but no one complained about that. In fact, most

exhibitors expressed elation at the quality of the traffic through their booths.

Business is good

A second and more significant fact was that major companies dropped out of the show, allowing new and small firms to get in for the first time. They were at the bottom of the waiting list, had no track record at Joint conferences, and therefore got last call. But answer it they did. Still, with all of them accommodated, there was a number of empty booth spaces available.

If time-sharing, software, and other service firms were noticeable by their absence, firms with memories, peripherals, and terminals abounded. With the advent of IBM semiconductor memory 145, the most obvious adversaries on the floor were the core and semiconductor producers. It was the battle of the price-per-bit: the core makers touted here-and-now prices (although most have their eye on the inevitable semiconductor market somehow), while the semiconductor producers talked pennies-per-bit for the future when the quantities get big enough.

Lockheed Electronics passed out

badges that read: Think BIG—Business Is Good. And, by golly, an encouraging number of manufacturers report that business is good. An upturn isn't shown in their latest quarterly financial reports, they say, but it will within the next two. Hiring more people? Yup, but slowly and selectively.

The new look at the Fall Joint, with small firms represented, also brings back an old look. That's the sight of company presidents manning the booths. It's been several years since we were able to walk into a booth and meet the old man, and we welcome back his presence.

And while many major firms were missing, IBM and Honeywell came on stronger than ever. IBM's offerings ranged from its 370/155 and the new System/7 through oem products, card punches, and software. Honeywell's exhibit, largest in the show for the second consecutive JCC, included user-oriented minicomputers and peripheral products and its

Over...

by Edith Myers, Associate Editor

new time-sharing line. IBM made its presence felt outside its booth, too, and it wasn't always welcome. IBM representatives toured the show with pencils and note pads, picking up literature. Said one unhappy exhibitor, "If it had been little xyz company just getting started, I wouldn't have minded, but IBM?"

Viatron wasn't there but it was. Registration Inc. was typing the registration, producing data on System 21s, believe it or not.

Even with the AFIPS' anti-showbiz push, it wasn't all stark curtains and flashing lights. An exhibit visitor could, if he wished, play chess with a computer, have his handwriting analyzed by computer (a DATAMATION editor who did learned he can meet disaster and take it on the chin, something he hadn't known before), or carry on a conversation with an animated little man on a crt. One com firm was advertising "Fresh Fiche Today." And the pretty girls were there. A Texas paper covering the show called them "the most popular software."

The natives were friendly, which enhanced Houston's chances of getting another Fall Joint. AFIPS president, Richard I. Tanaka, said en route home that these chances "are much

better now than they were before the show." We're told the exhibitors couldn't have been happier with the hall, the services, and the unions. Houston's chances of getting the conference in '73, the only open date for the next several years, will have been decided by this publication date. Only one big complaint was generally voiced against Houston—the distance of the airport from the city. The nearly two-hour bus ride from the airport to the Astrodomain complex left much to be desired; for many it took longer than their flights.

But they made it, almost 22,000 strong (not far off the Atlantic City SJCC attendance) to pack conference halls, gape at the Astrodome, feel the Astroturf, sell and be sold, and to discuss the industry's problems and solutions.

The conference's two main speakers—Ross Perot and Art Buchwald—had somewhat differing opinions of both of these.

Perot, who brought along 113 Girl Scouts for his keynote address to a standing-room-only crowd of 3,000, mentioned the word "computer" only four times in his 5,000-word address, but implied that the computer industry had a lot to learn from other basic industries founded during periods of hard times. "Until recently, you could get money for a bad idea in the computer industry . . . now we're back to bedrock and must produce great people to manage our resources."

The 40-year-old chairman of Electronic Data Systems of Dallas announced he will spend a part of the rest of his life working to make the "American dream come true." It's a dream, he said, of an "America made up of families who have a great sense of destiny for this country and a deep love for it." He invited his audience to join him in "delivering the Constitutional guarantees to our people . . . and to our children."

Humor columnist Buchwald envisioned a quick end to the problems of a computerized society: "Every last piece of data will be used by Jan. 12, 1976. Even as I speak to you now, there are computers starving to death." Art was upset that a "computer in Houston had forgotten to tell a computer in New Orleans that Houston was fogged in" the day he arrived for his talk. "While you people were out getting drunk, I was flying in circles over Houston."

A more serious approach to problems and solutions was taken in the

technical sessions in the Astrohall conference rooms. Social implications is a rather tired Joint Computer Conference topic by now, but the 1970 FJCC nevertheless generated some new insights. The novelty lay not so much in what was said as in the different ways various speakers interpreted the conference theme, "Systems and Society."

The high cost of . . .

A panel on Interfacing Computers and Education extolled Computer Aided Instruction but was pessimistic about its immediate chances for widespread use. A general reluctance to spend money on public education today was cited, and A. I. Katz, session chairman, said the public today "lumps CAI with sex education as an element of conflict in education." He said that with all the work being done in CAI, "the total effect of the computer on education in the public schools of the country to date has been zero." It was generally agreed the cost of CAI would have to come down under \$1/hour/student if there is to be any progress toward widespread use.

In the session on Computers and Communications, V. N. Vaughan, AT&T, talked about on-line systems capable of monitoring heart attack patients in hospitals and servicing off-track betting parlors. He drew a big laugh when he said, "It depends on your social outlook whether the betting system is socially desirable, but if we can use our resources well, both kinds of needs can be met."

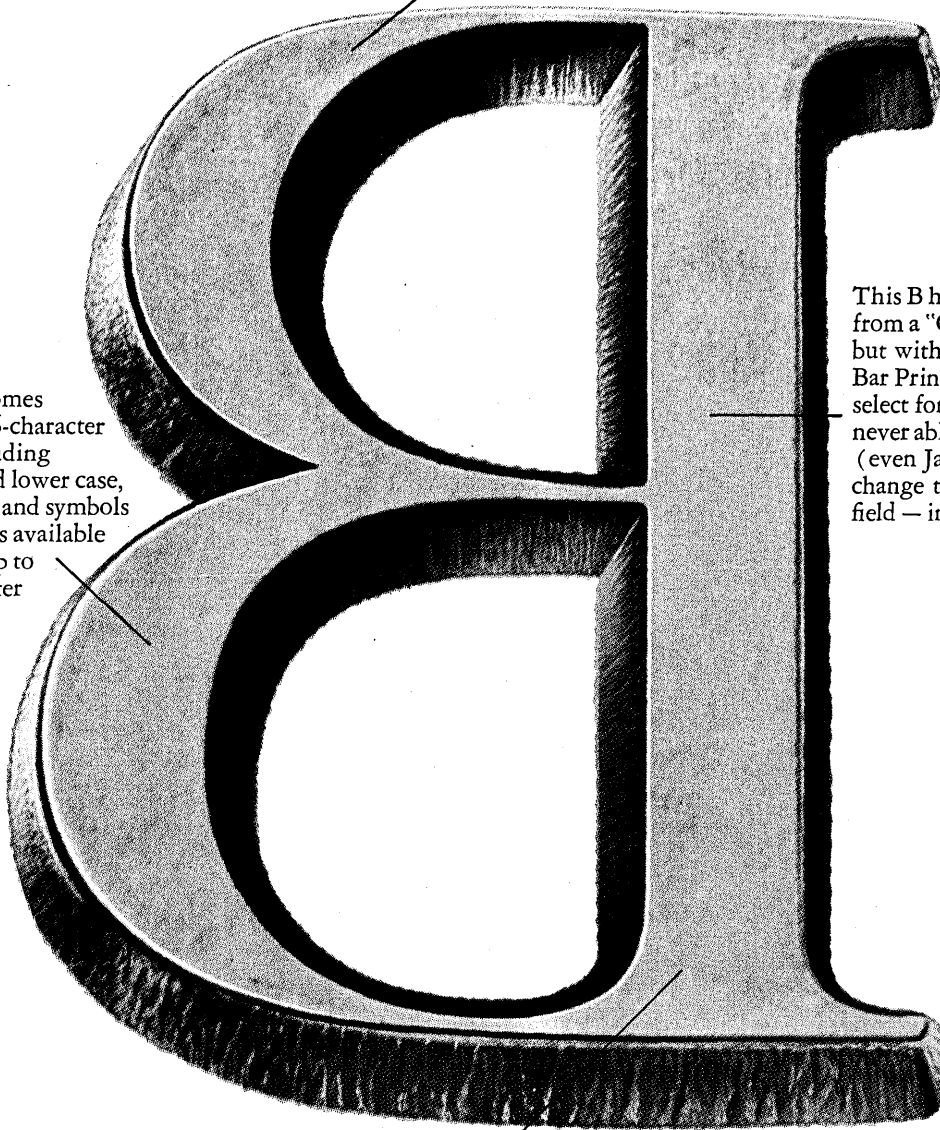
Later, a questioner in the audience suggested that Vaughan's optimism could be wistful thinking. Significantly, the questioner—E. M. Pease, of the Foundation for Advanced Communications for Education—was neither young nor long haired. He looked like a banker.

Pease chastised Vaughan and his co-panelists, who had been discussing "the challenge of the '70s," for not mentioning the need to reduce the costs of educational systems. At a time when there are 18½ million functional illiterates in the United States, Pease indicated, the industry should be attaching top priority to bringing down the cost of educational systems technology.

The reason the industry hasn't answered this distress signal, of course, is that it isn't economically attractive to do so. Traditionally this has been adequate justification because in-

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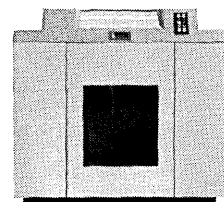
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Astro the Show . . .

vestments that were socially desirable have generally been economically attractive. What Pease seemed to be arguing is that the situation has changed: economic efficiency is no longer necessarily synonymous with social effectiveness. If he's right, the obvious question is whether or not systems experts can find a way of investing their talents in projects that promise a big social return but not much in profits.

The Computers and Communications session afforded a golden opportunity to nominate socially necessary projects and explore ways of getting systems experts involved in them, but instead participants devoted all of their attention to rehashing the problems of making computer communications economically efficient. The virtues of competition were discussed by Jack Goeken, Microwave Communications Inc. The benefits of ARPA-like networks were detailed by Frank Heart of Bolt, Beranek & Newman. The need for better service from the carriers was stressed by Sam Levine of Bunker-Ramo, and Neal Gorchow of Univac and F. H. Schulze of Comset argued the pros and cons of standardization. To many in the audience all this talk had a familiar ring—not surprising since the same topics have been discussed and the same positions elucidated at the last several Joint Computer Conferences.

Broad perspectives

A new-this-year series of six sessions lumped under the title "A Broad Perspective" and designed to offer an overview of areas in computing for those affected by but not directly involved in these areas, drew an average attendance of 500, often as broad in character as the subject matter was designed to be.

Gerhard L. Hollander of Hollander Associates, Fullerton, Calif., consulting and research firm, who presented a session on "System Architecture in the LSI Era," said he'd geared his presentation to the uninitiated only to find in his audience "at least half a dozen prominent systems architects."

"It was too late to change my talk," he said, "but it worked out well. They were as anxious to get a broad overview as anyone there, and I used them to field some of the questions that came later."

One veteran show attendee said the series "offered even the old pro a

chance to catch up on topics he hasn't had time to stay on top of in his pursuit of specialization." He termed the sessions "extremely well done."

Sid Berg, vice chairman of the Broad Perspective program, said reaction to it was "most favorable" and predicted it will be made a regular jcc feature.

Hollander's session was highly oriented toward cost/performance trade-offs. The recurring theme was that logic is cheap, pins are expensive. Mr. Hollander, a man who does not like to make predictions (says they usually feed on other predictions), cautiously opined that circuit gate costs might drop to a penny apiece when LSI really comes in, which he feels might be in 1977 or thereabouts.

Where are we going in computer architecture? Hollander feels we will see the end of step-by-step programming; that we'll see a large number of more specialized resources; that multiprocessing systems are going to be with us for awhile; that more tactical decision capability will be present in future computers; optimization aids will be expanded; and generally cpu's will get cheaper, smaller, and more powerful.

Dr. George Forsythe's Broad Perspective session, "Pitfalls in Automatic Computation or Why a Math Book Isn't Enough," was an overview with a note of warning. Forsythe, chairman of the Computer Science Dept. at Stanford, warned against the dangers of sensitivity and instability when putting mathematical problems on computers using algorithms from math courses. In the case of simulation problems, not subject to these two pitfalls, he advised his listeners to "look suspiciously at subroutines, built-in functions that come with your computer, especially at Randu, the random number generator on the IBM 360 series."

This struck a sensitive chord with at least one listener who apparently had fallen prey to what he called "the traps of Randu." He told Dr. Forsythe his warning was well taken and wanted to know how it (the warning) could be more widely distributed. Forsythe threw this job in the laps of the numerical analysts who, he said, should "get out and give publicity to these problems." He called upon math teachers not to ignore computers, to study up on practical applications. "Mathematical software has become a buzz word,"

he said, "but what we need is more scholarship in this area. We must make this kind of scholarship respectable, give brownie points for it. If we don't, Ross Perot will accuse us of not making a strong enough effort to make this a better world and the Students for a Democratic Society will accuse us of not being relevant."

Brownie points were handed out in another Broad Perspective session to the GE 655 Multics system. Dr. John W. Carr III and Dr. Davi K. Hsiao, both of the Moore School of Electrical Engineering, Univ. of Pennsylvania, in their session on "Multiprogramming Systems Design and Operation—Current and Future," called the Multics the most modern operating system to date. What made it this way? According to Carr and Hsiao, it's the fact that hardware and software people sat down together from the start in designing the system—something they think is needed more. "For the hardware people to design all their pretty components and hand them over to the software people saying, here it is, make it run, will have to become a thing of the past."

Instant replay

And now, with the 1970 FJCC a thing of the past, many surprised former skeptics are wondering why they didn't want to go to Houston and already are making plans to attend the SJCC. Attendance breakdown for the Houston show was 5,960 exhibit personnel; 8,378 exhibitor guests; 5,502 paid; and 2,043 students.

Dr. Tanaka said AFIPS will take further steps to "manage attendance" at future conferences with a \$10 penalty to anyone who fails to register before the conference starts. Starting at the SJCC in Atlantic City next spring, nonmembers will be charged \$60 if they don't preregister, and members will pay \$30. All registered for \$20 and \$50 this year. Persons attending only the exhibits don't pay—if they've been lucky enough to receive one of the 40,000 guest registration cards issued to exhibitors.

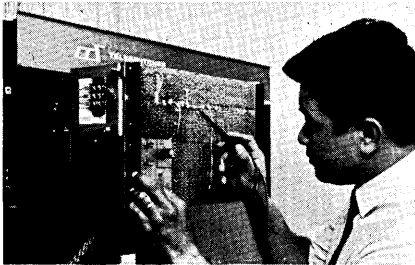
And how will the exhibits shape up in the spring? It's a safe bet many of the well-satisfied Fall Joint participants will want to repeat. In the case of at least one it's a sure thing; one minicomputer maker claimed it sold enough off the floor to pay for its exhibits at the next two JCC's. Hard to beat that. ■

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PERSPECTIVE

an interpretive review of significant developments

IBM Turns on Its Tormentors, Sues Memorex for Following Too Closely

IBM has sued Memorex and a subsidiary, Peripheral Systems Corp., in California Superior Court for appropriation and misuse of trade secrets concerning the 3330 disc drive. The complaint, which also charges misappropriation of confidential information, breach of contract by ex-IBMers, and interference with "advantageous business relations," is a clear indication IBM feels the compatible peripheral people are following too fast in its footsteps.

Extent of the pressure being placed on IBM in the 360 market is revealed in the claim by Memorex of annual orders of \$100 million. It has taken the company only four years to build this volume. IBM now is trying to prevent it and the other compatible equipment manufacturers from getting too big a start in the 370 market. Up to the filing of this complaint, its preventatives had been in hardware (i.e., the 2319 disc drive which needs the Integrated File Adaptor and microcode to interface to the 370/145).

However, the 3330, which some call the most significant innovation in the 370 line (and possibly significant to the 360 line), has no hardware deterrent, and the compatible peripheral makers indicated they would develop similar devices. Production isn't easy, though. A spokesman for one company ruefully commented, "we don't even know how many prongs are on the plug."

In taking Memorex to court over the 3330, IBM has selected the most venturesome of the compatibles group. It has also served notice on the others to be cautious in their pursuit of IBM technology. No matter what the outcome of the suit, it can only harm the smaller company — a drain in time and money, further aggravated by Memorex's own trade secret suit against California Computer Products, which has filed a countersuit.

Luring away

The IBM complaint lists 22 "example" items it considers trade secrets. It claims Memorex lured employees

away and induced them to disclose these secrets and confidential information on supply sources, product yield, and personnel data. It charges these employees breached employment contracts that have permanent nondisclosure clauses.

The validity of IBM's permanent nondisclosure requirement has yet to be tested in court. It was central to an earlier trade secret complaint against Cogar Corp., but that was settled out of court with no acknowledgment of guilt.

IBM's claims also may be affected by its long delay in making them. In other words, why didn't IBM go to court sooner? The complaint states that development of the 3330 was initiated in 1965. Memorex and IBM have been sharing the Santa Clara labor pool since the early 1960s. Of the ex-IBMers in top Memorex jobs, all joined the company at least 18 months prior to the complaint.

Another restriction on the individuals' breach of contract may be IBM's request for a 30-month injunction. This is a rather unique demand — time limits are usually at the discretion of the court — and would bar Memorex from producing, marketing, or making use of any disc file, controller, part, or component that is interchangeable with a 3330 or its parts for the duration.

Golden rule time

Investigation of any precedents for the time produces two theories. The first is that since the court of equity demands a "do unto others as you would have them do unto you" attitude, IBM felt it was limited by its system engineer contract which binded SE's to protect from disclosure technical data on customer systems for 30 months. This may also mean it can't expect more than 30 months of silence from ex-employees.

The other theory is that on the basis of Memorex's performance in producing its 2311 and 2314 compatible disc drives, a 30-month delay seems a reasonable demand. IBM delivered

its first units in July 1965 and Dec. 1966. Memorex began development of its versions — the 630 and 660 — in June 1966, and first deliveries were made in June 1968 and Feb. 1969. The 3330 will be delivered during the third quarter of 1971. That will be the start for most compatible development because IBM put final performance specifications on its trade secret list. This explains why prospective customers haven't seen any.

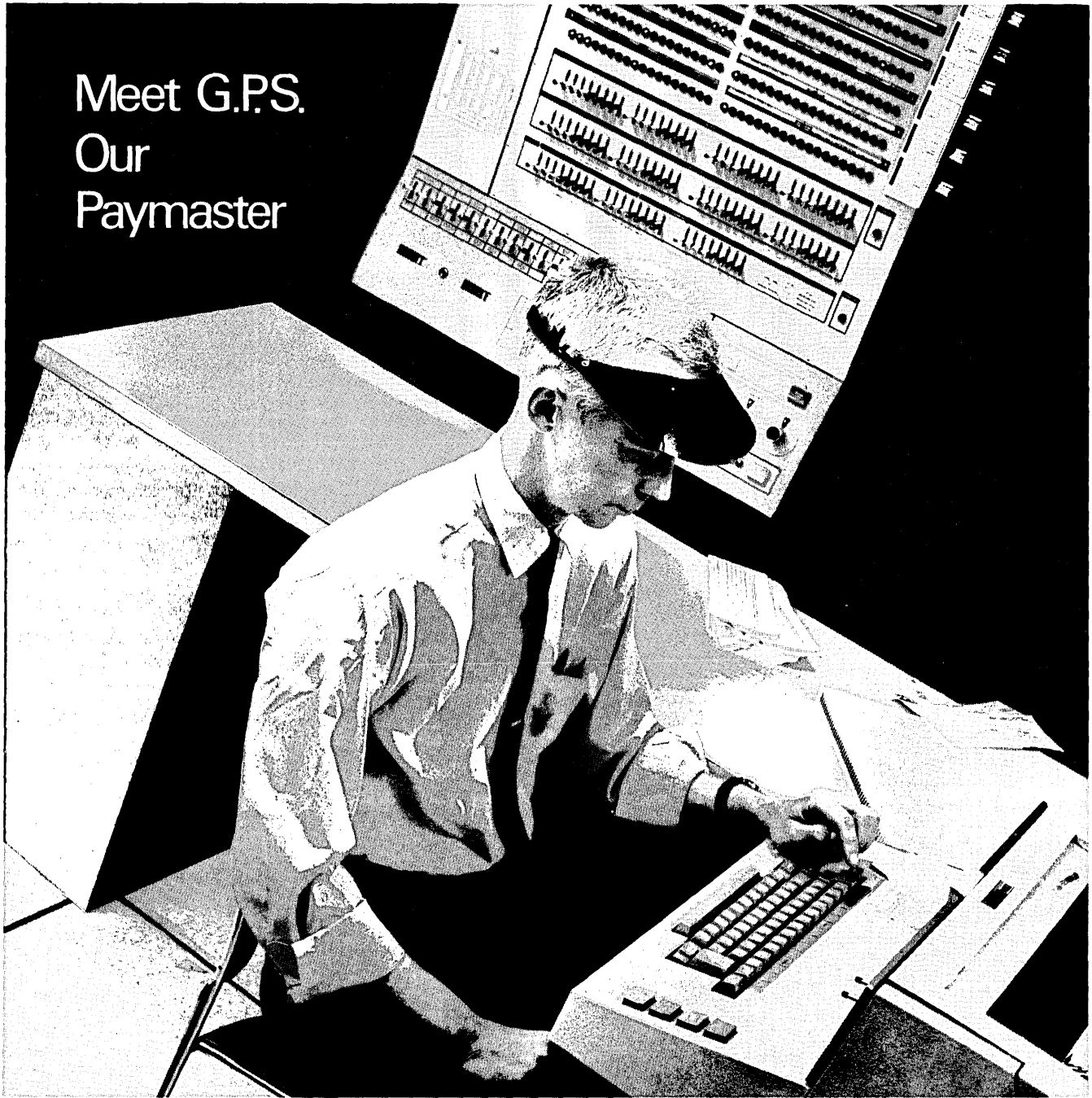
The injunction, if awarded, probably would give IBM control of the market for its duration and give every other compatible disc maker an advantage over Memorex, if they can exploit it.

IBM's burden is to prove there are trade secrets that have been misappropriated and used to IBM's disadvantage. A trade secret, says one definition, "may consist of any formula, pattern, device, or compilation of information which is used in one's business and which gives him an opportunity to obtain an advantage over competitors who do not know or use it. It may be a formula for a chemical compound; a process of manufacturing, treating, or preserving materials; a pattern for a machine or other device; or a list of customers."

This seems clear enough, but IBM must prove that they are truly secrets (has the 3330 information been kept under strict control since 1965?); that disclosures have been strictly confidential (can ex-employees be expected to keep information confidential forever?); and that unauthorized use is really injurious to its position. In addition, IBM could also have to prove that the alleged secrets weren't patentable. A recent New York trade secret action was thrown out of court over this point and is now being appealed.

To prove anything, the suit must come to court, and IBM seldom goes there except to preliminary palaver. Preference by the other companies for out-of-court settlement is indicated by the ending of the ADR, Levin-Townsend, and DPF&G antitrust suits and the Cogar action. The latter may have been, as one observer commented, the only means for IBM to

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PERSPECTIVE

satisfy itself that everything about the company's technology was on the up and up. The settlement included cross licensing and protection for IBM information.

Memorex has said the allegations have no foundation and that IBM is only trying to quash competition. It has implied it may take antitrust action at the "appropriate time." It has asked for government assistance in fighting the suit and called on the Justice Dept. to police IBM marketing activities.

Many industry people agree with Memorex that IBM is trying to control competition. But they also honor

IBM's need and right to stop information leakage. They see the computer giant trying to protect what may become *the* hardware market. One even expects IBM to some day willingly give up a central processor if it can keep its peripherals in an installation. More and more of the hardware dollar is going for peripheral gear, and customers are seeking alternatives to the IBM crisis. It is felt that IBM has been none too early with hardware that sharply limits the market for compatible peripherals.

— John Wessler
and Angeline Pantages

Senate Approves First Wimmex Buy as 'Second Standard' Battle Rages

Backers of DOD's big Wimmix computer buy scored what could be a significant victory last month when the Senate Appropriations Committee approved money to buy the first system in FY'71. Earlier, the House had vetoed this request.

Meanwhile, there's the bitter battle between IBM and other Wimmix bidders over the "second standard."

This standard, proclaimed by Deputy Defense Secretary Packard last June, excludes several Wimmix sites now equipped with IBM 360s from the forthcoming buy which covers a minimum of 15 systems. Non-IBMers would like to bid their equipment as replacements for second standard installations, so they're unhappy the standard was established. But they're even more concerned about rumors that its IBM systems will be upgraded on a sole-source basis, and that the number of sites will be increased.

They're concerned too that the second standard systems could be removed not only from the forthcoming buy but from any follow-on, preserving IBM's foothold indefinitely.

The Senate committee OK'd a \$6.4 million request from the Defense Communications Agency to buy a 360/65 which presently is leased. This gear supports the National Military Command System (NMCS), a component of the Worldwide Military Command and Control System.

Assuming the Senate goes

along with its appropriations committee, which is likely, the question of whether DCA gets the \$6.4 million this fiscal year will be decided by a House-Senate conference committee.

In a report accompanying the FY'71 defense appropriations bill, the Senate committee explained why it reversed the House and approved DCA's budget request.

"Original software conversion costs were estimated at \$159 million, but establishment of the second standard will reduce these costs by \$25-50 million ... The Dept. of Defense advised the committee that there is no basis for the estimated (ultimate) cost of \$500 million to \$1 billion cited by the House committee ... The proposed purchase of this equipment will generate annual lease savings of \$1.8 million commencing in FY'72, and the cost of the equipment will be amortized in three years."

The fight over the second standard is really a subset of a much broader battle involving management philosophy. The Defense Directorate for Research & Engineering and the DOD Comptroller's office are the chief protagonists, but in the former camp are Wimmix managers and military commanders, and in the latter, the service secretaries and *their* comptrollers. Neither group will say very much for the record, except to complain that the second standard battle is being fought in the press.

DDR&E clearly doesn't believe some of the Comptroller's management directives can be applied to Wimmix without substantial modification.

Another bone of contention is the lengthy, detailed analyses required by the Comptroller's shop to justify acquisition, upgrading, or replacement of a dp system. Ultimately, these analyses control the distribution of adpe procurement money. DDR&E would like to simplify the procedures and replace the Comptroller as the semi-final arbiter of Wimmix investment decisions. (The final arbiter — the Secretary of Defense — would remain the same.)

How this battle will end is anybody's guess at the moment. In the meantime, DDR&E is seeking ways of resolving the second standard fight. If successful, this effort could help establish the agency as the Wimmix focal point; the Directorate would be subject to the Comptroller's guidance but not under his control. IBM would reap a significant benefit in the long run. However, the beauty of the scheme is that non-IBMers also stand to gain.

The idea, as explained by a top official of the research directorate, is to permit some second standard sites to be upgraded while concurrently phasing others out of the second standard community and thus making them fair game for non-IBM suppliers.

The Joint Chiefs of Staff reportedly are developing an overall Wimmix implementation plan which will include a list of the sites to be upgraded and those to be moved outside the standard.

Two probable Wimmix vendors, when asked to comment on this plan, said they would oppose any scheme that allowed IBM, on a sole-source basis, to develop new Wimmix software because this would give Armonk an "unfair" advantage in competing for the pending buy.

A source within the Comptroller's office agreed that this is a justifiable complaint, adding that, "We would oppose any policy which resulted in IBM getting a sole-source contract to upgrade the software now used at second standard sites."

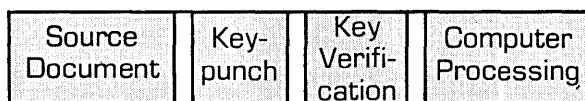
— Phil Hirsch ■

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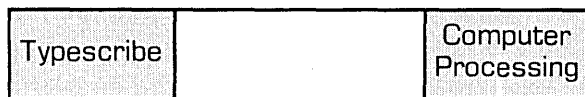


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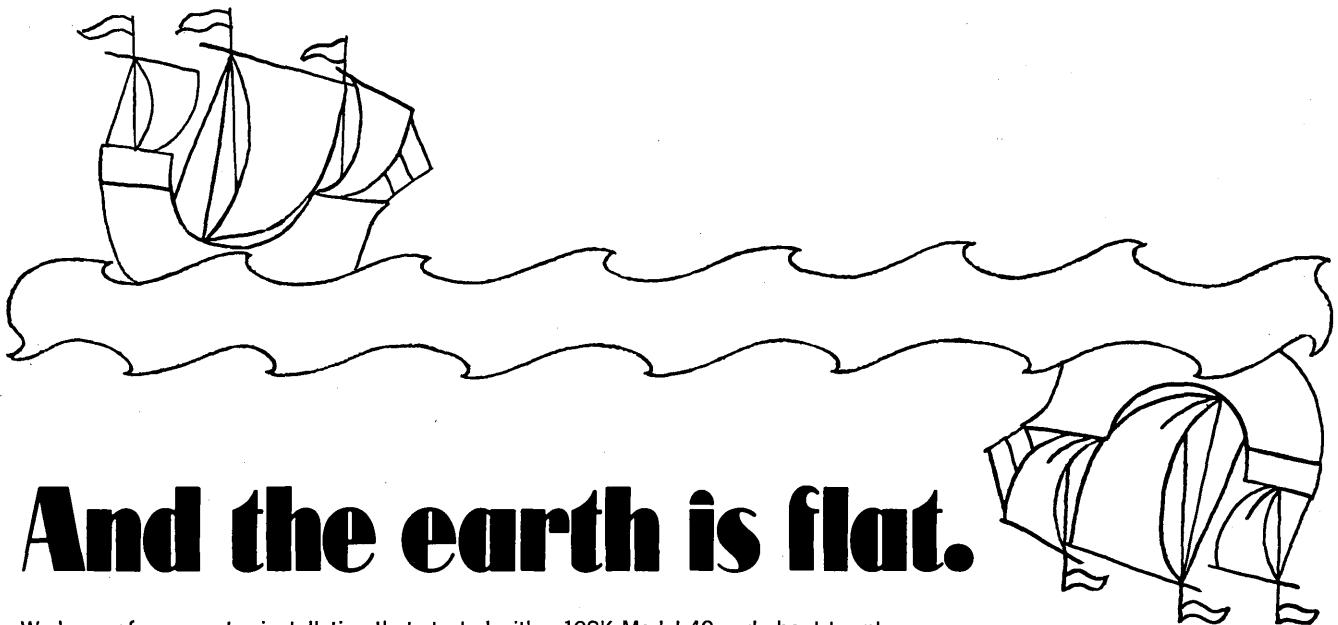
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NEWS SCENE

Bright Spots in Time-Share Land

Donald Cravitz, vice-president, operations, for Remote Computing Corp., Los Angeles, says business is great, but he has a hard time convincing his friends of the fact.

"When I tell them this, they say OK, but *really* how's business."

Remote Computing is a time-sharing firm, and considering that of more than 200 in the field only a small handful are profitable, the reactions of Cravitz' friends are understandable.

Remote last month installed its third computer, a Burroughs 5700. It now has two 5700s in Los Angeles and a 5500, which it expects to exchange soon for a 5700, in Palo Alto. Cravitz said they added an average of 20 customers per month over the last nine months of last year and have experienced a greater growth in revenues through increased penetration with existing customers.

Things weren't always this good. In the early months of last year, Remote, like a lot of other time-sharing firms, was scrambling for money. On March 1, 1970, they got a commitment from URS Systems Corp. as part of a tentative merger agreement. URS has an option to acquire Remote March 1 this year. Since last March, according to Cravitz, Remote has been growing steadily and became profitable in November.

This makes them part of a select group with more in common than profitability. A Quantum Science Corp. "samson trends" forecast late last year listed five time-sharing firms as "possibly profitable" and indicated the "more resourceful" among the 200+ in existence "are supplying unique business functions with value several times the computational service." The study forecast that "the fast-growing need for business applications will surpass all others in the industry."

In the case of Remote, business applications make up more than 70% of their business. Cravitz indicated that only 10% of the new business gained in the latter part of last year came from companies which had folded. Most were first-time t-s users.

Cravitz said he felt sure Remote was not alone among time-sharing firms enjoying "good business." Listed in the Quantum Science study as "possibly profitable" were Tymshare, Palo Alto, Calif.; RAPIDATA, Fairfield, N.J.; On-Line Systems, Pittsburgh; and Keydata, Watertown, Mass. Another, not listed by Quantum but claiming profitability, is International Time-Sharing Corp. (ITS), Minneapolis.

Tymshare, Inc., which went public early last year and had lost money every year before that since its formation in 1966, moved into the black during what many consider the worst months for the economy. For the nine months ended Sept. 30, the firm showed its first profit, \$88,010 on revenues of \$7,634,528, higher than those for any full year prior.

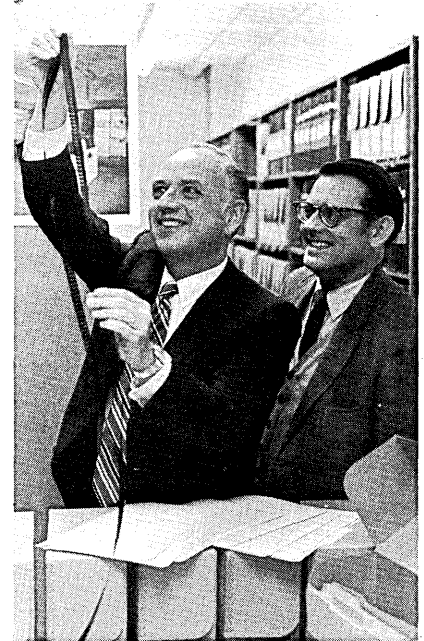
The Quantum Science's forecast indicates revenues of time-sharing vendors will top \$2 billion by 1975. Someone's got to get the business.

HISI Provides Customers Access to Cybernet

While Honeywell Information Systems (HISI) works on integrating the GE and Honeywell lines and services, it is now providing its 200 series and time-sharing service customers with access to Control Data's Cybernet network. A similar agreement with University Computing Co. lasted 12 months but was ended when Honeywell-GE computer operations were merged and both firms agreed there would be conflict of interest.

In essence, HISI is protecting its customer base through these moves. Its users, whose computing needs are mostly commercial, can access CDC 6600s and 3300s for their big remote batch scientific and data handling problems — but deal only with Honeywell, which will buy time from CDC and bill the customer.

Users with their own in-house systems (almost all models in the 200 line) can have them modified on site to operate as remote batch terminals. CDC is writing a simulation program for the 200 systems which permits them to communicate with the CDC

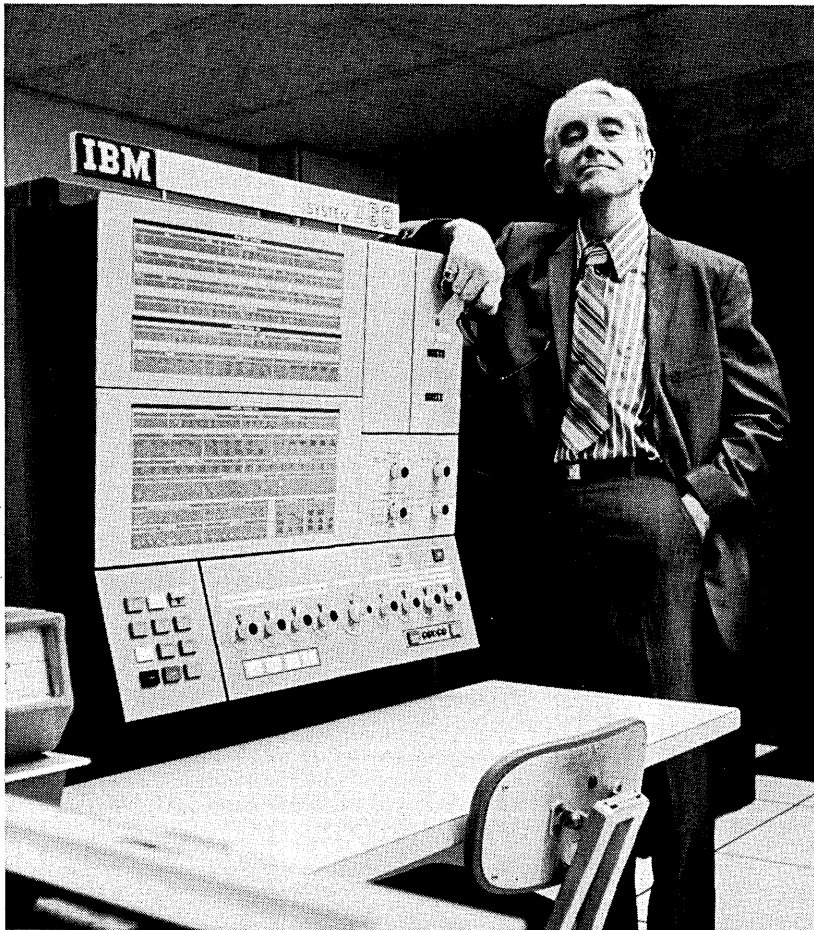


WHIRLWIND COMPUTER, first general-purpose digital computer to operate in real-time, became part of the Smithsonian Institution's new Computer History Project last month. Its development began at MIT in the late '40s, first as an aircraft simulator, then as a high-speed digital computer, until finally it evolved into the SAGE air defense system in the early '50s. Its developers pioneered such "firsts" as magnetic core memory and real-time control system, forerunner of time-sharing. One of the developers, Robert R. Everett, left, president of the MITRE Corp., takes a last look at film of the computer before turning it over to Prof. Richard Mertz of the Smithsonian.

hardware. Users will have to convert 200 series programs to run on Cybernet or use Cybernet software. HISI's time-sharing Information Services Operation (ISO) will provide its customers access to Cybernet through five H-1648-based centers; these users will also have the program conversion problem. Although ISO will do the billing, the costs will be the same as CDC charges.

Honeywell expects the Cybernet arrangement will last for about two years. By then ISO may have its own large-scale systems, probably the 600 series. Presumably it will have its own arsenal of scientific and data handling programs, as well as the interfaces to link the 200 series with the big machines.

(Continued on page 50)



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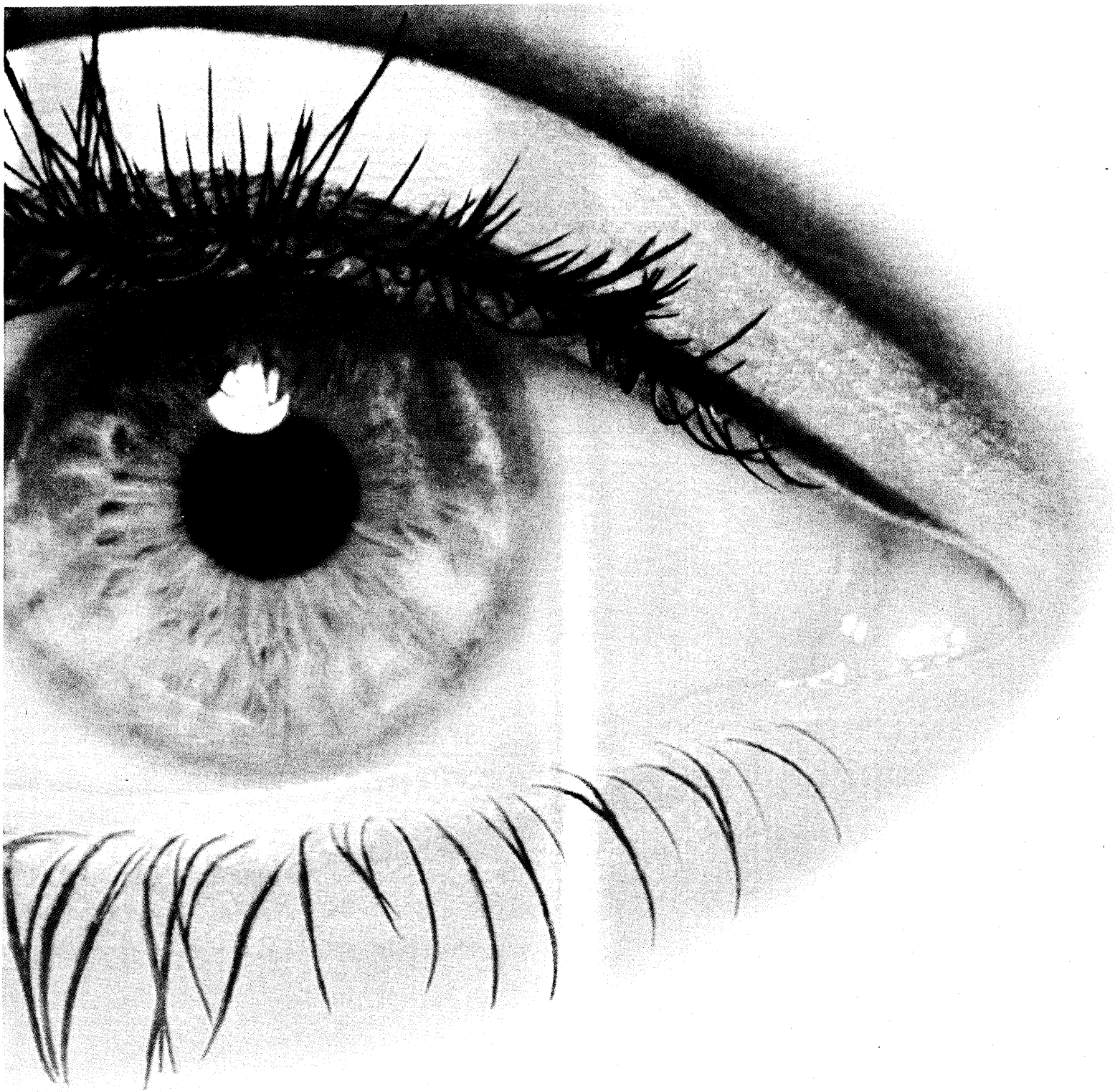
The Dept. of Defense and the National Bureau of Standards agreed "in principle" last month to develop standardized test routines for validating COBOL compilers against the ANSI standard. Once this validator is adopted, each new COBOL compiler offered to federal agencies will probably have to pass the test before it can be acquired.

Currently, only the Navy requires COBOL compilers to be validated. A staff headed by Commander Grace Hopper developed the Navy validation routine. A government-wide validation standard, according to the understanding reached last month, will be developed jointly by DOD, Commander Hopper's Navy group, and NBS. The final product will be an integration of the Navy validator and an NBS system developed originally by Information Management, Inc., San Francisco, under an Air Force contract.

Hitches could still develop in the agreement because each participant's responsibilities haven't been defined. But officials say they don't anticipate trouble. On the other hand, and despite official denials, we understand there has been some friction in the past between Commander Hopper's office and certain echelons within NBS. Much of the flak has developed within ANSI's X3.J.4 committee, which is trying to develop a validation routine that can be added to the ANSI COBOL standard.

In another standards development, the protracted battle between advocates of OCR-A and OCR-B was apparently resolved last month when ANSI's X3.A.1 committee, meeting in Florida, accepted a number of changes proposed by a working group of ECMA, the European Computer Manufacturers Association. According to an X3.A.1 member, "We're now ready to begin drafting an American OCR-B standard." The final version may become official before the end of 1971. At the same meeting, the committee approved a lower case font for the existing OCR-A standard. It will be considered by X3 this month in Phoenix and could become official this summer.

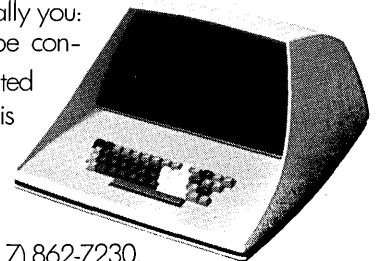
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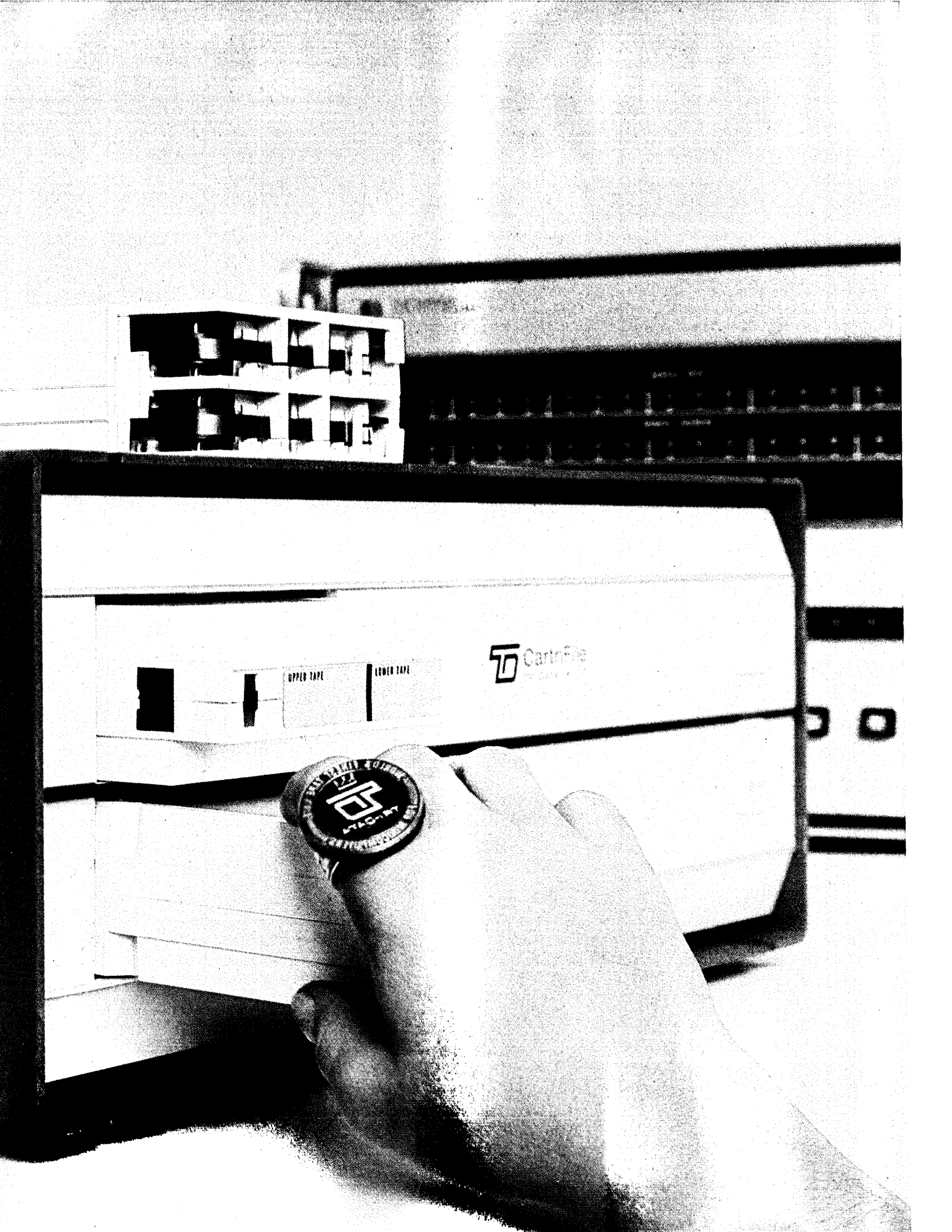


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CIRCLE 65 ON READER CARD

Thawts on California's Buying Freeze

California Governor Ronald Reagan specifically mentioned edp purchases in his buying freeze edict aimed at cutting the state's whopping budget deficit.

At a glance this looks like bad news to the industry because the state last year spent some \$67.5 million on edp. But it's not all that bad. The state was taking a long hard look at its edp expenditures anyhow with an eye on trimming. A long-range "master plan" for state edp utilization had been devised which in some instances calls for initial expenditures to achieve ultimate savings.

Charles Smith, director of the Office of Management Services, responsible for all state edp purchases, feels the freeze, while "a serious constraint" won't materially affect upcoming edp expenditures. He stressed the point that the freeze is aimed at reducing expenditures "to the maximum extent possible." There will be exceptions granted, he said.

Among these probably will be purchases of replacement peripherals aimed at saving the state money. OMS claims replacement of 12 IBM 729 tape units in the Dept. of Human Resources with Telex 4704s since July will save some \$25,500 yearly with added savings of about \$5K a year because the new units have eliminated a need for extra shift usage. Replacement of 70-80 IBM and CDC disc packs over the past five months is saving \$10K a year, OMS said. Due for replacement in the near future are some 40 tape and disc drives with Telex, Memorex, and Caelus in the running for the bulk of the order.

And some big buys probably will be made too in spite of the freeze. Such agencies as the California Highway Patrol and the Justice Dept., for instance, have access to special fund money not affected by the gubernatorial edict. An upcoming RFP for a new computer installation for Human Resources Development probably won't be affected because it would be 90% federally funded.

In addition to future purchases, the freeze affects contracts already negotiated by state agencies and in final approval stages. Smith said

some 30-40 edp related contracts were in this stage, many of them annual IBM lease renewals delayed because of arguments over new terms and conditions. These, he said, would have to go through because they affect equipment already installed and performing. Also pending was a \$60K award to SDC to teach OMS personnel how to evaluate edp purchases. OMS was expected to request exception treatment for this, so it looks as if they're looking forward to purchases being made.

Feds to Set Up Simulator Facility

A system simulator facility serving all federal agencies will be established by the Air Force and General Services Administration sometime this year and, it is learned, may be in business by July 1.

Likeliest site is Hanscom Field, where a simulation lab for military users already is operating. Since the federal government is the biggest user of commercially supplied systems simulators, this development could have profound impact on the market.

A major reason for centralizing federal systems simulator activities is to eliminate the duplication and extra cost inherent in the present setup, under which each of several agencies acquires its own simulator service and often tests the same computer configuration.

Another purpose would be to reduce the use of benchmarks. Here, the basic idea is to convert simulation test data, after it has accumulated, into a list showing which commercially marketed computer systems are acceptable for specified applications.

Meanwhile, CDC and Burroughs have raised questions about the ability of simulation to measure performance of their systems. The Compress routine, SCERT, which the new lab would use initially, is said to be the primary target of this concern. CDC and Burroughs say they suspect all commercially available simulators. CDC said it is working with Compress in evaluation of SCERT performance but added that no conclusions have been reached.

Asked about the new simulation

couldn't you use a directory of over 25,000 companies with EDP installations?

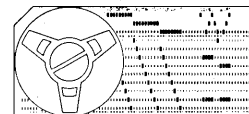
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CIRCLE 75 ON READER CARD

lab, a CDC source said it would be a good idea. He thought the lab would remove the commercial supplier from temptation. "Right now, when the feds ask for bids, the simulator supplier often contracts the government to evaluate the bids with his routine being used by all bidders simultaneously. If the competition is close, the results of the simulator can be crucial."

ACM Chapter in League with Training Center

The Los Angeles chapter of the Association for Computing Machinery recently passed a resolution (through its executive council) expressing support for the training and employment placement efforts of the Urban League Training Center (June, p. 195), an edp school aiding minorities and disadvantaged persons in the Southern California area. The center, sponsored by IBM, the Bank of America, and the Urban League, is in its third year of operation and has

graduated and placed more than 250 programmers, operators, and key-punch personnel in the last two years.

However, times are tough, and although the center's track record of placing entry level people who stick is good, the task of finding firms willing to take a chance is becoming more and more difficult. The ACM role will be to educate industry "to the capabilities of the center's graduates and to provide guidance and assistance in placement activities." The ACM will not deal with or for individual center graduates, operating only in a general way to bring industry and prospective employees together.

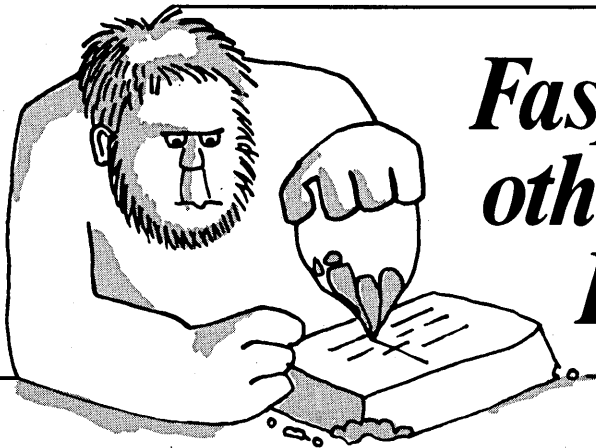
The L.A. chapter is, of course, aware that many of its own members are unemployed, but it doesn't expect any head-to-head conflict between a member and a center graduate, because the latter will be applying for an entry-level trainee position, while the former has years of experience ("overqualified" is the usual term of rejection). Besides, the center does good work and the chapter's action

helps carry out the theme of "social involvement" that keyed the ACM '70 conference.

ICES Users to Meet

The 300-member-company ICES users group will meet in Los Angeles Jan. 20-22 to study recent new applications of the MIT-developed program to link civil engineers to computers. ICES stands for Integrated Civil Engineering System, started in 1964. Since then, various subprograms of the system have been developed.

Those to be studied during the conference by the three-year-old group include STRUDL, a structural design language; OPTECH, which extends into management optimization techniques; and LEASE, a program which helps civil engineers use computers to calculate the effects of slopes and embankments in construction projects. Registration of \$20 may be paid to R.J. Nugent, County of Los Angeles Road Dept., Box 4089, L.A. 90054.



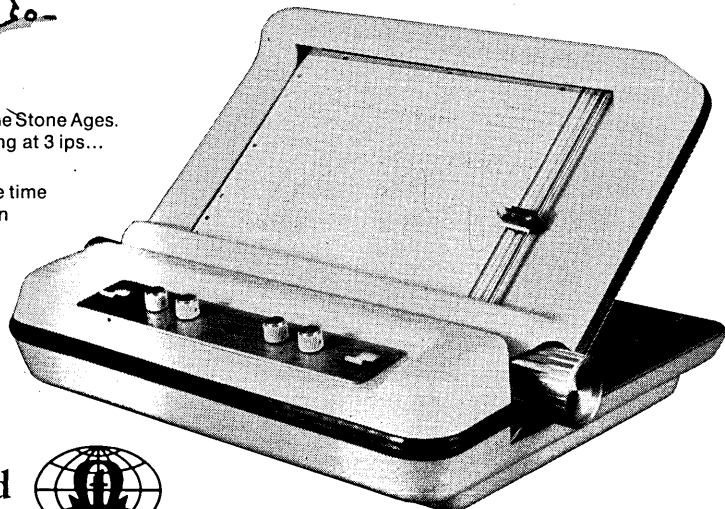
Fasplot makes other plotters look Paleolithic.

Before FASLOT, time share computer plotting was in the Stone Ages. The other plotters were slow on their feet, trudging along at 3 ips... some were not so accurate, and most were expensive.

Now, FASLOT moves along faster than any comparable time share plotter on the market... 10 inches per second when used in conjunction with computer terminals or the "FASLOT Paper Tape Reader"... and into the space age with solid state analog plotting.

Simple to operate, FASLOT is accurate to 0.2% of full scale. An Automatic Axis Segment Mode saves up to 50% of transmitted data required... and thus saves 1/2 of time share computer transmission time.

FASLOT is priced within your budget... call Glen Renfro for the details.



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T.J. Back Soon

The mild heart attack suffered Nov. 19 by Thomas J. Watson, Jr., IBM's chairman of the board, set off a barrage of rumors that he would retire from his post and president Vincent Learson would step up. IBM has responded with an emphatic "not true."

Watson, the firm says, is making excellent progress towards full recovery and will resume all his duties; Learson temporarily was filling in for him.

Other rumors of management change arose after Ralph A. Pfeiffer, Jr., took over as president of the Data Processing Div., replacing Francis "Buck" Rodgers. Rodgers moved over to corporate director of marketing and soon after was denying reports he would go to the enemy Memorex camp. The man he replaced, James Johnson, was made vice president of DPD's eastern region, but left IBM soon after, and at this writing RCA was his next stop.

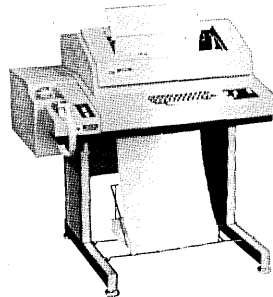
SHORTLINES

And another county's been heard from on the subject of computers and privacy. The Computer Timesharing Services Section (CTSS) of the Association of Data Processing Service Organizations (ADAPSO) has issued a position paper asserting that "while privacy involves issues of fundamental human rights and liberties, there is a degree of social good to be derived from intelligently conceived data banks." It states that such information should be controlled, but hasty legislation could result in lack of benefits to the individual . . . The Urban and Regional Information Systems Assn. will take a closer look at geographic base file systems such as the Bureau of Census' Address Coding Guide through a new special interest group it set up under Charles E. Barb, Jr., of the Urban Data Center, Univ. of Washington . . . Ailing Scientific Control Corp., Dallas, was still in "a holding pattern" last month, but for the

first time president John Boness was expressing "cautious optimism" that needed financing would be forthcoming, the only questions being from whom and how soon. And SciControl stock was up a notch . . . Devilishly clever Diablo Systems, Hayward, Calif. (April, p. 218), four months ahead of schedule on delivery of its Model 31 disc drive, has delivered its 100th to Digital Equipment Corp. for use in the new PDP-11 systems . . . A Jerusalem Conference on Information Technology is slated for Aug. 16-20, in Israel. Gerald Estrin of UCLA is program chairman . . . IBM has developed an experimental programming language it calls Process and Test Language (PTL) which permits engineers without programming training to write test routines . . . Call for papers has been issued by American Society for Information Science for its Denver meeting in November. Deadline is April 1. Write ASIS, P.O. Box 1262, Boulder, Colo. 80302. ■

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gives you clean, sharp multi-copies at
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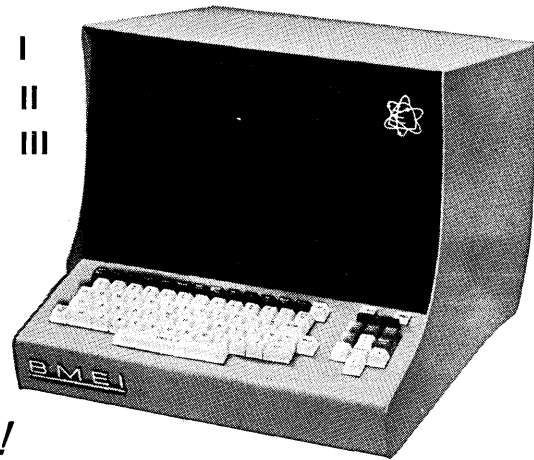
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CIRCLE 44 ON READER CARD

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DOUBLE CAPACITY IN TWO MINUTES!

with a  **MODEL I**
BEEHIVE **MODEL II**
TERMINAL **MODEL III**



Now, change functional capabilities in the field. Just add a logic card and presto! 800 character storage and display expands to 1600!

CRT terminal users are continually finding that the demand for expanding functions has made their terminal obsolete. Beehive, and only Beehive Models I, II, and III, with their unitized construction, enable the user to expand their terminal capabilities, change models, features, or functions

in the field . . . all in less than 2 minutes by just adding logic cards.

If you are just starting, start with Beehive . . . and maintain terminal capability! Avoid a future trade-in loss. Buy the one that can grow with your demands. Buy Beehive!



FOR BASIC TIME SHARING / BEEHIVE MODEL I provides all the minimum functional capabilities required of an alphanumeric CRT display unit with a teleprinter style keyboard. It has 800 character storage and display (20 lines x 40 ch/line), parity detection and generation, composite video, output, four way cursor control, home and clear, switchable baud rate, scroll overflow, RS 232B interface for half and full duplex operation.



FOR BATCH PROCESSING / BEEHIVE MODEL II has all the capabilities of Model I plus the following features: erase screen, erase line, tab, tab set, tab clear, and block transfer.



FOR SOPHISTICATED BATCH and INQUIRY / MODEL III incorporates all the features and capabilities of Models I and II and adds: format, edit by line, and edit by page (character and line insert and delete).

FIELD INSTALLABLE

OPTIONS

Models I, II, III	80 character display Parallel I/O adapter
Models II, III	Remote printer adapter Cassette adapter and stand alone cassette unit

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Model changes as well as options are possible in the field!

360 USERS ATTENTION!

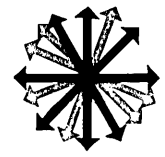
Beehive Model IV is our new unit committed to replace the IBM 2260/2265 terminal systems. It has been engineered with the same keen eye for quality, convenience, and LOW COST as our Models I, II, and III. Let us send you complete details.

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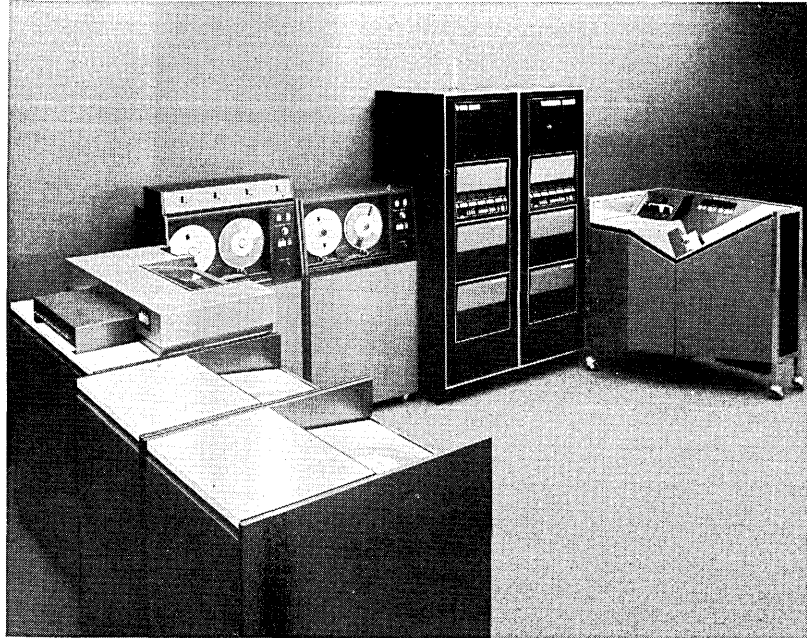


HARDWARE

Time-Sharing Computers

It is estimated that approximately \$64 million was spent for time-sharing systems during 1970, and that by 1975 this figure will grow to \$310 million. Here are four multiprocessor, multiprogramming systems that will try to capture 10% of that market. Built around the popular and proven Series 16 cpu's and peripherals, they can handle 16-64 simultaneous users and up to 960 subscribers over dedicated and/or dial-up lines.

An already fully developed user library of over 200 applications programs plus six interactive languages—BASIC, FORTRAN IV, DAP-16, SOLVE, TEACH, and EDIT—are provided with



PRODUCT SPOTLIGHT

even the smallest system (the 1642), while COBOL and Extended BASIC are included with the three larger systems. Peripherals available include magnetic tape units, line printers, and punched card equipment.

The 1642, 1644, and 1646 systems have dual 316 mini processors, while the largest system, the 1648A, has two 516s and one 416 cpu. All four systems provide terminal response time of 3-5 seconds using tty, crt's and other terminals that operate at 110, 150, or 300 baud and handle ASCII code, or the Selectric typewriter that operates at 134.5 baud using

EBCDIC.

Each processor in the 1642 has 16K (by 16 bits) of core, and 14.4 megabytes of disc storage and rents for \$2995/month on a five-year contract, or sells for \$144K. The 1644, including the control processor with 20K core and the job processor with 32K, plus 14.4 megabytes of disc storage, rents for \$4250/month and sells for \$192K. Deliveries require 90 days ARO.

The 1646, with 32K core in each cpu plus 14.4 megabytes of disc storage, rents for \$5550/month and sells for \$240K. It includes random file

capability and extended user file storage of up to 93.6 million bytes. Shipments begin in the third quarter.

Finally, the model 1648A includes 32K core in each 516 cpu, plus 4K in the 416, and disc storage of 28.8 million bytes. Rental is \$7815/month and sale price is \$375K. Small 1640 systems can be upgraded in the field to larger systems. HONEYWELL INFORMATION SYSTEMS, INC., Wellesley Hills, Mass. For information:

CIRCLE 327 ON READER CARD

Point-of-Sale

Honeywell has finally entered the point-of-sale market with the TraCom (Transaction Communicator) system, based on the firm's H-112 minicomputer. It features real-time, on-site data processing, and is primarily intended for fast-food chains. Units are now being tested by Marriott Jr. Hot Shoppes, and Dairy Queen, according to sources. Up to a week's sales, inventory, tax, and employee labor information can be captured, processed, and stored in the H-112 in an "average" franchise store, according to the firm. In the basic configuration, TraCom consists of the minicomputer, two keyboard entry terminals that serve as electronic cash registers, two printers, and four cash drawers, plus basic software, at \$12K. Deliveries begin in the second quarter. HONEYWELL INFORMA-

TION SYSTEMS, Framingham, Mass. For information:

CIRCLE 337 ON READER CARD

CRTs Sans Keyboards

How about *soft* copy for your Teletype? Or an intelligent terminal made from a tty, minicomputer, and a crt? Or even *video* response, using Touch-Tone pads, analogous to voice response? Those are the uses for the 200 series crt's.

The 201 communications display features roll mode operation with the screen acting as an endless piece of paper: data from the top line copied on the bottom line. Its command set includes carriage return and rubout. The 202 computer display features page mode operation, with the screen acting as a type-

writer with command-movable non-destructive cursor. Its command set includes clear screen and optional insert and delete. Finally, the 203 high-speed display features data entry rates up to 2 million cps.

All models are offered with either parallel or serial interface, rs232c or current loop, for compatibility with minicomputers and 103-type data sets. The 201 and 202 are also available with built-in telephone couplers for operations to 300 baud. Available code sets include ASCII, Baudot, Hollerith, and EBCDIC. Price of the 201 and 203 is \$695; the 202 is \$795. Delivery requires 15 days ARO. ANN ARBOR TERMINALS INC., Ann Arbor, Mich. For information:

CIRCLE 342 ON READER CARD

(Continued on page 60)

Do your programmers know basic systems concepts and applications?



The Basic Systems Course for programmers will do just that, without detracting from their programmer duties.

One hour per day for 25 weeks, your registrant will cover such topics as

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Upon completion, he will have an excellent working knowledge of systems concepts, which he will be able to put into practice immediately! Also, The Basic Systems Course for Programmers will help close that ever widening gap between programmer and systems departments.

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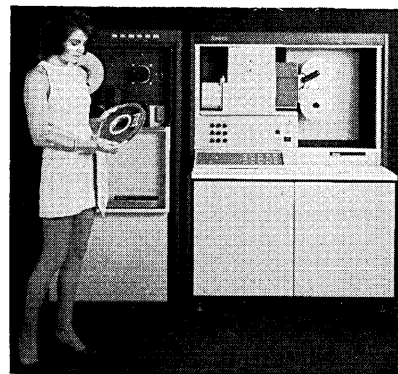
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Box 730, Colorado Springs,
Colorado 80901

CIRCLE 24 ON READER CARD

Off-Line COM

Three models of the KOM-80 micro-filmer allow for off-line processing of computer output at 60KC, (MOD 60), 90KC (MOD 90), and 120KC (MOD 120). The KOM-80 reads 800 or 1600 bpi EBCDIC coding from mag tape, displays the information on a crt, and then takes a picture of it—reducing the size up to 42:1.

Regular, italic, and boldface fonts are allowed, but graphics are not. The basic character library consists of 64 characters, expandable to 82. Three image retrieval coding methods are available, with Image Control being standard, and MIRA-CODE and code line indexing optional. Film widths available are 16, 35, 70, 82.5 and 105mm. Throughput rates for



the KOM-80 are claimed as 300-500 pages/minute.

The KOM-80 is tentatively priced at \$86K. EASTMAN KODAK CO., Rochester, N.Y. For information:

CIRCLE 328 ON READER CARD

Video Display

The model 5400 computerized video generator system might find applications in the cable tv industry, in airports, hospitals, or for educational purposes. The system consists of a crt for preparing up to 15 lines of 24½-inch size textual information. The data is then assigned a cue number and stored on a drum for later display. The controller supplies the data to each of seven channels at once, and it rolls up on the screen at an operator controlled rate ranging from 75-300 wpm. Formatting and editing functions are assisted by a cursor, and the 5400 can also have protected areas of screen. A basic system including the operator console, controller, drum, and video channel is \$60K. DACONICS CORP., Sunnyvale, Calif. For information:

CIRCLE 336 ON READER CARD

Disc Storage

With the announcement of the Burroughs 700 computers came the model 9472 head-per-track disc storage system for usage on the 6700 and 7700 models of the series. The basic 9472 accesses from 150 megabytes to 112 billion bytes in 35 msec, and transfers data at rates to 575kb.

A second version has the same capacity range, but accesses data in 20 msec and transfers it at 574kb. The fastest version, which makes use of a disc file optimizer, can yield effective access times around 2-6 msec. Each disc side is divided into 378 tracks and two discs are incorporated into a storage unit. Controllers can drive up to five storage units.

A typical minimum subsystem, of 150 megabytes, leases for \$5350, or can be purchased for \$256,800. BURROUGHS CORP., Detroit, Mich. For information:

CIRCLE 371 ON READER CARD

Satellite Processor

You can be sure there is a minicomputer buried inside the model 2550 satellite processor, which has off-line processing capability, as well as being able to hook up as a remote batch terminal. In this case it's the vendor's recently announced model 2500 mini, which in this configuration has 4K of 16-bit, 750 nsec memory. The peripheral equipment includes a 300-cpm reader and a 350-lpm line printer.

Options to the 2550 include more core storage, a tty, paper tape equip-

ment, a crt, a disc unit, an mtu, 1200-lpm printer, and 600-cpm card reader. Standard software includes an executive, a communications package, and an i/o handler. Optionally available are a SYMBAL II assembler, BASIC and FORTRAN compilers, an RPG, and utility and diagnostic programs. The basic 2550 is priced at \$36,500, with first deliveries scheduled for April. WESTINGHOUSE COMPUTER DEPT., Orlando, Fla. For information:

CIRCLE 331 ON READER CARD

... HARDWARE

Minicomputer

Apparently intended for process control or other industrial applications, the EPI-118 is a 4-32K, 900-nsec, 18-bit minicomputer with electrically isolated switches and power supply, which should help alleviate line interference and static problems encountered in industry.

Four hardware registers, 64 interrupt levels, 22 basic instruction codes, and two channels are standard. Arithmetic is performed by the two's complement method. Also standard are direct memory access, a 3-bit adder, and a tty. Software so far includes a two-pass assembler, binary and octal loaders, and some debug routines. The basic EPI-118 is priced at \$5900.

The 118 can also be obtained without an adder, or with an 18-bit adder. Peripherals available include discs, a printer, an mtu, and reader/punch. ELECTRONIC PROCESSORS INC., Englewood, Colo. For information:

CIRCLE 332 ON READER CARD

Off-Line Tape-to-Print

The Series MP off-line tape-to-print system consists of a tape drive, mini-computer controller, and a 600-lpm printer. Standard 7- or 9-track magnetic tape is used for input, and the standard 64-character ASCII set is printed at 132 characters per line. Rental is \$1,185 per month on a three-year lease, or \$40K outright sale. Delivery requires 60-90 days ARO. PERIPHERAL DATA MACHINES, INC. Hicksville, N.Y. For information:

CIRCLE 333 ON READER CARD

Terminal Plotter

Compatible with IBM 2741 and tty terminals, the CP-702 is an 11 x 17-inch successor to the 8.5 x 11-inch CP 701 which is a little more than a year old. A fiber pen draws at about 5 ips, with pen up/down time given as 0.3 seconds. Slewing rates go up to 20 ips. Software available includes 3D display routines, character generation, and mathematical functions. Prices range from \$3-3.5K depending on options, and the units are available 60 days ARO. TIMESHARE DEVICES, INC., Waltham, Mass. For information:

CIRCLE 340 ON READER CARD

(Continued on page 62)

January 15, 1971

Computer Systems Software Development

*Senior Positions in Britain with
International Computers Limited*

International Computers Limited, Britain's foremost computer manufacturer, has an established software organization which is among the largest in Europe. To provide increased capability for the design, development and production of software, ICL has recently acquired additional premises — historic Dalkeith House near Edinburgh — where a new software division is being established. Software development work will also continue to be carried out in offices in and around London and Manchester, and there are, therefore, opportunities to join ICL and be based in any one of these cities.

To further strengthen our technical and management capability at all levels, we are looking for new talent in the form of senior software design personnel who have managed project teams or who have made significant technical contributions for major computer manufacturers, large users or advanced software firms. Experience must include at least one of the following:

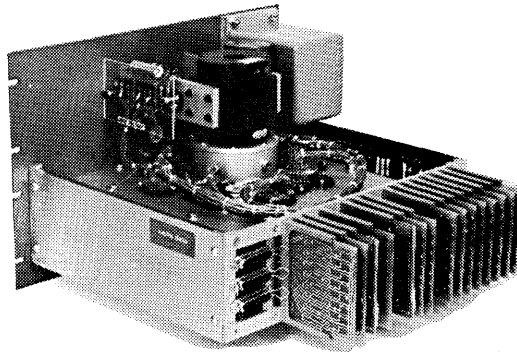
- Operating Systems
- Major Language Systems
- Real Time Systems
- Advanced Communications Software Techniques
- Compilers

Successful candidates will have a unique opportunity to work in a dynamic, growing computer company as consultants or managers on priority projects. We have set realistic objectives which must be met within a planned time scale. If you are interested, we shall explain the responsibilities and rewards in more detail. We are now arranging interviews in major cities in the United States. Please write now giving full particulars of your background and experience. Direct your inquiry to our consultant, Mr. J. R. Yelverton at: Wilkinson, Sedwick & Yelverton, Inc., 255 California Street, San Francisco, California 94111.

ICL

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**Save \$1000 or more right now
on a quality disc memory
with head lifters.**



Our model 10128 magnetic disc memory
will give you inexpensive mass storage.

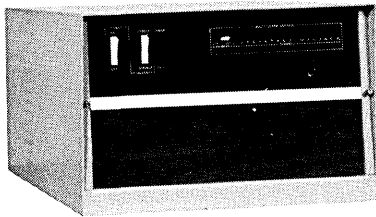
- Up to 4,000,000 bits
- 8.4 milliseconds average access time
- Head lifters to eliminate disc contact starts and stops
- Sealed construction
- Choice of interfaces

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CIRCLE 25 ON READER CARD

No Excuses Our Multiplexer Works



Yes, our TTC-2000/3000 Time Division Multiplexer really works.

Hundreds of successful installations are proof of its unmatched reliability, versatility, efficiency, and economy.

Multifold features include 2 to 38-channel operation . . . start small and just slide in cards as your system expands. Full intermix capability at high and low speeds. Powerful integral error detection. Sophisticated, yet simple, diagnostic capability. System flexibility . . . the ability to perform equally well in a point-to-point or multipoint system. Ultra-simple installation. Maintenance-free.

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CIRCLE 37 ON READER CARD

...HARDWARE

Honeywell Peripherals

An interactive graphics display system and a buffered line printer are the latest from this manufacturer. The model 7420 display is for use with 516 or 316 cpu's, but can be used with larger mainframes either via a Series 16 computer or through slight modification of the standard hardware. The display includes a digital subsystem, an analog subsystem, a 21-inch crt, etc. Options include buffer memory module, alphanumeric keyboard, function keyboard, and interactive light pen.

Prices start about \$45K, but most applications will require a system costing about \$66,600. Delivery is four-six months ARO.

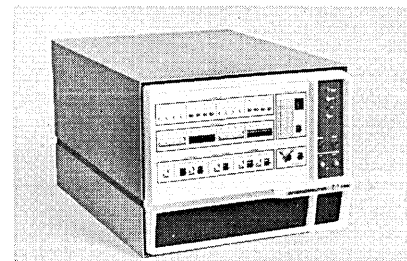
The buffered line printer, model I-543, was developed by Honeywell-Bull and operates at 200 lpm. It prints a 64-character ASCII set in 128 or 136 print positions and makes up to six multiple copies. Prices start at \$7860, f.o.b. Belfort, France. Deliveries begin in the third quarter. HONEYWELL INFORMATION SYSTEMS, INC., Wellesley Hills, Mass. For information:

CIRCLE 334 ON READER CARD

Processor Replacement

Optimization of a minicomputer for strictly communications handling chores has resulted in the i-50 communications processor. The 16-bit, 1-usec processor was designed from the ground up (significantly by people who were associated with the development of the GE, Datanet 30 communications processor, among others), endowed with a specialized instruction repertoire for data manipulation, and multiple i/o channels for up to 256 terminals of various types. The manufacturer claims that where other communications processors have required as many as 25 instructions to manipulate data buffers, the i-50 requires only one instruction—which leaves the i-50 available for other functions such as editing, formatting, error checking, and ASCII/EBCDIC conversion. Later modification will allow message store-and-forward duties.

Designed as a transparent replace-



ment for the IBM 2702/3 units, the i-50 can support 30 lines (even phone lines) at 4800 baud, dropping to 110 baud for the full complement of 256 lines. A 30-line configuration, including all the hardware and software, would be typically priced around \$40K, about 60% of the corresponding IBM set-up, it is claimed. Capabilities for supporting 170 lines would cost about \$70K. The i-50 communications processor will be available in March. INTERCOMPUTER CORP., Phoenix, Ariz. For information:

CIRCLE 335 ON READER CARD

Dual Cassette Transport

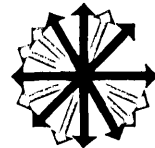
A dual cassette tape transport, utilizing standard Philips-type cassettes with certified magnetic tape, is intended to replace paper tape i/o systems on minicomputers. The unit includes a controller and a built-in power supply. Transfer rate is 300 bytes/second, with 250 kilobytes of storage per 300-foot cassette, 3-ips read/write speed, 800 bpi packing density and fast forward/rewind speed of 90 ips. The \$2,500 price includes interfacing to vendor's machines. Interfaces can be developed for other machines, however, at extra cost. OEM discounts are available. INTERDATA INC., N.J. For information:

CIRCLE 338 ON READER CARD

Microfilm Plotter

A digital microfilm plotter called the Microplot 1000 is designed to record graphical information onto microfilm, with primary applications in engineering and scientific laboratories. It accepts digital positioning and intensity inputs from a computer or other sources of digital data and plots at speeds to 50,000 points/second using a crt, a 16 or 35mm camera, and a forms flash that merges photographic images with computer-generated data. The price is about \$35K. BETA INSTRUMENT CORP., Newton Upper Falls, Mass. For information:

CIRCLE 329 ON READER CARD



Cobol Post-Compiler

Operating as a job step immediately following the IBM COBOL F compiler, the OPTIMIZER package reduces the size of the program object from 25-35% by eliminating compiler generated code that is nonessential. No changes to the operating system are required for its implementation. OPTIMIZER devises global strategies for general register usage and for the code which controls procedure flow, leaving untouched all data areas and code which calculates answers. The space saving can then be automat-

ically redeployed by the dynamic storage utilization option at run time for extra buffer space to speed I/O. The OPTIMIZER requires a region size of 128K bytes or a region as large as the object program, whichever is larger. It will optimize single object program modules up to 512K bytes in size.

The OPTIMIZER will only operate on executable object programs so that if the COBOL compiler flags a program as nonexecutable, the OPTIMIZER will not act on it. The OPTIMIZER generally requires less than 50% of the time the compiler

needs to process source coding. The output consists of the optimized program module and a new listing showing the optimized coding interlined with the COBOL source statements, plus a table showing the amount of optimization performed on the user's input.

The price of the OPTIMIZER is \$15K, including a built-in usage and performance measuring facility, plus \$1K/year. CAPEX CORP., Phoenix, Ariz. For information:

CIRCLE 316 ON READER CARD

Exec 8 Random Access

A package of subroutines called GETPUT is designed to give users of FORTRAN V on the Univac 1108 EXEC 8 operating system the same sort of random access capability enjoyed by System/360 users: word-addressable storage on disc, using storage files such as FASTRAND or compatible systems. The GETPUT routines operate only with binary fixed-length records and can be used in conjunction with the FORTRAN V unformatted I/O statements. Up to 10 temporary and/or cataloged files may be handled by these routines. The price is \$525. AXICOM SYSTEMS, INC., Paramus, N.J. For information:

CIRCLE 317 ON READER CARD

Mini Macro-assembler

MINI-DUAL is a smaller version of the DUAL machine-independent macro assembler package (Sept. 1, 1970, p. 95). MINI-DUAL can squeeze into as little as 8K bytes of memory, but still offers a string of capabilities which includes external symbols, data definition directives, macro definition directives, and intrinsic functions to scan arguments of source statements. Also, any program written for MINI-DUAL can be run under DUAL. The price of \$15K includes installation and documentation, or the package can be leased. PROPRIETARY SOFTWARE SYSTEMS, INC., Los Angeles, Calif. For information:

CIRCLE 361 ON READER CARD

Telephone Expenses

Firms whose telephone utilities offer "Special Code Billing (oz)" or "Centrex" data and supply toll message tickets on punched cards or magnetic tape can utilize the Telesave package to eliminate manual allocation of telephone expenses. The system provides reports which pinpoint areas for cost reduction, such as the utilization of tie lines, fx lines, twx, etc.; expose unjustified telephone usage and costs; and provide feasibility analysis of WATS. It's written in COBOL and requires a 360/30 32K disc system. The price is \$4,800. PELHAM MANAGEMENT SYSTEMS, INC., New York, N.Y. For information:

CIRCLE 322 ON READER CARD

Programmer Testing

FACTS (Programmer Aptitude/Competence Test System) is bound to meet with mixed reactions, depending on whether you're a programmer or manager. Candidates are asked to write a program in a vendor-developed language that is said to be free of punctuation and therefore easy to learn. The programs are then key-punched and processed by FACTS in an interpretative mode, simulating the computer for which they were written. Memory requirements and execution cycles are recorded for scoring purposes. Each program is tested with several sets of inputs, and the outputs are compared to correct solutions.

The package price is \$5K, and the BAL program requires 32K bytes on 360 models above the model 20. HAVERLY SYSTEMS INC., Den-ville, N.J. For information:

CIRCLE 346 ON READER CARD

DP Cost Allocation

The intent of REALCOST is to identify all costs associated with the operation of a data processing department. It produces 10 reports: a dollar distribution report by system and by cost center; a time report by system and by hardware; five equipment reports, including a keypunch evaluation; and three personnel reports designed to assess productivity. Input is obtained either from the user's job scheduling system or through three written input sheets covering personnel, machine time, and administrative functions. REALCOST is written in COBOL and operates under either OS or DOS requiring 48K. The price of \$6K includes three man/days of on-site assistance. CONTROL, Rocky Hill, Conn. For information:

CIRCLE 319 ON READER CARD

Communications Monitor

Intended to minimize the time, effort, and expense of developing on-line packages, TASK/MASTER is a generalized telecommunications monitor. Batch and conversational applications are controlled, with communications support providing terminal handling, password protection, simultaneous file update protection, error recovery, and other chores. TASK/MASTER is a turn-key package that can be implemented on any system that provides at least 32K bytes of storage and standard compiler and linkage support.

A DOS "starter" version is rented for \$200/month plus an installation charge of \$1K. The full TASK/MASTER is priced at \$20K. TURNKEY SYSTEMS INC., Norwalk, Conn. For information:

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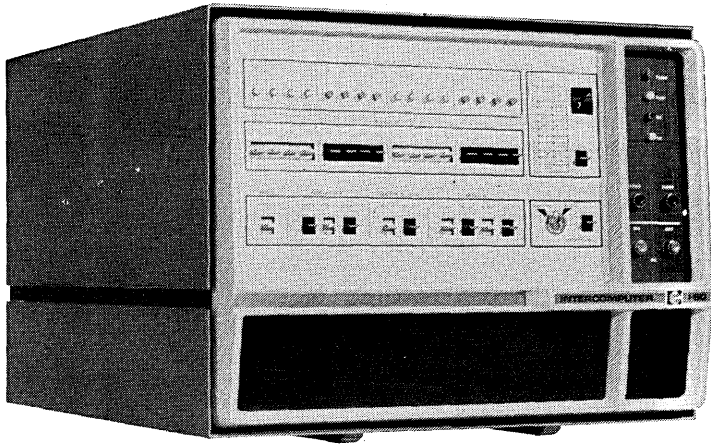
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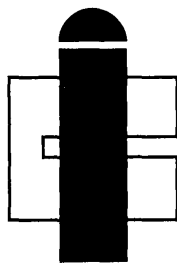
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Exclusive options: An "accumulate" feature will total selected card fields. Another feature provides a count of keystrokes and cards.

It has all these new advantages. Yet it has the same familiar keyboard. So your operators won't have to be retrained to use it.

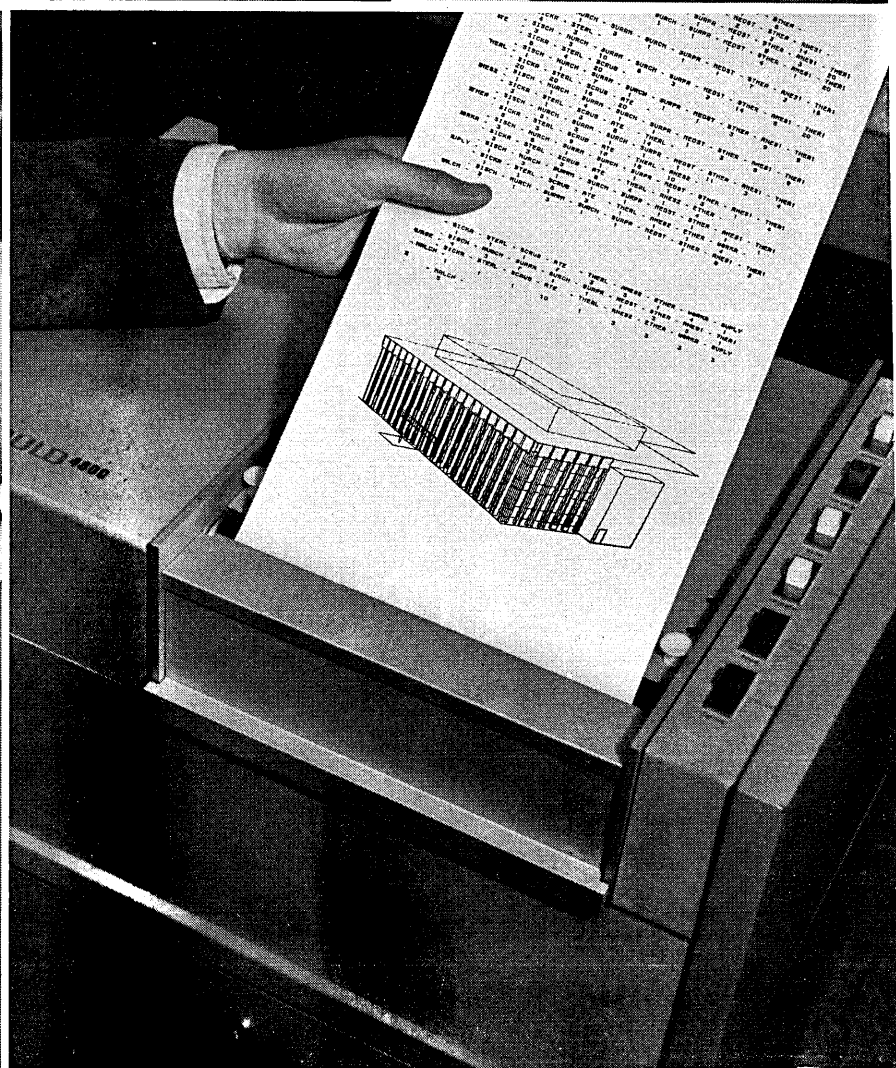
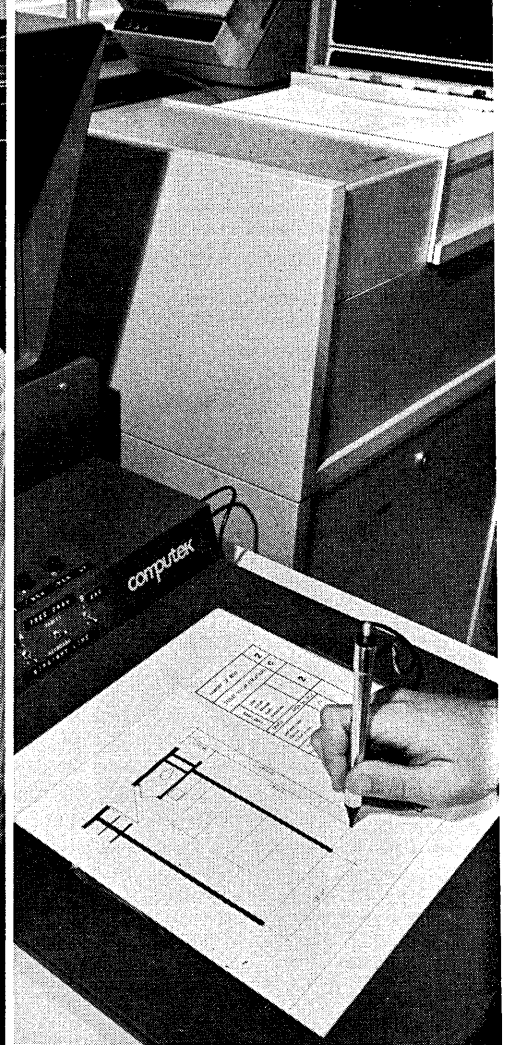
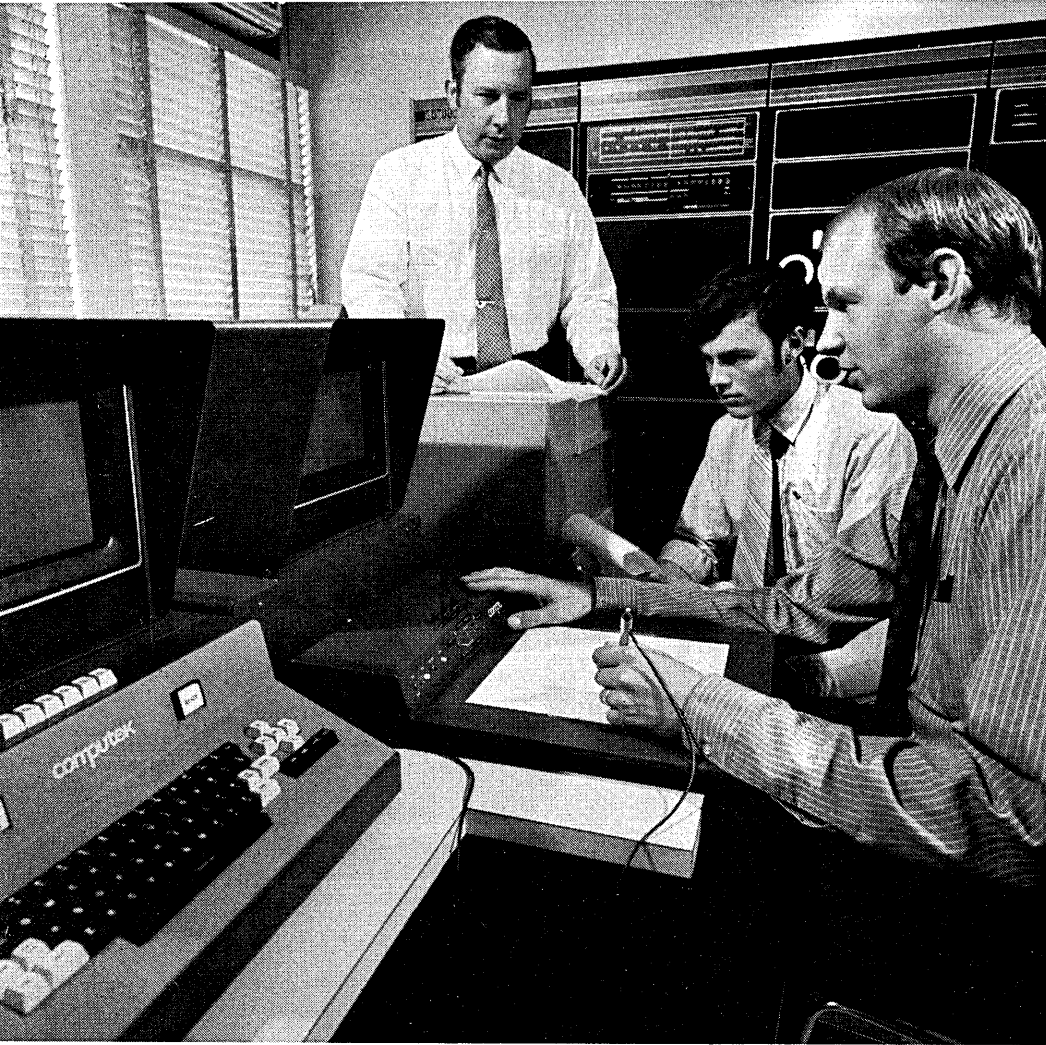
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Gould 4800 meets architects' demanding requirements for hardcopy alphanumerics and graphics.

A Boston-based architectural firm, specializing in institutional projects, has made a high speed interactive computer system an integral part of their architectural design process. And to take full advantage of this capability, they use a Gould 4800 electrostatic printer to provide hardcopy alphanumerics and graphics.

The Gould 4800 provides printout for feasibility studies, area diagrams, alternate plans, perspectives, detail drawings, specifications and managerial reports. Where a plotter would take up to 30 minutes to produce a drawing, the Gould 4800 delivers one in seconds.

And where a dry-silver photographic process would produce muddy copies that can't be traced or used directly, Gould 4800 copy is sharp, clean and fully acceptable for client presentations.

The computer system, called the ARK/TWO was developed by Perry, Dean and Stewart Architects and Planners and programmed by Design Systems, Inc.

It includes an Autrotrol digitizer, a DEC PDP 15/20 (16K), 500K Disk, two Computek CRT's with a keyboard and tablet. Ultimately, it's felt this advanced system will reduce the critical path in large construction projects by 4 to 6 months. All kinds of companies are using the Gould 4800 to meet all kinds of hardcopy requirements. This smooth, quiet unit delivers up to 4800 lines per minute on an 8½" or 11" format. It has an optional character generator. Software and interfaces for major computers are available. And while the Gould 4800 has relatively few moving parts and little need for maintenance, there are service facilities nationwide.

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Give us a call. Or write: Graphics Division, Gould Inc., 3631 Perkins Avenue, Cleveland, Ohio 44114.

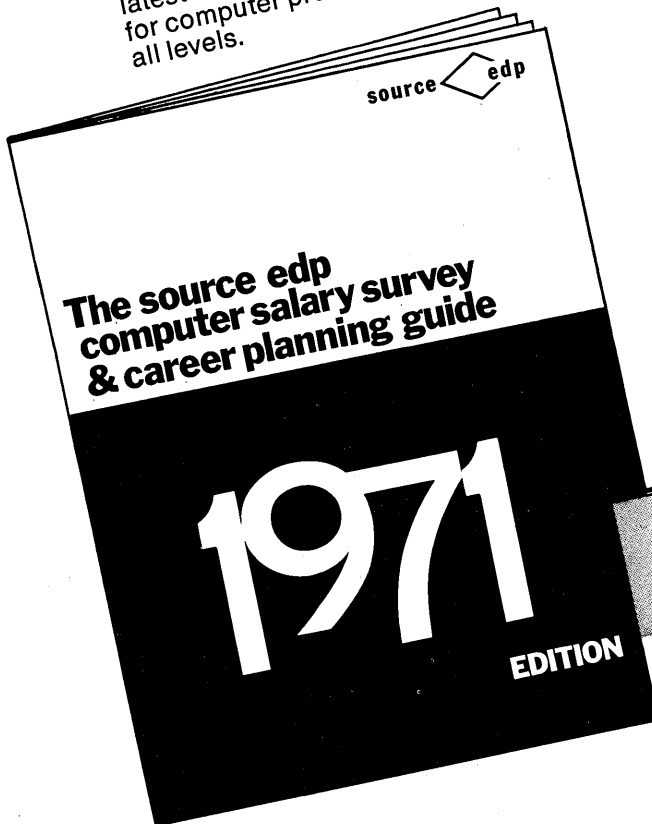


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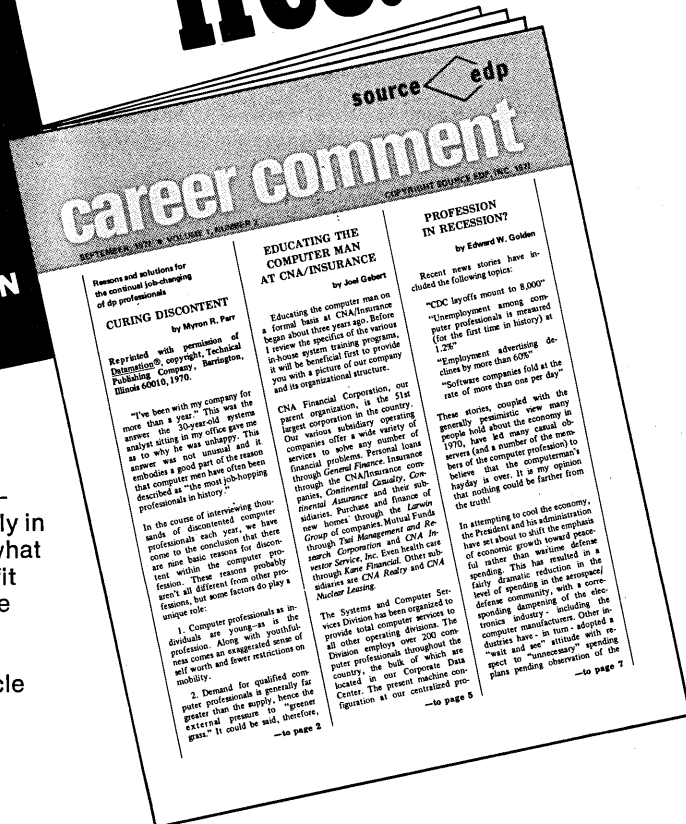
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WASHINGTON REPORT

DOD ENTERS SERVICE
BUREAU BUSINESS

An on-line service bureau probably will be established by DOD within the next six months. Pentagon planners hope it will replace several small military dp installations. Initially, the center will offer remote batch, then expand into real-time t-s applications. It will use a 360/85-size system, acquired on a competitive basis, with money from the Brooks Bill revolving fund. After a one-year trial, the center will continue if users revenue equals operating costs.

NEW DOMESTIC SATELLITE
NET ANNOUNCED

Microwave Communications, Inc., and Lockheed's Missiles and Space division plan to establish a domestic satellite system by 1975. They've formed a subsidiary, MCI-Lockheed Satellite Corp., to provide 60 one-way transmission channels in the 4-6 and 11-13 GHZ. bands. The channels will connect two operational satellites with several earth stations spread across the country. MCI and Lockheed each have a 50% interest in the new company. Bill McGowan, MCI's board chairman, expects the system to cost "somewhere around \$160 million." He says the prime market will be users of business voice and data communications.

ADP INDUSTRY WINS
VICTORY IN BANK-BILL

The House-Senate conference version of the One Bank Holding Company bill gives service bureaus (and others) legal standing to protest non-banking activities in the courts and to the Federal Reserve Board. Other provisions are clear anti-tie-in rules under which customers cannot be pressured to buy a bank's other services as the condition to get loans; general requirements that non-banking activities be so closely related to banking "as to be a proper incident thereto" and that they be in the public interest. Also prohibited are: undue concentration of power, unfair competition, conflict of interest.

HOUSE TO CONTRACT SOON
ON ELECTRONIC VOTING

The House Administration Committee will make a decision soon--possibly this month--on a sole-source contractor to draw up specs for the chamber's electronic voting system. Contract for hardware and software will be negotiated in coming months. Committee sources expect the system to use a mini-computer dedicated solely to this function. The committee hopes to have a system installed and working by the end of 1971. Money is available--without special appropriation--from the House contingency fund. Under the system now being considered, a congressman's vote will be recorded by inserting a personalized card (the size of a standard credit card) into one of 49 stations located on the House floor and pressing one of three buttons (Yea, Nay or Present). Votes will be stored in a computer and displayed immediately for verification, with a printout available immediately.

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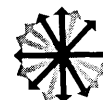
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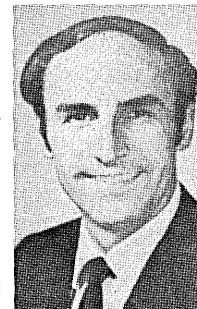
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PEOPLE

A 25-year veteran of computer marketing will be heading RCA's ambitious guaranteed conversion program to convert IBM 360 users to RCA's new series of computers, the 2, 3, 6, and 7. **E. Allen Henson**, recently named division vice president, conversion programs, had been the company's central region vp heading Midwest sales of the Spectra 70 line. He joined RCA in 1966 as manager for marketing education, after 21 years with Univac and IBM. Henson's job will be to convince users of 360/30, 40, and 50 computers that their transition to the new RCA series will be easy and safe because RCA will sign a contract to guarantee to pay penalties if it fails to convert equipment at a stipulated price and time span.

Financial management was his chief interest. When **T. E. Brady** joined Fabri-Tek, Inc., of Minneapo-



E. A. Henson **J. E. Turney**

lis in 1966, it was to fill the post of vp-finance and administration. Last March he was elected president to allow the company's founder, **M. F. Mickelson**, to move up as chairman. But this fall Brady quit the company to go back to his first love—financial administration—as the vp-finance for Josten's, Inc., the Midwest printing concern. Back in as president is Mickelson who also announced the appointment of **Lyle D. Altman** to handle operations as executive vp . . . **Jane P. Cahill**, former executive assistant to Thomas J. Watson, Jr., has been named secretary of IBM's management review committee, a group which considers the firm's policy and planning . . . Technicolor, Inc., of Hollywood formed an Information Systems division for the CATV field, headed by **James E. Turney, Jr.**, former president of DM Systems, Inc.,

a Los Angeles firm in the same field . . . The Midwestern NCR Computer Users Association, a 500-member group formed with the introduction of the Century Series of computers, has elected **Jim Snyder** president. He's dp manager of Lowe's, Inc., a mining and processing company . . . Victor Comptometer Corp., Chicago, has elected **Harold R. Salisbury** a vice president in charge of the newly formed Computer Div. Salisbury, 48, has been with the company nine years . . . New appointments to the Business Equipment Manufacturers Assn. board: **Raymond H. Herzog**, of 3M Company, chairman; **G. L. Gabetti**, of Olivetti Corp. of America, vice chairman; and **Charles A. Phillips**, vice president . . . The Western Electronic Manufacturers Association, which now calls itself simply "WEMA", elected **Dr. R. C. Mercure, Jr.**, its 1971 president. He is group vp of the Ball Corp., Boulder, Colo., and is the first non-Californian to hold this post in the association's 27-year



Jim Snyder



H. R. Salisbury

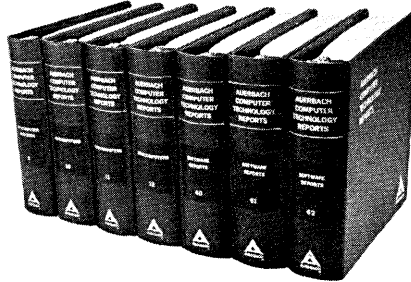
history . . . **Donald W. Fuller** has left Redcor Corp. to become chairman of Microdata Corp., the Santa Ana minicomputer manufacturing and consulting firm . . . **John L. Wilson** succeeded **T. Paul Bothwell** as vice president of computer systems operations for Honeywell Information Systems at Framingham, Mass. . . . **Donald K. Sampson**, recently named to head the Systems Peripherals Div. of System Engineering Laboratories, was elected a vice president of the company. Systems Peripherals is an SEL subsidiary, formed through the acquisition of Computer Peripherals Corp., San Diego . . . **Eugene R. White**, 39, was named a corporate vp and gm of the Systems Technology Div. of Fairchild Camera & Instrument Corp., Sunnyvale, Calif. The division makes semiconductor test systems and peripheral equipment. ■

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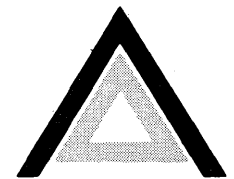


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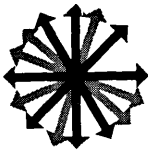
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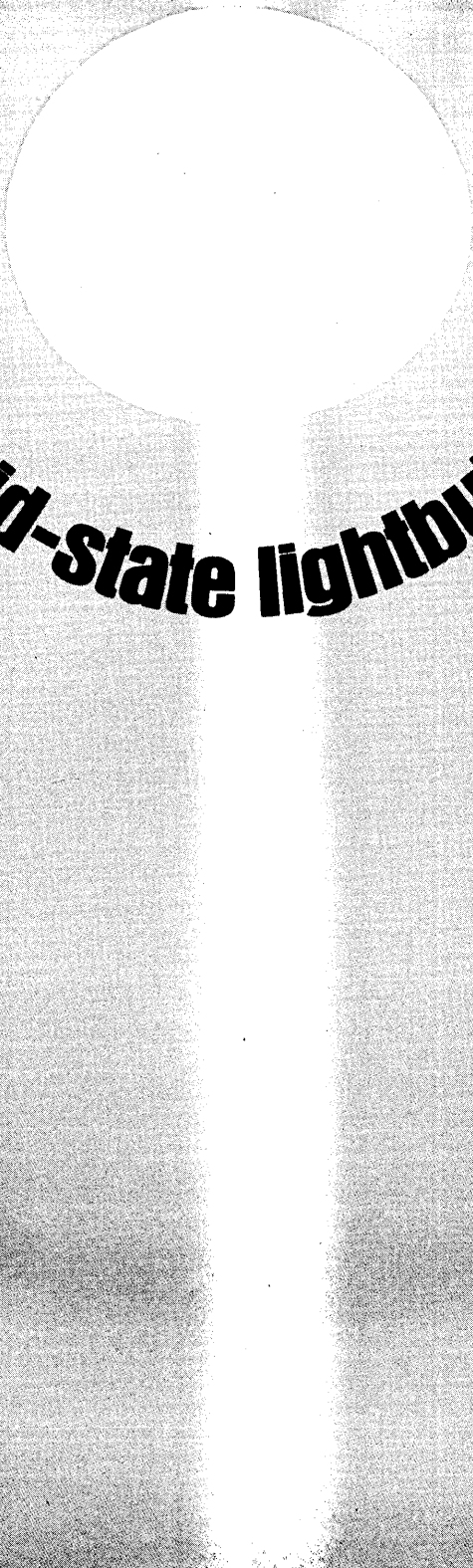
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