July, 1969
Vol. 18, No. 8

computers and automation

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Scientific Data Systems,
El Segundo, California

Letters To The Editor

Games and Simulation

Presently I do not subscribe to your magazine. Occasionally, however, an article or two from previous issues have crossed my desk. Before me is the April, 1969 issue, which has a letter entitled "Games Played by Computers" (p. 6). In this letter there is a reference to a "directory" issue concerning games played by computers. What is this directory, and how can it be acquired? Would you kindly forward a copy to me and bill me accordingly?

I am greatly interested in this subject, and have just proposed that a business simulation course be added to our present curriculum. Has your magazine completed any survey in this area to determine how widely simulation is used — in industry or colleges? If so, what appears to be the most popular

(Please turn to page 7)

computers and automation

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computers and automation

Vol. 18, No. 8 — July, 1969 *The magazine of the design, applications, and implications of information processing systems.*

Special Feature:

Computer Installations — Experiences and Lessons

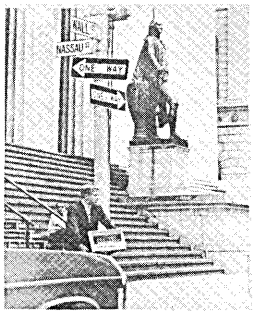
Regular Features

Editorial

C&A Worldwide

Jobs and Careers in Data Processing

Multi-Access Forum



The front cover picture shows Richard Dunsheath holding a computer, waiting for an opening to cross Wall Street on his way to an appointment to demonstrate one of his company's software packages. His company, Futuristic Applications Corp. of New York, has found that the most effective way to demonstrate its software is to pick up the entire hardware system and carry it to their prospect's office. The computers they've been carrying are Varian Data 620i's, weighing 35 lbs. "Taking what used to be a mountain to Mohammed breaks down the trepidation many nontechnical people have about computerization," Dunsheath observes. Perhaps the day will come when he will be able to carry his computer in his pocket.

Departments

How Much Should an Educated Man — and a Top Manager — Know About Computers?

Some years ago, Dr. Walter M. Taylor who was then President of the Regional Community College, Greenfield, Mass., organized a discussion on what is an educated man. At this discussion, one of the definitions of an "educated man" was this:

An educated man:

— is able to read, write, and do arithmetic;
— has a basic knowledge of the history and geography of the world and of man;
— understands the scientific method, and has an elementary knowledge of at least one science;
— has an elementary knowledge of mathematics and logic, what they are, and how to use them.
— knows at least one other language besides his own, well enough to read it and talk a little in it;
— can say what he means in suitable words, both speaking and writing;
— is able to listen, knows how to learn, and enjoys learning;
— never forgets that his views and opinions may be wrong, and is always ready to change them on good evidence.

Now there is no mention of computers in this definition in 1963; they were less important then than they are now. But on the basis of our knowledge now of the present and future role of computers in society, should not that definition be changed to mention computers? C. P. Snow, the English author of *The Two Cultures,* has called the computer "the most remarkable machine by far, yet made by man."[1]

It is still true nowadays that a man can be accepted as educated and as a top manager of a business, and yet know nothing about computers. For example in the "Newsletter" (October 1, 1968) of Composition Information Services, there is a report on several publishing industry executives (not mentioned by name):

> . . . Too many managers prefer to remain naive with regard to computer fundamentals. At a PIA meeting in May, for example, one publishing industry key executive almost boastfully stated that the only thing he knew about his organization's four computers was that "one was blue, two were coral, and the other was tan".

> Earlier in the year, one top manager indicated, somewhat pridefully, that he would be the last president of his company to know nothing about computers. . . .

Now the amount of knowledge of a person can be measured, roughly and approximately. His knowledge is measured in two ways: the capacity to perform operations correctly; the capacity to give correct answers to questions.

Forty-four years ago, when I studied the course that was called "college algebra" in my last year of high school, I put down all the key formulas that I had to know on two sides of one sheet of paper, in compact handwriting, and learned them by heart and visually. I can still see in my mind's eye the quadratic formula! And I took the examinations at the end of the course, confident that I knew and understood the key formulas, and could apply them to problems and obtain a good mark.

The summary knowledge that an executive (and an educated man) should know about computers could, I think, be put down on ten sheets of paper, in about 3000 words. This knowledge would consist of the definitions of some 50 key ideas; and the statement of some 40 to 60 fundamental propositions mentioning those key ideas.

In addition to the key knowledge, some actual experience with a whole computer is highly desirable. It is hardly reasonable for a top executive to seek first-hand experience operating a giant computer, but he should have at least a little experience operating an entire small computer. Using a remote terminal to interact with a computer is better than nothing, but that leaves one's mind with no image or feeling of having a whole computer under one's fingers: how a computer works remains as mysterious as how a telephone works.

The educated man of 200 years ago in the United States did not need to know anything about science. The educated man of 25 years ago did not need to know anything about computers. But the educated man (and the top executive) of today needs to have at least some sensible and significant knowledge of science — and at least a little sensible and significant knowledge about computers.

Whoever puts together an excellent version of "A Ten-Page Summary of the Essentials of Computers for the Top Executive" will be performing a useful service to the computer field and the profession of business management. We invite discussion of this subject in the pages of *Computers and Automation,* and the submission of articles for publication that are candidates to be this summary.

Edmund C. Berkeley
Editor

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[1]See "Science and the Advanced Society", by C. P. Snow, Parliamentary Secretary, Ministry of Technology, British Government, in *Computers and Automation,* April, 1966, Vol. 15, No. 4, p. 14 . . .

LETTERS TO THE EDITOR

(Continued from page 4)

game? What type of computer system does it require?

Finally, would you kindly notify me as to whether or not there is a special subscription rate for faculty members?

Thank you for your cooperation and assistance.

KENNETH M. LONG, Asst. Prof.
Management Dept., EDP
Bryant College
Providence, R.I. 02906

Ed. Note — *Thank you for your letter. Our directory issue contains a listing of over 1400 applications of computers. I enclose a tear sheet of the part of the 1968 listing that describes computer games: this is the part to which the writer of the letter refers. Copies of the 1969 Directory will be available in July for $14.50 to non-subscribers. Although we have made no surveys of how widely business simulation is used, I do know its use is growing, and it is a valuable and interesting application of computers. We do not offer reduced subscription rates for faculty members. The subscription rate is $18.50 per year, including the midyear directory issue.*

Numbles

In solving Numble 695, I digressed from a strictly mathematical solution. After obtaining equations for some of the letters, I decided that the letter "K", while not shown in those equations, must be in the solution. "Awake", the antonym of "asleep" must be involved, I thought, and it could be logically if A is 8, W is 5, K is 7, and E is 9. Pursuing this with the mathematical relationships from the equations I set up, the full message was: "When sorrow is asleep, awake it not."

BOB WEDEN
809 Creston Rd.
Edina, Minn. 55435

Ed. Note — *Thank you for confessing your "illegal", non-mathematical mode of solution! Evidently, we must disguise the answer even more, to prevent the kind of cryptanalytic tactic that you used!*

Proof Goof

I just received our copy of *Computers and Automation* for May of 1969. The solution to "Proof-goof" 694, on page 76, seems to indicate only one "proof-goof" for April, 1969, proof reading problem. Besides the error given in paragraph 6, line 2, I feel there should be another solution; the last line of paragraph 2 should have a quotation mark (") to indicate the end of the quoted definition.

We in the Data Center for the College of Administrative Sciences, look forward to reading your publications and enjoy the puzzles and "proof-goofs" each month. Thank you very much.

MARJORIE BRUNDAGE, *Supervisor*
Data Center
The Ohio State Univ.
1775 South College Rd.
Columbus, Ohio 43210

Ed. Note — *You are right — and thank you.*

Editorial Approval of Advertising

I can only assume that your acceptance of advertising for the organization called "Sane" in the May issue constitutes editorial approval. The ad should be clearly labeled: "Endorsed by the people who brought you Communist China, Cuba and Czechoslovakia."

Remove my name from your mailing list immediately and do not solicit this company for advertising now or at any time in the future.

IRVING H. ROSS, *President*
Western Telematic Inc.
5507 Peck Rd.
Arcadia, Calif. 91006

From the Editor: — At your request we are at once removing your name from our mailing list.

In regard to the assumption that you make, i.e., that acceptance of an ad constitutes editorial approval, this is *not true*. We accept advertising of many kinds from many quarters. We do not regularly attempt to exercise "approval or disapproval" of advertising, although we do reserve the right not to accept some advertising. For the 18 years that we have published, however, I cannot think of an ad that we have refused to accept.

The ad "From the People Who Brought You Vietnam" originally appeared in the *New York Times,* which I am sure did not "editorially approve" it either.

EDMUND C. BERKELEY, *Editor*
Computers and Automation

Responsibility for Accuracy

I note and applaud your stand on the census on pages 14 and 15 in the April issue of *C & A*. But accuracy is a many-sided thing, and hard to attain.

DR. NED CHAPIN
1190 Bellair Way
Menlo Park, Calif. 94025

AS WE GO TO PRESS

IBM CORP. HAS ANNOUNCED A MAJOR CHANGE IN THE WAY IT CHARGES FOR AND SUPPORTS ITS DATA PROCESSING EQUIPMENT. On June 23, the company announced that certain systems engineering activities, most future computer programs, and most customer education courses, previously furnished without charge, will now be offered for a charge in the United States. Generally, these changes are effective immediately for new orders, and will become effective Jan. 1, 1970 for customers with machines installed or on order. There will be a six-month transition period, ending Dec. 31, 1969, "so that IBM and its customers can make the necessary adjustments to the new environment". During that period, customers with equipment installed or on order will continue to receive services to the extent that such services have been mutually planned by IBM and the user.

Coincident with this action, the company is reducing data processing equipment lease and purchase prices by approximately 3%. New purchase prices are effective for all equipment installed on or after June 16, 1969; new lease prices are effective Oct. 1, 1969. IBM's Field Engineering Div. will continue to maintain both purchased and leased equipment in the same manner as in the past.

The company also announced custom contract services, a new offering. Under a custom contract, IBM will assume responsibility for performance of specified tasks, such as the design and installation of a data processing system.

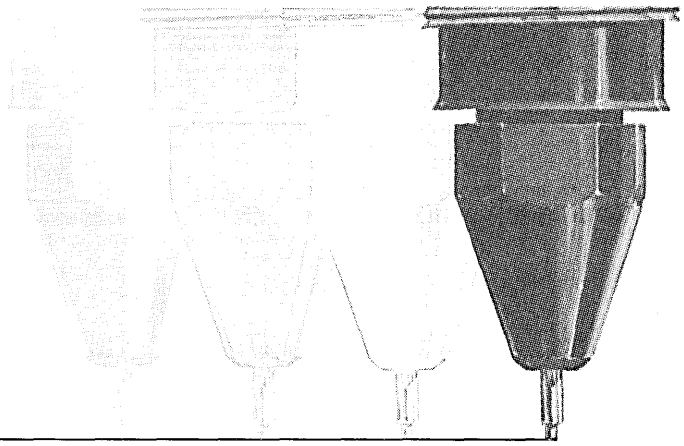
PROGRAMMATICS, INC. HAS FAILED IN ITS BID FOR A PRELIMINARY INJUNCTION TO PREVENT IBM FROM DISTRIBUTING AND SUPPORTING ITS 483 SORT PROGRAM for use with IBM/360 computers. The hearing was held at the U.S. District Court for the Southern District of N.Y.

Last fall Programmatics introduced Pi Sort, which is designed to operate with the IBM 450 Sort (the predecessor to the new 483 Sort as part of IBM's Disc Operating System). Programmatics claimed that IBM's "free" distribution of the 483 package (announced in Feb. 1969) was destroying its market for the Pi Sort system, which does not operate with the 483 Sort. The judge said there was not enough evidence to show that IBM set out to destroy Programmatics business, that IBM's actions would irreparably harm Programmatics, or that IBM violated any antitrust law.

THE SECOND MAJOR PHASE OF A PLANNED PROGRAM IN WHICH APPLICATIONAL PROGRAMMING FOR EDP EQUIPMENT IS PRICED SEPARATELY FROM EQUIPMENT HARDWARE has been announced by Burroughs Corp. President of the Corporation, Ray W. Macdonald, said the separate pricing policy for Burroughs E4000 and E6000 series of electronic accounting systems will go into effect July 1, 1969.

Under the E4000 and E6000 price separation plan, prices for hardware will be lowered, and customers will be able to choose from four basic methods in identifying costs for applicational software: (1) Customized programming can be written by a Burroughs representative according to a customer's specific requirements; (2) The customer can select standard applicational programs supplied by Burroughs; (3) The customer can select a standard program and have it modified for his application; or (4) The customer can do his own programming after receiving

(Please turn to page 50)



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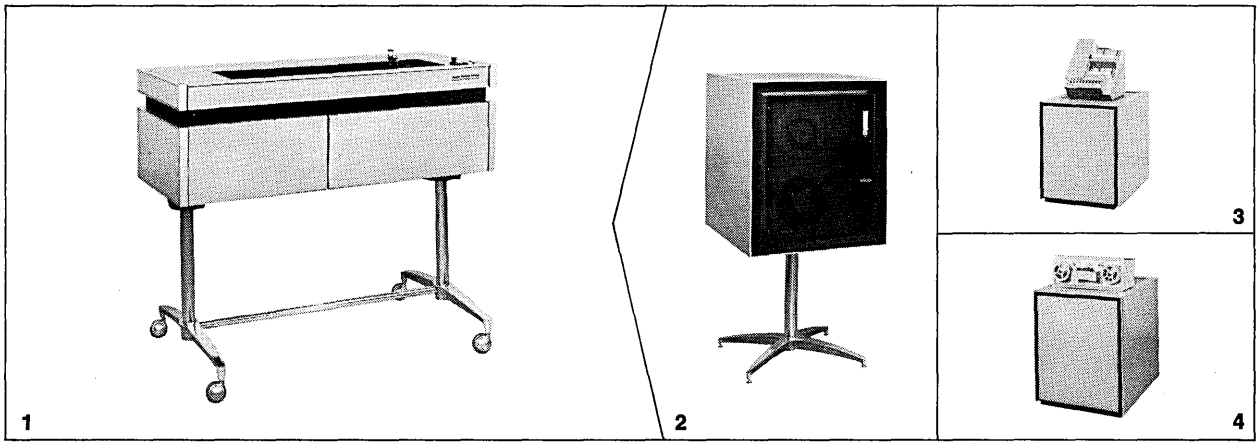

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C.a

MULTI-ACCESS FORUM

THE COMPUTER ASPECTS OF A SYSTEM FOR ANTI-BALLISTIC MISSILES

Daniel D. McCracken
7 Justamere Drive
Ossining, N.Y. 10562

I write to you as Editor about a concern that I don't know whether your readers share or not, but if some do, I would like their support.

The issue is that of further ABM deployment, which I oppose as

- a pointless escalation of the arms race,
- a wrong-priority diversion of national resources from other problems that badly need solving, and
- technically dubious.

For the record, however, let me say, that I am not a pacifist nor do I favor unilateral disarmament. I simply cannot see the value of raising the ante in the balance of terror.

On the technical feasibility question, I think the computer system required would be too complex to be able to do its job, given the unknowable offensive maneuvers it would have to cope with, and given that it could not be tested under operating conditions.

One analogy is that of an airline reservation system that had to be tested for five years on made-up data, then respond without any failure to the first 20 live customers that showed up without warning — in seven seconds. And if the overall system — radar, computers, and weapons — could not be expected to be at least 90% effective, there would be little point in building it.

If any of your readers share these views, I invite them to join with me in attempting to shape public and Congressional opinion — or, if any of your readers knows of such a group already in existence, tell me and I'll join.

I have in mind a statement signed by as many computer people as possible urging that the ABM is both bad national policy and bad computing. A white paper on the latter point would be a possibility, if people with the background to write it or supply the facts could be found.

I would like to hear from your readers. If any are interested but are not prepared to associate themselves publicly with what is, after all, an unknown quantity at this point, let them say so; and I will not use their names. And if any disagree entirely, I assume they are working to implement their point of view. That's democracy!

I would like to report that the initial trickle of responses received from computer people to letters already sent is very strongly supportive. I have also had a couple of letters from members of Congress to whom I described the plans, encouraging me to proceed. One Senator reminded me that the present headcount is 49 opposed and 47 favoring, which is the kind of situation where vigorous efforts have a real opportunity to pay off.

Computer people cannot possibly duck responsibility on this one: computers are at the very heart of the system; and many thousands of computer professionals would be devoting their professional competence to the system.

My main purpose is specifically to emphasize the computer aspects of the problem. There is so much question about the technical feasibility of the computer portion of the system that we can usefully emphasize that aspect, I feel, without dealing with other problems that are being dealt with by others. □

THE SPECIAL INTEREST COMMITTEE ON THE SOCIAL IMPLICATIONS OF COMPUTERS OF THE ASSOCIATION FOR COMPUTING MACHINERY — DISCUSSION, PART 3

I. Note from the Editor

The following is a continuation of the discussion, Part 1, on pages 11 to 14 of the April issue of *Computers and Automation,* and the discussion, Part 2, on pages 12 and 13 of the June 1st issue (our June 30 or midyear issue is the "Computer Directory and Buyers Guide" issue).

Robert P. Bigelow is the chief organizer of a petition to reactivate the Special Interest Committee on the Social Implications of Computers of the ACM; he was joined in initiating this petition by Paul Armer, Michael A. Duggan, Roy N. Freed, Herbert R. J. Grosch, Patrick J. McGovern, Anthony G. Oettinger, Donn B. Parker, and Stanley E. Rothman.

A meeting on this subject on the evening of May 14 in Boston at the Spring Joint Computer Conference was attended by more than 100 persons, including many members of the ACM, several members of the Council of the ACM, and many members of Computer Professionals for Peace. For those who attended, it was a most interesting and informative meeting, with much clash of viewpoint, and *no* disorder or disruption. The entire meeting went well, thanks largely to the skillful and democratic chairmanship by Robert Bigelow. The motions that the meeting passed were, of course, just the votes of an ad hoc group.

This demonstration of emphatic interest in this subject by many computer people (both with and without important professional standing in the computer field) was undoubtedly taken into account in the deliberations of the Council of the ACM at the Council meeting on May 17.

II. From Robert P. Bigelow
39 Grove St.
Winchester, Mass. 01890

On Saturday, May 17, 1969, the Council of the Association for Computing Machinery passed the following motion by a vote of about 17 to 4:

> The committee on SIGs and SICs [Special Interest Groups and Special Interest Committees] is instructed to work with the sponsors of the petition [regarding a Special Interest Committee on the social implications of computers] and to bring before the Council in August a working plan for a special interest committee in the field of social implications of computing.

We will of course be happy to work with the committee on SIGs and SICs, and we hope that anybody who has suggestions in regard to a working plan will let us have them as soon as possible.

III. From William L. Harrison
49 Holyoke Lane
Willingboro, N.J.

The letter by Mr. Shapiro and the editorial comments by Mr. Berkeley in "Multi-Access Forum" in your April, 1969, issue typify the type of logic unfortunately too prevalent among professional people today. Mr. Shapiro indicates that "there are few social issues not within our competence since computers pervade society". I submit that the use of computers in many areas of our society does not raise the "computer professional" to a unique class of person able to speak intelligently on a wide variety of subjects. Although within this profession there are certainly individuals who encompass wide interests and experience, this is no different from most cross sections of society. The computer professional in fact normally works in a narrow environment, with little contact with the wide spectrum of society. It is very doubtful that a computer professional programming in the state department is more or less qualified to comment on foreign policy than the electrician who also works there.

There are unquestionably issues on which computer professionals should be heard. Mr. Shapiro is rightly concerned with unscrupulous computer schools, questionable educational requirements, and the problems of mass data banks. These are certainly areas where the computer professional can and should play a vital, constructive role. These and similar subjects will be serious social problems for some time to come.

The mistake Mr. Shapiro and Mr. Berkeley make, along with similar individuals in other professions, is to overrate their education and profession to the extent that they believe themselves qualified to render judgements on all aspects of today's society. My objection to this is that they then attempt to use the leverage of a professional group to formalize and give prestige to their personal views. As a "computer professional" of twelve years, I find this objectionable and unwarranted.

IV. From Vernon J. Maruska
12467 Pine Rock Lane
Houston, Tex. 77024

The letters printed in your April, 1969, Multi-Access Forum advocating active implementation of SICSIC and even proposing a "Resolution" for computing professionals would be merely interesting if they didn't have such serious implications. I (a registered professional engineer who is active in the real-time computer control field) do not agree with several statements of the "Resolution". I have many co-workers who feel the same way. I further find that most responsible and hard working professionals will not knowingly become involved with any organization promoting such left wing causes which, if successful, could destroy the great accomplishments obtained in our nation under a free and competitive environment.

Mr. Shapiro's enclosure (page 12 of the April issue) emphasizes some of the well known dangers to individual privacy which could result from improper usage of computing capabilities. These subjects are clearly covered in the U.S. Constitution. The problem is that we now have a technology which, if left unchecked, could circumvent some of the original intent of the privacy rights granted by the Constitution. I think that legislation could and should be enacted to guarantee law abiding citizens that their Constitutional rights of privacy will not be invaded by *any* unscrupulous computer user. This very serious need should have received much higher priority in Mr. Shapiro's "Resolution".

Mr. Shapiro's main emphasis appeared to be an attempt to obtain professional opposition to the Vietnam War, the profit motive, and the use of educational requirements in the hiring of computer organization employees. By skillfully sandwiching these items around the privacy invasion matter, Mr. Shapiro leads one to believe that all computing professionals do or should share his views and that these "problems" exist to his stated degree. His technique is known as guilt by association.

I want to know what is wrong with freedom, privilege of competition and the profit motive. It has built the greatest society ever known (and I'm not referring to President Lyndon B. Johnson's Great Society) — one in which the very poorest, who seem to be doing so much complaining, are generally better off materially than so-called "middle classes" under many of the systems they claim we should imitate. We have been more generous with our wealth, both foreign and domestically, than any other nation in the history of the world — and frankly we have received little gratitude in return. I think most Americans, including professionals, are justifiably proud of our America.

Moralists are a necessary part of our society even though they frequently lose all sight of reality. However, there is no more room for inadequately trained personnel in a computer installation than in a hospital. There appear to be some people who believe that money in itself is bad; that all training is unnecessary; etc. It is very simple. We must decide if we want to live in a free, competitive society (such as built this great country in only 200 years) or live in a communist-type slave state.

One of the problems with a free society is that a man can choose either to apply himself or not to apply himself. If he chooses not to work or not to learn, he will not starve to death — the rest of us will give him his necessities.

An even greater problem is that most moralists refuse to accept the fact that lazy individuals do exist. They become frustrated when they cannot help those who refuse their help and when they cannot fulfill the needs of those who truly want and need assistance. We must remember that equal men are not free and that free men are not equal. God created a Heaven but most men are destined for Hell because they failed to apply themselves to the correct standards.

A most serious problem with moralists is that they cannot comprehend the criminal mind. They have even more difficulty understanding a criminal conspiracy — particularly one organized on an international basis and dedicated to the enslavement of the entire world. Still, American intelligence verifies that communist revolutionaries are actively operating within the United States today — providing organization and coordination for revolutionary activities.

I am of Czechoslovakian ancestry and am old enough to remember Czechoslovakia being once enslaved by the Nazis and twice by the communists — once very recently when they

again asked for help which didn't come from the rest of us. A man who has always lived under freedom may prize it lightly, whereas one who has once lived under slavery would be willing to die in the hope of becoming free.

The ACM and/or SICSIC might adopt the proposed "Resolution". However, this certainly doesn't mean that such represents the view of the computing profession. It simply verifies that the organization has been infiltrated by left wing "intellectuals" (persons educated beyond their intelligence).

V. From the Editor

It is distressing to observe the large number of persons in many countries who become excited and talk in sweeping statements (about freedom, communism, God, Hell, the Vietnam war, the profit motive under capitalism, the motive of service under socialism, etc.) when the social implications of computers for society is brought up.

Professional and expert knowledge of computers does not imply that a computer professional is an expert in any other field. Neither does that expert knowledge imply that he should say and do nothing at all. In any area where experts and politicians disagree, it is desirable to have more and not less discussion, and more thought, and more wisdom.

It is also distressing to observe the large number of persons in many countries who fear to discuss certain "difficult" subjects.

I happened to be in Moscow in August, 1968, at the time of the invasion of Czechoslovakia by the Soviet Union and four other countries. I did not find one Russian who dared to say that he thought it was wrong, though no Russian I talked to was happy about it.

Once in 1948, when I worked in the home office of a mutual life insurance company in New Jersey, I was told by a vice president of the company that the only employee who could publicly express views about future catastrophe hazards including the right or wrong of nuclear weapons, was the president of the company — that every other employee in the company had to keep silent. I disagreed with him, and I resigned.

In the process of making a better society, which is unfinished business all over the world, computer people have an unusually important role to play: they are essentially engineers (technological trustees for society) in the proper handling of information, with due regard to logic, facts, morality, and the best interests of humanity and the world.

They should live up to this social responsibility in the best possible way they can discover and develop. □

ADAPSO POSITION PAPER ON COMPUTER MANUFACTURERS PRICING POLICIES

ADAPSO (Association of Data Processing Service Organizations, Inc.)
420 Lexington Ave.
New York, N.Y. 10017

The following is a position paper issued by ADAPSO on the pricing policies of computer manufacturers.

The American electronic data processing industry already has significant impact on our domestic and the world economy. With the next decade, it may emerge as a major factor. Clearly any review of competitive conditions in any segment of the industry calls for participation by all those having a major interest. This is especially true of the present reviews of the hardware segment of the industry being conducted by all three branches of government, executive, legislative and judicial, as well as by civic groups and the manufacturers themselves.

ADAPSO, as the representative of the data processing service organization industry, a most important user group with a deep interest in the outcome of the pending reviews, submits this first of several industry position papers in order to carry out its responsibility to inform all concerned parties of the industry's views.

It is ADAPSO's general position that the hardware manufacturers' traditional practice of providing a variety of products and services in a single purchase or rental price (the so-called "bundled price") represents in practice:

1) A tie-in sale no less odious than the full line forcing of products which are separately priced.
   In fact, because of the vast amount of unwanted and unneeded products which in practice are tied in, ADAPSO submits that the tie-in aspect is completely indefensible.

2) A form of price discrimination, inasmuch as each user in fact obtains widely different amounts of costly services without impact upon the price he pays.

ADAPSO believes that the best interests of all users (service organizations and others alike), would be served if all computer manufacturers would separately price any service or function which is or can be available in the marketplace or provided by the user himself if he chooses. Specifically, ADAPSO strongly recommends that the following services or functions be separated from the present single price and offered to all customers at prices related to the cost of providing each unit of the service involved:

1) *Systems Engineering Support*
   A leading manufacturer has stated that the primary mission of its systems engineering personnel is the sale of more equipment. Nevertheless, there is abundant evidence that a great deal of this assistance is rendered on a continuing basis to any customer who "needs" or demands it. A customer who does not need, want or know how to demand it, is still required to pay for the cost of this service in his equipment rental or purchase price.

2) *Educational Programs*
   Here again many computer users have no need for the manufacturers' profferings, while others are continually consuming this service without additional charge.

3) *Application Oriented Software or Programming*
   Most manufacturers have vast libraries of applications programs which are made available with assistance in implementation at no charge. The user who does not require such assistance nevertheless must pay for it.

ADAPSO has specifically excluded equipment maintenance and so-called operating software (operating systems, compilers, etc.) from its recommendations for separate pricing. Both functions are intimately connected with the equipment itself, require special expertise not likely to be available in most users own organizations, and are not at the present time available in significant degree in the marketplace. Moreover, there is less evidence of discrimination here because the amount of service consumed is likely to be commensurate with the amount of equipment in use and is related to the manufacturer's capabilities rather than the user's. However, these circumstances may well change, and if so, the same criteria for desirability of separate pricing would apply. □

A BILL TO PREVENT THE INVASION OF PRIVACY THROUGH THE MISUSE OF COMPUTER INFORMATION

Text of the Data Surveillance bill introduced into the House of Commons of the British Parliament by Mr. Kenneth Baker (Acton, C.) on May 6, 1969.

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1.—(1) A register shall be kept by the Registrar of Restrictive Trading Agreements (hereinafter in this Act referred to as "the Registrar") of all data banks as hereinafter defined which are operated by or on behalf of any of the following:—

(*a*) any agency of central or local government;
(*b*) any public corporation;
(*c*) any person exercising public authority;
(*d*) any person offering to supply information about any other person's credit-worthiness, whether to members of a particular trade or otherwise and irrespective of whether payment is made therefor;
(*e*) any private detective agency or other person undertaking to carry out investigations into any other person's character, abilities or conduct on behalf of third parties;
(*f*) any person who offers for sale information stored in such data bank, whether to the general public or otherwise.

2.—(1) This section shall apply to all data banks which are required to be registered under section 1 above except for the following:—

(*a*) data banks which do not contain personal information relating to identifiable persons;
(*b*) data banks operated by the police;
(*c*) data banks operated by the security services;
(*d*) data banks operated by the armed forces of the Crown.

(2) The operator of each data bank to which this section applies shall maintain a written record in which shall be recorded the date of each extraction of data therefrom, the identity of the person requesting the data, the nature of the data supplied and the purpose for which it was required.

3.—(1) The Registrar shall submit annually to Parliament a report covering the previous calendar year in which he shall state the number of data banks entered on the register, the number of such data banks which fall within the terms of section 2(1)(*a*) and of section 2(1)(*b*) to (*d*) respectively and the number of instances in which he ordered entries to be amended under section 1(5) or refused an application to after an entry under section 1(6).

(2) The Registrar's report may contain such additional information, statistical and otherwise, as the Registrar may think fit.

4.—(1) Any person about whom information is stored in a data bank to which section 2 above applies shall receive from the operator, not later than two months after his name is first programmed into the data bank, a print-out of all the data contained therein which relates to him. Thereafter, he shall be entitled to demand such a print-out at any time upon payment of a fee the amount of which shall be determined by the Registrar from time to time; and the operator shall supply such print-out within three weeks of such demand.

(2) Every print-out supplied in accordance with this section shall be accompanied by a statement giving the following information:

(*a*) The purpose for which the data contained in the print-out is to be used, as entered on the register referred to in section 1 above;
(*b*) The purposes for which the said data has in fact been used since the last print-out supplied in accordance with this section;
(*c*) The names and addresses of all recipients of all or part of the said data since the last print-out supplied in accordance with this section.

(2) The register referred to in the foregoing subsection shall contain the following information concerning each data bank:—

(*a*) the name and address of the owner of the data bank;
(*b*) the name and address of the person responsible for its operation;
(*c*) the location of the data bank;
(*d*) such technical specifications relating to the data bank as may be required by the Registrar;
(*e*) the nature of the data stored or to be stored therein;
(*f*) the purpose for which data is stored therein;
(*g*) the class of persons authorised to extract data therefrom.

(3) The owner of the data bank shall be required to register the information referred to in paragraphs (*a*) to (*c*) of the foregoing subsection. The person responsible for the operation of the data bank shall be required to register the information referred to in paragraphs (*a*) to (*g*) of the foregoing subsection.

(4) Any person responsible for registering information under this section shall be required to inform the Registrar of any alterations of, additions to or deletions from the said information within four weeks of such alteration taking effect, subject to the provisions of subsection (6) below.

(5) If at any time the Registrar is of the opinion that in the circumstances the information given or sought to be given under paragraphs (*f*) or (*g*) of subsection (2) above might result in the infliction of undue hardship upon any person or persons or be not in the interest of the public generally, he may order such entry to be expunged from or not entered in the register. In reaching a decision under this or the next following subsection, the Registrar shall be guided by the principle that only data relevant to the purposes for which the data bank is operated should be stored therein, and that such data should only be disclosed for those same purposes.

(6) An alteration to the register in respect of paragraph (*f*) or (*g*) of subsection (2) above shall be made by application to the Registrar who shall, not earlier than four weeks after receipt of such application, grant or reject the application giving his reasons in writing.

(7) The register together with applications submitted in accordance with the last foregoing subsection shall be open to inspection by the public, including the press, during normal office hours:

Provided that entries relating to data banks operated by the police, the security services and the armed forces shall be kept in a separate part of the register which shall not be open to inspection by the public.

5.—(1) Any person who has received a print-out in accordance with section 4 above may, after having notified the operator of the data bank of his objection, apply to the Registrar for an order that any or all of the data contained therein be amended or expunged on the ground that it is incorrect, unfair or out of date in the light of the purposes for which it is stored in the data bank.

(2) The Registrar may, if he grants an order under the foregoing subsection, issue an ancillary order that all or any of the recipients of the said data be notified of the terms of the order.

6.—(1) It shall be an offence, punishable on summary conviction by a fine of not more than £500, or on conviction on indictment by a fine of not more than £1,000 or imprisonment for not more than five years or both, for the owner or operator of a data bank to which this Act applies to fail to register it in accordance with this Act.

(2) If the operator of a data bank to which section 2 above applies—

(*a*) fails or refuses to send a print-out when under a duty so to do; or

(*b*) permits data stored in the data bank to be used for purposes other than those stated on the register; or

(*c*) allows access to the said data to persons other than those entered on the register as having authorised access; or

(*d*) fails or refuses to comply with a decision of the Registrar, he shall be liable in damages to the person whose personal data is involved and, where such acts or omissions are wilful, shall be liable on summary conviction to a fine of not more than £500 and on conviction on indictment to a fine of not more than £1,000 or imprisonment for not more than five years or both.

(3) A person who aids, abets, counsels or procures the commission of an offence described in this section or with knowledge of its wrongful acquisition receives, uses, handles, sells or otherwise disposes of information obtained as a result of the commission of such an offence, shall likewise be guilty of the said offence.

7. An operator of a data bank to which this Act applies who causes or permits inaccurate personal data to be supplied from the data bank as a result of which the person to whom the data refers suffers loss, shall be liable in damages to such person.

8. The Registrar may make rules relating to the implementation of any part or parts of this Act and in particular relating to—

(*a*) the keeping of the register and records referred to in sections 1 and 2 above;

(*b*) access by the public to the register referred to in section 1 above;

(*c*) procedure on hearing objections and argument on a proposal to alter or expunge from the register under subsection 5 of section 1 above;

(*d*) procedure on application to alter the register under subsection 6 of section 1 above;

(*e*) verification of the identity of a person demanding a print-out in accordance with section 4 above.

9. An appeal shall lie to the High Court from any decision made by the Registrar under this Act.

10. In this Act, the following terms shall have the meanings hereby respectively assigned to them, that is to say—

"data" means information which has been fed into and stored in a data bank;

"data bank" means a computer which records and stores information;

"operator" means the person responsible for the operation of a data bank and for the introduction into and extraction from it of data;

"owner" means the person who owns the machinery comprising the data bank;

"print-out" means a copy of information contained in the data bank supplied by the computer and translated into normal typescript.

11. *There shall be paid out of moneys provided by Parliament any expenses incurred by the Registrar attributable to the provisions of this Act.*

12.—(1) This act may be cited as the Data Surveillance Act 969.

(2) This Act shall come into force on the first day of July 1970.

(3) This Act shall extend to Northern Ireland. □

MARTIN LUTHER KING MEMORIAL PRIZE NOT AWARDED IN 1969

In February, 1969, *Computers and Automation* announced an annual Martin Luther King Memorial Prize of $300 to be awarded for the best article submitted in the general field of:

> The application of information sciences and engineering to the problems of improvement in human society.

Deadline for receipt of manuscripts for the 1969 Contest was April 30.

The terms of the contest were published in *Computers and Automation* for February (on page 10) and for March (on page 12). In accordance with those terms, the judges have concluded that no sufficiently good essay was received to justify the awarding of the prize for 1969. Accordingly, the next time the prize may be awarded is 1970.

The judges were: Dr. Franz L. Alt of the American Institute of Physics; Prof. John W. Carr III of the Univ. of Pennsylvania; Dr. William H. Churchill of Howard Univ.; and Edmund C. Berkeley, Editor of *Computers and Automation.*

An announcement of the 1970 contest including the terms of the contest will be published in the October, 1969 issue of *Computers and Automation.* □

FJCC SEEKS COMPUTER ART ENTRIES

Special Activities Committee
'69 FJCC
1209 N. Riedel Ave.
Fullerton, Calif. 92631

One of the old professions — art — will interact with one of the new professions — computing — at the Fall Joint Computer Conference in Las Vegas, Nov. 18-20, 1969. It is expected that some 200 works of art, from a computer art contest sponsored by the Conference, will be on display for the public and conference attendees. The art contest will include two categories: art *about* computing, and art prepared *by* computing. Entries are invited, and prizes will be awarded.

Art will deal with computing and computers, the science and the art, industry and society, people and machines. Entries are desired that depict not only present realizations, but also projections for the next ten years, in keeping with the conference theme, "Threshold of the Seventies".

The art exhibit will open Sunday, Nov. 16, and will remain open through Thursday, Nov. 20. A computer music exhibit will also be held Nov. 16-20.

The art will be judged by a group whose members are to be announced. Entries will open on September 2 and will close on September 22. Details are available from the address above. □

"THE MISDIRECTION OF DEFENSE AND THE SOCIAL RESPONSIBILITIES OF COMPUTER PEOPLE" — COMMENTS

Karl E. Korn, President
Industrial Computer Systems, Inc.
One E. 42 St.
New York, N.Y. 10017

As your editorial (in the April, 1969 issue) on the Misdirection of Defense and the Social Responsibility of Computer People points out, many individuals are spending their efforts toward the destruction of part or all of the human race. Unless such individual behavior is redefined as illegal, it will probably continue its present course, until mankind is destroyed.

The solution would appear to be the adoption of a uniform international code of law which would make it a uniformly-punishable *individual* crime to participate in the invention or manufacture or storage of atrocity weapons, atomic missiles, etc. Gradually over the years such constraints upon destructively oriented behavior of the *individual* could be uniformly adopted by all governments and enforced internally within each country.

Participation in anti-human enterprises needs to be studied for the many situations which are presently viewed as "borderline". Gradually our concepts of "borderline" will be moved to be considerably more favorable to mankind's survival.

A "creative law" conference on an international scale is an overdue project for those devoted to man's survival.

Computer people, as problem solvers, may help solve this problem also.

Remy Landau and Rene Pardo
805 Mt. Auburn St., Apt. B1
Watertown, Mass. 02172

We believe that what you say in your editorial in the April issue is indeed quite important and quite well stated.

The prospect of a United States gearing itself increasingly at all levels to feed a growing military machine is frightening. It is encouraging that you are not alone in denouncing the aggressive shift of American military policy.

What was said in your editorial properly belongs there in spite of the nature of *Computer and Automation* as a magazine. You did not need to justify the content by asking what it was that we could do as computer personnel. Computer people are after all human, and in that sense bound by the same moralities. □

"HOW TO SPOIL ONE'S MIND — AS WELL AS ONE'S COMPUTER" — MORE COMMENT

Daniel N. Jediny
44 Sherman Ave.
Hawthorne, N.J. 07506

I have just recently read your statements in "How to Spoil One's Mind — As Well As One's Computer — Some Comments", which appeared in the December 1968 edition of *Computers and Automation*. I find your comments well-stated in the expression of your criticism of the government.

The indignant rebuttal to the original editorial, submitted by C. W. Chamberlain, M.D., implies that the United States Government is above reproach in the matter of "integrity". Inasmuch as all governments (and other institutions of authority) are always the embodiment of human beings, the rebuttal necessarily alleges that all of these same people are unequivocally truthful.

I wonder if Dr. Chamberlain, and his governing body of health authority, are similarly "programmed" to always tell the truth. Do they always render all professional services to their patients without ulterior motive?

Institutions, like their human counterparts, do not voluntarily reveal any of their "dark secrets", except under possible duress. The subterfuge of "truth" takes the form of lies, ranging in magnitude from "little white lies" to mountainous prevarications. Such substitutes for truth are often created as an excuse to justify acts of aggression. □

COMPUTER GRAPHICS 70 — CALL FOR PAPERS

Professor M. L. V. Pitteway
Computer Science Dept.
Brunel Univ.
Uxbridge, Middlesex, England

Papers are invited for the Computer Graphics 70 Second International Symposium to be held at Brunel University, Uxbridge, England (near London), April 14-16, 1970. A survey conducted among the 450 delegates from 18 countries who attended the 1968 symposium indicated major areas of interest in: Applications of Graphic Display Devices; Case Studies from Commerce and Industry; and Presentations by Hardware and Software Companies. The Symposium Committee is particularly interested in papers from graphics users.

Two copies of a 500-word summary or first draft should be submitted by September 30, 1969 to the above address. Final papers are due by November 30, 1969. □

C.a

PROOF GOOFS

Neil Macdonald
Assistant Editor

Note:

The department of "Proof Goofs" is no longer scheduled to appear in every issue, unless enough readers request it.

Solution to Proof Goof 696:

Paragraph 2, line 2: Replace "is" with "has".

THE SOCIAL IMPACT OF INFORMATION SYSTEMS

James M. Gavin
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"The cause of many of our social difficulties is, in the final analysis, lack of information; thus there is inadequate reaction, or no reaction, until a crisis occurs. . . .The computer community must develop adequate information on our social needs."

The mood of our country today is a very somber one. I feel quite apprehensive about where we are going. We go from crisis to crisis in a pragmatic way. Yet we have the capacity to acquire significant information and make it available for solving our problems.

In looking at the social impact of information systems, one is strongly tempted to cite an array of potential situations to which computers have application. For we like to think in terms of specifics, and to think in real terms about what actually can be done. But, rather than take this approach, I believe it very important that we think in terms of trends, the trends of our times, and what meaning these trends have in relationship to information, and information management.

The Age of Communications

To characterize in a few words the era in which we live, I would certainly say, "It is an age of communications." I use the word communications broadly, to include not only the spoken and written word, but the management of information in general, and travel as well. For today we can travel with unprecedented speed to any point on the globe. (to be sure, we may have trouble with surface transportation when we get there).

Furthermore, information can be transmitted via communications satellite to any point on the globe almost instantly. And more people are better informed about more things that are going on than ever before in the history of man. In fact, the average housewife today who watches or listens to the news programs morning and evening probably knows more about what is going on all over the world, than a head of state did a generation ago. This, of course, is the cause of our basic frustrations, and the cause of much anger with the Establishment. For the political structure and institutionalized framework of the Establishment has not kept up with the needs of our society. When people are as well informed on as many matters as they are today, they want action at a rate comparable to that at which they acquire new information. It isn't enough to tell people that if they do not like something that is happening in Vietnam, for example, or elsewhere, that they should elect new members of Congress and through this activity bring about change. Above all, they need to feel that they can participate in bringing about the changes that will affect every aspect of their daily lives.

All around us we see our cities becoming more and more crowded and many parts of them more and more rundown. The roads and highways are becoming more congested, and our environment more polluted. The cost of education and medical care is increasing rapidly. Numerous examples could be cited of the injustices we seem to inflict on members of our society — while at the same time many of us get impatient with those who cry for change, and change now. These problems are all part of the age of communications, for they are problems that must be dealt with if our society is ever to regain the sense of order and commitment to its own improvement that we once knew.

Expressing Views via TV

About a year ago I was so impressed with the sense of frustration that I encountered on many college campuses, and throughout the country, that I tried to think through a way of giving people a means of participating in the events that were molding their lives and environment. A device that is basic to much of the frustration is the television set. I wondered whether we could equip a TV set with a device to permit people to express a point of view, a reaction to a president's speech for example. Recently, I have learned that this idea is now being discussed by others, and I think that it has a great deal of merit. Particularly when community and antenna television — CATV — is more widespread, it will be a simple matter to permit people to register a point of view which would be recorded in a central information gathering station. A device subsidized by government funding could be provided with each television set which would permit people, in a limited way, to express a point of view. For those who do not have television at home, sets could be provided at local schools or fire stations, for example.

I would like to emphasize that people would not be expected to vote this way, but merely would have an opportunity to express their point of view after national figures, such as the President, have expressed a view or proposed action to be taken with respect to national problems. An arrangement such as this would be very useful also in marketing surveys, for example. With the proper organization throughout the country — and I will discuss this briefly in a moment — it would be possible for people to participate in a "town hall meeting" on city, state and national levels. The implications of this in terms of information management is quite far-reaching.

Multinational Corporations

There is another aspect of our age of communications that has great political and business significance. A man today, thanks to information management systems, can control greater amounts of capital, raw materials, people, production and marketing systems than ever in history. Hence, we have the growing movement of multinational corporations and these, in turn, have tremendous social and political significance. Lester B. Pearson, recently wrote two fascinating articles published in the *"Saturday Review,"* "Beyond the Nation State" and "Trade, Aid and Peace." Referring specifically to the multinational corporation, he said, "The multinational firm transcends national boundaries not by crossing them, but by ignoring them through the establishment of subsidiaries in foreign countries. Its success has been so great that not long ago one economist predicted that by 1980 there would be 300 multinational corporations substantially controlling the business of all the non-Communist world." Further, he went on to say, "The fact is that the sovereign state is now becoming virtually obsolete as a satisfactory basis for rational economic organization." This, I am sure, is a rather startling observation to many countries so strongly nationalistic in their orientation, but I quote it to illustrate the thinking of one of our leading statesmen.

Ambassador George W. Ball, in a very thoughtful article in the magazine, *War Peace Report,* recently wrote on the subject of "Making World Corporations into World Citizens." Noting that the current rate of corporate growth is much faster than that of national growth, he pointed out that General Motors, for example, which was founded just sixty years ago, has already grown to the point where the money it handles annually is greater than the gross national product of all but seventeen of the nations of the world. He made the remark, with which I agree, that "Caught in a whirlwind of pervasive and accelerating change, we concentrate so intensely on learning to cope with the altered demands of a shifting environment that we have little time to inquire as to the larger implications of change, and where they may lead us a decade hence."

"Fortune Magazine," excited over the growing multinational corporation, has observed that, "Somewhat like Byron, the multination corporation, has suddenly awakened to find itself famous. Five years ago practically no textbook on international economics even mentioned it. Today foundations and corporations are making research grants for studies of the subject; business schools are giving it key billing in their courses. . . ."

Speaking at the Harvard Graduate School of Business Administration earlier this school year, Robert W. Sarnoff, President of RCA, chose the multinational corporation as the subject for his talk. Quoting Abraham Lincoln, who said that responsibility goes with power, Mr. Sarnoff urged his international audience of young businessmen to awaken to their new responsibilities; he said, "There is no greater challenge to you than to help fulfill the potentials of multinational business management — to help quicken the pace of economic progress, to open new channels for cooperation among nations, to breed wider respect for the worth of the individual in shaping man's future.

I have talked about two trends that are consequences of the age in which we live and that seem to be moving in opposite directions. First, the need for improved information handling so as to give people a participatory role in their own affairs, and second, the growing importance of the multinational corporation and its implications in terms of the national labor force and small industries.

Social Need and Discontent

I would now like to talk more specifically about the role of the computer and the management of information in dealing with our domestic condition. The managers of computerized information, probably more than any other group, appreciate the need for organization associated with the management of information. There is a basic incompatibility between traditional governmental structure in this country and the present areas of critical social need and discontent.

The present state boundaries were defined many years ago for political purposes. People, however, settled where the environment afforded them the opportunity they sought, usually major port areas near waterways which had economic importance. Then these areas grew, and continue to grow today. This summer over 100,000 young men and women, mostly black, will move from the South to the North. They will move into already terribly overcrowded cities such as Detroit, Chicago, New York, and Philadelphia. The areas in most critical need of attention are those, for example, that encompass the greater New York area — or Appalachia, or Chicago, or Detroit — most of which include portions of several states.

Regional Organization

I believe we should organize a structure within our country to deal realistically with these problems. Any adequate organization should begin at the top. I am convinced that we should have a Cabinet post with responsibility for domestic affairs, exactly as we have a Cabinet post for foreign affairs. Subordinate to such an office should be regional offices, probably on the order of 8 to 12. These regions should be identified with the major problem areas that I have already referred to. Although Federal administrative regions exist, there is no Federal regional organization dealing with the worst problems.

A number of Federal activities are already organized on a regional basis, for example, the Federal Reserve System. Under that system the country is organized into 12 regions. The head of each Federal Reserve District collects a considerable amount of information on the economic conditions in each District. In addition to the Federal Reserve System, there is the Internal Revenue Service organization, for example. There are a number of others as well. So, it would probably be wise to take a look at the entire regional structure of the United States before imposing upon it an additional one to deal with the ghetto problems. No doubt, some of the information that we would need to deal with social problems is already being assembled and stored in key areas. As I would see this system working, the individual responsibility for each region would receive bloc grants of funds from the Federal Government, which would be used to deal with the problems in each particular region. In order to plan effectively and to deal with the problems, it would be necessary to acquire vast amounts of information on all of the resources and needs of the region. I would emphasize that such a regional structure would recognize the existing political structure, but, except for its relations with Washington, would tend to be independent of political influence.

The Effect of the Computer on Social Problems

At first it may seem somewhat ridiculous to suggest that a computer could seriously affect the social problems of ethnic groups, poverty, medical care, education and man's environment. On reflection, however, it becomes clear that the human action which is needed to attack these problems must be preceded by information — detailed information which defines and delineates the problem in a quantitative way. One major form of national response to social problems is that of providing funds for education, welfare, unemployment, medical care and hospitals, roads, parks, recreational and sports facilities, and so on. With such detailed information, for example, it would be possible to shape the legislation needed to deal with problems long before they arise. I doubt that, under the present conditions in this country, there is any legislation being considered anywhere to deal with the problems beyond the next five years. Yet, now is the time when we should be acquiring information and passing the legislation that will permit us to act when those problems do arise. The cause of many of our social difficulties is, in the final analysis, lack of information; thus there is inadequate reaction, or no reaction, until a crisis occurs. Under these circumstances, it is understandable why people cry for an opportunity for participation, hoping that things might be done better and sooner. We must develop adequate information on our social needs; the computer community must recognize clearly the complex interdependence of what it can do and what the needs are within the social system.

Human Needs and Attitudes

Computers by themselves are only a single tool in the package we are going to need to solve social problems; exploiting their capabilities will hinge upon our ability to develop the software. It is quite clear that information or data is completely inadequate without structure and analysis. For example, an enormous data bank can be useful for administrators in dealing with many day-to-day problems, but by itself it cannot furnish the guidance necessary for policy determination. First, it must be incorporated in some form of model which also accounts for human needs and attitudes.

A primary requirement for developing such models is skilled analysts dedicated to work on social problems. These men and women will be needed in vast numbers. A single run of a large-scale simulation, for example, may require only a few hours or less of computer time, but many man-months of analytical effort to prepare, and many more man-months to evaluate.

Consider the unforeseen social impact of public programs which often are based on very sophisticated statistical forecasts. Highway planning is rich in examples. Freeways built on the basis of projections of current traffic levels between two points always seem to be filled to capacity sooner than the planners anticipated. Sadly, all too often they are built for the sole purpose of moving a particular traffic level from one point to another with little regard to the social impact of the highway, not only on those at the terminal ends, but on those whose homes are displaced along the route. In Watts, the suburb of Los Angeles, I noticed recently a dozen medical trailers in a small block, providing medical service to the people of Watts. But I was told with bitterness by someone there, "All that has to go out now — another freeway is coming through. We have offered them another route, two blocks further over — but they won't let the freeway go through that way." Must we disregard these human and social values?

Once built, freeways tend to promote new patterns of social and commercial interaction. In urban areas quantitative analytical studies have been used to select optimum routes for freeways. However, in some cases these routes have proven to be not so optimal, simply because citizens will not accept the computer solution, and they protest and delay construction indefinitely.

The big question often overlooked in these studies is whether a particular freeway should be built at all. In discussing this problem, I do not mean to single out highway planners. The point I want to make strongly is that in developing sophisticated mathematical techniques, we absolutely must provide for human wants and needs better than we do now. Technically valid solutions may not be socially adequate; they may even be socially disastrous. So, I plead once again for participation, participation on the part of those who are going to be affected by the solutions we develop, and the participation of professionals in addition to computer experts.

An Inter-disciplinary Approach

We must approach these problems on an inter-disciplinary basis, using the combined professional resources of social scientists, teachers, public opinion experts, management scientists, architects and planners, as well as persons skilled in understanding and programming computers. The industry to date has concentrated on hardware and relatively straightforward mathematical languages for business usage. It has in many respects grown up in isolation from the most critical problems our nation faces. The task now facing the computer industry is to make the major contribution it is capable of, through developing the necessary interactions for effective social progress.

The problem of matching human needs to available resources is the big social problem for the seventies. The computer community can play a very large role in solving it. However, it will require that the computer scientists adopt a wider perspective in order to avoid the pitfalls inherent in the easy assumption that what can't be quantified doesn't exist.

The need is clear and the challenge is very real. The opportunities are limitless. To achieve the solutions we must recognize that to program machines to do the necessary social jobs we must thoroughly understand the context of the problems.

Based on an Address at the Spring Joint Computer Conference, Boston, Mass., May, 1969. □

Your Girl Friday won't be in Monday.

She was killed in a car accident.

Like the nearly 25,000 valuable employees who lost their lives in car accidents last year.

Maybe it's because some businesses don't make it their business to do the little things that help save people's lives.

Like sponsoring the National Safety Council's Defensive Driving Course.

If you're too busy for little things, consider some of the companies who aren't.

Coca-Cola.
Dow Chemical.
Ohio Edison.

Set up a Defensive Driving Course for your people.

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COMPUTER INSTALLATION AT TRW SYSTEMS — SOME EXPERIENCES AND LESSONS

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"For successful introduction of a new computing service, the capability provided to the user must not be impaired throughout the transition period."

Looking back over the last several years, I find three experiences in computer installations at TRW Systems Group that stand out as ones which provide lessons for those planning future installations. Each of them had its painful moments and its successful results. The words "painful" and "successful" have meaning to both the computer user and the computer center manager. The user looks at the computing center in terms of:

- its capability to solve his computing problems;
- its response in delivering the solutions; and
- the cost of the solutions.

He measures each change in the installation in terms of its effect on these three things. The manager seeks to continually improve these things, but in doing so he may temporarily impair one or more of them, to the distress of his customers and himself.

Computers are known for their processing speed, performing enormous computing tasks in a few minutes. But to the user, that 5 minute central processing unit (CPU) time computing job may involve 24 hours or more in the computing center. The additional time is taken up in preparing the job for the computer, preparing the computer for the job, etc. The result of all this is that the CPU is idle much of the time and is engaged in productive work only a few hours a day; meanwhile the computing job sits and waits. This low productivity has another consequence, high cost to the user. In the late 1950's attempts to improve the productivity of the computer led to the development of "batch processing" in which a batch of computing jobs is put on a magnetic tape in a card-to-tape converter. The taped batch is carried to the computer, the tape mounted, and the batch of jobs run, with the computer stopping only for the mounting of job tapes. The output from the jobs is then batched on a tape, which is carried to the printer and the output printed. Batch processing improved throughput, but computers kept getting faster, and the magnitude of set-up time caused the computer to be idle up to 30% of scheduled time. A classic batch computer system was the IBM 7090 supported by one or more IBM 1401's which performed card-to-tape and tape-to-print.

The Integrated System

In 1962, in an effort to improve the throughput of the batch processing system, a group at TRW, under the direction of R. A. Beach, designed a hardware/software system which they called the "Integrated System." The hardware configuration was selected after simulation of alternative equipment arrangements. It consisted of an IBM 7090 computer connected to an IBM 1410 computer through a 1301 disk unit.

In this system, computing jobs are processed automatically. Frequently used programs are stored in a program file on the 1301. Jobs on punched cards are read into the 1410, which places them in a queue on the 1301. The 7090 examines the queue and schedules the jobs taking into account their importance (priority), time of submission, estimated run time, and estimated print volume. Then it looks at the magnetic tape requirements of the first 5 jobs scheduled to be run and reschedules them to be run in the order which would minimize tape set-up time. Tape mounting instructions and other messages to the operator are printed on an on-line printer. After completing the scheduling calculations, the 7090 executes the job scheduled to be run first. Upon completing the running of that job, the 7090 places the computed output on the 1301. The 1410 prints the output on one of 2 printers and/or punches it on a card punch. (The 1410 card reader, card punch, and both printers are run concurrently.)

The operating system software for the Integrated System was constructed using ingredients from IBM's IBSYS operating system. It processed programs written in FORTRAN, COBOL, IBMAP, SCAT, SMASHT, and absolute machine language, presented to the computer in any order.

The Integrated System was scheduled to begin operation in April 1963. Not surprisingly, the schedule slipped as it took longer to check out the software than the system designers estimated; the system became operational in mid-June 1963. From an operational viewpoint, the system worked well, achieving the anticipated reduction in setup time from about 30% to about 15% and turn-around-time improved. There were few system errors. But the users were unhappy. Many of their jobs had a longer running time and, because computer usage was billed on the basis of run time, their computing bills were larger.

Planned improvements in the software implemented within six months improved the running speed to equal that of stand-alone IBSYS, but the users' memories of bitter experiences lingered. Within a year, running speed improved so that run times on the integrated system were less (by about 5% according to benchmark tests) than stand-alone IBSYS. Then the users complained if their jobs were not run in the integrated mode. The 7090's in the system were replaced

by 7094's and they by 7094 Mod II's. The integrated system's advantage became more pronounced with the faster machines, for as they processed more jobs per day, set-up time increased (people cannot set up tapes faster when computer speed is increased); and the reduction in set-up time by the automatic processing of the integrated system became more pronounced.

Transition to the Third Generation

About 1964, computer manufacturers announced new computers which were sufficiently different from those then in use to be called a new or third generation. The larger computers of this generation are characterized by:

- Large-core high-speed storage (approximately four times as large as that in the IBM 7094) with memory-protect, which protects each program in core storage from being accessed or modified by other programs in core.
- Large disk units, having approximately four times as great storage capacity as the IBM 1301.
- Capability to communicate with many external devices, including remote terminals via telephone lines.
- Multiprocessing — i.e., several CPU's on some (but not all) of the larger systems.
- Operating systems which automatically schedule and control (with multiprogramming) the work flow through the machine.

Additionally, economies in electronic component manufacturing and in computer system assembly resulted in lower prices.

These capabilities enabled the computers to handle significantly larger programs and data bases, at lower cost. These factors aroused the interest of TRW, and planning for the acquisition of these new computers was initiated. This involved defining and appraising its computing requirements, planning conversion to the new equipment, and having competitive bidding on the procurement. Paramount among the requirements was the capability to process a work load per day of over 350 jobs, 400,000 cards input, and 2,500,000 lines of printed output with good response (turn-around-time less than four hours). A target date of July 1, 1966, was set for installation of the first new computer, to allow the computers to have been in use elsewhere for at least 6 months. Because most (85%) of TRW's scientific computer programs were in machine (symbolic assembly) language, a major program conversion effort was planned. The arrival of the new computers and the attainment of their promised benefits were eagerly anticipated.

A Rocky Road

Although most of these benefits have now (1969) been realized (on CDC 6500, Univac 1108, and IBM 360/65 equipment), the road to them was rocky. First, the computers installed in 1966 and 1967 (GE 635/635 and IBM 360/65) were not satisfactory for the heavy scientific workload at TRW Systems Group. (Large computers from other manufacturers were having similar problems, according to reports from other users.) There is no irritant to a computer user as great as an unreliable computer. Not only were results of computer runs frequently unacceptable, but repeated job submissions were required to achieve the desired results, with attendant delays in completing the work. The throughput of correctly computed jobs was low, resulting in high cost per satisfactory job. As a result, there was in 1967 a retreat to the IBM 7094 integrated system and a delay until 1968 in the production use of large third-generation computers.

The poor initial performance of the third-generation computers was aggravated by problems with the operating system software, problems caused by errors in the software and poor throughput. Although the computer manufacturers proudly describe the thoroughness of their software test activities, one day's running of each new operating system with a normal workload disclosed many errors. It seems to take a year of use in the field before an operating system works with a satisfactory error rate (fraction of jobs which won't run). The early versions of the operating systems universally produced poor throughput. New versions of one of the systems have achieved a ten-fold improvement in throughput over version one. The first operating system to reach a reasonable degree of maturity was GECOS for the GE 635 and the last is Univac Exec 8 for the Univac 1108.

A much publicized problem of the third generation was the need to convert programs to the new machine languages. TRW's experience indicates that this problem has been significantly overstated. The total cost of converting scientific programs amounted to only 25% of 1968 new application programming cost, and much of this conversion cost was due to the difficulties of checking out converted programs on hardware and software full of errors.

Remote Terminal Computing

One of the important capabilities of the third-generation computers is the servicing of remote terminals. To the user of computing services, a remote terminal simplifies the process of using a computer. It can be located in his normal work environment, so that he no longer has to bring his computing work to the building where the computer is. From the terminal, he can, with appropriate software, insert data, create files, write programs, initiate the execution of programs, interact with programs, and receive computed results. These capabilities are bringing about a major change in the utilization of computers.

Although the concept of remote terminal computing originated in the late 1950's, and a general purpose remote terminal computing system (RW 400) with multiple teletype and graphic consoles was implemented and demonstrated in 1961, it has taken until now for remote terminals to begin to be used extensively. The history of their use at TRW Systems Group may shed some light on the problems.

The first use of remote terminals in productive use at TRW Systems Group was in 1965, when two experimental capabilities were introduced to computing service users. One of these employed a small computer, a BR-340, with four graphic terminals, and was programmed with software designed by Dr. G. Culler and Dr. B. Fried. The other was a modification to the IBM 1410/7094 integrated system which enabled an IBM 1050 terminal to communicate over a telephone line with the system and use, concurrent with normal batch processing, one of the following three capabilities:

(1) CALC, a small problem calculational capability,

(2) Remote job entry, which enabled a user from the terminal to select a program from program files on the 1301 disk, insert data for the program, and cause the program to be placed in the execution queue of the integrated system; and

(3) PADS (Parts Acquisition Data System), a system for storage and retrieval of information from a large data base.

None of these systems were successful in obtaining more than a moderate degree of acceptance from users.

During 1966, a remote terminal computing service for small problems using the BASIC language was introduced. This has been very successful. There are now 75 active terminals using this service at TRW's Space Park in Redondo Beach, California. Work on an interactive graphic system using IBM 2250 consoles connected to an IBM 360:65 com-

(Please turn to page 28)

INFORMATION SECURITY IN A COMPUTER ENVIRONMENT

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"It is conceivable that the legal liability for unauthorized leaking of sensitive information may someday become as severe as for divulging classified military secrets. But for the present, the only security obtainable is what the computer center enforces itself."

It is not difficult to imagine circumstances in which it would be profitable for one company to launch an industrial espionage attack against the computer system of a competitor. Computer systems are now used to store both industrial secrets and privacy information. Information on proprietary processes, research, customer master lists, address files, or state-of-health of a company during a lawsuit, are just some of the instances when private information could be of use to an interested outsider.

Similarly, one can imagine situations in which confidential information on individuals which is kept within a computer is potentially profitable to a party not authorized to have the information. Payroll information, health records, "change your dossier or credit record for a price," are some possibilities along this line.

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Outside and Inside Penetrators

Hence, we can expect that both outside and inside penetrators, at least theoretically, will attempt to obtain unauthorized information. Most organizations depend on the ignorance of any outsider to be their main defense against unauthorized disclosure of computerized information. This is only a defense when the potential penetrator is unskilled, not highly motivated, and an outsider. Organized crime and industrial spies should be expected to have the motivation, the financial resources, and access to the necessary skills, including insiders, to use and misuse the information in most systems being used today.

Information security can never become absolute; but it is possible to take a few steps so that the costs to the penetrator will become high — hopefully higher than he is willing to pay.

Information is quite different from tangible objects because information is readily copied and distributed without any one being the wiser. Thus, it is important to take steps to insure that any loss that might occur is invariably detected.

The first step in any security system is that management must be aware of the need for security safeguards, and must be willing to support the costs of obtaining this security protection. Someone must also be technically competent enough to judge whether or not a desired security level has been reached.

Classifying Information

Whether or not management is sufficiently aware of and willing to pay the cost of a given security feature is not easy to determine. The costs of security are not exorbitant provided security is needed. Nor is security costless. That is why the second step of security is — decide what you want to keep confidential and concentrate your efforts on keeping this information secret. Defense secrets are classified among several levels of secrecy, but this is probably not necessary

for most business secrets. Usually just two classifications are sufficient: Confidential and non-confidential.

There are several reasons for establishing a guideline of this sort. The first is that it is usually too expensive and time-consuming to attempt to keep everything secret. Another reason for guidelines is that if there is a legal hassle over unauthorized release of confidential information, the injured party must show that they attempted to keep the information confidential. If employees are expected to help guard the confidentiality of information, unambiguous guidelines are necessary to inform the employees of what to guard.

Once guidelines are established, proper measures can be taken to guard the privacy of information. Confidential information should be given only to those that need it to function properly. Others should not have access to confidential information solely because of their position. Computer reports that are considered confidential should carry a restrictive legend. The legend should state that the data is confidential and cannot be reproduced in part or in any form without written authorization.

Audit List

Locked storage areas should be used for storing confidential data when it is not in use. Card files, tapes, and disks along with confidential reports should be kept in locked storage areas and charged out every time they are used. This establishes an audit list that can be periodically checked; if it is suspected that some confidential information has been misused, the check-out list will provide information as to who has been using the files.

Disposal of Obsolete Files

Proper disposal of obsolete files is part of any security system. Card files and old reports should be put through a paper shredder. According to Air Force regulations it is necessary that streams of random digits be written over classified information at least three times to declassify tapes, disks, and drums. The reason for multiple writings is simply to make certain that all the classified areas have been covered. There are certain types of software and hardware failures in a computer which could negate the intent of this overwriting of nonsense information if only done once.

This procedure is helpful but not completely acceptable for military specifications because files such as tapes and disks can be removed from the computer and can be subjected to electronic or magnetic tampering in a laboratory that can bring back information that is not accessible to the computer. For this reason tapes and disks once classified must remain so.

Copying Core

Procedures must be established so that a program handling confidential information cannot be copied by the next user who simply copies core. There are several methods to overcome this — one being the last step of a confidential program to wipe itself out of core. This is commonly done already on lower generation equipment, but it can be encouraged simply by adding a macro instruction to perform it. When using multi-processing computers, one method is to always load security programs in a certain area of core so that only this area must be wiped out instead of the whole core area. Some basic security and privacy protection can be obtained by variation in detailed logic of programs, data formats, and word structures.

Security must include physical security and personnel security. Theft of a tape file or unauthorized access to a computer hookup is a serious breach of security. An unauthorized copy of a file might be made using the computer itself and the copy revealed to unauthorized persons. A central computer system should be protected by the standard physical security measures, such as security guards, standard access controls, fire prevention, and warning devices.

Personnel Security

Intimately involved with the central computer are three types of personnel: operators, programmers, and maintenance engineers. Operating personnel must be trustworthy personnel since they can normally modify any protection device on the computer. This does not mean that every operator in the installation need be cleared, but it does mean that on every shift there must be at least one individual who understands and is able to enforce the security requirements of the computer installation. All operators must understand that there exists a protection philosophy. If the personnel are expected to help enforce the protection philosophy it must be clearly defined and specific so that it can be obeyed.

With the advent of computer systems which share the resources among several users (or several problems), there is the risk that information from one user will be coupled to another user either accidentally or through deceit. If no precautions are taken on multi-processing computers, the risk of security loss can be quite high. On the other hand if the security level is raised to the level required for information being processed, security is probably a good deal better than in non-time-shared systems.

Multi-Processing Systems

Bernard Peters of the National Security Agency has offered some guidelines for multi-processing computer systems which bear repeating here: The computer should operate under a monitor because the monitor acts as the overall guard to the system. The monitor provides protection against both accidental and deliberate attempts to misuse the computer. The monitor should have a set of rules by which it judges all requested actions. It should obey only those requests for action which conform to the security principles necessary for the particular operation.

The computer should have adequate memory protect and privileged instructions. Memory protection should be sufficient so that any reference, read or write, outside of the area assigned to a given user program must be detected and stopped. Read protect is as important as write protect, from a security standpoint, if classified material is involved.

The privileged instruction set must contain not only all Input/Output commands but also every command which could change a memory protection barrier.

The computer should keep a log of all significant events. This log should record the utilization of files and source of any illegal requests. Periodical audits of the log will indicate overuse or misuse of a file. Also logs will indicate who has used a file when misuse of a file is suspected.

User Identification

In addition to the above safeguards, each user should log in with an identification number. This is used to identify the user and his files, and for bookkeeping. Passwords which are used over and over provide very little security since a password can be compromised by a single use. Frequent change of passwords is helpful and lists of passwords where each one is used only once in sequence offers a higher degree of security than a single password.

Other suggestions for file security include: if an employee goes on vacation or only works during the day hours, the fact that he is not going to be asking for his files can be cranked into the system so information cannot be obtained during off-hours. A call-back system has been suggested for sensitive files; but if a large number of users wanted to do

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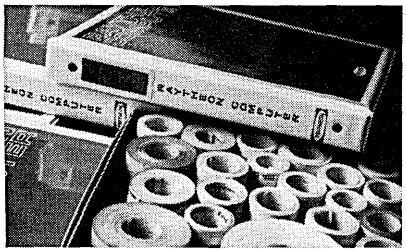

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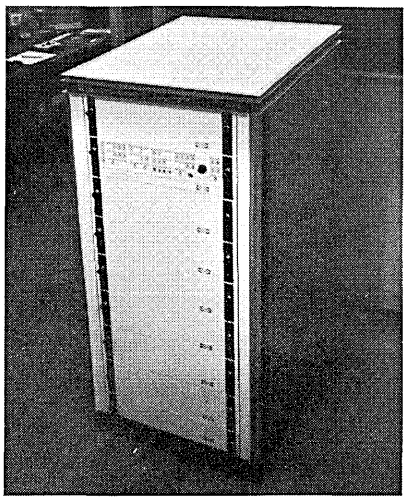
DP Integer Exponentiation	392954
Exponentiation X**JJ	392955
Integer+Logical to Double Integer	391887
Three Word Shift	392953



Designate No. 12 on Reader Service Card

FORTRAN IV-Complex Functions	Part No.
Complex Conjugate (CONJG)	392271
Complex Exponential (CEXP)	392273
Complex Imaginary Part (AIMAG)	392269
Complex Modulus (CABS)	392272
Complex Natural Log (CLOG)	392274
Complex Sine and Cosine (CCOS, CSIN)	392929
Complex Square Root (CSQRT)	392277
Two Reals to Complex (CMPLX)	392270

FORTRAN IV-Double Precision Operations	
MP to DP Conversion	390029
Double Precision Compare	392283
DP Exponentiation X**J	392944
DP Exponentiation X**JJ	392945
DP Exponentiation X**Y (M R)	392942
DP Exponentiation X**Y	392943
DP Floating Point	392951
DP Floating Point Soft	392952
DP To Mid-Precision	391874
DP Negative Store	391873
DP Polynomial	392949

FORTRAN IV-Double Precision Functions	
DP Arc Tangent (DTAN, DTAN2)	392941
DP Common Log (DLOG10)	392946
DP Exponential (DEXP)	392948
DP Natural Log (DLOG)	392947
DP Sign Transfer (DSIGN)	391910
DP Sine And Cosine (DSIN, DCOS)	392940
DP Square Root (DSQRT)	392939
DP (MOD X)	392950
Maximum Value Double Precision (DMAX1)	392281
Minimum Value Double Precision (DMIN1)	392282

Application Programs	
Compositing Program	390302
Data Acquisition and Record prog	390876
Data Tab and Trend Program	392251
Horoscope Message Loader	392980
Horoscope Program	392974
LSI Test Control Program	391076
LSI Test Translator	391078
Petroleum Flow Data Monitor	392289
Playback Program	390789
Seismic Compositing System	390840
Seismic Software System	392244
Setup Program	390839
Wire Wrap-Form Factor Control	392293

Data Processing Programs	
Data Compare-Binary or Character	393320
Data Move With Character Suppression	393322
Edit Print Format	393321
Get/Put Card Files	393314
Get/Put Tape Files	393315
Inventory File Control	393313
Inventory Master File Maintenance	393310
Load Non-Serial Disc Files	393316
Monthly Transaction Register	393312
Move or Convert and Move Data	393318
Print Page Control	393319
Read Non-Serial Disc Files	393317
Sort/Merge-Control	393306
Sort/Merge-Initialization	393305
Sort/Merge-Intermediate Merge	393308
Sort/Merge-Merge	393309
Sort/Merge-Primary Sort	393307
Shop Schedule Report System	393311

this the time required by the operator and computer would probably be prohibitive.

Time-sharing users can be restricted to FORTRAN, COBOL, or PL/1 languages. Since users can't modify the supervisor, users can't bypass the memory protection system. Any attempt at an illegal operation and the user should be cut off. He can dial back in immediately but all this should be logged in and he knows he is being watched. Immediate cut-off prevents anyone from using the computer to set up iterative processes to attempt to break security. Periodical tries should be made by special programs to deliberately attempt to violate the security. This should always be done after hardware or software changes. If the security is not occasionally checked, either machine failure or subtle changes to the monitor could go undetected.

Outside Telephone Lines

If outside telephone lines are used, they are vulnerable to three types of security problems: wire-tapping; "piggy-back" entries, (that is, selective interception of communications between a user and the processor and then releasing these with modifications); or "between lines" entry, (that is, entry to the system when a legitimate user is inactive but still holds the communications channel or cancellation of the user's sign-off signal, so as to continue operation in his name).

Privacy transformation (sometimes called scramblers or cryptographic techniques) provide protection from all three of the above threats. A privacy transformation is a non-singular (reversible) operation which hides the original message by either substitution of new characters, rearrangement, or the adding of strings of digits to the original message.

The greater the skill of the privacy transformation, the more difficult it becomes for unauthorized decoding. Telephone lines are easy to tap; nevertheless, some users seem willing to entrust to telephone lines information that they would not verbally communicate over a telephone. Cryptographic techniques also offer some protection against unauthorized copying of files.

No security system can approach a zero risk of loss. Security is based on a "cost-benefit" concept; that is, that it would cost more to violate the confidence of the center than would be gained from such violations. There is some satisfaction in the fact that a small amount of protection usually means that a large cost (in effort, money, danger, etc.) will be needed to violate the security of the center.

It is conceivable that the legal liability for unauthorized leaking of sensitive information may become as severe as for divulging classified military secrets. At least one programmer has been convicted of giving away privileged information. Legal protection of privileged information is by and large not too helpful yet; so the only security currently obtainable is what the computer center enforces itself.

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Nelson, COMPUTER INSTALLATION AT TRW

(Continued from page 23)

puter has been underway for two years. Production use of it has recently begun in a small way.

User Acceptance

What has made some of these remote terminal services successful, while others have found it difficult to obtain acceptance? Clear and correct answers are not easy to obtain. They are related to how people really use information and how they value information services. From the user's point of view, he will use and pay for a remote terminal computing service which he believes provides him value in excess of its cost to him. At the present time, users have tended to place the most value on the improved turn-around time which remote terminal computing provides. They have been able to value most easily services which are closely related to computing, which they have used before and with which they are familiar. The fancier and more interactive services, which show off so well in demonstrations, are infrequently used when they must be paid for.

Based on this experience, TRW Systems Group is developing a remote terminal computing system on a CDC 6400/6500 shared-file computer system, with the system software constructed using components obtained from Control Data Corporation. This system, scheduled to be operational in early 1970, will have mutually compatible remote-terminal and batch-computing services. The remote-terminal computing facilities are oriented to aid:

- the solution of small problems,
- the development of programs, large or small, and
- the production use of developed programs.

Lessons

What lessons have been learned from these experiences?

For successful introduction of a new computing service, the capability provided to the user through the new service, as compared with the one it replaces, must not be impaired throughout the transition period:

- Do not try to install a new service which lacks features present in the old system.
- Make sure that the capability to account for use of the new service exists before the service is introduced.
- Carry on extensive public relations with the users so they know what is happening and believe that it is being done for their benefit.
- In order to keep the transition from becoming too expensive, improvements must be made in the testing of hardware and software.

The reliability problems of the early third generation computers should not be repeated in the fourth generation.

Computer manufacturers are unlikely to supply operating-system software which fulfills the computing user's needs and effectively utilizes the resources of a computer system — until the computer users learn to communicate these needs to the manufacturer. Until this communication can be effectively established, a computing center which wants to obtain effective utilization of its computing equipment, may have to develop its own operating system, or modify the manufacturer-supplied software to meet its own needs.

The evolution of remote-terminal computing capability is proceeding rapidly. Going down the wrong path may be very costly. Choosing the right way to go will require sensitive attention to the needs of computing users: — how they use information and how they value computing services. □

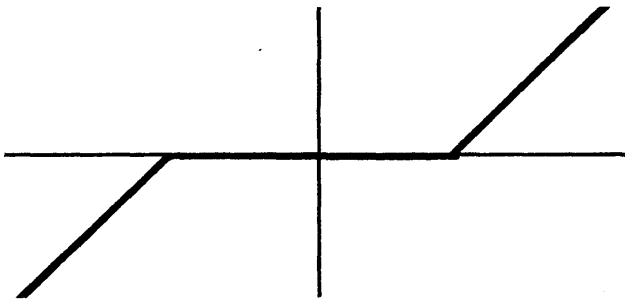
C·a

PROBLEM CORNER

Walter Penney, CDP
Problem Editor
Computers and Automation

PROBLEM 697: THE VOLUME OF A MUJIB

"All right, class, here's your assignment for tomorrow." Claude Liffey started to draw a diagram on the blackboard. "Assume the volume of a Mujib increases uniformly with temperature up to a certain point, then remains constant, but starts increasing uniformly again after another temperature is reached. The "curve", if you want to call it that, looks like this:



Write a statement that will compute the volume for any temperature T."

"What are the two temperatures between which there is no change?", asked Pete.

"Let's assume 0° is the origin, with the two critical temperatures at A and −A."

"Won't that make the volume less than nothing at all below T= −A?"

"Well, it looks that way, but we can always translate the axes to take care of that." Claude paused to see whether there were any other questions. "Of course we could just have a test to tell whether we were above A, below −A, or in between and have V = T − A in the first case, V = T + A in the second and V = 0 in the third", he went on. "But I want only one statement that will work for all T."

How can it be done?

Solution to Problem 696: The Unbeatable Machine

The computer can always win. If the player leaves 19, 6-13 or 8-11, the machine can convert these into 6-11. If the player leaves 3-16, 4-15 or 9-10, the machine can convert these into 3-4-10. The only other possibilities are 1-18, 2-17, 5-14 and 7-12. The machine can respond 1-8-8, 2-4-11, 4-5-8, and 4-6-7 respectively, thus winning in all cases.

Readers are invited to submit problems (and their solutions) for publication in this column to: Problem Editor, Computers and Automation, 815 Washington St., Newtonville, Mass. 02160.

C·a

NUMBLES

Number Puzzles for Nimble Minds — and Computers

Neil Macdonald
Assistant Editor

A "numble" is an arithmetical problem in which: digits have been replaced by capital letters; and there are two messages, one which can be read right away and a second one in the digit cipher. The problem is to solve for the digits.

Each capital letter in the arithmetical problem stands for just one digit 0 to 9. A digit may be represented by more than one letter. The second message, which is expressed in numerical digits, is to be translated (using the same key) into letters so that it may be read; but the spelling uses puns or is otherwise irregular, to discourage cryptanalytic methods of deciphering.

We invite our readers to send us solutions, together with human programs or computer programs which will produce the solutions.

NUMBLE 697

```
          W A N T
        X     I S
      ---------
        A O O H T
      N I O T W
      ---------
      = N H T I F T

29089  02621  30178  42
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Solution to Numble 696

In Numble 696 in the June 1 issue, the digits 0 through 9 are represented by letters as follows:

I = 0	O = 5
U = 1	T = 6
R = 2	S = 7
A,E = 3	N = 8
H,L = 4	W = 9

The full message is: Walls hear without warnings.

Our thanks to the following individuals for submitting their solutions to Numble 695: A. Sanford Brown, Dallas, Tex.; T. P. Finn, Indianapolis, Ind.; Ron Geist, Allentown, Pa.; Jerrold M. Grochow, Brookline, Mass.; Carol Incremona, Salt Lake City, Utah; Robert C. Jensen, Endicott, N.Y.; Kenneth S. Johnson, Newark, N.J.; D. F. Stevens, Berkeley, Calif.; A. O. Varma, New York, N.Y.; and Bob Weden, Edina, Minn.

COMPUTERIZING TOTAL HOSPITAL ACTIVITIES — A PIONEER EFFORT

Blaine M. Lair, Administrator
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"One of our major problems was a language barrier: the hospital people were using hospital language; the computer people were using computer language — and the project was bogged down for lack of mutual understanding of what various decisions meant."

Blaine M. Lair has been an administrator at the Baptist Hospital of Phoenix for the past six years. He has spent a total of eleven years in hospital administration, and has been nominated for membership in the American College of Hospital Administrators.

For several years many people have dreamed of revolutionary changes that will occur in our hospitals as the result of the new computer age. A patient's hospital bed will be selected like airlines select seats for their customers. Meals, medications, lab tests, and radiology exams will be ordered automatically, scheduled automatically, and recorded automatically, as the result of a nurse entering the doctor's order into a terminal at the nursing station. The computer will store, accumulate, and total for each patient — and then print out his bill upon discharge, and will even figure his insurance claim automatically. Then computer use will be expanded to include the recording of temperatures and other statistics for the patient. It will dial vendor computers, so that supplies are ordered automatically from the vendor with the lowest price for the quality acceptable to the hospital. Each doctor on the staff will have a terminal in his office, tied into the hospital computer and set to receive all information about his hospital patients. He could know from moment to moment exactly what was happening with his patients. He could even change orders or add orders, to be printed out at the nurses' station in the ward, *and without the need to make an interrupting telephone call to a very busy nurse.* This dream is nearer now!

In 1965 the three Baptist Hospitals in Arizona (Phoenix, Yuma, and Scottsdale) attempted one of the most difficult projects of these times; the computerizing of total hospital activities, not just the accounting functions. Most hospital administrators and managers of hospital finances would not find it particularly surprising if this very ambitious effort failed. How do you sell just one Board of Trustees, let alone three, on a project in which you cannot demonstrate what it will do and what it will cost? How can you justify a heavy layout of cash for a project which has not been proven elsewhere and which is just at the pioneer level in a few areas in the entire country? We needed the answers to those questions and decided to see if we could find them.

An Acceptable Service Contract

It took three years of effort for Baptist Hospital of Phoenix to arrive at a point where administration could finally recommend a plan acceptable to its Board of Trustees. One of the major obstacles was to design a service contract acceptable to the Board. Such a contract required a careful explanation of not yet developed applications to be installed, the inclusion of service charges for those applications before the cost was known, the delineation of applications not to be included (for additional clarification). This effort resulted in the designing of a basic contract that may be useful to other hospitals who will be developing their own computer system. Obviously, those hospitals will not include some of the conditions we required, for they will not have to deal with the unknowns that existed for us.

The Medical Information Service Company, headed by Mr. Cecil Little, was the contracting organization we have been working with for this extended period. Mr. Little spent many months working on the project, first with the three Arizona Baptist Hospitals, and when that failed, he organized a corporation at first privately financed, then later additionally financed through the sale of stock. When the contract was finally finished and signed, we had agreed upon the following applications to be phased in as indicated here:

1. Admitting Application
2. Medications Application
3. Laboratory Application
4. Radiology Application
5. Dietary Application
6. Surgical Application
7. Business Office Application
8. Central Supply Application

There are no present plans past this point. Other applications specifically named in the contract as not being included (there are many more but this list includes most of the major ones) are:

1. Delivery Room Application
2. Outpatient Application

3. Medical Records Application
4. Payroll Application
5. Accounts Payable Application
6. General Ledger Application
7. Engineering Application
8. Personnel Application
9. Housekeeping Application
10. Inventory Control Application

Special considerations to MISCo have been allowed by us mainly because we are their first hospital, and because we are more interested in getting the applications modified, on line, and tested. Later on they will be required to furnish other necessities. For example, the contract does not require that MISCo have a standby computer through the first three applications. (Incidentally, a standby computer with only one phone line would still leave us vulnerable to emergency down time.) They must provide standby support, however, before they will be allowed to expand their services to applications four (4) through eight (8). (We have been notified that the second computing unit is being installed at the time of this writing.) On the other hand, we do not plan to proceed past the Laboratory application until after the first three are in operation long enough so that a complete evaluation can be carried out. We believe at this point that the Medications and Laboratory applications together include a sample of all the basic problems which exist in the development and installation of all applications planned. So if we prove these feasible, it will indicate the feasibility of all applications, and that our ambitious project is possible.

Cost

From a cost viewpoint, it appears that the first three applications — Admitting, Medications, and Laboratory — will cost the hospital approximately 2½% of present total expenses. How much the total expenses will be reduced after those applications are installed and in acceptable use is a question yet to be answered. We do know this: the possibility of savings is greatly enhanced as each additional application is installed. For example, our contract called for service charges to begin when the first application (Admitting) was installed and accepted. We quickly found that if we should stop there, we could not justify the cost, even though it saves time by carrying out many very desirable functions automatically. On the other hand, with completion of the Medications application and its use in conjunction with the Admitting application, computer usage jumps and this results in lower unit cost. This increases the value of both and increases the range of possibly saved motions by hospital employees. Adding the next application and then the next, stacks savings on top of savings.

Medications

We have been using the Admitting application for several months, and went on parallel with the Medications Program just recently. While we already see several needed changes, our first experience is encouraging. We expect soon to discontinue the very involved present nursing procedure of duplicating the doctors medication order onto cardex files, medication cards, requisition slips to Pharmacy, etc. We also expect the nurses to be able to discontinue keeping track of when a medication is due, or worrying about whether or not it was actually given and when. Stop orders and reorders will be done automatically and without the regular paper work necessary to keep track of those things. Distractions and tension will be no problem to the computer. Of course, that is not the only area helped, for Pharmacy will be notified immediately and automatically of medication needs on the hospital floor; the notification will become the pharmacist's label for the medication, and thereby save him time. When the medication is given to the patient, the computer will automatically furnish Accounting a charge slip.

Actual installation of the Laboratory application has been scheduled after the Medication application is going smoothly. But were we to do things over, this application proved easier to develop and install, and would have preceded the Medications application, and could have been in use for some time.

We believe the hospital will find it easy to justify payment for computer services up to at least 10% of its present total expenses. Justification will come from at least three sources: first, major salary cost savings created directly from discontinuance of paper work; second, savings created indirectly by administration being provided additional and timely information for better planning; and third, substituting for the growing shortage of available people in the health care field.

Language Barrier

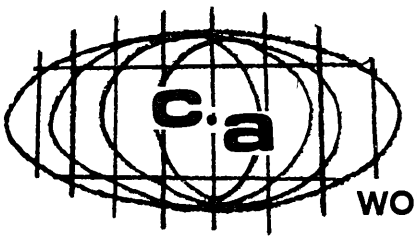
Installation of these three applications so far has not been entirely smooth even though cooperation between the hospital staff and the contractor has been good. Our people are very eager to see the various applications completed and in use. We anticipated in the beginning that timely decision making was one of the biggest problems we would experience; so we decided that when the contractor ran into a problem requiring an immediate decision, rather than waiting for a decision through regular channels, the question should be referred to me. This same procedure applied for the hospital people involved in the project. We soon ran into a major problem: the hospital people were using hospital language; the MISCo people were using computer language; and the project was bogged down for lack of mutual understanding of what the decision meant. This required stopping, meeting, arriving at a mutual understanding of terms, outlining general concepts, establishing step-by-step schedules, committing the appropriate people to the appropriate procedures, and then agreeing that any departure from any part of the procedure required another meeting.

Personnel

We have made no estimates of the extra cost to the hospital for duplication of work during installation of the various applications. Percentagewise, it is not large now; but I believe it will become measurable as we continue to expand the program. Probably the most difficult problem is just hiring the extra people. This problem may increase somewhat because only parts of the doctors orders are being phased in at a time, first the Medication, then the Laboratory, then Radiology, Dietary, Surgery, Physical Therapy, etc., but not necessarily in that order. On the other hand, there are indications that as the nurses become used to using the computer terminal (which, by the way, is relatively simple) and experiencing the saved time, they will be willing and able to continue both types of operation without too much trouble until all doctors orders are phased, and parallel processing is no longer necessary.

We also anticipate another problem: discarding computer paper after the instruction is carried out. There is already a worry among nurses that throwing away that paper is the throwing away of vital information. Convincing them that information produced once by the computer can be reproduced will take a while.

We at Baptist Hospital of Phoenix feel that what we have accomplished to date is of great importance to us, and may be of some interest to hospitals in general. We believe that other hospitals will follow a similar path, but will take far fewer steps to reach where we are going. We hope we will have helped smooth the way. □



REPORT FROM GREAT BRITAIN

GE's Three Major Systems Groups

There is no doubt about it: the main event in Britain during the past month has been the formation by "our" General Electric Company of a computer building division to serve its three major systems groups.

These are each major companies in their own right with annual turnovers not far off the $250 million mark. They deal in telecommunications, automation of every industrial process large or small, and electronics of all kinds from massive defence radars to underwater weapons systems, taking in a large microcircuit activity on the side.

Marconi-Elliott Computer Systems is the name chosen for this central service. To see it well and truly launched, Desmond Hunter, its managing director, was backed at the inaugural press reception by Arnold Weinstock, the tough financier who has expanded GEC tenfold in less than five years. The task of the new organisation is to build a range of central processors making use of Large Scale Integration, which must be as good if not better than anything on the market or in the pipeline, because the three systems groups do not *have* to buy from "Paddy" Hunter.

Mr. Weinstock said: "We will spend what it takes — because we have no option." But he would not commit himself to a figure or to the number of machines in the range. UK observers say "little change out of $25 million and four machines". This is possible. Marconi-Elliott has committed itself to a full range of peripheral equipment as well. Moreover, the new group is taking over a huge area of responsibility. Some of the equipment installed by its predecessors is looking after really hefty hot-rolling mills. Some is controlling groups of gas chromatographs. Yet other units are integrated with inertial navigation equipment and compact military fire-control sets. It seems highly unlikely therefore that there can be less than three or four sizes of a machine with — probably — lightweight and/or ruggedised versions of each.

It is inevitable that the best features of the Marconi Myriad and the Elliott 900 series (installed in the American Galaxie and Corsair aircraft) will be combined in the new machines when they appear in mid-1971. While the central service will provide a comprehensive software backing, the groups will — and must — retain their own specialist software teams whose job it is to integrate the processor with the system it is to control.

Full responsibility will also be taken, eventually, for two very different developments (other than Marconi and Elliott machines). These are the relatively recent English Electric M range and the Con/Pac computers built under licence from General Electric of the U.S. by Associated Electrical Industries, now absorbed. These machines will last just as long as there is a commercial demand for them. This means the end of the GE licence in the not very distant future.

Worldwide Significance

Now all this may seem rather remote to U.S. readers. But we are talking here about an area of data processing which is expanding at a faster clip than business uses. We are also talking about a company of world stature — its current market valuation is $2 billion — which has so far installed or on order 800 process control systems. This is more than either GE(USA) or IBM. Moreover there are few organisations where the computer builders work in such close proximity to the systems designers. These, in turn, will be able to supply anywhere in the world fully automated control systems for industrial complexes, and most of the prime movers and instruments to operate such companies.

GEC is selling in the U.S. market and is perfectly able to expand its competition at prices well below local figures. Meanwhile, many Europeans feel that the "Buy American Act" has had its day.

Important Decisions at ICL

Turning to that other pillar of the UK data processing industry, International Computers, Ltd. (ICL), I understand that some crucially important decisions have been taken.

These involve the fourth generation computers which will eventually supersede the 1900's, and the System-4 machines the company has to sell in parallel because it unwillingly inherited the latter under Government pressure when ICT was merged with English Electric to form ICL.

But nothing has yet leaked out as to what design philosophy is being followed. It can hardly be very alien to the 1906A and the 1908A at the top of the ICL range. These machines use super-fast ECL circuits and new ¼ microsecond memories from Plessey.

It may be that the follow-on from the RCA/IBM 360 oriented System-4 will be provided only in the case of the larger Government installations through versions of the 1906A and 1908A designed specifically to cope with software from both sides, albeit at some loss in efficiency. Certainly this was at one time the solution envisaged.

The Pan-European Computer

Some observers in Britain say ICL will not make sense till it has a firm base in another European country. But it already holds a respectable share of the Scandinavian and the French markets. In fact, in France it has sold many more machines and has many more prospects than the prestigious Plan Calcul — though this is not particularly difficult. Nothing this costly French Government venture has done so far

(Please turn to page 38)

Computer Training at the South Carolina Department of Corrections

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In this magnificent age when computers are literally "out of this world" aiding scientists and engineers in solving spatial problems in almost infinitesimal increments of time — they are also really "getting down to earth" at the South Carolina Department of Corrections (S.C.D.C.), where inmates are able to equip themselves with advanced knowledge in the field of Electronic Data Processing.

In July, 1967, the S.C.D.C. received a Federal Grant of $212,035 under the Manpower Development Training Act, and a State Grant matching 10% of the Federal Grant. Armed with these funds, Ellis C. MacDougall, Director, and William D. Leeke, Warden, promptly instituted a two-year Pilot Program called "Operation Pushbutton" which fostered the South Carolina Data Processing Academy begun under the supervision of William L. Perrin and Thomas A. Edmonds.[1]

The S.C.D.C. was the first prison system in the country to have a Computer "in house" for training. The Academy proper is located at the Central Correction Institution with additional Card-Punch Machines and Verifiers located at Harbison Correctional Institution for Women.

Physical Facilities

The building in which the equipment is located was completely renovated by inmate labor using paneling for the walls, floating floors for the machines, suspended acoustical ceilings, centralized heating and air conditioning, carpeting for all office spaces and FM music throughout, making it a modern system comparable to any its size.

The Computer system consists of an IBM 1401 main frame with 12K capacity, an IBM 1402 Card Read-Punch, one IBM 1403 Printer, one IBM 1407 Console Inquiry-Station, one 1311 Disk Unit, and three IBM 7330 Magnetic Tape Units along with a full EAM complement.

Students are selected from the Central Correctional Institution and five satellite Institutions. They are given a programmers aptitude test, the Lowry-Lucifer Logic test, Machine Operator Aptitude test, and an I.Q. test. The highest scorers are then screened by Institutional records, progress, and personalities before being accepted.

The contract called for five classes of twenty students for Business Programming, for a total of one hundred students over a two-year period. In addition it also called for training of sixty-four Keypunch Operators, sixteen students per class. A class for Keypunch Operators lasts six months and a Business Programmers class lasts one year.

Curriculum

Phase I of the Data Processing curriculum covers all IBM unit-record equipment — the operation, principles, and control panel wiring. Keypunches, Verifiers, Sorters, Interpreters, Reproducers, Collators, and Accounting Machines are completely covered in detail. At the conclusion of Phase I the students are given a two-day examination consisting of four hundred technical questions, plus various practical problems in the form of Machine Applications.

In Phase II intensive training is given on Systems and Procedures, Form Design, Flow-Charting, Procedure Writing, Basic Accounting, Cost Accounting, Machine Accounting, Basic and Advanced Algebra, Slide Rule Usage, and Industrial Organization and Management.

If the student successfully completes the final examination for Phase II, he is permitted to enter Phase III of the training program, and when openings exist he is allowed to accept a full staff position or section manager position within the unit. In Phase III the student is trained on operation, programming, and utilization of the IBM 1401 Computer System, covering Tapes, Disk, Card and Telecommunication techniques.

Upon completion of Phase III the student is awarded a diploma which is endorsed by the South Carolina Commission for Employment Security, the South Carolina Committee on Technical Education, and the Data Processing Management Association.

A Post Graduate Course is offered for students who have the remaining time and desire additional training. In Phase IV the student studies hardware and software for the following Computer Systems: IBM System/360 and Honeywell/H-200 (and their respective machine languages), 360 Cobol and Bal, Easycoder, and H-200 Cobol.

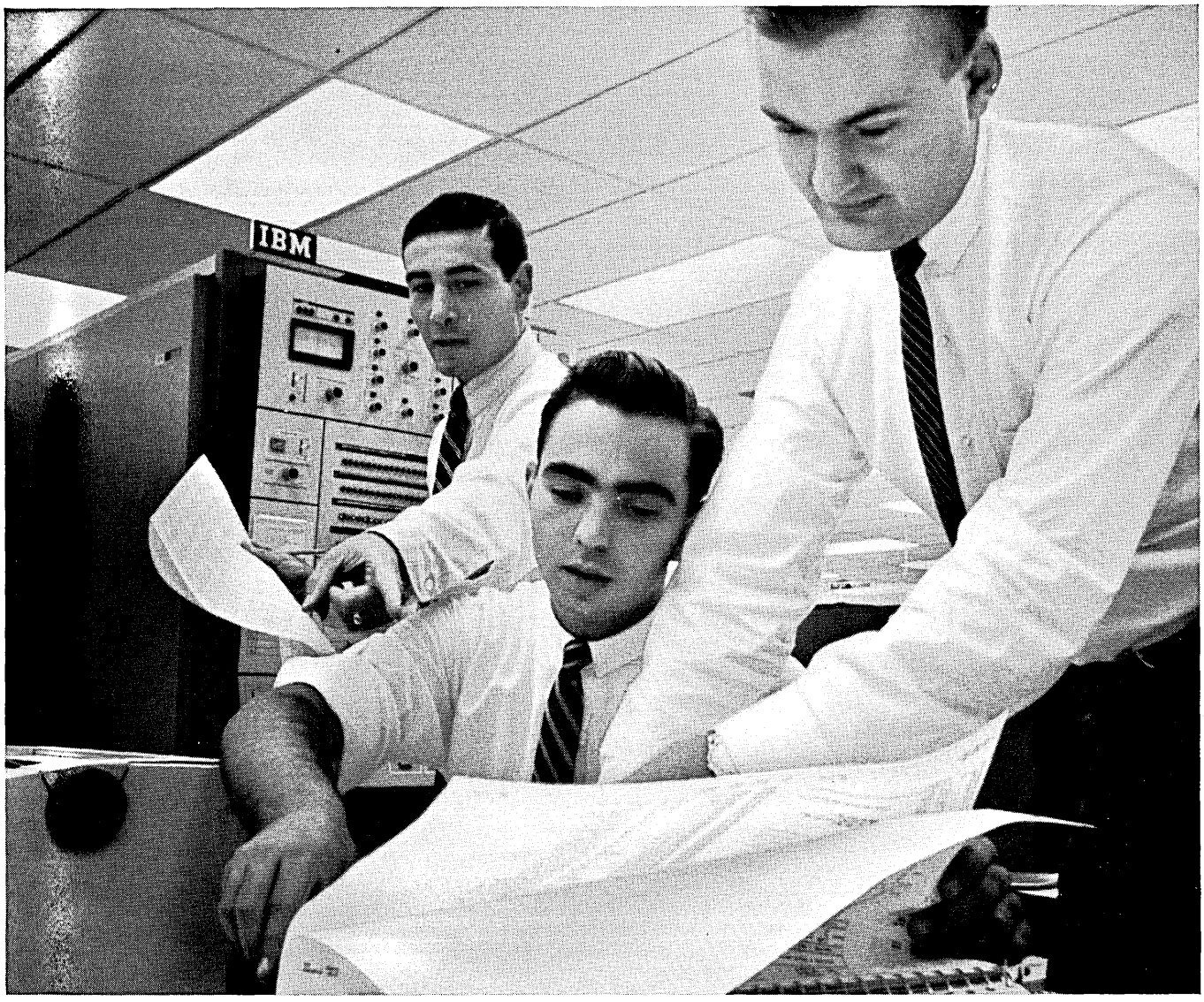
Progress Reports

From the time he joins the program each man must submit weekly a one-page, typed, error free progress report on his personal activities and progress within the project. The principle of the progress report is to maintain a record of the progress and development of each individual. This becomes the reference file summary for an employer who requests factual recommendations about the graduate. The progress report also teaches the student the necessity for reporting to

[1]Mr. MacDougall has since accepted the position of Commissioner of Corrections for the State of Connecticut and Mr. Leeke has been promoted to Director of the Department of Corrections. Mr. Jesse W. Strickland is now Warden. Mr. Perrin has accepted an Executive position with a leading computer education corporation, and Mr. Edmonds has been promoted to Coordinating Supervisor of the Academy.

Scientific Engineering Programmers:

Help IBM expand new technologies in semiconductors.



At IBM's Components Division in East Fishkill, N.Y., we develop and manufacture semiconductor devices for our computers.

We're looking for Scientific Engineering Programmers to help us design and develop quality control and manufacturing systems to test improved semiconductor devices.

What you'd do

If you qualify, you'd join a project team, or take on an individual assignment, within our advanced semiconductor group. You'd interface with a number of engineering disciplines and give them basic system support.

You'd concentrate in such areas as process control of test equipment, semiconductor processes, analysis of process-oriented engineering data, research or manufacturing records.

And among the tools you'd use are our sophisticated 1800, 1130 and System/360 computers.

You should have a Bachelor's degree in Engineering or Math with at least one year's programming experience.

Call or write

If you're interested, call Dan Pearlman at (914) 897-6405 collect. Or send a brief letter or resume to him at IBM Corporation, Dept. CG1011, Components Division, Route 52, Hopewell Junction, N.Y. 12533.

An Equal Opportunity Employer

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upper management and the need for continual progress during his period of training.

A Phase III graduate is expected to continue his education in any area of his choice. He is expected to participate in at least two extracurricular activities to help expand his horizons and to allow him a chance to express himself socially as well as technically.

Contact with Professionals

Whenever possible the students are taken, properly dressed in civilian attire, to tour local Data Processing installations and operate equipment unavailable in the institution. Civilians are invited to visit, lecture, and work with the students. Through this technique the student learns to readily communicate on a technical basis with those persons in the free world who earn their living in Data Processing. This permits the student to cultivate personal contacts with professional people who allow themselves, at times, to be used as references or contacts in obtaining employment.

The students and graduates are given full access to our library of technical trade books, newsletters, and press releases which citizen supporters continually supply, that they may keep themselves abreast of current events in the world of computer science. This permits them to best judge if their training is adequate and saleable in competition.

Rebuilding of self-confidence and self-reliance is a prerequisite for re-entry into society. Constantly the students are reminded that their "image" is one which must reflect credit upon the project. They become aware that their actions will affect the attitude of their fellow students and department members. By this method they learn respect for authority, and develop a sense of business competition and healthful conformity, yet maintain individual self-respect through their technical ability.

Projects

The Academy's on-the-job training program has undertaken and successfully completed numerous projects for State, Federal and Civilian forms. We played an instrumental part in the South Carolina Voter Re-registration Project (67-68) in preparation for the national election, by helping to punch, verify, and collate dual punch cards, and furnish print outs on each registered voter. This saved the State many thousands of dollars. Presently we are aiding the S. C. Department of Agriculture with its annual warehouse inventory and the U. S. Department of Labor in its Concentrated Employment Program (C.E.P.). We are also compiling complete statistics on the Federal Bonding Project for unbondable persons who have had Federal training.

In-House Applications

Within the Department of Corrections we have our Inmate Location's System "on the air" which enables us to keep a daily updated listing of all inmates in any desired order as to their sex, race, custody, job assignment, living quarters, etc. In conjunction with this we are currently installing our Inmate Records Statistics (I.R.S.) which will be a centralized data bank with information and statistics on all inmates past and present.

Follow-Up

To date we have enrolled one hundred men in our Business Programmers Course, and fifty-two women and twelve men in the Keypunch School.

A follow-up of the Business Programmer student shows that thirty-three have graduated from Phase III, seven were released before completion, four were transferred for priority institutional work assignments, and forty-six dropped due to personal or academic reasons. Ten are still in training. Of the thirty-three graduates, eighteen have been released; eleven of these have procured gainful employment in the Data Processing profession. One of these men was employed by the Department of Corrections to work in the Academy, but since then has accepted a managerial position with the University of South Carolina. Three are presently working in the profession in our Inmate Work Release Program. Twelve graduates are still incarcerated and are the nucleus from which the Academy now operates.

The follow-up of the Keypunch students shows that twenty-six women and six men graduated, sixteen females were released and five were paroled before completion, ten are presently in training. Eleven women and six men dropped out due to personal or academic reasons. Of the sixteen graduates that were released, seven are working in the Data Processing field. One of the graduates was employed by a leading textile firm in Greenville, S. C. When given the firm's programmer aptitude test, she made the highest score on the company's records. She is currently attending Business Programmers School at the company's expense.

Honor System

The students are under a complete honor system and are self-governed twenty-four hours a day, seven days a week, with no correctional officer present unless on a guided tour by the inmates. To date there have been no infractions of an institutional rule within the Academy.

The Pilot Program has been a complete success and is about to end, but we have been re-funded for another year and are now taking bids for a third generation computer system which we hope to begin installing this summer. Proof, in fact, that getting computers "down to earth" has put our correctional system "out of this world", and is making it a highway instead of a dead end. □

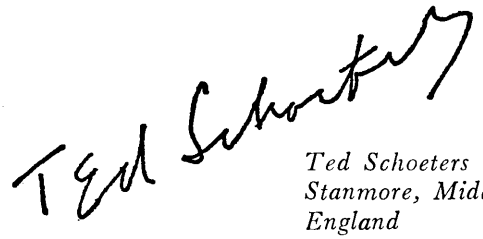
REPORT FROM GREAT BRITAIN

(Continued from page 35)

has inspired any confidence, either inside or outside of France. There is of course the revitalised idea of a giant pan-European computer which was fed to the popular press in Britain a few weeks ago from the Common Market Lobby in Britain, under the banner headlines of a "Great British breakthrough".

We are so short of inspiration at the moment that the idea was quite invigorating — till one looked at the target date of 1980 and the fact that a few not so small European companies, each with its own design ideas, were involved. Philips, Telefunken, Olivetti, Siemens and CII (Plan Calcul) are the names.

In effect this means that the sixth generation large computers for European use would be — must be — designed by a committee. "A camel is a horse designed by a committee," — remember?



Ted Schoeters
Stanmore, Middlesex
England

CALENDAR OF COMING EVENTS

July 19-22, 1969: 30th Annual Convention of the National Audio-Visual Association, Conrad Hilton Hotel, Chicago, Ill.; contact Harry R. McGee, National Audio-Visual Association, Inc., 3150 Spring St., Fairfax, Va. 22030

Aug. 5-7, 1969: Joint Automatic Control Conference, Univ. of Colorado, Boulder, Colorado; contact W. E. Schiesser, Dept. of Chem. Engrg., Lehigh Univ., Bethlehem, Pa. 18015

Aug. 11-15, 1969: Australian Computer Society, Fourth Australian Computer Conference, Adelaide Univ., Adelaide, South Australia; contact Dr. G. W. Hill, Prog. Comm. Chrmn., A.C.C.69, C/-C.S.I.R.O., Computing Science Bldg., Univ. of Adelaide, Adelaide, S. Australia 5000.

Aug. 25-29, 1969: Datafair 69 Symposium, Manchester, England; contact the British Computer Society, 23 Dorset Sq., London, N.W. 1, England

Aug. 26-28, 1969: Association for Computing Machinery (ACM) National Conference and Exposition, San Francisco, Calif.; contact Pasteur S. T. Yuen, P.O. Box 2867, San Francisco, Calif. 94126

Sept. 8-12, 1969: International Symposium on Man-Machine Systems, St. John's College, Cambridge, England; contact Robert C. McLane, G-MMS Meetings Chairman, Honeywell Inc., 2345 Walnut St., St. Paul, Minn. 55113

Sept. 15-17, 1969: First International Conference on Programming Languages for Numerically Controlled Machine Tools, IFIP-IFAC, Rome, Italy; contact Dr. E. L. Harder, R & D Center, Westinghouse Electric Corp., Beulah Rd., Pittsburgh, Pa. 15235

Sept. 28-Oct. 1, 1969: Association for Systems Management International (formerly Systems and Procedures Association) International Systems Meeting, New York Hilton Hotel, New York City, N.Y.; contact Richard L. Irwin, Association for Systems Management, 24587 Bagley Rd., Cleveland, Ohio 44138.

Oct. 1-5, 1969: American Society for Information Science, 32nd Annual Meeting, San Francisco Hilton Hotel, San Francisco, Calif.; contact Charles P. Bourne, Programming Services, Inc., 999 Commercial St., Palo Alto, Calif. 94303.

Oct. 6-10, 1969: Second International Congress on Project Planning by Network Analysis, INTERNET 1969, International Congress Centre RAI, Amsterdam, the Netherlands; contact Local Secretariat, c/o Holland Organizing Centre, 16 Lange Voorhout, The Hague, the Netherlands

Oct. 9-11, 1969: DPMA Div. 3 Conference, Lafayette Hotel, Little Rock, Ark.; contact Robert Redus, 6901 Murray St., Little Rock, Ark.

Oct. 13-16, 1969: Association for Computing Machinery (ACM) Symposium on Data Communications, Calloway Gardens, Pine Mountain, Ga.; contact Edward Fuchs, Room 2C-518, Bell Telephone Laboratories, Inc., Holmdel, N. J. 07735; Walter J. Kosinski, Interactive Computing Corp., P.O. Box 447, Santa Ana, Calif. 92702

Oct. 13-16, 1969: 1969 International Visual Communications Congress, International Amphitheatre, Chicago, Ill.; contact Internat'l Assoc. of Visual Communications Management, Suite 610, 305 S. Andrews Ave., Fort Lauderdale, Fla. 33301

Oct. 14-16, 1969: American Society for Cybernetics, Third Annual Symposium, National Bureau of Standards, Gaithersburg, Md.; contact Dr. Edmond M. Dewan, Data Sciences Lab., Air Force Cambridge Research Laboratories, Hanscom Field, Bedford, Mass. 01731

Oct. 15-17, 1969: IEEE Tenth Annual Symposium on Switching and Automata Theory, University of Waterloo, Waterloo, Ontario, Canada; contact Prof. J. A. Brzozowski, Dept. of Applied Analysis and Computer Science, University of Waterloo, Waterloo, Ontario, Canada

Oct. 22-24, 1969: IEEE 1969 Systems Science and Cybernetics Conference, Philadelphia, Pa.; contact C. Nelson Dorny, Moore School of Electrical Engineering, Univ. of Pa., Philadelphia, Pa. 19104.

Oct. 26-30, 1969: ACM/SIAM/IEEE Joint Conference on Mathematics and Computer Aided Design, Disneyland Hotel, Anaheim, Calif.; contact J. F. Traub, Program Chairman, Computing Science Research Center, Bell Telephone Laboratories, Inc., Murray Hill, N.J. 07974.

Oct. 27-29, 1969: Electronics and Aerospace Systems Convention and Exposition (EASCON '69), Sheraton Park Hotel, Washington, D.C.; contact Howard P. Gates, Jr., EASCON '69 Technical Program Chairman, P.O. Box 2347, Falls Church, Va. 22042.

Oct. 27-30, 1969: 24th Annual ISA Conference & Exhibit, Astrohall, Houston, Texas; contact H. Buntzel, Jr., Program Chairman, Bonner & Moore Assocs., Inc., Suite 1124, 500 Jefferson Bldg., Houston, Texas 77002.

Oct. 27-31, 1969: Business Equipment Manufacturers Assoc. (BEMA) Annual Business Equipment Exposition and Management Conference, New York Coliseum, Columbus Circle, New York, N.Y. 10023; contact Laurance C. Messick, Business Equipment Manufacturers Assoc., 235 East 42nd St., New York, N.Y. 10017

Oct. 30-31, 1969: Assoc. of Data Processing Service Organizations Management Conference, Regency Hyatt Hotel, Atlanta, Ga.; contact Jerome L. Dreyer, Assoc. of Data Processing Service Organizations, Inc., 420 Lexington Ave., New York, N.Y. 10017.

Nov. 3-5, 1969: 5th Annual IEEE Symposium on Automatic Support Systems for Advanced Maintainability, Chase-Park Plaza Hotel, St. Louis, Mo.; contact Matthew F. Mayer, Program Chairman, P.O. Box 4124 Jennings Station, St. Louis, Mo. 63136

Nov. 5-7, 1969: IEEE Northeast Electronics Research and Engineering Meeting (NEREM), War Memorial Auditorium and Sheraton Boston Hotel, Boston, Mass.; contact NEREM, 31 Channing St., Newton, Mass. 02158.

November 15-16, 1969: ACUTE (Accountants' Computer Users Technical Exchange), Jack Tar, San Francisco, Calif.; contact ACUTE, 947 Old York Rd., Abington, Pa. 19001

Nov. 17-19, 1969: IEEE Eighth Symposium on Adaptive Processes, The Pennsylvania State Univ., State College, Pa.; contact Dr. George J. McMurtry, Program Chairman IEEE 1969 (8th) Symposium on Adaptive Processes, Dept. of Electrical Engineering, The Pennsylvania State Univ., University Park, Pa. 16802

Nov. 18-20, 1969: Fall Joint Computer Conference, Convention Hall, Las Vegas, Nev.; contact American Federation for Information Processing (AFIPS), 210 Summit Ave., Montvale, N.J. 07645.

Nov. 25-27, 1969: Digital Satellite Communication Conference, Savoy Place, London, England; contact IEE Joint Conference Secretariat, Savoy Place, London WC2, England.

Dec. 18-20, 1969: Third International Symposium on Computer and Informational Science (COINS-69), Americana Hotel, Bal Harbour, Fla.; contact Dr. Julius T. Tou, COINS-69 Chairman, Graduate Research Professor, University of Florida, Gainesville, Fla. 32601.

Jan. 19-21, 1970: Computer Software & Peripherals Show & Conference, Eastern Region, New York Hilton, New York, N.Y.; contact Show World, Inc., 37 West 39th St., New York, N.Y. 10018.

Feb. 17-19, 1970: Computer Software & Peripherals Show & Conference, Midwest Region, Pick-Congress Hotel, Chicago, Ill.; contact Show World, Inc., 37 West 39th St., New York, N.Y. 10018.

March 17-20, 1970: IEEE Management and Economics in the Electronics Industry Symposium, Appleton Tower, University of Edinburgh, Edinburgh, Scotland; contact Conference Secretariat, Institution of Electrical Engineers, Savoy Place, London, W.C.2, England.

Apr. 7-9, 1970: Computer Software & Peripherals Show & Conference, Western Region, Anaheim Convention Center, Los Angeles, Calif.; contact Show World, Inc., 37 West 39th St., New York, N.Y. 10018.

Apr. 14-16, 1970: Computer Graphics 70, Second Interna'l Symposium, Brunel Univ., Uxbridge, Middlesex, England; contact Prof. M. L. V. Pitteway, Computer Science Dept., Brunel Univ., Uxbridge, Middlesex, England. □

ACROSS THE EDITOR'S DESK

Computing and Data Processing Newsletter

Table of Contents

APPLICATIONS

MUSICAL COMPOSITIONS BY COMPUTER

A symphony based on physics, logarithms, and trigonometry, performed by a computer, may well become the musical style of the future. A class called "The Physical Basis of Music" at the Univ. of Chicago is exploring sound, music, and the psychology of hearing in both musical and scientific terms. As a special project, students are creating their own musical works and submitting them to a one-man orchestra — the computer.

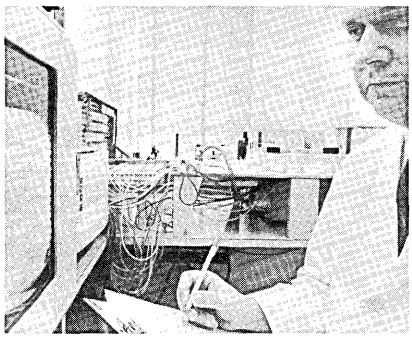
Students are finding that computer produced music offers the composer unlimited horizons. Many of them have composed original pieces or have translated Bach and Brahms by programming the computer. What distinguishes the computer is its ability to produce an unlimited range of sounds. For instance the computer can produce tones no conventional instrument can, such as a 22-tone scale, or a 29-tone scale. It also possesses an infinite variety of tone qualities and a flawless technique.

Out of twelve students taking the course, only two are music majors; the rest come from six other fields. According to Arthur Roberts, teacher of the course, the students in the sciences seem to be the most enthusiastic computer composers.

PREVENTIVE MEDICINE PROGRAM LAUNCHED BY MILWAUKEE HEALTH DEPARTMENT

The Milwaukee Health Department (Wis.) has begun a computer-aided preventive medicine program — the Multiphasic Health Screening Examination — designed to assist physicians in detecting disease conditions in persons prior to the appearance of warning symptoms. Milwaukee health commissioner, Dr. E. R. Krumbiegel, explained that most chronic diseases develop slowly, with years passing between the start of an ailment and the development of symptoms which cause a patient to seek medical attention. "Many tests are required to detect illnesses before symptoms occur, and the costs of these tests are prohibitive if ordered on an individual basis. Our solution to this problem is to have adults who feel well undergo a screening examination before seeing their doctor."

The screening exam is free to city residents aged 40 and older. It includes a two-hour exam consisting of 31 tests. The patient fills out a comprehensive medical history form, and is then given an electrocardiogram (ECG), a lung capacity test, a chest x-ray, and a diabetes test. The patient's height, weight and blood pressure are measured, vision is tested, and eye pressure is measured for Glaucoma. Samples of blood and urine are given a variety of tests.



— Technician records blood test data from autoanalyzer, which soon will be linked to an IBM 1800 computer for monitoring the blood and specimen tests and printing out results for interpretation.

All information is recorded on special sheets which are later "read" into an IBM computer by a 1231 optical mark page reader. The computer summarizes the data and prints a report which is mailed to each patient's physician for interpretation and diagnosis. (The computer also prepares statistical summaries for department use.) In addition to the report, the physician receives the medical history, a copy of the ECG, information on the screening procedures and a form to be filled out and returned for the department's use. Simultaneously, the patient is notified to see his doctor to discuss the results of the screening tests.

COMPUTER SYSTEM TO DIAGNOSE "ILLS" OF LOCOMOTIVES WHILE THEY ARE ON THE MOVE

Seaboard Coast Line (SCL) plans to use a computer to diagnose repair and maintenance needs for locomotives while they are on the move. Electronic monitoring equipment to record the performance of 96 operating functions of a diesel engine will be installed on 20 powerful locomotives that will begin service on SCL tracks by January 1970.

Performance data collected by the monitoring equipment will be recorded on a removable magnetic tape cassette while a locomotive is moving and under load. The data will be transmitted from strategic stops to a computer at SCL's Jacksonville base for analysis.

If the computer — an IBM 1800 data acquisition and control system — discovers a potential malfunction in a locomotive, it will instantly print information on the repairs or maintenance needed. A mechanical crew will then be directed to service the locomotive at its next terminal.

SCL mechanics now conduct visual inspections of the engines at the end of each trip and at monthly intervals by pulling them out of service and taking them to maintenance shops. Unscheduled repair work occurs whenever a locomotive has a malfunction. The new computer system should eliminate this time-consuming and expensive procedure.

Monitoring equipment will later be installed on other high-horsepower locomotives, and will eventually be extended to SCL's entire fleet of 1247 locomotives. The equipment was developed by IBM's Federal Systems Division at Huntsville, Alabama.

PROBLEM OF SCIENTIFIC CLASSIFICATION ATTACKED BY TEAM OF EXPERTS AND COMPUTERS AT UNIV. OF KANSAS

One of science's most vexing problems — scientific classification (taxonomy) — has been attacked at the Univ. of Kansas, where a group of numerical taxonomists are using computers and advanced classification principles to account for and identify species of plant and animal life. Whereas traditional classification schemes are based upon one or a very few characteristics, the computer can assess a multitude of characteristics.

Here is how the computer-based numerical taxonomy system works: Scientists choose a variety of characteristics, and assign a numerical value to each. Varieties within the characteristics are further assigned values from 1 to 10. Unclassified specimens are described numerically and compared with patterns of values previously cataloged to identify the unknown specimen. For example, the length of the spinal column might be one characteristic assessed. The digit "0" might be assigned for spines less than 12 inches long; "1" for 12-18 inches; "2" for 18-24, etc. Coupled with many other characteristics, the numeric value of spine length can then be interpreted by the computer as it assigns classi-

fications to unidentified specimens, or spine length can be used in cataloging a known specimen.

Dr. Robert R. Sokal, professor of biology at the Univ., predicts a bright future for computer-based taxonomy: "It removes subjectivity from the most critical scientific activity and adds a degree of precision not formerly present. The assumption that numerical taxonomists make is that it is possible to assign numerical values to varying degrees of similarity. Our experience has shown this assumption to be valid.

The same techniques used to classify plant and animal types have been used to organize soil types, disease symptoms for diagnosis, political blocs and legislation, archaeological artifacts, socio-economic analysis of neighborhoods, television audience program preferences, psychological types, and linguistic patterns.

EDUCATION NEWS

HONEYWELL ENTERS EDUCATION FIELD

Honeywell Inc. has entered the education field by setting up the computer industry's first program in computer management for college graduates. The first course began on June 9 at the new Honeywell Education Center in Wellesley Hills, Mass. It will cover a wide variety of data processing subjects including programming, system design, data communications, and business management.

The goal of the Honeywell program is first to provide students with respectable EDP credentials by making them technically competent, and second, to give them a deeper understanding of the computer as a management decision-making tool. C. W. Spangle, Vice Pres. and General Manager of Honeywell's EDP Div., feels that the course will help bridge the gap between management and the computer. "What is needed is a new breed of men and women who can understand both languages. We plan to graduate this type of individual," he said.

The "high intensity" course will last 480 semester hours running 8 hours a day for 12 weeks. The computer will be available for student use every night until midnight. Each student must complete a series of interviews and an aptitude test to be admitted.

Other educational services being planned include EDP career development for high school graduates, adults, and veterans; an advanced computer science curriculum for technical people already in the EDP field; and an executive education program for top and middle management.

— A student at the new Honeywell Education Center in Wellesley Hills, Mass.

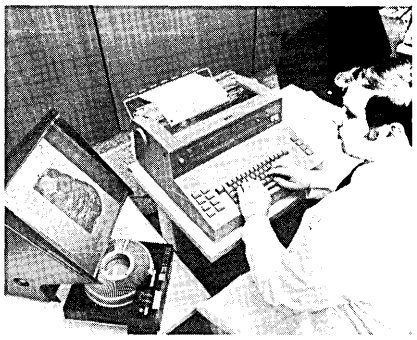
Approximately 100 administrative and staff members are expected to occupy the Wellesley Hills Center by year-end. The company intends to set up similar courses nationally beginning next year. The firm is also negotiating with colleges indicating an interest in granting credits for the Honeywell programs toward master's or even doctorate degrees.

COMPUTER-BASED MEDICAL INSTRUCTION EXPOSES DOCTORS TO LATEST DRUG AND MEDICAL FINDINGS

A program of computer-based medical instruction has been initiated at the Ohio State University's College of Medicine to help keep physicians and other health professionals in rural and remote communities abreast of new developments in medicine.

Computer terminals are being installed at four Ohio hospitals and linked via telephone lines to an IBM System/360 Model 40 in use at the College of Medicine. Doctors in the hospitals can draw on a variety of programs, including retrieval of the latest information about the medications and treatments available for a particular disease. They may also take refresher courses in their area of specialty.

Individuals taking these courses respond to a series of tutorial questions posed by the computer in order to evaluate their own progress at learning. The system rewards right answers with advanced material, and tutors as necessary when the learner does not completely understand the subject matter.



— A computer terminal and companion slide projector which are part of a system in use by doctors at four Ohio hospitals

The system also may refer him to an outside source, such as a professional journal, for further background before proceeding.

In addition to serving the educational needs of practicing physicians, the system will offer specific courses of instruction to nurses, physical therapists, dietitians, and other health professionals.

INSTALLMENT TUITION PAYMENT PLAN MADE AVAILABLE TO EDP STUDENTS BY COMMERCIAL CREDIT CORP.

An installment tuition payment plan for young men and women studying electronic data processing has been introduced by Commercial Credit Corp. of Baltimore, Md. The plan is available to students whose classroom instruction includes 500 hours or more of training at the Automation Institute of America, Inc., or Control Data Institute. Both of these technical institutions maintain schools throughout the country which provide a standard 26-week course of instruction.

Depending on financial need and personal credit history, students may finance up to 95% of their total tuition. Loans are repaid in small amounts while students are completing their course, and in increased amounts upon graduation.

Another feature of the Tuition Finance Plan provides low-cost life insurance which students may include in their monthly installment payments.

Automation Institute is an education affiliate, and Control Data Institute an education division of Control Data Corp., of which Commercial Credit is a subsidiary.

NEW PRODUCTS

Digital

GE-PAC 30 SERIES / General Electric

A flexible, read-only-memory-based computer, selling for under $10,000, is GE's entry into the mini process computer market. The GE-PAC® 30 computer series read-only-memory feature makes it one of the most flexible machines of its size presently on the market. The series also includes dual in-line integrated circuits; functional, plug-in modular design; and easy programming — 16-32 bit instructions, direct addressing to 64K bytes.

The major difference between the series' two models, GE-PAC 30-1 and GE-PAC 30-2, is in instruction execution times. The 30-1 costs less, and is highly flexible, due to the general-purpose organization of its micro-processor. The 30-2 model, with more commitment to hardware, is much more powerful at the user level.

A full line of peripheral equipment, and a wide range of software, is available for the GE-PAC 30 series. Software is upward compatible between models. Typical applications for the new series include production testing of electronic components, loading terminal automation, instrument control, process control and subsystem controlling.
(For more information, circle #41 on the Reader Service Card.)

808 CONTROL COMPUTER / Computer Automation Inc.

A cost reduction in the 808 control computer has been announced by Computer Automation Inc. The computer, priced below $5000, is designed to bring real-time performance to industrial control and process applications. According to David Methvin, Computer Automation president, reliability built into this off-the-shelf computer is the major factor for the price cut.

Cycling in 8 microseconds, the 808 control computer obtains its memory efficiency through the use of 8-bit instructions for Control, Register Change, Shifts and Skips. The computer uses a random-access 3D core memory for mainframe storage and is expandable from 4096 to 16,384 words. Thirteen I/O instructions provide power and execution speeds for a broad range of control and monitor jobs. Three priority interrupt lines are included to increase the I/O flexibility and furnish real-time capability beyond programmed I/O.

The 808 software package includes an assembler, maintenance programs, debug packages, math library, various loaders, tape editor, and utility packages.
(For more information, circle #42 on the Reader Service Card.)

H1603 CONTROL SYSTEM / Honeywell Computer Control Division

The mini-computer-based control system, H1603, is made up of Honeywell Computer Control's H316 minicomputer and a new integrated-circuit unit called the real-time interface. The system is designed for data acquisition, monitoring, supervisory control, automatic testing and production control uses, and includes more than 500 field-proven programs. The low-cost system offers users the option of breaking their control problems into several parts, each controlled by its own computer.

The H316 central processor in the H1603 system is an integrated-circuit machine with full cycle time of 1.6 microseconds. Memory is 4,096 16-bit words, expandable to 16,384 words. The computer has a 72-command instruction repertoire.

The real-time interface provides the necessary connection between the computer and sensors, field contacts, logic signals, peripherals and subsystems. It handles multiplexing, isolation and signal conditioning for up to 2,048 analog and 4,096 digital inputs. The device will scan up to 125 random input points per second for low-level analog signals and up to 20,000 input points per second for high-level analog signals.
(For more information, circle #43 on the Reader Service Card.)

Special Purpose Systems

BILLY CASPER GOLF COMPUTER / Lectron Industries

A new device for the teaching and practice of golf recently was introduced by famed pro Billy Casper. The new invention, called the Billy Casper Golf Computer, enables a golfer to measure his swing scientifically — for both distance and accuracy. Unlike other swing-measuring devices, the new Golf Computer does not require a golf ball or elaborate trapping nets.

The new invention was conceived by an electronics engineer who spent over five years on its development. Heart of the equipment is an analog computer. The golfer stands atop a 6x3-foot platform, similar to a driving range mat, and hits a golf ball-like object on a pivot. The movement generated by the swing is converted electronically into measurements that show immediately on a control panel. Distance is measured to 350 yards on a dial, while red, green and white lights on directional arrows reflect the amount of push, pull, hook or slice on the simulated drive.

The Golf Computer, weighing only 140 pounds, can be moved with relative ease. It is completely weather-proof and built to withstand both rain and cold. A hydraulic/electrical system used in distance measurement is thermostatically controlled to assure accurate performance in all weather. Designed primarily for use at driving ranges or practice tees, developers of the new device also foresee it being used in such various locations as shopping centers, bowling alleys, resorts, and other recreational areas.
(For more information, circle #44 on the Reader Service Card.)

DATAPLEX BUSINESS SYSTEM / Data Instruments Co.

Any typist now can prepare data for computer input as a by-product of her normal typing duties. A new business system, the DATAPLEX© System, has been designed to automatically gather data as it is generated and convert it directly into a computer-usable form. The system is composed of three elements: (1) the DATAPLEX Terminal; (2) the DATAPLEX Processor; and (3) FORMOL© software.

The Terminal, used to acquire and store data at its source location.

contains a conventional electric typewriter, a cassette tape record-

er, and associated electronics. Any time a secretary is typing something that should also go into the computer, she simply pushes a button on the Terminal; then, while she types, a magnetic tape cassette automatically records the information (including changes and corrections). One cassette usually holds a full day's typing. Normally the cassettes are hand-carried to the Processor; however, a built-in acoustic coupler is available to transmit data via the telephone.

The DATAPLEX Processor consists of an automatic cassette reader, a mini computer, a computer tape transport and an input/output writer for interrogating and logging. Up to ten cassettes can be loaded in the Processor at one time. After the data on each cassette is read, it is rejected and the next cassette enters. The cassettes are read at an accelerated speed into the computer. One Processor can handle hundreds of Terminals.

FORMOL©, stored inside, is the most important component of all. This proprietary software package, automatically edits and formats cassette information and puts it on computer-compatible magnetic tape. FORMOL not only performs "duplicate" and "skip" functions but also inserts, deletes, modifies, corrects, inspects, searches, sorts, merges, and many other jobs previously done by people and computers. Also it can be customized for special pre-processing to fit the particular need.
(For more information, circle #45 on the Reader Service Card.)

Memories

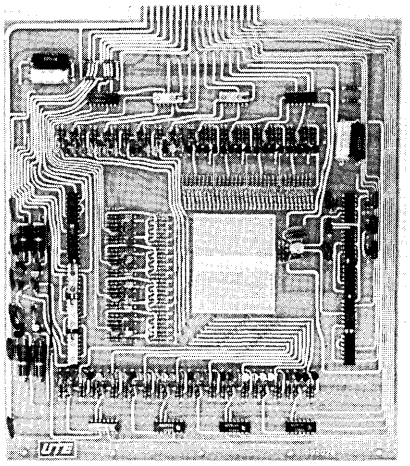
ALPHA 10.2 and ALPHA 12.2 MEMORY SYSTEMS / Tetra Corp.

The first line of memory products from Tetra Corp., designated ALPHA 10.2 and ALPHA 12.2 Memory Systems, have modular construction, high density and low cost. The ALPHA line of memories is especially intended for applications where large numbers of units are needed on a variable, short delivery basis. Modules are available in sizes of 1024 to 40,960 bits with expansion to large capacities through the use of multiple modules.

ALPHA 10.2 has a cycle time of 1.5 microseconds and a maximum module size of 1024 x 10; cycle time for the ALPHA 12.2 is 1.75 microseconds, with module capacities to 4096 x 10. The ALPHA 10.2 and 12.2 require 65 and 130 cubic inches, respectively, for complete memories including registers and temperature compensation regulator for the memory drive voltage. Tetra has priced the memories to specifically aid the prototype buyer, while maintaining substantial quantity discounts. (For more information, circle #46 on the Reader Service Card.)

HIGH SPEED BUFFER MEMORY / United Telecontrol Electronics

The UTE Model 5030 Memory, a complete 1K x 1 random access high speed buffer memory — including address decoding, stack driver, data register and control circuits — occupies a single printed circuit card that will just fill a file holder. Cycle speed is 1 microsecond in the Read or Write mode and read data access time is 750 nanoseconds.



The 5030's, field expandable in both address and word length, are suitable for many delay line, data logging, data buffering and data formatting applications. By adding external steering, counter and shift logic, other operating cycles can be obtained to extend the application possibilities even further.
(For more information, circle #47 on the Reader Service Card.)

MEMCARD 418 MEMORY SYSTEM / Sanders Associates, Inc.

MEMCARD© 418 is a compact, field expandable core memory system on plug-in cards with a maximum capacity of 32,768 by 18 bits. The total 4096 x 18 system is contained on two 12" x 12" plug-in circuit boards. One card provides all I/O electronics necessary to drive 32,768 words by 18 bits of memory; the other, or magnetic board, contains 4096 words by 18 bits of core storage.

MEMCARD 418 is a 1.5 microsecond system and has read/restore, read/write, read/modify/write, and a hybrid cycle — read/write/mask. The system has been designed by Sanders Associates to meet requirements for fast, compact and field expandable systems for "miniputers", numerical control systems, display terminals and similar devices.
(For more information, circle #48 on the Reader Service Card.)

CARD SET MEMORY (CM-1 SERIES) / Ferroxcube Corp.

A new small memory, designated the CM-1 Series, is available from Ferroxcube Systems Division in a capacity of 160 words by 8 or 16 bits per word. Consisting of plug-in cards, the core memory system has an access time of 2 microseconds and low temperature coefficient cores. Only ½-inch spacing is required between cards, so a four card system (160 x 16) uses a space of only 2 x 6 x 6 inches.

CM-1 Systems include address decode and drive circuits, timing, data logic and temperature compensating circuitry. The system can be used for data acquisition, buffering, instrumentation, numerical control, machine tool control and medical electronics equipment applications.
(For more information, circle #49 on the Reader Service Card.)

Software

REMOTE COMPUTING CORP. TO OFFER ROYALTIES TO PROGRAM AUTHORS

Remote Computing Corp. of Los Angeles has announced that it will offer authors of computer programs an opportunity to make their programs available for on-line use by the company's clients, and to collect royalties based upon the rate of usage.

Under the Program Authors' Royalty (PAR) Plan, as it is called, Remote Computing, in effect, will serve as a marketing representative for independent programmers, small software houses, etc.

To obtain copies of the data sheet describing the Plan (publication 10-04-059-02), write Director, Corporate Information Services, Remote Computing Corp., One Wilshire Bldg., Los Angeles, Calif. 90017.

AID / Data Management Concepts Inc., Chicago, Ill. / Proprietary software documentation package that

allows any third generation RPG program to be translated into easily understood English cross reference lists. Some of the features include English description of file definition specifications, cross reference lists of datanames and labels, alphameric literals, hexadecimal literals, and numeric literals; cross reference list of all indicators used; and a list of unused indicators. Designed for IBM System 360 Model 30 DOS, AID also is available on a service basis. (For more information, circle #50 on the Reader Service Card.)

AMR (Automated Management Reports) / Cullinane Corp., Boston, Mass. / Software package permits the computer to be handled directly by accountants by means of a special simplified report specification system. Program permits extraction and manipulation of data from a data bank of trial balances and other information — and its presentation in the desired form. Developed by United Shoe Machinery Corp. and being distributed by Cullinane, the program is suitable for any system in which a great deal of regularly-updated data from many operations need to be coordinated, manipulated, and assembled in reports reflecting total operational performance. AMR is written in COBOL and operates on the IBM 360/30 under DOS, with 65K, 3 tapes, and 2 disks. Price for the program is $15,000.
(For more information, circle #51 on the Reader Service Card.)

CUSTOMER LIST / Automated Information & Management Systems, Inc., Cincinnati, Ohio / System will create and maintain a file such as Vendor File, Customer File, Employee Master, etc.; allows for a six line address, area code and telephone number, and a history section. User may specify up to ten unique codes for each record which may be used for selection or non-selection in label printing; system prints labels varying from one to four across. The package consists of two programs written in IBM 360 COBOL; operates under DOS or OS with a minimum of 32K and requires reader, printer and two storage devices. (For more information, circle #52 on the Reader Service Card.)

CUTS (Computer Utilized Turning System) / Warner & Swasey Co., Cleveland, Ohio / Program substantially cuts the time required to produce new parts on a numerically controlled (N/C) machine tool. Using CUTS, an engineer keys dimensions of proposed new part into computer directly from engineering drawing; the computer then calculates and incorporates into punched tape all of necessary machine tool commands for shaping the part. Developed on IBM 360/30 for use with firm's SC28 N/C turret lathe, CUTS is being expanded to operate with company's complete line of N/C tools. Program is available either on a service basis or as a package with newly purchased machines.
(For more information, circle #53 on the Reader Service Card.)

DATA CHECK EXPRESS / Express Software Systems, Inc., New York, N.Y. / General purpose system that checks, corrects, updates and merges any kind of data without original programming; new editing language, core of system, is very easy to learn, has simple syntax, and only 18 commands. Data Check Express System can be used with IBM 360/30 and up, OS or DOS; it also is convertible to any other equivalent computer. FORTRAN IV support is required. System is sold in modules, with each module priced individually. (For more information, circle #54 on the Reader Service Card.)

TILT (Truth in Lending Tool) / Decision Analytics, Inc., Pearl River, N.Y. / A series of programs designed to help the creditor meet the computational requirements of Regulation Z, the Truth in Lending Regulation which became effective July 1, 1969. Programs are written in FORTRAN and can be adapted to most time-sharing systems. The programs can be purchased outright, or, the TILT service can be leased.
(For more information, circle #55 on the Reader Service Card.)

Peripheral Equipment

SEBIT-72 DATA SET / Rixon Electronics, Inc.

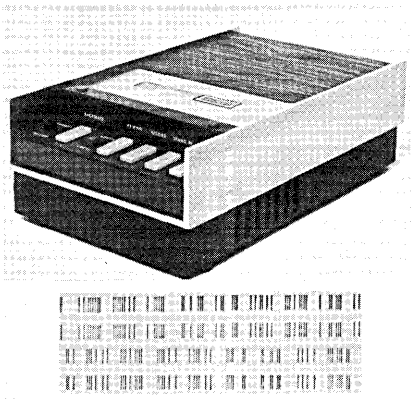
This Data Set is a highly versatile device having switch selectable data rates from 3600 to 7200 bits per second over C2 conditioned lines. The SEBIT-72 includes its own continuously adaptive automatic equalization. This simplifies installation and day-to-day operation of the high speed data set.

The SEBIT-72 has been especially designed for those applications demanding maximum utilization of their data communications network for a relatively small additional capital equipment outlay. They are typically used with computers or other high speed terminals in a point-to-poin private line network.
(For more information, circle #56 on the Reader Service Card.)

'SYNCREMENTAL' MAGNETIC TAPE RECORDERS / Mobark Instruments Corp.

Mobark's new recorder/reproducer instruments will record 140,000 characters (equal to a short novel) on a single low-cost 1/8-inch tape cassette at recording rates up to 120 characters per second and playback rates to 300 characters per second. The recorders accept parallel or serial data.

The new incremental recorder utilizes a patented optical/mechanical system in which the position of the tape itself triggers individual data bits from storage electronics onto the tape. The photomicrograph of 150-mil wide tape (shown below) indicates the high degree of packing uniformity made possible with the 'syncremental' technique. Shown are two digital tracks (center) flanked by tracks which contain internally generated parity checks or, at customer option, clocking data.



The new type of low-priced digital magnetic tape recorder produces tapes with IBM-compatible format, and accepts random data from business and scientific data inputs such as Dataphones, analog-to-digital converters, teletypewriters, Flexowriters, digitally encoded typewriters and similar keyboards. (For more information, circle #57 on the Reader Service Card.)

DIGITAL MAGNETIC TAPE UNIT / Peripheral Equipment Corp.

The digital magnetic tape unit, recently introduced by Peripheral Equipment Corp. (PEC), has a read-after-write dual stack head, operates at speeds of 37.5 ips, 25 ips or 12.5 ips and has a rewind speed of 150 ips. The transport, designated 6x40, is designed for use with

small and medium scale computer systems, in data terminal pooling and other mass storage applications.

The 6x40 is equipped with 10½-inch reels, it is available either in 9 track -800 bpi or 7 track-dual density configurations. The transport is compatible with IBM 729 and 2401 (Model 1) and IBM 2415 (Models 1-3 and 1-6). The 6x40 includes an adjustment-free tape guiding system, electronic deskewing and low power consumption.
(For more information, circle #58 on the Reader Service Card.)

DATA DISPLAY ON STANDARD TV SET / Digital Scientific Corp.

The DSC Model 2102 controller, developed by Digital Scientific, converts any standard TV set, without modification, into an alpha-numeric display. The lightweight, portable controller communicates with a computer via standard telephone lines.

The DSC controller includes an 800-character memory for buffer and image refreshing, a character generator, and an input/output control section. Characters, transformed into 5x7 dot matrix patterns, are displayed in a format of 25 lines of 32 characters each. Up to 32 terminal controllers per line are individually addressable. Among the options available are keyboard and cursor, Teletype, off-line test module, parallel interface, and special character set.
(For more information, circle #59 on the Reader Service Card.)

NUMERIC PRINTING PORTABLE KEY PUNCH / Varifab Inc.

The Model 402 Vari-Punch, an all-electric portable key punch, for on-the-job data recording, will punch and print numeric information on any standard tab card, or a snap-out card set containing a tab card, as well as duplicate copies. The Vari-Punch is easily programmed for as many positions of the 80 column card as desired. A "funnel feed" method of card insertion is used. An electric tray return provides fast, easy loading and unloading of the card tray. Punching and printing speed is 13 columns per second.
(For more information, circle #60 on the Reader Service Card.)

COMMUNICATIONS MULTIPLEXER / RCA

RCA's Commercial Communications Systems Department has introduced a data communications multiplexer that subdivides a single telephone line into as many as 24 tone channels for low-cost transmission of data. The CDM (for Communications Data Multiplex) can be used with all low-speed data terminals. It will be available in three models, providing nominal speeds of 75, 110 and 150 bits per second.

The CDM equipment also can be used for telegraph message service. It will be available as single units, which can be attached to a teletype terminal, or in multiple unit packages of up to 24 for installation in wall or rack mounts.
(For more information, circle #61 on the Reader Service Card.

ALPHA NUMERIC PRINTER / American Regitel Corp.

The 4440 Series of Alpha Numeric Printers are designed to operate with ASCII or Baudot Codes. The machine can print 44 characters (the complete alphabet, numerics, and a set of punctuation symbols), accepts input data, character serial, bit serial, is line asynchronous, and operates at a rate of 40 characters/second. The 4440 Series, for use in a variety of communications terminal applications, have a special feature allowing for the insertion of documents, forms, or tickets through the top or side of the machine for over-printing.
(For more information, circle #62 on the Reader Service Card.)

Data Processing Accessories

AUTOMATIC DISK PACK CLEANER / Kybe Corporation

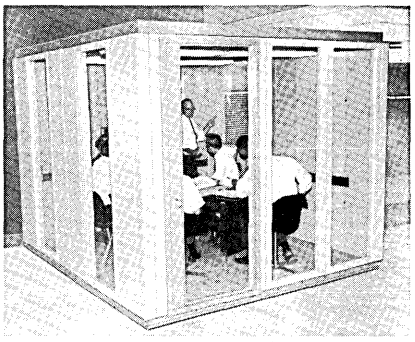
The DP-10, an automatic disk pack cleaner, developed by Kybe Corp., is compatible with all 1316 type disk packs. The DP-10 processes disk packs completely in five minutes or less. Heart of the system is a pair of electromechanically operated wiping posts inside the pressurized cleaning chamber. The posts are fitted with lint-free pads which are impregnated with iso-propyl alcohol. After the cleaning operation, the residual cleaning fluid on the disk pack surfaces is evaporated by filtered air. A second disk pack cleaner, Model DP-20, 2316 compatible, will soon be available.
(For more information, circle #63 on the Reader Service Card.)

IBM COMPATIBLE TAPE CARTRIDGE / Memorex Corporation

Field testing has been completed on a new magnetic tape cartridge that is fully compatible with the IBM Magnetic Tape/Selectric Typewriter, Magnetic Tape/Selectric Composer and Model 50 Data Inscriber. Memorex will use the same coating formulation for its tape cartridge as used in its computer tape. The cartridge, which carries a one year warranty, is available at a price structure which Memorex feels will provide attractive savings to buyers.
(For more information, circle #64 on the Reader Service Card.)

SOUND MODULES ISOLATE NOISE / Wenger Corporation

Noise problems originating with data processing equipment can often be eliminated by isolating the machines or by shielding non-operating employees. The method is available through the use of sound modules — "sound-proof" rooms designed to fit into the clerical areas and serve



as offices, enclosures for machines, conference rooms (shown above), and communication centers. According to the needs of the application, three sizes are available: 31 sq. ft.; 54 sq. ft.; and 87 sq. ft. All units are delivered complete with ventilation and lighting systems.
(For more information, circle #65 on the Reader Service Card.)

COMPUTING/TIME-SHARING CENTERS

DEPT. OF AGRICULTURE OFFERS COMPUTER SERVICE TO 32 GOVERNMENT AGENCIES

The initial phase of a project to link government agencies to an IBM System/360 Model 40 computer at the Dept. of Agriculture was recently completed. The Dept. is now offering service to 15 locations within its own organization and to users at 17 other government agency locations.

Within Agriculture, the computer is handling information related to areas such as meat inspection, consumer menu planning, management of timber resources, and soil conservation. Outside users include the

Bureau of Public Roads, the Civil Service Commission, Public Health Service, Naval Air Systems Command, and the State Dept.

Typewriter-like terminals, linked by telephone lines to the computer, enable each user to solve problems directly from his own office. The full power of the system is at his disposal at virtually all times during the business day.

The second phase of the project, scheduled for completion in six months, will accommodate an additional 31 users.

UNIVERSITY COMPUTING CO. EXPANDS REMOTE COMPUTING SERVICE

A new computing service called FASBAC is now commercially available from University Computing Company's Computer Utility Network. FASBAC service is based on special computer-communications equipment, and provides remote users with a processing capability over telephone lines that combines major aspects of time sharing and remote batch processing.

FASBAC users have access to very large, low-cost bulk storage devices linked to powerful computing systems at UCC Centers. Files maintained in this storage can be shifted on command by remote users into the central Utility computer for processing, or they can be used as the basis for a centralized remote query service. A wide variety of low-speed and high-speed remote data terminals may be used with FASBAC.

Initially FASBAC service is being offered through UCC centers in Dallas and Los Angeles, and will be provided shortly through the UCC center in East Brunswick, N.J.

COMPUTER-RELATED SERVICES

WORLD MEDICAL DATA BANK COULD HELP SAVE LIVES

Medicron World Medical Data Bank, a division of Command Control Inc., Wayne, N.J., has established a "personal assurance" service which will make individual medical profiles instantly available to physicians by phone at any time, anywhere in the world.

Child Care Centers of America, Inc., a New York-based chain of day nursery schools is providing memberships in the Medicron World Medical Data Bank to all youngsters

who register for the fall term. Membership cards will be issued to youngsters along with other school-purchased supplies and equipment.

Members of the plan are issued a wallet-size identification card containing their name and membership number, and the telephone number of the direct line to the Medical Data Bank. The Data Bank records and stores up to 102 facts about a member's medical history, including blood type, allergies, special conditions and prescriptions, sensitivities, chronic illnesses, and electrocardiograms. The Data Bank can also provide information on next of kin, vaccinations (and dates), eyeglass prescriptions, and a member's medical insurance company and identification number.

Bonus benefits to members include use of the Medicron Blood Bank, through which the names of possible donors can be made available to attending physicians; and of the Organ Donor Bank, a computer-age clearing house for organ donors and recipients.

Cost of an individual lifetime registration in the Medicron Data Bank is $13, with an annual maintenance fee of $1 per name. Updating, no matter how often it may be required, is free. Family registrations are also available.

NEW CONTRACTS

TO	FROM	FOR	AMOUNT
General Electric Co.	U.S. Air Force Data Services Center, Pentagon, Washington, D.C.	Two dual GE-635 systems (replacing 8 existing IBM systems) and five GE-115 information systems	$12.2 million
	J. C. Penney Company, Inc., Los Angeles, Calif.	Equiping approximately 50 retail stores in the Los Angeles area with GE's new Retail TRADAR© Information System	$10 million
Sanders Associates, Inc., Nashua, N.H.	U.S. Navy, Naval Air Systems Command	Additional production of airborne receiver-transmitters and associated equipment	$5 million
Computer Applications Inc., New York, N.Y.	National Aeronautics and Space Administration	Continuation of technical support of NASA's Goddard Institute for Space Studies (N.Y.)	$2.5 million
Northwestern Univ., Evanston, Ill.	W. K. Kellogg Foundation, Battle Creek, Mich.	Development of a Center for the Teaching Professions within the School of Education	$2.48 million
Bunker-Ramo Corp.	New York Stock Exchange	Manufacture, installation and service of desk-top terminal equipment for the Exchange's new Block Automation System	$2 million (approximate)
Information Control Corp., El Segundo, Calif.	COMCET, Inc., St. Paul, Minn.	A production run of ComRac 1000 memory systems and power supplies; systems will be used in COMCET 60 computer	$1.8 million
Digital Development Corp., San Diego, Calif.	Hewlett-Packard Co., Palo Alto, Calif.	DDC 73 Series Digital Memory Units for use in the H-P 2116 Time-Sharing System	$1.5 million (approximate)
Data Disc, Inc., Palo Alto, Calif.	Scientific Control Corp., Dallas, Texas	Manufacture of 7200 Series disc memory systems and memory controllers for the SCC 4700 computer	$1.2 million
RCA	U.S. Air Force, Rome Air Development Ctr., Griffiss AFB, N.Y.	Building a laboratory model of an electronic switching system capable of handling voice and data communications simultaneously	$1+ million
Farrington Mfg. Co., New York, N.Y.	Prudential Insurance Company of America	Nine Farrington 3010 Optical Character Document Readers (2 already installed) for use throughout U.S. and Canada	$1+ million
Burroughs Defense, Space and Special Systems Group, Paoli, Pa.	U.S. Post Office Department Bureau of Research and Engineering	Development of an automatic carrier sequencer capable of automatically feeding, reading and sequencing letter-size mail in carrier delivery order	$768,500
Dataram Corp., Princeton, N.J.	Potter Instrument Corp. Plainview, L.I., N.Y.	Memory systems (160 x 16) for use in Potter's KDR series of key-to-tape peripheral equipment	$750,000
Burroughs Corp., Detroit Mich.	Atomic Energy Commission of Denmark	A Burroughs B6500 computer system for use in studying civilian applications of the energy liberated by changes in nuclei of atoms	$650,000
Gerber Scientific Instrument Co., South Windsor, Conn.	Siemens, Germany	Two Gerber 2032 systems to be used in the production of printed circuit masters for use in actual manufacturing, and for generation of integrated circuit artwork	$560,000 (approximate)
Planning Research Corp., Los Angeles, Calif.	U.S. Department of State	Designing a substantive information handling system and recommendation of hardware to implement the system	$212,000
Univ. of Pennsylvania, Moore School of Electrical Engineering, Philadelphia, Pa.	U.S. Public Health Service	Design and development of a computerized information system for the National Library of Medicine (NLM); goal is an easily accessible source of toxicity information on drugs and chemical products, with supporting bibliographic references	$189,311
Intertech Research Services, Inc., Huntsville, Ala.	Univis, Inc., Fort Lauderdale, Fla.	Survey and analysis of the operations of Univis (mfr. of eyeglass frames and optical lenses) to determine scopes and goals to be achieved for a total Management Information System (MIS)	$160,000
Battelle Memorial Institute, Columbus Laboratories, Columbus, Ohio	U.S. Post Office	A research program on advanced character recognition techniques for use in address reading machines	$90,000
Princeton University, Princeton, N.J.	U.S. Office of Education	A million character computer count of Modern Vernacular Literature Chinese — this will be the key element in providing the basis for improved Chinese language teaching	$85,000
Data Dynamics, Inc., Los Angeles, Calif.	Palm Beach County, Fla.	Newly developed STAX (Scientific Tax Assessing System); covers first two phases of a four-phase $340,000 program designed to analyze information requirements and implement a data processing system to assist in county assessment of property	$81,600
Dataram Corp., Princeton, N.J.	Interdata, Oceanport, N.J.	A sizeable quantity of 2½D Core Stacks for use in Interdata's Models 3 and 4 computers	$75,000
Applied Dynamics Inc., Ann Arbor, Mich.	The Boeing Co., Seattle, Wash.	A large-scale APPLIED DYNAMICS/Four general purpose analog/hybrid computer system; primary use will be for aerospace research and development programs	—
Dun & Bradstreet, New York, N.Y.	Informatics, Inc., Sherman Oaks, Calif.	A new, expanded, computerized message switching center	—

NEW INSTALLATIONS

OF	AT	FOR
Burroughs B500 system	Citizens National Bank, Abiline, Texas	Processing demand deposits, savings and installment loan accounts as well as proof and transit operations; computer service to other banks in west and northwest Texas also is being offered by 'Citizens'
	Union National Bank, Lowell, Mass.	General ledger, trust and commercial loan applications; also as the basis for the bank's proposed customer account services
Burroughs B3500 system	First Western Bank and Trust Co., Los Angeles, Calif. (2 systems)	Integrating all of the bank's data processing functions into a total information system (systems valued at $2 million)
Control Data 3300 system	Rigshospitalet, Copenhagen, Denmark	For several applications, beginning with registration and admission of patients, and ultimately evolving into a complete medical information system
	U.S. Army Information and Data Systems Command (USAIDSCOM), Washington, D.C.	Handling Army and Defense Department information files covering a full spectrum of general purpose data processing, scientific and business research and permanent information storage
Digital Equipment PDP-8/I	Teradyne, Inc., Boston, Mass.	Incorporation into the firm's J 259 computer-operated circuit test system
Digital Equipment PDP-10	Riley's Datashare International, Ltd., Calgary, Alberta, Canada	On-line access to the firm's petroleum well information library, part of facility for researching and disseminating data to its clients
GE-255 system	Vincennes Univ., Vincennes, Ind.	Use in providing computer training to students as well as in administrative data processing needs
GE-405 system	Shulman Freight, Cherry Hill, N.J.	Handling on-line rating of goods to be shipped; system will receive communication from 13 major centers
Honeywell Model 110 system	Felixstowe Dock & Railway Co., Felixstowe, England	Processing the paper work for freight shipments will be the principal task
	V. H. Monnette Co., Inc., Smithfield, Va.	Sales analysis, reporting and control, inventory and payroll — firm acts as a clearing house for purchase orders from 500 U.S. Army, Navy and Air Force exchanges to more than 1,000 suppliers
Honeywell Model 120 system	Central Grocers Cooperative, Inc., Franklin Park, Ill.	Inventory control, billing, accounts receivable and order entry
	Holbrook Grocery Co., Keene, N.H.	Inventory, accounts payable and receivable, stock status, order processing and customer service reports
	Pepsi-Cola Metropolitan Bottling Co., Royal Oak, Mich.	Accounts receivable and payable, general ledger, payroll, sales analysis and vehicle maintenance
IBM 1130 system	Perel & Lowenstein, Memphis, Tenn.	Payroll, accounts payable, accounts receivable, general ledger, sales analysis, dollar and unit inventory control and sales forecasting
IBM 1401 system	International Systems Associates, Ltd., Barbados, West Indies	Providing the Carribean business community with the same full service programs as the N.Y. main office
NCR Century 100 system	Cuckler Steel Span Co., Cedar Rapids, Iowa	Stress testing and general accounting
	Independent Television Authority, London, England	Various engineering applications and a wide range of accounting tasks
	Investor's Mortgage Insurance Co., Boston, Mass.	Processing mortgage insurance accounts
	Normandy Osteopathic Hospital, St. Louis, Mo.	Automating patient accounting and eventually monitoring laboratory testing; also payroll, general ledger, accounts payable and inventory/purchasing control
	Polymer Corp., Reading, Pa.	Various sales and market analysis applications, and general accounting and payroll processing
NCR Century 200 system	IBEC Housing Co., Inc., (subsid. of International Basic Economy Corp. of New York), San Juan, Puerto Rico	Construction scheduling and a wide range of accounting applications; also engineering computations, and statistical marketing studies
SDS Sigma 7	Bucknell Univ., Lewisburg, Pa.	Academic, research, and administrative needs of the University; also, will be used by Susquehanna Univ. and Lycoming College via remote terminals (system valued at $750,000)
UNIVAC 494 system	First Federal Savings of Detroit, Detroit, Mich.	Supplementing existing data processing equipment, and on-line service for other Savings & Loan Associations in the Detroit area (system valued at $1.6 million)
UNIVAC 1108 system	Canadian Government Information Processing Center, Ottawa, Ont., Canada	All phases of the Canadian Government's accounting operations; first major application, now operational, is issuance of all Canadian Government checks (system valued at $6 million
	Dutch State Mines (DSM), Heerlen, Holland	Business and scientific applications; system will provide greater computing capacity for new industries in the southern region of Holland (system valued at $2.6 million)
UNIVAC 9200 system	Affiliated Foods, Scranton, Pa.	Billing, inventory control, payroll processing, general ledger accounting; replaces punched card equipment
	Oy SKF Ab, Helsinki, Finland	Order processing, stock control, statistical routines and reports to SKF Home Office in Goteborg, Sweden
UNIVAC 9300 system	Bankstown, New South Wales, Council Australia	Local government operations and service bureau work
	Pritchard and Abbot, Fort Worth, Texas	Tax billing, appraisal reporting and internal record maintenance; also specialized DP services for clients

AS WE GO TO PRESS

(Continued from page 8)

training from Burroughs. Similar separate pricing policies for the L2000, TC500 and TC700 were announced earlier this year.

In commenting on the larger Burroughs EDP systems, Macdonald said that users are being given the option to continue under present contract terms, or to convert to a new separate pricing plan which may be announced in the near future. The details of what that plan might be were not made known.

GENERAL ELECTRIC CO. PLANS TO INVEST $34 MILLION IN A NATIONWIDE BUSINESS COMPUTER NETWORK which will provide customers with a complete teleprocessing system combining communications, computing and simultaneous access to centrally filed information. The network will enable firms to develop their own specialized corporate information system which people in their offices and factories can use for such activities as order entry, inventory control, market analysis and data management.

The first stage of the network, centered in Cleveland, is now in the final tests. Initial local call service will be available early this fall to subscribers in nearly 40 major U.S. cities. Consideration is reportedly being given to the idea of linking the network by communications satellite to selected metropolitan areas in Europe as well.

BOOK REVIEWS

Neil Macdonald
Assistant Editor
Computers and Automation

We publish here citations and brief reviews of books and other publications which have a significant relation to computers, data processing, and automation, and which have come to our attention. We shall be glad to report other information in future lists if a review copy is sent to us. The plan of each entry is: author or editor / title / publisher or issuer / date, hardbound or softbound, number of pages, price or its equivalent / comments. If you write to a publisher or issuer, we would appreciate your mentioning *Computers and Automation*.

Carlson, Elliot / Learning Through Games / Public Affairs Press, 419 New Jersey Ave., S.E., Washington, D.C. 20003 / 1969, 183 pp., hardbound, $4.50

This book consists of seven chapters which are: 1) Varieties of Gaming Experience, 2) Business Games: Main St. to Liechtenstein, 3) Political Games: Sacred and Profane, 4) Gaming Crises: Four Days in December, 5) Games for the Quick and the Slow, 6) Sixth Graders and Sumeria, and finally 7) Games: Do They Make Any Difference?

This book appeals to a general reader. Much attention is devoted to the growing use of games as learning devices at the elementary, secondary, and college levels. Emphasis is placed on how games permit students to discover for themselves principles that govern social, political, and economic situations. Games are being used by schools, business firms, labor unions, government agencies, and others to achieve a wide range of objectives. In summary, games are now being used in education to relieve classroom boredom and textbook boredom.

Elliot Carlson holds a B.S. in Political Science and an M.S. in Communication and Journalism. He was a Congressional Fellow of the American Political Science Association and is now a reporter for the *Wall St. Journal*.

Kovalevsky, V. A. / Character Readers and Pattern Recognition / Spartan Books, 432 Park Ave. South, New York, N. Y. 10016 / 1968, hardbound, 267 pp., $12.00

The nineteen articles by over a dozen authors in this collection center on the problems of pattern recognition and computer simulation of various algorithms and recognition systems. All aspects of character recognition circuits and readers described here were developed at the Institute of Cybernetics, Academy of Sciences of the Ukrainian SSR, Kiev, under the general leadership of V. M. Glushkov, Academician. The book may be of interest to those concerned with computer programming and special purpose hardware for character recognition, and to those following current Soviet research in optical scanning. The four parts containing 19 papers are: The Theory of Character Recognition; Experiments and Calculations with the Use of Machines; The Designing of Character Readers; Character Readers and Their Components. There is an index.

The usual impression from much Soviet work is here again produced: overemphasis on high-level mathematical theory; almost no real experience with machines actually recognizing characters optically on a large scale. The book is quite theoretical.

ADVERTISING INDEX

Following is the index of advertisements. Each item contains: Name and address of the advertiser / page number where the advertisement appears / name of agency if any.

ANNOUNCING:

REGIONAL COMPUTER SOFTWARE AND PERIPHERALS SHOWS & CONFERENCES

COMPSO

EAST: NEW YORK CITY • MIDWEST: CHICAGO • WEST: LOS ANGELES

WHAT IS COMPSO?

COMPSO will be the first Regional Computer Software & Peripheral Show to be presented in the three major business and industry centers in the United States. COMPSO East, Midwest and West will provide computer users with the latest information on software, peripherals, supplies and services.

WHERE WILL COMPSO BE HELD?

The REGIONAL COMPUTER SOFTWARE & PERIPHERALS SHOWS & CONFERENCES will be held in:

COMPSO provides you with an opportunity to exhibit your products and services in one or more of the three largest and most active markets for computers and related services in the country. These cities are world centers for communication, manufacturing, marketing, transportation, international trade and finance; headquarters for almost every one of the 500 largest corporations in the country.

WHO WILL ATTEND COMPSO?

Each REGIONAL COMPUTER SOFTWARE & PERIPHERALS SHOW & CONFERENCE will be attended by thousands from business, industry, finance, education, communications and government. These prime budgetary and buying executives, department heads, educators, and others have a growing and vital interest in software and peripheral use.

The REGIONAL COMPUTER SOFTWARE & PERIPHERALS SHOWS & CONFERENCES are sponsored by COMPUTERS & AUTOMATION MAGAZINE.

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