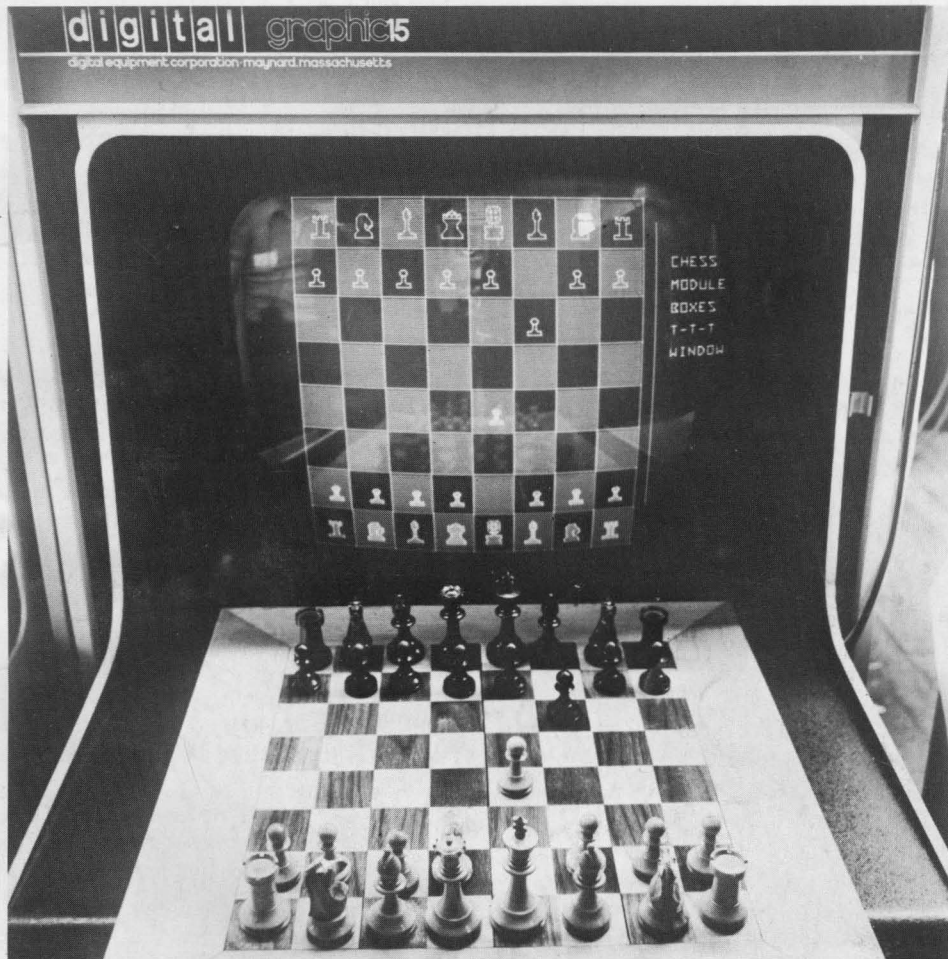


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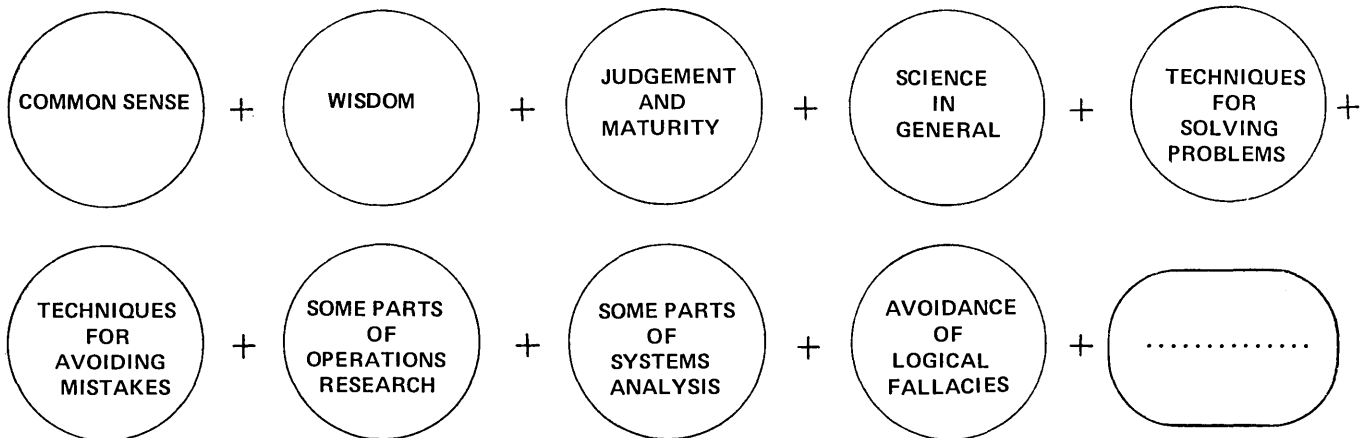
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Some Hard Facts, and What To Do About Them

To: Our Subscribers, Readers, Customers, Friends, and Allies for a Better World

From: Edmund C. Berkeley, Editor

We – Computers and Automation (Berkeley Enterprises, Inc.) – are faced with problems. We would like to discuss them with you.

In this century and this environment, we believe it makes sense for us to be a small business. In exchange for resisting the pressures of the economic system, the role of the small business allows one the freedom to pursue one's major social concerns: you cannot be fired if you own 80% of the business!

For 24 years (1948 to the present) we have survived as a small business and pretty much succeeded year after year in making income exceed expenses – but not in our fiscal year ending August 31, 1972. To survive, as a small business, is a struggle, a condition in which we live every day, week, and year. This condition keeps us lean and efficient, working as hard as possible, sparking with ideas, free to propose ideas, unpopular ones, new ones, – and it prevents the growth of bureaucracy, dead wood, and waste.

But the trick is becoming harder; staying in the race is becoming harder, even though – like Avis – we try harder. We need your help. Here are the facts:

Circulation

Our circulation (about 7500 currently, all paid) is less than half of what it was 2½ years ago (17,000).

Basic reasons:

- (1) the disappearance of a large number of the organizations that used to be in the computer field;
- (2) the loss of jobs in the computer field by a large number of our former subscribers;
- (3) the Xerox machine and its cousins, making convenient copies, and replacing the payment for second and third subscriptions from us.

(Note: Based on several telephone surveys, the proportion of expired subscribers who stopped receiving the magazine because of our branching out into controversial subjects related to the pursuit of truth is only about 3 to 5%.)

Advertising

Our paid advertising, which used to bring us about \$70,000 of gross income per year, now brings us less than \$4000 a year.

Basic reason: There are now more than 10 magazines in the computer field which are supported either (1) by an association of 20,000 or more members who receive the magazine as part of their dues, or (2) by advertising and controlled circulation (copies free to qualified advertising prospects). All these magazines have a circulation ranging from about 25,000 up to about 110,000. As a result, an advertiser obtains more exposure from advertising in such a magazine than he possibly can from advertising in our magazine.

Editorial Developments

Starting in February 1970 we have devoted a portion of the pages of C&A to the most interesting, most important, and most incisive information that we can find. We believe that the pursuit of truth in input, output, and processing of information is a necessary part of the responsibility of a professional information engineer.

At the same time, we continue our regular coverage of many important aspects of the computer field, seeking to publish information that is factual, useful, and understandable. See for example the recent article by Warren Teitelman on “‘Do What I Mean’: The Programmer's Assistant” (C&A, April, 1972).

If you like what we are doing, if you like the principles we are working for, please help us continue serving you by examining our products, and buying those you want (money back if not satisfied – we want only happy and satisfied customers):

– Show C&A to your friends and invite them to subscribe. For every paid subscription you send in to us, we will gladly send you a publication of ours (you may choose No. 1 or 3 or 6 or 11 – see page 34).

– If you and your friends have not tried “The C&A Notebook on Common Sense, Elementary and Advanced” please do try it (money back if not satisfied). It can help you and them. If you could prevent just one important mistake (like the Democratic Party's mistake with Senator Eagleton or the Republican Party's mistakes with the bugging at the Watergate Hotel), how much would that be worth to you? – and wouldn't you agree that sense, common and uncommon, ought to be the key to preventing mistakes?

– Look over our “Autumn 1972 Offers” in this issue of C&A, and consider them – for yourself, for your friends, for Christmas gifts!

Every now and then some nice person sends us a contribution because he or she admires what C&A is doing. It's a heartwarming day when that happens. However, we do not ask for contributions: we ask for purchases on a business basis – money back if not satisfied.

May we hear from a great many of you?

Edmund C. Berkeley

Edmund C. Berkeley
Editor and Publisher

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computers and automation

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

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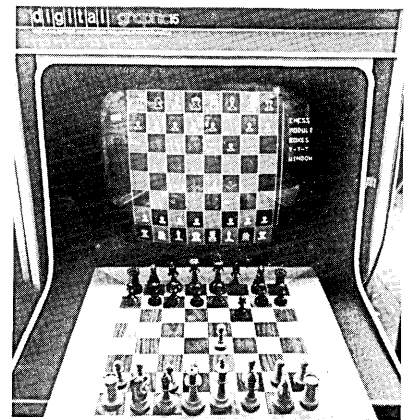
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Chess is shown being played on a computer display screen of a DEC PDP-15. A computer program in a DEC System 10 recently won some amateur tournaments held under the auspices of the Massachusetts Chess Federation.

NOTICE

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"Statistics -- A Guide to the Unknown"

Every now and then there comes across one's path a book for which one says:

Where has this been all these years? It swings open such great shutters -- it reveals such marvelous visions.

Such an experience happens to me about once every two or three years. The poet John Keats had this experience on one occasion, and he wrote a sonnet about it, "On First Looking Into Chapman's Homer":

.....
Then felt I like some watcher of the skies
When a new planet swims into his ken;
Or like stout Cortez when with eagle eyes
He stared at the Pacific -- and all his men
Looked at each other with a wild surmise --
Silent, upon a peak in Darien.

Such a book for me, full of revelations, full of answers to half-formed wondering, is "Statistics: A Guide to the Unknown", edited by Judith M. Tanur, and the Joint Committee on the Curriculum in Statistics and Probability of the American Statistical Association and the National Council of Teachers of Mathematics. This committee included: Frederick Mosteller, William H. Kruskal, Richard F. Link, Richard S. Pieters, and Gerald R. Rising. The book includes 44 essays by a total of 49 authors, and is published by Holden-Day Inc., 500 Sansome St., San Francisco, Calif. 94111, 1972, 430 pp., available either hardbound or softbound. The book is easy to understand:

The audience for which the book is written is primarily readers without special knowledge of statistics, probability, or mathematics; the intended audience includes especially parents of school children, school principals, school board members, but also teachers of mathematics and their supervisors, and young people themselves.

The essays illustrate remarkable past accomplishments and current uses of statistics and probability:

We asked authors to stress one or a very few important problems within their field of applications, and to explain how statistics and probability help to solve them and why the solutions are useful to the nation, to science, or to the people who posed the problem.

The result of the undertaking is one of the most significant and mind-stimulating collections of records of discovery and methods for discovery that I have ever come

across. Evidence for this assertion is reflected by many of the titles and capsule summaries of the essays, such as the following:

The Biggest Public Health Experiment Ever: The 1953 Field Trial of the Salk Poliomyelitis Vaccine / Statistics contributes informed experimental design to the first attack on polio.

Statistics, Scientific Method, and Smoking / A summary of the effect of smoking on health, and the value of the debate to medical science.

Looking Through Rocks / A special method of sampling the surface of microscopically thin sheets of rock produces estimates of the relative volume of each kind of mineral in the rock.

Cloud Seeding and Rainmaking / Statistical design and analysis indicate whether Man's efforts at rainmaking actually work.

Information, Simulation, and Production: Some Applications of Statistics to Computing / Applying statistical techniques to the design and to the use of computers.

How to Count Better: Using Statistics to Improve the Census / Sample survey methods have improved the accuracy of the U.S. Census.

But most of the evidence comes from actually examining the book for one's self -- although the excitement of discovery nowadays is more on the frontiers of science than in finding an additional planet in the solar system, or finding an ocean across the Isthmus of Panama.

We have received permission from the publisher to reprint one of the essays in this issue of "Computers and Automation". The one we have chosen is "The Importance of Being Human" by Professor W. W. Howells of Harvard University; it is a report on the use of a method for discriminating (which required a computer to make it easy), applied to deciding whether a certain unusually old, fossil elbow joint was manlike or chimpanzee-like.

We recommend (1) the statistical experiment of examining "Statistics: A Guide to the Unknown" at the nearest bookstore that might have it, and (2) the probable conclusion, that this book is a needed acquisition because it is unusually informative, illuminating, and mind-opening.

Edmund C. Berkeley

Edmund C. Berkeley
Editor

What Have Computers Done For Us Lately ?

Congressman Jack Brooks
9th District, Texas
House of Representatives
Washington, D.C. 20515

"The computer community continues to envelop data processing in a vast cloud of abstract complexities."

There is an old story in politics: a candidate for reelection reminds a constituent of all the things he has done for him in the past, then asks for his support in the coming election. The constituent admits to the effective work of the candidate; then he asks: "But, what have you done for me lately?"

I must point out that this philosophy is not limited to politics. Society generally applies the same philosophy — the demand for constant improvement, for continuing progress — to all of us including the computer community.

Human Intellectual Capacity

The electronic computer has extended the intellectual capacity of man. The capability of the computer has become a fundamental element of success. Hundreds of years from now, the past quarter of a century will be known as the beginning of the computer age.

Throughout society, computers are beginning to take hold, to make difficult tasks easier, and to make problems that were previously beyond our grasp subject to practical solution. In terms of what we had a quarter of a century ago, practically every computer application in the nation today is, in a sense, a minor miracle.

Cloud of Complexities

Unfortunately, to some people the computer has a bad reputation. As you know, the computer is often assigned the blame when some individual does not program or operate the computer properly. Furthermore, society is becoming increasingly concerned over fun-

damental questions of individual privacy and the security of data that involve personal and confidential affairs of the individual

Meanwhile, the computer community — unintentionally or otherwise — continues to envelop data processing in a vast cloud of abstract complexities, discouraging many people from trying to understand what computers are or how they work. Computers continue to be accessible only to the expert. As far as the public is concerned, computers and computer people are similar to Apollo's oracle at Delphi, dealing in a vast flow of cryptic messages beyond the full understanding of the average individual.

Problems Facing the Computer Community

Despite all of the advances due to computers, society asks — and rightly so — what has the computer industry done for us lately?

In order for the next 25 years to be a period of solid progress, the nation's computer community must make an attempt to identify to a reasonable degree where we must go and what we must do. Although I am a legislator, and a lawyer and journalist by profession, and not a computer expert, I have had ten years of investigating computer management and use in the federal government, the world's largest user of computers. I have acquired some insight into the problems facing the computer community. These views may be of some help.

(Based on a talk in November 1971 before the joint meeting of the Association for Computing Machinery and the Data Processing Management Association, at Port Neches, Texas.)

I believe it important that we remember that computer technology in its earliest stages. Compared with aviation, for example, we are still in the 1920's. And, the day will come when the most advanced computers in use today will be in museums instead of at work.

Data

The acquisition, processing, and communication of data is fundamental to continuing progress. I believe we will never reach an acceptable plateau of development. I believe that if computer technology levels off or begins to decline, then, inevitably, society and civilization will follow the same trend. Our goal, therefore, is continual improvement. Consequently, we have to concentrate on obvious problem areas and exploit new breakthroughs in technology as they become apparent. Our objective is to mould computer applications to best use our nation's resources to meet the needs of society. There is an infinite list of potential applications. If the thought process can be identified, regardless of the field of endeavor, there is a potential benefit through the application of a computer.

At present, we have only begun to use computers. Most, if not all of the 5,000 computers in government and the 50 to 60 thousand computers in the United States, perform routine-like tasks that otherwise would require an extensive number of low-echelon employees. The crude, relatively easy computer applications of the larger elements in business, industry, and government have been dealt with. The time has come to move up a step toward more sophisticated application of computers on a general front, to handle applications that for the first time will exploit in new ways the great capacity that is inherent in these systems.

Lack of Discipline

Progress in this area will be slow, partially because of an inherent lack of discipline in computer technology. In data processing, data is the name of the game. Yet, data itself is the stepchild of the computer industry.

Addressing Campaign Material

A year or so ago, before the last election, as an example, I harbored what I consider a fairly reasonable thought that I might use computers to address campaign material to the registered voters in the ninth district. Earlier, a very talented systems engineer in Beaumont, Texas, had developed an excellent system on an IBM 360 to do the job. And, all I had to do was apply the program to the computerized registered voter lists in the counties, one of which had a Honeywell. As I recall, the other had an NCR system.

This relatively simple application, because of incompatibility in data structure, led to four months of arduous and very costly reprogramming.

Independence of Data

I advocate a Declaration of Independence for data — so that, within reasonable bounds, the data on a tape can be read, printed out, and understood, regardless of the availability of the program that generated the data or the manufacturer of the system used. Throughout the federal government as well as in business and industry, hundreds of thousands of tapes that are maintained for historical record purposes cannot be read or understood. Column headings

and other data descriptions are often stripped from the data before it is stored on the tape. As a layman, I cannot identify all the problems that are involved. However, I can attest to the importance of their solution. The time has come in the field of computers to give data the integrity and the independence it deserves.

If data were independent, I believe that a number of critical problems confronting the computer industry today, such as in the conversion of systems during procurement, might well be reduced to manageable size.

Interface Between Users and Computers

Flowing along with this concept is the need to improve the interface between computers and users. None of you here tonight has to be a mechanical engineer to drive an automobile. And, I believe that the same concept should apply to the computer. The computer industry should use the computer itself to make it possible for the nontechnician to use data processing techniques within a reasonable spectrum of applications. Not only would this benefit society, but it would have a most beneficial impact on the entire computer industry.

There would be a significant increase in job potential. More young men and women who have the talent for computer work would be drawn into the field. There would be greater development and progress throughout the range of computer technology. And these developments, in turn, might help maintain the present competitive business advantage the United States has over the rest of the world in computer technology. Remember, the Japanese can make computers as well as cameras and television sets.

Privacy

We must work toward an effective program for the independence of data. Second, we must improve the interface of computers with the user. But there are other priority areas of computer technology. One challenging problem is the manifold threats to the privacy of the individual brought on by computers and other technological advances.

Involvement in Social Problems

The future will be difficult, challenging, often dismaying and frustrating. But, computer people are involved in one of the most dynamic endeavors that mankind has ever experienced. The Association for Computing Machinery and the Data Processing Management Association are at the cutting edge of advances in the state of the art in computers. They are necessarily involved in the social problems of the nation.

Think — and Discipline

Mr. T. J. Watson, Sr. of IBM, years ago adopted the word "think" as IBM's motto; this is a worthwhile objective in any endeavor. But in view of the increasing complexity of computer software, which now accounts for substantially more than 50 percent of computer system costs, I believe that the computer community should adopt another word, "discipline".

Discipline is what we must apply if we are to bring an acceptable level of order and understanding out of the broad field of computer software and system development. Discipline and adherence to fundamentals are basic essentials as we work and progress toward a better world. □

The Management Consultant's Role in Assessment of Data Processing Activities

James K. McKenna, Jr.
Vice President, Marketing
Computer Planning Corp.
315 Fifth Avenue
New York, N.Y. 10016

"Jim, I don't need a consultant to tell me what my problems are. I know what they are. I just got rid of a firm which submitted a report that only outlined my problems. I need a consultant to solve those problems!"

Management Consultants

Since the beginning of professional management as we know it, management consultants have played an active role in complementing the work of managers. In fact, the founders of the management consulting profession were, in large measure, responsible for the establishment of "management" as a separate field of study and as a unique discipline. The development of almost every accepted management technique — work measurement, compensation and incentive plans, work methods, systems analysis, market research, information systems, budgetary control, and the like — have been the joint work of consultants and men in industry. Like it or not, the consultant is here to stay, and if not currently, then at some point in time, may be needed by your organization. This has been particularly true of our profession, electronic data processing, because of the historical imbalance between technological advances and trained personnel.

Recognizing that the consultant is an everyday occurrence in our business life, I would like to examine what the proper role of the consultant is and how to select the right consultant for the right purposes.

Data Processing

Of course, we are speaking specifically of the role of the consultant in data processing, or the data processing consulting firm, sometimes also referred to as the "software house" or "systems house." In this group I do not include the "programming house" or "body shop". Perhaps it would be good to begin with a brief examination of when a consulting firm is needed, by whom the consulting firm is needed, and for what purposes.

Need for a Consultant

Generally speaking, a consulting firm is required when line or executive management discovers that it has a problem in the EDP area. Executive management may realize (unfortunately, usually only after repeated frustrations) that the data processing function has become uncontrollable from the point of view of cost and/or performance. Or, line management may realize that it cannot fulfill a specific management objective without outside assistance. It is at this point that the services of a consulting firm are considered. The consultant is, therefore, a professional problem solver. Problem solving is the consultant's only reason for being in business.

Specifically, the tasks the consultant is called upon to perform, the problems he is asked to solve, will vary depending upon many factors. These include: the level of management requiring his services; the industry involved; the equipment configuration; and of course the reputation of the consulting organization itself. For example, line management will most frequently call upon the consulting firm for application development, when insufficient personnel resources are available in-house to meet development objectives. Frequently this will occur when priorities are shifted or new priorities introduced. In this case, services may include any or all aspects of systems analysis, systems design, and implementation. Line management may also decide to go outside when specialized skills are required for a specific application and it is considered economically more advantageous to utilize an outside firm than to recruit and/or train personnel. The forward looking Data Processing Manager or Manager of Management Information Systems, will also be interested in applying the established management techniques of periodic review and re-evaluation of existing plans and programs. In this instance, for objectivity, he may call upon an outside consulting firm for purposes of conducting an audit. While professional audits may vary in scope and complexity, they usually will include a review of operations, systems, programming methods, programming standards, and program documentation. The audit may also include an evaluation of specific near or distant goals and objectives, as well as implementation plans and progress toward these objectives. In addition to objectivity, the consultant offers the client a broader base of experience upon which to conduct such an audit.

These, then, are the problems which line management usually calls upon a consulting firm to resolve. By line management, I am referring to that level of responsibility usually associated with the title of Director of Data Processing, or Director of MIS, or the equivalent. Executive management, on the other hand, that is, the Controller, Vice President, Executive Vice President,

James K. McKenna, Jr., currently Vice President-Marketing for Computer Planning Corp., has held various sales and marketing management functions in the EDP industry. The first part of his career was with IBM's Data Processing Division. His experience crosses a wide range of industries including transportation, publishing, medicine, government and education. Mr. McKenna's design of a system for Catholic schools was published by Marquette University in a monograph Data Processing in Catholic Education. He is an honors graduate of St. Peter's College, a member of the Association for Systems Management, and a member of the Data Processing Management Association.

(Based on a talk at the Data Processing Conference of the Data Processing Management Association, November, 1971, New York, N.Y.)

or President of a company, has different problems which require different solutions.

Level of Reporting

In the early days of my data processing career as a salesman in IBM's Data Processing Division, it was drilled into me by instructors, managers, and senior salesmen, that the most successful installations and accounts were those wherein top management was involved in and understood the data processing function. At countless professional meetings, like this one today, I have heard data processing managers, discuss the problems of communication with executive management. Invariably, these discussions have called for greater participation by the executive level in the data processing function or, more frequently, for a realignment of the organization chart placing data processing at a higher level within the executive hierarchy.

Now in retrospect, I am not so sure that these proposed solutions have had the effect intended. To begin with, from my own personal experience I know that the men operating on the highest levels of management, on let us say the level of a Vice President and Director of the Corporation, are frequently personally disinclined to involve themselves in the nitty gritty aspects of managing what they consider to be a highly technical area.

Even given the interest, this level of management frequently and honestly just doesn't have the time to learn an entirely new (to them) technology. The gobble-de-gook alone — HASP, OS-MVT, hexadecimal, chaining, index sequential, bits and bytes — is enough to put off the bravest and most interested of the uninitiated. After all, let's face it, the seasoned senior executive has spent years acquiring the knowledge required to attain and effectively sustain him in the position he holds. Why shouldn't he be able to delegate responsibility for data processing in the same manner in which he delegates responsibility in other areas which he manages? and with the same expectations for results? Should we ask him now, in effect, to go back to kindergarten and start learning a new field all over again? I don't believe it is necessary.

Nor for that matter is the other proposed solution, raising data processing management to the senior level, an invariably adequate alternative. There are too many instances wherein this solution has failed.

Sad Examples

A major financial institution here in New York City has, for example, gone through six Senior Vice-Presidents in charge of data processing in five years.

A medium-sized firm in New Jersey which installed its first computer system two years ago, has lost over \$1,000,000 in accounts receivable due to computer foul-up. Their solution: fire the blankety-blank who installed it, hire a new D.P. Manager and over him, hire a new Vice-President with EDP experience, and give him ultimate responsibility for EDP performance. They have just let go the new Vice-President with EDP experience, and are about to let go the D.P. Manager. Without completely resolving their accounts receivable problem, they have placed two new computer systems on order from different manufacturers. They have also ordered especially engineered communications

equipment for an esoteric application for which they only had four sheets of systems design at the time the order was placed. I needn't tell you the difficulties they're headed for. Obviously, having a Vice-President-Treasurer responsible for the data processing function and reporting to the President and Board of Directors has not solved their problems.

Control of Performance, Costs, and Results

Their problem is symptomatic of the problem which too many executives have had with data processing: i.e., how to control performance, costs, and results. As the Corporate Controller of one of the world's largest department store chains stated it — "I can control what happens in any of the other areas of responsibility which I have, but sometimes I think that computer system is contemplated. When I ask the manager of data processing week after week why I don't have the results I'm looking for and he tells me, 'Next week, we've got to iron out a bug in the program.' and, the next week he tells me, 'The program blew core, but we're working on it.' What can I do?"

To reiterate, the problem which executive management faces is the problem of controlling performance, costs, and results. After defining what they want, they need to obtain a realistic estimate of what time, dollar, and personnel resources are required to reach their objectives. And they need a methodology capable of providing them with the information they need to control performance. Historically, many companies have found that changing the boxes in an organization chart, or the people in the boxes, is not the answer to missed schedules and over extended budgets. If one D.P. Manager at \$20,000 per year has consistently missed commitment dates and run over budget, there is no assurance that a new manager at \$30,000 or \$35,000, or \$40,000 per year, even with a Vice-Presidential title, will do any better. Their problems can, however, be resolved by utilizing a professionally qualified consulting firm.

Audit

The professional audit which we spoke of earlier, addresses itself to these issues in that it incorporates a review, evaluation, and recommendations regarding systems, programming, and operations from the point of view of standards, controls, and documentation. The audit should also deal with a review of: current and future application plans; equipment and personnel resources; and schedules. The audit should contain appropriate recommendations for implementation. The recommendations resulting from a full scale professional audit can provide executive management with a blue-print which, if acted upon, will provide him with the means for controlling costs, performance and results in ways heretofore unavailable to him.

Facilities Management

The professional audit also can serve as a basis for a facilities management proposal from the consulting firm. Indeed, the same recommendations incorporated in the audit would have to be adopted by the consulting firm if it were profitably to enter into a facilities management agreement with the client. Facilities management is, of course, a long term contractual relationship between the client and the facilities management organization or consulting organization. By this agreement, the consulting firm assumes complete responsibility.

for the information processing function at a fixed annual cost, usually below the client's current budget for EDP. The facilities management firm finds its profit through improvements in efficiency as indicated in the audit, as well as through improvements in personnel performance standards.

Executive management is increasingly turning to facilities management to resolve problems of control in the EDP area. There are many established and proven precedents for this approach in the accepted business practice of turning over specialized areas of the business to firms professionally established to accept them. For example, it is quite common to retain outside legal, advertising, public relations, and accounting firms. I submit that the same practice can be applied to the data processing function with beneficial results to all concerned.

Reduction of Personnel

Many people in our profession are opposed to facilities management because they have heard many horror stories regarding drastic reductions of personnel associated with the shift in management from the client to the facilities management firm. This is not a valid fear for the professionally competent programmer, analyst, or manager. Of course, the key word in this statement is competent. It has been demonstrated that the difference in performance between a good and a mediocre employee can reach twenty to one in the computer industry. Despite this fact, the general shortage of programming personnel during the 1960's led to a situation in which high salaries and low performance were the norm. To quote a Frost and Sullivan report on the computer services industry,

This attracted to the industry a large number of personnel who can only be regarded as phoneyes. Their knowledge of computer software or anything pertaining thereto was minimal, and many have now drifted out of the industry, (or as one commentator put it "back to the used car lots").

Obviously, this weeding out of incompetence is to the advantage of the profession as a whole.

The competent professional should find greater opportunity for advancement with the consulting firm engaged in facilities management than with the client organization. A fledgling but highly competent programmer analyst, realistically, rarely hopes to become president of his company if his company is primarily engaged in, let us say, the furniture business; but he can realistically hope to become president if he's employed by an EDP consulting firm engaged in facilities management. And, opportunities in facilities management will substantially increase throughout the next decade. To quote the Frost and Sullivan report referenced earlier, "Facilities Management firms will gross \$320 million in 1971, and will increase their penetration to \$870 million in 1975, and \$1.63 billion in 1980."

Facilities Management Services

To get back to the point at issue, data processing consulting firms will increasingly respond to the needs of executive level management through the provision of facilities management services. As Mr. Hoskyns, head of the Hoskyns Group, said in the February 27 issue of The Economist:

The executive has reached the point when he wants the milk, not the cow. By the cow I mean computer, people, and problems. And what he is saying is, I would like someone to take the cow away and start delivering the milk on Monday.

From my remarks so far, you may consider that my point of view is entirely too prejudiced by virtue of my employment. I recall, however, my IBM days when on occasion the IBM staff executive in charge of consultant relations would address a group of trainees or salesmen. He spoke with an accent which I still remember, and was famous throughout the organization for his oft-quoted comment, "Gentlemen, the consultant is your friend." His comment was often quoted because it was accepted with a tongue-in-cheek attitude. A consultant running around in one of our accounts was generally viewed as a threat by most IBM salesmen in those days, as I presume it is viewed today. Unfortunately, a substantial portion of data processing management share that anxiety, though not necessarily for the same reasons. The trepidation which data processing management feels with respect to the data processing consulting firm is understandable in light of the events in our industry over the past ten years.

Short Life of Software Houses

The first substantial number of pioneer independent software houses sprang up in the late 1950's and early 1960's. From a handful of companies in 1960, there were at one point in 1968, estimated to be no less than 3,000 independent software and services companies. The average size of these companies was very small, and only about 30 exceeded \$10 million in annual sales. This was a time when a group of programmers could get together, incorporate, and attract substantial outside capital without a specific business plan. Stock multiples for computer software and service organizations in 1967-'68 stood at 55 price/earnings ratio with some stocks trading at 300 times earnings. The recession of 1970 left many of these companies and, of course, their clients in a highly exposed position. Accordingly, some 1500 small companies went out of business or simply faded away. Most of these organizations were tiny, but bankruptcy struck some of the big ones too. Computer Applications, Inc., for example was one of the bigger independent houses which bit the dust.

Needless to say these events had a profound effect upon not only the EDP consulting industry, but upon their clients as well. Once the recession hit and the glamour disappeared, the poor management which was typical of many of these organizations reared its ugly head for all to see. Perhaps, though, this is a development which bodes well for the EDP consulting industry. These developments have forced the industry to move, to quote the president of the Association of Data Processing Service Organizations, "out of the entrepreneurial stage and into the stage of sound management."

Poor management within the EDP consulting industry has largely been responsible for the negative views which a substantial portion of Data Processing and Executive management people hold regarding the EDP consulting industry. All too frequently, due to poor management, software houses have performed inadequately and been unable to deliver their assignments on schedule and within
(please turn to page 40)

The Importance of Being Human

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"The fossil elbow joint was extraordinarily similar to the same piece in modern man. But the date of the deposit was certainly beyond the existence of anything like modern man. Volcanic basalt lying above the deposit gave an age estimate of about 2½ million years, pushing back the continuous record of human evolution ¾ of a million years at a single bound."

Outline

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5. A Quantitative View
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Chapter, pp. 92-100, from *Statistics: A Guide to the Unknown* by Judith M. Tanur, editor, 5 more editors, and 53 authors; issued by the Joint Committee on the Curriculum in Statistics and Probability of the American Statistical Association and the National Council of Teachers of Mathematics; published by Holden Day Inc., 500 Sansome St., San Francisco, Calif. 94111; 1972, hardbound or softbound, 430 pp; price, paperbound, domestic, \$4.95, foreign, \$5.50; hardbound, domestic, \$9.95, foreign, \$11.00.

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1. A Fossil Elbow Joint

In the summer of 1965, my paleontological colleague, Bryan Patterson, was in charge of a Harvard expedition working near the shore of Lake Rudolf in northern Kenya. At a locality called Kanapoi, searching in deposits believed to be of the early Pleistocene (the last geological epoch before the present), he picked up an important fossil. The broken lower end of a left humerus (the upper arm), it was easily recognized as hominoid; that is to say, it came from a creature of the group formed by man and his closest living relatives, the apes, but not from a monkey.

2. 3/4 of a Million Years Further Back in Time

What was the special importance of the fossil? From shape and size it could be seen at once not to belong to a gorilla, an orangutan, or a gibbon (and the last two have never been present in Africa anyhow). It was extraordinarily similar to the same piece in modern man, in fact, it was indistinguishable. But the date of the deposit was certainly before the existence of anything like modern man, and after the field season was over, volcanic basalt from a bed lying above the deposit gave an age estimate, by radioisotope dating, of about 2½ million years. The oldest human stage that had been established so far was that of the erect-walking but small-brained and large-jawed australopithecines found by Leakey at Olduvai Gorge, which had been dated at about 1 3/4 million years. If this small piece of arm bone were "human," or hominid, in the sense of belonging to such a creature, it would extend the continuous record of human evolution backward three-quarters of a million years at a single bound.

3. Chimpanzee?

But there was one problem. This piece of elbow joint in man can easily be told from that in orang, gorilla, and gibbon, but not from that in the chimpanzee. Although the rest of a chimpanzee's bone is shorter and stouter, this region is so similar in the two that many, if not most, specimens defy classification as one or the other on examination. In spite of different uses of the arm, this particular part shows such slight, subtle, and inconstant dis-

inctions in size and shape as to baffle ordinary methods of study even by experts. The problem, therefore, was this: either the bone was that of the earliest australopithecine yet found in our direct ancestral history or it was simply that of an ancestral chimpanzee, in which case we could breathe normally. What about testing something old with something new? Could an electronic computer tell us anything useful?

4. Can a Computer Tell?

A computer, of course, does not really "tell" anything. It merely makes possible answers to mathematical questions that we would not live long enough to answer if we tried to work them out with simple calculating machines. With its enormous capacities and speed, a computer transfers the effort from getting the right answer to getting the right question. Biological material — bones or skulls are good examples — lends itself to particular kinds of questions. Because the genes they inherit are capable of a virtually infinite number of different combinations, no two individuals of a population or species are exactly alike (with the spectacular exception of identical twins). So, quite apart from different habits of use, diet, or other accidents of growth, human elbow joints vary normally in size and details of shape, though they vary within a limit of form that is basic to the actions of human elbow joints.

Quite different species of animals, of course, have quite different forms in various body parts. Any beginner can distinguish between a cheek tooth of a mammalian carnivore, with its narrow, knifelike shearing crown, and that of a herbivore, which has a broad surface for grinding vegetable matter. These are marked evolutionary divergences. Within herbivores the differences are smaller, and within groups of herbivores such as pigs (for example, domestic pigs, wild boars, warthogs, etc.) or elephants, species distinctions are matters for experts, who can obtain a wealth of information from fossils as to the history of pigs and elephants or as to the exact species of animals present at a given time in the past at a fossil locality such as Kanapoi. Finally, for particular parts, such as the elbow joint in chimpanzee and man, the species distinctions may be so slight as to be eclipsed by the variation within each species, already described. That is the situation we are faced with here.

5. A Quantitative View

This is not just a matter of impression: it may be viewed quantitatively. Some time ago, Professor William L. Straus of Johns Hopkins University, a man with much experience in such studies, tried to deal with the same problem, when the same piece of the humerus of a species of australopithecine was found at the site of Kromdraai, near Pretoria, South Africa. In this case, it was plain that the bone belonged to Paranthropus, the species in question, because other skeletal and cranial parts of the same species had been found at the site, and the bone could hardly be assigned to anything else. Here the problem was whether the bone was more manlike or more apelike, since the hominid ("human") position of the australopithecines at that time was less clear. Professor Straus made a number of typical measurements of human and chimpanzee bones in an attempt to find differences between them. He found statistically significant differences¹ in the averages of certain of the measurements, but the absolute differences were slight, and the overlap in each measurement between man and chimp was so great that the Paranthropus fragment could not be allo-

cated to either. In no case did its measurements lie outside the range of either man or chimpanzee, though the figures were more often closer to the mean, or average, figures for the latter.

6. A Method Not Limited to Single Measurements

This was no solution and led to no decision as to the relationships of Paranthropus, insofar as the arm could shed light on them. In such a case, we need a method that is not limited to comparisons of single measurements, but that somehow takes account of the whole shape of the bone, or part, as the eye tries to do, and also has some way of emphasizing the really telling differences in shape between two species, if they exist. Now here is an important point: in the end, any such problem comes down to a mathematical question because the eye itself (though very seldom consciously) attempts to assess the average differences in proportions and complex aspects of shape, to rate the varying importance of these, and finally, to judge the probability that a given total shape, in a single case, falls nearer to the essential basic form within the variation of one population than to that of another. These are questions of quantity and probability, whether measured or not, and are thus statistical in nature. After all, educated opinion is always the weighing of probabilities. And here is another important point: biologists and anthropologists — and members of many other sciences — are not often strong in mathematics of a higher order, though they may see only too acutely the limits of their own ways of solving problems. At the same time, mathematicians, although they have hearts of gold, are not usually sufficiently conversant with the niceties of biological problems to understand just what the biologist is trying to gain by using a mathematical analysis. When the two really get together, however, the rewards in the way of new solutions may be great. And I must say that mathematical training among biologists who see better what such training can offer has increased notably in recent years.

7. Sifting Out Important Differences

Fortunately, the particular problem of the Kanapoi fossil is not exceedingly complex, and the solution was provided some years ago by the great English statistician and geneticist R. A. Fisher in the form of the discriminant function. The discriminant function eliminates the futile business of looking at measurements one at a time, of finding that the overlap prevents discrimination of two sets of specimens such as human and chimp elbow joints even though they are known to be from quite different animals, and of being unable to place something such as the Paranthropus specimen logically nearer one group than the other. It has a set of weights with which to multiply a number of different measurements of a specimen, the sum of the products being a single discriminant score that makes the best attainable use of all the information in the several measurements. Given two groups, such as men and chimpanzees, the computation develops the optimum set of weights possible from the measurements used: the effect is to sift out important differences — often quite invisible to the eye or in average figures — so as to emphasize precisely the aspects of shape and size that will best discriminate between the two groups. That is to say, compared to just that variation within a set of human elbow joints, or chimpanzee elbow joints, the distinctions between the sets are searched out mathematically so that the discriminant scores of the two groups are segregated one from the other to the maximum degree possible, limited only by the information contained in the measurements. Thus the

overlap, acting as a mask to hide any real group differences, is reduced or removed.

The basic idea of the discriminant function may be appreciated graphically in the case of two measurements, represented by the two axes of Figure 1. (The measurements might be heights and girths of two different groups of men.) The oval areas correspond to groups of individuals from two populations A and B. If we just look at measurement 1 by dropping projections on the horizontal axis, we find considerable overlap between the two populations. The same holds for measurement 2. On the other hand, the slanted line perfectly separates the two populations. This is not the place for mathematical detail, but to write the previous sentence is to say that looking at something like

$$(\text{Measurement 1}) + 2 \times (\text{Measurement 2})$$

gives us a new score, the discriminant score, which permits much better separation of the populations than either of measurements 1 or 2 alone. If there are more than two measurements, as in the present case, there are great potential gains in combining measurements.

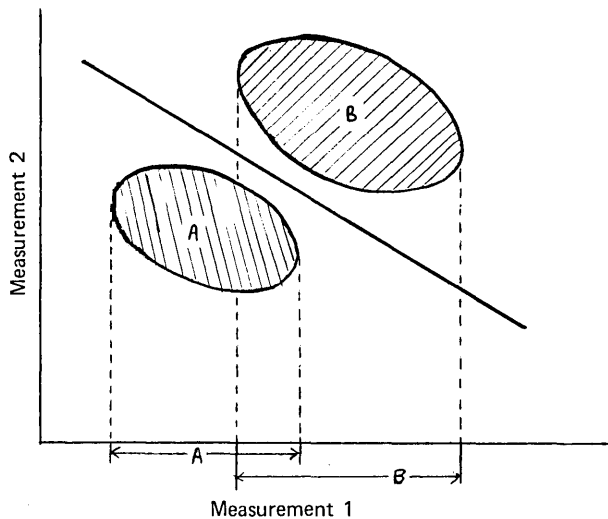


Figure 1

Two measurements together separate groups better than either separately

8. A Statistical Demonstration

Professor Patterson and I felt fairly strongly that the Kanapoi fragment was hominid — on the human, not the ape side, of the hominoid group as a whole. But we wanted to demonstrate this statistically, not merely to voice an opinion to which opposing opinions could be raised by others. As strategy, we examined human and chimpanzee humeri to see what measurements would most likely reflect such differences as we thought appeared, whether frequently or not. Figure 2 shows the fragment itself and some of the measurements. To begin with, we took the total breadth across the whole lower end, as a matter of general size (measurement 1). Second, the more projecting inner, or medial, epicondyle (at the left in the figure) has a snub-nosed, or slightly turned-up, aspect in some chimpanzees, and we hoped to register this effect by measuring from the lowest point on the trochlear ridge both to the "beak" of the epicondyle and to the nearest point on the shoulder just above it (measurements 2 and 3). The idea was that a slightly greater difference between these two would reflect a deeper

curve and more upturned epicondyle. We also measured the backward protrusion of the central, or trochlear, ridge of the joint, the length and breadth of the oval inner face of the medial epicondyle (none of these is shown in Figure 2), and an oblique height of the opposite, or lateral, epicondyle. We thought these measurements showed some tendency to vary one way in man, the other in chimpanzees, though not being the rule in either (if there were regular distinctions, obviously the problem of discrimination would be much less). We were not certain of the functional meaning of the possible differences, but they logically could be related mostly to muscle attachments connected with simpler and more powerful use of the flexor and extensor muscles of the hand in the chimp, in hanging by the arms or supporting the body in ground-walking by the characteristic resting on the middle knuckles, all as contrasted with the more general, but more complex and varied, use of the hands in man.

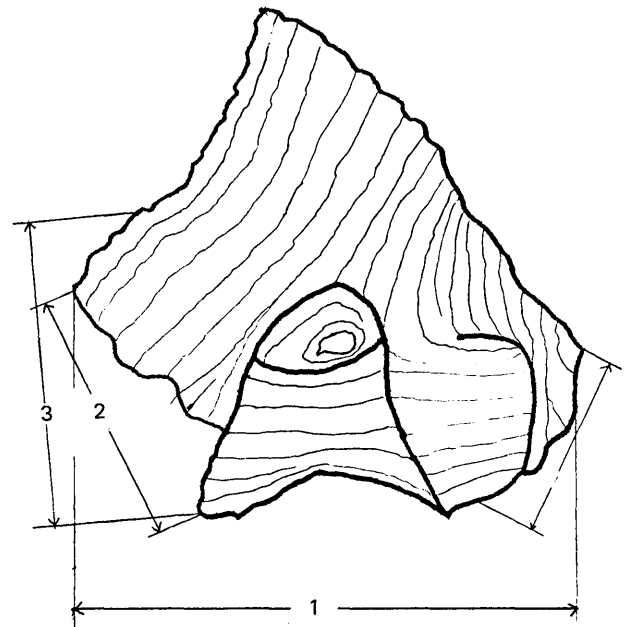


Figure 2

Kanapoi humeral fragment and measurements taken

9. Biologist-Statistician Cooperation

Now this is just where the cooperation comes in. It is the paleontologist's or anthropologist's business, from his background knowledge, to find measurements that will carry important and real information as to differences. It is the statistician's business to say how the measurements can be put together to bring out the differences for evaluation. Here, cooperation had already gone so far in recent years that the biologists knew in advance what statisticians could offer them and we planned our work accordingly.

We measured 40 human bones in the Peabody Museum at Harvard and those of 40 chimpanzees in the Harvard Museum of Comparative Zoology and the American Museum of Natural History in New York. As in Straus's measurements, the overlap of man and chimp was great, but the mean differences, resulting from the special selection of measurements, were in most cases better defined. The means for the two groups and the figures for both the Kanapoi and Kromdraai fragments (the latter taken on two casts) are given to 1/10 mm in Table 1.

(please turn to page 41)

How Technology Is Freeing The Secretary

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"Many smart women are keeping themselves ignorant of secretarial skills, to avoid the trap of being categorized as secretaries, and so precluding their promotion into more responsible positions."

Technology Changes Lives

Technology has a way of changing people's lives in unanticipated, often unpredictable ways. Computer technology is no exception. MOS (metallic oxide semi-conductor) circuitry, originally developed for computers, is now being applied to office machinery, in ways that promise to drastically alter the nature of office work and give women a better chance to advance within America's corporations.

Liability: Secretarial Skills

The way things stand now, many women making their way up in business and industry face the formidable liability of their own secretarial skills. The better their skills, the more they are categorized as secretaries, effectively precluding their promotion into more responsible positions. Many smart women are keeping themselves ignorant of such skills in order to avoid that trap; this is passing the burden on to office managers, who find good secretarial help harder and harder to come by.

New office machinery, utilizing MOS, is offering a solution useful to both sides. This machinery is taking over much of the very work that ambitious women are shunning. Thus, it is becoming possible for intelligent women to work in the office without wasting their time and creativity doing dead-end jobs.

Editing Typewriter

Until now, almost all the equipment used in the office was mechanical or electro-mechanical in nature. The automatic typewriter — which I prefer to call the "editing typewriter" — was the first machine to utilize electronics in the office. More recently we see the utilization of MOS in the office, with striking results. It has given the new calculators increased capabilities, smaller size and a lower price. I am the president of a company that is applying MOS circuitry to editing typewriters for the first time, with similar results: increased capabilities, lower price — and most important — simplified operation.

Let me explain briefly just what an editing typewriter does. Using magnetic tape cassettes or magnetic cards, it records the words that a typist is putting down on paper, typing at her best rough-draft speed. If there is an error in typing, she simply backs up, erasing the incorrect word, types the correct word, and goes on. When she is finished, she

presses a button. Then correct, complete copy is poured out at the rate of more than a page every two minutes. The magnetic tape cassettes or cards can be used for frequently retyped material and can be edited and repeated indefinitely.

More, and Simpler, Operations

Machines like this have been on the market for several years. With MOS technology, however, they have become much simpler to operate than before, and are capable of performing more typing operations.

An easy-to-operate editing typewriter lends itself to a radically different approach to document handling. Pieces of typewritten material that repeat themselves from document to document can be regarded as "inventory", to be recorded, stored and assembled into new documents. Sales letters and proposals that must be approved by several people, or go through several revisions, have to be typed through only once; the recording can be changed to incorporate corrections and revisions. Once the recording is finalized, an unlimited number of freshly-typed copies can be made, with or without minor variations for name, date, etc. Also, pages of statistics can be revised and updated without the drudgery of re-typing and re-proofreading.

Benefits

The editing typewriter is very useful for a secretary for it does a lot of repetitive work for her. Not the kind of work she might enjoy or profit from, but the jobs of retyping, revising, and correcting that go with the rest of the job.

With an editing typewriter in the office, the secretary is going to find her immediate job changed in two big ways. First, her own mechanical skills, such as accurate typing, become less of an asset, since there will be a machine that is faster and more precise. Second, she will find herself with time on her hands — and energy.

A smart secretary can use her newly-found time away from the typewriter. She can take on new jobs that will put her in closer touch with the decision-making levels of the corporation she works for. She will be able to attend meetings, do the first drafts of reports, coordinate and keep records, follow up past activities, handle questions, and solve problems. Most important of all, she will be able to witness first-hand how power operates in corporations. She may well find her job an "apprenticeship" to become
(please turn to page 40)

COMPUTER MUSIC IN 1972

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"A typical one-minute musical composition might require 45 minutes up to an hour of time from the central processing unit of an IBM 360/50."

The ability to create any imaginable sound is for musicians one of the most attractive capabilities of the digital computer. The hardware and music-generating programs¹ now available make it possible to imitate the sounds of traditional musical instruments with surprising fidelity and realism, and to synthesize a great variety of completely new sounds as well. It seems reasonable to speculate that in the not-to-distant future, computer-generated music could become as common as the more familiar kinds.

At present, however, anyone who wants to try his hand at generating music with a computer faces a discouraging situation. Work in computer-generated music is currently underway at only about half a dozen universities in the United States,² and it is

Stuart Smith began working in computer music nine years ago when his undergraduate School, Rutgers University, got its first computer. He received his B.A. in music theory from Rutgers and a M.F.A. in music theory from Brandeis University. He also studied electronic music at the Brandeis Electronic Music Studio.

Since then Mr. Smith has experimented with computer graphic art, musical analysis and composition and, most recently, sound-generation. Currently he is Assistant Professor of Music at Lowell State College, Lowell, Mass., where in addition to traditional music subjects, he also teaches electronic and experimental music, and directs a multi-media performing group.

at best a fringe activity even at these places. The work is usually carried on under difficult and frustrating conditions: small budgets, cranky equipment, late hours, long turnaround times, and the perpetual annoyance of being bumped by higher priority jobs.

There are four main reasons for this state of affairs.

Time and Core Requirements

Although the music-generating programs now in use³ are expertly written and highly optimized, they nevertheless eat up large amounts of core and CPU time. A typical one-minute musical composition might, for example, require 210K bytes of core and 45 minutes to an hour of CPU time (assuming that an IBM 360/50 is our computer). With overlay, the core requirement can perhaps be halved, but the time requirement is pretty much fixed at several tens of CPU seconds for each second of music generated⁴ — depending, of course, on the particular computer used and the complexity of the music being generated.

Difficulties

The second main reason is difficulty in obtaining, installing, and learning to use a music-generating program. A music-generating program is not available "off the shelf" from any software outfit, but must be obtained directly from the person who wrote it or from someone already using it.⁵ Assuming a program is suitable for your machine, there remains

the problem of actually getting it to run. This generally means bringing the author of the program himself to your installation to put it in. Finally, even though every effort has been made to write these programs in terms that will be intuitive for musicians,⁶ they are (even for experienced programmers) formidable structures, and the typical musician's first response to them is fear or a feeling of stupidity. There are few really helpful materials for learning how to use these programs.

Special Hardware

Next are needs for special hardware and personnel. Computer music generation requires an expensive (around \$60,000), special-purpose digital-to-analog converter⁷ to transform binary information on digital tape into analog information on ordinary audio recording tape. Further, a willing technician is needed to keep this device in working order. (Fortunate people may be able to find someone capable of building and maintaining a D/A converter).

Competition from Analog Hardware

Although the digital computer can theoretically generate any imaginable sound, in practice its capabilities are more limited.

First, music-generating programs are deliberately written so as to imitate the kinds of sounds produced by circuits found in analog music synthesizers: oscillators, filters, noise generators, envelope generators, etc. These relatively familiar effects are thus the easiest, most "natural" ones to achieve with the processes provided by the programs.

Second, the mathematical approximations used, for the sake of efficiency, to represent the various sound functions (waveform, amplitude modulation, envelope contour, etc.) produce sound output that is often no better than that of vastly cheaper hardware devices. For example, each of the sound waveforms used in a musical composition is typically stored by the computer as a table of 512 values. The computer produces a tone by repeatedly scanning the table, with provision for interpolation or skipping of locations to obtain all required frequencies.⁸ The waveform accuracy and signal-to-noise ratio resulting from this procedure are equivalent to those of presently-available audio equipment costing a tiny fraction of the price of a digital computer (in fact, an entire analog electronic music studio can be equipped for less than the cost of a commercially purchased D/A converter).

Minicomputer Control

In a newer type of electronic music system, a minicomputer is used to control an analog music synthesizer.⁹ The computer is given a program representing a musical composition, and then it "plays" the synthesizer by regulating the controls of the various units on the synthesizer which produce the actual tones, noises, attacks and delays, etc. This arrangement permits the composer to vary the playback speed of his composition without affecting the pitches of the notes and also allows him to edit wrong notes or make any other changes simply by changing the contents of the one or two storage locations containing the information to be altered.

The rapid man/machine interaction characteristic of this system probably makes it the most attractive of the presently-available alternatives: composers can hear their works, however complex, almost as

fast as they write them and then hear them again right away to judge the effect of any changes made. The educational possibilities of this situation are immediately obvious.

However, since the computer is not directly involved in the production of sound in this type of system, the system's performance is ultimately limited by that of the synthesizer: ease and speed in use are purchased at the cost of loss of generality.

Musicians: "Turned Off"

Beyond the admittedly difficult practical considerations discussed above, there is another, more serious problem plaguing almost all electronic music at present: the fact that so many people, including quite a few musicians, are "turned off" by it (which is the death blow to all your plans if one such person holds the purse strings at your school). Much of this feeling is, of course, just the natural resistance to anything new.

But there is also a deeper and completely valid reason: most electronic sounds at present are too simple and dull in comparison to the richness of traditional musical instruments in expert hands,¹⁰ or even when compared to the noises of our everyday environment. This poverty of sound derives from the fundamental process of electronic music synthesis itself, namely, the combination of incessantly repeated unit-elements: sine-, square-, and triangle-waves, various pulse shapes, etc. Regardless of the number of these units that are combined to make a sound, the basic sameness of the underlying elementary materials is still apparent.¹¹ It is this characteristic that prompts people to call electronic sound "artificial", "un-human", or just plain "weird". Even with electronically-generated noise — "white", "colored", filtered, etc. — the ear perceives the average characteristics in a fraction of a second and loses interest in the details of its random fluctuations.

New Digital Possibilities in Music

But the digital computer need not be used in this repetitive way. Here lies its true potential as a musical instrument of the future: if the appropriate number-generators can be devised, ones that will produce complex sequences of numbers directly (rather than, as at present, by redundant heaping of generator upon generator until a sufficiently complex sound results), the computer will be able to represent new, complex sound contours.¹² In this area the computer should be able to outstrip any conceivable piece of audio hardware and come into its own as a truly new musical instrument.

In any case, computers now have more than just a foothold in the field of music. They are currently being used to compose and analyze music, to make graphic records of music directly from sound, to produce scores without costly page-by-page manual editing, to investigate the make-up of the sounds of traditional instruments, etc.

It is only a matter of time before computer generation of music becomes an important part of the music scene.

Notes

1. The principles underlying these programs are lucidly explained in Max Mathews' book, *MUSIC BY COMPUTER* (MIT Press, 1969). Mathews, of Bell Laboratories, is the "father" of computer music, and
(please turn to page 42)

The June 1972 Raid on Democratic Party Headquarters (The Watergate Incident) – Part 2

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1. Introduction

This article is a second installment (date finished, Sept. 12) of a continuing report on the famous (or notorious) "Watergate Caper", 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. 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)

Richard E. Sprague received his BSEE degree from Purdue University in 1942. His computing career began in 1946 when he was employed as an engineer for the computer group at Northrop Aircraft. In 1950, he co-founded Computer Research Corp.; by 1953, with Sprague serving as Vice President of Sales, the company had sold more computers than any competitor. In 1960, Sprague became Director of Computer Systems Consulting for Touche, Ross, Bailey, and Smart. He became a partner in that company in 1963, and started its Advanced Business Systems Department in 1964. He is currently in a business development and marketing position in the business systems branch of a large New Jersey organization.

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.

"In the many sensitive cases I have handled, I have never had depositions sealed for the reasons given in this court. There has been a very deliberate effort to conceal the nature of the facts regarding the bugging." — Edward Bennett Williams, attorney for the Democratic National Committee.

- Eugenio R. Martinez
- Virgilio R. Gonzalez

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.

For more information and background, see the first article on this subject, published in "Computers and Automation" for August, starting on page 33; see also the references listed at the end of this article. In addition, a "cast of characters" (the dramatis personae) is given at the end of this article.

Much information has not yet been revealed. Important members of the Republican Party are using in general four tactics: (1) lying — for example, saying that persons who are connected with them are not connected; (2) silence, saying nothing — that is the standard tactic of the CIA; (3) counterattacking — such as starting law suits for libel against the Democratic Party and individual Democrats; (4) pressure — threatening and otherwise exerting force or strong pressure on persons connected with investigating, probing, or judging aspects of the situation.

2. Watergate Continued

The Great Watergate Caper, discussed and analyzed in last month's issue of C&A, continues to escalate and to become more and more embarrassing for the Republicans and President Nixon. Many new developments have taken place and new revelations made since the article last month went to press. The links between the Watergate invaders and the White House as well as the Committee to Re-Elect the President have become more obvious. Resignations of key high level Republicans have continued. Financial obfuscations involving several people in the Republican ranks have been uncovered. At least five separate investigations have been announced.

The motives still remain obscure. If the postulation made in last month's issue of C&A, namely that assassination of George McGovern was a prime motive, is true, the possibility that the FBI, Secret Service, Federal Grand Jury or the Justice Department

will thoroughly investigate the case is very slim indeed. Hopes will have to be pinned on McGovern himself and the Democratic National Committee carrying on their own investigations. Senator McGovern has strongly indicated that this will happen in a speech he made on August 15. He said, "What I regard as a real national scandal that I believe points right to the White House itself has not had the attention that it should have."

Also, the suit by the Democrats against the invaders was refiled in August. Edward Bennett Williams, famed defense lawyer, will represent Lawrence O'Brien and the Democratic committee. Lawrence O'Brien, Democratic campaign chairman, has demanded the appointment of a special prosecutor.

Another, much more all-encompassing, motive of the invaders and their sponsors and cohorts has been suggested by assassination researcher Mrs. Mae Brussell, of Carmel, Calif. In the August 1972 issue of The Realist, Mrs. Brussell postulates that the ultimate goal of the conspirators was to insure President Nixon's continued occupancy of the White House by cancelling the elections in November under a legally declared state of national emergency and martial law.

We shall examine the credibility of this thesis a little later. First, here is a summary of developments since the August article.

3. \$114,000 Linking Barker and the Republicans

1. A \$25,000 cashier's check was discovered in Bernard Barker's bank account. Barker was the nominal leader and apparent bagman of the Watergate invaders. The check originated with Kenneth H. Dahlberg, the President's campaign finance chairman for the Midwest. Dahlberg says he was on vacation and a fundraising trip in Florida (he lives in a Minneapolis suburb), where he had collected a lot of cash. He said he didn't want to carry cash to Washington, so he had a cashier's check made out to himself by a bank in Boca Raton, Florida, for \$25,000 in exchange for the cash. He says he brought the check to Washington and personally handed it to Maurice Stans, chief Republican fund-raiser. Stans told interviewers that he had turned the check over to Hugh W. Sloan, former treasurer of the Republican re-election finance committee who resigned from his post in June for "personal reasons unrelated to the incident." Stans said Sloan gave the check to G. Gordon Liddy, who then exchanged the check for cash and then depo-

sited the money in the campaign fund. Liddy is the lawyer who was fired from the re-election committee in June for refusing to cooperate with FBI agents working on the Watergate investigation.

Sloan was asked by reporters about Stans' comments. He refused to discuss any details but said Stans' account was "inaccurate." Reporters later interviewed Stans, Liddy and a spokesman for the Re-election Committee, all of whom refused comment. Dahlberg also refused further comment, saying he had no idea how the check could have gotten into the trust account of Barker Associates Inc., and stating, "I gave it to Maurice Stans, and that's absolutely the end of it as far as I knew." Ronald Ziegler, Nixon's press secretary, when asked about the check said, "No comment."

The check bore Dahlberg's endorsement but not Bernard Barker's. Banking authorities characterize the omission of Barker's endorsement as highly irregular. The check was dated April 10, 1972. Dahlberg at first claimed he had collected the cash prior to April 7, the deadline for declaring identity of contributors. Stans received the check on April 11 at the Washington Hilton hotel. Barker deposited the check in his account on April 20. He also deposited four Mexican checks totalling \$89,000 the same day. Barker withdrew \$25,000 on April 24 and \$89,000 in early May. Later, Dahlberg admitted he had received the check on August 9 at a golf course.

Clark MacGregor, Nixon's new campaign chief, could offer no explanation either. He said, "I know nothing about it. Mitchell and Stans would presumably know." Powell Moore, director of press relations for the Re-Election Committee, told reporters on July 31 that Stans would not be available for comment and John Mitchell could not be reached.

On August 17 a Washington Post editorial headlined "Mr. Stans and the Sounds of Silence" says about the old saying "the truth will out", don't count on it in the Watergate case. The Post says "Stans' narrative about the \$25,000 check makes things more, not less, obscure and only adds to the importance of the questions surrounding the whole affair which the principals refuse to acknowledge, much less to answer publicly.

On August 25, the New York Times revealed that the \$25,000 cash came originally from Dwayne O. Andreas, a Minnesota Democrat and businessman who gave it to Dahlberg in Florida.

2. A deposit of \$89,000 made by Barker to his account has been traced to four bank drafts issued in Mexico City by Manuel Ogarrio Daguerre, a 68 year old, semi-retired, prominent Mexican lawyer. Ogarrio has denied that he received, endorsed, or passed on the four drafts and denied knowing Barker. The drafts were drawn on Banco Internacional S.A., a large commercial bank in Mexico City. Each bears Manual Ogarrio's endorsement on the bank. Ogarrio's son Alejandro stated the signatures were not those of his father. He also denied that he or his father had an account at the Banco Internacional.

A spokesman for Barker said that the four bank drafts had come from a group of Chilean investors in a real estate transaction. He would not identify the group for fear of political reprisals in Chile. The Washington Star on August 10 ran a front page headline story stating that the \$89,000 passed through the Committee to Re-Elect the President before reaching Barker's account. The FBI was said to be trying to pinpoint the origins of the bank drafts

totalling \$89,000. Finally, on August 22, the source was revealed to be Texas Democrats for Nixon, rather than Chilean businessmen.

3. On August 18 the Washington newspapers began to tell a new financial story, quoting Clark MacGregor. He said that G. Gordon Liddy had been given authority prior to his dismissal to spend campaign fund money to find out what radical elements were planning for the Republican convention, then scheduled for San Diego. The August 22 edition of the Post says that a \$100,000 slush fund was uncovered by the office of federal elections department of the General Accounting Office, which is investigating the books of the Committee to Re-Elect the President. The \$25,000 Barker check was included in the \$100,000. GAO spokesman Philip Hughes says that a full GAO report will be forthcoming but that violations have already been found totalling several hundred thousand dollars. The Post estimates the violations (of the new disclosure law) to be \$500,000. They quote a spokesman as saying, "We found a rats nest." MacGregor stated that a security fund of at least \$250,000 was established before he took over the committee.

4. Indictments

There are at least three legal cases pending. The first is the civil suit by the Democrats. The second will be criminal indictments rumored to be imminent as this article goes to press. A federal grand jury in Washington has been investigating the break-in and according to Senator William Saxbe, Ohio Republican quoted in the Washington Star August 16, "an indictment is expected over the next week." Word was also passed around among Republican Convention delegates to expect indictments soon.

The third is a possible indictment of Barker for forging a check endorsement notarization in Florida.

Earl J. Silbert, principal U.S. Attorney leading the grand jury investigation, refuses comment on a date. Richard Kleindienst was quoted as saying indictments might be returned before September 7. However, a spokesman for the attorney general later said he was misquoted and that he didn't give any timetable. This is an important point for the Democrats because of a newly adopted rule of the U.S. District Court in Washington which requires Judge John J. Sirica to begin any widely publicized trial within 60 days of an indictment. This would mean a trial would start before the November 7 election, if indictments were completed before September 8. Republican attorneys can be expected to try delaying the case by all means possible. McGovern and O'Brien have already gone on record predicting delays and coverups.

O'Brien said on August 23, "The delay in releasing a GAO report (on the Republican campaign funds and Barker's bank account) is the most outrageous conspiracy of suppression that I have witnessed in a generation of political activity. It's an example of the frantic Republican effort to conceal, lock up or otherwise submerge a growing scandal that reaches into the White House itself. A clear pattern has now emerged: suppress at all costs the facts of this deepening morass. This kind of coordinated coverup can only mean that President Nixon, John Mitchell and Maurice Stans believe that the facts, if known, would seriously jeopardize the entire Republican re-election campaign."

An even greater suspicion of coverup is caused by the civil suit. Nixon's Re-Election Committee law-

yers filed a brief in answer to the suit. The brief asked that a date be set by the judge, Charles S. Richey, for the suit to be tried after the November 7 election. The lawyers stated that irreparable damage could be done to the Republican campaign by holding the trial prior to November 7. Richey said, "I don't intend to make this into a political case." He then ruled on August 22 that all pretrial testimony and records must be kept under seal and withheld from the public until after the grand jury completes its investigation and returns indictments in the criminal case. He did this to protect the constitutional rights of persons who may later be charged in criminal proceedings.

Edward Bennett Williams initiated the taking of depositions on August 23 from Maurice Stans, John Mitchell, Hugh Sloan, Gordon Liddy, Douglas Caddy, Howard Hunt, Charles Colson, Alfred Wong, James McCord, Bernard Barker, Frank Fiorini, Eugenio Martinez and Virgilio Gonzalez. He also subpoenaed from the telephone company the phone records of Mitchell, Hunt, Caddy, Colson, Liddy, Sloan, Barker, and the Republican Re-Election and Finance Committees. (For reasons see later section on phone calls.) Judge Richey's order will place all of these depositions and the phone records under seal for some time. His ruling represented a mysterious shift in position implying Presidential or Justice Department pressure. On August 11 he held that only the statements of the eight specific persons named in the civil suit could be kept under seal. He said then, "I hope the time comes when the facts in this case are spread across the newspapers. If there's something wrong, it ought to be exposed."

Williams didn't think much of the ruling. He told the judge, "In the many sensitive cases I have handled, I have never had depositions sealed for the reasons given in this court. There has been a very deliberate effort to conceal the nature of the facts regarding the bugging." He told Richey his order would be counterproductive and would serve to focus additional attention on the case.

The Republicans, the judges, the General Accounting Office, the FBI, the lawyers and everyone else involved on the side of the invaders is covering up to such extreme lengths, that one is convinced that a very serious, possibly sinister, motive must have existed.

5. Investigation by the General Accounting Office

Congress passed a new law last spring which made it illegal to withhold the identity of any contributors to political parties and campaigns. The law went into effect on June 7. A new department was set up to handle violations, under Philip S. Hughes. Announcements were made about an audit of the Re-Election funds soon after stories broke concerning the \$25,000 check and the \$89,000 bank drafts. The GAO was ready to release a report about the Barker checks and the violations (rumored to total \$500,000) on August 22, when the sudden suppression took place at the request of Maurice Stans to Elmer B. Staats and Hughes. Staats heads GAO and used to work for Stans. Roland Sawyer, GAO spokesman, confirmed that Stans called from the Republican Convention in Miami just one hour before the report was to be released. Hughes jumped on an airplane and went to Miami with Robert Higgins, one of his field investigators. Neither one was available for comment for a day. Upon his return, Hughes said, "We went down there chasing more material." The GAO, feeling the intense pressure and a threat of subpoena of the report by Wright Patman, finally released it on August 26. Meanwhile,

reporters on August 24 found out a little more about the \$89,000. The FBI questioned Robert H. Allen and Emmett E. Moore, chairman and treasurer of the Texas Finance Committee to Re-Elect the President. Allen is a Texas multimillionaire who is president of Gulf Resources and Chemical Co. of Houston. Gulf has been represented for many years in Mexico by none other than Manuel Ogarrio Daguerre, whose signature, real or forged, appeared on Barker's four bank drafts. Hot after this possible link, reporters found out that Allen had been recruited for Nixon's fundraising by William Liedtke and Roy Winchester, two other Houston oil executives. They served as Southwestern co-finance chairmen for the Nixon campaign. Liedtke contributed \$17,000 to Republicans in 1968 and is president of Pennzoil United Co., while Winchester is vice-president for public affairs. Winchester maintains a permanent suite at, guess where, the Watergate Hotel, attached to the Watergate Office Building where the raid took place. Neither Winchester nor Liedtke were available for comment on August 24, and Liedtke was found to have cancelled a room reservation on August 23 at the Watergate.

Moore stated that since the \$89,000 was sent through Mexico prior to May 30 it could not have passed through his and Allen's hands because their Texas committee was not formed until May 30. He said prior to May 30 all campaign contributions had been handled by Liedtke and Winchester.

6. Investigation by the House Banking Committee under Rep. Wright Patman

Wright Patman, chairman of the House Banking and Currency Committee, announced that his group would undertake an independent investigation of the Watergate Caper. He said, "The delay raises major questions about the objectivity of the GAO report. The release of information to Nixon's committee before its release to the public gives the Republicans a golden opportunity to cover their tracks, to put a good face on this sordid affair."

His pressure and threat to subpoena the report helped spring it loose from GAO on August 26. However, he was very unhappy about the GAO turning the matter over to the Justice Department to investigate. He said that is the same group who want to delay the civil suit until after the election.

7. Earlier Bugging Break-Ins

Lawrence O'Brien announced upon amending the civil suit, that the bugging of Democratic Headquarters had been going on for some time. Speculation started up that the five invaders had actually been removing bugs planted earlier. Rumors about earlier break-ins had been circulated, and records showed that nine men registered at the Watergate from May 26-29 and again on June 16-17. The known raid took place on June 17, so the possibility exists that monitoring had been going on for nearly a month.

The bugs were planted apparently in the ceiling panels of O'Brien's office and two other offices with crudely made radio transmitters attached to microphones. The question naturally arose, where were the radio receivers and tape recorders and people listening at the other end. Time magazine claimed to have found the answer when they reported in their August 28 edition that the receivers had been located in Howard Johnson's motel directly across Virginia Ave. from the Watergate Office Building. And guess who Time says was staying there? none other than G. Gordon Liddy, E. Howard Hunt, and big surprise, Robert Mardian. Mardian was former U.S. Attorney

General under Mitchell, generally considered to be the author of the use of Federal Grand Juries across the U.S. in the crackdown on hippies, Yuppies, Panthers, SDS members and other "undesirables". Mardian, who now works for Nixon on the Re-Election Committee, supervises the campaign in Texas. Allen, Moore, Liedtke and Winchester (Watergate Suite) all work very closely together. Mardian denied the Time story to reporters, and Hunt and Liddy could not be found to be interviewed by reporters on August 20. Time enlarged on the story by stating that McCord had given Hunt, Liddy, and Mardian their assignments and that this intelligence squad grew out of a team of "plumbers" recruited by the Nixon administration to investigate leaks to the news media.

8. Line of Sight Transmission to Mitchell Apartment

I visited the Watergate complex in late August and determined that line-of-sight transmission was possible between the three bugged offices in the rear or hotel side of the office building, and the rooms on one side of the Watergate Hotel. However, large chunks of iron, steel and concrete lie between the bugs and Howard Johnson's, preventing line of sight transmission. Another possible location for the radio receivers with direct line of sight transmission was the penthouse apartment of John and Martha Mitchell in the apartment building across from the hotel.

Since monitoring apparently went on for nearly a month, and since the invaders checked in and out of the hotel in May, it would seem likely they used a more permanent, less public location for the receivers and tape recorders than either Howard Johnson's or the Watergate Hotel.

What better place, and least suspicious location, than John Mitchell's own apartment? Perhaps that is why Martha received a needle in her posterior administered by five, (not one) men when she tried to tell Helen Thomas of UPI about the dirty tricks and the cops and robbers games that go on. Martha was quoted as saying, "I'm sick and tired of politics. I'm a political prisoner. I know dirty things. I saw dirty things. I'm not going to stand for all those dirty tricks that go on. I was a patriot until I got assassinated. What country can I go to?"

"A telephone call to Miss Thomas confirmed the fact that Martha had mentioned James McCord's name to her in the course of one of their long rambling conversations. Miss Thomas could not recall her saying anything which would hint one way or another at what she had actually seen that was dirty, or where."

If Martha did see men, tape recorders and radio receivers operating in her own apartment, it could account for her high degree of disgust about "dirty tricks."

9. Telephone Calls Between Barker and Republicans

The stimulus for Williams to obtain telephone call records came from newspaper investigations of FBI records of phone calls from Barker's Florida home office in Miami to the office of G. Gordon Liddy in Washington. Mr. Liddy looks like one of the centers of the whole plan involving the five arrested plus Hunt, Caddy and others at higher levels. He was fired by Mitchell, shortly after the case broke, ostensibly because he refused to answer FBI questions. But when Mitchell resigned shortly after that, the suspicion arose that both men did not want to be in an official position when the Watergate flood gates opened.

On July 25 the New York Times broke the telephone call story. They stated "at least 15 calls to President Nixon's campaign organization were placed from telephones in the home and office of ... Barker in Miami Records of the calls ... suggest more direct and extensive links between the Watergate incident and the Committee for the Re-Election of the President than previously reported." The first calls were placed in March 1972. More than half of the calls (9) went to Liddy's unlisted office phone in Washington before he was fired. The last call was made from Barker's home the day before the raid. The other 6 calls went to a number in the offices of Liddy and Glenn Sedam, which has since been disconnected. Sedam says he knows nothing about the calls, although he admitted sharing the phone with Liddy, and Liddy refuses to comment. Sedam is now general counsel to the Nixon committee, succeeding Liddy.

Three of the calls shook up Sedam a little. They were placed to the shared phone (which is still connected) on April 10, April 27 and May 1. According to Sedam, Liddy moved out of the office to a new headquarters for the committee on March 27. Sedam said, "Barker sure wasn't calling me, I can guarantee you that." Calls to the disconnected phone were made on April 10, May 8, two on May 17, June 1 and June 16.

Calls to the still connected phone (202 333-6575) were made on March 15, March 16, March 20, March 22, March 23, March 24, April 10, April 27 and May 1. The raiders were at the Watergate on May 26-29 and June 16-17. Barker obviously called Liddy or someone else about a week before the first Watergate visit, two days after the visit, and the day before the raid.

The next Times story on July 26 was even more interesting. Barker telephoned Hunt and Liddy several times at their homes in suburban Maryland. He phoned Liddy's home from Miami on June 10 and someone phoned Hunt's home and his Washington office at least 29 times at the rate of two or three calls a day at times. The Hunt calls were made over a period of months and included two calls on June 16 and June 17, the day of the raid.

The latter may have been made by Barker's wife because Barker was in jail at the time. In addition, Barker called several Washington hotels including the Watergate, Statler Hilton and Manger Hamilton, and also called Santiago, Chile, Caracas, Venezuela and another place in Venezuela. On February 28 he sent a cable to Rio Piedras, Puerto Rico.

10. Interpretation — The Reality Behind the Movie "Z"

In seeking an interpretation of all these goings on, it is perhaps worth looking at the reality behind the movie "Z".

Two significant assassinations took place in 1963: President John F. Kennedy in the United States and a liberal politician in Greece, Gregory Lambrakis. They were both murdered that year by cabals made up of military, paramilitary, espionage, local police, and ultra right-wing elements with direct links to the national government.

The movie (and book) "Z" was a novel based on the actual event in Greece in 1963 after the military takeover had occurred. A few politicians in Greece on the liberal side were objecting to the right-wing, military control and suppression of civil liberties. Z, one of the liberal deputies, was appearing at a political rally in Salonika in northern Greece. Several military men and local police including a general who lectured

on the Communist disease, likening it to the spreading of downy mildew, conspired to assassinate Z. Knowing that "leftist" demonstrators would be at the rally, they employed hundreds of ultra right-wing laborers, thugs, toughs, and semi-professional killers to counter-demonstrate and start fights and riots. The local police chief conspired by ordering his men to stand idly by while the right beat up on the left. When Z came out of the rally hall into the public square to demand that the police stop the fighting, two hired assassins killed him in the melee and confusion, using a small truck and making it look like an accident. Newspaper and official statements treated it as an accident. A reporter from Athens smelled conspiracy and began investigating. A young prosecutor from the central government in Athens spurred by the reporter and Z's supporters investigated, uncovered the conspiracy, arrested the general and the others and was ready to prosecute. At the end of the movie, the high government powers suppressed the entire matter, sent the prosecutor off to other duty, reinstated the general and others, assassinated several people who might have talked and that was that.

In the reality behind the movie, the author, Vassilis Vassilikos, was really there; and most of it really happened. Z was actually Gregory Lambrakis, a great pacifist liberal leader, member of the chamber of deputies and probable candidate for high office. His death was mourned by his supporters all over Greece and the mark, Z, appeared in print, chalk and scratchings everywhere for months after he died. Z stands for "Zei", meaning "He lives."

The book and movie have been completely banned in Greece and Vassilikos has lived in exile since it was published in 1966.

The implications for the United States began when the United States helped the new Greek military regime overthrow the former government, through CIA support. The same generals who assassinated Lambrakis and the government officials who covered it up are still in power and still backed by the Nixon administration. For example, Secretary Rogers announced on August 24 that the U.S. would base Sixth Fleet destroyers in Greek ports.

11. Right Wing Links and the Republican Convention

Many of the people on the list have right wing connections or have been involved in right wing activities in the past.

The five men arrested have all been associated with ultra right-wing, Anti-Castro Cuban groups since the Bay of Pigs. They were all involved one way or another in contingency plans dealing with radicals, especially for the Republican Convention. They were preparing to stir up or otherwise organize ultra right-wing groups and elements, if necessary, at the Convention. James McCord was hired as Chief of Security for Nixon's committee, and also his company was given a contract, recommended by Secret Service agent Al Wong, to provide all security for the Republican Convention in Miami. As Mae Brussell said in her article, "The Secret Service that hired McCord did not follow his off-duty meetings at the Watergate Hotel (during the first visit of the group when they undoubtedly planted the bugs) on May 26-29. If the data banks and surveillance systems keep records of 'radicals' and 'demonstrators', it seems they could follow their own hired Security Chief." The idea that the man hired to protect the President of the United States at his own nominating conven-

tion, by the Secret Service, actually was arrested for breaking into the opposition party's headquarters to remove bugs he planted earlier, does seem ludicrous. Mae also says that Bernard Barker was planning "a little action" at the Convention, apparently with McCord's able protection and sanction. "He was telling people in Miami that 'something is going to happen at the time of the conventions'. He was then planning demonstrations in approval of Nixon's bombing of Haiphong Harbor. April 24, Barker and a secret team of 7 men went to Miami to hire provocateurs for a New York demonstration in May. Four of this team were arrested at the Watergate Hotel." "Money to pay for street scenes and fights with police and radicals (by Cubans) came from the same money man, Bernard Barker, who also served as the conduit of funds for the Bay of Pigs Invasion." Barker was handing out in Miami to ultra right-wing agitators and demonstrators, crisp \$100 bills, consecutively numbered as in all CIA-type operations. (See my prior article in August, 1972 C&A.) These bills came from the \$25,000 + \$89,000 that Barker withdrew from his account, and indirectly from the Committee to Re-Elect the President.

James McCord was paid for his role in the Watergate raid using the same Republican source of funds. If this all sounds a little like the General and other right-wingers in the movie Z in the demonstration scene when the Deputy is assassinated, the reader is encouraged to check Mr. Clark MacGregor's statements in the *Washington Post* and *Star* papers on August 18. In slightly different terms he confirmed that Barker and McCord were doing just what the papers and Mae Brussell claimed. When he was asked about the Republican \$100,000 "security" fund from which Barker apparently was given the money, he said that Liddy had been fired partially because he spent money to find out what radical demonstrators were planning for the Republican Convention, and to get ready for them.

Like the General in Z, the best way to get ready in Barker and McCord's minds, and possibly in everyone's mind right up to Nixon himself, would be to fight fire with fire. Pit Cubans against "radicals." Stir up trouble, and maybe in a general melee, the correct political figures will get hurt. Don't forget that these plans and the raid all took place before the Democratic Convention, so the same disruptive techniques might work there, too. History tells us that ultra right-wing Republicans did exactly the same thing at rallies and at the polls in the election of 1964.

Frank Sturgis was also planning demonstrations by right wing Cubans for the Republican Convention. So was Martinez. Both men were seeking many rooms for the Convention. The *Washington Post* quoted Miami law enforcement officials as being puzzled by this since the Republicans had no need for more rooms. Sturgis was also planning to import students since he called Barry College and two private Catholic colleges looking for Young Republicans. Eugenio Martinez was making reservations for about 3000 "young Republican demonstrators". Actually, to bring into Miami thousands of young right-wingers, all they probably had to do was contact Douglas Caddy.

Mr. Caddy, lawyer for the Watergate five, who was held in contempt of court on July 13 for refusing to answer grand jury questions about the raid, also has a right-wing background.

Caddy, who was recommended by Charles Colson as a part-time White House consultant, appeared, accord-

ing to the U.S. grand jury, unsummoned and "mysteriously," at a police station soon after the break-in and helped the five men. The grand jury should have discovered he co-founded Young Americans for Freedom, an ultra right group which has been infiltrated by Nazis, right-wing radicals and extremists.

Angel Ferrer, one of the Watergate men not arrested, and president of Ex-Combatientes, anti-Castro Cuban group, was very active in Miami and had many Washington contacts. He was reported to have offered the Republicans direct action to combat left-wing causes in the U.S. How could McCord have maintained security in Miami with all of these plans? Perhaps he didn't really want to. He was a member of James Landis' special 16-man unit, concerned with plans and preparedness, part of the executive office of the President. The unit's purpose was to prepare contingency plans to deal with radicals (presumably left-wing). The unit's work, according to Landis and Captain R. Franz, U.S. Naval Reserve, also included control of the news media and the U.S. Mail.

E. Howard Hunt was known as a very conservative Republican during his 21 years with the CIA. He had occasion to put down the "radicals," "blacks," and "war protestors" many times. Hunt wrote Brown University alumni that "he deplored the lack of patriotism in youth," when Brown students objected to a scheduled lecture by Henry Kissinger. During his CIA days, Hunt was senior member of a Special Task Force during two periods of national emergency and participated with the White House on security matters. Mae Brussell asks, could these periods of crisis have been when we were removing Diem in Viet Nam by CIA coup d'etat or when we helped the military overthrow Greece, or when John Kennedy was murdered by CIA elements?

To men like these, a little bugging job at Democratic National Headquarters must seem pretty mild and certainly legal and patriotic.

12. Robert Odle, Who Hired McCord

Another new name on the list is Robert Odle. He was named as the man on the Committee to Re-Elect the President who actually hired James McCord as chief of security. The White House refused to allow Odle to be queried by anyone. He was staff assistant with Communications in the White House.

13. Alfred Wong, Who Recommended McCord

The Secret Service suddenly entered the picture with the introduction of Alfred Wong's name. Since he recommended McCord and is right there in the White House, his role may be very important. For Senator George McGovern, who is presently relying on the Secret Service for his security, this could have sinister implications. Wong is refusing to talk, and is having difficulty getting the Justice Department to represent him before the judge in the civil suit. The judge ruled that a conflict would develop if the Justice Department defended Wong because they will be prosecuting the five men in the criminal case.

14. Investigation by Florida State Attorney Gerstein

Still another investigation surfaced late in August when Maurice Stans was questioned under oath by Martin Dardis, investigator for Richard Gerstein, State Attorney in Miami. Kenneth Dahlberg was also questioned about the \$25,000 check. Barker apparently used his notary public seal to attest that

Dahlberg had endorsed the check in Barker's presence. Barker did this at his Miami bank in order to deposit the check. Although Gerstein's investigation is legally limited to crimes in Florida, he has admitted that a complete investigation of the whole affair has been under way for some time.

15. Researcher Mae Brussell's Interpretation

Let's examine the credibility of Mae Brussell's guess about the overall goal of the entire team, including Mitchell, Liddy, Caddy, Hunt, Wong, Barker, McCord, Gonzalez, Fiorini, Martinez, Ferrer, Lopes, Colson, Landis, Mardian, and perhaps others. The guess was that the security money was to insure by any means necessary the security of Richard Nixon remaining in the White House for the next four years. The means to the end under contingency plans, if the Democratic candidate showed strength, could have included declaration of marshal law and cancellation of the elections.

Remembering that the group's plans were laid during a period when there was still a possibility, slim as it may have seemed, that Ted Kennedy might have become the Democratic nominee. Or perhaps a McGovern-Kennedy ticket was considered possible. The meaning of the word contingency is what counts. It means what do we do if the thing with the smallest probability actually happens.

16. Rand Corporation Commissioned by President Nixon to Study Conditions Under Which 1972 Presidential Election Could Be Canceled

Rand Corporation was commissioned by Nixon to study the legal conditions under which the 1972 elections could be cancelled. An uncontrollable state of emergency caused by riots and demonstrations by the radicals, with martial law declared, is one such condition.

17. Los Angeles Police Undercover Squad 19, to Provoke Violence at the Republican National Convention in San Diego

Mae Brussell cites the public statements of Louis Tackwood, former Los Angeles Police Department paid agent and provocateur, to demonstrate that the Watergate team may have had just that condition in mind at the time of the Republican Convention which was scheduled for San Diego at the time plans were laid.

Tackwood's book The Glass House Tapes — The Story of an Agent Provocateur and the New Police Intelligence Complex will be published soon by Avon Press. He disclosed in a press conference in September 1971 in Los Angeles information about "Squad 19". This was a special group within the Los Angeles Police Department whose plans included provocateur agents who would create enough violence at the Republican National Convention that martial law would be declared. Squad 19 was formed by the Criminal Conspiracy Section and the FBI to provoke violence at San Diego in August 1972. Tackwood stated, "The plan entailed planting a number of agent provocateurs both inside and outside the Convention. Agents were to infiltrate the groups planning demonstrations against the war and poverty. At the time of the demonstrations, these agents were to provoke street battles with police surrounding the convention hall. Meanwhile, agents inside the convention hall were to plant explosives timed to blow up coincidental with the riots in the streets. The purpose was to kill a number of delegates. The result would be to create a nationwide hysteria that would then

provide President Nixon with the popular support necessary to declare a state of national emergency. Orders for Squad 19 came directly from the California State Department of Justice, and State Attorney General Evelle Younger. Richard Nixon would then arrest all militants and left-wing revolutionaries and cancel the 1972 elections. He could invoke special emergency powers leading to the detention of political activists. Martial law would be achieved." Tackwood resigned from the LAPD when he found out what Squad 19's plans were.

If an extension of Tackwood's Squad 19 description is now applied to what is known about the Watergate Squad's plans for the Democratic and Republican Conventions in Miami, the following contingencies can be postulated. For the Democratic Convention, especially if Ted Kennedy were in the running, follow the Z pattern. Results could be either assassination during a melee or martial law or both. For the Republican Convention, create a martial law situation and cancel the elections.

With this view, the bugging of Democratic National Headquarters becomes one of the less important activities of the Watergate Squad. What some of those investigating groups should be checking out are the Miami activities, the right-wing connections of Caddy, Liddy, Hunt, Colson, et al., and above all an investigation of Squad 19 and the role of the FBI in it. Perhaps Richard Gerstein with Miami jurisdiction and Wright Patman with Congressional authority can accomplish some things.

The best bet, however, would seem to be Lawrence O'Brien's suggestion to Mr. Nixon, repeated several times, that a special prosecutor (like the one in Z) be appointed, independent of the Justice Department, the FBI, and the CIA to investigate the entire case. If necessary, this prosecutor should be empowered to prosecute and take testimony under oath from anyone and everyone involved, including Richard M. Nixon.

18. Late Notes: September 12, 1972

As this article goes to press, announcements and developments are taking place at the rate of two or three per day. The Democrats are obviously not going to let President Nixon and his cohorts continue to cover up the situation. They amended the civil suit on September 12, naming Maurice Stans, Gordon Liddy, E. Howard Hunt and Hugh Sloan in a conspiracy to illegally obtain information from the Democratic party. Mr. O'Brien, Senator McGovern and Mrs. Jean Westwood, Democratic national chairwoman, all stated that more bugs and tapes had been planted or attempts made to plant them in McGovern's Capitol Hill headquarters as well as at Democratic national headquarters.

Republican ranks seemed to be dividing. One of Martha Mitchell's security guards admitted participating in the bugging at the Watergate. He told both the FBI and the federal grand jury that Hunt, Liddy and others had monitored conversations in the Democratic offices, taped them, typed them, and prepared memoranda directed to top-echelon officials of the Nixon committee and to Nixon's assistants. James McCord typed the memos.

19. High Level Informant for Senator McGovern

Sources close to McGovern let it be known that he has a high level informant in the Nixon committee. McGovern would not comment on this, but he did not deny it. As Mr. Shriver stated on ABC's "Issues and Answers" program on Sunday, September 10, it

would seem that someone on the Republican side developed a conscience suddenly.

Bernard Barker, for his part, granted an interview to the New York Times on September 12, admitting his role, but refusing to implicate anyone higher up. He basically stated that an old CIA-FBI espionage type person learns early in his career to be silent and to take the rap for his superiors if he is caught.

His most significant statements pertained to the political or psychological viewpoints of those involved. He said that, "most Cuban refugees, himself included, believe that an election of McGovern would be the beginning of a trend that would lead to socialism and Communism, or whatever you want to call it." He spoke highly of E. Howard Hunt, saying he had "never known anybody who this country is so indebted to as Howard Hunt."

These two statements taken together with what is known about Barker, Hunt and McCord's backgrounds and plans for the Miami conventions, confirm the appearance of an American "Z" situation, with the Watergate conspirators possessing the same attitudes as the Greek officers.

Further high level evidence of this thinking appeared in the Evans-Novak column on September 9. They discussed the battle between Charles Colson and Clark MacGregor over who is going to control President Nixon's campaign strategy. Colson influenced Senator Robert Dole, Republican national chairman, to issue a statement bludgeoning Senator McGovern for his willingness to condone the violent demonstrators at the Republican National Convention "by his silence". Colson told MacGregor he should issue a similar statement because the President wants it done. MacGregor issued a toned down statement after his aids checked with H. R. Haldeman who had never heard President Nixon say anything about it.

The conspiracy team as of September 12 would appear to be captained by Charles Colson, with E. Howard Hunt, Maurice Stans, Gordon Liddy and James McCord at the next level. Barker, Gonzales, Sturgis, Martinez, a former Martha Mitchell guard, Caddy, Sloan, Ferrer, Lopes, Wong, De Diego, Liedtke, Winchester, Odle, and perhaps Mitchell and Mardian were also part of the team.

20. Barker and Sturgis' Film, June 10, Showing Documents

Barker and Sturgis showed up at a film-developing shop in Miami on June 10, a week before the arrests, and got two rolls of 35 mm film processed. Michael Richardson, the owner of Rich Photos, Inc., got a look at what was on the film and says there were pictures of documents being held by hands wearing rubber gloves. He remembered seeing a number of letters to and from Larry O'Brien on the film. This evidence (substantiated by a lie detector test and statement under oath to Richard Gerstein) confirms the O'Brien claim that monitoring had been underway for some time prior to June 17.

Mr. O'Brien summed up the situation when he said on national TV on September 1, "Mr. Nixon, you can try to cover up the truth about the Watergate affair but you will not succeed. It will cost you the election." □

Appendix 1 - Index of People Referred To

Since the August article, the list of people involved in the Watergate arrest on June 12 has been

growing quickly. To maintain a complete list is hardly possible. Nevertheless, an attempt is made below to identify persons named.

Robert H. ALLEN - President, Gulf Resources & Chemical Co.; chairman of Nixon Texas Finance Committee
Jack ANDERSON - newspaper columnist; close friend of Frank Fiorini, who was arrested at the Watergate
Dwayne O. ANDREAS - Minnesota businessman who contributed the \$25,000 to Dahlberg in Florida
Bernard L. BARKER - arrested at the Watergate; associated with the CIA and the Bay of Pigs invasion
Paul E. BARRICK - Nixon committee treasurer
Judge James A. BELSON - Washington, D.C., judge on the five arrests
Dorothy BERRY - sister of James W. McCord, who was arrested at the Watergate; employed by Houston Oil Co.; on board of directors of McCord Associates, Inc.
William O. BITTMAN - lawyer for E. Howard Hunt, who was named in address books of those arrested at Watergate
Capt. Manuel Artime BUESA - involved with CIA invasion at Bay of Pigs
Douglas CADDY - lawyer for the five men arrested at the Watergate, friend of Bernard Barker
Charles W. COLSON - attorney, counsel to President Nixon, office in the White House, handles "touchy" political jobs
Juis J. CREEL, Jr. - former partner of Ogarrio
Manuel Ogarrio (DAGUERRE) - Mexico City lawyer for Gulf Resources
Kenneth H. DAHLBERG - Midwest campaign manager for Nixon
Martin DARDIS - chief investigator for Gerstein, questioned Dahlberg
Felipe DE DIEGO - anti-Castro Cuban in Miami; at Watergate Hotel May 3-4, between May 22 and 30, and during break-in
Angel FERRER - President of Combatientes, stayed at Watergate Hotel
Frank FLORINI (alias STURGIS) - anti-Castro Cuban, arrested at the Watergate, associated with the CIA
Richard E. GERSTEIN - Florida state attorney, Miami, Fla.; conducting Florida investigation of Watergate affair and Cuban aspects
Irwin GOLDBLOOM - U.S. Dept. of Justice lawyer assigned to represent Colson and Wong
Virgilio GONZALES - associated with Combatientes and the CIA; anti-Castro Cuban arrested at the Watergate
Robert HIGGINS - assistant and field investigator for Philip Hughes
Philip S. HUGHES - head of the Office of Federal Elections in the General Accounting Office (GAO)
E. Howard HUNT - name in an address book, linked to Bernard Barker, who was arrested at the Watergate
Richard G. KLEINDIENST - U.S. Attorney General
James M. LANDIS - heads special unit on subversives for President Nixon
Major Pedro Diaz LANZ - CIA, Bay of Pigs, associate of Fiorini, who was arrested at the Watergate
G. Gordon LIDDY - fired from Committee for Re-Election of the President for not answering questions
William LIEDTKE - President of Pennzoil United Co., Texas millionaire; contributor to Nixon and other Republicans; handled Nixon campaign contributions in Texas until May 30
Humberto LOPES - member of Combatientes, stayed at the Watergate Hotel
Clark MACGREGOR - campaign chairman for President Nixon
Robert MARDIAN - former Asst. U.S. Attorney General; official for Nixon's Texas campaign; in the Howard Johnson motel across from the Watergate during the raid according to Time magazine
Eugenio MARTINEZ - Combatientes, CIA, anti-Castro; arrested at the Watergate
James W. MC CORD, Jr. - arrested at the Watergate;

19 years with the CIA; on Republican payrolls at least until May 31
John MITCHELL - Former U.S. Attorney General and Nixon campaign manager
Martha MITCHELL - wife of John Mitchell
Emmett E. MOORE - treasurer of Nixon Texas Finance Committee
Powell MOORE - Nixon campaign committee, Director of Public Relations
Lawrence O'BRIEN - Democratic Campaign Chairman
Robert ODLE - the member of the Nixon committee who hired John W. McCord, who was arrested at the Watergate
Manuel OGARRIO (Daguerre) - Mexico City lawyer for Gulf Resources
Rep. Wright PATMAN - Texas Democrat; Chairman, House Banking Committee; conducting House investigation of Watergate affair
Joseph A. RAFFERTY, Jr. - Lawyer for Bernard Barker, who was arrested at the Watergate
Judge Charles RICHEY - Federal district judge on civil suit
Roland SAWYER - Public information officer for the GAO
Glenn J. SEDAM, Jr. - Nixon committee counsel; shared office with G. Gordon Liddy
Devan L. SHUMWAY - Nixon committee public relations director
Earl J. SILBERT - Asst. U.S. Attorney General leading grand jury inquiry
Hugh W. SLOAN - former treasurer, Nixon committee
Elmer B. STAATS - Comptroller General, head of GAO
Maurice STANS - Nixon finance committee chairman
Miguel R. SUAREZ - Miami lawyer, associated with Bernard Barker, who was arrested at the Watergate
Betty THOMPSON - new lawyer for the five men arrested at the Watergate
Fred THOMPSON - legal counsel, GAO
Edward Bennett WILLIAMS - Democratic National Committee lawyer in civil suit
Roy WINCHESTER - vice-president for public affairs for Pennzoil; co-chairman of Nixon Texas Finance Campaign Committee; kept permanent suite at Watergate Hotel
Alfred WONG - Secret Service agent assigned to the White House; recommended McCord
Mr. X - unidentified friend of Douglas Caddy; linked to the raiders
Ronald L. ZIEGLER - Presidential press secretary

Appendix 2 - References - Partial List

Books and Magazine articles

Brussell, Mae. "Why was Martha Mitchell Kidnapped?" The Realist. New York (August 1972).
Sprague, Richard E. "The June 1972 Raid on Democratic Party Headquarters." Computers and Automation (August 1972).
Vassilikos, Vassilis. Z. New York: Ballantine Books, 1966.
"Watergate Issue, the." Time (August 28, 1972), page 20.

Newspaper Articles - Chronological

"Lawyer Held in Contempt in Democratic Raid Inquiry." New York Times (July 14, 1972).
"Justice Department Lawyer Defends Aid to Nixon." Washington Post (July 22, 1972).
"GOP Drops Lawyer in 'Bug' Probe." Washington Post (July 23, 1972).
"Calls to GOP Unit Linked to Raid on the Democrats." New York Times (July 25, 1972).
"Calls From Phones of Man Held in Democratic Break-
(please turn to page 36)

EIGHT PHOTOGRAPHS OF A BUSH: Pictorial Reasoning Tests — Part 7

Neil Macdonald
Assistant Editor, Computers and Automation

"Look at each of the eight photographs of a bush, taken over a period of time, comparing them with each other. Then answer the questions that test your capacity to observe and to reason."

"There undoubtedly is a place for non-verbal, non-mathematical testing which is not culture-limited, not occupation-limited, and not background-limited ... and which would enable finding and employing many useful people — including programmers — who do not have American, middle-class backgrounds."

The pictorial reasoning tests which we have been publishing since October 1971 require: observation, perception, comparison, recognition of shapes and designs, and reasoning. These operations are difficult for a computer program (except for the reasoning), yet stimulating to a human being. The techniques needed are those which we as human beings have had to use (and improve) all our lives — and it is fun to do something you're good at!

New Style of Test

In this issue we publish a sample of a new style of test, Style 5. It consists of eight photographs of the same bush taken from time to time during 1972. The photographs are here printed in a random sequence, and the test consists of a number of questions about the photographs. The photographs are published on successive odd-numbered pages of this issue of "Computers and Automation" so that a reader may cut the eight pictures out of the magazine, place them side by side, and compare them.

Answers

The answers and comments that you, our readers, send us on these tests are very useful and give us much data to work from and think about. Our thanks to all of you.

Some individuals write us asking to know "the answers". The answers that we believe may be "correct" will be published from time to time in "Computers and Automation."

In many cases, it is not possible to prove that certain answers are correct; accordingly what we publish are so-called correct answers, denoted using quotation marks as "correct" answers.

Prior Articles

Prior articles in "Computers and Automation" on Pictorial Reasoning Tests (PRTs) are:

- Oct. 1971 / PRTs and Aptitudes of People — I / Test 1
- Dec. 1971 / PRTs and Aptitudes of People — II / Test 1 (repeated)
- Feb. 1972 / PRTs and Aptitudes of People — III / Tests 2, 3
- March 1972 / PRTs — Analysis and Answers / Tests 4, 5
- April 1972 / PRTs — Part 5 / Test 6
- July 1972 / PRTs — Part 6 / Test 7

In case any reader has missed these articles, we can supply back copies at moderate cost.

PICTORIAL REASONING TEST: C&A No. 8 (may be copied on any piece of paper)

1. PURPOSE. The following is a test of your capacity to observe and to reason, and your general knowledge. The test is not timed.

2. INSTRUCTIONS. Look at each of the eight pictures of the bush labeled A B C D E F G H, cutting them out if you wish, and comparing them with each other. Read the introduction in Section 3. Answer the questions given in Section 4, making use of the Answer Sheet given in Section 5, and consulting the pictures whenever you need to.

3. INTRODUCTION. Across from our office which is on the north side of Washington St. in Newtonville, Mass. is a strong wire link fence. This fence separates Washington St. from a steep embankment descending to lower ground, occupied by a railroad and a turnpike. At one place on the steep bank behind the fence, grows a vigorous bush which pushes its branches against and through the wire fence. The distance between the left end and the right end of one link in the wire fence has been measured at $3\frac{1}{4}$ inches.

Here are eight pictures of the bush taken from time to time in 1972. The pictures were all taken about the same time of day. The eight pictures are designated A B C D E F G H. (see pp 29, 31, 33, 35)

4. QUESTIONS

- (1) Bush. What kind of bush is pictured?
- (2) Chronological Sequence. What is the correct sequence of the pictures?
- (3) Time of Day. About what time of day were the pictures taken?
- (4) Direction of Sun. What was the approximate compass direction of the sun?
- (5) Weather. For each picture, was the weather sunny and bright? or hazy and dull?
- (6) Distance Closest. What picture was taken closest?
- (7) Distance Furthest. What picture was taken the furthest away?
- (8) Duration. What was the approximate period of time from the earliest picture to the latest picture?
- (9) Time Intervals Between Pictures. What was the approximate interval of time between one picture and the next one? Were all the intervals about the same?
- (10) Calendar Date. Approximately what calendar date or calendar week was each picture taken?
- (11) History. What were some ten major events that happened to the bush during the period of the series of pictures?

5. ANSWER SHEET
(may be copied on any piece of paper)

1. (name of kind of bush) _____

2. (eight letters A to H in the sequence you choose)

Picture:

--	--	--	--	--	--	--	--	--	--

3. (time of day) about _____ to _____

4. (compass direction — circle one)

N NE E SE S SW W NW

5. (weather — in each cell insert a letter S for "sunny and bright" or N for "hazy and dull"

A	B	C	D	E	F	G	H		

Picture:

6. (closest distance — choose one letter) _____

7. (furthest distance — choose one letter) _____

8. (total duration) _____ days OR _____

weeks OR _____ months OR _____

9. (statement about time intervals)

10. (statement about calendar times)

11. (short descriptions of up to 10 events)

Survey Data: 1. Your Name? _____

2. Title? _____

3. Organization? _____

4. Address? _____

5. In computer programming (CP), systems analysis (SA), and management (M), are you:

	Aver- age?	Good?	Excel- lent?	Not your field?	Other (specify)
CP:					
SA:					
M:					

6. What fields (not mentioned above) are you fairly good in (or even expert in)?

7. What other capacities do you have? (Please don't be bashful — but be objective)

8. Any remarks? _____

(attach paper if needed)

When completed, please send to: Neil Macdonald, Survey Editor, Computers and Automation, 815 Washington St., Newtonville, MA 02160

c.a PROBLEM CORNER

Walter Penney, CDP
Problem Editor
Computers and Automation

PROBLEM 7210: BILLET-DOUX

Joe came into the Computer Center with a cat-that-ate-the-canary look. "Did you know Pete and Esther are sending notes to each other via APL?" he asked Al. "In cipher yet!"

"How do you know?" Al sounded skeptical.

"Here's the latest in their exchanges of *billet-doux*."

Joe put a sheet on the table. It read: H T X I J A O K
J W R M J A O L X H Q R Z J M P L E Z D T F Y E
V M.

"That may be just a random sequence of letters. Perhaps it's got a VALUE ERROR."

"No, this is on the level. I know because I figured it out."

"Oh? What does it say?"

"Well, I don't want to spoil the fun for you", said Joe. "You might like to try it."

"O.K. I'll give it a whirl. How does it work?"

"Each letter of the message is advanced a certain num-

ber of places in the normal alphabet and . . ."

"Hold on", Al interrupted. "What if a letter is Z? You can't advance that very far."

"You simply treat A as following Z so that the whole process is mod 26."

"Looks tough. How did you ever get started?"

"I just assumed it would begin with ESTHER and end with PETE."

What does the message say?

Solution to Problem 729: A Square Problem

Joe is right. No matter how many digits are considered, the probability that it could be the ending of a square is always greater than 5/72 (approximately .0694).

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



PICTURE A



PICTURE B

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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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- OR
- () \$15.00 since I already have access to the last cumulative edition

I understand that in each 12 months I shall receive at least three updating supplements, expected to total over 3000 entries.

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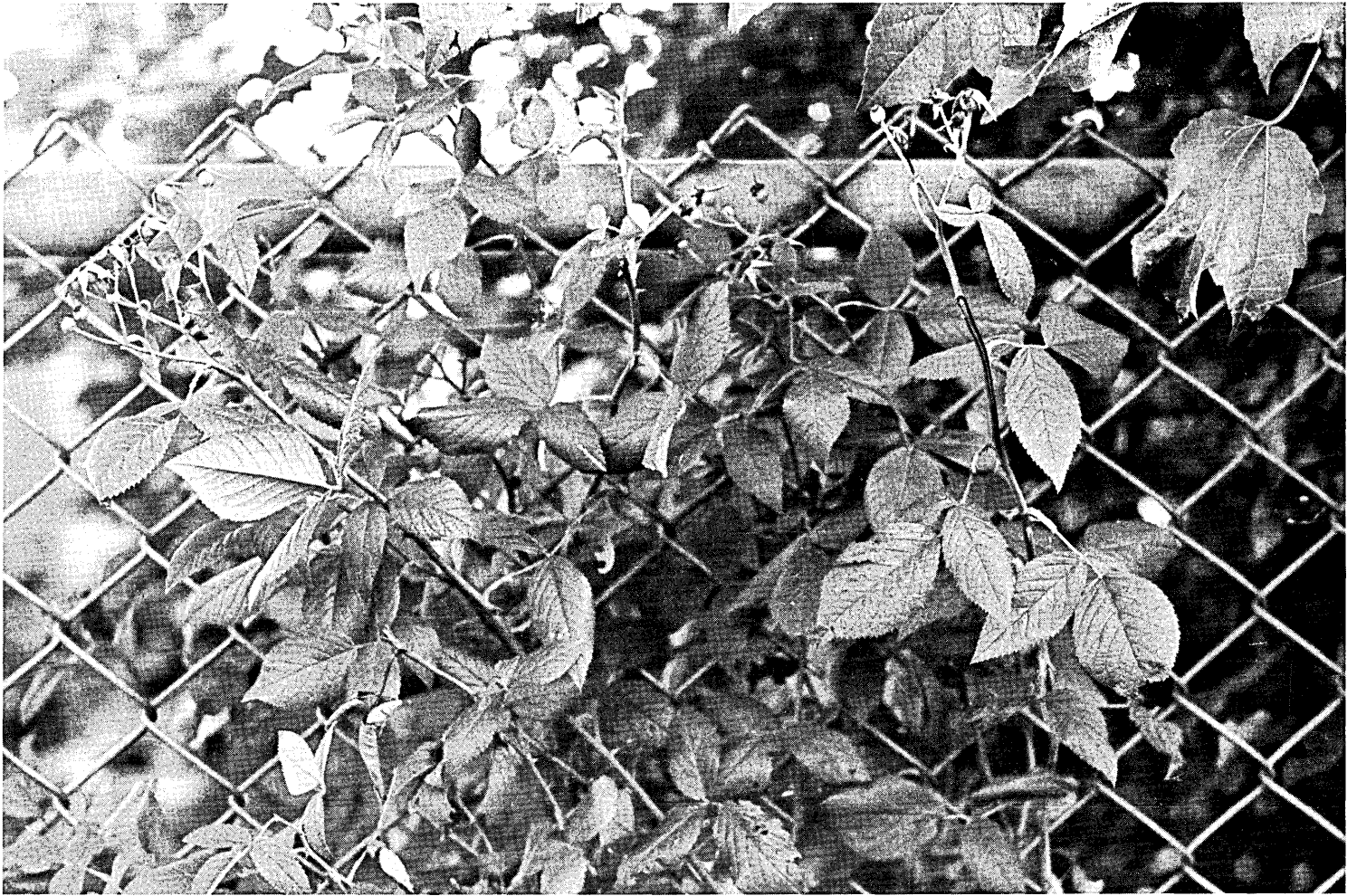
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PICTURE C



PICTURE D

COMPUTER-ASSISTED ANALYSIS AND DOCUMENTATION OF COMPUTER PROGRAMS

● ARE YOU INTERESTED IN THIS KIND OF PROBLEM?

Problem: You have a piece of software, a working binary program (WBP) in machine language — with operating instructions, and it is useful in your installation -- but you have no idea how it works in detail and you have no idea how to modify it to suit new conditions or requirements. (The programmers who wrote it went away two years ago to their next job -- or they never worked for you at all -- or ...)

But YOU have the problem of understanding and modifying that program, salvaging what you can of it; YOU have the problem of making its subroutines useful in other programs by calling them when you want them; etc.

Theory: Use a computer to assist you in your detective work analyzing that program (the WBP) and producing documentation for it. **Desired Goal:** Complete understanding.

Idea 1: Use a computer program (SIMULATOR ANALYZER) which will simulate your computer, and operate the given program (WBP) on examples, step by step, from one point to another point, showing you intermediate results, telling you where control goes.

Idea 2: Use a computer program (RELOCATOR) which will shift the WBP into another area of core, and thereby reveal which machine words can be moved unchanged, and which machine words have to have the shift difference added or subtracted from them.

Idea 3: Use a computer program (SUBROUTINE EXAMINER) which will show how each subroutine in the WBP operates on each kind of information that comes into it.

Idea 4: Apply techniques of CRYPTANALYSIS to discovering what systems of character representation are being used in the computer program.

Etc., Etc., Etc.

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WHY NOT TAKE A LOOK? ... HOW CAN YOU LOSE?

----- (may be copied on any piece of paper) -----

To: Berkeley Enterprises Inc., 815 Washington St., Newtonville, MA 02160

() Please send me both volumes of "Research in Computer-Assisted Documentation", for \$6.00.

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() I enclose \$_____ in full payment. () Please bill me. () Please bill my organization.

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● IF THIS KIND OF PROBLEM IS INTERESTING TO YOU, WHY NOT TAKE A LOOK AT THE FOLLOWING BOOKS?

Research in Computer-Assisted Documentation of Computer Programs

by Edmund C. Berkeley
principal investigator, author

- Vol. 1, published by Information International, Boston, Mass., softbound, April, 1969, 128 pp, \$3.00

- Vol. 2, published by Berkeley Enterprises Inc., Newtonville, Mass. 02160, softbound, Nov. 1971, 112 pp, \$3.00

Technical (but understandable) reports produced — and research done — under contracts with the Office of Naval Research (N00014-68-C-0268, N00014-C-70-C-0225)

Volume 1, CONTENTS:

- The Subject and Purpose of this Research
- The Documentation of Computer Programs
- Some Estimates of Loss Due to Inaccessibility of Computer Programs
- The Concept of the Simulator Analyzer
- Model 1 and Model 10 of the Simulator Analyzer
- Cryptanalysis of a Portion of a Computer Program with Unknown Documentation

Volume 2, CONTENTS:

- Simulator Analyzer Model 13
- "Comments" in Computer Programs: Principles for Abbreviating, and Suggested Abbreviations
- Successful Relocation of the Working Binary Program for "Old 16K DDT" (Dynamic Debugging Program) Without Knowing the Symbolic Program from Which it was Assembled



PICTURE E



PICTURE F

THE 18TH ANNUAL EDITION OF THE

COMPUTER DIRECTORY AND BUYERS' GUIDE, 1972

. . . a special 13th issue of Computers and Automation has gone to press and will shortly be mailed

The **COMPUTER DIRECTORY** is:

- an annual comprehensive directory of the firms which offer products and services to the electronic computing and data processing industry
- the basic buyers' guide to the products and services available for designing, building, and using electronic computing and data processing systems

CONTENTS:

- Roster of Organizations in Computers and Data Processing (over 47 pages)
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- Geographic Roster of Organizations in Computers and Data Processing
- Characteristics of Digital Computers
- Roster of Programming Languages, 1972
- Over 2300 Applications of Computers and Data Processing
- Roster of College and University Computer Facilities
- Roster of Computer Associations
 - I. The International Federation for Information Processing Societies
 - II. American Federation of Information Processing Societies — Constituent Societies
 - III. Association for Computing Machinery (ACM)
 - IV. Other Computer Associations
- Roster of Computer Users' Groups
- . . . AND MUCH MORE

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BOOKS

by
Edmund C. Berkeley

1. "Giant Brains or Machines that Think", John Wiley and Sons, New York, 1949, 277 pp; sale, over 25,000 copies (translated into French); second edition, 1961, softbound, \$3.00
2. "Computers — Their Operation and Applications", Reinhold Publishing Co., New York, 1956, 366 pp; sale, over 10,000 copies, hardbound, \$6.50
3. "Symbolic Logic and Intelligent Machines", Reinhold Publ. Corp., New York, April 1959, 203 pp; (translated into Russian); softbound, \$3.95
4. "Brainiacs — 201 Small Electric Brain Machines and How to Make Them", October 1959, 256 pp; softbound, \$4.95
5. "Glossary of Terms in Computers and Data Processing", June 1960, 96 pp; softbound, \$3.95
6. "Probability and Statistics — An Introduction Through Experiments", July 1961, 140 pp; sale, over 15,000 copies; (translated into French); softbound, \$3.75
7. "The Computer Revolution", Doubleday & Co., New York, N.Y., August 1962, 249 pp; (translated into Japanese and Polish); hardbound, \$4.95
8. "Teaching Machines, Programmed Learning, and Automatic Teaching Computers", Berkeley Enterprises, Inc., Newtonville, Mass. 02160, December 1963, 204 pp; softbound, \$3.95
9. "The Programming Language LISP: Its Operations and Applications", March 1964, 392 pp; softbound, \$4.95
10. "A Guide to Mathematics for the Intelligent Non-Mathematician", Simon and Schuster, New York, N.Y.; April 1967, 352 pp; (translated into Japanese and Swedish); softbound, \$2.45
11. "Computer-Assisted Explanation", May 1967, 280 pp; softbound, \$3.00
12. "Computer-Assisted Documentation of Computer Programs", Volume 1, April 1969, 120 pp; softbound, \$3.00
13. "Computer-Assisted Documentation of Computer Programs", Volume 2, April 1971, 104 pp; softbound, \$3.00

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(if in good condition)

My name and address are attached.



PICTURE G



PICTURE H

In Made to Home of Nixon Election Unit Aide." New York Times (July 26, 1972).

"Funds Seized in Raid on Democrats Traced to Mexico." New York Times (July 31, 1972).

"\$25,000 Nixon Campaign Check Tied to Suspect in Democratic Raid." White Plains Reporter Dispatch (August 1, 1972).

"Elections Agency and F.B.I. Examine GOP Unit Funds." New York Times (August 2, 1972).

"The Plot Thickens in Watergate Whodunit." New York Times (August 6, 1972).

"More Money Tied to Barker." Washington Star (August 10, 1972).

"GOP Cries Foul at McGovern Attack/The Watergate Issue." Washington Star (August 16, 1972).

"Saxbe Predicts Indictments in Bugging Case." Washington Star (August 16, 1972).

"Mr. Stans and the Sounds of Silence." Washington Post Editorial (August 17, 1972).

"Nixon, Barker Tells of Link to Lawyer in Funds Case." New York Times (August 22, 1972).

"...but Oh, Watergate." White Plains Reporter Dispatch (August 22, 1972).

"Plea by Stans Delays Audit Report on GOP." Washington Star (August 23, 1972).

"Judge Seals Watergate Testimony." Washington Post (August 23, 1972).

"GAO Delays Report on Audit of Nixon Campaign Funds." Washington Post (August 24, 1972).

"GOP Aide Queried on Check in Study of Raid on Democrats." New York Times (August 24, 1972).

"Indictments in 'Bug' Case May be Tried After Election." Washington Post (August 24, 1972).

"Patman Threatens to Use Subpoena on GOP Data." New York Times (August 24, 1972).

"Bugging Figure Got Quick Banking Charter." White Plains Reporter Dispatch (August 26, 1972).

"GAO Report Asks Justice Inquiry Into GOP Funds." New York Times (August 27, 1972).

"Inquiry on Campaign Funds, and Special Prosecutor for Watergate Case." Transcript of Nixon Press Conference, San Clemente, Calif. New York Times (August 30, 1972).

"Two Held in Watergate Case Tied to Film of Party Data." New York Times (September 1, 1972).

"The Watergate Caper." Tristram Coffin. Washington Watch, Issue 22 (September 1, 1972).

"Dismissal of Suit in Breakin Asked." New York Times (September 2, 1972).

"Depositions by Five in Break-In Stayed but Mitchell Can Be Queried." New York Times (September 3, 1972).

"It Isn't all that Funny, Watergate." New York Times editorial (September 3, 1972).

"The Nixon Strategy Struggle." Rowland Evans and Robert Novak. The White Plains Reporter Dispatch (September 4, 1972).

"Mitchell Again Denies Knowing of Raid as He Ends Testimony." New York Times (September 6, 1972).

"New Bugging Move Hinted." New York Times (September 6, 1972).

"The Watergate Report." Time (September 8, 1972).

"O'Brien Charges More Bugging." White Plains Reporter Dispatch (September 9, 1972).

"McGovern Says Attempt to Bug Him was Foiled." New York Times (September 10, 1972).

"McGovern Silent on Bugging Spy." New York Times (September 10, 1972).

"Participant Spills Watergate Details." White Plains Reporter Dispatch (September 11, 1972).

"Barker Admits Raid Role, but Won't Involve Others." New York Times (September 12, 1972).

"Democratic Suit Charges Spy Plot." New York Times (September 12, 1972).

Association for the Prevention of Doomsday — News and Ideas

The Temporary Steering Committee of the Association for the Prevention of Doomsday met for several hours on September 12 in New York. All the members of the steering committee were present: Franz L. Alt, Donald Bates, Richard E. Sprague, and Edmund C. Berkeley (acting secretary).

The secretary reported that No. 1, 2, and 3 of a bulletin had been mailed to the members, consisting of a copy of the remarks about the Association which produced the 29 founding members; a letter of information; and a list of members.

Formalities

The steering committee agreed that:

1. The first task is to find out if any similar association exists and to see if this association is necessary. No one present, however, knew of any similar association. The secretary is to investigate further.

(please turn to page 39)

World Peace Tax Fund Act — Proposed Legislation

*Representative Ronald V. Dellums
7th District, California
House of Representatives
Washington, D.C.*

On April 17th of this year I introduced legislation in the House of Representatives which I feel may be of special interest to you.

"The "World Peace Tax Fund Act", H.R. 14414, would extend the principle of conscientious objection to the sphere of taxation, allowing those citizens morally opposed to war to have their federal taxes spent on only non-military programs.

Under this bill, all men and women whose moral and religious beliefs oppose participation in military endeavors could have their federal tax payments routed to the World Peace Tax Fund, where the Fund's Trustees would supervise its use for peace related programs. In this manner no taxpayer would be relieved of the financial responsibilities of citizenship; but neither would the country be imposing its moral decisions of life and death on that minority whose consciences strongly oppose violence, as is the case now.

I believe you will find the legislation innovative and effective, and I hope you will be able to support it. To aid passage of the bill, a group of concerned citizens in Ann Arbor, Michigan, have formed a World Peace Tax Fund Act Steering Committee, and would appreciate receiving your reaction to this concept. You may also address any inquiries on the bill, or requests for more reprints, to them at:

WPTF Steering Committee
Box 1447
Ann Arbor, Michigan 48106

Following is some more information about the proposed legislation, consisting of:

- some remarks of mine on introducing the Act;
- the names of my colleagues in the House of Representatives who presented the Act with me; and
- a summary of the provisions of the Act.

The text of the Act is in the Congressional Record for April 17, 1972.

Mr. Dellums. Mr. Speaker, today is the deadline for the filing of income tax returns in the United States. My colleague from New York (Mr. Rosenthal) and I, along with eight of our colleagues, are taking this opportunity to introduce legislation which we believe is essential to the integrity of this Nation's tax system.

The World Peace Tax Fund Act, as our bill is called, would amend the Internal Revenue Code to establish conscientious objector status for taxpayers identical to that established presently under our Selective Service laws. Under this act, any man or woman in the country who felt he or she could not, in good conscience, contribute to military expenditures would have the option of having their tax dollars routed instead to peace-related activities.

It has long been recognized in this body and throughout the Nation that thousands, perhaps millions, of our citizens are so strongly compelled to resist violence that participation in war in any form is morally and religiously intolerable. What our laws have not yet recognized is that many of these citizens are equally opposed to seeing their tax dollars spent on implements of death and destruction.

The World Peace Tax Fund Act recognizes this moral conviction and, without lowering anyone's total tax bill, removes the great dilemma now facing conscientious objectors — to disobey their own beliefs or to disobey the laws of their country?

The original authors of this measure are to be highly praised for their contribution to this very important effort. Among those responsible for the drafting of this legislation were David R. Bassett, M.D., of Ann Arbor, Mich., Joseph L. Sax and G. Joseph Vining, members of the University of Michigan Law School faculty and Michael P. Hall, a law student there.

Joining Mr. Rosenthal and me in sponsoring this bill are Mr. Kastenmeier, Mr. Rangel, Mrs. Abzug, Mr. Bingham, Mr. Conyers, Mr. Diggs, Mr. Mitchell, and Mr. Ryan.

At this time I would like to insert into the Record a summary of the legislation, followed by the text of the bill and other related material:

Summary

The World Peace Tax Fund Act proposes that the Internal Revenue Code of 1954 contribution to military spending for Federal taxpayers who are conscientiously opposed to participation in war, and that a Fund be established to receive and distribute to qualified peace-related activities the portion of such individuals' tax payments that would otherwise go to military spending. The remainder of qualifying individuals' income, estate, and gift taxes would be transferred to the general fund of the U.S. Treasury, to be spent only for non-military purposes.

The Act gives relief to those citizens conscientiously opposed to participation in war, who are presently forced to violate their beliefs by participating in war through tax payments. There is considerable precedent for such relief. The Selective Service System has long recognized and accommodated the beliefs of conscientious objectors. Tax exemptions have been provided for certain religious groups to avoid violation of their religious and conscientious beliefs.

The requested tax relief for conscientious objectors will not open the "floodgates" to similar relief for other groups. The conscientious objector's request for tax relief is exceptionally compelling because it is motivated by the widely-held and long-established fundamental religious and moral mandate — "Thou shalt not kill."

The Act provides taxpayers, who are conscientiously opposed to war and who might otherwise feel compelled to undertake illegal tax resistance, with a means of making a meaningful contribution to world peace consistent with their obligations of citizenship. It is particularly important that the Act extends the opportunity for conscientious objection to women and to men not eligible for conscientious objector status under the Selective Service System.

The amendments to the Internal Revenue Code of 1954 provide that a qualified taxpayer may elect to have his or her Federal income, estate, or gift tax payment transferred to a special trust fund, the World Peace Tax Fund. The amendments also explain how a taxpayer qualifies to have his or her tax paid to the Fund. Other sections of the Act provide for the creation of the World Peace Tax Fund, and for the appointment of a Board of eleven Trustees to administer the Fund. The Fund is modelled after the National Highway Trust Fund and the National Airport and Airway Trust Fund. The act provides that the General Accounting Office shall annually determine and publish the percentage of the Budget of the United States which was spent for military purposes in the fiscal year just ended. This percentage will be used to determine the portion of the qualifying taxpayer's tax which shall be received by the Board. The Board shall submit a budget to Congress for approval and appropriation, providing for channeling of these monies to specified peace-related activities. Monies not appropriated from the Fund for expenditures budgeted by the Board shall remain available for use in subsequent years by the Board, subject to Congressional appropriation.

ON THE JJ COMMAND

*I. From: Mr. Tore Rambol
Rodsasen 17
N-1380 Heggedal, Norway*

I have read with interest your editorial "The shortage of good typists — and the jj command" in the *jujj* in the June issue 1972.

First, I think it is best to inform you that I am not a computer proffjjprofessi9jjprofessional, (I am an electronic design engineer) so there might possibly be some obvious points that I have missed. I hope that you will bear with me, though.

Your basic idea looks very good, but there are a few things that needjjthat need clarification. My questions are:

1. What computer has both upper and lower case letters on its line printer or typewriter?

2. If you look at the supposed output from the computer (ijjcomputer (in the editorial), you will find that the right margin is fairly straight. What is the general procedure the editing program jjprocedure of the editing program for obtaining this? (It seems to me that this procedure necessarily must be rather complicated.)

3. In the "output" paragraph, the word departments is jjword "departments" has been dived between two lines thus: de/partments. jjbeen divided between two lines thus: de/partments. I am no expert on the English language, but I know that at least in my own language there are certain rules concerning the division of words, that must be observed, lest the word be rendered meaningless. Those rules are easy for a human, but would be hard to program, I think.

I have found no "LetterwjLetters to the Editor"-department in your magazine, so I hope that you can answer in a personal letter. The subject really interests me.

Hoping to hear from you.

II. From: the Editor

Thank you for your letter in reference to the jj command.

Specifically, in answer to your questions:

1. There are output attachments which have both upper and lower case on their keys and keyboards. I think one of them is made by Teletype Corp. (Skokie, Ill.)
2. There are general procedures for right justifying. Many software houses offer computer programs to accomplish this.
3. There are hyphenation rules which a computer can apply. We use a one-page sheet of hyphenation rules for typists in our office, so that they do not have to look up each word they need to hyphenate in the dictionary.
4. Our "Letters to the Editor" department is scattered through the magazine. Such items are labeled on the table of contents page with "F" for "Forum" and "G" for "Golden Trumpet". I shall leave to your imagination which designation applies to which incoming letters!

Thank you for writing.

Publishing Articles on Issues that Don't Get the Attention They Deserve

*I. From: M. Egan
4956 Prince St.
Pierrefonds, Quebec
Canada*

I have seen copies of your magazine and as a gesture of support for your courage and public spirit in publishing important articles on issues such as the political murders in the U.S.A., that don't get the attention they merit in other periodicals, I enclose \$10.00 for a personal subscription.

While I don't agree with some of the causes that you have championed, I think it is quite appropriate that a magazine concerned with organizations and systems should attempt to analyze the realities of the power structure and raise important questions about the future of democracy in the U.S.A.

II. From: the Editor

Thank you very much for your welcome letter and your personal subscription to Computers and Automation.

I enclose a list of important assassination articles published in CGA over the last two years. Please let me know which two of these back issues you would like to have, and I will gladly send both to you, as a kind of "thank you" for your subscription and for your warm and encouraging support.

Moment of Truth in Vietnam?

*Charles A. Wells
Editor and Publisher of "Between the Lines"
P.O. Box 570
Princeton, N.J. 08540*

(Excerpt from "Between the Lines" — The Wells News Service, issue of Sept. 1, 1972, BTL Circulation Dept., Newtown, Pa. 18940)

During the early summer, U.S. news channels pictured the war in Vietnam as approaching a favorable conclusion, the South Vietnamese Thieu Government having rallied its forces and turned back the Communist offensive after the riotous retreats when the Red attacks began. This was accomplished of course with the massive support of the U.S. Air Force, laser beam targeting having dramatically increased bombing accuracy. And the Haiphong blockade was supposed to clinch this favorable turn of events.

"Air Power" Issue

The U.S. air command was determined to prove at last that air power could stop the movement of men and material and compel the North Vietnamese people to abandon their war effort. This, after failing to achieve such objectives in World War II, in Korea and through seven years in Vietnam. Here's one of the big, seldom spoken-of issues of the war.

Despite this apparent success of the U.S. strategy, we forecast in our June and July releases that U.S. air power would not be able to stop the North Vietnamese troops and supplies. Nor would the blockade prove adequate. (We gathered these views from the British, Canadian, French and Japanese press whose correspondents move freely on the ground in Southeast Asia while the U.S. and the South Vietnamese military severely restrict all U.S. observers.) The North Vietnamese and Vietcong forces, though suffering enormous losses from the U.S. bombing, were expected to carry out their strategy.

Alternative Supply Routes

These predictions have been proved accurate: Russian ships are being unloaded into sampans all along the North Vietnamese coast; mobile pontoon bridges replace bombed-out bridges; underground pipelines bring oil down from China; trucks and thousands of bicycle brigades replace bombed-out railroads. Though the U.S. Air Force spends billions in bombing forays, this strategy continues.

Distraction Attacks

The early attacks on Quang Tri and Hue, moreover, caused Thieu to send nearly all his best regiments north to restore the line of defense where they have been pinned down by enough North Vietnamese to maintain a stalemate. But North Vietnamese and Vietcong battalions have meanwhile penetrated deep into the south, quite extensively into the Delta and all but surround Saigon itself. These are guerrilla troops who launch sudden mortar and artillery attacks on supposedly "secure" areas, not attempting to seize and hold as yet, but to prove that the Thieu forces cannot protect the people anywhere, which opens the way for the Vietcong infrastructure again to infiltrate and take over villages and provincial centers, shattering the U.S. pacification and Vietnamization programs. Now that they have demoralized the Thieu forces, we can expect devastating hit-and-run Communist attacks North and South, despite Hanoi's terrible losses.

Tyranny, Imprisonment, Corruption

The corrupt Thieu Regime has become ever more tyrannical, great numbers of its own citizens having been imprisoned and tortured, especially the youth, simply because they are desperately tired of the war and want peace. In fact the air power issue is paralleled by the concept prevalent in Washington official thought and symbolized by Thieu in Saigon, that no matter how rotten and tyrannical a regime may be, if it's anti-Communist and open to U.S. military and economic collaboration, it's worthy of U.S. support. This policy, followed by the Pentagon under Lyndon B. Johnson and Richard M. Nixon, is an integral part of the still more repugnant strategy that the wholesale slaughter of civilians is justified if necessary in attacking enemy targets.

Wanton Killing

The wanton killing of civilians, the deliberate bombing of civilian areas in North Vietnam and the symbolic bombing of the Red River dikes as a warning have been established beyond refutation by impartial authorities.

If we exclude the testimony of such observers as Jane Fonda, Ramsey Clark and others who can be accused of being biased or having political motives, there is still a formidable list of impartial witnesses that the U.S. air action is as callous and inhumane as anything in history.

These sources include Jean Thoraval of the Agence France Presse, Le Monde, July 12, in which Mr. Thoraval and several other journalists witnessed direct U.S. air attacks on the dikes and surrounding civilian areas. Also the Swedish TV took photos of similar action and the Swedish Prime Minister reported the dike bombing from their official sources.

Continuous Lying

The Pentagon and the White House under both Lyndon B. Johnson and Richard M. Nixon have lied continuously to the American public, as the Pentagon Papers and other documents prove. So the present official denials about the bombing of civilians and the dikes would have little weight in any court, the witnesses having proved so unreliable in the past.

As the situation deteriorates, action of some kind by Nixon before election can be expected. Replacing the Thieu regime by a balanced coalition government is most likely. □

Doomsday — continued from page 36

2. Distinguished persons who might be invited to be on the steering committee were considered. The secretary is to inquire if they might be interested.

3. Edmund C. Berkeley is to continue as acting temporary secretary.

4. Dues for the first eight months (to April 30, 1973), to cover mailings and reports to members, were set at \$2.00. Contributions are also invited.

5. The next meeting of the steering committee should be after Election Day, November 7, when the situations confronting us is likely to be clearer.

Ideas

6. The great hazards which face mankind were divided into Class A, those which might cause or lead to more than 1% of the human race dying in a year, and Class B, those which probably would not. It was decided that our concern was with Class A hazards, and we would not at present seek to deal with Class B hazards. The secretary is to issue a short report listing the Class A hazards that we see.

Edmund C. Berkeley

Edmund C. Berkeley
Acting Secretary

Unsettling, Disturbing, Critical . . .

Computers and Automation, established 1951 and therefore the oldest magazine in the field of computers and data processing, believes that the profession of information engineer includes not only competence in handling information using computers and other means, but also a broad responsibility, in a professional and engineering sense, for:

- The reliability and social significance of pertinent input data;
- The social value and truth of the output results.

In the same way, a bridge engineer takes a professional responsibility for the reliability and significance of the data he uses, and the safety and efficiency of the bridge he builds, for human beings to risk their lives on.

Accordingly, Computers and Automation publishes from time to time articles and other information related to socially useful input and output of data systems in a broad sense. To this end we seek to publish what is unsettling, disturbing, critical — but productive of thought and an improved and safer "house" for all humanity, an earth in which our children and later generations may have a future, instead of facing extinction.

The professional information engineer needs to relate his engineering to the most important and most serious problems in the world today: war, nuclear weapons, pollution, the population explosion, and many more.

budget. If the president of ADAPSO is correct, however (and I believe he is), those companies which survived the debacle of 1970 and those which will continue will be those consulting firms which are soundly managed.

Client Management

Despite all of this negative history, the poor performance of consultants has not been entirely attributable to the consulting firm alone. Some of the blame has to be shared by client management which in many cases created an environment for failure. This environment for failure has often been the result of both the competitive nature of the industry and the selection criteria which clients have employed.

Selection of a Consulting Firm

To begin with, I suggest that the establishment of a time and dollar bidding environment is not the best means for ensuring that your company obtain the "best bang for its buck" in procuring consulting services. In a highly competitive environment, this encourages "low balling" to get the business. Once a contract is underway and substantial amounts of time and money have already been expended, it will be difficult if not impossible to disengage when it appears that schedules cannot be met or that additional funds might be required. I suggest that you employ the same criteria for the selection of a consulting firm which you might apply to the selection of a law or accounting firm. What is the reputation of the organization? What is its history of performance? Who have their clients been and what has client experience been with the firm? Then, have the courage of your convictions and select the firm which you feel can do the job. A bidding environment is a prime exemplar of what Gerard DePaolo, President of Computer Planning Corporation, characterized as the "prudent man principle" in a cover article for Forum 70 Magazine. But, "prudence" is not necessarily a virtue if it means selection of the low bidder or the "big" company and, if despite this, you fail to obtain the end result desired.

Definable Tasks

When making an assignment to a consulting firm, be wary of big projects. If the problem to be solved or the application system to be designed is a large one, then be sure to segment it in contracting for service and insist on a high level of documentation standards. Breaking down large problems into definable tasks will enable you to measure the consultant's performance and evaluate the results. This also requires the smallest possible investment on your part and therefore limits damages should they occur. Moreover, based upon the consultant's performance, additional assignments can be made or the relationship ended. In this connection it is advisable to have two or three firms on tap whom you have evaluated as capable. Should one fail, replace it with another until you are confident that you are obtaining consistently good performance.

Documentation

Prior to selecting a firm for the first time, be sure to review their standards of documentation. The better consulting firms will insist on the highest level of detailed documentation even if you don't. This is in your interest, as systems and programming documentation are the foundation

upon which implementation will take place and future commitments made. Moreover, adequate documentation will provide you with independence after completion of the contract.

Political Motives

Finally, never select a consulting firm simply for purposes of telling you what you want to hear or what you already know. When a manager seeks a consulting firm for purposes of telling him what he wants to hear, his motivation is usually political. A consulting firm cannot operate effectively unless it is above internal politics. Otherwise, the results are likely to be unsatisfactory to all concerned. Also, you don't need a consultant to tell you what you already know, for though this may offer you a certain degree of peace of mind, it is most certainly a waste of your company's funds. As the Executive Vice President of a Fortune 500 publishing firm expressed it to me:

"Jim," he said, "I don't need a consultant to tell me what my problems are. I know what they are. I just got rid of a firm which submitted a report that only outlined my problems. I need a consultant to solve those problems!"

To summarize, professional problem solving is the consultant's only reason for being in business. A competent data processing consulting firm can be of immeasurable help to your company, providing an economical tool for the realization of your data processing objectives.

Berezin — Continued from page 15

ing an executive herself. Editing typewriters can truly upgrade secretarial work, and make it a stepping stone to success in the business world. But, if that career is not what she wants, the editing typewriter permits her to become a skilled machine operator, and be paid at a higher rate.

Humanizing

Equipment such as editing typewriters is truly humanizing. It frees people to do what people should do: think, create, participate in the companies they work for. A stay-put clerk/typist cannot be expected to care about her company, or the decisions it faces. Nor can a smart and ambitious woman who has found herself locked in the permanent role of secretary when what she really wants to do — and can do — is a good deal more.

The well-paid member of a small, competent staff, however, given meaningful responsibilities and treated as a professional in his or her own right, is going to care about the business and is going to be willing to put creative energies into it. And I envision office staffs in which there is room and demand for much more creative energies than we see today.

So let's keep an open mind toward the new office machines on the market, and the ones coming in the near future. Let's explore their possibilities, not just as additional office appliances, but as representing whole new methods of handling business communications. Let's think in terms of the human energies these machines can release. Let's think of the enormous potential they hold for helping people — especially women — carve out more meaningful careers for themselves.

Howells — Continued from page 14

The chimpanzee specimens, as a sample, may be accidentally a little large on the average. The Paranthropus fragment is obviously small in all dimensions and so appears "human" when we glance at this list; however, this does not necessarily mean that the shape relations conform to those of man. The correspondences of the Kanapoi measurements to the human means (of this particular sample) are very close throughout — closer than we might expect any random human bone to be in all its measurements.

Table 1. Measurements

	CHIMP MEAN	HUMAN MEAN	KANA-POI	PARANTH-ROPUS	SCALED VECTOR
1. Biepicondylar width	64.1	58.0	60.2	53.6	-.09
2. Trochlea medial epicondyle discriminant	44.8	40.7	41.7	33.6	+4.40
3. Trochlea-Supracondyle discriminant	41.3	38.8	39.4	32.1	-.62
4. Posterior trochlear edge	26.4	22.1	22.2	19.9	+1.11
5. Medial epicondyle length	24.7	20.3	20.8	15.5	+1.19
6. Medial epicondyle breadth	12.8	12.6	13.9	10.4	-.32
7. Lateral epicondyle height	31.5	26.7	27.6	24.9	+5.56

10. A Discriminant Calculation

To assure ourselves of this apparent closeness, we computed a discriminant function from the human and chimp figures. For only seven measurements and such small samples, the calculations could be done by hand, though at the cost of no little labor. In technical language, matrices have to be formed of the sums of all the cross multiplications of all the measurements of all the individuals both within each group and of the total lot; other steps require the inversion of one matrix and the determination of the latent roots of another. Inversion by hand of a matrix of even the modest size of 7 x 7 is a tedious business and one open to error. This all leads to finding the discriminant function, which takes the seven measurements from a specimen, multiplies each measurement by a weight specific to that measurement, and then adds these products to give the discriminant score. This is a great deal of arithmetic and we can only say that to have a computer handle such a job from punched cards in a matter of minutes is very welcome. Waiting for paint to dry or for a film to be developed now seems long and drawn out by comparison, and such easy computation has obviously greatly encouraged undertakings such as the one described here.

The last column in Table 1 gives, not the actual weights in the discriminant function as used, but rather a rescaled form of the weights with their relative importance in proper perspective (because, for example, a small measurement, such as thumb length, might require a much larger weight in the function than a large measure, such as stature, to make it effective). These figures show how a number of measurements combine to form a single pattern of greatest difference between the two groups. As might have been expected, the two measurements to register the snub-nosed effect of the medial epicondyle, or its opposite, are useful, as shown by the large size of the scaled vector values. The plus value of measurement 2 and the minus value of measurement 3 combine to make the total discriminant score higher when the epicondyle is most turned up; that is, when measurement 2 is high relative to measurement 3 (see Figure 1), the function creates a

greater positive value to add and a smaller minus value to subtract in the total score, and when the opposite is true, with the shoulder of the condyle more sloping, there is on balance a greater minus value in the total score. The lateral epicondyle (measurement 7) also adds a greater plus value when it is high, while the breadth of the medial epicondyle (measurement 6) adds to a plus value (or rather subtracts least from a total value) when it is relatively narrow.

Table 1 shows that the above are indeed characteristic human-chimp differences in the averages (though small ones), all of which tend to produce higher score values for the chimpanzee. We note that there is almost no absolute difference in measurement 6, the breadth of the medial epicondyle, certainly not a significant one, and yet this measurement is important in discrimination because it is relatively narrow in chimpanzees, whose other measurements (in these samples) are larger, on the average, than the human measurements.

We notice also that because the discriminant score is affected by all measurements, it takes account of variation in form toward or away from a basic pattern: if a chimpanzee bone lacks any snubbing of the medial epicondyle, it may exhibit another combination of narrow epicondylar face or high lateral epicondyle, and so it may score in a chimpanzee direction anyhow.

11. Separation that Distinguishes

When the discriminant scores were calculated, they produced a far greater separation of human and chimpanzee bones than did any of the measurements singly. Here are the mean score values, and the limits of the individuals in each group:

	Mean	Range
Chimpanzee	99.77	67-130
Man	61.42	40-84

All but two of the chimpanzee values fall between 80 and 120, and all but one of the human values fall between 50 and 75, which are nonoverlapping intervals. So the separation was very good: of 80 specimens, only three overlapped, falling closer to the wrong mean figure than to their own. Unquestionably, this is a successful procedure to distinguish human and chimpanzee humeri by measurement, with a much greater probability of correct assignment than is possible by eye.

12. Conclusion: Manlike not Chimplike

Now for the scores of the Kanapoi and Paranthropus fragments. These were 59.4 and 63.9, respectively, very close to the human average (almost too good to be true, being closer than most of the known human individuals) and, of course, outside the range of the 40 chimpanzee values entirely. Using statistical theory we compute that, had either bone actually belonged to a chimpanzee, it would have a discriminant score as small as those above (or smaller) with a probability of only about 1 in 500. With so small a probability, we conclude that the two bones did not come from chimpanzees, but from hominids, and that is the answer to the question we framed.

13. Checking

Of course, we must be careful. The real question (because of the material we used) was this: how do the fragments classify themselves when they are asked to choose between modern human and modern

chimpanzee arm bones? These were the only alternatives which we offered to fossil creatures which existed when there were no modern men, and when ancestral chimpanzees might also have differed significantly from those of today. Nevertheless, we have good grounds for inferring from their shape that the arm bones were used, on the whole, like those of men and, at least, not like those of the African apes, terrestrial though they are to a great extent. This takes care of the Kanapoi individual and, as a bonus, says the same thing for the hitherto baffling fragment from Kromdraai.

14. Summary

To review: unable to establish from visual inspection that the Kanapoi fossil did not belong to an animal like a chimpanzee, we turned to measurement and a statistical procedure that could be applied with the help of a computer. (As biologists, we knew from experience how to state the problem and extract a great deal of information, but how to order, analyze, and judge it we learned from statisticians.) Though moderately complex, the discriminant function is well suited to the biological realities of individual variation and group differences in shape and gives an answer that states a numerical probability from the known evidence. So, by the middle of 1966, Professor Patterson and I had concluded that we could rule out the possibility that he had found the bone of an ape and that from what we know about East Africa, the only other possible possessor of the fossil was an early hominid, that is, an australopithecine.

15. Later Confirmation

Happy though this made us, the original question since has become partly academic. Patterson went back to the Lake Rudolf region and other teams have been at work in fossil-bearing areas to the north. It is now clear to Patterson (from such evidence as fossil pigs and elephants and more radio-isotope dates) that the Kanapoi formation is over 4 million years old, not $2\frac{1}{2}$ million. Numerous australopithecine fossils — skulls, jaws, teeth, leg bones — have been found in different places with ages of 1 to 4 million years; and at a locality known as Lothagam Hill, near Lake Rudolf, Patterson found a piece of a lower jaw that is clearly hominid, that is, another early australopithecine, and that is over 5 million years old. So it has to be accepted that the Kanapoi bone is that of an australopithecine, agreeing with the result obtained from the discriminant function.

16. Use in Human Fashion

If the original question now has less meaning, our analysis also implies something about the actual form of the bone: it was used in human fashion. This is equally important, if not more so. Several anthropologists and graduate students have recently been using similar, but more complex, analyses to study shape and function of other bones and fragments of our early ancestors, the australopithecines.

Note

1. The reader may recall that, when a statistician can detect a difference likely to be a real effect and not one stemming from chance variation, he calls it "statistically significant." By saying "statistically" he warns that the absolute size of the difference may be small and seemingly unimportant because it depends on the objects being studied.

Smith — Continued from page 17

his MUSIC IV program is the prototype from which virtually all current music-generating programs are descended. A good sampling of computer music by Mathews and his associates can be found on "The Voice of the Computer", DECCA record CL710180.

2. Among others: Princeton, Stanford, University of Indiana, University of New Hampshire, Queens College, Purdue, and, in Canada, the University of Toronto.

3. The most widespread is Barry Vercoe's MUSIC360, an assembly language program, which is machine-specific to the IBM 360 and 370 series computers; H.S. Howe of Queens College has written MUSIC 7 for the XDS Sigma 7 and MUSIC4BF, a FORTRAN program adaptable to computers with a FORTRAN IV compiler.

4. This is true because every second of music is represented by 10-20,000 (or more) numbers, called "samples", each of which is frequently the result of involved computations (subroutines which simulate the effects of certain kinds of audio filters are notoriously costly of computer time).

5. Writing your own program is almost certainly out of the question as the magnitude of this task is on the order of man-years of professional programming time.

6. The various functions and subroutines within the program are given names reminiscent of familiar hardware units found on analog music synthesizers (e.g., OSCIL = oscillator, ENVLP = envelope generator, REVERB = reverberation unit, etc.) and the flowcharting procedure associated with the program is designed to resemble the interconnection of these units by patchcords, as would be done on a music synthesizer.

7. A school involved in computer speech synthesis may have surmounted this particular obstacle since speech synthesis requires essentially the same devices as music synthesis.

8. i.e., "lengthening" the table to produce longer periods for lower frequencies, "shortening" it to produce shorter periods for higher frequencies.

9. The original implementation of this idea is the "GROVE" system developed by F.R. Moore of Bell Laboratories. A system for the general market is being developed by Donald Buchla, designer of a popular line of music synthesizers.

10. Recent research has shown that instrumental sound is far more complex than a simple set of harmonically-related sine tones in various proportions: transients, formant frequencies, changes in harmonic content over time and with changes in pitch, etc. all figure very significantly in the characteristic "colors" or musical instruments.

11. "Musique concrete" is an exception in that it is produced by manipulating pre-recorded sound materials, which may already be quite complex: musical instruments or even whole orchestras, machine noises, human voice, animal sounds, etc. These sounds may be played faster or slower than normal, played backwards, superimposed on one another, filtered, modulated, etc., etc.

12. Composer Iannis Xenakis has suggested a few such generators in his book, FORMALIZED MUSIC (U. of Indiana Press, 1971). As far as I know, however, he has not actually tried any of them out and a few I tried produced disappointing results.

ACROSS THE EDITOR'S DESK

Computing and Data Processing Newsletter

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APPLICATIONS

MISSISSIPPI'S COMPUTERIZED STATUTE SYSTEM

T. C. Williams
The Lawyers Co-operative Publishing Co.
Rochester, N.Y. 14603

With Governor Waller's receipt last July of Vol. #1 of Mississippi's new, computerized laws, the Magnolia State leapfrogged many of its Northern sisters in applying more science to political science. By hitching the deliberative wheels of legislative functions to the spinning reels of electronic data processing, Mississippi has acquired a display-case body of statutes that any state might envy.

To do this, every major law on the State's books was scrutinized for content and intent by a team of professional lawyer/editors and an IBM 370 computer. Contradictions and murky areas were spotted; overlappings and redundancies were apprehended; obsolescent and unconstitutionals were eliminated. The new laws were then reorganized into an efficient, easy-to-use modern format.

The new Mississippi Code of 1972 (as it is officially known) is the culmination of many months of close, co-operative effort by the State's legislature, the attorney general's office and the legal publishers. The new Code, which completely replaces all previous general statutes, is being marketed jointly by The Lawyers Co-operative Publishing Company of Rochester, N.Y., and The Harrison Company of Atlanta, Ga. It not only clarifies, simplifies and pulls together 16,000 sections, most of which date back to 1930, but the computer format also vastly increases the State's potential legislative effectiveness. Mississippi is the first State to contract for such a complete editorial and legal recodification using computer equipment.

In addition, the extensive collateral material necessarily appended to statutes was similarly updated and rearranged for convenience and ease of finding. This includes all the historical or derivative references that legislators need; pertinent state and federal legal decisions; reports on substantive and procedural points of law; plus cross references and references to related subjects in law books.

It won't be until next year that all the printed volumes and computer tapes will be finalized and updated and delivered to Mississippi. Then, it will be possible for legislators to "talk" to the computer

by typing words and requests on a keyboard much like a typewriter. They ask for references to previous laws, section-by-section comparisons, legislative history. The computer's ability to respond has few limitations beyond human programming capabilities. It can type out the information or display it on a TV-like tube. One computer can serve many incoming calls simultaneously and perform prodigious jobs of searching, selecting, relating, organizing and communicating information. Of course, it can also keep abreast of and record all changes and modifications and can automatically make these part of a perpetually updated code.

Although the finished product should be a very model of a statutory system, it is the capabilities of the new Code that prompted Mississippi Attorney General A. F. Summer to predict that it will result in "the most outstanding code ever produced in the history of American jurisprudence." He believes that "computerization, combined with trained legal minds analyzing and organizing the input to the computer, together create an essential new dimension in the intelligent management of today's massive, fast-growing body of state laws and court decisions."

COMPUTER TELLS CAR OWNERS WHEN MAINTENANCE IS NEEDED

Shufeldt Cadillac, Inc.
Southdale
Edina, Minn. 55435

Computer-produced maintenance recommendations are being given service customers of Shufeldt Cadillac, Inc., in what may be the first consumer service of its kind in the automobile industry.

An IBM computer helps car owners maintain their warranty obligations and, at the same time, gives them guidance on when to keep sophisticated emission control features functioning properly.

Based on the most previous service performed, the computer produces an individualized recommendation for up to 25 separate services, ranging from an engine tune-up to replacement of the positive crankcase ventilator valve (PCV), a key emission control part.

"Through the years we've found that many people have had problems in keeping track of the owner-responsibility maintenance required to protect the integrity of their car warranty. The new computer will do the necessary remembering for our customers, said Robert Shufeldt, president of the auto agency.

"With federal anti-pollution regulations becoming increasingly strict and greater in number — reaching their full impact by 1975 — the most logical way to be sure auto pollution devices stay in peak operating condition is via computer. For it is through proper maintenance and regular servicing that these devices can be kept functioning successfully and do the job they were meant to do."

The IBM System/3 Model 6 computer tells a customer exactly what was last serviced on his car and exactly what needs to be done currently.

A record of the mileage, date and mechanic is entered into the computer for each service that is performed. On subsequent servicing, the service supervisor calls from the computer a record of the most recently performed services and recommended services or a listing of all 25 services, whether or not they have been performed.

While Shufeldt recommends certain services, it is the car owner's decision if the work should be done.

For 1972 cars, the Federal Clean Air Act requires seven maintenance services be performed at certain mileage or time intervals.

"Although it is the owner's responsibility to keep the emission control system in working condition," said Mr. Shufeldt, "few could recognize any part of it."

"Besides helping him keep his car in peak operating condition, regular maintenance is a step toward reducing auto engine pollutants. On the one hand this adds to the car's value and its most efficient operation, and on the other it helps meet a vital environmental concern."

The IBM system also:

- Maximizes auto safety through regular maintenance.
- Gives the car owner a complete service record, for possible additional future trade-in value.
- Enables Shufeldt to alert a customer who has not had his car serviced for a period of time to specific needed maintenance.
- Helps Shufeldt avoid duplication of services that have been done within recommended limits on a car just traded in.

OHIO STATE UNIVERSITY PROBING EFFECT OF ENVIRONMENTAL CHANGES ON BODY

*Dr. Charles E. Billings
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A small computer at the Ohio State University College of Medicine, Division of Environmental Health, is helping scientists gauge the effects of environmental changes on the body. The computer quickly correlates and records statistical findings for a variety of research programs

One current study involves male volunteers who live in an environmental exposure chamber and breathe controlled amounts of sulphur dioxide, the byproduct of burning coal or low-grade fuel oil. The object is to determine what effect breathing this kind of contaminant has on a person's functional behavior and on his real health.

Devices in the experimental chamber are linked to volunteers and measure their vital bodily functions, including blood pressure, heart rate and lung function. Impulses from the instruments are transmitted directly to an IBM System/7. The computer then converts the data into meaningful numerical values and transmits the results to a larger computer on campus, for compiling into statistical reports for comparison purposes.

Further research programs and experiments currently utilizing the computer include: a vibration and noise analysis program aimed at determining whether these phenomena retard a person's ability to perform certain mental or physical tasks; pressurization and atmospheric research programs which measure the body's reaction to, and tolerance of, sudden or severe changes in air pressure encountered during air travel or underwater exploration; and, a chemical pollution analysis project that is testing the immediate and long-term effect of waterway contamination on aquatic life. Still another program is measuring the effects that fatigue, the use of drugs and alcohol have on a pilot's ability to perform.

COMPUTER-RELATED SERVICES

TOXICON SERVICE BEGINS OPERATIONS

*R. Harcharik
Informatics, Inc.
6000 Executive Blvd.
Rockville, Md. 20852*

An important new research service, TOXICON, giving health professionals and related support personnel direct access to one of the world's largest computerized collections of toxicology and pharmacology information, began operations on September 18. A service of the Toxicology Information Program of the National Library of Medicine, TOXICON (The Toxicology Information Conversational On-Line Network) enables health professionals to request and receive, via a teletype or other standard terminal device, information on some 180,000 bibliographical records on drugs, pesticides, environmental pollutants and other toxic agents compiled by the Library. The new service answers a need for greater dissemination of toxicology information as identified by a Presidential Science Advisory Committee.

TOXICON is designed to provide health professionals and related support personnel with the ability to access toxicology data and information by direct interaction with a computer based store via a remote terminal. Access may be through the communications network provided or by direct communication to the computer located in Washington, D.C.

The charge to the user has been minimized to reflect the costs directly associated with the utilization of the communication network and computer resources. Despite the complexity of the system, the 15 word command language provided the health professional to search the system can be mastered in a matter of hours.

Three interrelated but distinct files comprise the TOXICON data base. These are:

1. The Bibliographical Master File, consisting of 180,000 bibliographical records containing a full citation plus index terms, an abstract or both.

2. A Whole Text File which will contain a collection of full text reports and reviews ranging in size from books to brief one or two page articles.

3. The Data File, a hierarchal arrangement of data fields, consisting of structured verbal, numerical or alpha-numerical items. Data to be incorporated in this file will include protocol animal studies, clinical reports and chemical identification material.

Based upon open competitive bidding, Informatics Inc., has been selected as the contractor to maintain and support the TOXICON service. To subscribe, an individual or organization enters into a contract with Informatics. Access to TOXICON is open to the public.

The system is based in Washington, D. C. and utilizes an IBM 360/65 with a COM 40 as a communications handler and an AMPEX double density disc storage device. Most of the file maintenance is accomplished at the National Library of Medicine in Bethesda, Maryland, on an IBM 370/155.

NEW PRODUCTS

TELEPHONE-SIZED COMPUTER, BR-1018, MOVES INTO PRODUCTION

*Ron Smith
Bunker Ramo Corp.
Electronic Systems Division
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The telephone-sized computer from Bunker Ramo Corporation — the BR-1018 — has moved into production status. On the heels of delivery of engineering models to the Air Force for evaluation, BR's Electronic Systems Division, announces it has started work on the first production lot. The first five production computers are slated for delivery to the U.S. Army and the U.S. Navy for use on classified programs.

Developed originally for missile guidance applications requiring large computational capacity in small space, the BR-1018 weighs some three pounds without memory. Its central processor and input/output sections occupy about 10 cubic inches. Some customers are purchasing only the CPU and I/O units and are planning to supply their own memories. Units from the first production lot will be completed at a two-per-month rate.

BUNKER RAMO ACTIVATES NEW NATIONWIDE MARKET DATA SYSTEM

*Walter Clark
Bunker Ramo Corp.
Information Systems Group
35 Nutmeg Drive
Trumbull, Conn. 06609*

One year after announcing it would build an electronic market information system, Bunker Ramo Corporation has achieved nationwide operation of the new computer-based complex with several New York City brokerage office installations. These followed cutover during August for brokers in Los Angeles, Houston and Cleveland. Other installations are now being made in 40 more cities throughout the country. Called Market Decision System 7, the new complex is

operated through a network of computers and high-speed data circuits to provide current quotations and other data from 22 stock, bond, and commodity exchanges, and over-the-counter markets. The new system is operated by Bunker Ramo's Information Systems Group, Trumbull, Connecticut, which introduced prototype equipment last September at the management conference of the Securities Industry Association in New York City.

The brokers' equipment consists of desk-top keyboard units, each with a video screen divided horizontally into three segments connected to the system through programmable control units. Each unit can tap up to 12 data channels, displaying the outputs of any three channels at one time. This enables the user to watch his own selection of tickers, newswires, and the changing prices on hand-picked groups of stocks or commodities. He can also query the computer for current status of any one of 5,000 issues, or for computations on contemplated trades. The equipment can be interconnected to the broker's in-house communications and computer system for interrogation and updating of customer records and for outside transmission of buy-and-sell orders and other messages.

MISCELLANEOUS

CHINESE COMPUTER SCIENCE MORE ADVANCED THAN EXPECTED

*United Press International
The South Middlesex News
Framingham, Mass. 01701
August 30, 1972*

A computer science expert from Harvard University has reported, after a visit to China, that Chinese computer science is more advanced than American experts had believed. Professor Thomas E. Cheatham, Jr., director of the Center for Research in Computing Technology at Harvard, said, "We saw an operational, third generation computer using integrated circuits, all home built. This really shocked us. It puts them ahead of the Russians in this technology. The Russians have to import their integrated circuits," he said.

Cheatham, part of a six-man group of computer experts who toured China recently, said the third-generation machine was in operation at a research institute of the Chinese Academy of Sciences in Peking, the key center of computer research in China.

"They are quite a ways behind in certain peripheral equipment — discs and drums," Cheatham said. "Their output printers run at about 600 lines per minute compared to, say, 1000 lines for ours. But their vacuum-controlled tape drives seem very nearly as good as ours. Their emphasis has been on big scientific machines — number-crunchers — as opposed to data-processing machines as a bank would use. They have not yet felt the need to miniaturize. They do not pack their chips (integrated circuits) very tightly. This makes maintenance simpler," he said.

Cheatham does not think there will be a market for U.S. computer equipment in China. "They're making their own integrated circuits," he said. They cite Mao's teachings on self-reliance. They just are not going to let themselves be put in a position of dependency on outside suppliers."

NEW CONTRACTS

TO	FROM	FOR	AMOUNT
Computer Science Corp. Los Angeles, Calif.	NASA	Overall management responsibility for on-site data processing services at Goddard Space Flight Center, Greenbelt, Md.; CSC will provide 75% of contract services; contract calls for computer programming and operations support, simulation, data processing, and reduction of images transmitted to earth by NASA's advanced satellite systems	\$21 million
Litton Industries Data Systems Div., Van Nuys, Calif.	U.S. Army	Automating combat operations and intelligence data processing for the field Army	\$13.5 million
Univac Division, Sperry Rand Corp., Philadelphia, Pa.	Tokyo Electric Power Co., Tokyo, Japan	UNIVAC 1110 system to be used for general office applications; power distribution schedule; material fuel, equipment, and planning control; and technical engineering	\$8.3 million (approximate)
Univac Division, Sperry Rand Sweden	Swedish State Office Stockholm, Sweden	A UNIVAC 1110 system to the National Police Board; will replace computers currently used by the Board	\$5.5 million
General Telephone & Electronics Corp., GTE Sylvania Inc., Needham, Mass.	Federal Aviation Administration (FAA)	28 computerized air traffic control simulators for initial training of new controllers and recurrent training of journeymen controllers	\$5.3 million
Univac Division, Sperry Rand Corp., Blue Bell, Pa.	U.S. Air Force, Washington, D.C.	A UNIVAC 1108 multiprocessor and associated peripherals to be used at Foreign Technology Div., Wright Patterson AFB, Ohio	\$4.5 million (approximate)
Computer Sciences Corp., Los Angeles, Calif.	American National Bank and Trust, Montclair, N.J.	Providing computer facility management and a series of automated banking systems	\$4 million
Tri-Data Corp., Mountain View, Calif.	Teradyne, Inc., Boston, Mass.	A two-year contract for approximately 500 of the various models of CartriFile digital magnetic tape systems for use in Teradyne computerized test systems	\$1.8 million
Computer Sciences Corp., Los Angeles, Calif.	Southern California Edison Co., Rosemead, Calif.	A three-year contract to develop a series of computer-based information systems that will serve a broad range of public utility functions	\$1.5 million (approximate)
Data Products Corp. Telecommunications Div., Stamford, Conn.	Air Force Systems Command, Electronic Systems Div., Hanscom Field, Mass.	A Traffic Data Collection System for the overseas Autovon System to be used by the Defense Communications Agency	\$1.3 million
Honeywell, Inc., Tampa, Fla.	U.S. Air Force, Rome Air Development Center, Rome, N.Y.	Developing a data modem (AN/USC-26) designed to transmit and receive data at rates as high as 153,600 bps over group bandwidth channels	\$1.1 million
National Cash Register Co., Dayton, Ohio	Winters National Bank and Trust Co., Dayton, Ohio	NCR Century 300 system and associated equipment to enlarge capacities of current NCR system	\$1 million
Computer Machinery Corp., CMC Limited, United Kingdom	British Post Office, Bristol, England	Four CMC KeyProcessing ^U Systems to keep records of telecommunications service and apparatus	\$875,000
EMR Computer, Minneapolis, Minn.	Government of Poland	Three 6135 computer systems to process seismic data obtained from oil and gas exploration tests	\$800,000 (approximate)
Digital Systems Div., Ferranti, Limited, Bracknell, Berks, England	Italian Air Ministry, Rome, Italy	Air traffic control simulator based on Ferranti FM.1600B computer; to be shipped to Ciampino ATC Training Centre, Rome Airport	\$488,000
Computer Sciences Corp., Los Angeles, Calif.	U.S. Department of Health, Education and Welfare (HEW), Washington, D.C.	Two contracts: \$109,000 to develop computer-based grants payment system for HEW's federal assistance programs; \$189,000 to provide technical assistance to 12 states in operation of public assistance quality control	\$300,000 (approximate)
Computer Sciences Corp., Los Angeles, Calif.	U.S. Defense Intelligence Agency	Developing a computer simulation model that will enable the agency to identify present and potential bottlenecks in its on-line data processing system	\$149,000
McDonnell Douglas Automation Co., St. Louis, Mo.	Springfield Public School District, Springfield, Ill.	Data processing services for the school district; contract provides potential of annual renewals for computer processing and extensive computer program development	\$97,000
Syracuse University, Syracuse, N.Y.	National Science Foundation	Studying new method of decoding very long "error-correcting codes" (used in the reliable transmission of data in communications systems and in design of computer systems)	\$60,000
Computer Network Corp. (COMNET) (NASDAQ:CNET), Washington, D.C.	Informatics, Inc. (NASDAQ:IMAT), Canoga Park, Calif.	A multi-year subcontract to provide computerized data base in formation retrieval services to the Environmental Protection Agency	—
Cyphernetics Corp., Ann Arbor, Mich.	Michigan Bell Telephone Co.	A three-year contract as major supplier of time-sharing services	—
Environmental Research Corp., Las Vegas, Nev.	U.S. Geological Survey	A seismic study of the Lake Mead region in Nevada and Arizona to determine the relationships that exist between earthquake activity and large artificial lakes	—

NEW INSTALLATIONS

OF	AT	FOR
Burroughs B 3500 system	Citizens Bank, Sheboygan, Wisc.	On-line processing for bank's 42 Savings and Loan and commercial banking customers throughout the state; replaces existing two B 300 computers (system valued at over \$724,000)
	Jockey International, Inc. Kenosha, Wisc.	Sales and shipment statistical analysis, production and inventory control, credit analysis, and general office applications (system valued at more than \$750,000)
	The National Safety Council, Chicago, Ill.	Billing systems for membership dues, subscription sales, publications; a service fulfillment system and advertiser-exhibitor system; applications also include commercial and statistical applications and a safe driver award system (system valued at over \$480,000)
Burroughs B 4700 system	Garden Grove Unified School District, Garden Grove, Calif.	Grade reporting, attendance, student history, test scoring, staff planning and other administrative functions, accounting; replaces a B 3500 system
Burroughs B 6700 system	University of Rio Grande do Sul, Brazil	Serving as central system of a data communications network; applications include scientific research, student computer instruction, and administrative control tasks (system valued at about \$1 million)
Control Data CDC 1700 system	Data Graph, Inc., St. Paul, Minn.	Expanding firm's semi-automated circuit design service to electronics-industry customers
Control Data 6500 system	Manitoba Provincial Government, Winnipeg, Manitoba, Canada	Business and scientific data processing services to clients of the Manitoba Development Corp., provincial Crown Corporations, government agencies and commercial enterprises (system valued at \$3.2 million)
DECsystem 1040	Tufts University, Medford, Mass.	Use by students and faculty for general academic work primarily in the liberal arts area (system valued at \$437,000)
Honeywell Model 316 processors	German Bundes Press Agency (BPA), Bonn, Germany (2 systems)	Use on a time-sharing basis in a news collection and distribution system for German ministries and government agencies
Honeywell Model 2040 system	Clover Park School District, Tacoma, Wash.	Student scheduling, test scoring, grade reporting and business/financial applications
IBM System 7	University of Pennsylvania, Philadelphia, Pa.	Library use; will provide broader and faster service to patrons than the system it replaces
ICL 1904A system	Association Generale de Retraites par Repartitions, Chartres, France	Assessments, retirement pension files, loans, accountancy and file updating; replaces an ICL 1904E (system valued at about \$1.1 million)
NCR Century 50 system	Jasper Rubber Products, Jasper, Ind.	Payroll processing, requirements planning and production scheduling
UNIVAC Series 70/45 system	Old Dominion University, Norfolk, Va.	Administrative, instructional and research applications; replaces a second generation IBM 1401 (system valued at approximately \$700,000)
UNIVAC 1106 system	Consolidated Papers, Inc., Wisconsin Rapids, Wisc.	An on-line order entry system for inventory control, statistical monitoring, personnel record maintenance, payroll processing, quality control, research and development, and other mathematical and scientific purposes (system valued at \$1.3 million)
	Fisher Food, Inc., Bedford Heights, Ohio	Inventory control, general accounting and payroll processing (system valued at \$1 million)
	The Province of New Brunswick, Fredericton, N.B.	Accounting, payroll, pension systems, consumer tax system, welfare information system, personnel files, medicare registration, equipment preventive maintenance, and property tax records (system valued at \$1.2 million)
	University of Zagreb, Yugoslavia	Center of nationwide network; will be used for projects to advance the economic, social and cultural life of Yugoslavia; will also provide training for computer users (system valued at over \$3 million)
UNIVAC 9200 system	Northwestern Photo Co., Milwaukee, Wisc.	Expediting customer billing, direct mail sales promotion, general accounting and payroll processing
UNIVAC 9211-C system	Cost-Savings Data Systems Inc., Davenport, Iowa	Providing data processing services to customers
UNIVAC 9314 system	Personal Service, Columbus, Ohio	Maintaining and updating policy master files, premium and commission accounting, claims loss analysis and bank reconciliation
UNIVAC 9400 system	Van Hool en Zonen, Koningshooikt, Belgium	Implementation of a management information system including accessing in real-time information from data files on all aspects of the firm's business
Xerox Sigma 3 system	Pacific Northwest Bell, Seattle, Wash.	Collecting and monitoring telephone network traffic data in Washington, Oregon and Idaho (system valued at more than \$300,000)

MONTHLY COMPUTER CENSUS

Neil Macdonald.
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 SEPTEMBER 15, 1972

NAME OF MANUFACTURER	NAME OF COMPUTER	DATE OF FIRST INSTALLATION	AVERAGE OR RANGE OF MONTHLY RENTAL \$ (000)	NUMBER OF INSTALLATIONS			NUMBER OF UNFILLED ORDERS	
				In U.S.A.	Outside U.S.A.	In World		
Part II. Manufacturers Outside United States								
A/S Norsk Data Elektronikk Oslo, Norway (A) (Sept. 1972)	NORD-1 NORD-2B NORD-5 NORD-20	8/68 8/69 - 1/72	2.0 4.0 (S) - 3.5 (S)	0 0 0 0	82 20 1 7	82 20 1 7	18 X 0 7	
A/S Regnecentralen Copenhagen, Denmark (A) (Jan. 1972)	GIER RC 4000	12/60 6/67	2.3-7.5 3.0-20.0	0 0	40 19	40 19	0 3	
Elbit Computers Ltd. Haifa, Israel (A) (Sept. 1972)	Elbit-100	10/67	4.9 (S)	-	-	315	15	
GEC Computers Ltd. Borehamwood, Hertfordshire England (A) (Sept. 1972)	902 903, 920B GEC 905 GEC 920M GEC 920C Myriad I Myriad II GEC M2140 GEC 2050	5/68 12/65 5/69 7/67 7/68 1/66 11/67 10/69 6/72	- - - - - - - - -	0 1 0 0 0 0 9 0	17 464 77 130 19 47 32 21 5	17 465 77 130 19 47 32 30 5	0 19 1 103 0 0 0 0 32	
International Computers, Ltd. (ICL) London, England (A) (Sept. 1972)	Atlas 1 & 2 Deuce KDF 6-10 KDN 2 Leo 1, 2, 3 Mercury Orion 1 & 2 Pegasus Sirius 503 803 A, B, C 1100/1 1200/1/2 1300/1/2 1500 2400 1900-1909 Elliott 4120/4130 System 4-30 to 4-75	1/62 4/55 9/61 4/63 -/53 -/57 1/63 4/55 -/61 -/64 12/60 -/60 -/55 -/62 7/62 12/61 12/64 10/65 10/67	65.0 - 10-36 - 10-24 - 20.0 - - - - - 5.0 3.9 4.0 6.0 23.0 3-54 2.4-11.4 5.2-54	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 2 0 0	6 2 34 1 43 4 10 9 8 18 107 13 11 82 35 3 2200 100 200	6 2 34 1 43 4 10 9 8 18 107 13 11 82 35 3 2202 100 200	X X X X X X X X X X X X X X X X - X -	
Japanese Mfrs. (N) (Sept. 1970)	(Mfrs. of various models include: Nippon Electric Co., Fujitsu, Hitachi, Ltd., Toshiba, Oki Electric Industry Co., and Mitsubishi Electric Corp.)						Total: 4150 E	Total: 800 E
N.V. Philips Electronica Apeldoorn, The Netherlands (A) (Aug. 1972)	P1000 P9200 P9200 t.s. P880 P850/55/60 ELX DS 714 DS 18 PR 8000	8/68 3/68 3/70 9/70 9/70 5/58 -/67 9/72 1/66	7.2-35.8 - - - - 6-21 - - -	- - - - - - - - -	- - - - - - - - -	105 300 5 29 40 42 33 - 23	39 25 1 16 290 - 15 9 -	
Redifon Limited Crawley, Sussex, England (A) (May 1972)	R2000	7/70	-	1	13	14	6	
Saab-Scania Aktiebolag Linkoping, Sweden (A) (July 1972)	D21 D22 D220	12/62 11/68 4/69	7.0 15.0 10.0	0 0 0	38 33 16	38 33 16	- 3 2	
Selenia S.p.A. Roma, Italy (A) (Aug. 1972)	G-16 GP-160	7/69 -	10.9 (S) 5.6 (S)	0 -	118 -	118 -	51 250	
Siemens Munich, Germany (A) (Aug. 1972)	301 302 303 304	11/68 1/68 4/65 5/68	0.9 2.1 2.7 4.5	- - - -	- - - -	103 30 70 80	15 7 2 14	

NAME OF MANUFACTURER	NAME OF COMPUTER	DATE OF FIRST INSTALLATION	AVERAGE OR RANGE OF MONTHLY RENTAL \$(000)	NUMBER OF INSTALLATIONS		NUMBER OF UNFILLED ORDERS	
				In U.S.A.	Outside U.S.A.		
Siemens (Continued)	305	2/68	6.1	-	-	117	16
	306	6/70	7.9	-	-	28	6
	2002	6/59	16.4	-	-	41	-
	3003	12/63	15.8	-	-	34	-
	4004/15/16	10/65	6.1	-	-	101	2
	4004/25/26	1/66	10.0	-	-	79	16
	4004/35	2/67	14.2	-	-	213	50
	4004/135	10/71	20.5	-	-	51	42
	4004/45	7/66	27.3	-	-	355	34
	4004/46	4/69	41.0	-	-	16	1
	4004/55/60	7/66	35.0	-	-	27	-
	4004/150	2/72	49.0	-	-	18	53
	4004/151	3/72	61.0	-	-	4	4
	404/3	4/71	2.1	-	-	29	10
	404/6	10/71	4.5	-	-	39	47
						Total: 1435	Total: 319
USSR (N) (May 1969)	BESM 4	-	-	-	-	C	C
	BESM 6	-	-	-	-	C	C
	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: 6000 E	Total: 6000 E

CALENDAR OF COMING EVENTS

Oct. 8-11, 1972: International Conference on Systems, Man and Cybernetics, Shoreham Hotel, Washington, D.C. / contact: K. S. Nurendra, Yale Univ., 10 Hill House, New Haven, CT 06520

Oct. 16-17, 1972: 7th Annual Digitronics Users Association, Royal Orleans Hotel, New Orleans, La. / contact: Executive Secretary, DUA, Box 33, Southboro, MA 01772

Oct. 16-20, 1972: IBI-ICC World Conference on Informatics in Government, Venice, Italy / contact: Intergovernmental Bureau for Informatics (IBI-ICC), 23 Viale Civita del Lavoro, 00144 Rome, Italy

Oct. 31-Nov. 1, 1972: The Applied Data Research Users Group Second National Annual Meeting, Howard Johnson Motor Lodge, Newark Airport, N.J. / contact: Mrs. Judith Miller, Applied Data Research, Inc., Route 206 Center, Princeton, NJ 08540

Nov. 9-10, 1972: Second National Conference of Society for Computer Medicine, Williamsburg, Va. / contact: Society for Computer Medicine, Box M488, Landing, NJ 07850

Nov. 15-17, 1972: DATA CENTRE '72, Sheraton-Copenhagen Hotel, Copenhagen, Denmark / contact: Data Centre '72, Danish IAG, DIAG, 58 Bredgade, DK 1260, Copenhagen K, Denmark

Nov. 20-21, 1972: 8th Data Processing Conference in Israel, Tel Aviv Hilton, Tel Aviv, Israel / contact: Information Processing Assoc. of Israel, Programme Committee, The 8th Data Processing Conference, P.O.B. 16271, c/o "Kenes", Ltd., Tel Aviv

Dec. 5-6, 1972: TDCC 1972 Transportation Data Systems Forum, Presidential Ballroom, Statler Hilton Hotel, Washington, D.C. / contact: Edward A. Guilbert, President, Transportation Data Coordinating Committee, 1101 17th St., N.W., Washington, DC 20036

Dec. 5-7, 1972: Fall Joint Computer Conference, Anaheim Convention Center, Anaheim, Calif. / contact: AFIPS Hdqs., 210 Summit Ave., Montvale, NJ 07645

Jan. 17-19, 1973: 1973 Winter Simulation Conference, San Francisco, Calif. / contact: Robert D. Dickey, Bank of California, 400 California St., San Francisco, CA 94120

Jan. 31-Feb. 1, 1973: San Diego Biomedical Symposium, Sheraton-Harbor Island Hotel, San Diego, Calif. / contact: Dr. Robert H. Riffenburgh, Program Chmn., San Diego Biomedical Symposium P.O. Box 965, San Diego, CA 92112

Feb. 20-22, 1973: Computer Science Conference, Neil House, Columbus, Ohio / contact: Dr. Marshall Yovits, 101 Caldwell Lab., 2024 Neil Ave., Ohio State Univ., Columbus, OH 43210

Mar. 4-9, 1973: SHARE Meeting, Denver, Colo. / contact: D.M. Smith, SHARE, Inc., Suite 750, 25 Broadway, New York, NY 10004

Mar. 26-29, 1973: IEEE International Convention (INTERCON), Coliseum & New York Hilton Hotel, New York, N.Y. / contact: J. H. Schumacher, IEEE, 345 E. 47th St., New York, NY 10017

Mar. 29-31, 1973: 10th Symposium on Biomathematics and Computer Science in the Life Sciences, Houston, Texas / contact: Office of the Dean, The University of Texas Graduate School of Biomedical Sciences at Houston, Division of Continuing Education, P.O. Box 20367, Houston, TX 77025

April 2-5, 1973: SOFTWARE ENGINEERING FOR TELECOMMUNICATION SWITCHING SYSTEMS, University of Essex, Essex, England / contact: Mrs. Penelope Paterson, Institution of Electrical Engineers Press Office, Savoy Place, London WC2R 0BL, England

April 10-12, 1973: Datafair 73, Nottingham University, Nottingham, England / contact: John Fowler & Partners Ltd., 6-8 Emeral St., London, WC1N3QA, England

April 10-13, 1973: PROLAMAT '73, Second International Conference on Programming Languages for Numerically Controlled Machine Tools, Budapest, Hungary / contact: IFIP Prolamat, '73, Budapest 112, P.O. Box 63, Hungary

- April 24-26, 1973:** I.S.A. Joint Spring Conference, Stouffer's Riverfront Inn, St. Louis, Mo. / contact: William P. Lynes, c/o Durkin Equipment, 2384 Centerline Ind. Dr., St. Louis, MO 63122
- April 30-May 2, 1973:** 1st Symposium on Computer Software Reliability, Americana Hotel, New York, N.Y. / contact: David Goldman, IEEE Hdqs., 345 E. 47th St., New York, NY 10017
- May 14-17, 1973:** Spring Joint Computer Conference, Convention Hall, Atlantic City, N.J. / contact: AFIPS Hdqs., 210 Summit Ave., Montvale, NJ 07645
- June 4-7, 1973:** 1973 8th PICA Conference, Radisson Hotel, Minneapolis, Minn. / contact: IEEE Hdqs., Tech. Svcs., 345 E. 47th St., New York, NY 10017
- June 4-8, 1973:** National Computer Conference and Exposition, Coliseum, New York, N.Y. / contact: AFIPS Hdqs., 210 Summit Ave., Montvale, NJ 07645
- 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 26-28, 1973:** Workshop on Computer Architecture, Universite de Grenoble, Grenoble, France / contact: Grenoble Accueil, 9, Boulevard Jean-Pain, 38000, Grenoble, France
- July 20-22, 1973:** 1973 International Conference on Computers in the Humanities, University of Minnesota, Minneapolis, Minn. / contact: Prof. Jay Leavitt, 114 Main Engineering Bldg., University of Minnesota, Minneapolis, MN 55455
- 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. 13-17, 1973:** SHARE Meeting, Miami Beach, Fla. / contact: D. M. Smith, SHARE, Inc., Suite 750, 25 Broadway, New York, NY 10004
- 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
- Oct. 8-12, 1973:** BUSINESS EQUIPMENT SHOW, Coliseum, New York, N.Y. / contact: Rudy Lang, Prestige Expositions, Inc., 60 East 42 St., New York, NY 10017

ADVERTISING INDEX

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

- BERKELEY ENTERPRISES, INC., 815 Washington St., Newtonville, Mass. 02160 / Pages 32, 34, 52
- THE C&A NOTEBOOK ON COMMON SENSE, ELEMENTARY AND ADVANCED, published by Computers and Automation, 815 Washington St., Newtonville, Mass. 02160 / Page 2
- COMPUTERS AND AUTOMATION, 815 Washington St., Newtonville, Mass. 02160 / Pages 34, 51
- WHO'S WHO IN COMPUTERS AND DATA PROCESSING, jointly published by Quadrangle Books (a New York Times Company) and Berkeley Enterprises, Inc., 815 Washington St., Newtonville, Mass. 02160 / Page 30

C.a

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:

Andrew M. Langer
Newton High School
Newton, Mass.

NUMBLE 7210

$$\begin{array}{r}
 \\
 \\
 + \quad H E L L \\
 = \quad H E O S \\
 + \quad T H E R E \\
 = \quad T I F N E \\
 + \quad A R E \\
 = \quad I E R O L \qquad 497840
 \end{array}
 \qquad
 \begin{array}{l}
 I N \\
 I = T
 \end{array}$$

Solution to Numble 729

In Numble 729 in the September issue, the digits 0 through 9 are represented by letters as follows:

$$\begin{array}{ll}
 T = 0 & L = 5 \\
 M, P, Y = 1 & N = 6 \\
 C = 2 & D = 7 \\
 E = 3 & S, F, R = 8 \\
 B = 4 & O = 9
 \end{array}$$

The message is: Empty coffers need not be locked.

Our thanks to the following individuals for submitting their solutions – to Numble 728: Mark J. Begeman, Penn Hills, Pa.; A. Sanford Brown, El Paso, Tex.; T. P. Finn, Indianapolis, Ind.; Mahmood Lafar, New York, N.Y.; Felicitas Reich, Yonkers, N.Y.; Elwyn Smith, La Jolla, Calif. – to Numble 727: Mark J. Begeman, Penn Hills, Pa. – to Numble 726: T. M. Kaegi, Switzerland.

A reprint from
computers
and automation

● DO YOU LIKE
COMPUTERS AND AUTOMATION?

● DO YOU HAVE A FRIEND
WHO MIGHT LIKE IT?

● HOW ABOUT GIVING HIM
(OR YOURSELF) A GIFT
SUBSCRIPTION?

● Take advantage of our current offer:
a gift subscription to him (or you)
and for you —
a copy of our FOUR-STAR **** REPRINT

● ANY MORE FRIENDS OR ASSOCIATES
WHO MIGHT LIKE SAMPLE COPIES
OF C&A FREE? — just tell us
and we will send them a copy
— so they also may start
liking C&A

FOUR-STAR REPRINT

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)
EMPLOYMENT, EDUCATION, AND THE INDUSTRIAL SYSTEM,
by Prof. John Kenneth Galbraith, Harvard Univ. (Aug. 1965)
COMPUTERS AND THE CONSUMER, by Ralph Nader,
Washington, D. C. (Oct. 1970)

cut here and tuck in flap

To: Computers and Automation

() Please enter a subscription for

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() Send 13 issues including directory, \$18.50
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cut here

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One Year (including the Computer Directory and Buyers'
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Name: _____ Title: _____

Organization: _____

Address: _____

City: _____ State: _____ Zip: _____

Country if not U.S.: _____

Signature: _____ P.O. No.: _____

Payment enclosed

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New subscription

To SPEED the processing of your order, please check the one best
descriptor in each of the two categories below. (This information
will be used for statistical purposes only.)

BUSINESS TYPE

- 01—Computer Manufacturer
- 02—Aerospace / Aircraft
Manufacturer
- 03—Other Manufacturing
- 04—Raw Materials Processing;
(chemical, primary metal,
petroleum, food, etc.)
- 05—Mining and Construction
- 06—Computing & Consulting
- 07—Finance, Insurance, Publ.,
and Service Organizations
- 08—Transportation Companies
- 09—Public Utilities
- 10—Research
- 11—Wholesale, Retail, Sales,
and Marketing Firms
- 12—Educational; (College,
University, or School)
- 13—Government and Military
- 14—Libraries

JOB FUNCTION

- 1—Technical Management; (computer
installation management, program
management, or engineering mgmt.)
- 2—Computer Center Personnel;
(methods & procedure analysts,
and operators)
- 3—Programming Personnel; (systems,
application & research programmers)
- 4—Professional; (systems analysts,
mathematicians, operations
researchers, and professors)
- 5—General Management Executives,
(corporate officers, owners, and
partners)
- 6—Engineering Personnel; (systems
engineers, research & development engineers)
- 7—Research Personnel
- 8—Students
- 9—Library Subscription
- 10—Subscription in Company Name
Only

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BOSTON, MASS.

BUSINESS REPLY MAIL

No postage stamp necessary if mailed in the United States

POSTAGE WILL BE PAID BY BERKELEY ENTERPRISES, INC.

COMPUTERS AND AUTOMATION

815 Washington Street

Newtonville, MA 02160

cut here

B — fasten to A

bend here and fold

A — fasten to B

cut here

PROBABILITY AND STATISTICS KIT K22

. . . a kit with more than 60 Experiments and Examples in CHANCES, PROBABILITIES and STATISTICS

- Designed by the makers of the **BRAINIAC®** Electric Brain Construction Kit

- Produced under the direction of Science Materials Center (Div. of Library of Science)

. . .

- *If a World Series team has won the first two games, what are the chances of its winning the Series?*

- *How reliable is a sample of twenty observations?*

- *Are stars in the sky distributed randomly? What about towns on a map?*

The above posers are only a few of the provocative questions you can now answer with our new Probability and Statistics Kit K22—an irresistibly entertaining introduction to one of the most fascinating and far-reaching subjects in science today.

With this kit—by means of more than 60 intriguing, easy-to-perform experiments and exercises—you can see for yourself, at first hand, the scientific basis for predicting events . . . drawing statistical conclusions . . . making informed estimates in many chance situations . . . analyzing the patterns of chance happenings. You acquire a firm knowledge of many of the key ideas of probability and statistics THROUGH YOUR OWN EXPERIMENTS.

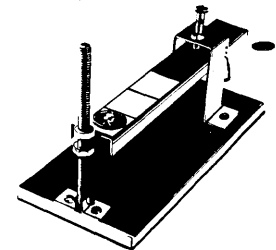
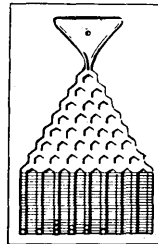
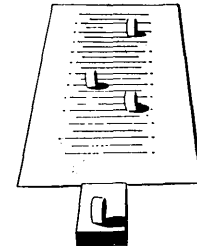
SOME OF THE CONTENT OF THE EXPERIMENTS: If you flip a coin 50 times, what will happen? If you roll 2 dice, what will happen? If you roll 30 dice and do that 40 times, what will happen? How often will you get 5 sixes when you roll 30 dice? How often will you get 10 sixes when you roll 30 dice? How will raindrops be distributed? How do you use the frequency of letters to solve a cryptogram? If you have 20 black beads and 10 white beads in a sampling box, what are you likely to get in ten samples? If you have 20 black beads and 10 white beads in one sampling box and 25 black beads and 5 white beads in another sampling box, are you likely to be able to tell the boxes apart if you sample twenty times? How random is random? Can a person name 100 digits randomly out of his head? How do you measure departure from randomness?

STATISTICAL DISTRIBUTIONS DISCUSSED IN THE KIT AND EXPERIMENTS: Uniform Distribution in one and two dimensions; Binomial Distribution; Normal Distribution; Chi-Squared Distribution; Poisson Distribution; Multinomial Distribution.

From the Instruction Book's preface by Dr. Frederick Mosteller, Professor of Mathematical Statistics, Department of Statistics, Harvard University, Cambridge, Mass. . . . Some may feel that this sort of material is only for the youth who is quick at science and mathematics, and certainly such a youngster will profit mightily. But it is not so well known that children, retarded in the mathematical areas, brighten up when presented mathematical tasks derived from experiments they have executed themselves . . .

In all the talk about science and mathematics, let's not forget that experimentation with mathematical ideas is fun. And hours and hours of such instructive fun are in the Berkeley book and lab. How do I know? In preparing this introduction, I have been greatly hampered by my not-very-studious 14-year old who busily instructs me in the use of all these materials.

Now if you'll excuse me, I have a new theory I'd like to try on the coin-flipping machine. Have fun!



WHAT COMES WITH YOUR PROBABILITY AND STATISTICS KIT K22?

- Every Special Part needed to perform the experiments in the kit:
 - Variable Coin-Tossing Machine—to toss coins randomly or predictably or any stage in between
 - Quincunx (or Hexstat®)—a device for producing a great variety of statistical distributions by rolling 300 little steel balls past obstacles into 9 compartments
 - 5 specially-designed Sampling "Urns" and 75 black & 75 white Beads
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