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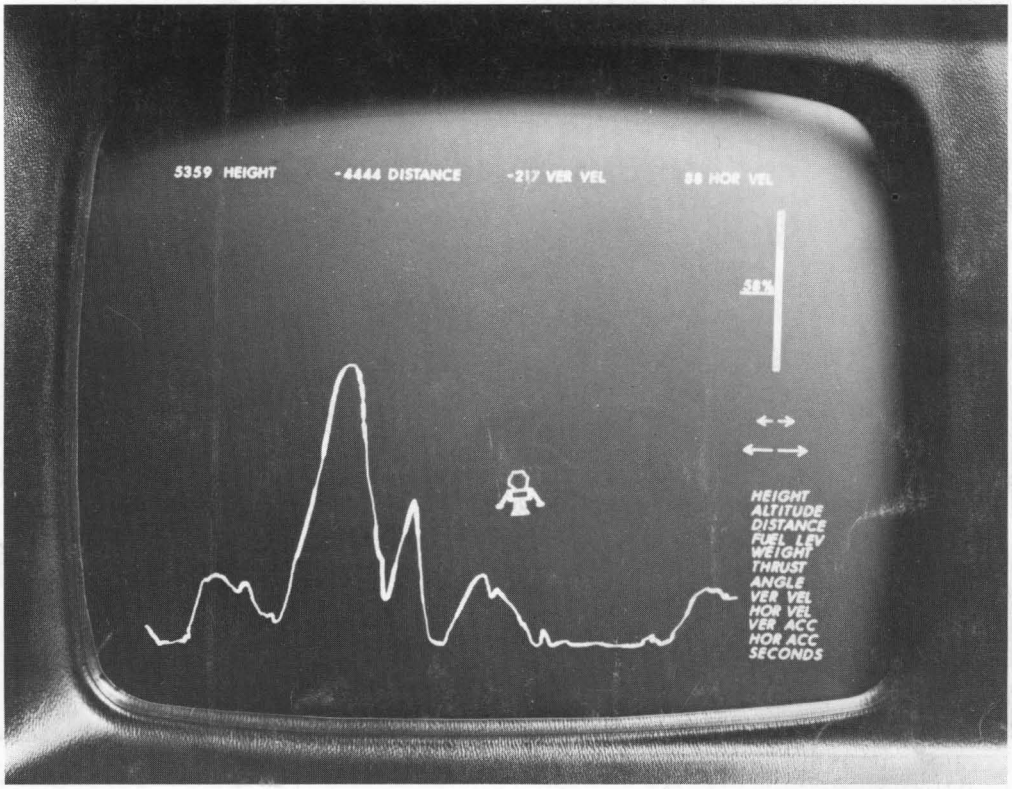
computers and automation

and people



THE GAME: "MOON LANDER"

Pre-publication offer expiring July 31, 1973:

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by Edmund C. Berkeley, Author and Anthologist

Over fifty parables (including anecdotes, allegories, and fables) by Berkeley and many other authors, modern and ancient, dealing with famous problems, modern, classic, or ageless. Many parables are decorated by a bouquet of proverbs and quotations — for readers who like to choose which variety of lesson appeals to them. A short guide to some patches of common sense and wisdom. An ideal gift. Illustrated. Hard cover. Over 250 pages.

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"RIDE THE EAST WIND:
Parables of Yesterday and Today"

Table of Contents (preliminary)

The Fox of Mt. Etna and the Grapes

Once there was a Fox who lived on the lower slopes of Mt. Etna, the great volcano in Sicily. These slopes are extremely fertile; the grapes that grow there may well be the most delicious in the world; and of all the farmers there, Farmer Mario was probably the best. And this Fox longed and longed for some of Farmer Mario's grapes. But they grew very high on arbors, and all the arbors were inside a vineyard with high walls, and the Fox had a problem. Of course, the Fox of Mt Etna had utterly no use for his famous ancestor, who leaping for grapes that he could not reach, called them sour, and went away.

The Fox decided that what he needed was Engineering Technology. So he went to a retired Engineer who lived on the slopes of Mt. Etna, because he liked the balmy climate and the view of the Mediterranean Sea and the excitement of watching his instruments that measured the degree of sleeping or waking of Mt. Etna. The Fox put his problem before the Engineer. . . .

Expected to be published in October 1973 by Quadrangle Books, a subsidiary of *The New York Times,* hard cover, probable price, $6.00

Pre-publication offer expiring July 31: Book $4.50 (25% discount), plus postage and handling costs $.50 = $5.00

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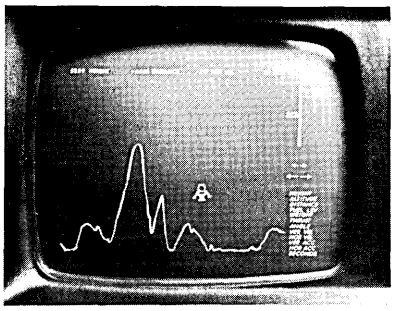
computers and automation and people

The magazine of the design, applications, and implications of information processing systems — and the pursuit of truth in input, output, and processing, for the benefit of people.

NOTICE: The official name of this magazine throughout 1973 is *Computers and Automation.* We expect to change the name officially as of January 1, 1974, to *Computers and People.* During 1973 from time to time, unofficially, and irregularly, we plan to use the name *Computers and Automation and People* as a way of informing our subscribers and readers of the intended change on January 1, 1974.



Front Cover Picture

The front cover shows a display by a "moon lander" computer program, a realistic game. Its object is to "land" the "space ship" safely on the "moon". There are many changing parameters; the task of the person interacting with the computer is difficult. The program and equipment are from Digital Equipment Corporation, Maynard, Mass. For more information, see page 25.

Departments

Key

[A] — Article
[C] — Monthly Column
[E] — Editorial
[F] — Forum
[G] — The Golden Trumpet
[NT] — Not Technical
[R] — Reference Information
[T] — Technical

NOTICE

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EDITORIAL

The Fountain of Youth, in Computer Form

One of the computer books which I really prize is *An Executive's Guide to Computer Concepts* by James E. Monsma and Kenneth F. Powell, published by Pitman Publishing Corp., 6 East 43rd St., New York, N.Y., 1969, 166 pp. I recommend it highly; it is full of interesting and significant ideas. I quote from page 99:

> One of the authors while working with an engineering firm determined that a major product costing millions could be described by five [program] building blocks. When the building blocks were programmed, it became possible for the engineers of the firm to design these products with the aid of the computer. One day a senior engineer sat at the console of the computer and designed product after product. He was heard to remark as he got up from the console, "I've learned more about designing this product in the last 20 minutes than I have in the previous 20 years".
>
> This was not entirely an exaggeration, for now he was able to test within the machine, products he would never dare to build. At worst, errors in their design would flash a red light. Because of the ever present possibility of danger and the pressures of time, he had previously limited his design work to modifying existing designs by handbook and rule of thumb methods of calculation. With danger removed and the speed of the computer at his disposal, he was free to experiment with various designs and evaluate their performance.
>
> If Ponce de Leon in his search for the fountain of youth had encountered the modern computer, he might not have viewed it as the answer to his quest; yet in one special sense the computer has extended the executive's lifetime. If we view the life span as a series of experiences, the ability that the computer provides is tantamount to extending our lifetime. . . . There is no finer operational training ground for future company executives than the computer area. . . . Skillfully utilized the computer enables its users to extend their lifetime of experiences.

Recently I had the task of comparing two parables. They dealt with much the same theme. One had been written thirty years ago, the other one recently. Each had 8 human characters – but there were substantial differences between them. One had 13 dramatic scenes and the other 18. One was about 3500 words long, the other about 5000 words long. Both had somewhat the same conclusion to draw.

Because of the existence of an appropriate computer program on our computer, I was able to undertake a comparison that would have been totally out of the question in B.C. ("Before the Computer"). This was a comparison of the two vocabularies of *content words.* A *content word* is a word which belongs specifically to a given context. The other words are those which may be used in a great many different contexts and which stick content words together (as cement sticks bricks); these other words are called *function words.*

For example, if we are given the context of a game of bridge, the words "deck, shuffle, trick, honors" take on unique meanings related to the game. We easily think first and quickly of a deck of cards, not the deck of a boat; of shuffling the cards, not of an old man shuffling along the floor; of a trick consisting of four cards one collected from each player, not a playful trick or a Watergate trick; of the honor cards of a suit of cards, not a student on the honors list. And words like "and, of, a, the, not, along, from, on" are function words; they appear in all contexts and perform a function; they are like logical cement.

The comparison I was able to make was this one:

> What is each content word in alphabetic sequence, for Parable A and for Parable B? what is the frequency of each? and how different are these two parables in this respect?

Here is a short extract of the comparison:

	Parable A	Parable B
cascades	1	0
celestial object	0	3
chain	5	0
cloak	3	0
cloudless	0	1
confused	0	1
corridors	0	3
cover (-s, -ed)	5	0

The reason this comparison was possible is that we have available a program on our computer which will take in all the words in a passage, sort them into alphabetical sequence, and report how many occurrences of each such word appear in this passage. This program in addition will determine the number of syllables in every word, and report for example all words of n or more syllables – so that a piece of writing can be edited so as to be easy to read, with few syllables per 100 words instead of many.

For persons who produce works composed of words, as do writers, reporters, lecturers, poets, authors, editors, publishers, and so on, the existence of new computerized techniques for dealing with words is a new dimension. And it invites further development. In fact, there ought to be a computerized way in which ideas could be amplified by computers into interesting, well-worded sentences, and a way in which the sentences could be assembled into paragraphs, and the paragraphs into chapters, and the chapters into books.

From 1943 to 1973 I have written 14 books; now at age 64, there are 20 more that I want to write. Perhaps the only way I may succeed, it seems to me, is to make use of the fountain of youth provided by the computer – and to program our computer to write books for me, the way I would like to write them!

How fanciful is it to program a computer to write books, especially nonfiction? Is this a sensible idea or a silly one?

A great deal of nonfiction is quite constrained. The first work of nonfiction that I studied over and over again with intense interest (because as a boy I collected minerals), was a *Textbook of Mineralogy* by Edward Salisbury Dana and W. E. Ford. The descriptions of minerals always consisted of the reporting of facts about mineral species, always in the same systematic sequence, in a condensed style. Accompanying this editorial is a sample of two of these descriptions, slightly abbreviated and modified.

Suppose we imagine a table of data of 100 items listed down and 20 reports on 20 properties for each item going across. It should be rather easy to convert this tabular presentation into running text.

To avoid monotony, a random number generator module in the computer program could choose at random among several equivalent modes of expression. For example, a few patterns of function words that all have the same meaning are:

All ...s are ---s.
Every ... is a ---.
Each ... is a ---.
Always, an ... is a ---.

If the relation of inclusion of one class of things in another is indicated in the data in the cell (intersection of column and row), then one of these forms of expression could be selected at random. Similarly, for other relations.

The two biggest barriers it seems to me to programming a computer to write a book are:

- Lack of imagination.
- The belief (or the conviction) that such a thing cannot be done.

Edmund C. Berkeley

Edmund C. Berkeley
Editor

A COMPUTER SHOULD BE ABLE TO WRITE AS WELL!

The following are somewhat shortened and modified descriptions of two common mineral species that were described one after the other in *A Textbook of Mineralogy* by Edward Salisbury Dana, Third Edition revised and enlarged by William E. Ford, John Wiley and Sons, New York, 1922, 720 pp.

CORUNDUM Rhombohedral. Axis c = 1.3630.

Twins, sometimes penetration twins. Often polysynthetic, and thus producing a laminated structure. Crystals usually rough and rounded. Also, massive, with nearly rectangular parting or pseudocleavage. Granular, coarse, or fine.

Parting, sometimes perfect, but interrupted. Fracture, uneven to conchoidal. Brittle; when compact very tough. Hardness, 9. Specific gravity, 3.95 to 4.10. Luster, adamantine to vitreous; on the basal plane, sometimes pearly. Occasionally, showing asterism as in star sapphire. Color, blue, red, yellow, brown, gray, and nearly white; streak uncolored. Pleochroic in deeply colored varieties. Transparent to translucent.

Varieties: Sapphire, ruby, corundum, emery.

Composition: Alumina, Al_2O_3. The crystalized varieties are essentially pure.

Use: Clear varieties of corundum form valuable gem stones. Also formerly largely used as an abrasive; at present, various artificial abrasives are largely used instead.

HEMATITE Rhombohedral. Axis c = 1.3656.

Twins, penetration twins, polysynthetic twinning lamellae, producing a fine striation, and giving rise to a distinct parting or pseudocleavage. Cyrstals, often thick to thin, tabular, parallel to the base, and grouped in parallel position or rosettes; also in cube-like rhombohedrons. Also columnar to granular, botryoidal, and stalactitic shapes.

Parting, due to lamellar structure, and caused by twinning. Fracture, subconchoidal to uneven. Brittle in compact forms; elastic in thin laminae. Hardness, 5.5 to 6.5. Specific gravity, 4.9 to 5.3; of crystals, mostly 5.20 to 5.25; of some compact varieties, as low as 4.2. Luster, metallic and usually splendent; sometimes dull. Color, dark steel gray or iron black; in very thin particles blood red by transmitted light; when earthy, red. Streak, cherry red or reddish brown. Opaque, except when in thin laminae.

Varieties: Specular, compact, columnar, fibrous, red ocherous, clay iron-stone.

Composition: Iron sesquioxide, Fe_2O_3.

Use: The most important iron ore.

IF YOU COULD PREVENT JUST ONE IMPORTANT MISTAKE BEFORE IT HAPPENED —

- like the Democratic Party's mistake with Senator Eagleton
- like the Republican Party's mistake with the Watergate Bugging
- like the West German government's mistake in not catching the Arab guerrillas before they penetrated to the Israeli Olympic Team's building
- like Southern Airways' mistake in allowing three hijackers with guns on to one of their planes

HOW MUCH WOULD THAT BE WORTH TO YOU — $100? — $1000? more?

Our considered estimate is that 10 to 20% or more of the cost of operation of most businesses is the cost of mistakes. (Just one foreseeable mistake that "Computers and Automation" made in 1970 has cost us $4000.)

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In a number of the issues of "The Notebook on Common Sense, Elementary and Advanced", we examine systematically the prevention of mistakes, such as:

No. 15: Preventing Mistakes from Failure to Understand
No. 23: Preventing Mistakes from Forgetting
) — Volume 1, first subscription year

No. 38: The Concepts of Feedback and Feedback Control
No. 41: Preventing Mistakes from Unforeseen Hazards
) — Volume 2, second subscription year

Among the forthcoming issues of the Notebook in Volume 2 are:

- Preventing Mistakes from Camouflage
- Preventing Mistakes from Placidity

and we are planning at least 20 more issues in Volumes 2 to 4 under this general heading.

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3. The Golden Trumpets of Yap Yap
4. Strategy in Chess
5. The Barrels and the Elephant
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6. The Argument of the Beard
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7. The Elephant and the Grassy Hillside
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34 and 35. Time, Sense, and Wisdom
36. Wisdom — An Operational Definition

. . . . 24 issues promised, 36 issues delivered, for good measure

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I believe these to be the best, if not the most important, reading that I have had this year.
— Harold J. Coate, EDP Manager, St. Joseph, Mo.

Your concept is brilliant, and a welcome antidote to much which is passed off as useful knowledge these days. Keep up the good work.
— Charles E. Abbe, Data Systems Analyst, Pasadena, Calif.

Very good articles; something all managers should read.
— William Taylor, Vice President, Calgary, Alberta

As I am involved with systems work, I can always use one of the issues to prove a point or teach a lesson.
— Edward K. Nellis, Director of Systems Development, Pittsford, N.Y.

Thoroughly enjoy each issue.
— David Lichard, Data Processing Manager, Chicago, Ill.

All are good and thought-provoking — which in itself is worthwhile. Keep it up.
— Richard Marsh, Washington, D.C.

Especially like "Right Answers".
— Ralph E. Taylor, Manager of Research and Development, West Chester, Ohio

Your tendency to deal with practical applications is very rewarding.
— Jeffrey L. Rosen, Programmer, Toronto, Canada

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Computer Programming Using Natural Language

Edmund C. Berkeley, Andy Langer, and Casper Otten
Associates, Frontiers Group
815 Washington St.
Newtonville, Mass. 02160

"Ordinary natural language would become a satisfactory programming language for great numbers of problems."

Outline

1. Automatic Programming Using Natural Language

The objective of programming a computer using ordinary natural language has been considered out of reach for more than a quarter century of the development of automatic computers. Consequently, great effort has gone into the creation of over 300 programming languages, including many very useful ones such as FORTRAN, BASIC, COBOL, assembly languages, and so on. And probably over 200,000 persons have learned how to write a precise computer programming language so as to give instructions to computers.

But this situation is now changing. Much of the programming of computers is now done interactively where a repertoire of 20 to 50 commands to a computer can enable a person sitting at a computer terminal to get just what he wants. For example, there are editing programs which give very powerful editing of text by rather simple commands. So part of the programming is inside the computer, and the rest of the programming is inside the mind of the human being using the computer.

In addition there are investigators pursuing the goal of having a computer program understand ordinary natural language and thus obey any commands expressed in ordinary natural language. These investigators include groups at Project MAC at Mass. Inst. of Technology, IBM Corporation, Bolt Beranek and Newman, Stanford University, etc.

2. Task F

However, so far as we know at present writing, none of these investigations has been reported as succeeding in the following task, which we shall call Task F:

> Produce a definite, efficient, and rather small program which will take in ordinary natural language specifying any one of many kinds of calculations, and will put out automatically a computer program which will correctly handle any sample of any kind of those calculations.

This would mean that ordinary natural language expressed in unconstrained ordinary English would become a programming language for computers for a large collection of problems to be solved.

If Task F is accomplished, then the following consequences occur, among others:

- A large part (not necessarily all) of ordinary calculations done in ordinary offices and other places can be performed using ordinary natural language to specify them to the computer.
- A great many people will not have to learn BASIC or FORTRAN or some other programming language.
- The expense of a computer installation can be reduced by hiring fewer programmers and purchasing less software.
- If a program (for one of this class of calculations) needs to be modified, all that is needed is to modify the ordinary natural language expressing the program.
- Ordinary natural language would become a satisfactory programming language for great numbers of problems.

3. Frontiers Group

Task F as described above is what we think we have done — though on a small and preliminary scale. "We" is a group of persons consisting of Andy Langer and Casper Otten (seniors at Newton high schools) and myself. From time to time we call ourselves "Frontiers Group". The work in this direction has proceeded since August 1972, and is an offshoot of work done under a contract with the Office of Naval Research, N00014-70-C-0225, on computer-assisted documentation of Navy computer programs.

One of the problems investigated under that contract was documenting an unknown working binary program, i.e., discovering what it was doing without knowing any program description or documentation except the operating instructions. We applied cryptanalytic and other methods to the unknown working binary program to find out many things about it.

Then we realized that these methods and similar methods (especially cryptanalytic) could be applied to the description of an algorithm in ordinary natural language. And we have taken ordinary natural language and produced precise computer programs from it.

Table 1
Calculating Mean and Standard Deviation —
Manager's Instructions to a Clerk —
Input to GENIE

1. Take the first number in column (1), and multiply it by the first number in column (2), and enter the result in Column (3).

2. Do the same operation all the way down through the first two columns.

3. Then, take the first number in Column 3 and multiply that by the first number in Column 1, and put that result as the first entry in Column 4.

4. Do that same operation also all the way down the table.

5. Total column (2), and put the total in item (5).

6. Find the sum of column (3) and put the result in item (6).

7. Add up column (4) and put what is obtained in item (7).

8. Now perform the following calculations:

9. For item (8): Divide Item 6 by Item 5; the result is the MEAN, the first answer.

10. For item (9): Divide item (7) by item (5); the result is put in item (9).

11. Item (10): Multiply item (8) by item (8).

12. Item (11): Subtract item (10) from item (9).

13. Item (12): Take the square root of item (11); this is item (12), the STANDARD DEVIATION, the second answer.

4. The Starting Point

The place where we like to start is the following:

- If one person can effectively explain to another person using ordinary natural language and ordinary examples, how to perform a certain kind of calculation —

- Then that explanation still in natural language can go into a general computer program (suppose we call this program GENIE) and GENIE will automatically produce as output a precise computer program that will perform that kind of calculation.

Suppose we call the person giving the explanation the "manager," and the person receiving the explanation the "clerk". Over and over again in business, accounting, engineering, and elsewhere, managers give such explanations to clerks. From them clerks are informed how to perform the calculation. Often, the calculation is aided by a calculation layout form with columns and rows where many intermediate figures are entered during the course of the calculation.

So the input to the computer program GENIE consists of: (1) manager's instructions to a clerk, (2) one or more numerical examples which the clerk can use as a model, and (3) a calculation layout form.

The computer program which GENIE produces may be written in BASIC or FORTRAN or machine language or some other programming language. The computer program produced as output will be correct; it will not suffer from certain kinds of human programmer errors, where the programmer forgets for example that only abbreviations starting with the letters I, J, K, L, or M can be used for variables with integer values.

5. A Specific Example

Let's suppose that in the first case the desired calculation is to find the mean and standard deviation for a frequency distribution. Table 1 shows the manager's instructions — input. Table 2 shows the worked example and the calculation layout — also input.

Table 2
Calculating Mean and Standard Deviation —
Worked Example and Calculation Layout —
Input to GENIE

(1) OBSERVED VALUE	(2) FREQUENCY	(3)	(4)
8.1	2	16.2	131.22
8.2	1	8.2	67.24
8.3	0	0	0
8.4	2	16.8	141.12
8.5	1	8.5	72.25
8.6	2	17.2	147.92
8.7	0	0	0
8.8	2	17.6	154.98
8.9	2	17.8	158.42
9.0	0	0	0
9.1	3	27.3	248.42
9.2	0	0	0
9.3	3	27.9	259.47
9.4	1	9.4	88.36
9.5	0	0	0
9.6	1	9.6	92.16
9.7	1	9.7	94.09
9.8	0	0	0
9.9	2	19.8	196.02
10.0	1	10.0	100.00
10.1	0	0	0
10.2	1	10.2	104.04

(5): 25 (6): 226.2 (7): 2055.62

(8) 9.048 = the MEAN = ANSWER (1)

(9) 82.2248

(10) 81.8663

(11) .3585

(12) .599 = the STANDARD DEVIATION = ANSWER (2)

If we inspect the example, we can see that the manager's instructions are satisfactorily complete and definite for a human clerk, and that the figures look reasonable. If we verify the arithmetic, we find that the figures are actually correct. The information given therefore ought to be sufficient for a clerk to know just what to do, and do it.

But instead of giving this information to a clerk, we give it to the computer program we call GENIE.

The first output that GENIE produces is shown in Table 3. It is expressed in what we call Level Two Language, and it is the output of Part 1 of GENIE which is called the Statement Analyzer. The example shown here was produced by a version of GENIE which was written in machine language for the DEC PDP-9 computer.

The second output that GENIE produces is expressed in this case in the programming language BASIC. This output is shown in Table 4. For a computer that is programmed to accept BASIC, this program works, and gives the two desired results, MEAN = 9.048, and STANDARD DEVIATION = .599. Level Two Language is the input for Part 2 of GENIE, which is called the Program Maker (and is of course quite similar to an ordinary compiler). The example shown here was produced by a version of Genie which was written in SNOBOL.

Table 3
Output of GENIE in Level Two Language

```
(1) = DAT
(2) = DAT
(3) = (1) * (2)
(4) = (1) * (3)
(5) = SUM (2)
(6) = SUM (3)
(7) = SUM (4)
(8) = (5) I/ (6) = MEAN
(9) = (5) I/ (7)
(10) = SQR (8)
(11) = (9) - (10)
(12) = SRT (11) = STANDARDDEVIATION
```

Key to the Abbreviations

DAT	DATA
*	MULTIPLIED BY
SUM	SUM OF
I/	DIVIDED INTO (i.e., inverse of divided by)
SQR	SQUARE OF
-	MINUS
SRT	SQUARE ROOT OF

6. Strategy

Let's now discuss the strategy which we are using: the ideas and the principles by means of which we have gone from ordinary natural language, worked example, and calculation layout to a program expressed in standard programming language. Let's call this "Strategy F".

7. The Principle of Appropriate Neglect

First is what we might call the Principle of Appropriate Neglect.

Many words that occur in a set of manager's instructions to a clerk make almost no difference in conveying understanding to the clerk, in the context of what is to be done: the carrying out of a calculating rule. For example, the words "a" and "the" are very likely to make no difference. The same principle is applied in newspaper headlines: "SMITHVILLE MAN BITES DOG" is used in place of "A MAN IN SMITHVILLE BITES A DOG". A large amount of

Table 4
Output of GENIE as a Program in BASIC

```
1Ø DIM A2(22)
2Ø FOR I=1 TO 22
3Ø READ A2(I)
4Ø NEXT I
5Ø DIM A3(22)
6Ø FOR I=1 TO 22
7Ø READ A3(I)
8Ø NEXT I
9Ø DIM A4(22)
1ØØ FOR I=1 TO 22
11Ø LET A4(I)=A2(I)*A3(I)
12Ø NEXT I
13Ø DIM A5(22)
14Ø FOR I=1 TO 22
15Ø LET A5(I)=A2(I)*A4(I)
16Ø NEXT I
17Ø LET A7=Ø
18Ø FOR I=1 TO 22
19Ø LET A7=A7+A3(I)
2ØØ NEXT I
21Ø LET A8=Ø
22Ø FOR I=1 TO 22
23Ø LET A8=A8+A4(I)
24Ø NEXT I
25Ø LET A9=Ø
26Ø FOR I=1 TO 22
27Ø LET A9=A9+A5(I)
28Ø NEXT I
29Ø LET BØ=A8/A7
3ØØ PRINT "MEAN="BØ
31Ø LET B1=A9/A7
32Ø LET B2=BØ*BØ
33Ø LET B3=B1-B2
34Ø LET B4=SQR(B3)
35Ø PRINT "STANDARDDEVIATION="B4
9ØØ DATA 8.1,8.2,8.3,8.4,8.5,8.6,8.7,8.8,
      8.9,9.Ø,9.1,9.2,9.3,9.4,9.5,
9Ø1 DATA 9.6,9.7,9.8,9.9,1Ø.Ø,1Ø.1,1Ø.2
9Ø2 DATA 2,1,Ø,2,1,2,Ø,2,2,Ø,3,Ø,3,1,Ø,1,
      1,Ø,2,1,Ø,1
2ØØØ END
```

effort and a large amount of programming can be avoided if we do not try to "understand" all the words and phrases that are being used in a set of manager's instructions to a clerk.

8. The Principle of the Preferred Synonym

The next principle we may call the Principle of the Preferred Synonym.

In a set of manager's instructions to a clerk, it may well be that the manager uses different synonyms for the same idea. For example in Statement 5 of Table 1 we find: "Total Column (2)," which means "Sum the values in Column (2)". In Statement 6 we find: "Find the sum of Column (3)" which means "Sum the values in Column (3)". In Statement 7 we find: "Add up Column (4)" which means "Sum the values in Column (4)".

In the Statement Analyzer portion of GENIE we store a table of synonyms for words and phrases. Opposite each one we place the preferred synonym. For example, a portion of that table might contain:

ADD UP:SUM	DETERMINE:FIND
SUM:SUM	FIND:FIND
THE SUM OF:SUM	GET:FIND
TOTAL:SUM	TAKE:FIND

Then it is easy for the statement analyzer to recognize many words and phrases, and to replace each one by its preferred synonym.

This is regularly done in mathematics. The expressions "TWO, II" are regularly replaced by the expression "2". The use of a single convenient symbol for an idea is a great aid to calculation using symbols to stand for ideas.

9. The Principle of Relevant Context

It is not always possible to translate one and the same word into the same preferred synonym. Take for example Statement 5 in Table 1:

Total Column 2 and put the total in Item 5.

In this sentence, the first word "total" designates an operation, and should be translated into the preferred synonym SUM. The second word "total" however designates the result of an operation, and its preferred synonym here should be RESULT. The program GENIE should be designed so that it can translate the first "total" into SUM and the second "total" into RESULT, responding to the difference in context. Based on our experience so far, this is not difficult.

10. The Principle of a Series of Separate Statements

A manager's instructions to a clerk are assumed to be expressed in good English with a clear meaning, and in a style which an ordinary human clerk would readily understand.

As a result, a very natural requirement is that the instructions should be stated in a reasonable series of separate statements. The statements would be in a natural sequence, just as in a recipe for making bread: what you do first, what you do later, what you do to finish.

For Task F, there is no need to design a program to understand complicated discourse such as legal documents where statements may be bundled together with "whereases" or "provideds".

Table 5
Probably Acceptable Vocabulary

A
a
according to
add
added to
again
all the way
an
and
and/or
and so on
answer
any
appropriate
are
array
as
as soon as
assign
at this point

B
beginning
box
but
by

C
calculate
call
called
case
cell
class
collection
column
compute
continue
correct
corresponding
count

D
data
define
determine
difference
digit
divide
divided by
divisor
do
down

E
e.g.
each
element
else
empty
end
ending
enter
equal
equals
etc.
evaluate
example
express

F
false
figure
fill in
final
find
first
following
for
for example
for instance
from

G
get
give
given
go to
group

H
here

I
I
i.e.
in
input
in other words
intermediate
is
it
it is
item
iterate
iteration
its

L
last
less
let
list
look up

M
me
minus
multiplicand
multiplier
multiply
multiplied by

N
name
named
namely
next
no
none
not
number

O
observed
obtained
once more
one of
operation
otherwise
out of
output
outset

P
partial
percent
perform
plus
points
print
proceed
process
produced
product
provided
put down
put in
put into
putting

Q
quantity
quotation marks
quotient
quotes

R
read
refer to
regardless of
remainder
repeat
repeated
repetition
reply
respectively
response
result
return
return to
row

X
same
same way
score
second
see
set
several
shall
shown in
similarly
single quote
space
square root
start
starting
subtract
subtract from
subtracted from
sum
suppose

T
table
take
take away
take away from
temporary
that
that is
the
then
this
this is
third
through
times
total
to
to the end of
true
type

U
unit
us
use
using

V
value
values
variable

W
we
wait for
what
whatever
which
which is
will
with
write
write down
write in

Y
yes
you

Z
zero

Note: The program GENIE at this time may not be able to handle some of the phrases that can be constructed using these words, particularly where those phrases have special or idiomatic meanings.

11. The Principle of Statements of Reasonable Length

One of the requirements of good clear English for manager's instructions to a clerk is that the individual sentences should not be "too long". A good limiting length is about 25 or 30 words.

Versions of GENIE should be designed to complain if any one of the manager's statements to a clerk is longer than 30 words.

It is easy enough to break long sentences of instructions into shorter ones. A manager should not protest about this. Often in fact a clerk can then work more efficiently — because clarity is increased.

12. The Principle of a Finite Vocabulary

At the present time we are working with only a small finite vocabulary of words that may occur in manager's instructions to a clerk. The reason for this decision is that it makes sense to begin with less than a full vocabulary and then after achieving success with that, move on to a more inclusive vocabulary.

The vocabulary we are working with currently is shown in Table 5, "Probably Acceptable Vocabulary".

The vocabulary of words and phrases which may occur in managers' instructions to clerks, and which we do not believe that GENIE can handle at this time is shown in Table 6, "Probably Unacceptable Vocabulary (At This Time)". But we see no theoretical barriers to the extension of GENIE to handle these words (and the corresponding ideas).

13. The Principle of Gradual Development

A major principle we are using is the Principle of Gradual Development as contrasted with the Principle of Assembly Line Production. For, if you do not have a very good idea of just how to produce something, it makes sense to make a series of models or trials, ranging from a very simple model to a complicated one. Then you learn from each model. On the other hand, if you really know just what you are producing, it makes sense to set up an assembly line and have each prefabricated component arrive at the time it is to be assembled.

In the case of natural language programming, we do not know all we would like to know. So we begin with a very simple problem (like the calculation of mean and standard deviation) and proceed to more complicated ones. Deliberately, we are not trying to design immediately a full system for dealing with all of natural language for all sets of problems that we can imagine computers being applied to. An automobile manufacturer knows enough to set up an assembly line; we don't as yet.

However, we have selected a group of problems connected with businesses, that computers should be able to deal with. For this group of applications, first, we hope to develop GENIE. The list of applications is shown in Table 7.

14. The Principle of Questioning by the Clerk

It may well be that the "clerk" after "listening" to the "manager's instructions" has some questions — especially if the manager's instructions are incomplete or inconsistent. It is logical for the program GENIE to inquire of the person giving it the manager's instructions whenever it finds upon examining the information given to it, that there are puzzles or ambiguities. A prior program that does this is DWIM, "Do What I Mean, the Programmer's Assistant," by Warren Teitelman (see Computers and Automation for April 1972).

Although our versions of the program GENIE do not as yet contain this feature, this is a desirable feature in interactive computer programs and should be relatively easy to implement.

15. Other Principles

These eight principles mentioned constitute perhaps a quarter of all the principles that we are using in Strategy F. Many of the others however are more detailed and of less general interest than those we have mentioned here.

We are hoping to find ways to expand the work we are engaged in, and to apply our ideas to many more problems of understanding manager's instructions to a clerk than we have so far tackled.

16. Level One Language and Level Two Language

As we mentioned before, GENIE has several portions. The first portion of GENIE is the Statement Analyzer, which produces what we call Level One Language. Another portion of GENIE is the Program Maker, which takes in Level Two Language produced by prior portions of GENIE and in its turn produces a regular computer program in a regular computer programming language — which may be BASIC or machine language or something else.

So far the varieties of Level One Language that we have been experimenting with seem unsatisfactory.

Level Two Language, the input to the Program Maker, is a very natural kind of language for those persons who have had experience with calculations in business, accounting, engineering, and similar fields. Basically it consists of:

- Naming columns and items (i.e., variables) with numbers or letters (for example Column (5), Schedule B, Form 1090);
- Expressing in symbols and words the relations between the columns and the items.

The Federal Income Tax Form is a good example. The directions "(6) is (1) or (3) or (5), whichever is greatest," is a good example. In the years 1930-41 when I worked in the actuarial departments of life insurance companies, I was surprised to see how much more one could do with this sort of specification of calculating rules than one could do with the ordinary mathematical notation of the academic world.

17. Criticisms

Many criticisms can be directed at what we have done so far. Suppose we try to express some of them and a rebuttal to each in a kind of dialog.

Question: How far have you gone? and what evidence do you have that you can go the rest of the way?

Answer: Not very far. But as long as an ordinary uninformed clerk can learn what a manager is saying about how a calculation is to be performed, it seems logical to believe that those ordinary natural language directions can be "understood" by a computer program.

(text continues on page 18)

Table 6
Probably Unacceptable Vocabulary (At This Time)

A

after
afterwards
alphabetical
alphabetize
among
another
approximation
arctangent
arrange
arrangement
as soon as
at
at random

B

before
beforehand
between
binary

C

character
choose
collate
combination
compare
comparison
complex number
contained in
cosecant
cosine
cotangent
cube
cube root

D

denial
derivation
derivative
determinant
differentiate
during

E

equation
exists

F

fixed point
floating point
fraction part

G

greater than
greatest

I

if
if ... then
integer part
integral
integration

K

kind

L

larger than
largest
least
less than
logarithm

M

match
matrix
maximum
merge
minimum
most

N

notation

O

octal
on
order
other

P

permutation
power
prime
prime number
probability
problem
punctuation

R

raise to a power
random
real number
representation
root
round off
rounded off

S

secant
select
selection
sequence
sine
smaller than
smallest
so long as
solution
some
sort
string
summation
symbol

T

tangent
than
there are
there exists
there is
till
time
to the near
truncate
truncated
truth value

U

unless
until
upon

W

when
while

Table 7
General Business Applications to which the Program GENIE Might Apply First

Absenteeism reports
Accounts receivable
Advertising effectiveness
Attendance records
Billing and invoicing
Budgeting
Capital investment analysis
Consumer credit verification
Cost accounting
Data assembling, from multiple sources
Depreciation calculations
Dispatching
Equipment, register and inventory
Financial statements
Forecasting
General ledger
Hiring analysis
Insurance records and schedules
Inventory control
Labor cost calculations
Lease and rental accounting
Manhour records and analysis
Orders: acknowledgement, analysis, processing, shipping records
Overhead cost allocation
Overtime reports
Payroll computation and payment
Performance evaluation
Price analysis
Production forecasting
Property accounting
Purchase orders, writing and followup
Questionnaire analysis
Repair and maintenance
Rent analysis
Retirement fund records and valuation
Sales analysis, area distribution, forecasting, quota calculations
Sales order processing, invoicing, shipping
Savings bond deductions
Seniority records
Taxes
Transportation optimization
Traveling salesmen scheduling
Turnover analysis
Vacation scheduling
Wages and salaries, analysis, and records
Work in process records

(please turn to page 18)

Soviet Information-Handling Problems: The Possibilities in Computer Usage

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"While the numbers of projects involving computers are multiplying, benefits from computer utilization are severely limited by a series of chronic problems . . ."

When a nation centrally plans its entire economy, the data problems incumbent in collecting and disseminating the necessary economic information are indeed sizable. In the vast Union of Soviet Socialist Republics (USSR), which stretches from the Baltic Sea to the Pacific and from the Arctic Ocean to the Black and Caspian seas, the commitment to centralized planning has resulted in one of history's most formidable data-handling problems.

Since the early sixties, Soviet economic, statistical, and computer experts have given increasing attention to the massive data requirements of their economic structure. As an indicator of the accelerating complexity of the Soviet economy, one expert estimates that the number of persons involved in economic planning and control increased 50 percent between 1955 and 1962.[1] V. Glushkov, head of the Ukrainian Republic Academy of Sciences' Cybernetics Institute and one of the Soviet Union's foremost computer specialists, estimates that utilizing adding machines and calculators, it would take three billion persons to solve current management problems in the Soviet Union.[2] Another writer warns that unless manual data collection and calculation methods are altered, every adult in the Soviet Union will be engaged in planning and administration by 1980.[3]

Barriers to Effective Usage of Computers

After Norbert Wiener's book, Cybernetics or Control and Communication in the Animal and the Machine (MIT Press, 1948), was published in the Soviet Union in 1958, many Soviet experts seriously began to consider computers a means of maintaining the continued viability of their centrally planned economy. Today, there is heavy emphasis on computer usage in many sectors of the economy. At the same time, numerous barriers, such as insufficient hardware, inadequate software, and organizational difficulties, obstruct the effective utilization of computers in the Soviet Union.

Pyramid-Like Network of Computers

A prominent part of plans to streamline data handling has been the concept of a nation-wide network of computers which could collect and disseminate Soviet economic information. Proposed as early as 1959 by the noted Soviet Academician A. I. Berg, the network usually is envisioned as a pyramid with three levels.[4] At the bottom level, computers would be placed in various plants or enterprises. For the second level, computer centers would be set up on the basis of either industrial sectors and their ministries or territorial divisions based on the USSR's fifteen republics. At the top of the pryamid, computer centers would serve major administrative units in Moscow, including the Central Statistical Administration (Tsentral'noe statisticheskoe upravlenie — TsSU) and the State Planning Committee (Gosplan). Thus appropriate information would be channeled up the pyramid, with summary data ultimately used in Moscow. In addition, special multi-user centers would be established at the bottom level for those enterprises without their own computers.

Network Controversy

Hardly had initial work on planning the network received the official sanction of the Party Central Committee and the Council of Ministers in 1964,[5] when signs of controversy regarding the network began to emerge. The dispute primarily centered around who should have jurisdiction over the network and how the second level of the pyramid should be organized. One side, led mainly by the TsSU, argued that the statistical administration should have sole control of the network and that the second level should be organized on a regional basis. In this way enterprises could send their data to existing regional TsSU mechanized accounting centers which would acquire computers to complement their calculating equipment. In addition, TsSU would expand the number of mechanized accounting centers under its control.[6] Data would be supplied by TsSU to industrial ministries, Gosplan, and other users. Some advantages of the TsSU approach would be: (1) centralized data collection for greater control of information; (2) efficient use of computer equipment and trained personnel because they would be clustered in centers; (3) regional planning while still furnishing industrial sectors and their ministries data essential for planning.

Industrial Sectors vs. Regional Planning

Opponents of the TsSU plan, led primarily by Gosplan, argued that a computer network should be established on the basis of industrial sectors, which could collaborate on regional planning with regional Gosplan offices. Under the Gosplan scheme, data would be passed from enterprises to their ministries and regional Gosplans and finally to central agencies in Moscow. To serve enterprises too small to justify their own computers, each ministry could locate computer centers near clusters of enterprises. Arguing that statistical records are only a small part of information which must be collected, the Gosplan proponents advocated the use of computers to streamline management on all levels and opposed the use of computers simply to do existing jobs faster. They further argued that if ministries receive data from TsSU centers, this would require the TsSU centers to handle much data which are not required by regional statistical administrations or the agencies at the top of the pyramid.[7] Advantages of the Gosplan approach would be: (1) decentralized data collection would permit industrial sectors latitude in

tailoring information systems to their own needs; (2) automated communication and control systems between ministries and their enterprises could improve the administration of various industrial sectors; (3) regional Gosplan offices could provide regional planning; (4) data collection could be supervised by the agency which ultimately must use the data for centralized planning. A major disadvantage is that those who must fulfill the central plans directly provide the data upon which they will be evaluated. On the other hand, ministries are reluctant to surrender data from their enterprise to the control of TsSU, which would be in a position to weight the performance of enterprises prior to assessment by the respective ministries.[8]

TsSU and Gosplan Proceed Independently

In spite of the continued controversy, there has been no final decision on an agency to take charge of the network. In the interim, both sides of the controversy are moving ahead with their own plans. The ministries, TsSU, and Gosplan have been expanding the numbers of computers and computer centers under their jurisdictions, in spite of the fact that there has been no agreement on the data to be collected, the formats to be used, or the organization of the network.[9] All indications suggest that the network is far from a reality. In fact, some prominent Soviet experts appear to be retreating from ambitious plans for the nation-wide network now that its complexities have become more obvious. The State Network of Computer Centers increasingly is described in terms of the future and it is probable that the final network design will involve concessions among the factions.[10] The compromising dialogue is by no means an indication that the Soviets have abandoned their goal to establish a nation-wide computer network. During the twenty-fourth Party Congress held in Moscow in 1971 Premier Aleksei N. Kosygin gave the network major emphasis in the directives covering the 1971-75 five-year plan for the USSR.[11]

Soviet Priorities

While the network remains an ultimate objective, current Soviet efforts are concentrated on projects with more immediate returns. Priority is given to the design of systems which will improve production and provide better management data at the enterprise and ministerial levels.

The most widely-acclaimed example of a computerized system at the plant level is the Lvov Automated Control System designed for the Lvov Television Plant in the Ukraine. Although descriptions are vague, it appears that counters on conveyer-belts and other equipment transmit production data to the plant's computer which compiles reports for management. The system is used further to partially regulate assembly line operation, schedule work, control inventory, settle accounts with the plant's suppliers and customers, and calculate wages. Work on the two main phases of the system, initiated in 1963, was completed in 1969 at a total cost of 1.3 million rubles.[12] The Lvov system is considered a prototype and attracts observers from throughout the Soviet Union.

Many Areas Using Computers

Computers are being utilized in many other areas as well. For example, the world-famous Moscow department store, GUM (State Department Store), recently acquired its own computer which is used primarily for warehouse inventory control. In addition, GUM is conducting consumer research employing paper tapes produced on cash registers with punch attachments; however, these efforts have been hampered by a general shortage of suitable cash registers.[13] The endeavor reflects growing Soviet concern with consumer demand after numerous products have stood unsold on store shelves.

In the Moscow construction industry, mobile teletype stations placed at each construction site transmit work progress data to a central computer center. The central computer compiles a construction schedule giving such details as the precise departure and arrival time of supply trucks. Over 2500 construction sites and nearly 200 supply sources are linked to the system.[14]

At the Severodonetsk Chemical Combine, which was selected as an experimental enterprise for the introduction of automated systems in the USSR chemical industry, a computer assists in monitoring the production of nitric subacid. The computer is used also to calculate consumption and output of ammonia, natural gas, air, and electric power; schedule maintenance; analyze production costs and profits; and provide other vital information to management.[15]

Benefits Limited by Chronic Problems

While the numbers of projects involving computers are multiplying, benefits from computer utilization are severely limited by a series of chronic problems ranging from inadequate equipment to shortages of trained personnel.

With the exception of some third-generation computers purchased abroad and perhaps a few experimental models of domestic third-generation machines under development, the Soviets must rely on second-generation computers, such as the Ural and BESM series. These computers do not have sufficient capacities to handle the large-scale applications which are becoming more typical in the USSR. Furthermore, the second-generation computers often are delivered with less core than specified and without necessary peripheral devices. The fact that there is little or no compatibility among the various computer series complicates systems design and implementation.[16]

Computer allocation also appears to be a serious difficulty in the Soviet Union. Amidst complaints of shortages, many computers are underutilized. In Kharkov, for example, most computers are operated at half capacity.[17] The computer at the Ministry of Power, Engineering, and Electrification in Uzbekistan is used less than seven hours per day; while the computer at the Tashkent State Design Institute of Transport runs only five hours per day.[18] One Soviet factory had to be fined for leaving a computer, ordered by a former plant director, standing outdoors in its shipping crates.[19] Part of the problem can be traced to ministries which encourage plants within their jurisdictions to acquire computers, regardless of their needs.[20] Many enterprises also covet their own machines even when they have no applications planned and no prospects of using a computer on a full-time basis.[21]

Major Problems in Software

The software accompanying new computers is meager. One writer claims that delays of two years and more in putting machines into effective operation at particular sites are caused by the critical lack of basic software. Consequently, each organization develops systems and programs suited to its own unique situation, ignoring similar work completed elsewhere.[22] Centralized program libraries are at

an embryonic stage, but will not succeed without some agreement on programming standards.

Conditions in the software area are compounded by the scarcity of trained computer personnel. The major shortages seem to be in the areas of programming and systems analysis, but computer operators and engineers are also in short supply. In some areas, computer specialists are treated like "members of athletic teams," with heads of enterprises raiding personnel with promises of higher wages and better working conditions.[23] In the USSR, of course, this type of maneuvering must proceed with caution. Personnel deficiencies persist due to inferior and haphazard training programs which have resulted from a lack of centralized control over computer education. Symptomatic of the low calibre of training, at least one institute instructs computer engineers on obsolete equipment.[24]

Steps to Combat Problems

To combat some of these ills, a number of steps have been taken. In Riga, for example, a central organization has been established to perform maintenance on one series of computers.[25] Universities and other higher educational institutions throughout the USSR have intensified training programmers and are planning special courses for retraining former graduates. Technical schools and computer manufacturing enterprises are expanding electronic data processing studies.[26]

Nevertheless, the bulk of problems surrounding the use of computers in the Soviet Union can be traced to organizational difficulties. The dispute between TsSU and Gosplan groups over the design and control of the proposed nation-wide network of computer centers is symptomatic of general disagreements, overlapping responsibilities and rampant ambiguities which plague almost every aspect of computer usage. In general, creators of the various computer series do not coordinate their efforts in order to avoid duplication and foster computer compatibility.[27] Several ministries and departments are in charge of supplying enterprises with peripheral devices, punchcards, and magnetic tapes, a condition which results in "confusion and red tape".[28] There are few standards for coding data and no single authority responsible for information standards.[29] Even specialized agencies emerging to assist with systems and software development are afflicted by coordination difficulties. The Lenelectronmash Association, specialists in automated plant production systems, and the Assembly-Adjustment Administration, developers of shop subsystems, operated for several years in Leningrad ignorant of one another's existence.[30] One Soviet engineer characterizes the field of computer technology as a "patchwork kingdom divided among various authorities and ministries".[31] Until organizational conditions are improved, computer usage in the Soviet Union will not realize its potential.

Footnotes

1. Voprosy ekonomiki, 1962, No. 12, p. 102.
2. Izvestiya, December 15, 1971, p. 2.
3. Planovoe khozyaistvo, 1962, No. 10, p. 5.
4. Problems of Cybernetics, Vol. 6 (1965), pp. 115-130.
5. V. Nemchinov. Kommunist, 1964, No. 5, p. 84.
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Berkeley — *Continued from page 15*

Question: There may be situations in which it will take thousands of worked examples to cover all the cases. How can you deal with that?

Answer: This is puzzling. It seems to us, however, that probably the examples can be grouped in clusters, and the clusters can be organized. Again if clerks can understand what to do, then surely a computer program can understand also.

Question: Do you propose to discard all the powerful software that has been built?

Answer: No. Powerful existing computer software will continue to be useful. They might differ little in substance from programs that GENIE would produce; and they might well be more efficient. But there could well be classes of problems and classes of users for which the method of GENIE would be more efficient and easier to use than many other methods.

18. The Future

It seems clear that programming in ordinary natural language may be expected to arrive in the next five to ten years. Aside from the foregoing explanations and arguments, if we consider the example of programming chess playing, there are now chess playing programs stronger than 19 out of 20 good human chess players. As Professor Michie of the University of Edinburgh has said, "If we can program world championship chess, then we can program anything." And it is likely that the understanding of ordinary natural language should be included in "anything". □

Computer Utilization in Management of Water Quality

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"There is a growing need for a comprehensive information system for water quality management which would provide current, accurate data to the water quality manager at speeds that will allow anticipation of water quality problems."

There is obvious concern for environmental conservation, and as a result it has become necessary for water quality management programs of the state agencies to gather, process, and investigate increasingly voluminous amounts of data for utilization in decisions about water quality management. The sheer volume of data generated in managing a water quality program is overwhelming. Water quality management itself is a complex problem which centers around the collection, processing, and retrieval of information. An effective data management system for water quality can assist management and personnel at all levels as they discharge their responsibilities in planning, organizing, directing, evaluating, and controlling a state's water quality program.

Along with new emphasis on over-all management of water quality, at the state level as well as regionally and nationally, there have been numerous advances in computer and information systems. For several years, federal agencies in all areas of environmental control have been working on the application of information systems technology and, in particular, applications to water quality management. The literature describes such a program which utilizes systems technology and the power of advanced computer hardware to measure and control pollution.[1]

There is a growing need for a comprehensive information system for water quality management which would provide current, accurate data to the water quality manager at speeds that will allow anticipation of water quality problems. And to remain consistent with regional cooperation concepts, the information system considers possible interfaces with various other agencies, state, local, and national.

Since such an information system to assist the states in discharging their responsibilities for management of their water quality programs has now been developed, it is sensible to ask, To what extent are the states utilizing the computer? In addition, because of the costs involved, it is equally important to ask, Just how far have advanced and coordinated techniques of water quality management and computer technology been applied to statewide water quality management systems?

Questionnaire

In order to obtain this information, a poll of state water pollution control agencies was carried out. Results of this census were compiled on a percentage basis and the data presented herein is based on a 73% response. The information gained is intended to point out the existence, or lack of existence, of state data systems, as well as the scope of computer usage within the state's water quality program.

Existence of Computer Systems

Previous indications were that not all state governments had rushed to computerize their records for reasons of a lack of understanding of the service which could be provided, the fear of job security associated with the computer changeover, and the costs involved in changing from hand-operated record keeping to the computer.[2] Despite the great potential of computer usage in environmental control, it has been indicated that there is an apparent reluctance of the computer industry to do business in this field.[3] This reluctance involves the lack of computer orientation and experience of personnel in the field, political decisions, and the initial size of the agency or its applications.

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However, results of this study indicate that 82% of the states are presently utilizing a computer. In 50% of the states access to the computer was through a time-sharing system with the remaining 42% having in-house capabilities. The reasons indicated by those not presently utilizing a computer involved: small volume of data; low budgetary priority; the lack of funds and personnel; and lack of economic justification for a computer as opposed to manual record keeping.

The need for consistency with regard to regional cooperation concepts has already been stressed. Information for a body of water lying between two or more states may be compiled by all the states as well as through federal programs. The agencies involved should be able to communicate quickly and effectively about water quality problems; for this to happen, their data management systems should be compatible. A uniform system of data management for water quality has been developed and is presently in use by the federal government (STORET). This study indicates that 90% of the states utilizing computers in water quality management are using a system capable of processing STORET data.

Therefore, an increasing number of state agencies are evidently acquiring computer capability; and the capability seems to be equally divided between their own system and a time-sharing system. The importance of water resources in the future will produce further growth in computer use for water quality.

Extent of Utilization

One of the more important areas of water quality management is the area of collection, storage and retrieval of information. However, this function represents only the first step in an advanced, fully coordinated, statewide comprehensive water quality management system.

A primary justification for accumulating water quality data is to quantify trends in deteriorating water quality. Data is needed to identify the contributors of the different pollutants, to establish the effects of pollution on the environment, to determine the interaction and assimilation of pollutants, and to isolate the contribution of each diverse industry or activity.[4] Information systems which are capable of assimilating this information for presentation to the water quality manager, whether it be for the task of standards setting or for enforcement management, serves as a tool to enhance the quality of the decision.

Previous studies have identified some general levels of information systems to include: scientific information systems; environmental control systems; and management information systems.[5] By examining what areas are included in the state programs, it can be determined to what extent a data system is being fully utilized.

This study determined that of those states having computer capability, 43 percent were utilizing the computer for information storage and retrieval only. The area of information consistently involved in storage and retrieval was water quality measurements.

However, 57% of the states indicated that their data systems had been broadened in scope to include a variety of subsystems which are necessary in establishing and implementing enforcement or pollution reduction strategy (control systems). The percentage of states subscribing to these various subsystems is shown in Table 1.

Table 1
USE OF COMPUTERS BY STATES
RE WATER QUALITY

Inventories of municipal waste treatment plants	75%
Inventories of industrial plants	71%
Implementation plans	57%
Permit systems	54%
Construction grants programs	36%
Wastewater plant operator certification	32%
Complaints of pollution	25%
Pollution damage	25%

Managerial Applications

Although some of the greatest opportunities for information systems applications may occur in the area of control systems, it is now clear that application of computer technology can be even more fully utilized by integration of advanced management techniques. The impetus for the application of management techniques is due to the voluminous reports generated on reams of paper which are received when using a computer system. The water quality manager is faced with the task of literally reading through volumes of data to ascertain critical areas and where action is needed.

At least one system is in existence which utilizes advanced management techniques through the computer to effectively deal with this dilemma.[6] The management by exception approach uses a computer to analyze data to determine on the basis of system parameters where action is necessary; the subsequent report is then issued to the appropriate persons. Only the information necessary for the action to be taken is included. The stratified reporting approach similarly provides information to various water quality management levels on a need-to-know basis. This may involve monthly summary information on that manager's particular program as well as the actions taken on exceptions reports.

Inclusion of environmental modeling capabilities can also provide management with an important learning device. Environmental modeling facilitates the evaluation of the likely environmental consequences of proposed changes.[7]

Data from the states responding to this study indicate that approximately 50% of those states are utilizing the computer for management by exception, stratified reporting and modeling. It is often difficult for persons outside the water quality management field to comprehend the volume of data which must be processed. As the capabilities of state programs are expanded, the need for application of the above management techniques becomes mandatory. In planning for personnel and computer capacity this should be kept in mind.

Summary

In conclusion, it seems that within the last couple of years computer utilization in water quality management has become much more available.

Approximately one-half of those state agencies utilizing computers have expanded to include management information systems.

Electronic data processing has become necessary in water quality management in order to optimize water resource use. *(please turn to page 25)*

A Humanized Approach to Computers

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"A balance is needed between rapid technological change and the limited capacity of humans to absorb change. The introduction and use of computer technology should take into account not only the technical and economic factors but also the social factors."

When one reads about the characteristics of a planned new computer, almost invariably reference is made to such things as:

1. Tremendous computer memory devices, perhaps based on exotic technology which can store billions or even trillions of items of data.

2. Very rapid computing circuits that permit calculations in nano-seconds (billionths-of-a-second) or pico-seconds (trillionths-of-a-second).

3. Software packages (computer programs) which are claimed to quickly solve intricate problems which would take many man-years to solve by non-computer means.

This condition of "hardware hypnosis" exists in spite of the fact that most computers are probably underutilized and that most users have difficulty in coping even with current computer technology. Human, not technical problems, are the major obstacles to more effective computer applications. Yet it is the human problems that tend to be neglected.

Because the computer, one of the foremost technological developments of our time, has often been used with little sensitivity to its impacts on people, it has repelled many who could have helped add significantly to the benefits computerization offers.

Some of the specific areas where there are significant and harmful gaps, between humans and computers, are identified and discussed in this article. This article is based on research among eighty-seven organizations; and the findings presented here are derived from that research.*

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Introducing Computer Technology into an Organization

It is virtually impossible to introduce a computer into an organization without creating change in work flow, positions, and organizational relationships. Frequently, organizations do not prepare employees for such change; rather, a shock treatment approach is used which creates fear, a sense of inadequacy, and alienation in those affected by the computer. Two examples follow:

A large bank computerized a substantial part of the work of one of its trust departments. Little consideration was given to how the computerization would affect the department's staff which had a high percentage of employees that had been performing the same routine tasks for many years, and they dreaded the uncertainty created by the computer. Vicious rumors began about the computer absorbing all of the work of the department and eliminating all jobs. A number of key employees sought job opportunities in other organizations. Little regard had been given to the

*The organizations (all U.S.A.) in the research were drawn from the federal departments, the states, fifty largest counties, fifty largest cities, and from the Fortune list of 500 largest business firms. The detailed statistics and cases, from the research, are currently being compiled into book form for publication in 1973.

emotions of this group of heretofore loyal company employees.

A city department introduced on-line data terminals for use by administrators and their staffs. After several months of installation, the data terminals were seldom used and were the object of wide sarcasm. The intended users were never guided about the appropriate use of the terminals and how they could relate to their work assignments. Modern, sophisticated equipment was installed without adequately preparing and training the persons affected.

Prepare Employees for Change

These two examples identify the need to prepare employees for change induced by the computer. Frequently, pilot and parallel checkouts of new systems are ignored. Ideas are poorly conceived and implemented without adequately involving all interested parties.

The threat that the computer may pose to affected people and the organization's growing dependence on it may increase the organization's vulnerability to security breakdowns (e.g., sabotage, reduced employee loyalty, fraud, etc.).

There is need to achieve a balance between rapid technological change and the limited capacity of humans to absorb such change. The introduction and use of computer technology should not only take into account the technical and economic factors, but also the social factors. An example of why this is important is illustrated by the following case:

One large chemical company brought in a new sophisticated computer to replace a relatively modest sized computer with the idea that the new computer power could be used for a "total system" — solving complex inventory-billing-shipping procedures that were handled only piecemeal on the old computer and by a large staff of clerks. The departments responsible for billing, inventory, and shipping were only peripherally involved in the decisions regarding the new system. The new system looked very impressive in the proposals. Once in operation, after expenditure of hundreds-of-thousands of dollars, it was discovered that the designers had overlooked critical procedures handled by the clerks. The lack of involvement and enthusiasm of the clerks resulted in silent barriers, including withholding information about how exception routines were handled. The result was erroneously functioning computer programs (e.g., a carload of goods shipped to a customer who had ordered a single carton) and damaged relations with customers.

Ignorance Level Concerning Computers

Although about twenty-five years have passed since the computer was invented, a surprising amount of ignorance about computers and their use remains. This ignorance is reflected in a wide range of views; at one extreme is the criticism that computers are the cause of most organizational shortcomings (e.g., "Our work is behind schedule because the computer broke down."). At the other extreme is the fear that computers are so powerful that they are about to seize control over the world.

Organizations where billing, issuance of checks, or other data processing have been incorrect — have been known to direct blame on the inanimate computer rather than admit to human errors. The uninformed public accepts such indictments of the computer when, in fact, most such errors can be traced to human failures in the systems. The computer is an electronic robot, having a high degree of reliability, which obediently follows the commands of humans. Of course, if the human commands and the data given to the computer are faulty, then garbage-in, garbage-out.

The seriousness of this wave of feelings is evidenced by the Association for Computing Machinery (ACM), a prestigious society in the computer field, which recently set up an ombudsman mechanism to challenge erroneous publicity about the computer. It is reported that one businessman issued a public statement, apologizing to his customers for widespread errors in billing; he attributed the mistakes to the computer of the company. The ombudsman, after investigation, ascertained that the organization did not prepare its bills by computer! Can it be assumed that the businessman issued a public apology to the computer?

Rational Participation by Employees

Employees, whose work is affected by computers or whose work could be improved by computer use, are too often unable to rationally participate due to lack of understanding about the computer's power and limitations. This ignorance compounds an already inherent fear of the computer. Conversely, computer technicians are too often lacking in understanding about organizational objectives and practices. Examples of this type of problem follow:

The operations research department of a petroleum company, spent several man-years designing and developing a computerized model of the supply and distribution area. The model, when completed, was considered by the supply and distribution staff to be too theoretical and "blue sky" and did not fit the real world problem area. The operations researchers never perceived the down-to-earth issues that the supply and distribution staff considered to be at the heart of the problem. The supply and distribution staff could not comprehend the sophisticated mathematical models of the operations researchers. Years of work were largely wasted because of a communications gap.

A departmental manager, in a non-profit organization, spent several weeks laboriously preparing a statistical report. After her work was almost concluded, she discovered that the basic data were already computerized and that the report could have been prepared in less than an hour by the computer.

Programs Still Written by Technicians

The first three generations of computers, as designed by the computer manufacturers, have not resulted in equipment or programming that can be considered simple for people to understand and use. Invariably, considerable training and work experience is required to gain proficiency in using computers. Two illustrations of this problem follow:

Such computer programming languages as BASIC, COBOL, FORTRAN, RPG, PL/1, SIMSCRIPT, and others were introduced with the claim that even laymen would be able to write their own programs to solve their problems. The fact remains that most programs are still written by technicians, specializing in computer programming. Programs, of

any sophistication, are often beyond the capability of laymen to understand and develop. Further, constantly evolving new computer features (e.g., direct access disk storage, remote data terminal to computer communication, operating systems that permit multi-processing, virtual memory, etc.) have actually added substantial degrees of sophistication and complexity to computer programming. These developments tend to make the computer even more remote and mysterious to the average person.

In a Graduate School of Business it was found that most entrants have not previously been adequately trained in the basics of computers. This means that secondary schools, undergraduate colleges and business organizations (where the students are working during the day while attending the graduate school at night) have not adequately educated students about the most simple features and techniques of computers.

From the above, it would appear that there remains a serious gap between the computer user and computer technology. There is some substantial indication that the computer manufacturers and educational institutions are not closing this ignorance gap.

The Effect of Computers on Work

The computer has been used in such a way that it has frequently increased job boredom. This can reduce employee motivation and cause lowered productivity (e.g., the Lordstown Syndrome). Computerized applications often require standardization which demands that humans rigorously adhere to routines and specializations. Computer work is likened to a paperwork production line; the computer sets the pace and humans are expected to adhere to the rhythm set by the drone of the computer's electronic circuits, colorful blinking lights, and rapidly revolving disks.

An illustration of this kind of problem is presented below:

Budget analysts who formerly did a complete job of preparing budget forecasts were reduced to almost blindly placing numbers in certain blocks on preprinted forms. The data was then punched by key punch operators (who, to a large extent, did not understand what they were punching), and finally the computer did all of the computations, analysis, and printed the reports. What was formerly a dedicated team effort of proud and enthusiastic employees supplying management with valuable reports, changed to a highly automated, dull, and repetitious activity. Little job satisfaction could be derived by the budget analysts from their new mundane tasks. The interesting work had been absorbed by the computer. Errors creeped into the computerized system due to its sheer monolithic size and the lack of human involvement and understanding about the computer process.

The displacing and replacing of humans by computers and automation call for careful planning of retraining, job enrichment, reductions through attrition, transfers to other parts of the organization, etc.

Types of Computer Applications

The computer is extensively applied in such relatively mechanistic areas as production scheduling, inventory control, accounting records, etc. Very limited and prosaic use is made of the computer in the area of human resource systems. For instance, the authors' study of eighty-seven organizations revealed that the personnel function was frequently given the lowest priority for computerization (financially-oriented and operationally-oriented applications were generally given highest priorities).

Personnel Department staffs are often more absorbed with paperwork processing than they are with human contact and human resource development. They have created an image of antiquated and unimaginative departments that neither serve the human needs of employees nor the planning horizon of the organization's top management.

The computer could be used to relieve the paperwork burden of the personnel staff so they could devote more attention to true human problems and improve manpower planning.

Barriers to Implementing Computer Systems

Computer technicians, not having any particular competence in human behavior, design computer systems having far-reaching impact on the organization and its employees. On the other hand, humanists (psychologists, sociologists, behaviorists, and personnel specialists) are seldom involved in planning for and implementation of computer systems. Technical considerations of computers appear to be given highest priority, while social and human considerations are virtually ignored.

A federal governmental agency spent hundreds-of-thousands of dollars in planning a computer system that would centralize heretofore decentralized work. Only after the planning was completed was it "discovered" that there was almost unanimous and vigorous opposition to such centralization from key officials in the decentralized locations. The opposition was primarily articulated on human factor grounds: interference with local autonomy, undermining of existing responsibilities and control, displacement of long-time employees, forced standardization and uniformity, etc. The plan to centralize the computer systems was largely tabled in spite of the technical and economic soundness of the proposal. Had humanists been involved in the systems planning, it is likely that there would have been early awareness of the human barriers to the centralization scheme. Such awareness might have permitted early negotiation with the opponents of centralization and a compromise plan, which could have lessened hostile feelings and saved the considerable time and cost that went into the rejected plan.

Privacy

Another area, of growing importance, which requires involvement of humanists is that of privacy versus the computer. Computerized data banks and information systems are designed and installed without full consideration of the human rights and values of the persons who will be affected.

Productive Use of the Computer

Frequently, there is an image in organizations, that computers are busy working to full capacity: control panel lights are blinking, magnetic tape reels are revolving, card readers and printers are humming.

Behind the scenes investigations reveal that this image is too often a false facade and that,

1. Inefficiently designed and programmed computer applications waste considerable portions of expensive computer time.

2. There are not infrequent misuses of the computer by computer personnel. Reruns of sloppily handled work, "make-work" jobs to appear to be busy, and even the processing of contraband jobs (sometimes for a fee) are not unusual events in a computer center.

The mysterious nature of computers has long protected the field from conventional check-points and controls. The productive use of computers is largely related to the quality and abilities of the computer staff and those that manage the computer facility. There is need for improvement of the quality of the human beings that manage and instruct the computer.

Overdependence on Computer Rationality

The computer is an instrument that will provide quantitative analysis of problems. This has created an image of computers as rational, if not infallible, tools to replace irrational and frail human decisions. However, there is no provision for humans or human values in the maze of tools and techniques (e.g., flow charts, coding, compilers, etc.) that are applied with intricate precision by computer specialists.

While the computer can strengthen rationality, its output must be leavened by human judgement. This should be abundantly apparent when one considers that both the computer program and the data used by the computer are products of humans. Thus, the computer "rationality" is only as good as the programs and the data that are fed to it by humans. Further, even if the computer could produce completely rational decisions, it is unlikely that it would be wise to mechanistically accept such decisions. Such rational decisions are likely to be ill-suited to the real world with its high degree of uncertainty and change. At best, the computer can only aid rational analysis and assist man to make human decisions.

Decision-Making

There is inadequate knowledge and research in the areas of the theory and practice related to information exchange and human decision-making. Humanists and systems experts hopefully will devote more attention to this subject so that computerized information systems, in the future, can be developed based upon sounder premises.

To Humanize the Use of Computers

Many organizations have and are experiencing severe problems with their computers. The authors' research, in eighty-seven organizations, reveals that such problems are usually not resolved by merely expending more money or time on computerization.

An effective computer system is likely to evolve from a more human approach to this highly technical area. Such an approach includes:

1. Dynamic (or continual) planning for computer change. Such a self-renewing plan includes provision for organization change, as it affects people, as well as technical and economic factors.

2. Continuous education about computer limitations and potential. It seems to us that employers, education institutions, and computer manufacturers should take a greater, coordinating role in this field.

3. More attention to the human element when computer equipment is designed.

4. Job enrichment. As well as sheer efficiency, the enrichment of jobs should be considered when designing computer systems.

5. The computer should be imaginatively used to improve systems dealing with human relations (e.g., relieving personnel staff from paperwork burdens, use the computer to improve manpower planning, etc.).

6. Humanists should be part of the systems team effort, along with computer technicians, when planning and implementing computer applications.

7. Improvement of the quality of computer staffs and the management of the computer.

8. Organizations should not have "blind" confidence in the rationality of computers, but should view them as adjuncts in human decision-making. The side area of needs for information and decisions requires more research before the computer can be fully exploited for decision-making.

The computer has been advantageously used, in the space program, to explore uncharted areas. This feat was accomplished in less than ten years from start to finish; the vast complexity of the program was attained through coordinated effort of human and technical resources. If man can attain mastery of outer space travel, there is reason to hope that he has the potential for coping more successfully with the systems challenges on the Earth.

Conclusions

There has been a misplaced emphasis, by the computer industry and users, regarding the computer. Emphasis has been placed on the technical aspects of computers. Yet the primary key to more effective use of computers is human factors — and not technical factors.

The great computer issues of the day are not those of computer technology. The critical issues include people and social considerations, such as: invasion of citizens' constitutional rights to privacy, dehumanization of people and organizations by twisting them to conform to arbitrary mechanistic concepts and tools, and displacement of people by automation and computerization. Computer people have rarely faced these issues — either ignoring them or denying the validity of them. As a result, there is a bottleneck and breakdown in achieving the prophecy of the usefulness of computers to society.

It is largely because the computer manufacturers and users have poorly handled the human aspect of computers that the computer is so often maligned and fails to attain the great promises predicted for it. Computer people must learn that the computer must truly serve the people and not vice versa.

If the computer field is to become socially responsive, it needs to become more completely humanized — which means a new generation of computers

which places people first and technology second. Up to this point, it is apparent that technology has been given priority over humans.

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Morris — *Continued from page 20*

In a highly prosperous and industrialized society such as ours, it is not reasonable to hope to return each body of water to its original natural unspoiled state. But computer methods of water pollution control can make control increasingly better.

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4. Weisburd, p. 24.
5. Weisburd, p. 24.
6. Sawin, p. 26.
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Cover Story

MOON LANDER

This program was developed specifically as a game whose object is to make a simulated landing on the moon in real time. The equipment necessary to run the program consists of a fast computer with 8,000 words of storage, a light pen, and a clock. The program is written in machine language and occupies almost all of core memory. At the beginning, the human player has a mountainous view of the moon with an out-of-scale space ship; but after the ship descends to about 400 feet altitude, the scene changes so that the module is in scale.

The object of the game is to land the space ship safely. There are eleven continually changing parameters, any four of which may be displayed at any time in the flight. The numbers, speeds, weights, and so forth, are actual values for an Apollo flight; however, in order to make the game possible for the average player to play more easily, there have been provided 25% to 50% more propellants than actual allowance. The module can land at one of three sites — on the extreme left of the moonscape, on a small area to the right of the mountains, and on a large flat area to the right. The program "remembers" the locations of previously crashed modules; so if the player tries to land on one, the current module will crash.

The game can teach someone the rudiments of landing a lunar module in real time. In the picture, the module has descended low enough so that the terrain is shown full scale. The ship module is on the way to making a perfect landing.

Watergate: What More is There to Hide? — Part Six

Richard E. Sprague
Hartsdale, N.Y. 10530

"The new Nixon strategy still has one prime objective: protect himself from impeachment and the Republican Party from disaster."

This is the sixth in a continuing series of articles on the events known as Watergate.[1] The fifth article in March 1973 Computers and Automation stated that there must be something far more serious than mere political sabotage and espionage involved in Watergate and Mr. Nixon's past history. His strenuous, all-out efforts to hide the truth, even to the extent of risking perjury charges for some of his immediate cohorts, point toward something else he fears being brought into public view by Senator Ervin's committee.

Nixon's Past

There are two significant parts to Mr. Nixon's past which appear to be linked to some of the Watergate participants' planned activities in Florida These are: Nixon's links to organized crime; and Nixon's links to anti-Castro Cuban and American people involved in the assassination of President Kennedy. Either or both of these links being exposed could be extremely harmful to his future.

Before reviewing these two areas, a summary progress report on Watergate developments and a recap of the March article seem to be in order.

Four-Part Strategy of Cover-Up

In the March article a four-part strategy undertaken by Nixon to cover up Watergate was forecast. Part 1 involved drawing a line of innocence at the level of Gordon Liddy and protecting at all costs anyone above the line. Part 2 involved working out guilty pleas for Barker, Sturgis, Hunt, Martinez and Gonzalez, so that they would not have to testify. Part 3 was the not guilty plea for Liddy and McCord, so that appeals could be set up and used to block or delay the Ervin committee's investigation. Part 4 was the payment of large sums of money to all seven men to keep them happy and to keep them from talking, and a simultaneous appeal to their patriotism in supporting their country, the flag and their President; especially their President.

Five Factors that Crushed It

The four-part cover up strategy worked well for a while. Five things doomed it to failure. First, the press, headed by the Washington Post, kept digging for the truth. Second, the establishment of the Ervin committee put enormous pressure on Nixon and the people handling the grand jury inquiries and the trial of McCord and Liddy. The knowledge that public hearings would eventually expose any perjury or attempts to limit the investigations by the U.S. Attorney is strong medicine, even for Mr. Nixon. The lengths to which he would have had to go under the old strategy, with the Ervin committee, were amply demonstrated by Richard Kleindienst's statements to the House committee on executive privilege.

Kleindienst said that all 2.5 million federal government employees could take executive privilege and refuse to testify before a grand jury or Ervin's committee, if the President so directed. The Congressional reaction to this was instantaneous astonishment. Senator Fullbright said he had never heard anything quite like that in his entire career.

Third, Judge John Sirica pressed hard on the Watergate 7, throwing Gordon Liddy into a really horrible jail in Washington, D.C., and using various enticements for the Cubans to talk before the grand jury. Liddy may never crack. His lawyer resigned, saying Liddy was "going up the river" without taking any lieutenants or sergeants with him. Hunt, Barker, Sturgis, Gonzalez, and Martinez began to talk a little bit to the grand jury.

James McCord Talked

But fourth, the man who broke the whole case wide open was James McCord. He decided to turn "states' evidence" both with the grand jury and with the Ervin committee. He hired B. Fensterwald through a mutual friend to represent him and to make contact with Samuel Dash, the Ervin committee's chief lawyer. Fensterwald is an old hand at tilting with windmills like Nixon, the FBI, the Justice Department, and the CIA. He arranged for McCord to tell everything he knew and threatened to hold a press conference for a public airing of what McCord knew. Senator Ervin requested that the committee be given the first public exposure crack at McCord; so Fensterwald acquiesed.

Once McCord talked, the lid blew off for Nixon. Jeb Stuart Magruder decided to talk next. Since he was in a position to implicate H. R. Haldeman and John Dean with direct evidence, whereas McCord's testimony was hearsay, Nixon was forced to change his overall strategy. In a crisis meeting with Kleindienst; Henry Peterson, assistant attorney general; Ron Ziegler; Haldeman and Ehrlichman, he came up with a new strategy. The fifth factor was the capitulation of conservative Republicans, beginning with Senator Lowell Weicker of Connecticut and culminating in Senator Barry Goldwater's statement that something smells.

The New "Line of Innocence"

The new Nixon strategy still has one prime objective: protect himself from impeachment and the Republican party from disaster. The chart (see Figure 1) illustrates how the new strategy differs from the old. The "Line of Innocence" had to be moved up to just under Nixon himself. In fact, among all of the people involved or named to date in the Cabinet, the White House staff, or the Committee to ReElect the President (CREEP), the only man other than Nixon above the line is Ronald Ziegler, Mr. Nixon's press secretary.

Ziegler is closely tied to Gordon Strachan, Donald Segretti, and Dwight Chapin, from their days together at the University of Southern California. His credibility is also being attacked because of the official pronouncements he made under the old strategy, "inoperative".

Nixon went to the Bahamas for an Easter vacation and to mull things over. He took with him only Ronald Ziegler from his White House staff, leaving Haldeman and Ehrlichman at home for the first time.

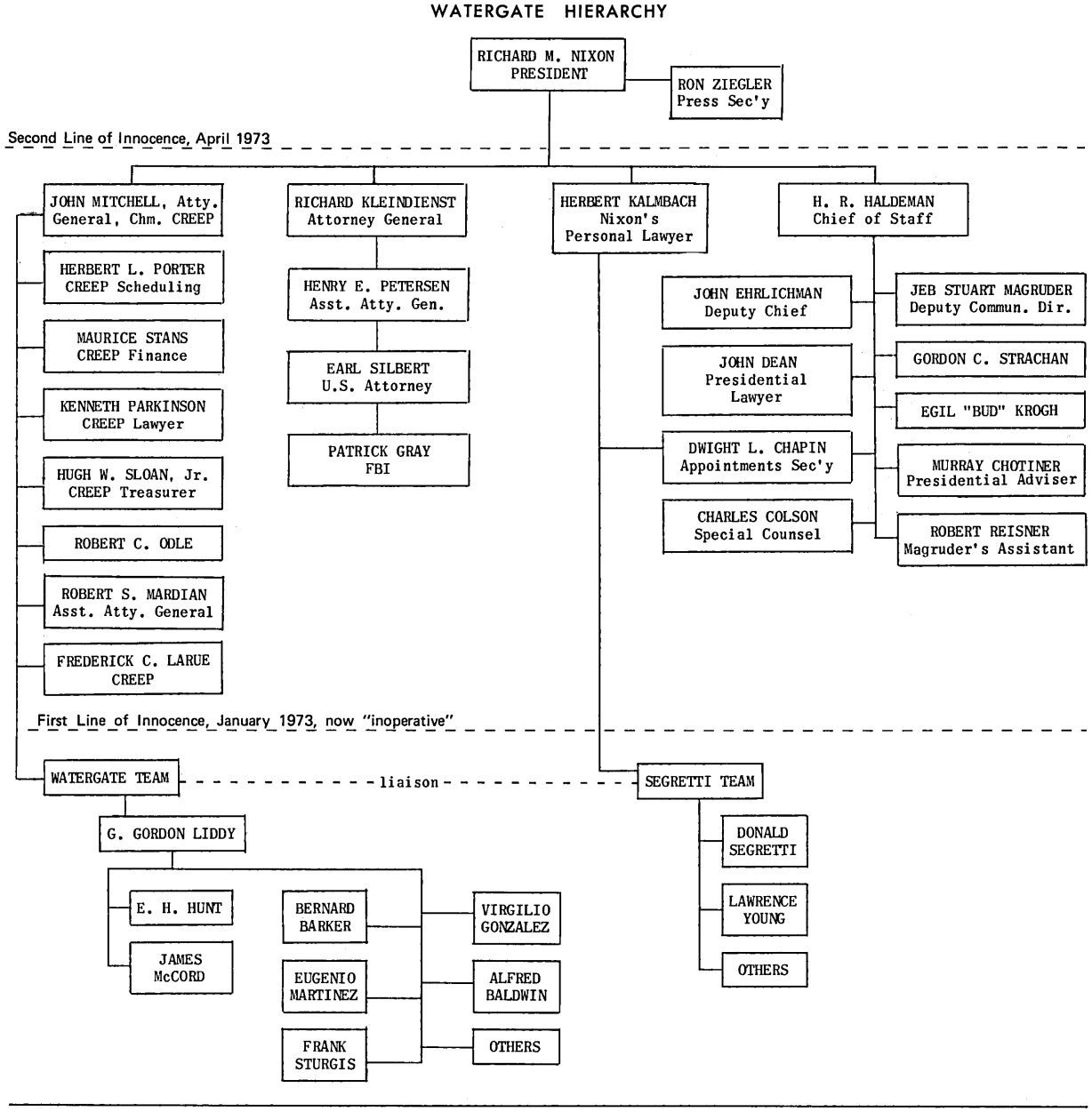

Figure 1

One can imagine a scenario in the Bahamas in which Tricky Dick says to Ziegler, "Ron, everyone on my staff in this affair is guilty except you and me, and frankly I'm not too sure about you". A week later Nixon isolated himself at Camp David, taking along only his Irish Setter, whom he apparently trusts.

The Old "Line of Innocence," Now "Inoperative"

The chart shows clearly that the old line of innocence was just above the Liddy-Segretti level and the guilty parties selected by Nixon were essentially the two operating teams, Watergate and Segretti. As long as he could isolate the rest of the people by insuring that Liddy, who knew the most about the involvement of those above his level, did not talk, and that the others were well taken care of financially and legally, the old line of innocence would hold. But when McCord, Magruder and others (Dean, Mitchell, Martha, LaRue, Chapin) began to "sing," the line could not be held.

The chart shows four groups reporting to Nixon which represented any activities in the political arena in 1972. CREEP, The Committee to Re-Elect the President, was headed by Mitchell. The White House staff, some of whom were essentially loaned to CREEP in 1972, was headed by H. R. Haldeman. The Justice Dept. and the FBI headed by Richard Kleindienst and Herbert Kalmbach, Nixon's personal lawyer, are the other two groups.

All of the people below the line are now subject to suspicion, investigation and indictment under the new Nixon strategy. The majority of the individuals on the chart are already suspect in either the original crimes, or the even worse crimes of covering up the original crimes. Kleindienst, Peterson, Silbert and Gray are included below the new line of innocence, even though they were still responsible, at the time the strategy changed, for conducting the grand jury investigations and any new indictments. By May 1, Kleindienst had resigned, Haldeman and Ehrlichman and Gray had resigned. Peterson was suspect because he was the person who stopped cold in its tracks an investigation of Segretti in 1972, on the stated position that "no laws were broken". Silbert was suspect because of his failures to question witnesses thoroughly during the Watergate trial. Dean had been fired.

Nixon's Main Problem: Continued Innocence?

The chart illustrates in a simple way Richard Nixon's main problem. How can he be innocent when everyone reporting to him is guilty? By the time this article appears in print (mid-June 1973) the obvious may already have been made public. If Senator Ervin's open hearings, scheduled to begin on May 15 and to be broadcast on national TV, actually have been under way for one month, by the time the reader sees this article impeachment talk will certainly be in the air. Impeachment proceedings may even be under way.

Options: Confess or Be Found Out

The steps that will lead to impeachment are like a staircase of guilty accusations and confessions that began with McCord and will end with Nixon. Each person in the chain has the option of telling the truth, thereby implicating the one above him or lying and risking eventual perjury charges. The initial strategy called for, and achieved, lying cooperation. Mitchell lied. Magruder lied. Liddy kept his mouth shut. Dean lied. Stans lied. Sloan lied. Chapin lied. Kalmbach lied. Haldeman and Ehrlichman have not lied because they have not testified.

Suddenly the seesaw has begun to tilt. Mitchell told partial truth, admitting that he had known about Watergate in advance. Magruder asked for immunity, didn't get it, but told the truth anyway, implicating Dean, Haldeman and Mitchell. Gray told the truth about destroying the documents that Hunt had in his desk and then resigned, his career in a shambles. Even Hunt began to tell the truth before a grand jury. Dean threatened to expose everyone and everything if Nixon tried to make him a scapegoat. Only Liddy held out, reportedly because Nixon has stashed away $1 million for him in a Swiss bank account.

It No Longer Pays to be Loyal to Nixon

Why this sudden urge to tell the truth? The answer is the people below the line of innocence finally realize that Nixon is going to lose, to be impeached eventually. It no longer pays to be loyal to him, and to lie for him. One is safer to tell the truth and see who wins. Hopefully, the truth will win, along with the Senate and the American people. Nixon's impeachment is long overdue and will be brought about mainly by the testimony on the cover-up by Haldeman, Ehrlichman, Mitchell and Dean.

When McCord began to sing, events moved so fast that a magazine like Computers and Automation could not possibly print current information. As this article is being prepared, right up to the May 3 editorial deadline for June 10 publication, three or four new fantastic events occur every day. The reprints below from the Sunday April 29 New York Times illustrate how fast things are happening. The first part is from the main editorial and is titled, "The Time for Truth". The second is James Reston's column from the Op Ed page titled, "Haldeman and Ehrlichman":

Start of quotation:

THE TIME FOR TRUTH (from *The New York Times*)

From disclosures in recent days, the public is finally getting a picture of what was going on at the highest levels of the American Government in 1972. To wit:

- His own campaign organization was apparently deluging the President of the United States with thousands of telegrams to create the false impression that his war policy had much more enthusiastic and active support than it actually enjoyed.

- The then Attorney General of the United States was participating in meetings that discussed illegal wiretappings and burglaries and took no action against the persons who made those criminal proposals in his presence.

- The counsel to the President and the head of the President's domestic policy staff were discussing whether imcriminating documents should be thrown into the Potomac River or destroyed in some other fashion.

- The acting head (now resigned) of the Federal Bureau of Investigation obliged his White House friends by having those same documents burned.

- The former Secretary of Commerce and chief fundraiser for the President's campaign organization was, with the active assistance of the President's brother and the President's personal attorney, pressuring shady businessmen and organized pressure groups for large sums of money, preferably in cash.

- Experienced intelligence agents in the employ of the White House and the President's re-election committee were burglarizing the files of a psychiatrist in an effort to find something damaging to one of his patients who is a defendant in a criminal case — a case based on Administration charges of breach of privacy.

- The White House press spokesman who repeatedly issued false statements about the Watergate affair in 1972 asserts that those lies and slanders are now to be regarded as "inoperative."

The instances of infamous behavior accumulate day by day, each more appalling than the one before. Their still incomplete sum is a picture of men in the highest offices of the Government engaged in lawless and ruthless actions and utterly contemptuous of the restraints which apply to ordinary citizens.

* * *

If the events of last year are becoming at least partially clear, the picture of what is going on now in President Nixon's mind and in the minds of his White House entourage is far from clear. The scandals breaking almost daily extend to the very door of the President's office and involve his most trusted and powerful associates. Mr. Nixon's own reputation and authority are potentially in jeopardy.

Yet instead of being candid in explaining himself to the public and forthright in seeking immediate reform, Mr. Nixon acts with curious ambiguity. There is mounting uncertainty whether his order to refuse immunity to any Administration official was an effort to deal sternly with wrongdoers or an attempt to muzzle those officials who might speak freely in exchange for such immunity. It is equally unclear what information he is seeking in his frequent conversations with Assistant Attorney General Henry Petersen, the man now in charge of the Watergate investigation, and what orders, if any, he is giving.

Why does the President hold lengthy conferences with the private attorney for Mr. Haldeman and Mr. Ehrlichman? It is disturbing that the President asked those aides, both deeply compromised, to accompany him in his public appearance in Mississippi on Friday. The feckless Mr. Gray has had the decency to resign as acting head of the F.B.I. and Mr. Magruder, the deputy manager of Mr. Nixon's re-election campaign and the coordinator of his Inaugural, has also quit his Commerce Department post. But Mr. Haldeman, Mr. Ehrlichman, Mr. Dean, Mr. Ziegler and

others stay on in their White House offices collecting their public salaries.

President Nixon is deeply mistaken if he thinks that he can hold his palace guard together and somehow brazen his way through this scandal. The public correctly perceives him as surrounded by unworthy and incompetent persons. The public understandably expects an accounting from the President for the grave misdeeds done in his name and in his interest. The time for lies, cover-ups, public relations posturing and cute maneuvers is over. The time for truth is at hand.

Start of second quotation:

HALDEMAN AND EHRLICHMAN – by James Reston
(from *The New York Times*)

The basic assumption of the American political system is that parties will fight hard for power, but that there is a limit beyond which the clash of personal and party strife cannot go without impairing the essential unity of the nation. This is the imponderable the Nixon Administration forgot.

Mr. Lincoln kept reminding his fellow countrymen that whatever the conflict of the moment, they would have to work with one another when the conflict was over. "We are not enemies but friends," he said. "We must not be enemies. Though passion may have strained, it must not break our bonds of affection."

The British put the limitations of political skulduggery more simply: "It simply isn't done," they say. Thus it is taken for granted that you don't bug and burglarize your political opponents, try to steal the psychiatric records of your adversaries, forge and burn official documents, manhandle the wives of Cabinet officers to shut them up, put fake ads in the newspapers from bogus committees, send your chief thousands of congratulatory telegrams for bombing Hanoi and mining Haiphong, or refuse to answer questions about criminal activities when requested to do so by the political representatives of the people.

Now we are confronted by evidence that all these things were actually done, and that even men like Haldeman and Ehrlichman, who were supposed to be models of unusual probity, didn't know the difference between right and wrong, and even now don't know when to get out.

The American Constitution makes it very difficult to change a newly elected President when he loses the confidence of the people, but at least he can change his team and his approach to the common decencies of political behavior.

The courts will deal with the criminal activities eventually, but this will take a great deal of time and even if you assume that the President knew nothing about any of all this, and that Ehrlichman and Haldeman did not break the law, the fact is that they were in charge of the staff that entangled the Presidency in the worst political scandal of the century and on this alone should have the grace to resign.

The fact that they don't see it this way is only the latest bit of evidence that the President and his men have come to Washington with different assumptions about permissible personal and political action: what is and isn't done, where the line lies between fair and unfair political activity, how far the President can go in waging war without the approval of the Congress, and where a staff officer's first loyalty lies — to his chief or to his oath of office under the Constitution.

If you think things are mixed up here now as a result of all this moral confusion, imagine where we'd be if the Nixon Administration's views on the Congress, the courts and the press had been in operation when the scandal broke.

In the last four years, the President and his colleagues have insisted that Congressional committees have been too demanding, the courts too liberal, the press too inquisitive, and radio and television too quick with "instant analysis" of Presidential activity.

The Administration didn't just talk about readjusting the balance of powers in the Republic, but acted to establish the authority of the White House, and suggested and threatened new ways to restore the moral integrity of the people under the guidance of the President and his advisers.

They proposed new legislation under which any Government official who passed classified documents to a reporter, or any reporter who received such documents, would be liable to a whopping fine and/or years in the pokey.

Attorney General Kleindienst insisted that nobody who worked for the Federal Government could be called to Capitol Hill for questioning, even about suspected crimes, if the President forbade them to appear.

Local commercial broadcasters were put on notice that if they kept on distributing the negative news and liberal criticisms of the small but powerful network establishment, without striking a balance of their own, they might lose their licenses. And public broadcasting, funded by Government money, has been under relentless pressure to submit to Government influence over its programs or risk the loss of Government financial support.

Finally — and this in the end may be the most enduring influence of the Nixon Administration — the President, who has already appointed four of the nine Justices of the Supreme Court of the United States, has promised that he will continue in the next three and a half years to appoint to the bench men of his own judicial philosophy.

Nevertheless, there is the consolation that the Congress, the courts and the press were not working under the Nixon philosophy when the scandals broke. But the problem will remain even if Haldeman and Ehrlichman get lost.

For the President is still not acting under the unwritten rules that require moderation, candor and cooperation in American political life, and that has been his personal problem from the start.

End of quotation:

Impeachments in Former Years

The editorial lists seven instances of infamous behavior in the campaign year of 1972. Any one of these would have resulted in the impeachment of any President who used it in the earlier days of our republic. Andrew Johnson was impeached by the House of Representatives and was rescued by the Senate by one vote, for a lot less than the collection of 1972 actions sponsored by Nixon and CREEP.

Two of the most fantastic events revealed by April 29, 1973 were the burglarizing of Daniel Ellsberg's psychiatrist's files by Hunt and Liddy, and the destruction by Gray of two files compiled by Hunt to help nail Teddy Kennedy to the wall in case he had decided to run against Nixon. The government, represented by Nixon, Kleindienst, Mitchell and others involved in the Pentagon Papers trial, had employed Hunt and Liddy to gather material either proving that Ellsberg was insane or to find some-

thing in the files that Ellsberg had revealed to his doctor that would be useful in his trial.

This indicates a much broader kind of assignment for Liddy and Hunt than just helping Nixon win the election. It matches the apparent assignment the CIA types were given to connect supposed radicals with McGovern, Kennedy or Muskie. (See Articles 1 and 2 in this series, August and October 1972.)

Attacks Prepared on Two Kennedys

The Hunt actions and assignments on behalf of patriotism, anti-Communism, and Richard M. Nixon have been known for some time to include compilation of dirt on Ted Kennedy and a report on Chappaquiddick that would make him look bad. However, the Gray and Dean revelation about Hunt's destroyed files showed that he had created fake memos to make John Kennedy look bad in the South Viet Nam Coup d'Etat against Diem in 1963. Presumably, Ted Kennedy's public image would be damaged by any tarnishing of John Kennedy's image.

Hunt manufactured a fake message signed by Dean Rusk and others which made it sound as though John Kennedy approved the assassination of Ngo Dinh Diem and his brother. Then he tried to leak it to the news media through William G. Lambert, a Life magazine reporter. The memo was in his files when he was arrested. John Dean had these files confiscated and told Haldeman and Ehrlichman about them. Dean and Ehrlichman called Gray to the White House, turned over Hunt's files on Kennedy and intimated that Gray should destroy them, which he did.

The indictments which are sure to be issued against as many as ten or twelve of Nixon's men, may be more for perjury and obstruction of justice, than for conspiracy in the 1972 camapign activities. The evidence of perjury and of lying is already in the public domain. The men most likely to be indicted are Dean, Mitchell, Stans, Sloan, Magruder, Chapin, Segretti, Strachan, Haldeman and Ehrlichman.

The addenda to this article show what the key people, Nixon, Mitchell and Ronald Ziegler, had to say earlier and later. Also, Martha Mitchell's latest remarks are included.

Florida, Anti-Castro Cubans, Organized Crime, and Nixon

Returning now to Mr. Nixon's past, and the two sensitive areas mentioned earlier, Nixon does have plenty worth hiding in these two parts of his history. An open, unlimited Congressional investigation shown live on public TV could be extremely dangerous to him and to several other Americans if it began to touch these two raw nerves. The Watergate people, and the rich Republican donors supporting Nixon in 1972, are involved with people and organizations in organized crime and in the assassination of President Kennedy. If Senator Ervin looks into these connections because of Watergate traces, it could turn out for Nixon somewhat like pulling on a thread that unravels a new coat. The more Ervin pulls on the Watergate thread, the more likely it will be that Nixon's entire coat will fall apart, leaving him entirely naked.

The connections involve people and groups in Miami, Key Biscayne, and the Florida Keys who are imbedded in many nefarious and illegal activities with the Mafia, the Syndicate and organized crime in general. Also some of these people were involved in illegal anti-Castro projects.

An all-pervading area involves rich anti-Castro Cubans and organized crime. Much research has been done into Richard M. Nixon's Florida real estate and other connections with the Mafia. A house committee as early as 1957 conducted several inquiries. While the results were never made public, some of them appear in a book by Bernard Schwartz, published in 1959.[2]

Later research by Jeff Gerth and others has been published in several recent articles, detailing Mr. Nixon's Mafia connections.[3, 4, 5]

It is expected that these subjects can be covered promptly in forthcoming articles in "Computers and Automation".

Footnotes

1. Five articles in Computers and Automation:
   August 1972 — The June 1972 Raid on Democratic Party Headquarters
   October 1972 — The June 1972 Raid on Democratic Party Headquarters (The Watergate Incident) - Part 2
   December 1972 — The June 1972 Raid on Democratic Party Headquarters (The Watergate Incident) - Part 3
   January 1973 — President Richard M. Nixon, the Bay of Pigs, and The Watergate Incident - Part 4
   March 1973 — The Watergate Crime and the Cover-Up Strategy - Part 5
2. "The Professor and the Commission", Bernard Schwartz. New York: A. Knopf, 1959
3. "Nixon and the Mafia", Jeff Gerth, Sundance Magazine, Nov.-Dec. 1972, San Francisco, Calif.
4. "Can Congress Stop the President?" I. F. Stone, New York Review of Books, April, 1973
5. "Special Issue, Nixon and the Election", North American Congress on Latin America Vol. VI #8 October 1972, New York, N.Y.

The Watergate Crime

Articles Published in *Computers and Automation* August 1972 to April 1973

Inventory of Titles, Authors, and Summaries

The Watergate Crime consisted of the breaking in of the offices of the National Committee of the Democratic Party, on the 6th floor of the Watergate Office Building, Washington, D.C., and resulting arrests. The forced entry took place around 2:30 a.m., Saturday, June 17; five men were arrested by Washington police. They had with them extensive photographic equipment and electronic surveillance devices, and wore rubber surgical gloves. The five men arrested were:

- James W. McCord; a Lt. Colonel in the U.S. Air Force Reserve; 19 years service with the CIA; head of a security agency; on the payroll of the Committee to Re-elect the President as late as May 31, 1972; an organizer of the CIA for the Bay of Pigs invasion of Cuba in 1961.
- Bernard L. Barker; a Cuban-born Miami business man; long associated with the CIA; he established secret Guatemalan and Nicaraguan invasion bases.
- Frank Fiorini (alias Frank Sturgis, Edward Hamilton); former American marine; soldier of fortune; friend of Jack Anderson, columnist; anti-Castro-Cuban organizer; involved in the Bay of Pigs preparations.
- Eugenio R. Martinez (alias Gene Valdes); former CIA agent; real estate agent for Bernard L. Barker in Miami; anti-Castro activist; friend of E. Howard Hunt.
- Virgilio R. Gonzales (alias Raoul Godony); former CIA agent active in the Bay of Pigs affair; anti-Castro activist.

These men were closely connected with:

the Republican Party,
the White House,
President Richard M. Nixon
the Central Intelligence Agency, and
the Committee for Re-Election of the President.

These five men and two more, E. Howard Hunt and G. Gordon Liddy, were tried in the court of Judge John J. Sirica in Washington, D.C., and found guilty.

August 1972

33 The June 1972 Raid on Democratic Party Headquarters — Part 1
by Richard E. Sprague, Hartsdale, N.Y.
A report on five men who have numerous connections with the Republican Party, the White House, the Central Intelligence Agency, anti-Castro Cubans, and plans for the assassination of President John F. Kennedy, and who were arrested seeking to bug Democratic National Headquarters at 2:30 a.m., June 17, 1972.

October 1972

18 The Raid on Democratic Party Headquarters (The Watergate Incident) — Part 2
by Richard E. Sprague, Hartsdale, N.Y.
A report on further developments in the June 1972 raid by James McCord, Bernard Barker, and others, on National Democratic Party Headquarters, and implications affecting a number of Republican leaders and President Richard M. Nixon.

November 1972

26 Bernard L. Barker: Portrait of a Watergate Burglar
by Edmund C. Berkeley, Editor, *Computers and Automation*
How a cloak and dagger operative and right-wing activist, who was caught as a burglar in the Watergate Hotel offices of the Democratic National Headquarters, looks at himself and his line of work.

29 Walter Sheridan — Democrats' Investigator? or Republicans' Countermeasure?
by Richard E. Sprague, Hartsdale, N.Y.
Walter Sheridan, recently employed by the Democratic National Committee to investigate the Watergate Incident, may actually be a "countermeasure" by the Republicans to defeat the Democratic investigation.

December 1972

24 The Raid on Democratic Party Headquarters (The Watergate Incident) — Part 3
by Richard E. Sprague, Hartsdale, N.Y.
A report on further developments in the June 1972 raid by James McCord, Bernard Barker, and others, on National Democratic Party Headquarters, and implications affecting a number of Republican leaders and President Richard M. Nixon.

26 Martha Mitchell and the Watergate Incident
by Martha Mitchell, the magazine *Parade,* and Richard E. Sprague
How Martha Mitchell (wife of former Attorney General John Mitchell) was molested and kept incommunicado and a prisoner — reported on by Mrs. Mitchell and the editor of *Parade* magazine.

27 The Watergate Crime: An Eye-Witness Account
by Alfred Baldwin, 3rd
A round-by-round account by an ex-FBI agent, an employee of the Republican Committee to Re-elect the President, of what went on while five men burglarized the Watergate offices, June 17, 2:30 a.m. Baldwin's main assignment was listening to bugged calls to the Democratic National Committee.

January 1973

33 President Richard M. Nixon, the Bay of Pigs, and the Watergate Incident — Part 4
by Richard E. Sprague, Hartsdale, N.Y.
How President Nixon lied in 1960 about the plans for the Bay of Pigs Invasion, and is suppressing in 1972 the investigations of the Watergate Incident.

March 1973

26 The Watergate Crime and the Cover-Up Strategy — Part 5
by Richard E. Sprague, Hartsdale, N.Y.
A report on the trial of E. Howard Hunt, James McCord, Bernard Barker, and four other persons for their raid on Democratic National Committee Headquarters in June 1972 using funds of the Republican Committee for the Re-Election of the President; and the strategies of cover-up that have been employed.

The Importance of Calling a Defeat a Defeat

Paul M. Sweezy and Harry Magdoff, Editors
Monthly Review
116 West 14th St.
New York, N.Y. 10011

"Why not let the ruling class's politicians and ideologists save face with claims of victory . . . The answer is that what is at issue . . . is whether the American people . . . are now at last going to get a chance to discover the truth, not only about Vietnam but also . . . about how they are governed and led."

Explanation of Bombing of Hanoi and Haiphong

There has still been no official explanation of the Christmas-New Year's bombing of Hanoi and Haiphong, and the U.S. media, even those which were against the war, seem to be willing to forget the whole affair as though it had been a bad dream. The reasoning seems to be that the cease-fire is the important thing and that what led up to it now has only an historical interest.

We strongly disagree. To adopt this attitude is in effect to condone and excuse one of history's most barbarous acts. Americans of conscience can never forgive or forget this monstrous crime of Richard Nixon and his accomplices. But more than this is at stake, nothing less than the very meaning of the cease-fire. Therefore, unless or until the inside story is revealed, we must seek to establish the truth through careful examination of whatever clues may become available.

Kissinger's Remarks

Let us begin with what Kissinger said about the bombing in his February 1 TV interview with Marvin Kalb of CBS. It is necessary to quote at some length to get the full flavor of Kissinger's "explanation".

Start of quotation:

> The decision to resume bombing in the middle of December was perhaps the most painful, the most difficult, and certainly the most lonely that the President has had to make since he is — since he has been in office.
>
> It was very painful to do this at that particular season, when the expectation for peace had been so high and only six weeks before his inauguration — it was very difficult to do it under the circumstances, when the outcome was not demonstrable.

There were really three parts to it: one, should we resume bombing; two, if we resume bombing, with what weapons (that involved the whole issue of the B-52); and, three, should we talk to the American people.

With respect to the first part — why did the President decide to resume bombing — we had come to the conclusion that the negotiations as they were then being conducted were not serious, that for whatever reason the North Vietnamese at that point had come to the conclusion that protracting the negotiations was more in their interest than concluding them. It was not a case that we made certain demands that they rejected; it was the case that no sooner was one issue settled than three others emerged, and as soon as one approached a solution, yet others came to the forefront. At the same time, the more difficult Hanoi was, the more rigid Saigon grew, and we could see a prospect therefore where we would be caught between the two contending Vietnamese parties with no element introduced that would change their opinion, with a gradual degeneration of the private talks between Le Duc Tho and me into the same sort of propaganda that the public talks in the Hotel Majestic had reached. And therefore it was decided to bring home really to both Vietnamese parties that the continuation of the war had its price, and it was not generally recognized that when we started the bombing again of North Vietnam we also sent General Haig to Saigon to make very clear that this did not mean that we would fail to settle on the terms that we had defined as reasonable.

So we really moved in both directions simultaneously. Once the decision was made to resume bombing, we faced the fact that it was the rainy season, and that really the only plane that could act consistently was the B-52 which is an all-weather plane. ...

Now, why did the President decide not to speak to the American people?

The President can speak most effectively when he announces a new departure in policy and indi-

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cates what can be done to bring that particular departure to a conclusion.

He could have done only two things in such a speech. One is to explain why the negotiations had stalemated, and, two, to explain under what circumstances he would end the bombing.

The first would have broken the confidentiality of the negotiations even more than was the case anyway through the exchanges that were going on publicly.

And the second would have made the resumption of talks an issue of prestige and might have delayed it. And therefore the President decided that if this action succeeded, then the results would speak for themselves in terms of a settlement.

And if a settlement was not reached, then he would have to give an accounting to the American people — to the American people — of all the action that led to the continuing stalemate.

End of quotation.

Jumble of Evasion

On the face of it this is a jumble of obfuscation and evasion. Moreover, its effort to picture the United States as a sort of unwitting victim "caught between the two contending Vietnamese parties" and moving in an even-handed way "in both directions simultaneously," would be hilariously funny if it weren't at the same time so cynical and disgusting. Sending B-52s to Hanoi and General Haig to Saigon "to bring home to both Vietnamese parties that the continuation of the war had its price" — as though there were Vietnamese who didn't know, and as though one could make the equation: hundreds of B-52s = one General Haig.

But taken in the context of what had gone before, Kissinger's statement is something else: it is flagrantly and totally dishonest. How can what happened in December be even discussed without so much as a mention of what had happened in October? Kissinger knows better than anyone else that he had negotiated an agreement in October which had been expressly, and without any subsequent denial, accepted by Nixon in a cable to the North Vietnamese Premier. Nixon asked not for changes in the agreement but for a postponement of the signing, presumably to give him time to arrange matters with Saigon. It is perfectly absurd for Kissinger to assert that Hanoi had suddenly and inexplicably decided to protract the negotiations in November and December: the fact, known to the whole world, is that hardly a day went by without the North Vietnamese demanding the immediate signature of the already agreed-upon October settlement. The question Kissinger should have answered is why the United States reneged.[1] And this is the question which Nixon too would have had to answer or evade if he had decided to go on TV and try to justify the resumption of the bombing. With an answer he could have given a real explanation, but it is pretty clear by now that this is the one thing he was and is absolutely determined not to do. Without an answer to this question, any proffered "explanation" could only have sounded trivial and grotesquely out of proportion to the enormity of the acts about to be committed. No wonder Nixon decided to remain silent.

Pentagon Overruling?

In this space last month we argued the case that the real reason Nixon went back on the October agreement was that the Pentagon didn't like it because of its negative implication for the survival of the Saigon regime, and won Nixon over to its side. "One can only speculate," we wrote, "that Kissinger, whose views [in favor of a negotiated agreement] are known from the 1969 Foreign Affairs article, won him [Nixon] over in October and then lost him to the Pentagon in November." Since then, new and important corroborative evidence has become available. William P. Clements, Jr., in Senate hearings on his appointment to the position of Deputy Secretary of Defense, shocked people all over the world by refusing to exclude the use of nuclear weapons in Vietnam. "Clements Won't Rule Out A-Bomb Use," ran the headline in the New York Times (January 12). But this, though monopolizing the headlines, was not the only revelation of Clements' testimony. Further along in the Times story we read:

> In a discussion of the heavy December bombing raids over North Vietnamese cities, Mr. Clements startled the Senate Armed Services Committee, where he was testifying, by saying that Adm. Thomas H. Moorer, chairman of the Joint Chiefs of Staff, had suggested the bombing as "a contingency plan."
>
> "Moorer was consulted," Mr. Clements said. "He did understand the whole operation.
>
> "Admiral Moorer helped make the plan for the December 18 bombing."
>
> December 18 was the date the heavy raids began following a breakdown of the peace talks in Paris.
>
> Mr. Clements added, "In my new capacity, I may have said something I shouldn't have said, but I don't think so."
>
> Senator John C. Stennis, Democrat of Mississippi who is the committee chairman, said, "It was inferred to this committee that the President acted unilaterally" in ordering the bombing.

Why all the mystery? Why, even after the bombing is over and the cease-fire agreement is in effect, must it be made to appear that the whole operation was solely Nixon's responsibility?

Real Purpose of the Bombing

The most plausible answer, it seems to us, is that only in this way can the real purpose of the bombing be hidden. If the role of the military in vetoing the October agreement and planning the raids were generally known, it would be pretty obvious that the purpose of the bombing was to force Hanoi to accept Nixon's new (really old) terms, i.e., to win a military victory. And in that case, what actually happened — the halting of the raids and the acceptance by the United States of an agreement essentially the same as that rejected in October —

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1. Avoiding this question was of course made easier for Kissinger by the failure of his TV interviewer to put it to him. This kind of tacit collusion between the media and the administration to suppress really damaging information is typical. The administration's pretense that it is being abused by the media is in reality nothing but a device to bludgeon editors and reporters into becoming even more pliant tools of the government propaganda apparatus.

would be seen for what it is, i.e., a stunning defeat. From Nixon's point of view it is crucial that all this should be kept secret, that the breakdown of negotiations should be blamed on Hanoi (as in Kissinger's TV interview quoted above), and that the bombing should be pictured as the masterstroke which brought the North Vietnamese back to "serious" negotiations and to the acceptance of an allegedly much altered agreement. In this way defeat is turned into victory and an agreement unacceptable in October can be hailed as "peace with honor."

New Myth

In all this we can see what bids fair to become the making of a new myth, the myth of America's victorious war in Vietnam. As an example of this myth-making process, take Henry Cabot Lodge's Op-Ed article in the New York Times of February 3rd under the ringing title, "A Diplomat's Hail to His Chief." Lodge tells us of his own pessimism about the possibilities of achieving a negotiated settlement during the years when he served first as Ambassador to Saigon and later as Nixon's representative to the Paris peace talks. In 1969, he says, "Hanoi had no incentive to negotiate seriously, because they were confident that President Nixon's diplomatic hand was weakened both by war-weariness at home and by the insecure allied military position in the South. ... Only the success of the President's patient, long-headed policies in turning around the conditions of 1969 has made a settlement possible in 1973." Lodge then bids us look at the changes brought about by these policies:

- In bringing home half a million troops, President Nixon rallied public support in the United States for the U.S. government's efforts to bring about an orderly and equitable end to the war.

- In turning the U.S. combat role over to the strengthened regular forces, he made possible a shift from an effort based largely on conventional military strategy, which in spite of much sacrifice and skill had not solved the problem, to a greater reliance on the more effective territorial and local approach which can only be carried out by an indigenous force.

- He hurt the enemy's resupply and staging system badly in Cambodia and Laos.

- He established new relations with Hanoi's major allies in Peking and Moscow.

- He helped to counter North Vietnam's Easter invasion by the bombing and mining counteroffensive that began last May.

Analysis of the Myth

In the first of these items, placating rising antiwar sentiment is equated with rallying public support. The second is pure gobbledegook. If the third were true, how come the U.S.-Saigon invasions of Cambodia and Laos were smashed and how did the liberation forces manage to bring supplies to the South, including tanks and heavy artillery, in preparation for the 1972 spring offensive? The fourth is true but without any demonstrable relation to the course of the war in Vietnam. And the last item would not have had to be added at all if the claims made in the others were correct.

After this brilliant piece of argumentation, Lodge proceeds to his rhapsodic conclusion:

> These actions radically changed the negotiating situation. Last October, Hanoi finally dropped its demand for dismantling the government of South Vietnam and entered serious talks — and now the settlement that eluded us for so long has been negotiated, with solid expectations for peace in Laos and Cambodia as well.
>
> This is an outcome worth all the work and all the waiting. It is surely more secure and more specific than the "fade-out" I long believed we would have to accept. ... I not only gladly admit I was wrong in doubting that the other side could be induced to take so constructive and auspicious a formal step toward peace; I also say "hail to the chief" whose courage and tenacity have made the decisive difference.

Total Fiasco

What really happened of course was very different. Nixon's policy of Vietnamization was a total fiasco, suffering crushing defeats in Cambodia and Laos, and finally in the spring offensive. It was these defeats, capped by the failure of Nixon's late-December bombing of Hanoi and Haiphong, which "radically changed the negotiating situation," leaving him no alternative but to withdraw U.S. forces on substantially the same terms the French were obliged to accept after their defeat at Dienbienphu in 1954. Chapter I, Article 1 of the agreement signed on January 27th states simply and clearly: "The United States and all other countries respect the independence, sovereignty, unity, and territorial integrity of Vietnam as recognized by the 1954 Geneva Agreements on Vietnam." One gets the full measure of U.S. "victory" when one reflects that the United States (1) refused to accept the Geneva Agreements in 1954; (2) immediately set out to subvert them by installing a neocolonial puppet regime in Saigon; and (3) has fought the longest war in U.S. history to maintain the principle and the reality of two Vietnams.

Importance of Learning the Truth

But, one may ask, why hammer away at the theme of U.S. defeat in Vietnam? Why not let the ruling class's politicians and ideologists save face with claims of victory if it gives them any satisfaction? The answer is that what is at issue is not a matter of innocent face-saving. It is whether the American people, who have been brutally lied to and deceived over Vietnam, are now at last going to get a chance to discover the truth, not only about Vietnam but also (and in the long run even more important) about how they are governed and led. If blackguards like Nixon, who murder and maim and destroy in the interests of a blood-sucking social system, are now to be whitewashed and their crimes turned into virtues, there is a grave risk that all the sobering and cleansing lessons that can be learned from the country's quarter-century involvement in Vietnam will be lost forever. And against this we must fight as determinedly as we would against further imperialist aggressions by the U.S. ruling class, in Vietnam or anywhere else in the world.

The Danger of Re-Intervention?

Here we ought to pause to ask how great really is the danger that Nixon will go back into Vietnam in case things seem to be going badly for the Saigon regime. He has already said that the United States recognized only Thieu's government in South Vietnam, which is in obvious violation of the agreement since the latter not only recognizes the existence of the Provisional Revolutionary Government but is signed by the PRG as one of the four agreeing parties. On the face of it, this would seem to be laying the ground for possible future intervention on behalf of Saigon. And yet here too we have to take account of the realities of the situation. If the picture of

Nixon having turned the negotiating situation around and forced Hanoi to agree to his terms were accurate, we would have to rate the danger of re-intervention as very real indeed. But if, as we have argued, the truth is the other way around, i.e., that Nixon's Vietnamization policy suffered a decisive defeat and it was the United States which had to agree to Hanoi's terms, then the situation is very different. For in that case going back into Vietnam would be like deliberately entering a trap from which one has just managed to escape. And even Richard Nixon would surely think long and hard before committing such an obviously self-defeating act. In addition, there are two other factors which tend to reduce the danger of re-intervention. First, it is hard to imagine circumstances arising in Vietnam which would move any significant section of the American people to support U.S. re-involvement in what is now universally recognized as a hated war. If Nixon, having assured the country that he had achieved "peace with honor," were so rash as to try to commit it once again to war, he would almost certainly isolate himself politically even more thoroughly than Johnson did in his last year in office. It is not impossible, strange things have happened in the Vietnam war, but it hardly seems likely. Second, the U.S. ruling class, caught up in another international monetary crisis so soon after the cease-fire, would certainly react strongly against a move which could only make it much worse. For all these reasons, the danger of U.S. re-involvement, while not nonexistent, seems as of now to be rather remote.

The Position of the Thieu Dictatorship

It is well, however, to close on a note of caution. Those on the U.S. Left — and we include ourselves among them — who have tended to assume that American withdrawal from Vietnam will be followed by the more or less rapid disintegration of the Saigon regime had better not let our hopes run away with us. The situation in South Vietnam is extraordinarily complicated and without historical precedent. Long years of imperialist occupation and savage warfare have shattered the old framework of an essentially peasant society. Millions of refugees have been herded into the cities and deprived of their normal means of livelihood. Hundreds of thousands have been forced into the role of compradors or other kinds of parasites, a few accumulating great wealth in the process, many more being reduced to the depths of poverty and degradation, but all with some sort of stake in the status quo. The Thieu dictatorship has one of the largest and best equipped military establishments in the world, no match in battle for the revolutionary liberation forces but doubtless with a fearful repressive potential. A continuing flow of U.S. subsidies will stave off outright economic collapse. What will come of all this no one can now say with certainty. Perhaps the revolutionary forces which have already accomplished wonders will be able to sweep it all away and set about the arduous task of rebuilding the country and the lives of its people: this is of course the fervent hope of all decent people everywhere. But it seems more likely that a difficult period of struggle still lies ahead, one in which not only Vietnamese but also Americans can and should be involved. For it is perfectly certain that without massive U.S. economic and logistical support, the Saigon regime would indeed rapidly disintegrate. And it must be one of the top priorities of the Left in this country, including all antiwar and anti-imperialist forces, to do everything possible to reduce and eventually cut off altogether this flow of poison still being poured into the bloodstream of South Vietnam. (February 12, 1973) □

The American News Media and the Assassination of President John F. Kennedy: Accessories After the Fact[1]

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"What has happened to the inquiring reporter and the crusading editor?" — (who hunted for facts about President Kennedy's assassination)

The American public have begun to develop a skepticism toward information they read in newspapers, magazines and books, or information they receive on television or radio. Various news stories appearing in our national news media over the past several years have brought about this attitude. Some examples are: the Songmy-Mylai incident, the Pueblo story, the Murder of Black Panther Fred Hampton, The Pentagon Papers, the Clifford Irving Hoax, The Bangladesh Tragedy and the India-Pakistan War, Hoover & FBI Antics, the Jack Anderson Papers, IT&T and the Rupublican National Convention, etc.

The general reaction is bound to be, "Don't believe everything you read, see or hear, especially the first time around, and more especially if the story comes from Washington." In the case of the Pentagon Papers, things we all had taken as gospel for nearly two decades, suddenly seemed to be crumbling away.

To what extent can the national news media be held responsible for this situation? What has happened to the enquiring reporter and the crusading editor who are both searching for and printing the truth? If a government or a President lies or keeps secrets, can the American news media really find out about it? And if they do, what moral, ethical, political or other criteria should they use in uncovering the lies and presenting them to the public?

Vice President Agnew would say, "The press is already going too far". Members of the press would say, "We must remain independent and maintain the freedom of speech". Just how independent are the news media? Are they controlled to some extent by Washington?

The answer to some of these questions can be found by taking an inside look at the major national news media organizations and how they have treated the most controversial (since World War II) news subject of all. The assassination of John F. Kennedy and its aftermath is an all pervading, seemingly endless topic. It has yet to reach the "Pentagon Papers, Anderson Papers, Mylai" stage of revelation. Precisely because it is still such a controversial subject, verboten for discussion among all major news media (unless the discussant supports the Warren Commission), it serves as an excellent case study.

In summary, a categorical statement can be made that management and editorial policy, measured by what is printed and broadcast, of all major American News media organizations, supports the findings of the Warren Commission. This has been true since 1969, but was not true in every case between 1964 and 1969.

Of significance in this analysis and what it implies about the American public's knowledge about the assassination and its aftermath, is a definition of "major American national news media". It can easily be demonstrated that an overwhelming majority of the news information reaching the eyes and ears

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Sprague is the author of several books, including Information Utilities published in 1969 by Prentice Hall. He is a member of numerous professional organizations including: IEEE, the Institute of Management Sciences, the Association for Computing Machinery, the American Management Society, and the Society for Management Information Systems.

1. Accessories After the Fact is the title of a book by Silvia Meagher, published by Bobbs Merrill in 1967, accusing the Warren Commission and the various government agencies of covering up the crime of the century. This book accuses the national news media of the same crimes.

of Americans comes from about fifteen organizations. They are, in general order of significance: NBC-TV & Radio, CBS-TV & Radio, ABC-TV & Radio, Associated Press, United Press, Time-Life-Fortune-Sports Illustrated, McGraw Hill-Business Week, Newsweek, U.S. News & World Report, New York Times News Service, Washington Post News Service, Metromedia News Network, Westinghouse Radio News Network, Capital City Broadcasting Radio Network, the North American Newspaper Alliance, and the Saturday Evening Post (the Post is, of course, now defunct).

There are some subtle reasons for this, not generally appreciated by the average citizen. Television has, of course, become the number one source. For any nationally circulated news story, local stations rely heavily on film, videotape and written script material prepared and edited by the three networks. Once in a while Metromedia may also send out TV material. In effect, this means that editorial content for a vast majority of the television information seen by American citizens everywhere, originates not only with three or four organizations, but with a very small number of producers, editors and commentators in those networks.

Similarly, a large majority of any national news items printed by local newspapers originates in the small number of press-wire services. AP and UP dominate this area, with selected chains of papers subscribing to a lesser extent to news services of the New York Times, Washington Post, North American Newspaper Alliance, and a very small percentage receiving information from papers in Los Angeles, Chicago, and St. Louis. Reuters is increasing its domestic coverage in recent years but is still not a major factor in the situation.

In a national news story of major significance such as the assassination of President Kennedy, the smaller local papers rely almost exclusively on their affiliated news services. Economic reasons dictate this situation. The small paper can't afford to have reporters or photographers everywhere, nor can they afford to send reporters everywhere. The major newspapers might send a man to Dallas for a few days to cover the assassination, or they might send a man to New Orleans to cover the Clay Shaw trial. But even the major papers can't afford to cover every part of a continuing story anywhere around the world. So they too rely on UP and AP for much of their material. They also rely on AP, UP and Black Star[2] for most of their photographic material.

In the case of news magazines, the holding corporations become important in forming editorial policy in a situation as controversial as the assassination of JFK. Time Inc. & Life, Newsweek & the Washington Post, U.S. News, and McGraw Hill managements all became involved.

Fifteen organizations is a surprisingly small number, and one is led to conjecture about how easy or difficult it might be to control or dictate editorial policy for all of them or some appreciable majority of them. An article in Computers and Automation[3] reprinted a statement by John R. Rarick, Louisiana Congressman and an entry made in the Congressional Record bearing on this subject. In the reprint, the Government Employees Exchange publication is quoted as stating that the CIA New Team used secret cooperating and liaison groups after the Bay of Pigs, in the large foundations, banks and newspapers, to change U.S. domestic and foreign relations through infiltration of these organizations. The "coordinating" role at The New York Times was in the custody of Harding Bancroft, Exec. V.P. It would be difficult for most Americans today to believe that the CIA controls all fifteen organizations listed in this manner. It is probably fruitless to speculate on it, beyond making a mental note.

A more useful analysis consists of examining what happened organizationally and editorially inside each of the fifteen companies, following the assassination of the President and up to the present time. My personal knowledge, plus information available from a few sources connected with the major news media, permits such an analysis to be made for eleven of the fifteen. They are: NBC, CBS, ABC, Time-Life, The New York Times, Newsweek, Associated Press, United Press, Saturday Evening Post, Capital City Broadcasting, and North American Newspaper Alliance. In addition, the performance of 9 local newspapers and TV stations directly involved in the events in Dallas and New Orleans will be analyzed. These include: Dallas Times Herald, Dallas Morning News, Ft. Worth Star Telegram, Dallas CBS Affiliate WBAP, New Orleans Times Picayune, New Orleans Times Herald, New Orleans NBC Affiliate WDSU-TV.

Most of these organizations had representatives or reporters and photographers present in Dallas at the time of the assassination or within a few hours afterward. Most of them had direct coverage available when Jim Garrison's investigation broke into the news in 1967 and during the trial of Clay Shaw in New Orleans in 1969. For many of them the Shaw trial became the turning point in changing editorial policy toward the assassination. For a few, the Garrison investigation, the Shaw trial, and Jim Garrison himself took on the aspect of waving a red flag in front of a bull. They became directly involved in a negative way and thus not only reported the news, but influenced it.

Immediately following the assassination the media reported nearly everything that happened, at least the obvious. All was confusion for the first few days. The killing of Oswald by Ruby on live TV produced even greater confusion.

For one year the major media reported everything from probable Communist conspiracies to the lone insane assassin theory. The media waited for the Warren Report, and when it was issued in October 1964, many of the major media fell into line and editorially backed the Commission's findings. Some questioned the findings and continued to question them until 1968 or 1969. The New York Times and Life magazine fell into this category. But, by the time the Shaw trial ended in March 1969, every one of the fifteen major news media organizations was backing up the Warren Commission to the hilt, and has continued to maintain this editorial policy to this date.

This situation would perhaps not be so surprising, had not the internal assassination research teams in several of these organizations discovered the truth about the Kennedy killing for themselves in the 1964 to 1968 period. These teams examined the real evidence and thoroughly analyzed it. No

2. Black Star is a New York based organization made up of free lance photographers, called stringers, in every major city. They do contract work for news media with Black Star acting as contracting agent.
3. Samuel Thurston. "The Central Intelligence Agency and The New York Times." Computers and Automation, July 1971.

one who has ever taken the trouble to do just that with an open objective approach has reached any conclusion other than there was a conspiracy in the JFK assassination.

In each and every case, the internal findings were over-ruled, suppressed, locked up, edited, and otherwise altered to back up the Warren Commission. Top management at the highest editorial and corporate level took the action in every instance. Before drawing any further generalization about the performance of the media in the JFK case, it will be revealing to examine what happened and specifically who took what actions in the case of the eleven national organizations and the nine local ones listed earlier.

Time-Life

The Time Inc. organization let Life magazine establish its editorial policy while Time published more or less standard Time-Life stories. Life became directly involved in the assassination action and evidence suppression from the very beginning on November 22, 1963.

Life purchased the famous Zapruder movie from Abraham Zapruder on the afternoon of the assassination for a figure amounting to about $500,000. The first negative action took place when Life and Zapruder began telling the lie that the price was $25,000 which Zapruder donated to the fund raised for the widow of Dallas policeman J.D. Tippitt, who had also been murdered that day. Apparently, both Life and Zapruder were ashamed of the idea that he profited by the event. He lived in fear that the true price would be revealed until the day he died.

As many readers know, the Zapruder film alone, viewed in slow motion, proves there was a conspiracy because of the backward motion of the President's head immediately following the fatal shot. It proves the shot came from the grassy knoll to the right and in front of the President, while Oswald's position was very nearly directly behind him. The film also helps establish that five, and not three shots were fired, and that one of them could not have been fired from Oswald's supposed sniper's nest because of a large oak tree blocking the view.

Life magazine, by never permitting the Zapruder film to be seen publicly in motion, and by locking it up since November 1968 so that no one inside or outside Life can have access to it, has automatically become an "accessory after the fact". Life has, in effect, helped protect the real assassins, has committed a worse crime than the Warren Commission. The film rightly belongs to the American public, not to a commercial organization whose purposes are very obscure.

In answer to those defenders of Life who will say, "But Life turned over a copy of the Zapruder film to the Warren Commission, and it is available in the National Archives," let's look at the facts. Life did not supply the copy of the film now resting in the Archives. That copy came from Zapruder's original to the Secret Service to the Warren Commission to the Archives. It is available for viewing by the few people fortunate enough to visit the Archives. It can not be duplicated by anyone, and copies can not be taken out of the Archives or viewed publicly in any way. The Archives people responsible for the Kennedy assassination records state that the Life magazine ownership of the Zapruder film is what prevents copies from being made available outside the Archives.

The Warren Commission did not see the film in slow motion, nor does the average Archives visitor get to see it in slow motion or stop action. Yet the most casual analysis of the film in slow motion convinces anyone who has seen it to conclude there was a conspiracy.

Thus Life magazine has truly become an important part of the efforts to suppress evidence of conspiracy.

Life is involved in several other ways as an accessory after the fact. The organization began its efforts to discover the truth about the assassination in 1964, by assigning Ed Kern, an associate editor, to investigate. By the fall of 1966, Kern had become convinved, as all other honest researchers have, that the basic evidence pointed to conspiracy. Life management was apparently convinced also because they published articles in November 1965 and November 1966 questioning the Warren Commission's conclusions.

In the fall of 1966 Life transferred Richard Billings from their Miami office to headquarters in New York. His assignment was to take over the investigation of the Kennedy assassination, and to head a team of several people working full time on it. One of Dick Billings' objectives became the searching for and the acquisition of as much of the missing photographic evidence as possible.

This author initiated a similar search, independent from Life magazine, in September 1966. As often happens, people with common objectives decided to work together. Billings and the author arrived at a tacit understanding that any JFK assassination photographs including TV films or private movies found by either would be brought to the other's attention. In exchange for access to Life's photographic collection including the Zapruder film and slides, the author agreed to give Life the results of any analyses of the photographic evidence. In cases where the author could not afford to acquire some new piece of evidence, Life would offer to purchase the materials from the owners and supply copies to the author.

In this manner the author discovered and helped Life magazine acquire the largest collection of photographic evidence of the JFK assassination, outside of the author's personal collection and the collection now located at the headquarters on the Committee to Investigate Assassinations in Washington, D.C. Among the photos discovered were:

The Dorman movie	- Private
The Wilma Bond photographs	- Private
The Robert Hughes movie	- Private
The David Weigman TV footage	- NBC
The Malcolm Couch TV footage	- ABC
The Jack Beers photos	- Dallas Morning News
The William Allen photos	- Dallas Times Herald
The George Smith photos	- Ft. Worth Star Telegram
The John Martin movie	- Private
Hugh Betznen's photograph	- Private

(See Computers and Automation, May 1970)

Many of these were important in proving conspiracy and some showed pictures of the real assassins.

The Life team headed by Billings were in the process of discovering a great deal about the con-

spiracy during the 1966-1968 period. While editorially not taking a strong position favoring conspiracy, Life did take a position favoring a new investigation by the government. This was editorially summed up in a lead cover story on the fourth anniversary of Kennedy's death in November 1967 with the title, "A Matter of Reasonable Doubt". In that issue, John Connally and his wife were shown examining the Zapruder film's frames, and concluding that he had been hit much later in the film than the Warren Commission claimed. This meant that two bullets struck the two men and, by the Commission's own admission, pointed automatically to conspiracy.

The government naturally did not respond to Life's suggestion for a new investigation, so nothing ever came of that editorial policy. Billings however continued his team's efforts and in October 1968 was preparing a comprehensive article for the November anniversary issue. The author continued to work with him and continued being given access to the photos right up to October 1968.

It was at that point in time that a drastic change in management policy occurred at Life magazine. Dick Billings was told to stop all work on the assassination; his entire team was stopped. All of the research files including the Zapruder film and slides, and thousands of other film frames and photographs were locked up tight. No one at the magazine was permitted access to these materials and no one outside (including the author) was ever allowed to see them again.

Simultaneously, editorial and management policy toward the assassination changed from one of questioning to complete and utter silence. Billings and crew were not allowed to even discuss the subject at Life, let alone work on it. In November 1968 the article Billings had been working on was turned into a nonentity, from the point of view of supporting or questioning the Warren Commission. A few of the hundreds of photographs collected by the author and purchased by Life, were published in the article along with some innocuous commentary. Credit for discovering the photos was given to a number of people at Life magazine in New York and Dallas, rather than to the individuals who actually found them.

That article, published nearly four years ago, was the last word Life has ever uttered about their extensive research probe and their feelings about a conspiracy. Dick Billings, his entire project and effort scrapped and his personal commitment to discovering the truth trampled upon, resigned from Life to take a job with a newspaper in St. Petersburg, Florida. The rest of the research team scattered to the four winds. Billings has more recently moved to Washington, D.C., as editor of the Congressional Quarterly and has become a member of the board of directors of the Committee to Investigate Assassinations (CTIA).

Who made the policy change decision at Life and why? Various high level conspiracy enthusiasts claim that the cabal behind the assassination of the President brought extreme pressure to bear upon the owners and management of Time Inc. to silence all opposition to the Warren Commission findings. Others may conclude it had something to do with the CIA controlling Life's editorial policy from inside. This author takes no position on why. Dick Billings knows only that the decision was made at high levels and passed downward and that it was irrevocable.

Repeated attempts by the CTIA and several independent assassination researchers to break loose the basic evidence in Life's possession, such as the Zapruder film, the Hughes film, and the Mark Bell film, have met with total opposition and a stone wall. Attempts to break loose the Archives' copy of the Zapruder film or slides have also met the same stiff opposition. In 1971 Life representatives did indicate they might be interested in selling rights to the Zapruder film for a sum in the neighborhood of a million dollars. That is the film which rightfully belongs to you, the reader and all of the American public.

CBS

The American public is aware of the editorial policy adopted by the Columbia Broadcasting System toward the Kennedy assassination, because of a special four-part series with Walter Cronkite which was broadcast on network TV in prime time in the summer of 1967.[4] That series, while taking issue with some of the work of the Warren Commission and criticizing the Dallas police, the FBI and the Secret Service, nevertheless backed up all of the basic conclusions of the Commission.

Any knowledgable person watching the Cronkite series may have wondered why the basic evidence, presented by CBS in an itemized format for each of several areas in the case, did not always seem to point to the conclusion reached at the end of each section. The conclusion always agreed with the Warren Commission's comparable conclusion. Some viewers may even have noticed Cronkite's double-take after reading through the basic evidence and then reading the phrase, "and the conclusion is!" It seemed as though he didn't believe the conclusion and hadn't seen it until he came to it in the script.

Actually, that is exactly what happened. CBS management caused the entire script to be changed from one concluding conspiracy to a script supporting the Warren Commission in the last week before the first part of the series went on the air. Cronkite had not seen the entire script until the program went on. Time had not permitted changing all of the points of evidence, so in most cases they were unchanged and only the conclusion was changed.

How did this come about? Who decided to change the script at the last moment and why? Again there are control theories extant, but the author's personal relationships to CBS people may help to shed a little light on the subject.

The discussions with all of the CBS people always centered on evidence of conspiracy and the CBS-TV film footage taken at the assassination site. Bob Richter was by all odds the most knowledgable of all the aforementioned people on the basic evidence. He was firmly convinced there was a conspiracy and remains so to this day. Bernie Birnbaum was convinced that a new investigation was desirable and his wife was convinced there had been a conspiracy. Dan Rather believed there was a conspiracy and so did Wes Wise.

CBS photographers, Sandy Sanderson, Tom Craven, and Jim Underwood, had taken movie TV footages showing evidence of conspiracy. Craven's footage, for example, showed the assassin's get-away car driving away from the parking lot area behind the grassy knoll about one minute after the shots were fired. Sanderson filmed one of the assassins being arrested in front of the Depository building about 30 minutes

4. CBS-TV Special on the Assassination of John Kennedy — June 25, 26, 27 and 28, 1972.

after the shots. Most of this footage was either lost or locked up in the CBS archives vaults in New Jersey.

Wes Wise was so strong in his opinion about conspiracy that he broadcast appeals for new photographic evidence over the KRLD local TV shows. This was done against the orders of Eddie Barker. Wes is now Mayor of Dallas, having been elected in 1971 due to his popular appeal and running against the Dallas established oligarchy. Wes actually received a new piece of photographic evidence based on his TV appeal from a Dallas citizen named Bothun who had taken a picture of the grassy knoll a few moments after the shots.

The script for the Cronkite series was being edited and was going through its final preparation stages in May and early June. The author was in constant touch with Wise, Birnbaum and Richter during this period, and was informed about the basic thrust of the script toward conspiracy and recommendations for a new investigation.

On May 8 a dinner meeting took place at the author's New York club with Mr. and Mrs. Birnbaum. The bulk of the conversation took the form of Mrs. Birnbaum and the author trying to convince Bernie that he should take a stronger position on a new investigation.

On May 18 Bob Richter and one of Jim Garrison's investigators met in the National Archives with the author and reviewed the evidence of conspiracy. On June 2, 3 and 4 in Dallas, the author showed Bernie Birnbaum and Wes Wise a film taken by Johnny Martin which showed three of the assassins and their cohorts on the grassy knoll running toward the parking lot a few seconds after firing two shots. Wise and Birnbaum attempted to interest Barker and others in taking a look at the film.

On June 14 Bob Richter invited the author to meet Midgeley, Lister and Wallace at CBS in New York during the time an interview was being taped with Jim Garrison for use in the series. At that time, Garrison, Richter and the author spent some time with the producer and his assistant discussing the evidence of conspiracy.

Finally on June 20, just five days before the program was to go on the air, the author met with Richter and Dan Rather in the Washington, D.C., CBS studios. The script was reviewed by Richter and Rather in the author's presence. The gist of the conversation was that Rather and Richter agreed that the conclusions stating conspiracy had to be made even stronger than they were at that time.

The day before the program was aired, Bob Richter assured the author that the theme was going to be conspiracy and a new investigation. The author telephoned Richter immediately after the first broadcast and asked what had happened. Richter was devastated. He could not understand what had happened. From that time forward his course paralleled that of Dick Billings. He resigned from CBS in disgust and formed his own company, Richter-McBride, in New York. It was his original intent to make a film telling the truth about the JFK assassination based on his own research and the films he could obtain. However, the massive suppression and oppression on the assassination, coupled with the Nixon depression, put off Richter's plans for a film.

The author through correspondence with Cronkite and others was only able to determine that the decision to change the script, distort and hide CBS' own findings and back up the Warren Commission to the hilt, came downward from Midgely and Lister. How much higher did the decision go? Richard Salant was head of the CBS News Division then and of course William C. Paley was (and still is) chairman of the board.

By an odd coincidence, in a sequel to the above CBS story, the author had an opportunity to learn a little more about Mr. Paley's knowledge. In the winter of 1967-68, Jeff Paley, William Paley's son, returned to the United States from Paris, where he had been writing news stories and a news column for "L'Express" and for the North American Newspaper Alliance, a group serving small papers in the states. Jeff had become convinced there was a conspiracy in the JFK case and came over to interview Garrison and others and to do a story for French papers. (European papers and magazines always believed and still do believe in JFK conspiracy). He met at length with Richter and the author and became quite disturbed at what CBS had done. He approached his father with the idea that CBS had been wrong in the Cronkite series and that something should be done to rectify the situation.

Bill Paley told his son that he knew nothing about the details of the programs or the work lying behind the conclusions. He said Midgely had been responsible for the entire production. He told Jeff that if he could show proof that the CBS conclusions were wrong and there had been a conspiracy, that he would fire Midgely and all the rest of the team and do the whole thing all over again under new management.

Needless to say, this did not happen and the mystery about where the decision to suppress the truth came from within CBS is as deep as it ever was.

Since June 1967, CBS has remained silent editorially on the subject of the JFK assassination. The photographic evidence of conspiracy in their possession remains locked up and suppressed. The Craven sequence was seen by a researcher in New York, but was cut out of the film where it appeared prior to the time the author and Richter began searching for it. There is little question that CBS is an accessory after the fact.

CBS edited out one other important piece of TV film. In November 1969, Walter Cronkite conducted a three-part interview with Lyndon B. Johnson at his ranch in Texas. The series was broadcast in the spring of 1970 and on the first program an announcement was made that portions of the taped interview had been deleted at Johnson's request "for reasons of national security".

What actually happened and what Johnson had said six months earlier was made public due to a leak at CBS. The story appeared in newspapers all over the U.S. several days before the broadcast.

Johnson told Cronkite that there had been a conspiracy in the assassination of President Kennedy, that Oswald was not a single lone madman assassin, and that he, Johnson, had known it all along. Johnson reviewed the tapes just a week or so before the program was to go on the air and then called up CBS management asking that his remarks be deleted.

Someone at CBS, very disturbed by this, called a member of the Committee to Investigate Assassinations and told him what had been deleted. This led to the story being printed in the newspapers.

(to be continued)

CALENDAR OF COMING EVENTS

June 18-21, 1973: SIAM 1973 National Meeting, Sheraton Conference Center, Hampton, Va. / contact: SIAM, 33 S. 17th St., Philadelphia, PA 19103

June 20-22, 1973: Canadian Computer Conference, Hotel Macdonald, Edmonton, Alberta / contact: Mr. Jim Wilcox, P.O. Box 1881, Edmonton, Alberta, Canada T5J ZP3

June 20-22, 1973: International Symposium on Fault Tolerant Computing, Ricky's Hyatt House, Palo Alto, Calif. / contact: E. J. McCluskey, Digital Systems Lab., Stanford University, Stanford, CA 94305

June 22-23, 1973: 11th Annual Computer Personnel Conference, Univ. of Maryland Conference Center, College Park, Md. / contact: Prof. A. W. Stalnaker, College of Industrial Management, Georgia Institute of Technology, Atlanta, GA 30332

June 24-29, 1973: 20th International Meeting, The Institute of Management Sciences, Tel Aviv, Israel / contact: TIMS XX, Box U, Brookline, MA 02146; OR TIMS XX, P.O.B. 16271, Tel Aviv, Israel

June 25-27, 1973: Design Automation Workshop, Sheraton-Portland Hotel, Portland, Ore. / contact: J. M. Galey, IBM Corp., Dept. G90, Bldg. 14, Monterey & Cottle Rds., San Jose, CA 95114

June 25-29, 1973: DPMA 1973 International Data Processing Conference & Business Exposition, Conrad Hilton Hotel, Chicago, Ill. / contact: DPMA 1973 International Conf., P.O. Box 502, Park Ridge, IL 60068

June 26-28, 1973: Workshop of Computer Architecture, Universite de Grenoble, Grenoble, France / contact: Grenoble Accueil, 9, Boulevard Jean-Pain, 38000, Grenoble, France

July 17-19, 1973: Summer Computer Simulation Conference, Queen Elizabeth Hotel, Montreal, Canada / contact: Stuart Trask, Sun Life Assurance Co. of Canada, P.O. Box 6075, Montreal 101, P.Q., Canada

July 20-22, 1973: 1973 International Conference of Computers in the Humanities, University of Minnesota, Minneapolis, Minn. / contact: Prof. Jay Leavitt, 114 Main Engineering Bldg., University of Minnesota, Minneapolis, MN 55455

July 22-27, 1973: 32nd Research Conference on Instrumentation Science, Hobart & William Smith Colleges, Geneva, N.Y. / contact: ISA, Meetings Administrator, 400 Stanwix St., Pittsburgh, PA 15222

July 23-27, 1973: 3rd Annual International Computer Exposition for Latin America, Maria Isabel-Sheraton Hotel, Mexico City, Mexico / contact: Seymour A. Robbins and Associates, 273 Merrison St., Box 566, Teaneck, NJ 07666

Aug. 5-8, 1973: 7th Annual Mathematical Programming Seminar and Meeting, Breakers Hotel, Palm Beach, Fla. / contact: George M. Lowell, Haverly Systems Inc., 4 Second Ave., Denville, NJ 07834

Aug. 6-8, 1973: 5th Annual Meeting of the National Association for State Information Systems, Hotel Ambassador, Chicago, Ill. / contact: Carl Vorlander, NASIS, Exec. Dir., P.O. Box 5377, Lexington, KY 40505

Aug. 7-9, 1973: Association for the Development of Computer-based Instructional Systems, University of Michigan, Ann Arbor, Mich. / contact: G. Ronald Christopher, The Ohio State University, 1080 Carmack Rd., Columbus, OH 43210

Aug. 13-17, 1973: SHARE Meeting, Miami Beach, Fla. / contact: D. M. Smith, SHARE, Inc., Suite 750, 25 Broadway, New York, NY 10004

Aug. 20-24, 1973: 3rd International Joint Conference on Artificial Intelligence, Stanford University, Stanford, Calif. / contact: Dr. Max B. Clowes, Laboratory of Experimental Psychology, University of Sussex, Brighton, Sussex BN1 9QY, England

Aug. 27-29, 1973: ACM '73, Atlanta, Ga. / contact: Dr. Irwin E. Perlin, Georgia Institute of Technology, 225 North Ave., N.W., Atlanta, GA 30332

Aug. 27-Sept. 1, 1973: Computer Arts Society, 1973 Edinburgh International Festival, Edinburgh, Scotland / contact: R. John Lansdown, Secretary, Computer Arts Society, 50-51 Russell Square, London WC1B 4JX, England

Aug. 30-Sept. 1, 1973: International Conference on Systems and Control, PSG College of Technology, Coimbatore, India / contact: Dr. R. Subbayyan, PSG College of Technology, Coimbatore 641004, Tamil Nadu, India

Sept. 4-7, 1973: International Computing Symposium 1973, Davos, Switzerland / contact: Dr. H. Lipps, International Computing Symposium 1973, c/o CERN, CH-1211 Geneva 23, Switzerland

Sept. 10-12, 1973: 5th Congress on Instrumentation in Aerospace Simulation Facilities, California Institute of Technology, Pasadena, Calif. / contact: H. F. Swift, Materials Physics Research, University of Dayton Research Institute, Dayton, OH 45469

Sept. 17-19, 1973: 7th Annual Intergovernmental Council for ADP Conference, Ottawa, Canada / contact: ICA Secretariat, 18 Keren Hayessod St., Jerusalem, Israel

Sept. 25-27, 1973: Conference on 'Hybrid Microelectronics,' University of Kent at Canterbury, England / contact: Registrar, Institution of Electronic and Radio Engineers, 8-9 Bedford Sq., London WC1B 3RG, England

Sept. 25-28, 1973: Engineering in the Ocean Environment Conference, Washington Plaza Hotel, Seattle, Wash. / contact: Ted Hueter, Honeywell Inc., Marine Sys. Ctr., 5303 Shilshole Ave., N.W., Seattle, WA 98107

Oct. 2-4, 1973: 2nd International Computer-Aided Design and Computer-Aided Manufacturing Conf., Detroit Hilton Hotel, Detroit, Mich. / contact: Public Relations Dept., Society of Manufacturing Engineers, 20501 Ford Rd., Dearborn, MI 48128

ADVERTISING INDEX

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

ACROSS THE EDITOR'S DESK

Computing and Data Processing Newsletter

Table of Contents

APPLICATIONS

VINTAGE COMPUTER HELPS SPOT SATELLITES

Stephen A. Kallis, Jr.
Digital Equipment Corp.
Maynard, Mass. 01754

What connoisseurs of computers would call a "vintage" machine is doing up-to-date research in developing methods to identify orbiting artificial satellites. The computer, a Digital Equipment Corporation PDP-1, is part of an experimental system devised by the Techniques Branch of the Air Force Systems Command's Rome Air Development Center, Griffiss Air Force Base, N.Y. It is used to control the antennas that track the satellites, helping the system to establish the elements of orbits by obtaining the coordinates (altitude, azimuth, and range) of the satellites.

The research effort has been established to develop improved techniques in radar systems designed to track satellites. The investigations are aimed at developing means of obtaining positive identification of artificial satellites by their radar signal returns. Because the work being done is applied research, the system will not be the model for the special radar facilities that may result; but the findings of the program will help the designers to develop the most effective system.

The PDP-1, which has been "on duty" for over four years, was acquired from another Air Force facility that was "retiring" the machine after years of service. Thus, the Rome Air Development Center has been able to conduct significant research on a cost-effective budget. The research personnel further economized the budget by developing the circuits to tie the computer to the radar system.

Introduced in late 1960, the PDP-1 was the world's first small scientific computer. Only 52 of these computers were manufactured, and 50 are still in operation. With respect to modern small computers, the PDP-1 was the computer field's equivalent of what the "Model T" was for cars.

ALL HOUSING IN ROCK ISLAND KEPT IN ELECTRONIC INVENTORY

William Fitzsimmons
Director of Community Development
City of Rock Island, Ill. 61201

In what may be the only complete housing inventory of its kind, City of Rock Island officials can tell precisely how every parcel of land is used, and the size, type and condition of every structure on it. One of the most useful outputs of the system is the neighborhood profile. This lists data on housing units and structures by type, population, quality condition of housing, tenure and occupancy characteristics and vacancy rates. It also gives the location of public assisted housing units and large multi-family private housing structures. This data is kept current in the computer's memory and can be printed out at any time. The system has already helped city planners better locate residential developments in areas that meet economic criteria of developers and, more importantly, environmental and social needs of the city.

A small IBM computer keeps track of the data that has been amassed since July 1970 to produce the Total Housing Inventory System (THIS), a joint development of the Chicago Area Office of the Housing and Urban Development Department (HUD), the Bi-State Metropolitan Planning Commission and Rock Island's Community Development Dept. "THIS" may well have a greater influence on the city's growth than anything in its history.

The system has become an invaluable tool in community development. All the factors which might decide the feasibility of a proposed housing development are stored in the system's inventory and quickly

retrieved to aid in promoting economic development or answering a prospective developer's questions about the community.

The IBM System/3 Model 10 computer tracks more than 50 housing factors which can be cross-referenced in unlimited ways. The analyzed data results in a viable profile of the city's housing needs, a mandatory criteria for any city applying for Federal housing assistance from HUD. Rock Island is at a point now where it can be predicted with a high degree of accuracy what will be the best use of a parcel of land and its chances of success.

In one instance, a developer was considering high-priced three-bedroom apartments. After looking at the data with him, he was able to see that if he built a low-cost three-bedroom — cut out the ornate lobby and made it a low-rise, eliminating elevators — it would rent like gold. If he can fill his apartments, he's happy, taxes get paid to the city, people have a nice place to live and the public's money doesn't have to be spent for more public housing. "The computer system," said Gene Steinmarch, Rock Island city planner, who was project supervisor when the system was developed, "is responding to the real needs of the community."

In addition to helping city planners do more planning, the IBM system has also helped the city's tax rolls. The computer turned up 36 parces of land that because of some bookkeeping errors years ago had never been on the city's tax rolls. They are now.

HOLLAND'S SHIPBUILDING INDUSTRY REORGANIZED BY MERGERS, COMPUTERS

Consulate General of the Netherlands
Commercial Division
One Rockefeller Plaza
New York, N.Y. 10020

Holland's shipbuilding industry has undergone extensive internal reorganization in recent times, resulting in consolidations, mergers and joint ventures, centralized manufacture of parts and the use of computers to operate numerically-controlled machinery. The Dutch industry has, in recent years, accounted for three to four percent of the world's annual new tonnage, thus putting Holland in ninth place on the global list of shipbuilding nations.

Determining the correct shapes of all the structural parts of a ship has always been an extremely complex and time-consuming task. The builders of VLCC's (Very Large Crude Carriers) and big container ships now make wide use of computers in association with punched-tape controlled drawing machines and similarly-operated torch-cutting machines. The torches of such large machines are able to describe mirror images with respect to one another so that starboard and port sections can be cut simultaneously. Large shipyards also make use of computers for storing data to assist in ordering, managing and working steel.

One combine of 14 medium-size and small shipyards in Holland operates a central production shop for the joint manufacture of ship parts. Occupying an area of 490 by 980 feet, this shop is equipped with the latest numerically-controlled torch-cutting machines, automatic frame-bending machines, lever slitting shears and big press brakes. The entire production, transport and shipping center employs only 29 craftsmen and 20 others who prepare data for the numerically-controlled installations.

When an order for a ship has been received, the drawings are converted into a code which is transferred into punched tape. As soon as a command is received to feed one or more of the numerically-controlled torch-cutting machines, a signal is automatically transmitted to an electromagnetic overhead traveling crane which picks up the appropriate steel plates, carries them to a torch-cutting machine and places them in the correct position. Finished ship parts are also transported by the overhead cranes.

One major Dutch shipyard has been able to reduce the construction time spent on the slips by big ships from seven to four months by introducing computer-controlled planning and production. When laying the keel of a ship by the traditional method, the first section of the keel is generally laid "by feel" in the middle of the slips. However, in the new technique, more than one keel section is laid at one time; starting from both ends at once, the sections are so laid as to meet in the middle. Theodolites insure a very high degree of accuracy in measurement. This allows the biggest parts to be laid to within tolerances of a few millimeters.

For shipbuilding research, the industry can consult the Netherlands Ship Model Basin in Wageningen, the Ship Research Centre in Delft, the Foundation for Maritime Research and the Netherlands Shipbuilding Industry Foundation in The Hague.

In view of its ultra-modern facilities and work systems, Holland's shipbuilding industry appears destined to keep narrowing the world's shipping distances by improving its merchant vessels.

EDUCATION NEWS

NEW HOME STUDY COURSES IN ELECTROTECHNOLOGY NOW AVAILABLE THROUGH THE IEEE

Martin Gitten
Institute of Electrical and Electronics Engineers, Inc.
345 East 47 St.
New York, N.Y. 10017

Four newly developed correspondence courses have been made available in the Americas through the Institute of Electrical and Electronics Engineers, Inc. The self-study courses are designed to provide an engineer who graduated between five and 20 years ago with opportunities to bring himself up to date in post-graduate subjects in electrical, electronics, and control engineering. Prepared by the Institution of Electrical Engineers (IEE), Great Britain, course titles are: Field-Effect Transistors, Pulse-Code Modulation, Digital Instrumentation, Modern Control Theory.

Courses run continuously, and each student will be associated with an individual instructor who will advise and comment on his progress. Courses have been designed with the intention that individual lessons and their test questions should occupy, for the average student, about six hours and should be completed within two weeks. In this way the normal duration of each course will be in the order of 30 weeks. Courses commence at a level appropriate to the final year of a modern 4-year degree course in

electrical/electronics engineering. Corollary texts are recommended for each course. Certificates are awarded students who have satisfactorily completed all of the written work.

IEEE members living in North, Central, and South America may enroll in any of these home-study courses for the same tuition paid by overseas members of the IEE — $75.00 per course. The rate for non-IEEE members in the Americas is $120.00 per course. A syllabus of each course may be obtained by writing to: Education Registrar, IEEE, 345 East 47 St., New York, N.Y. 10017.

CONTROL DATA, ST. CLOUD STATE COLLEGE REACH CREDIT-TRANSFER AGREEMENT

Nancy C. Zimmerman
Product Publicity Dept.
Control Data Corp.
Box O
Minneapolis, Minn. 55440

Control Data Corporation and St. Cloud State College (Minn.) have announced an agreement whereby computer technology graduates of Control Data Institutes throughout the world will be able to apply their training toward a degree at St. Cloud State. Effective immediately, anyone holding a certificate in computer technology from one of the twenty-two worldwide Control Data Institutes will be able to transfer up to 30 quarter hours of credit to the School of Industry, St. Cloud State College.

According to Dr. Robert Ryan, chairman of St. Cloud State's Technology Department, most CDI computer technology course work may be applied to St. Cloud's electromechanical technology program. "The CDI graduate will have completed virtually all of his electronics and computer hardware courses," Ryan said. "To earn an associate of science degree from St. Cloud, he will take general education and other related technology courses — a minimum of four quarters additional work."

NEW PRODUCTS

COMPUTER ACCESSORY RESTORES PRINTER RIBBONS ON-SITE

C. Paul Davis
Teda Corporation
16641 Roscoe Place
Sepulveda, Calif. 91343

A unique, cost-reducing computer accessory that re-inks printer ribbons on-site in a computer installation recently was unveiled in the U.S. market by TEDA Corporation. The new product, called the TEDA XRL/100 Extended Ribbon Life System, already has received a wide and growing acceptance in Europe.

C. Paul Davis, TEDA Executive Vice President, said the XRL/100 re-inks printer ribbons on-site in a computer installation, and restores ribbon fabric to a like-new condition. "Since the earliest days of the computer industry," he explained, "computer users have been throwing away their expensive computer ribbons after the ink has gone out of the fabric. Now, the ribbons can be re-inked at least twice. As a result, ribbon costs can be reduced up to 70%. In addition, a more consistent print quality can be achieved, because a user can re-ink his ribbon before the fabric has been damaged and print quality has deteriorated."

Davis said the re-inking process is clean and simple, and can be learned by anyone in a few minutes. A ribbon is completely re-inked in only 10 minutes. The unit operates unattended. Because it is portable, re-inking can be done anywhere — in the computer room or supply room, for instance.

Two models of the XRL/100 are being offered initially — one compatible with the standard IBM 1403 printer, and one compatible with IBM's new high-speed printer, the 3211. Models for other computer printers will be announced in the near future.

LITTON BUSINESS MINICOMPUTER HAS MEMORY CAPACITY OF OVER 100,000 BYTES

Robert S. Knapp, Manager
Regional Public Relations
Litton Industries
850 Third Ave.
New York, N.Y. 10022

A business minicomputer with internal memory capacity two to five times larger than any other system of its size and price range has been added to the 1200 Series of electronic business systems developed and produced by Litton's ABS division. The desk-size system, called the ABS/1251, can store on-line more than 100,000 bytes — or word elements — of data in its mass memory for instantaneous processing, recall and automatic printout, according to James W. Weidenman, division president.

The system offers small and medium-size business and accounting firms the ability to activate by simple keyboard routine a large number of internally stored programs. It also provides for fully automated processing from memory of such functions as accounts receivable/account aging, accounts payable expense distribution and labor accrual/job costing.

The new system is being marketed with a comprensive firmware set, and is fully supported by complete sort, utility and maintenance routines. The ABS/1251, priced at less than $27,000, is available for immediate delivery.

MISCELLANEOUS

GROCERY INDUSTRY'S UNIVERSAL PRODUCT CODE EXPECTED TO CREATE $7 BILLION MARKET FOR SUPERMARKET ELECTRONIC POINT-OF-SALE SYSTEMS

Robert S. Knapp, Manager
Regional Public Relations
Litton Industries
850 Third Ave.
New York, N.Y. 10022

Adoption by the U.S. grocery industry of a standard accounting code symbol to allow instant machine reading of product identification in supermarkets and food stores is expected to stimulate a new market for electronic retail point-of-sale systems that could total $7 billion world-wide over the next ten years. Charles S. Adams, a Litton Industries vice president and group executive for Retail and Revenue Systems, made this projection after the Uniform Gro-

cery Product Code Council chose a Universal Product Code symbol designed by a grocery industry committee to be read automatically by new point-of-sale electronic systems being developed for the food retailing industry.

Last December, Litton and the Zellweger Group of Uster, Switzerland, signed an agreement for the exclusive world-wide production and sale to supermarkets of such systems. Litton's Sweda International division, which will market the new system, is one of several companies already supplying electronic point-of-sale systems to department stores and general merchandisers.

"The grocery industry's decision will now allow point-of-sale system suppliers to direct their resources to the requirements of one standard symbol. The choice of the symbol opens the market for all point-of-sale system suppliers at the same time," Adams said.

At present the price of a supermarket item is read visually by a checker and entered manually on a cash register keyboard. The new code symbol printed on each item will permit price and complete product identification to be registered electronically — speeding the checkout process and virtually eliminating the possibility of error.

Studies have indicated that implementation of the automated Universal Product Code could give the grocery industry net savings of more than $150 million a year in operating costs by 1976. The symbol is expected to be printed by manufacturers on most items sold in supermarkets and grocery stores, and be in full use nationally in 1975.

MICROPROCESSORS – AN ERA ASSESSMENT OF LSI COMPUTER COMPONENTS

Timothy Johnson
Ovum Ltd.
22 Gray's Inn Road
London WC1, England

The newest generation of electronic components can cut the cost of a useful computer system to as little as £500. This is one of the conclusions of a six-months study of components called microprocessors carried out by a team at the Electrical Research Association, at Leatherhead near London. Their report is published by Ovum as Microprocessors — an ERA Assessment of LSI Computer Components, at £29. It defines a microprocessor as a computer processing unit implemented in large scale integration (LSI) electronics. This means having all the essential functions of a minicomputer etched into a small chip of silicon and mounted in a package three-quarters of an inch (20mm) long.

"Microprocessors open up a completely new vista of computer applications", says Dr. David Turtle who headed the team, working in ERA's Computers and Automation Division. "Their low cost will make it possible to use computing power in places which you would never have considered before." Turtle believes the first applications will be in computer peripherals, because "the computer industry is already showing the most advanced understanding of the value of these components and how to use them."

The advantages of microprocessors in cost and other respects promise to be big. "In typical situations a microprocessor can replace perhaps 100 MSI (medium-scale integration) packages and result in lower component costs, lower wiring costs, lower system design and development costs, smaller size, higher reliability, and considerably more flexibility when modifications are required," says the report.

The best known microprocessor available today, the Intel 8008, costs only £26 per unit in quantity orders. Other manufacturers who have so far announced microprocessors include American Micro-Systems, Fairchild, Microsystems International, and National Semiconductor. The American Micro-Systems 7200 which will probably cost £120 in quantity, promises to be the most powerful of this generation of microprocessors, and perhaps the only one immediately to compete effectively with minicomputers says the report.

WORLD'S LARGEST COMPUTERIZED EMISSION TESTING SYSTEM SOLD TO TOYOTA MOTOR COMPANY, LTD.

Dwight D. Carlson, President
Process Computer Systems, Inc.
G-4025 South Center Rd.
Flint, Mich. 48507

One of the largest single vehicle emission testing computer systems ever built has been purchased by Toyota Motor Company, LTD., of Japan. The system, designed by Process Computer Systems (PCS), uses hardware manufactured by PCS and Hewlett Packard Co. of Palo Alto, California.

The HP/PCS system, to be installed at the Toyota plant, in Toyota City, Japan, will provide the latest automatic system features for vehicle emission testing. These include the USA federal tests, and the new Japanese test for both bag analysis and continuous modal analysis. The system also performs continuous analysis of catalytic converter efficiency on 1975 vehicles.

The sale followed the signing of an agreement between PCS and HP, that HP will sell, integrate and service PCS systems using PCS and HP hardware throughout Europe and Japan.

THIRD EDITION PUBLISHED OF "AUTOMATIC DATA PROCESSING"

Steve Coha, Public Relations Manager
Data Processing Management Association
505 Busse Highway
Park Ridge, Ill. 60068

A third edition of Automatic Data Processing, Principles and Procedures, co-authored by Data Processing Management Association (DPMA) and Elias M. Awad, has been published by Prentice-Hall, Inc., Englewood Cliffs, N.J. The first edition was published in 1966.

The new edition emphasizes business data processing and contains a considerable amount of new material, including a new chapter on BASIC time-sharing language, an update on data communication and visual display devices, the addition of the data base concept to further explain file organization techniques, a new chapter on direct data entry devices, and updating of input-output media and devices.

The price of the book is $11.95 to members and $15.95 to non-members, in U.S. funds or equivalent. A workbook will be available in the Fall at extra cost. The book can be obtained from DPMA at 505 Busse Highway, Park Ridge, Ill. 60068.

NEW CONTRACTS

TO	FROM	FOR	AMOUNT
Univac Div., Sperry Rand Corp., Blue Bell, Pa.	General Services Administration, U.S. Army, Washington, D.C.	Computers and peripherals for 27 Automated Communications Message Processing Systems comprising Dept. of Army's Automated Telecommunications Center (ATCC)	$28.9 million (approximate)
Dai-Ei Co., Osaka, Japan	Takachiho Burroughs Co., Ltd.	Three B 4700 medium-scale computers, ten B 1700 small-scale computers, numerous TC 500 and TD 700 terminals for an on-line merchandise distribution control system	$7+ million
MI^2 Data Systems, Inc., Columbus, Ohio	Dedmon Industries, Inc., Dallas, Texas	MI^2 120 impact matrix teleprinters capable of printing in any language	$5.6 million
Mohawk Data Sciences Corp., Utica, N.Y.	Badische Anilin and Soda Fabrik AG (BASF), West Germany	4000 Series tape transports under multi-year contract; BASF plans to market tape drives to plug-to-plug end user market and certain OEM customers in Europe	$5 million (approximate)
Quotron Systems, Inc., Los Angeles, Calif.	Dun & Bradstreet, Inc., New York, N.Y.	QS Model 801 computer communications equipment, plus supporting services; contract allows for purchases up to $8 million	$4.4 million
National Cash Register Co., Dayton, Ohio	Foley's, Houston, Texas	797 NCR 280 retail data terminals and associated equipment including 3 NCR computers for conversion of all stores to electronic point-of-sale equipment	$3+ million
Univac Div., Sperry Rand Corp., Blue Bell, Pa.	Empresa Nacional Siderurgica SA (ENSIDESA), Aviles (Asturias), Spain	Two UNIVAC 1106 computers for real-time and batch processing of production data	$2.5 million (approximate)
National Cash Register Co., Dayton, Ohio	First National City Bank, New York, N.Y.	About 100 NCR 399 computers in 22 countries to automate back-office processing of demand-deposit accounts in various Citibank offices	$2.3 million
ITT Compagnie Generale de Constructions Telephoniques France	Aeroflot, Moscow, Russia	Electronic message switching equipment to supply complete passenger information to all airports in the Moscow area	$2.2 million (approximate)
Inforex, Burlington, Mass.	Soviet Institute of Automation and Control Technology, Moscow, Russia	Inforex shared processor data entry equipment; Russian engineers who will support equipment are attending training classes at Frankfurt facility of Inforex GmbH	$300,000+
Keane Associates, Inc., Wellesley Hills, Mass.	IBM Corp., New York, N.Y.	Assisting IBM with development of on-line teleprocessing system for a large customer; work involves development, implementation and test of advanced and complex software	$300,000+
GTE Sylvania Inc., Mountain View, Calif.	U.S. Dept. of Commerce, Maritime Administration	Develop, test and evaluate digital data transmission units as supplement to existing ship radio networks; will reduce contact time and eliminate lost messages	$246,000
Control Data Corp., Minneapolis, Minn.	Neorion Shipyards Syros Ltd., Piraeus, Greece	CDC 3100 system to support business and engineering data processing applications; part of multimillion dollar shipyard expansion	$220,000
Logicon, Inc.	System Development Corp.,	Developing verification and validation (V&V) methodology for use by Army's Advanced Ballistic Missile Defense Agency (ABMDA)	$124,000
Brown Univ., Center for Computer & Info. Sciences	Digital Scientific Corp., San Diego, Calif.	Helping foster new concepts/techniques in applications of microprogrammable computers	$12,500
Control Data Corp., Minneapolis, Minn.	Lee Way Motor Freight, Inc., Oklahoma City, Okla.	Mutually developing and marketing a management information system specifically designed to support trucking industry's operation data requirements; includes installation of dual CDC 3300 systems at LWMF Hdqrs. and exclusive licensing of CDC by LW to further develop and market LWMF applications packages	——
Honeywell, Inc., Test Instruments Div., Annapolis, Md.	Volkswagen of America	Maintaining and servicing Volkswagon's check-up system, Computer Diagnosis; 4-year agreement includes installation of units at 1,200 VW dealers	——
ITT Space Communications, Inc., Ramsey, N.J.	American Satellite Corp.,	4 transmit/receive earth stations equipped with 33-foot antennas; schedules for completion by fall 1973 when ASC initiates domestic satellite communications services	——
National Cash Register Co., Dayton, Ohio	Montgomery Ward, Chicago, Ill.	11,000 additional electronic point-of-sale registers for installation in retail stores	——
Systems & Computer Technology Corp. (SCT), West Chester, Pa.	Massachusetts Institute of Technology, Cambridge, Mass.	A computer-based Student Records and Information System; will provide complete maintenance and reporting capabilities for student biographic, demographic and cumulative academic history data	——
Tally Corp., Kent, Washington	Japan Radio Co., Ltd., Tokyo, Japan	Series 2000 line printers (prints Japanese Katakana characters as well as English) and Datascribe data communication terminals	——
Analytical Services Div. of Tesdata Systems Corp., McLean, Va.	Honeywell Information Systems, Phoenix Computer Operations, Phoenix, Ariz.	Supplying major modifications to HIS 600/6000 Time Sharing System Executive contained within Generalized Comprehensive Operating System (GCOS)	——

NEW INSTALLATIONS

OF	AT	FOR
Control Data Cyber 70, Model 72 system	Automated Building Components, Inc. (ABC), Miami, Fla.	Supporting building design activities of ABC's licensed fabricators throughout U.S. and Canada; system will also handle all in-house data processing requirements
Control Data Cyber 70, Model 76 system	Commonwealth Scientific and Industrial Research Organization of Australia (C.S.I.R.O.), Canberra, Australia	Supporting research activities of approximately 1,500 scientists in various centers throughout the Australian Commonwealth (system valued at $5+ million)
Control Data 6400 system	Compagnie Generale de Geophysique (CGG), Paris, France	Handling seismic data processing applications including land and sea exploration for oil companies and geoscientific organizations (system valued at $1.4 million)
Digital Equipment DECsystem 10	Essex University, Colchester, England	Research, teaching and administrative applications a second computer, an ICL 1909 has been tied to DECsystem-10 to act as input-output processor; DECsystem-10 is linked to sites throughout and outside university via 32 multi-terminal access lines
	First Data Corp. (FDC), Waltham, Mass.	Use along with FDC's current commercial dual processor system and the DECsystem-10 operated by FD for National Institute of Health
IBM System/7	Champlain Telephone Co., Champlain, N.Y.	Increased service by boosting number of long distance lines from 16 to 48; also has taken over job of automatically recording and calculating toll charges for these calls
NCR Century 200 system	Accudata, Amarillo, Texas	General accounting applications
	Dixon National Bank, Dixon, Texas	Maintaining a Central Information File (CIF); also prepares payrolls for a number of bank's commercial customers and processes in-patient and post-discharge billing for an area hospital
	Edison Jewelers and Distributors, Fort Worth, Texas	Inventory control, processing purchase orders and for sales auditing as well as general ledger accounting and payroll preparation
	Old Stone Bank, Warwick, R.I.	Monitoring demand deposits, savings accounts, and installment and mortgage loans
Univac Series 70/35 system	Social Security Administration, Baltimore, Md. (7 systems)	Replacement of older Model 301's; will be installe in Social Security payment centers - 2 in San Francisco, and one each to Baltimore, Chicago, Birmingham, Kansas City, and Philadelphia
Xerox Sigma 9 system	AutEx, Inc., Wellesley, Mass. (2 systems)	Complete communications flexibility; a stocks and bonds applications including a comprehensive customer service; phased out two Sigma 5's
Xerox Sigma 9 system Sigma 3 system	Naval Air Test Center, Patuxent River, Md. (3 Sigma 3 systems)	A real-time telemetry processing system, designated RTPS, for use in testing of such Navy aircraft as the F-14 and S-3A; Sigma 9 provides overall control of various inputs, while simultaneously processing the telemetry data; two Sigma 3's serve as pre-processors to the Sigma 9; third Sigma 3 is used as a display processor

C.a PROBLEM CORNER

Walter Penney, CDP
Problem Editor
Computers and Automation

PROBLEM 736: SWEEPING NUMBERS

"What's that you're poring over?" asked George. "A list of serial numbers on lucky bucks?"

"No, it's a printout of a lot of random sequences of the numbers 1 to 10 that we're going to use in that simulation problem," Hal said. "I've made a few calculations and I found a few surprising things about them."

"Like what?"

"I amused myself imagining how a person might do this by hand. Say he had ten blank spaces and wrote in the first few numbers from left to right, then back for another sweep, dropping off a few more numbers until he put 10 in the last empty space. I was just calculating the number of sweeps of the hand that might be used."

"Seems to me that could be anything from 1 to 10."

"Yes, but these sequences were printed out sorted by first digit and that's where I noticed something interesting in counting sweeps."

"I should think that as the first number got larger the average number of sweeps would increase," Hal said.

"Well, yes, or stay the same. But consider the number of arrangements that would require only two sweeps. If the first number isn't 1, 2 would be the minimum number. Now you might think that there would be more arrangements requiring only two sweeps if the initial number were small than if it were large."

"Aren't there?"

"Not always," replied George.

Is he right?

Solution to Problem 735: Variability

The number of terms in x + x + . . . (x terms) is also a variable and differentiation must be performed with respect to all occurrences of the variable, not just each of the individual terms.

MONTHLY COMPUTER CENSUS

Survey Editor
COMPUTERS AND AUTOMATION

The following is a summary made by COMPUTERS AND AUTOMATION of reports and estimates of the number of general purpose electronic digital computers manufactured and installed, or to be manufactured and on order. These figures are mailed to individual computer manufacturers from time to time for their information and review, and for any updating or comments they may care to provide. Please note the variation in dates and reliability of the information. Several important manufacturers refuse to give out, confirm, or comment on any figures.

Our census seeks to include all digital computers manufactured anywhere. We invite all manufacturers located anywhere to submit information for this census. We invite all our readers to submit information that would help make these figures as accurate and complete as possible.

Part I of the Monthly Computer Census contains reports for United States manufacturers. Part II contains reports for manufacturers outside of the United States. The two parts are published in alternate months.

The following abbreviations apply:

(A) -- authoritative figures, derived essentially from information sent by the manufacturer directly to COMPUTERS AND AUTOMATION
C -- figure is combined in a total
(D) -- acknowledgment is given to DP Focus, Marlboro, Mass., for their help in estimating many of these figures
E -- figure estimated by COMPUTERS AND AUTOMATION
(N) -- manufacturer refuses to give any figures on number of installations or of orders, and refuses to comment in any way on those numbers stated here
(R) -- figures derived all or in part from information released indirectly by the manufacturer, or from reports by other sources likely to be informed
(S) -- sale only, and sale (not rental) price is stated
X -- no longer in production
\- -- information not obtained at press time

SUMMARY AS OF MAY 15, 1973

NAME OF MANUFACTURER	NAME OF COMPUTER	DATE OF FIRST INSTALLATION	AVERAGE OR RANGE OF MONTHLY RENTAL $(000)		NUMBER OF INSTALLATIONS In U.S.A.	Outside U.S.A.	In WORLD	NUMBER OF UNFILLED ORDERS
Part II. Manufacturers Outside United States								
A/S Norsk Data Elektronikk	NORD-1	8/68	2.0		0	111	111	40
Oslo, Norway	NORD-2B	8/69	4.0	(S)	0	20	20	X
(A) (May 1973)	NORD-5	2/72	-		0	1	1	1
	NORD-10	5/73	2.0		0	0	0	34
	NORD-20	1/72	3.5	(S)	0	20	20	5
A/S Regnecentralen	GIER	12/60	2.3-7.5		0	40	40	0
Copenhagen, Denmark	RC 4000	6/67	3.0-20.0		0	22	22	3
(A) (May 1973)								
Elbit Computers Ltd.	Elbit-100	10/67	4.9	(S)	-	-	325	10
Haifa, Israel								
(A) (Nov. 1972)								
GEC Computers Ltd.	902	5/68	-		0	17	17	0
Borehamwood, Hertfordshire	903, 920B	12/65	-		1	464	465	19
England	GEC 905	5/69	-		0	77	77	1
(A) (Nov. 1972)	GEC 920M	7/67	-		0	130	130	103
	GEC 920C	7/68	-		0	19	19	0
	Myriad I	1/66	-		0	47	47	0
	Myriad II	11/67	-		0	32	32	0
	GEC M2140	10/69	-		9	21	30	0
	GEC 2050	6/72	-		0	5	5	32
International Computers, Ltd. (ICL)	Atlas 1 & 2	1/62	65.0		0	6	6	X
London, England	Deuce	4/55	-		0	2	2	X
(A) (Sept. 1972)	KDF 6-10	9/61	10-36		0	34	34	X
	KDN 2	4/63	-		0	1	1	X
	Leo 1, 2, 3	-/53	10-24		0	43	43	X
	Mercury	-/57	-		0	4	4	X
	Orion 1 & 2	1/63	20.0		0	10	10	X
	Pegasus	4/55	-		0	9	9	X
	Sirius	-/61	-		0	8	8	X
	503	-/64	-		0	18	18	X
	803 A, B, C	12/60	-		0	107	107	X
	1100/1	-/60	5.0		0	13	13	X
	1200/1/2	-/55	3.9		0	11	11	X
	1300/1/2	-/62	4.0		0	82	82	X
	1500	7/62	6.0		0	35	35	X
	2400	12/61	23.0		0	3	3	X
	1900-1909	12/64	3-54		2	2200	2202	-
	Elliott 4120/4130	10/65	2.4-11.4		0	100	100	X
	System 4-30 to 4-75	10/67	5.2-54		0	200	200	-
Japanese Mfrs. (N) (March 1972)	(Mfrs. of various models include: Fijitsu, Ltd.; Hitachi, Ltd.; Matsushita Electric Co. of America; Mitsubishi Electric Corp.; Nippon Electric Co., Ltd.; Oki Electric Industry Co.; Tokyo Shibaura Electric Co., Ltd.; Toshiba.)					12,809	-	800 E
Philips Electrologica BV	P1000	8/68	7.2-35.8		-	-	105	39
Apeldoorn, Netherlands	P9200	3/68	-		-	-	300	25
(A) (Oct. 1972)	P9200 t.s.	3/70	-		-	-	5	1
	P880	9/70	-		-	-	29	16
	P850/55/60	9/70	-		-	-	40	290
	ELX	5/58	6-21		-	-	42	-
	PR 8000	1/66	-		-	-	23	-
Philips' Telecommunicatie	DS 714	-/67	-		11	27	38	19
Industrie BV	DS 18	9/72	-		1	-	1	9
Hilversum, Netherlands								
(A) (May 1973)								
Redifon Electronic Systems, Ltd.	R2000	7/70	-		1	19	20	4
Crawley, Sussex, England	R2000A	-	-		-	-	-	1
(A) (Jan. 1973)								
Saab-Scania Aktiebolag	D21	12/62	7.0		0	38	38	-
Linkoping, Sweden	D22	11/68	15.0		0	35	35	2
(A) (May 1973)	D220	4/69	10.0		0	17	17	3
	D23	-/73	25.0		0	0	0	4
	D5/30	12/71	1.0		0	13	13	10
	D5/20	5/71	0.6		0	80	80	2000
Seelenia S.p.A.	GP-16	7/69	10.9	(S)	0	190	190	60
Roma, Italy	GP-160	-	5.6	(S)	-	-	-	-
(A) (Feb. 1973)								

NAME OF MANUFACTURER	NAME OF COMPUTER	DATE OF FIRST INSTALLATION	AVERAGE OR RANGE OF MONTHLY RENTAL $(000)	NUMBER OF INSTALLATIONS In U.S.A.	Outside U.S.A.	In World	NUMBER OF UNFILLED ORDERS
Siemens	301	11/68	0.9	-	-	103	15
Munich, Germany	302	1/68	2.1	-	-	30	7
(A) (Jan. 1973)	303	4/65	2.7	-	-	70	2
	304	5/68	4.5	-	-	81	13
	305	2/68	6.1	-	-	118	16
	306	6/70	7.9	-	-	29	5
	2002	6/59	16.4	-	-	41	-
	3003	12/63	15.8	-	-	32	-
	4004/15/16	10/65	6.1	-	-	98	4
	4004/25/26	1/66	10.0	-	-	82	15
	4004/35	2/67	14.2	-	-	204	49
	4004/127	4/73	14.0	-	-	-	4
	4004/135	10/71	20.5	-	-	93	38
	4004/45	7/66	27.3	-	-	365	35
	4004/46	4/69	41.0	-	-	16	1
	4004/55/60	7/66	35.0	-	-	28	-
	4004/150	2/72	49.0	-	-	53	53
	4004/151	3/72	61.0	-	-	9	3
	404/2	11/73	3.0	-	-	-	40
	404/3	4/71	2.1	-	-	37	14
	404/6	10/71	4.5	-	-	60	41
						Total: 1549	Total: 355
USSR	BESM 4	-	-	-	-	C	C
(N)	BESM 6	-	-	-	-	C	C
(May 1969)	MINSK 2	-	-	-	-	C	C
	MINSK 22	-	-	-	-	C	C
	MIE	-	-	-	-	C	C
	NAIR 1	-	-	-	-	C	C
	ONEGA 1	-	-	-	-	C	C
	URAL 11/14/16 and others	-	-	-	-	C	C
						Total:	Total:

NOTICE: Beginning with the July issue of *Computers and Automation,* the Monthly Computer Census will be published in three parts as follows:

Part 1 – U.S. manufacturers, A to H, in January, April, July and October

Part 2 – U.S. manufacturers, I to Z, in February, May, August, and November

Part 3 – Mfrs. outside the U.S., in March, June, September, and December

Updating sheets will, henceforth, be mailed quarterly to manufacturers.

All manufacturers of digital computers are invited to submit information for this census.

CORRECTION: In the May 1973 Numble, the numerical portion of the message (omitted in error) was 63850 22507.

NUMBLES

Neil Macdonald
Assistant Editor
Computers and Automation

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. This month's Numble was contributed by:

Casper Otten
Newton South High School
Newton, Mass.

NUMBLE 736

```
      T H E
+ Y E A R S      M = N
-------------    D = U = V
  Y E E T Y
+ T E A C H
-------------
  R R C V S N
```

80524 23442 70369 87071 47352

Solution to Numble 735

In Numble 735 in the May issue, the digits 0 through 9 are represented by letters as follows:

I = 0	W = 5
P = 1	Y = 6
L = 2	N = 7
O = 3	U = 8
A = 4	E = 9

The message is: Play alone; you will win.

Our thanks to the following individuals for submitting their solutions – **to Numble 735**: T. P. Finn, Indianapolis, Ind. – **to Numble 734**: Maurice Bougie, Hull, P.Q., Canada; **T. P. Finn – to Numble 731**: Nihan Lloyd-Thurston, Surrey, England

Who's Who in Computers and Data Processing

Edition 5.3 = Edition 5 + 2 Supplements published + a 3rd Supplement now being prepared

If you wish to be considered for inclusion in the *Who's Who in Computers and Data Processing* — or if you have already been included and your biography should be updated — please complete the following form (which may be copied on any piece of paper), and send it to: Who's Who Editor

Computers and Automation
RFD 1
No. Grosvenordale, CT 06255

Who's Who in Computers and Data Processing is published jointly by Quadrangle Books (a *New York Times* company) and *Computers and Automation.* The Fifth Edition (in hard cover, in three volumes, over 1000 pages) containing over 15,000 capsule biographies was published in the Spring, 1971.

Two supplements, together containing over 2000 entries, have been published, bringing updating through the autumn of 1972.

WHO'S WHO ENTRY FORM

(may be copied on any piece of paper)

1. Name? (Please print)_____

2. Home Address (with Zip)?_____

3. Organization?_____

4. Its Address (with Zip)?_____

5. Your Title?_____

6. Your Main Interests?

		Logic	( )	Other (please specify) ( ) _____
		Management	( )	
Applications	( )	Mathematics	( )	_____
Business	( )	Programming	( )	
Construction	( )	Sales	( )	_____
Design	( )	Systems	( )	

7. Year of Birth?_____ 8. Education and Degrees?_____

9. Year Entered Computer Field?_____ 10. Your Present Occupation?_____

11. Publications, Honors, Memberships, and other Distinctions?_____

_____

(attach paper if needed)

12. Do you have access to a computer? ( ) Yes ( ) No

    a. If yes, what kind of computer? Manufacturer?_____ Model?_____

    b. Where is it installed: Organization?_____

    Address?_____

    c. Is your access: Batch? ( ) Time-Shared? ( ) Other? ( ) Please explain_____

    d. Any remarks?_____

13. In which volume or volumes of the Who's Who —

	(a) Have you been included?	(b) Do you think you should be included?
Vol. 1 — Systems Analysts and Programmers	( )	( )
Vol. 2 — Data Processing Managers and Directors	( )	( )
Vol. 3 — Other Computer Professionals	( )	( )

14. Do you subscribe to Computers and Automation? ( ) Yes ( ) No — to The New York Times? ( ) Yes ( ) No

15. Associates or colleagues who should be sent Who's Who entry forms?

Name and Address

_____

_____

_____

_____

(attach paper if needed)

When completed, please send promptly to: Who's Who Editor, *Computers and Automation,* RFD 1, No. Grosvenordale, CT 06255

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What do they do ?
Where do they do it ?

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jointly published by Quadrangle Books (a New York Times company) and *Computers and Automation* (Berkeley Enterprises, Inc.)

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Prospective speakers . . .

anyone who needs to keep up with the important people in the field.

Each computer professional has a capsule biography detailing: last name; first name and middle initial (if any); occupation; year of birth; university education and degrees; year entered the computer field; main interests; job title; organization and its address; publications, honors and memberships; home address. See sample in next column:

ANDREE, Richard V. / professor, author, lecturer, consultant / *b:* 1919 / *ed:* BS, Univ of Chicago, PhD, Univ of Wisconsin / *ent:* 1948 / *m-i:* A Ma P Sy; writing, information science / *t:* professor of math, research associate in computing science / *org:* Univ of Oklahoma, Norman, OK 73069 / *pb-h:* ACM, AEDS, ASL, DPMA, MAA, NCTM, SIAM lecturer, American Assn for the Advancement of Science, American Math Society, American Society for Engineering Education, Mu Alpha Theta, Pi Mu Epsilon, Sigma Xi, 3 fellowships, numerous committees, *Who's Who in America, World Who's Who,* editor, 12 books, 8 paperbacks, about 20 articles / *h:* 627 E Boyd, Norman, OK 73069

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Title

Organization

Address

City State & Zip

Your Signature P.O. No. (if company order)

WILL YOU HELP?

Yes, *you.* It may come as a surprise that you'd be asked . . . but as a reader of *Computers & Automation* you are in a unique position to help us.

NAMES . . . people, institutions, companies who should be interested in 1) the computer industry and/or 2) seeking truth in information are very much needed to join you as readers of *C&A*.

Will you tell us who they are? And perhaps even more, will you let us use your name in writing to them? But with or without your name (we'll only use it if you grant permission) we need to know those *you* think might be interested in also reading *C&A*.

* * * * *reprint from* **computers and automation**

Science and the Advanced Society, by C. P. Snow, Ministry of Technology, London, England (April 1966)
The Information Revolution and the Bill of Rights, by Dr. Jerome B. Wiesner, M.I.T. (May 1971)
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