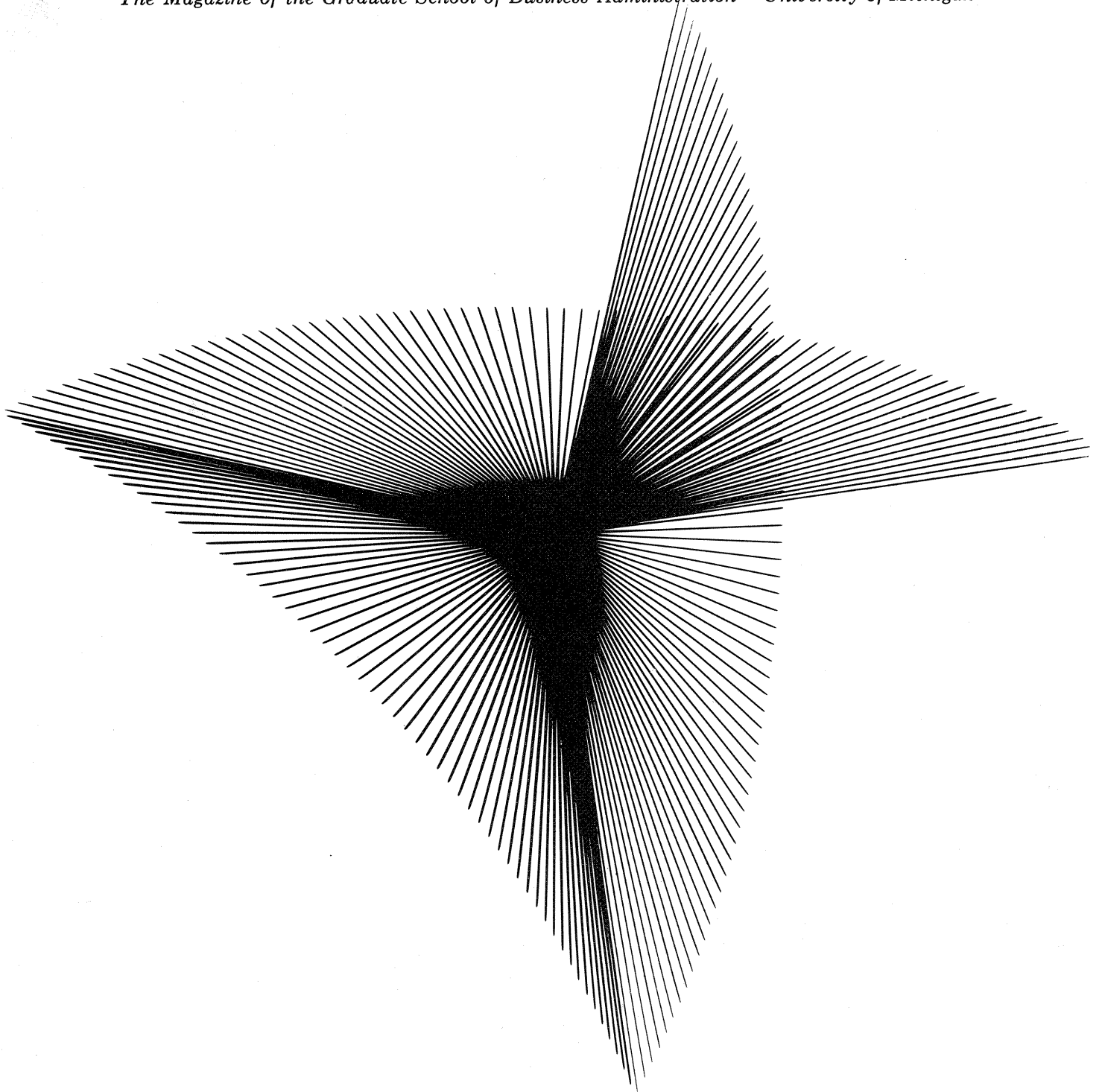


Spring-Summer, 1970

Dividend

The Magazine of the Graduate School of Business Administration • University of Michigan



Special Issue: The Computer

Letters

Film Dividends

Editor:

We have several hundred feet of negative film which probably contains scenes of Herbert Henry Dow, founder of The Dow Chemical Company.

The footage was exposed with a Movette camera, manufactured in Rochester, New York, in 1920. No laboratory that we have contacted has been able to print the film, preferably optically to 16 mm (probably step to 24 fps.).

It is impractical, of course, to view the negative directly to determine its contents.

Upon seeing the excellent article in the Winter, 1970 issue of *Dividend*, it has occurred to me that you have possibly encountered this "unusual" type of film (sample enclosed) and know of a laboratory that could print it, enabling us to assist you with your project.

Don Doane

Alden B. Dow Associates, Inc.
Midland, Michigan

Editor:

May I thank you for publishing my article on our School's Business History Film Collection. Since the article appeared in print, I have learned of the existence of film on Andrew Carnegie and have been apprised of the possible existence of film on the Dodge brothers and of additional footage of Julius Rosenwald. *Dividend* is indeed an apt name for your publication.

David L. Lewis

Professor of Business History

You're Right We're Wrong

Editor:

For shame! I refer, of course, to the picture of Henry and Clara Ford and their son (sic) Henry II on page 9 of the winter issue of *Dividend*.

Fortunately, this slight error didn't spoil my appreciation of an otherwise enjoyable and well written article.

Frank M. Diedrichs MBA '67
Esso International
New York

Editor:

How many people thus far have mentioned the missing generation on page 9? As one who was in the background that day (it was while I was teaching at The Edison Institute) the picture has always created images for me!

Dr. Robert C. Lusk
Educational Services
Automobile Manufacturer's
Association, Inc.
Detroit, Michigan

Editor:

Re: page 9, your Winter 1970 issue. If Henry Ford II was Henry Ford's son, where does Edsel fit in? Or am I wrong?

John H. Paull Jr., MBA '55
Detroit, Michigan

Editor:

On page 9, *Dividend*, Winter 1970 under the subject "Henry Ford" you write: "His son, Henry Ford II stands at right." Henry had one child, a son, named Edsel. Henry Ford II is Edsel's oldest son. He is Henry Ford's grandson.

I suppose, by this time, half the recipients of *Dividend* have written to you pointing out this error.

Jesse Ormondroyd
Ann Arbor, Mich.

Well, not half, but a good many, and those who did not write, telephoned! We apologize to one and all.—Ed.

Which Yardstick?

Editor:

You are to be congratulated on your Winter Edition. It goes a long way toward bridging the ever-widening gap between the business community and the school that was so much a part of our life for those few precious years.

"Great Entrepreneurs on Film" interested me as I have seen or met most of these men. I would not quarrel with those who have evaluated them as "greater"—nor would I necessarily agree. I would note, however, that my University in its attempt to measure greatness has "polled 423 executives."

We have learned the art of measurement to such a high degree that the distance to the moon is a known fact, temperatures over a million degrees can be discerned and objects too small to see can be accurately dimensioned—yet man in all his endeavors cannot measure his fellowmen.

You, who have been entrusted with the awesome job of measuring our young people in order to determine who will be educated, have long used a yardstick based largely on academic achievement with little value placed on potential.

Again, I do not criticize. I do look back over the more than a half-century I have been allowed to live and mentally catalogue the men and women whom I could call great. I know not what criteria I use: perhaps it is in some way related to one's ability to concern himself with his fellowmen, his ability to be understanding, his uncommon desire to place human value above position or prestige.

Am I wrong—or haven't I recently heard something about today's students calling for human values?

Michigan is a great school. Think how much better it will be in the years to come.

Dick McManus, '34 Eng,
Southfield, Michigan

Letters continued on page 30

Dividend

The Magazine of the Graduate School of Business Administration

VOLUME 1, No. 4

Spring-Summer, 1970

The Computer — Sweet and Sour 4 by Thomas J. Schriber

Dr. Schriber reviews a book on the computer which, he says, cannot help but be entertaining and revealing for the layman and the specialist alike. Dr. Schriber, associate professor of statistics, is directing two national workshops this summer on the use of the computer in management education.

What Managers Need to Know About the Computer 6 by Andrew McCosh

What should non-specialist managers know in order to use the computer most effectively? Andrew McCosh, associate professor of accounting and member of the School's committee on computer equipment and use, addresses himself to this question.

Ask Me a Question — Any Question — 8

A collection of items from various publications describing some ingenious ways the computer is being used to solve problems.

Analysis of Decisions Under Uncertainty 10 Reviewed by Rex Brown

Dr. Brown, associate professor of business administration, here reviews a book he believes may be the most important practical contribution to management science for many years to come.

Alumni and the Computer — 11

Twenty-six alumni who are working in the computer field, or who have founded businesses based on the computer, describe their jobs and comment on the problems and possibilities arising from the computer both now and in the future.

Among Ourselves — 24

Information on the newly established Associates Program, a fund-raising campaign inaugurated by a \$325,000 gift, and two accounting firms that have recently given the School a great deal of support.

Numbers, Part 11 — 31

This issue's *Numbers* section centers around statistics to do with the computer—jobs with computer industries, growth of computer fields and the computer as tax collector.

About the Cover and the Art Work in This Issue

Our cover is a picture drawn by a computer in the research laboratories of General Motors Corporation. The picture was developed to check image quality on the cathode ray tube screen of the DAC Graphic Console and is used by permission of the G-M Experimental Laboratories. Art work throughout the issue consists of entries in the 1969 Computer Art Contest sponsored by the magazine *Computers and Automation*, and is used with their permission.

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Editor: Pringle Smith

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THE COMPUTER-

A review of *The Real Computer: Its Influence, Uses and Effects* by Frederic G. Withington

Books which address themselves to highly technical topics often either contain valuable information masked in forbidding prose style, or make concessions in their technical content in an attempt to appear "readable" to the non-specialist. This is the case because, very often, the specialist has no interest in presenting his knowledge to the casual reader; and professional writers, although versed in the skills of written communication, must necessarily rely on what for them is second hand information as the basis of their subject matter. Only on rare occasions does one encounter that happy circumstance in which a man who is a technical expert and has a fluent prose style is motivated to reveal his experience and insights to professional and non-professional as well, within the bounds of a single text. Frederic G. Withington, Senior Staff Member in the Management Sciences Division of Arthur D. Little, Inc., is such a man. In his second book, *The Real Computer*, Withington adheres to the high standards he set for himself in his first book (*The Use of Computers in Business Organizations*) and succeeds in producing a volume which cannot help but be both entertaining and revealing for the layman and the specialist alike.

The book is advertised as "a factual, objective study of the effects computers have had on the individuals and organizations using

them, . . . intended to help concerned managers and individuals control these changes and adapt to them intelligently." There is no fault to be found in this claim. In addition to its authenticity and readability, the book has for the non-specialist the added advantage of containing an introduction to the characteristics of the computer, making it a self-contained volume. The specialist's interest in what Withington has to say arises in part because the author has achieved a

About the Author

Dr. Schriber, associate professor of statistics, is chairman of the School's committee on computer equipment and use, and the author of two books on the computer: *Fundamentals of Flowcharting* and *FORTRAN Case Studies for Business Applications*; both published by John Wiley and Sons, 1969. He is director for two national summer workshops entitled *Use of the Computer in Management Education* to be offered to faculty members from business schools across the country. The workshops are financed by a \$50,000 grant from IBM. Dr. Schriber holds an M.S. degree in mathematics and M.S. and Ph.D. degrees in chemical engineering, all from the University of Michigan. An article by him entitled "Computer Use in the Business School Curriculum" was published in the March, 1970 issue of the *Michigan Business Review*. Copies are available by waiting the MBR, Graduate School of Business, Ann Arbor, Michigan.

perspective on his subject that is not at all transparently obvious to the typical practitioner, committed as that practitioner often necessarily is to one or at most several detailed aspects of the computing field. A major strength of the book, important to all classes of readers, is its wealth of over 100 bite-sized case histories which Withington intersperses in the text and uses to illustrate the points being made. Nor are these case histories contrived by the author to support what are mere conjectures on his part. Rather, they are taken from actual cases encountered by Withington during his fifteen years' experience in the computing field.

The realistic objectivity with which this book is written is refreshing. "The computer is presented neither as a panacea nor as an agent of harm, but in both roles as the evidence dictates." (Quoted from the book's preface.)

This results in a sweet-and-sour treatment in which the observed and realized potential of the computer for good is counterbalanced by a frank treatment of the dislocations, both human and financial, which it often causes. Hence, a chapter on "The Computer's Strengths" discusses such computer advantages as its ability to repeat itself precisely and rapidly, perform complex calculations in "real time" (by which is meant that results of calculations are available early enough so that it is not too late to

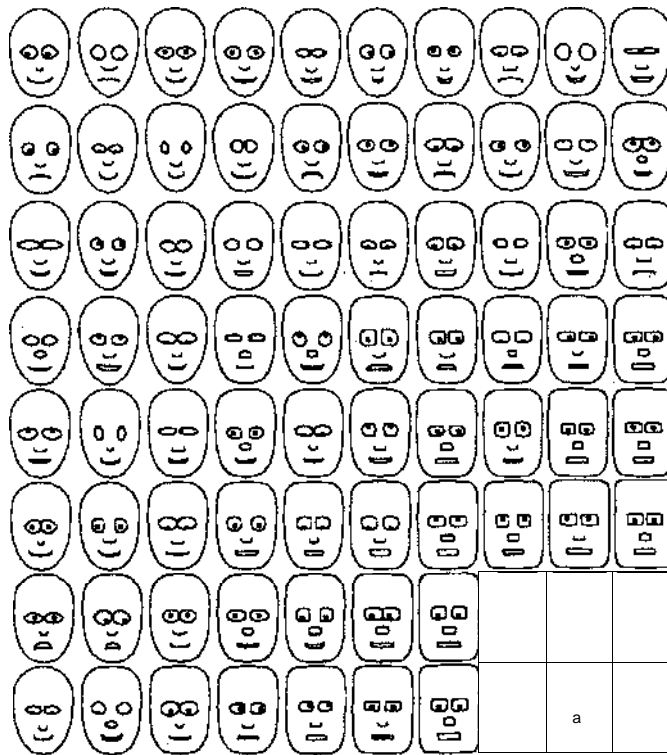
SWEET AND SOUR

Published by Addison-Wesley Publishing Company Inc.

By Thomas Schriber

make practical use of the results) manipulate models, and control other machines. But then the very next chapter opens with the startling quote from *Electronic News*, December 6, 1967 ". . . Losses for the fiscal year were due to the installation of a digital computer which hopelessly confused the affairs of the company." The chapter addresses itself to such computer weaknesses as its inability to perceive relationships, its inability to handle human languages, its lack of personality, and its cost. A third chapter, "Managing Computer-Caused Changes," is combined with these first two to make up Part I of the book, "The Computer Unmasked." Part II discusses "How the Computer Changes Organizations," taking up "Changes in Operations," "Changes in Management and Planning," "Standardization and Centralization," and "Dr. Frankenstein's Fate" as chapters in that order. "Dr. Frankenstein's Fate" refers to the fact that those who created the computer must now reckon with the consequences of that creation, whether they like it or not. Part III, "How the Computer Changes Individuals," devotes chapters to "The Priesthood of the Machine," "Those Who Benefit," and "Those Who Suffer." In Part IV, Withington extrapolates the observed effects of the computer to "The Next Generation," treating "Concessions Demanded by the Computer,"

continued on page 32



PROGRESS?

—George H. Meyfarth HI and Philip E. Meyfarth
Each face is a composite of super-ellipse quadrants with exponents ranging from slightly less than 2 to about 400. The variations in location, size, and shape of the features are controlled by a Gaussian random number generator. The trend toward squareness and conformity in the lower right corner results from predetermined changes in the statistical properties. The mouth expression is correlated with eye position to suggest apprehension in those who see that they themselves are not far from total mechanization. Programmed in FORTRAN and plotted on-line on an IBM 1627 driven by an IBM 1130. Used by permission of the magazine *Computers and Automation*.

What Managers Need to Know About the Computer

by Andrew McCosh

Computers should be used in business to solve those problems and perform those tasks which they can do better than the people who would otherwise do them. *Better* in this context may mean more quickly, more thoroughly, less expensively, more reliably, or a combination of these qualities. What should managers and would-be managers know about the computer—what it can do for them, how it can be used successfully?

Contrary to popular belief, skill at programming is not the most fundamental starting point from which to proceed into the study of computer systems. Instead, programming may be regarded as a necessary evil in a management school. It is infinitely more important to convey to present and future managers what they can reasonably expect a computer system to do for them. They must also learn about the limitations of computerized systems, and the difficulties and the opportunities associated with them. Requiring managers and would-be managers to learn how to program a computer is, however, a powerful method of bringing home to them the precision and clarity of thought which are necessary if a computer system is to contribute successfully to the management process. I have observed many managers develop a much clearer comprehension of what

computers are for after they have written a simple program.

Non-specialist managers should be exposed to the basic concepts of *systems analysis*. Systems analysis involves the study of the information requirements associated with a particular management decision or group of decisions. The analyst must become familiar with the economic realities of the decision which the manager finds before him. The next

About the Author

Dr. McCosh, associate professor of accounting, holds a bachelor's degree from Edinburgh University, Edinburgh, Scotland, and a doctorate from the Harvard Business School. He is a chartered accountant. His articles include: "Time Shared Merger Analysis," published in *Mergers if Acquisitions*, January, 1969; "Terminal Costing for Better Decisions," *Harvard Business Review*, May-June, 1968, and "Hospital Cost Finding by Computer," published in *Hospital Financial Management*, November, 1969. Dr. McCosh is a member of the computer equipment and use committee, the curriculum committee, and the teaching committee of the Business School. He has recently accepted an invitation from the Association of Computer Machinery to be a national lecturer for 1970-71. He is a member of the American Accounting Association's committee on the use of computers in accounting education.

step is the preparation of a suitable model designed to create, from the available sources of data, as close an approximation as possible to the information needed to support the decision. This aspect of information systems study is the most important one and certainly it is the aspect with which the operating manager should be most concerned. In his work situation, or in the case of pre-experience students, in the work situation they may reasonably expect to occupy, the manager is not interested in spending time coding a model in Cobol or Fortran or Algol. He is interested in establishing that the model being placed on the computer has a bearing on the problems he faces, and that it contributes toward their correct solution. This is true whether the application at hand is a straight-forward trade receivables program or a vastly complicated inventory control model. His interest extends to knowing the limits of capability of both the computer and the model in use, so that he neither expects the computer to solve all his problems nor fails to use computer power in a situation which the machine can readily be programmed to handle.

Another important area of legitimate managerial concern is the overall *supervision of a computer installation*. Such

supervision entails an analysis of the cost effectiveness of the machine and the work it is currently performing, and the cost effectiveness of using it for additional work. It is regrettably true that many computer installations have become fully loaded with work that was chosen for computerization purely because of the interest of the programmer or the simplicity of converting the system to computer operation. A computer in a business must contribute toward the profitability of the enterprise; there can be no guarantee that programmer interest or simplicity of conversion are reliable measures of profit contribution. Managers should be exposed to the techniques of system feasibility review, so that they can evaluate the economic viability of a proposed system or of a proposed computer installation.

Present and future managers should be exposed to the various types of *computational process* commonly found in business enterprises. By far the commonest and simplest of these is the deterministic computation. It involves the acceptance of input, the performance of a pre-determined calculation upon that input, and the preparation of a pre-determined

output. A payroll system would be a typical example. A more complex computational process is the general class of optimization methods. These include such techniques as linear programming and dynamic programming. Non-specialist managers need not be made familiar with the mathematical intricacies of such procedures, although specialists will, of course, become involved in the details. Instead, the general manager should be made aware of the existence of the methods and should be exposed to the benefits and drawbacks of each. The types of problem to which each method is best suited should be emphasized. A third class of computational process is the class of forecasting and projection models. These range in complexity from deterministic simple regression models through probabilistic multivariate models and beyond. They share a common purpose of seeking to predict future values of variables of interest. Once again managers should be exposed to the concepts involved in such procedures, to the limits and areas of application of each, without necessarily becoming familiar with the necessary mathematical procedures. It is probably desirable,

however, that Master's degree candidates be exposed to some of the mathematics of forecasting techniques. A last and most important class of computational process is the simulation model. Simulation techniques may be said to include the preceding classes to a greater or lesser degree; but the most important applications of simulation in business are applications in those areas where more formal mathematical procedures have proved intractable. By describing a physical or financial system dynamically in a set of equations, the creator of a simulation model seeks to study the probable behavior of the real physical or financial system in the face of changes in its composition or its environment. The importance of the simulation technique can hardly be over emphasized. The technique should form a significant part of the information systems courses available to Master's candidates. Explanatory coverage of the technique in management education is also imperative.

In summary, there should be a course at the Master's level which

continued on page 32

ASPIRATIONS-James S. Lipscomb

Programmed in FORTRAN on an IBM 1620 computer and drawn on-line by a CalComp 565 plotter.

Ask Me a Question

Once upon a time, so the story goes, a giant computer was invented which, when completed, would have the answer to *all* questions. At the dedication ceremonies, a huge crowd gathered to hear the super-computer's answer to the first question: "Is there a God?" The question was put. The computer whirred and clicked. The answer came back. "Now there is."

To the layman, the computer does at times seem nearly super-human, and it is comforting to remember that without a man to tell it what to do, a computer is worthless. Computers can only answer questions they have been programmed to answer. However, man's ingenuity has made it possible to program them to answer an astonishing variety of complex questions. Below, some selected items:

A Computer named STAR

STAR stands for "self-testing and repairing." A computer has been designed that automatically switches on identical backup units to replace parts that break down. It is capable of replacing each part with three or more standby units. All of STAR'S instruction and number words are so chosen that a fault will change a "good" word to a meaningless or "illegal" one. When a faulty unit sends a damaged word to another unit, the "illegal" word can be spotted by the computer monitor and its source identified. The computer monitor then checks itself and whenever two monitors indicate something wrong, the decision is made to repair the malfunction. The suspected unit is tried once more, then replaced if it persists in its errors. The diagnosis takes place in one-hundredth of a second. STAR, a member of the digital family of computers, was designed by Dr. Algirdas Avizienis, Lithuanian born computer scientist-engineer, and would permit years-long spacecraft missions to the outer planets of our solar system.

From the *Ann Arbor News*
February 1, 1970

Digging for Camelot

Boyce Rensberger reports in the Detroit Free Press that archeologists are digging in southwestern England for the remains of King Arthur's Camelot, and they are doing it with the help of a computer. An electronic survey of the area was made after marking off a map of the area with a cross hatch grid. At each intersection point on the ground, technicians pushed metal rods into the soil and measured how much electrical resistance there was from point to point. The resistivity of the soil can suggest where there are buried walls, foundations, hearths or just plain dirt. Other devices were carried around to each point to send out a pulse of magnetism and measure whatever return signal was bounced back. With such devices, 100,000 readings were taken and fed into a computer that printed out a map covered with clusters of dots in places where it might be profitable to dig.

The Mod Computer

Mary Quant, the original mod fashion designer, is planning to market computerized clothes which will be *molded*—no more sewing, no more cutting, no more darts. The clothes will be made of plastic materials, spun, poured, forced into shape. Computers will be fed instructions: "finish sleeves at wristbone" or "round out hips to size eight" or "spin to a density of silk," and thousands of dresses will fall from the machine "sculptured to the body." Says Mary Quant, "The machines are expensive to set up, but the clothes can be made marvelously cheap, once they are in operation, cheaper than any clothes available now."

From a story in the
Ann Arbor News

Mechanizing the Stars

A recent ad in the Ann Arbor News offers "For the first time ever by computer—you can have your personal horoscope cast by one of the world's most acclaimed astrologers." The ad goes on to explain that more than 25 million pieces of astrological information have been programmed into three giant computer memory banks, and that for a mere 20 dollars, the computer will print an 18 to 20 page time pattern report, based on the exact position of the sun, moon and planets at the exact time of your birth.

What did Akhenaten's Temple Look Like?

During his brief reign (1367 to 1350 B.C.), the pharaoh Akhenaten built a large temple at Thebes which was destroyed after he died. The temple was built with more than 30,000 separate blocks, each measuring only two feet wide by 10 inches high. Because of their small size the blocks could easily be lifted by a single man and carried to other sites; many of them ended up in the foundations of other temples, where they were found by archeologists thousands of years later. Through the years the Aten blocks have been accumulated and stored, but because of their number and state of disorganization, they could not be reassembled. Enter the computer. To help with the reassembling process, archeologists wrote detailed descriptions of individual blocks—including their hieroglyphs and inlaid sculptures—and fed them into a computer in Cairo which was programmed to reorganize the data. The matching process is now well under way, and scenes of chariots drawn by horses

Any Question

in full gallop, important hieroglyphic inscriptions, and inlaid sculptures of the royal family already number in the hundreds. When the matching job is finished, modern man will be able to reconstruct visually one of history's great structural achievements as it looked in the fourteenth century B.C.

From the March, 1970 issue of *The Sciences*, the magazine of the New York Academy of Sciences

Ain't It The Truth?

"When computing specialists attempt to explain their work to a novice, they have two major options. They can proceed slowly and confuse their listener almost immediately, or proceed even more slowly and confuse him more gradually. The difficulty is that some ordinary terms, when used in computing, have a special as well as a general meaning." (From a December '69 *Research News* article entitled "The Computing Center: Coming to Terms with the IBM System/360 Model 67." Copies are available free by writing the Editorial Office, Office of Research Administration, U. of M.)

This article is good for novices because it presents key terms in boldface and defines each of them in a glossary at the end. In making no assumptions about a reader's prior knowledge, it signals him at thirty-seven places that he may want to flip to the glossary to double-check his grasp of a key term. The writeup is accurate; it was reviewed and approved by Professors Larry Flanigan and Allan Emery of the Computing Center. Says the writer, James Haney, of ORA, "When they saw my first draft, they blanched

noticeably. But then they recovered and—fine teachers that they are—led me out of the confusions that this article is designed to prevent. I recommended they both be awarded a medal for bravery."

What Would You Do With Your Very Own Computer?

For starters, your own computer could: warn you when it's time to get a tune-up for your car, based on your individual driving habits; help you plan your meals, supply recipes, and with the aid of store computers, do your shopping; keep track of your budget and automatically figure your taxes, printing out a completed form 1040 at the end of each year; control your furnace and air conditioner vastly more efficiently than a simple thermostat; help your kids with their homework.

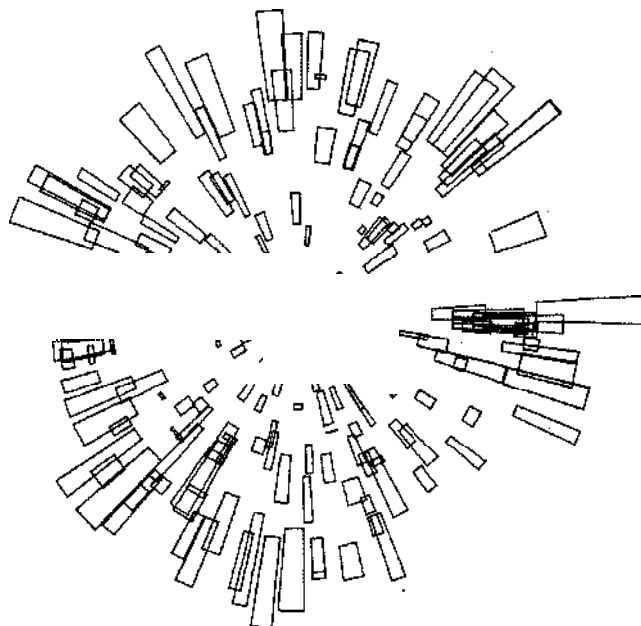
From *The Detroit Free Press*, Jan. 9, 1970

Titillating the Triodes

An article in the Michigan Daily reported that one of the University's computers had gone beyond counting ballots and started talking back to voters. The following mimeographed message was recently received in the Student Government Council Office: "Congratulations to Kirby Dilworth, voter no. 3688. You were the only student in the University of Michigan to vote both *Yes* and *No* on the bookstore referendum in the recent SGC election, and to put your ID number on your ballot. You could have been the 8231st person to vote *Yes* or the 834th person to vote *No*, or the 258th person to abstain. Instead, you have chosen this unique alternative. Never in all my years of reading ballots and spewing forth results have my triodes been so titillated." The message is signed "IBM 360/67"

EXPANDING UNIVERSE-
Darel D. Eschbach, Jr.

The picture below was drawn on an IBM 1620-1627 system. Random numbers controlled the parameters of location, size of base, and ratio of height to base. Entered in the 1969 Computer Art Contest sponsored by the magazine *Computers and Automation* and used with their permission.



Under Uncertainty

by Robert O. Schlaifer
(McGraw Hill, 1969)

Reviewed by Rex V. Brown

The ability to make sound decisions in the face of inconclusive evidence and many-faceted personal judgment has always been an enviable skill in business executives and other practical men of affairs. Until very recently, it was a skill almost entirely in the province of intuition and art. Over the past decade, however, a powerful new computer assisted technology has emerged, for imposing logical structure on the reasoning that underlies any given decision.

In essence, this technology, often referred to as personalist decision theory, accepts, as input, personal judgments, experience and attitudes, along with any "hard" data. It provides as output the logically implied decision, according to accepted statistical theory. In particular, the input requires: that decision options be specified; that critical uncertainties be assessed probabilistically; that possible consequences be quantified; and that decision criteria, including attitude toward risk, be given a formal representation.

Any executive who accepts these inputs should be logically bound by whatever decision the decision theory analysis favors. Actual and potential applications are not restricted to business. They include medical, military, engineering and governmental decisions. Possibly the most ambitious application yet reported specifies under what

circumstances the President should press the nuclear button.

Just the past two or three years have seen a dramatic burgeoning of attempts by major business corporations to incorporate this technology into their day-to-day decision making operations, as a way to make better, or perhaps just less painful, decisions. Although only a very small fraction of all top level business decisions are yet affected, and many obstacles, largely human, lie in the way of effective implementation, it has been plausibly argued that computerized decision theory will be for the manager of tomorrow what the slide rule is to the engineer of today.

If this should come to pass in our time, it will be due in no small part to the efforts of Robert Schlaifer. For more than a decade, Professor Schlaifer and others working with him

About the Author

Dr. Brown, associate professor of business administration, has the B.A. and the M.A. degrees from Cambridge University, Cambridge, England, and the doctorate from the Harvard Business School. He has written widely on probability and decision theory, and is author of the book *Research and the Credibility of Estimates*, published by the Division of Research of the Harvard Business School, 1969 and coauthor (with Buzzell and Cox) of *Marketing Research and Information Systems*, published by McGraw-Hill, 1969. His most recent article is being published in the May-June, 1970 issue of the *Harvard Business Review* and is entitled "Decision Theory: Are Managers Finding It Useful?"

at Harvard Business School have pioneered the development and teaching of applied decision theoretic tools. The tangible output of this effort is currently an intensive course required of all Harvard MBA's, a compendious and authoritative text and, finally, a thoroughly documented package of related computer programs.

Although the text, *Analysis of Decisions Under Uncertainty*, is intended, according to the preface, for "readers who actually have decisions to make" and requires no mathematical background, its theoretical content and ponderous style will surely make it too formidable as reading for any but the most ambitious and assiduous general executive. Indeed, it has the dubious distinction of having recently been the object of a public book burning by Harvard MBA's who presumably found the frustrations of mastering the text too much!

As a source book and training manual for the staff specialist, however, this book stands as a masterpiece of penetrating and thorough exposition, unlikely to be challenged for many years. Although the generalist will have to wait for more palatable and digestible versions to appear, this basic text may prove to be the most important practical contribution to management science for many years.

ALUMNI AND THE COMPUTER

We asked 30 alumni who work in computer industries or have founded businesses based on the computer to tell us (in as non-technical a way as possible) about their jobs, and to comment on coming uses for the computer and on problems connected with the computer.

Twenty-six alumni wrote us back. Here we present their answers to our questions and, where possible, their pictures. Alumni featured here were chosen on the basis of their answers to an alumni questionnaire circulated last summer. Since all of you did not answer the questionnaire, this story can make no claim to being a comprehensive survey. We do think, however, that it gives some idea of the range and variety of occupations in the computer field today, as well as providing a cross section of thinking about the computer—its problems and possibilities, from those actually working in the field.

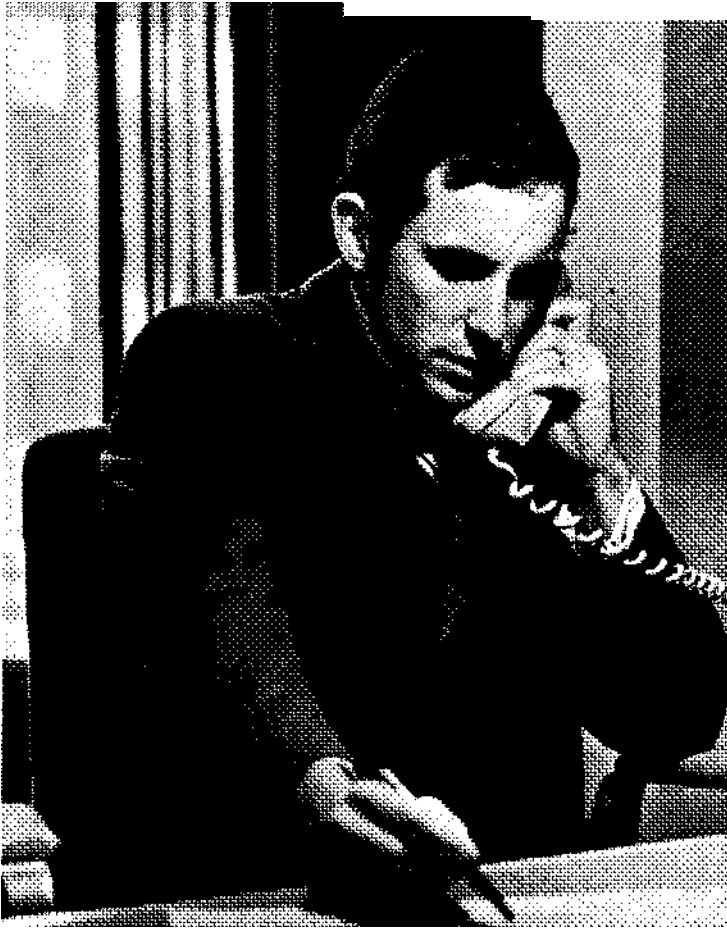
Art work on this page was one of the entries in the 1969 Computer Art Contest sponsored by the magazine *Computers and Automation*, and is used with their permission. The computer artist is Sidney Robertson of Fairfax, Va., who entitled the picture "Scorpion." The face profile at the tail of Scorpion is defined with 17 points and direction vectors. Each successive profile results by linearly transforming the 17 points and direction vectors of the face in such a way that the final profile has the same shape as the original. Produced by a CDC 3600 computer and a CalComp 564 plotter.

1

Name: Michael S. Pinkert, MBA '66, BSEE '64

Title: Director, Systems Engineering and Research

Company: Gordon A. Friesen International, Inc., Washington, D.C.



Gordon A. Friesen International is a consulting firm specializing in functional planning and management services to hospitals. One of their primary efforts has been to find new applications for automation (including computers) in the hospital. To accomplish this they found it necessary to change the traditional ways the hospitals are designed and operated, which has resulted in a new generation of hospitals (over 30 completed in this country and abroad) known as "Friesen" hospitals. As Director of Systems Engineering and Research, Mr. Pinkert has corporate responsibility for the researching and development of new systems that can be used in client hospitals' plans. These hospital systems include transportation, communication, dietary and many others. For example, the firm is currently planning for a computer system that

will operate an entire dietary department of a large medical center in Cologne, Germany. Here, a central process control computer will operate all the automatic cooking equipment, control the flow of food from freezers to a large frozen food storage matrix, and, based on patient menu selections, will retrieve the proper meals from the matrix for automatic transportation to the nursing floors. Other research work is underway that will enable doctors and nurses to enter orders from each patient's room for drugs, laboratory tests, X-rays, etc., into a central computer.

According to Mr. Pinkert, the full potential of computer applications in the hospital environment is still largely unknown. He explains: "Serious efforts at using computer technology in the administration of hospitals have until very recently been largely confined to accounting functions only. Clinical applications

"... simply an automated version of old, illogical, inefficient systems..."

have, however, recently emerged from preliminary experiments with coupling analog and digital computers to physiological monitoring equipment and have successfully predicted the deterioration of a patient's condition sooner than a nurse watching a patient could. Perhaps the most successful applications of computer technology in hospitals will be in the clinical laboratory, where direct interfacing with automatic analyzing equipment has already helped hospitals cope with the large amount of data that are normally generated in this area.

"I believe that over the next few years we will see hospitals increasingly relying on computers to process medical data to aid physicians in diagnostic work and determining proper treatment plans. Financial applications will become a spin-off of medical order processing rather than being separate systems as they are in most hospitals today.

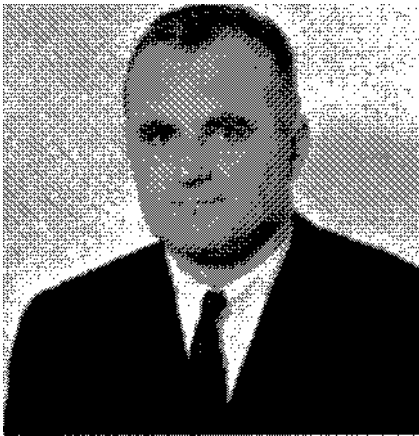
"Perhaps the greatest problem in applying computer technology in hospitals is the general unwillingness or inability to make any changes or improvements in existing administrative systems and procedures. Thus, we have the situation where hospitals take their old, illogical and inefficient manual information systems and merely automate them with a computer. The result is, of course, simply an automated version of the old, illogical and inefficient systems with little or no resultant savings.

"Hospitals, as well as most other businesses, must realize that merely plugging a computer into an existing information system will rarely utilize the computer to its greatest potential. If as much money and effort was expended in systems improvement as is usually expended on software and hardware acquisition, I firmly believe that the cost-benefit ratio for computer installations in a hospital environment would be greatly improved."

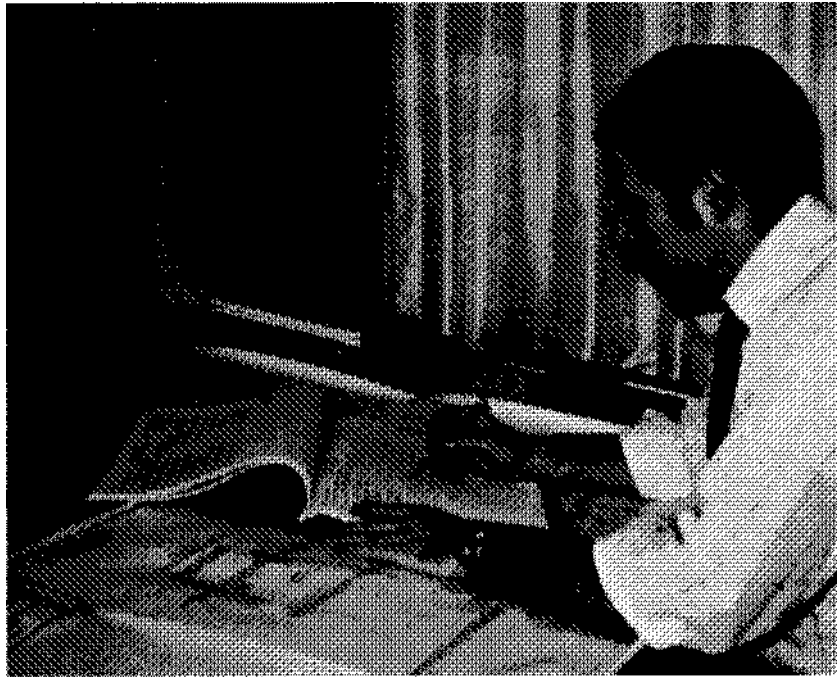
Name: J. Roger Moody, MBA '59,
BSEE (Columbia) '58
Title: Manager, Consumer
Transaction Systems
Company: IBM, Research Triangle
Park, North Carolina

Consumer Transaction Systems plans and engineers products that take the power of the computer to the consumer. Included are store control systems using point-of-sale devices powered by remote computers, banking systems, hotel/motel systems and credit terminals. Mr. Moody holds the corporate responsibility for product forecasts, revenue and profit/loss for this system area. He believes that computer systems will extend their application dramatically over the next five years and that "users will enlist the computer to aid in the actual daily operations of the business as opposed to today's preponderant use in simply reporting past events. This extension in operations will contribute significantly to profitability."

"The greatest problem in computer use is management's treatment of the computer as the Bible."



J. Roger Moody



3 Name: Stephen C. Wexler, MBA '67
Title: Vice-President
Company: Computrol Corporation, Needham, Mass.

Computrol Corporation was founded less than a year ago to offer management control and data retrieval systems for contractors, engineers, architects and owner authorities. It uses an extension of a sophisticated computer system (ICES PROJECT) designed to enable direct interaction between the "layman" engineer and the computer. Computrol schedules construction projects, including development of Network Logic, material and manpower resource planning and cost planning. The schedules show on what dates items of work are to be started and completed and their relationship to the critical path of the project.

The idea of using the computer to schedule construction jobs in the way Computrol does came to Mr. Wexler while his previous employer, Jackson Construction Company of Needham, Mass., was building a new computer facility for the Massachusetts Institute of Technology. He explains, "We became acquainted with MIT's development of the ICES System and the PROJECT Subsystem in particular, and agreed to serve as a testing ground for the program. Shortly thereafter MIT terminated development due to government budget cuts and we became associated

with a firm that agreed to develop ICES PROJECT further. Through a very successful use with Jackson Construction Company, we decided to spin off a new firm for computer scheduling. Computrol was the result.

"The primary advantages of the computer in this new use are that we are able to schedule very accurately, extremely complex and dynamic projects on an efficient and economical basis. Further, once the basic schedule is developed we have the ability and flexibility to update the project periodically and therefore maintain a current schedule."

"I foresee a tremendous future use for the computer in scheduling. Highly sophisticated systems for scheduling are presently available with a very low penetration of the present market. Use of computers in estimating and designing will change drastically as more sophisticated easy to use systems are developed.

"The greatest problem I see in computer use is management's treatment of the computer as the Bible or a cure-all. As soon as management realizes that the output is only as creditable as the input, and treats the computer as a *guide* to decision making, usage will increase greatly."

4

Name: Robert W. Fisher, MBA '66
Title: Senior Analyst
Company: Great Western Sugar Co., Denver, Colo.

Mr. Fisher is currently developing marketing and distribution oriented models of the company. He writes "We are a service group not only to the GW Sugar Company, but to Great Western United and all of its subsidiaries: Great Western Restaurants, Shakey's Pizza Parlors, California Cities (land development) etc. This Operations Research group responds quickly to pressing needs of the company (whichever one it might be) as opposed to the more traditional long term development and implementation of "reporting" functions.

"For example, it took me about

"I cannot tolerate long drawn out design and implementation periods. The time sharing computer is the greatest development since sex and popcorn."

three months to develop a very comprehensive supply and distribution model of the sugar company, including such considerations as various products at many factories, storage capacities, expected sales demands, physical shipment limitations, productions, individual tax factors, inventory policies, etc. This was developed on the G.E. Mark II time-sharing service and has since outgrown it. One of the men working for me currently has the project of putting an expanded version of this model onto the central computer.

"I am involved for instance in capital investment analysis: i.e. should GW Restaurants build another restaurant in a specific location? We have recently discussed the possibilities of building a model of the restaurant using a queueing theory approach in order to maximize customer service while minimizing the cost of obtaining it.

"My philosophy is very management and results oriented. I cannot tolerate long drawn out design and implementation periods stretching over several years. The time-sharing computer is the greatest development since sex and popcorn. It allows very quick development of tools for management analysis and overall control. As a manager, I want to worry about the dollars—I'll let the accountants and the detailed "business system" developers worry about the pennies.

"I see a natural progression of development from the time-share computer to a central computer. Analytical models should be built on the time-share computer, and refined as necessary. For many if not most applications the time-share computer is sufficient. It is quick and responsive. It is an excellent tool to use to learn relationships through model building. If the model outgrows the time-share service, as is the case with my supply and distribution model, it can then be put onto a central computer in a highly refined version to be used for overall corporate planning. A direct development then, is a parallel system (in this case) of routine processing or handling of an order for goods. The model is used to determine questions of strategy—the best strategy found to date is built into the routine system which processes the actual day to day business.

"The greatest problem arising from the use of computers in general is simply a lack of real, sophisticated knowledge on the part of top management, and hence a natural fear of this "new" tool. It is a management and personnel relationship problem to overcome this reluctance. Again, the time-share computer is an excellent tool in bridging this gap. As top level executives sit down at the terminal, they rapidly begin to see the possibilities. But it takes work to get them to that point."



Alvin R. Garchow

Name: Alvin R. Garchow, BBA '50
Title: Division Accounting Manager,
Computer Operations
Company: Michigan Bell Telephone
Company, Southfield, Mich.

"In the next few years," predicts Mr. Garchow, "the computer will finally be used by all levels of management—in administrative jobs as well as technical. People in middle management will quit worrying about computer systems which will eliminate the need for middle management, and systems designers will give up trying to design information systems which by-pass the need for middle management decisions. Information systems will be designed to produce data for decision making at the level where proper control can best be given. This is seldom just at the top management level.

"In other words, I expect that soon computer systems will be thoroughly integrated into all parts of a business. They will cease to be regarded as just a 'toy' for the engineers, mathematicians, or management sciences boys, or a faster bill printer or check writer for the comptroller, or an 'expense reduction club' for top management. They will contain files of all the vital information in the business and everyone will be able to make use of their

information storage, procedural control and retrieval capabilities.

"Sometimes businessmen have expected miracles to happen when they used computers—they used them in areas which turned out to be unprofitable and stuck with the losers too long—and they did not define what they wanted from computer systems in enough detail. Businesses must determine how to use new tools like computers wisely as contributors to the goals of the organization. Otherwise, they could turn out to be instruments of destruction. The chief problems I see now will be for those businesses which have been unable to integrate this tool into their work structure. Solution of this problem is essential for the survival of the business."

Mr. Garchow, who has worked with computers for 15 years, says his organization is responsible for all the data processing performed at Michigan Bell. Involved is the selection, acquisition and training of people, scheduling of jobs through the computers, key punch and control operations, balancing priorities, measuring computer utilization and forecasting computer needs. Programming and systems work is performed in another department.

6

Name: L. Dickson Flake BBA '60, MBA '63

Title: President

Company: Optimatics, Inc., Little Rock, Ark.

Optimatics, Inc. offers "computerized solutions to the construction industry's problems, particularly in computerized methods of structural steel sizing." Four people organized the business, including Mr. Flake, a structural engineer and a steel fabricator. "While the computer is already being used for standardized designs involving multiple unit production," says Mr. Flake, "I believe we will soon see design models used to determine specifications and design for one-of-a-kind production items."

"Finally people in middle management will quit worrying about computer systems which will eliminate the need for middle management,"



Name: Hal Kellman, MBA '68

Title: Vice-President, Finance

Company: Interactive Systems Inc., Ann Arbor, Mich.

Mr. Kellman is involved in system specification and analysis—choosing the least expensive and most efficient configuration of computer and peripheral equipment. As Vice-President, Finance he is responsible for maintaining adequate bank lines of credit and raising equity capital to finance the growth of Interactive Systems, Inc., which he helped found in February, 1969. He describes the new company as follows:

"Interactive Systems was established because of the wide gap between disciplines. Engineers know engineering but are generally ignorant of medicine; academicians know their specialty but are unconcerned with business. What we thought was needed were engineers expert in both engineering and medicine; programmers and statisticians who had worked inside assembly plants and understood the problems of fabrication and human engineering. ISI attempts to combine qualities best executed by humans with those best done by computers. The aim is for

Hal Kellman



maximum human-computer interaction, hence our name.

"Interactive Systems provides special purpose industrial and medical systems. The Industrial Division combines sophisticated mathematical and statistical theory and applies these to everyday industrial applications. An example is a system for the control and testing of electrical fixtures for a large automobile manufacturer. The system provides a statistical analysis of failure results in a form easily communicable to the machine operator. The Biomedical Division provides hospitals and nursing homes with devices that monitor patients on an exception reporting basis. This is not diagnosis—the doctor has the final say. But much of the routine checking is computer-monitored, thus saving valuable staff time for more patient-doctor interaction."

About computers in general Mr. Kellman writes: "Problems arise when people try to use computers as a security blanket by placing undue reliance on an answer just because it is computer generated. To use computer jargon: GIGO—Garbage In, Garbage Out.

"It is still not possible to use computers where final human judgment is needed. We cannot effectively computerize judgment because human pattern recognition and decision-making are not well enough understood.

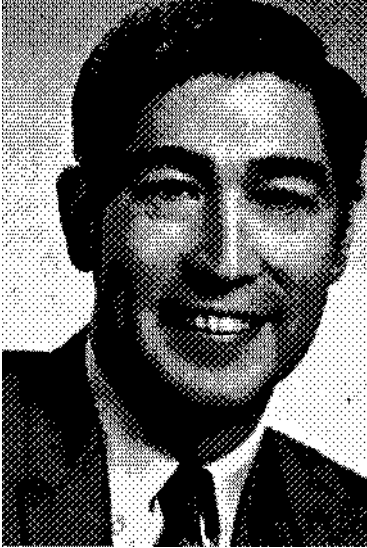
"Business is using the computer in more productive problem-solving ways. The easy jobs of payroll, accounts receivable, etc. have long since been solved. The computer's real value to business lies in being able to give timely, meaningful information to management—a Management Information System that really does help management manage.

"More and more businesses have simulation models of the firm, industry, and economy. Thus the effects of management decisions can become known quickly without costly cash expenditures."

Name: Leonard L. Westdale, BBA
(with distinction) '48

Title: President

Company: Westdale Company,
Grand Rapids, Mich.



Leonard Westdale

"When I saw salesmen sorting real estate cards by hand," says Mr. Westdale, "I thought much clerical time could be saved by the computer, especially by the random sort devices (disk) which can do in microseconds what it takes a salesman many minutes or hours to do. I attended IBM's executive school in San Jose, and our company had numerous meetings with IBM to convey the needs of a real estate salesman in matching houses to buyers' needs. As far as I know we were the first firm to have our own computer to do this job.

"We extract from each listing about 35 major characteristics which are coded on two IBM punch cards to be used with the IBM 1130 computer. Each buyer tells us the features he wants most in a house, plus optional features he would like if possible, listed in order of priority. This is then given to the computer operator, who first keys in the mandatory requirements and asks the computer how many homes listed, by our company and others, meet the requirements? If there are more than

ten houses available we then key in additional characteristics. Each time we key in a characteristic the computer tells us how many homes we have left. The buyer's requirements are then stored, the computer searches automatically each day to see if a house has been listed that meets the buyer's needs, and sends a list of such houses to the salesman, thus saving him several hours of work each day. When a salesman works at a branch office (Westdale Company has branches in Grand Rapids, Holland, Lansing and Kalamazoo), the computer prints out a punched paper tape which in turn is fed into a teletype machine and sent to the branch office teletype terminal. The computer is here to stay in the real estate business."

9

Name: Ralph R. Kleinedler, BBA '60,
MBA '62

Title: Senior Supervisor, EDP

Company: General Motors Parts
Division, Swartz Creek, Mich.

"Very basically our area processing center is composed of a communications and an order processing computer that communicate with one another and with terminal devices and other computers at the remote cities where we have parts departments," explains Mr. Kleinedler. "Nationwide we have five of these centers, each tied to its own terminal network as well as to our central operation. Although our system is quite intricate the following very simplified example might serve to uncomplicate it a bit: Your automobile (our make) has a crumpled fender which you want replaced. You take the car to your dealer who places an order with his parts distribution center. There a card is punched with the pertinent information and fed into a terminal device which transmits it via the network to the area processing center's communication computer. The processing computer has inventories for all locations stored on disk and

can be interrogated to see if your ordering location has stock on the fender you want. If it has, the order is billed and sent via the communications system back to the ordering location where it is printed on the terminal devices as a billed order. If it has *not*, the computer determines which location has the fender, re-directs the order, and notifies your dealer where the order is coming from. Although parts ordering and replenishment is a primary function of our business our computer system performs many associated tasks, such as invoicing, handling material returns, keeping parts records maintained, and I could go on and on."



Jere J. Sweeney

10

Name: Jere J. Sweeney, BBA '60

Title: Project Leader—Corporate
Systems

Company: The Covenant Group,
Hartford, Conn.

Jere Sweeney believes that the emphasis in computer usage will shift in the next few years from single function (payroll, inventory, policy issue) to on-line data management techniques and the data base. He says that hardware and software develop-

ments between now and 1975 will support this change as will a new generation of business managers schooled in management science techniques such as simulation.

Mr. Sweeney is responsible for the development of new computer based systems for The Covenant Group, a small but old (136 years) group of insurance firms now broadening their scope into varied financial areas. He participates in the entire development process, from the preliminary review of a problem, to feasibility studies for alternative solutions, to presentations of alternatives to top management for project selection. He does overall systems planning and supervises detailed design and programming efforts, as well as planning the implementation of the system, and in some cases, selecting facilities (both hardware and software).

Problems he sees in the use of the computer will stem from the lack of management involvement in computer based projects. "In the past," he says, "management has failed miserably to use the computer profitably. (For examples, see the recent McKinsey study). If these managers remain reactionaries and do not change, they and their companies will cease to exist. Thus, EDP education will play a key role in the seventies." Mr. Sweeney also believes that information privacy and the public image will grow as areas of concern but that the real problem here is not the computer but "misunderstanding and lack of faith in the integrity of government and the business institution."

11

Name: G. Howard Carrothers,
MBA '47, BSEE '39

Company: IBM Systems Development Division, Poughkeepsie, N.Y.

Kind of Work: Graduate education for IBM employees

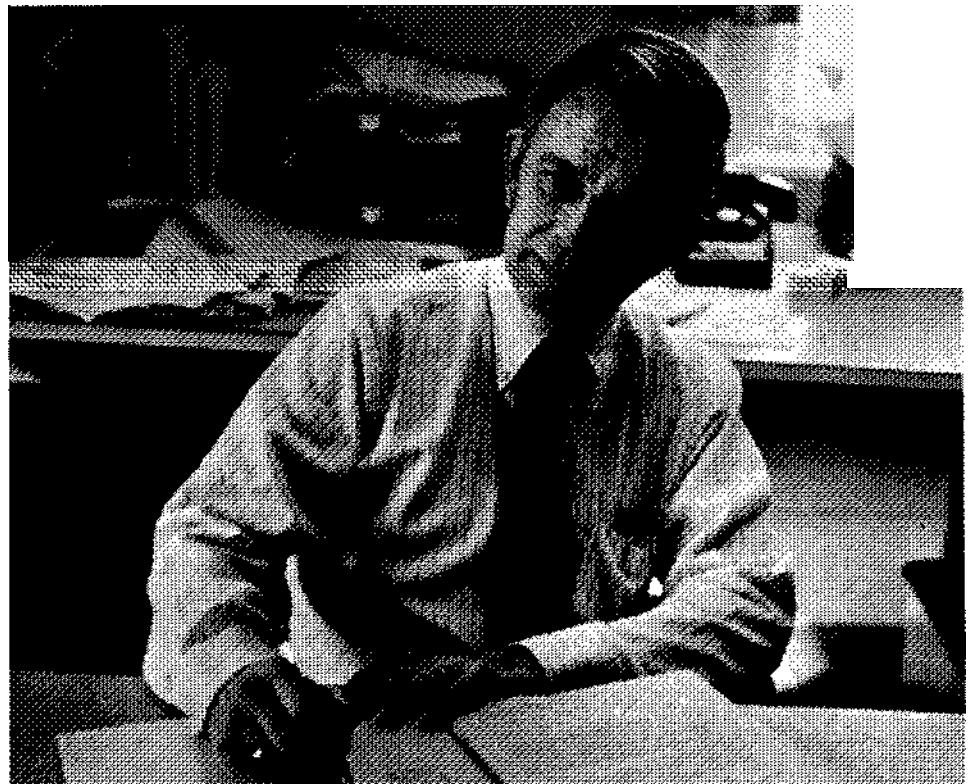
Mr. Carrothers administers the participation of IBM employees in graduate work-study, one of several

continuing education programs that IBM provides employees. Seven hundred students are currently enrolled in universities around the Poughkeepsie area, the largest number of them in the Poughkeepsie-Kingston Center of Syracuse University. Since the program is work-related, it deals primarily with engineering subjects, although Industrial Administration is included in their locally approved degree

"Ire the past, management has failed miserably to use the computer profitably. If these managers do not change, they and their companies will cease to exist."

program. Mr. Carrothers says "Computers and education are mutually rewarding—a symbiotic relationship which is not yet adequately recognized. A large problem is the need for computer professionals and the academic institutions to develop them. In addition a very large number of practitioners in the data processing field are needed, as well as training facilities to provide continuing education in data processing skills for those employed in the industry."

G. Howard Carrothers



12

Name: Jack E. Busselle, BBA '60
Jerry L. Powledge, MBA '61

Title: Founders

Company: Multi-Data, Inc., Detroit, Mich.

"The largest single problem arising from computers is the largest single problem in business—clear communication," say the founders of Multi-Data Inc. "If the person with a data processing requirement can specifically outline his requirements there will be no computer problem. The computer is no more than a tool; perhaps the fastest and most accurate, but just a tool. Multi-Data Inc. is a computer service bureau serving the architectural industry. When a client has a data processing requirement we first determine if it is computer feasible, and if it is, we design a system to implement it, including keypunching, programming, machine operation, pickup and delivery and monthly scheduling. Since the largest expense outside of the computer itself is in the programming labor field, we try to use our programs on many prospective clients, thus spreading our programming costs over many accounts."

*"Before the computer, we used to spend the whole semester with one model for a **small multiple** regression problem ... Now we can get out a new model every couple of seconds."*

Name: Michael J. Thorsen, MBA '68,
B.S.(Math) '64

Title: Project Leader, Management
Science Group

Company: Industrial Nucleonics,
Columbus, Ohio

"The computer's proper place in business cannot be achieved until it rises above its present super-clerk status and becomes a delineator of the basic parameters necessary for management to manage," says Mr. Thorsen, who coordinates the efforts of systems analysts, programming staff and computer operations staff. Before assuming his current position, he was in systems analysis, where his basic responsibility was to study current systems where growing needs dictated change. For the future, Mr. Thorsen believes that the manner in which the computer arrives at results will change, especially in data input, which, he says, "is proving to be the bottleneck in obtaining fast and accurate results from most business systems. I believe that optical scanning and direct terminal input will help overcome many of these problems in the coming years."



Michael Thorsen is pictured, left, sitting on the desk.

14

Name: Nate A. Newkirk, BBA '54, MBA '55

Title: President

Company: NGP and Associates, Riverside, Conn.

"My business is prospering because we are furnishing data processing training and education to large organizations who feel that training offers them the best possible solution to the problems that they are facing in the intelligent use of their computers. My company addresses its services to the data processing personnel problems faced by all who use computers. We consult and advise (including extensive classroom work) on all facets—recruitment and

selection, training, compensation, and motivation. Further, we are involved in teaching upper management about computers and their uses."

Newkirk believes that uses for computers will change drastically in the next few years. "The greatest change will come about as a result of top executives coming to the realization that computers can be much more profitably used when they become an aid in planning and

decision-making functions, rather than simply a means of reducing administrative workloads."

"The principal problems that surround the use of computers today stem from the simple idea that top executives refuse to, or resist, becoming involved in their company's data processing activities. When they come to the realization that they *must* become involved, and that they will benefit greatly from so doing, many problems will disappear. The key to executive involvement is that they must take the time (about one week) to become thoroughly indoctrinated."

15

Name: Richard N. Schmidt, Ph.D. '54
Title: Professor of Statistics
State University of New York at
Buffalo, New York

"Before the computer," says Dr. Schmidt, "we used to spend the whole semester with one model for a small multiple regression problem. Even this much work exhausted us. Now we can get out a new model every couple of seconds with many more variables and much more data. However the problem is unchanged—how you use the information, how you interpret outputs, and how you make decisions. For business, the greatest challenge still remains management's ability to solve problems analytically and to make wise decisions in the face of uncertainty."

After many years of teaching applied statistics in the School of Business Administration at SUNY Buffalo, Dr. Schmidt helped form a separate department (of which he is now assistant chairman) to provide a graduate program in statistics. Besides his basic teaching responsibility, he is also involved in research, writing, and committees ("which, in the past several years have numbered over a hundred, with the number of meetings going into the thousands"). He is the author of several books: *Executive Control*, University of

Buffalo Bookstore, 1956; *Introduction to Business and Economic Data*, Rinehart & Co., 1958; *Electronic Business Data Processing* (with W. E. Meyers), Holt, Rinehart and Winston, 1963, and *Introduction to Computer Science and Data Processing* (with W. E. Meyers), 1963. This book, which was published also in a Japanese edition in 1969, is a general introduction to the concept of the computer for people without a technical background. A Spanish edition is scheduled for 1970, and the book will also go into a second English edition this year. Dr. Schmidt is also an author, along with three others, of *Management Systems* (Holt, Rinehart and Winston), a book that attempts to put the difficult study and design phase of systems development on a formal basis.

"As far as routine business operations go, there are two areas that will still challenge us in the future," says Dr. Schmidt. "First, a tremendous amount of work remains to be done in process control within the plant. These problems involve mechanical equipment design, mechanical con-

trol equipment, electrical control instrumentation and computer control systems. We have people now who have expertise in individual areas, but as yet there is little done to take a systems approach to the process control areas as a total organization. This is not going to be a simple problem to solve, but I think it is one of the most important, and may be the key that unlocks the next phase of economic growth and development.

"On the administrative side, I feel it is now time for statistically validated control models to be incorporated with routine data processing. At present, the procedure is 1) to process routine data and then 2) independent of data processing, to work with models. Somehow, these two areas must be blended into one continuous computer process so that we no longer have two distinct phases, but rather one integrated approach in which both decision making and control are assimilated into the basic computer operations of the organization.

Perhaps the real problem is one I voiced years ago—the importance of having management personnel learn the concept of the computer. This can be accomplished only through a good knowledge of programming."

Dr. Richard N. SSchmidt

16

Name: Clyde L. Kloack, MBA '61
Title: President
Company: KVE Incorporated,
Ann Arbor, Mich.

"The primary problem is training people how to use computers and dispelling the uninformed sometimes popular version that machines will take over the world. Computers are marvelous tools but do take some understanding. People like us (KVE) are here to train in their use," says Mr. Kloack, who, along with Neil H. Vogt, MBA '61, founded KVE Incorporated, a professional marketing group specializing in computer applications, education software and consulting services.



17

Name: Leo Scull, Jr., MBA '48

Title: Supervisor, Product Manufacturing and Procurement Systems

Company: General Dynamics, Fort Worth, Texas



Leo Scull, Jr.

"For the foreseeable future, computer people will continue to be transient, high priced and less competent than they should be," predicts Mr. Scull, who believes that "top management will use systems analysts more and more in the role of analytical advisors. In the future there should be a further move away from mixing programming and analysts' tasks. Educational institutions should emphasize general business knowledge as the primary requirement and computer oriented technical knowledge as secondary."

It is Mr. Scull's responsibility to develop, obtain approval of, and coordinate product oriented data processing systems serving the operations department at General Dynamics in Fort Worth. Basically he acts as a systems consultant to management, coordinates systems execution and maintains liaison with systems-using departments.

"It is my opinion that the development of smaller and less expensive

"It is obvious that the telephone company has a reason for having twelve buttons on the new phones rather than the usual ten."

computers will open the way for routine applications of financial systems to small businesses and professional service people. However, successful applications for large computers will remain limited because of the limited number of capable personnel.

"Computer uses in the fields of human activities will create enormous problems in the 1970s. Information storage devices will continue to be controversial in the areas of privacy, security, etc. Such systems are always implemented for good causes, but just as in business systems, many ill effects can result. I believe that public concern will create a great deal of controversy and that such concern may lead directly to regulatory agencies in the field of computer applications."

18

Name: Laurence Wexler, MBA '61, BSIE, '60

Title: Supervisor, Systems and Programming

Company: Norden-Division of United Aircraft, Norwalk, Conn.

Management consulting internal to the company is Mr. Wexler's primary responsibility. The key aspect of his job is in dealing with management throughout the company to identify the "real" underlying problems and to gain the participation and support of management in developing and implementing the systems required. He believes the emphasis will shift in the future from using computers for improving day to day operations of a company to using computers to supply information to top management to help them make better decisions. Systems involving simulation and predictions of the consequences of decisions will become more widespread.

Name: Sanford C. Adams, MBA '61, BBA '60

Title: President

Company: Datatab, Chicago, Illinois

"People in business are turning to computers for some solutions that they could arrive at just by sitting down and thinking the problem out logically," says Mr. Adams. "We must not forget how we accomplished various tasks before the advent of the computer, and analyze carefully the need for a computer. This over-use of the computer is one of two major problems—the other one being communication. Either computer people must become easier to understand, or buyers of computer application must learn more about computers."

As president of a "relatively small company" (Datatab employs 50 people) Mr. Adams spends "a great deal of time aiding clients to understand what they need in order to analyze the particular study on which they are working. I then help them to communicate these needs to our company." He also makes sales presentations to potential new clients and calls on present clients to be sure they are satisfied, as well as making all major policy decisions and doing the long range planning for the corporation.

More and more uses for the computer will be realized in the future says Mr. Adams, but the actual number of machines will not increase as fast as the uses, since more and more applications will be handled via remote circuits tied to a large computer that thus can be shared by many different users. For example, he says, "it is obvious that the telephone company has a reason for having twelve buttons on the new phones rather than the usual ten."

Sanford C. Adams Jr.



20

Name: Barry R. Ludwig, BBA '62,
MBA '63

Title: Controller

Company: RE-CON Systems Corp.

According to Mr. Ludwig, RE-CON came into being for two reasons: first because of a need felt by many students, employers and college placement directors for greater efficiencies in the college recruiting process; and second because the technology (computer based information systems) to meet this need already existed.

Starting with a carefully designed market survey, some 100 companies were asked what criteria or variables were most important in screening candidates for job interviews. Based on their answers two questionnaires were developed: one for students seeking jobs, the other for employers seeking to fill jobs. Some 73 companies participated in the experiment, 86% of whom expressed satisfaction enough to try such a system. The success of this initial effort led to the formation of RE-CON Systems Corp. in March, 1968 and in January, 1969 RE-CON Systems became a public corporation with an initial offering of 300,000 shares. Recently, RE-CON has developed a job matching system for use in the recruitment of junior officers with degrees who are leaving the military, and has also acquired two services in the education area: one matches high school students with colleges, the other matches high school and college students with sources for scholarship aid.

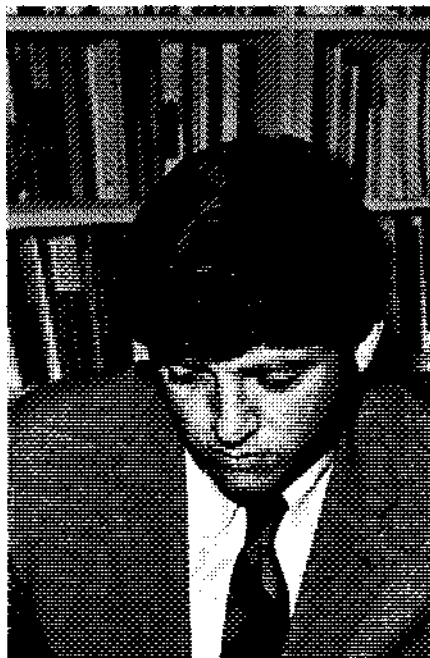
As controller of RE-CON Systems, Mr. Ludwig develops and maintains financial controls, prepares capital and operating budgets, forecasts revenues, invests short term funds and does other general money management.

He believes that a central problem in the use of the computer is one of perspective. "The computer to many people lies somewhere in a realm

between the unknown and the miraculous," he explains. "Ignorance of even the basic elements of computer technology causes both fear and resistance to its use on the part of some, and exaggerated ideas of its abilities on the part of others. The former attitude leads to a stance of blind resistance to needed progress, while the latter leads to an unthinking subordination of traditional ways of doing things to computerization.

"The final resolution of this problem in business will not come until those in a position of management responsibility involve themselves directly in the planning, implementation and maintenance of computer hardware and software. It is they who must choose the objectives, set the goals and evaluate the performance of a given computer system. In fact, a recent article in the *Harvard Business Review* contended that the inability of so many computer systems to meet corporate needs was due to a failure of management rather than to inadequacies of a mechanical nature. The article went on to cite lack of sophistication about computers as the major cause of this failure."

Barry R. Ludwig



21



Lawrence H. Walker, Jr.

Name: Lawrence H. Walker, Jr.,
MBA '49

Title: Director, Bureau of Management Information Systems

Company: Office of Administration,
Commonwealth of Pennsylvania

Mr. Walker is responsible for planning, central coordination and direction of electronic data processing and telecommunication facilities of state executive agencies and state administered colleges and community colleges. He is also responsible for the operation of a Central Commonwealth Information Center which develops, maintains and operates integrated EDP systems which support the requirements of more than one agency, such as personnel, payroll, and centralized accounting.

For the future, Mr. Walker foresees increased use of the computer in simulation and mathematical model applications, simplification of programming languages, greater use of decentralized terminal devices. He believes the development of more sophisticated software will be restricted by a scarcity of adequately trained people. He does not regard the "privacy issue" as an uncontrollable problem and believes it has been unduly exaggerated.

22

Name: Robert H. Gillow, BBA '56
Title: President
Company: Hospital Computer Center, Flint, Mich.

"I founded this business because of the frustration of seeing the computer either not used or misused in the hospital environment," writes Mr. Gillow. "Why? First, installing a computer was totally outside of the training and background of the hospital administrator, so he delegated this role to the data

"I founded this business because of the frustration of seeing the computer either not used or misused in hospitals."

which is connected to our computer and their terminal. Other reports are mailed or courier delivered. The philosophy of our business is that through sharing a computer, medical organizations can get a higher level of service for less cost, and can eliminate the severe problem of retaining data processing professionals in a small installation.

"Our company is currently serving 18 hospitals in Michigan, and recently signed a contract with the Chicago Hospital Council to service hospitals

in the Greater Chicago area. We are also marketing our services on the east coast. We provide data processing services in patient billing, accounts receivable, payroll, general ledger, accounts payable and inventory."

Mr. Gillow, who worked for IBM for nine years before founding Hospital Computer Center in 1966, believes that computers will be used more and more in hospitals but in an environment where the costs and expertise can be shared.



Robert H. Gillow

processing manager. However, in many cases the hospital wage structure was not high enough to get the proper man in this position, and the result was, time after time, a bad data processing installation. Another factor was that in the expanding world of computers, the data processing professional wants to work in large installations with more sophisticated approaches. I could sell the computer but I could not insure that it would be installed well.

"The establishment of a large shared center solved these problems to a great extent. The service we offer is primarily an on-line service which means the hospital has a terminal on premise which is used to send us their source information over a phone line

23

Name: Owen C. Sutherland, MBA '62, BSIE '61
Title: Manager, Resource Management Systems
Company: Burroughs Corporation, Detroit, Mich.

"The most important single factor in the use of computers is the recognition that little or no benefit can come from merely automating the existing process," writes Mr. Sutherland, who goes on to say that successful use of computers in management requires that the people who develop and implement systems should be masters of the business process first; and masters of the computer second.

Mr. Sutherland ought to know, as he supervises 50 management systems analysts in the design and development of computer based management systems. He says the

most significant advance in computer technology in recent years has been the advent of the capability to use random access mass storage media in conjunction with remote terminal devices: "Today, this capability has been used in only limited applications (such as program development and engineering computational support). However, in the future it will enable operating and management personnel in industry not only to maintain an extensive base of information but also to use this information in making more advanced and timely decisions."

Left, Owen C. Sutherland. Right, Gerald Montry, MBA '60



"The greatest problem with the computer today is the lack of human intervention once erroneous data has been introduced."

Name: Carl H. Newman, MBA '60
Title: Consultant
Company: Computer Sciences Corporation, Silver Springs, Md.

Mr. Newman writes, "It is my responsibility first to determine the requirements of the management information system, then to design and implement the system and insure that it is completely documented. To do this I must first become familiar with the range and depth of all the data available or to be collected, as well as with the long and short term plans and goals of the managers concerned. Once management reports have been carefully designed to meet management objectives and the input suitably designed, a major portion of the problem has been solved. Converting input data to output reports at the least possible cost then becomes my real challenge. The systems analyst, to be successful, must have devised the management information system so that little or no redundancy develops from the feedback system in either data acquisition, handling, conversion or storage. This is the real measure of my skill and efficiency and the part I find most fascinating and challenging.

"There are no repetitive tasks currently performed by humans that cannot be more expeditiously and efficiently performed by computers. For example, we are now living in the era of the moneyless society with the day of the checkless society fast approaching. The credit card and the store register will act as an input device to a computer, which will deduct the amount of the purchase directly from the customer's bank account. The greatest problem with the computer today is the lack of expeditious human intervention once erroneous data has been introduced to the computer. All of us have received erroneous bills at one



Carl H. Newman

time or another and experienced the difficulty involved in getting a satisfactory correction. Unfortunately, the most effective way of getting action is to mutilate the data processing card used as a billing device so that it cannot be processed upon return. What is beyond the capability of the computers is the ability to think or create in the human sense."

25

Name: Charles G. Blair, MBA '67
Title: Senior Programmer
Company: RCA Records

In the future there will be *no* paper documents which can be easily referred to as a source of information or to verify computer supplied information—thus it is imperative to employ professional data processing people who will resist the temptation to take a "short cut" to meet a deadline, that may later have dire consequences, says Mr. Blair, who is writing programs and doing occasional systems analysis for RCA Records.

26

Name: Herbert Waldman, MBA '56
Title: Director, Bureau of Management Information and Data Processing
Company: New York City Board of Education, New York, N.Y.

"The computer is like a clerical staff with the ability to remember all the facts it operates on. In the future, ability to communicate with the computer will be simplified—the language may become almost as easy to use as conversational speech." These comments are from Mr. Waldman, who supervises 225 people in the operation of data processing services for the New York City School system. He is responsible for having the men and machines available to process clerical, administrative and scientific data, as well as for developing the best ways to process such information. Mr. Waldman took his present job after retirement from the U.S. Air Force.



Herbert Waldman

mong Ourselves

An informal collection of items, including news of the faculty, of alumni, and of the school, and assorted other information, opinion or comment that we think will interest you.

As We Go to Press . . . First Phase of Building Program Approved by U-M Board of Regents

The construction of the first unit of a new management education center has been approved by the U-M Board of Regents. They have also approved the hiring of architects to design the building, and have authorized the Business School to conduct a drive to raise \$400,000 in the coming months to complete the financing of the project. The School now has \$300,000 donated during the U-M's \$55 Million Program, and \$325,000 donated by Clayton G. Hale for the construction of a 450 seat auditorium in the new center. The fund-raising campaign authorized by the Regents is designed to bring the School to its \$1 million-plus goal for the first phase of the building program.

Associates Program Established by School

A stronger working relationship between the Graduate School of Business Administration and the business community is the main objective of the School's new Associates Program, according to its author, Dean Floyd A. Bond. The plan was approved recently by the Board of Regents. Under the program, member corporations will receive a number of services, and the Business School will be able to undertake projects that cannot be financed out of general funds.

"The Associates will be secure in the knowledge that they are playing a significant role in the advancement of professional management," Dean Bond said. "Activities will be designed to promote the mutual interests of the Business School and the business community; to develop friendships, understanding, and closer working relations between faculty and executives; to enrich our instruction and research and to enhance our continuing management education programs.

"For their participation," he added, "Associates will receive all research reports and publications of the Business School, an annual resume of all degree candidates about to enter business, notice of timely meetings and seminars on subjects of interest, and opportunity to attend (without registration fees) annual conferences and special programs designed especially for members of the group."

Members could also participate in the school's summer internship program, various executive-development and business-outlook programs, along with student recruitment and placement activities, Dean Bond said.

The new Visiting Committee of the Graduate School of Business Administration, composed of chief executive officers from 14 leading business firms, endorsed the Dean's proposal to establish the Business School Associates Program.

All Places Filled in Two Computer Workshops

"The Use of the Computer in Management Education" is the topic for two national summer workshops to be offered by the Business School under a \$50,000 grant attained from IBM by Dr. Thomas S. Schriber and Dean Bond. Twenty-five faculty members from business schools across the country will participate in each workshop: both are filled. Dr. Schriber, associate professor of statistics and management science, will direct both workshops. Participants are not required to have prior knowledge of computing techniques, but are expected to complete some 30 hours of directed private study before they arrive in Ann Arbor.

The workshops are designed to teach by doing, and will consist of four phases: 1) development and description of problem-solving procedures prior to computerization 2) use of specialized techniques for communicating problem-solving procedures to the computer 3) consideration of case studies illustrating fundamental business applications and 4) development by participants of one or more computer programs applicable to problems in the area of their personal teaching and research interests.

Dean Bond said: "We are grateful to IBM for its support, and to the American Association of Collegiate Schools of Business for its sponsorship of this important and far-reaching program. We expect it to have a significant influence on curriculum and instruction in business schools nation-wide."

Fund-Raising Campaign to Build Assembly Hall

The Business School has received a gift of \$325,000 that sets the stage for a fund-raising campaign to build the first unit of a new management education center.

Clayton G. Hale, Chairman of the Cleveland insurance underwriting firm, a former member of the U-M Business School faculty, and presently a member of the School's Visiting Committee is the donor. Both he and Mrs. Hale are Michigan alumni and members of the University's Presidents Club.

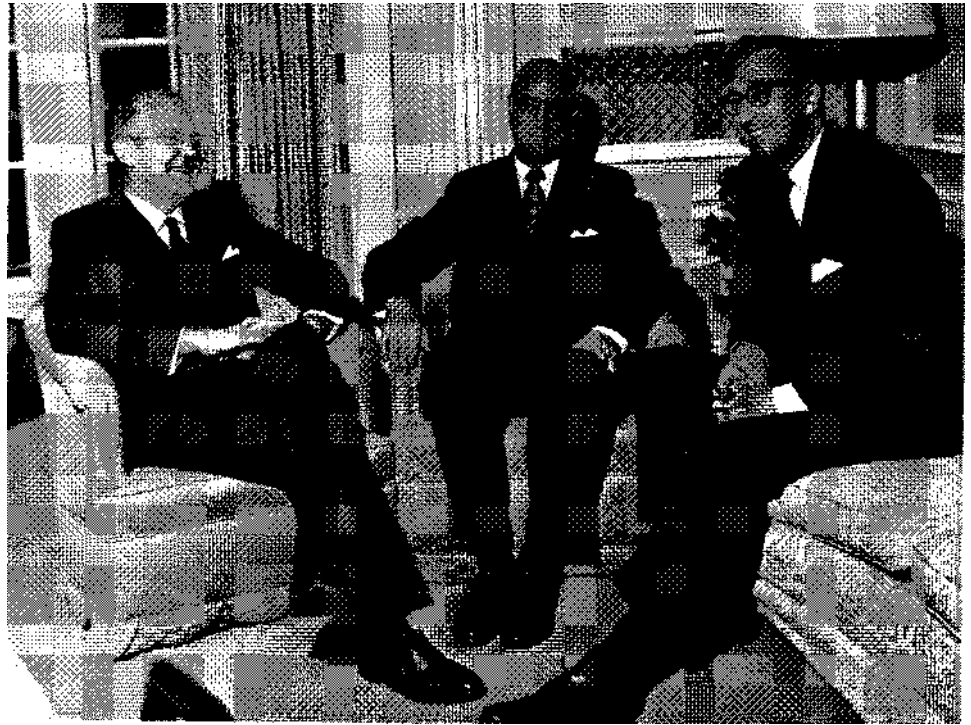
Mr. Hale announced that his gift is "to act as a catalyst to launch a fund campaign to complete the first phase of a building program at the Business School, and specifically to finance a 450-500 seat auditorium for the center."

Business School Dean Floyd A. Bond said, "the auditorium will be the central unit of the new Assembly Hall of the center. It will be named the Clayton G. Hale Auditorium."

"With the \$300,000 given to the School during the recent \$55 Million Program," the Dean noted, "Mr. Hale's gift gives us a significant boost toward our \$1 million goal for the first phase of this major building program."

According to the Dean, the new center will provide the physical facilities "to enhance and enrich the educational programs in the School, promote closer and more numerous contacts between students and faculty, and build stronger bridges between the School and the business community in the state and nation."

U-M's Business School is one of the leaders in management education. A recent survey shows that Michigan ranked first among all public tax-assisted universities and colleges in educating top executives. Further, the School's alumni are widely represented on faculties of leading business schools in the U.S. and Canada.



Clayton G. Hale, center, visits with President Fleming, left, and Dean Floyd A. Bond during a recent campus reception acknowledging Mr. Hale's gift of \$325,000 to the Business School where he once served as a professor of insurance.

The School has also pioneered in post-graduate programs in continuing advanced management education. In the past year alone, executives from major corporations and firms across the country spent over 30,000 man-days attending programs put on by the School.

The new Assembly Hall will be located adjacent to the Business School in the building complex bounded by Monroe, Hill, Tappan and East University streets.

In addition to the Hale Auditorium, phase one of the building program is to include a lounge, guest-speaker facilities, conference rooms and offices.

Mr. Hale received his bachelor's degree at Michigan in 1924, and a business degree in 1932 from Fenn College, now Cleveland State University, which awarded him an honorary doctor of laws degree in 1956.

He is the author of some 70 technical articles on insurance and for a number of years was a professor of insurance on the U-M Business School faculty. During his Michigan student days he worked as an assistant in the department of astronomy.

Mr. Hale is a life member of the U-M Alumni Association and was many years ago, head of the U-M Club of Cleveland. Mrs. Hale, the former Laura Bartlett, attended the University in 1920-21. Among their respective families are seventeen University of Michigan alumni who have attended the University over a span of 110 years.

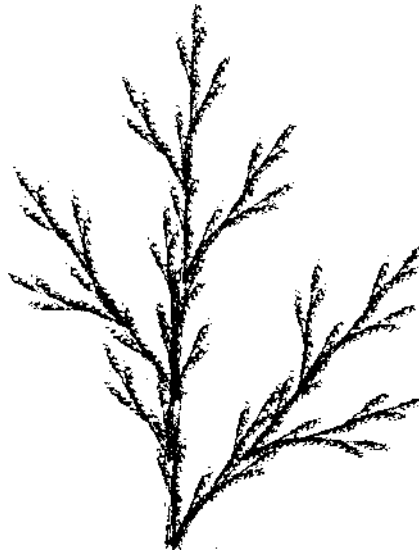
Arthur Young & Co. Establishes Professorship in Accounting

Arthur Young & Company, an international firm of certified public accountants, has established an Arthur Young Professorship of Accounting at the University of Michigan. The distinguished professorship was made possible by contributions from 15 U-M alumni who are partners in the firm, and matching gifts by the Arthur Young Foundation totalling in excess of \$120,000.00. Income from the endowment fund will be used to provide both a salary supplement and an expense allowance for research and professional activities of the Arthur Young Professor of Accounting.

The following partners in the Arthur Young firm have contributed toward the professorship: W. R. Shaw, MBA '39; E. G. Olsen, MBA '41; L. S. Dunham, BBA '46; R. L. Fairchild, MBA '33; Robert J. Henry, MA '30; B. J. Kirchenbaum, BBA '43; Rodney Lang, MBA '50; A. V. McPhee, BA '21; M. J. Miller, MBA '58; Wyba Nienhuis, *MBA '49; R. E. Pell, MBA '43; Hyman Sapakie, MBA '37; E. H. Soderstrom, MBA '48; F. M. Wheeler, LLB '54; W. A. Wood, MBA '57.

The University of Michigan is one of six schools in the nation that has an Arthur Young Professorship. The other universities are Chicago, Columbia, Illinois, Ohio State, and Kansas.

In accepting the check from Detroit partners William Shaw and Edwin Olsen, Dean Floyd A. Bond of the Graduate School of Business Administration stated, "we at the University of Michigan are very pleased to have this distinguished professorship of accounting." In addition to expressing sincere appreciation, Professor Walter G. Kell, chairman of the accounting faculty, indicated that the Arthur Young Professorship would significantly enhance the quality and stature of the accounting program at the University of Michigan.



Faculty News

Joseph W. Newman is Chairman of the 1970 Doctoral Dissertation Competition sponsored by the American Marketing Association. The competition is open to students in the United States and Canada who will have completed dissertations in the year ending June 15, 1970.

A monograph entitled "The Significance of Imported Consumer Goods in Indiana Retailing" has recently been published by the Indiana Department of Commerce and Indiana University. The monograph was written by *James D. Goodnow*, program director, Institute for International Commerce.

William H. Jean, associate professor of finance, has finished work on a book, *Analytical Theory of Finance*, which will be published by Holt, Rinehart and Winston in January, 1971. He is now at work on another book, *Managerial Finance*, which will be published by Dryden Press. He will also have a paper entitled "Terminal Value or Present Value in Capital Budgeting Programs," published in the *Journal of Financial and Quantitative Analysis*.

William Hall, assistant professor of statistics, presented a paper with research engineer James O'Day on "Causal Chain Approaches to the Evaluation of Highway Safety Countermeasures" at the national meeting of the Operations Research Society of America.

"Managing Industrial Conflict in Holland at the Plant Level" is the title of a monograph written by *Meyer S. Ryder*, professor of industrial relations, and published by the Bureau of Business Research. The study describes the systems used by Dutch industrial firms for handling and settling in-plant labor disputes where some or most of the employees are members of one or more labor organizations. Comparisons are made between Dutch and American disputes systems.

Karl G. Pearson, professor of business administration, has done a TV series for the U-M TV Center. Topics covered include "Whether to Buy or Rent", "Financing Your Home", "Legal Aspects of Real Estate", "Urban Problems", "Real Estate Investments".

William H. Williams, professor of statistics, published an article on "The Systematic Bias Effects of Incomplete Responses in Rotation Samples" in *The Public Opinion Quarterly*, Volume 33, No. 4, 1970.

Merwin H. Waterman, professor of finance, served as an advisor to Bank Indonesia in February of 1970. While in Jakarta, he gave a talk entitled "The Ingredients for an Indonesian Capital Market".

Mary C. Bromage, associate professor of written communication, has published an article in *Business Horizons* entitled "Ghost Writing—Shadow or Substance" and one in the *U.S. Army Audit Agency Bulletin* entitled "USAAA Reports for the Seventies." She also conducted a seminar on "Written Communication for Auditors" during the spring vacation. The seminar was held in Washington, D.C. under the auspices of the U.S. Department of Commerce and attended by representatives from various government departments,

including HEW, Small Business Administration, State Dept. and the Dept. of Labor.

Word has been received that the biography of *Dick Leabo*, professor of statistics, will appear in the forthcoming edition of "The Directory of British and American Writers." This edition will include the names of teachers, scholars, and members of other professions who have achieved distinction as published writers. Professor Leabo, who directs the doctoral studies program for the Business School, is the author of an article entitled "Doctoral Programs: AACSB's Next Challenge?" published in the March, 1970, issue of *Collegiate News and Views*.

Dallas L. Jones, professor of industrial relations, is the author of "Ramifications of Back-Pay Awards in Discharge Cases", a part of the book *Arbitration and Social Change*, published in 1970 by the Bureau of National Affairs and edited by Gerald G. Somers.

C. Merle Crawford, professor of marketing, has been elected vice-president of the American Marketing Association for 1971-72. He will serve this year as vice-president elect. The Association has about 19,000 members around the world, including 17,000 practitioners of marketing and about 2,000 teachers of marketing.

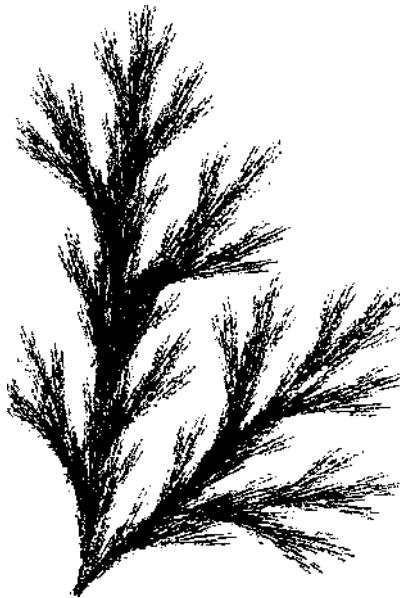
David L. Lewis, professor of business history, was recently named a member of the three man awards committee of the Historical Society of Michigan. The committee annually designates award recipients for outstanding contributions to Michigan history. Professor Lewis is also the author of several articles, including "America's Greatest Negroes" in the January issue of *The Crisis*; "In Voting on Great Americans, Business Gets the Business" in the March issue of *Nation's Business*; "Henry Ford Meets the Press" in the Winter, 1970 issue of *Michigan History*; "Problems in Evaluating Business and Organizational Records" in the first quarter, 1970 issue of *Historical*

Society of Michigan Chronicle and "Historic Film: Going, Going, Gone!" in the March issue of *Public Relations Journal*.

Arthur F. Southwick, professor of business law, has written a chapter entitled "Legal Implications of the Coronary Care Unit" for the book *Coronary Care in Small Hospitals—The Standish Experience*, published by the W. K. Kellogg Foundation, Battle Creek, Mich. He is also the author of "Hospital Medical Staff Privileges," an article published in both the *DePaul University Law Review*, Summer, 1969, and the *Law Review Digest*, Sept.-Oct., 1969.

SEASONS-Petar Milojevic

The two drawings on pages 26-27 are based on a pattern which reminds one of floral forms. The program is written in FORTRAN using random generators and various parameters. Drawn on a CalComp 565 plotter. Used by permission of the magazine Computers and Automation.



Partners in Ernst & Ernst Support Paton Accounting Center

Eleven partners in Ernst & Ernst, an international firm of certified public accountants, have joined the Presidents Club of the University of Michigan and directed that their contributions be used to further the construction of the William A. Paton Center for Accounting Education and Research. These memberships in the Presidents Club were in response to the efforts of Charlie Stilec, MBA '33, recently retired partner of Ernst & Ernst, who solicited support among the alumni members of his organization for the proposed Paton Accounting Center. Pledges by the Ernst & Ernst alumni approximate \$125,000.00 to date.

The following Ernst & Ernst partners have been added to the Presidents Club roster: A. P. Bartholomew, Jr., MBA '40; R. M. Finlayson, MBA '48; E. J. Potter, MBA '47; C. P. Shelly, MBA '39; Carl White, MBA '35; R. H. Townsend, Jr., MBA '55; N. R. Schmeichel, MBA '57; A. C. Mackinnon, MBA, '48; J. H. Savage, Jr., MBA '34; R. D. Neary, BBA '55; P. C. Berry, MBA '53.

In a letter to his associates, Charlie said: "Anyone who has graduated from the School of Business Administration of the University of Michigan with emphasis on accounting is well aware of the tremendous influence that W. A. (Bill) Paton has exerted on that fine school and the quality of its accounting curriculum . . . The University was indeed blessed, as were his countless thousands of students, for his decision to become an accounting and economics educator—probably the one most outstanding and influential accounting teacher of our time. It is only fitting that steps be taken to enshrine his name on the campus of the University forever."

"We are indeed grateful to Charlie Stilec and the Ernst & Ernst partners for their substantial contributions toward the realization of the Paton Center," said Dean Floyd A. Bond.

Dr. D. O. Bowman Appointed
Director of Management
Education Programs

Dr. D. O. Bowman, a North American Rockwell Corporation executive and a former member of the University of Michigan's economics faculty, has been appointed Director of Management Education Programs at the Business School.

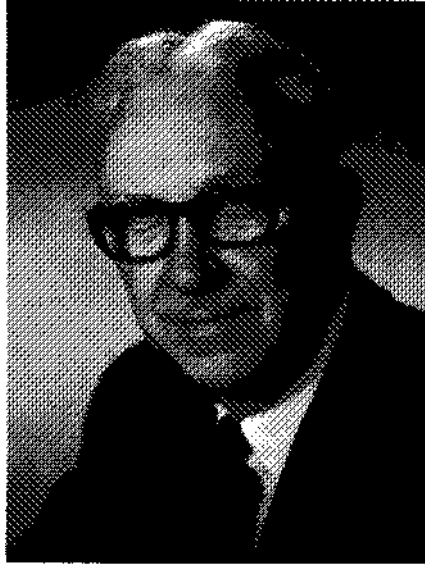
In announcing the appointment Dean Bond noted that Dr. Bowman "will coordinate the many programs that are now in operation at the school and will work closely with the faculty and staff on the long-range development of the School's continuing management education activities."

Since 1960 Dr. Bowman has served as Vice-President, Management Systems and Planning, of North American Rockwell's Autonetics Division, Anaheim, California. The division, with annual sales in the 600-million range, is one of the world's largest electronics complexes. At Autonetics, Dr. Bowman directed a staff of 450 persons and was responsible for the development and implementation of management information systems, strategic and economic planning, electronic data processing operations, audit of all non-financial operations, and internal cost reduction programs.

Dr. Bowman was Director, Long Range Planning, at Crown Zellerbach Corporation, San Francisco, from 1953-60. He served as Assistant Administrator, National Production Authority, from 1950-53, and helped to develop economic policies at the Departments of State and Commerce from 1946-50. During World War II, as an army officer, he was an executive in the Office of Price Administration and in the Office of Strategic Services.

The recipient of a Distinguished Service Award from the Office of Emergency Preparedness, Executive Office of the White House, in 1968, Dr. Bowman also received an Award for Exceptional Service from the Department of Commerce in 1953.

Dr. Bowman received B.S. and M.S. degrees in economics from



Dr. D. O. Bowman

Purdue University in 1933 and 1935, respectively, and a Ph.D. in economics from the University of Michigan in 1941. He served on the faculties of Purdue and Michigan before World War II.

A member of the Business Advisory Board, School of Business Administration, American University, and Advisory Board, Graduate School of Administration, University of California, Riverside, Dr. Bowman is a consultant to the Office of Emergency Preparedness, Executive Office of the White House, and a Director, Newport National Corporation.

J. Philip Wernette
is a Profit Prophet

An item in U.S. News and World Report (Trend of American Business) recalls that 10 years ago J. Philip Wernette, Professor of Business Administration, made this forecast for the 1960s:

Gross national product, up 50 per cent; *per capita income*, up 25 per cent; *bank deposits*, up 50 per cent. *Actual results*: GNP up 53 per cent; per capita income, up 34 per cent; bank deposits, up 110 per cent.

For the 1970s, Professor Wernette forecasts these advances in constant dollars: GNP, up 56 per cent; per capita income, up 35 per cent; bank deposits, up 90 per cent. He sees 1970 as a "limited year" because of anti-

inflation moves, but expects growth to resume when these restraints are relaxed.

Professor Wernette says: "The harm done by small inflation has been grossly exaggerated among our people for three and a half decades." He adds that inflation is not good, but its consequences are not as bad as painted.

BBR is Publishing Series
on Labor Relations and Law

The Bureau of Business Research is currently involved in a major publishing project for the Program in International Business. *Michigan International Labor Studies* is a six-volume series on law and labor relations in which the law, culture, and economy of each of six European countries are compared in depth with institutions and practices in the United States. The authors, members of the law firm of Seyfarth, Fairweather & Geraldson, consulted plant-level officials and labor law experts in each country, systematically examining the technical and economic structure of each system. The third volume in the series, *Labor Relations and the Law in West Germany and the United States*, has recently been published; studies of the United Kingdom and Belgium are already in print, and the volumes on Italy, France, and Spain are now in preparation.

Besides issuing books and studies by faculty members, the Bureau has also recently published an accounting study by Dean S. Eiteman, *Pooling and Purchase Accounting: the Effect of Alternative Practices on Financial Statements*, and the reports of two conferences, *New Directions in Utility Marketing* and *The Cost of Conflict*. The latter is the third in a series which presents lectures given annually at Western Michigan University under the sponsorship of the Economics Department. The speakers represented in this collection deal with the nature of conflict and the economic effects of war, defense spending, and disarmament, arguing that an end to the Vietnam war would not seriously hurt our economic growth.

Honors-

The annual honors banquet of the Graduate School of Business Administration was highlighted by the Business Leadership Award, which this year went to Joseph C. Wilson, Chairman of the Board of the Xerox Corporation. Pictured here are some of the people who were honored at the banquet:

- a. Christine Gunderson, President of the Business Women's Association during the fall term, received the Business Women's Leadership Award.
- b. George C. Martin received the Highest MBA award from Dean Floyd A. Bond. In giving the award, Dean Bond noted that Mr. Martin had an 8.64 grade average, which means that more than half of his teachers gave him an A+.
- c. Joseph Wilson, Chairman of the Xerox Corporation, greets Mrs. Philip Wernette as she comes through the receiving line. Dean Bond is chatting with Dr. Wernette. Later in the evening Mr. Wilson was presented with the 1970 Business Leadership Award.
- d. John M. Nannes received the Alpha Kappa Psi award for having the top grade average among graduating BBA students. He is being given the award by Ron Sladky, vice-president of Alpha Kappa Psi.
- e. Terry McHugh (left) and Larry Stevens are pictured after receiving gavels as a "surprise award." Terry was president of the student council in fall term and Larry was president in the winter term.
- f. John Nannes, vice-president of student council, gives the Outstanding Teacher Award of the year to Martin R. Warshaw, left, professor of marketing. The outstanding teacher is selected by a Student Council Subcommittee.

Photos by Robert C. Williams

Prof. G. O. Dykstra Dies

Gerald Oscar Dykstra, professor of business law at the Graduate School of Business Administration, died suddenly April 24. Death was attributed to a heart condition. He was 63 years old.

Prof. Dykstra received three degrees from Michigan, a bachelor of arts in 1927, bachelor of laws in 1930, and master of business administration, cum laude, in 1936. He joined the U-M faculty in 1950, after having reached the rank of full professor at Ohio University's College of Commerce. He began teaching at Ohio in 1936. Professor Dykstra was admitted to the practice of law in both Ohio and Michigan. He engaged in general practice of law in Cleveland for five years, where he was admitted to practice before the U.S. Federal Courts and was a partner in the firm of Shaver and Dykstra.



Gerald O. Dykstra

At the U-M, Prof. Dykstra taught business law. In 1968, students honored him with the Distinguished Teacher Award.

Dean Floyd A. Bond of the Graduate School of Business Administration said, "With his passing, the University has lost one of the most dedicated members of the teaching profession. He taught with spirit and devotion. His lectures were superb. Few men have had as great or as constructive an influence on students. He will live in fond memory of thousands of business school alumni, now scattered throughout the world."

Prof. Dykstra was born May 13, 1906, in Allegan, Michigan. He is survived by his wife, Lillian Green Dykstra, whom he married in 1936, and his mother, Mrs. Leonard Calkins of Kalamazoo, Michigan.

Letters

Editor:

Recently I received Volume I, No. 3 of your new magazine, *Dividend* published in the winter of 1970.

I am very impressed by the single issue of your magazine. It is a fine magazine and gets to the heart of both timely and interesting subjects. In view of the comments of others concerning the subject matter of Volume I, Nos. 1 and 2, I would appreciate having you send these copies to me.

The program you are undertaking to develop and maintain a photographic library of past great entrepreneurs is certainly worthwhile.

C. W. Walton, Consultant
3M Company
St. Paul, Minnesota

Stichting Bedrijfskunde

Editor:

In the article about the relationship between the Stichting Bedrijfskunde of the Netherlands and our Graduate School of Business Administration in the Winter, 1970 *Dividend* the fact that Robert W. Adams, professor of international business, had much of the responsibility for the administration of the program was inadvertently omitted. Professor Adams succeeded me as director of the program in international business in July, 1965. His contribution to our successful relationship with the Stichting Bedrijfskunde has been very substantial.

D. Maynard Phelps
Professor Emeritus

Gossip and Puffery

Editor:

Dividend is a great improvement over the *Alumni Bulletin*. But I am still unconvinced about the necessity for such a publication.

The resources used to produce what amounts to gossip and puffery, even when done well, should be shifted to an enterprise connected with the responsibility of the School to its alumni. M.B.A.'s become obsolete quickly these days. Why not provide a handbook designed to review developments in the art and science of business decision making.

Preparation of such a handbook would be difficult. But it could be made to fill a notable gap in the practical literature of business administration. It's worth a try.

Neil G. Cohen, MBA '64
Charlottesville, Virginia

NUMBERS ... IT YOU Like Them, sad On (Part 2)

The Computer as Tax Collector

As of 1966, the Internal Revenue System had 27 computers worth approximately \$12 million. In 1966 they:

- Did the work of 12,000 people.
- Produced additional revenues of \$27,000,000.
- Held back \$61,000,000 in refunds to cover tax debits.
- Noted 700,000 missing returns, with potential tax collections of \$156,000,000.
- Yielded \$19,000,000 by discovering mathematical errors.
- Uncovered 416,000 duplicate refund claims.

Source: Internal Revenue Service Automatic Data Processing Honeywell Corporation, 1967

Computers and Growth

By the mid 1970's, the number of people with jobs operating or programming computers will almost double—from today's 900,000 to 1,700,000. If those involved in manufacturing computers are included, the figure expands to as many as 2,500,000.

About 175,000 people are working today as programmers, vs. only 100,000 in 1966. Some 150,000 are systems analysts, vs. about 60,000 in 1966.

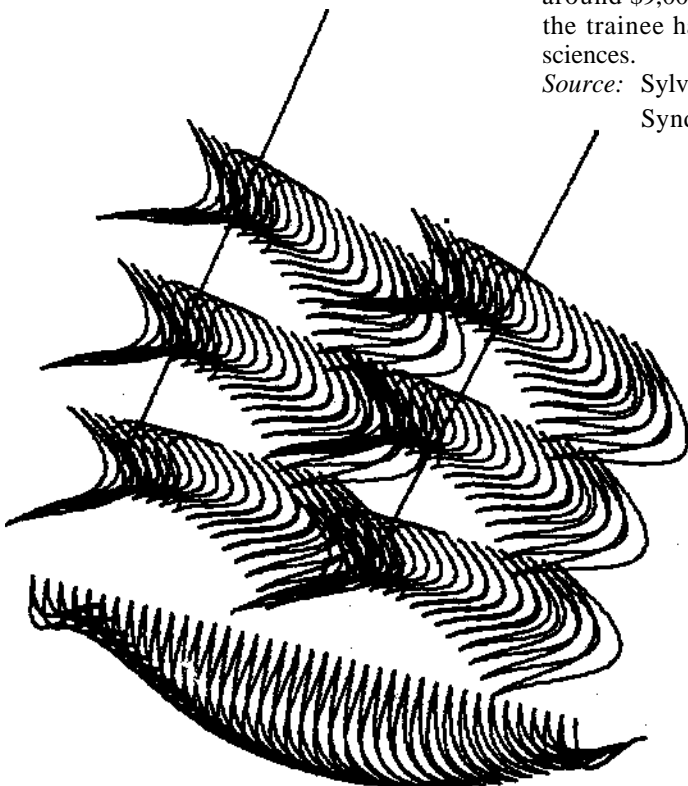
Sales of computers alone will soar from \$12 billion in 1970 to \$27 billion by 1975 (as against a mere \$4 billion in 1960).

The number of computers in use in the U.S. will jump from today's 90,000 to 160,000 by 1975. As for the total electronics industry, it'll be close to \$53 billion by 1972, against \$40 billion in 1968.

There are 40,000 computers in use in the U.S. today, compared to only 200 as recently as 1954.

Starting salaries for computer programming trainees are now around \$9,000 or around \$11,000 if the trainee has a degree in computer sciences.

Source: Sylvia Porter
Syndicated Columnist



*FLYING
DUTCHMAN-*
Michael Davis

Plotted on a CalComp
plotter at Stanford
University

The Nanosecond

"Up to 1945, when the first electronic computer was built, man's calculating speed for several thousand years had been the speed of an abacus. Overnight, it increased five times. From 1945 to 1951, it increased one hundred times again, and, from then until now, it has increased one thousand times again. Our measure of calculations today is nanoseconds—one billionth of a second. A nanosecond has the same relationship to a second that a second has to 30 years. This scale of speed is very hard to comprehend, but even this speed is too slow for the complex problems that computers are now being asked to solve. The distance that an electron has to move from one part of a circuit to another part has become a major limitation on the speed at which a computer works and a major challenge to the people designing computers."

Source: *Man and the Computer* by

John Diebold
Published by Frederick A.
Praeger Inc.
New York, 1969

Demand for Computers

During the past five years, demand for U.S. computers and related services has nearly tripled to a level of \$10 billion. Projections indicate that its size will approach \$25 billion by the mid 70s.

The areas for fastest growth in the computer industry in the next five years will be software, with an average annual gain of 41%, and peripheral equipment supplied to independent manufacturers, with an average growth of 25%. Another rapidly expanding area is "mini-computers," whose dollar volume is rising 30-35% annually.

The overall growth rate for the computer industry is projected at 19% annually through 1974, vs. 24% in the past five years (the period in which the third generation of computers was introduced).

Source: David L. Babson and
Company Inc.'s Weekly
Staff Letter for March 5,
1970

What Managers Need to Know About the Computer

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all future managers should take. This course would deal with the concept of systems analysis, with the problems and opportunities of management supervision over a computer installation (present or proposed), and with the techniques described above in greater or lesser detail. This exposure should include a certain amount of programming to clarify the realities of computerization in the minds of participants.

In the MBA program at the

The Computer- Sweet and Sour

continued from page 5

"Opportunities Offered by the Computer," and "New Dimensions of Freedom," chapter by chapter.

Throughout each of these thirteen chapters making up the book, Withington's coverage is comprehensive enough to include business, scientific, academic, and government organizations. At the same time, the impact of the computer on individuals at all levels within and outside of these

University of Michigan, two courses are particularly related to this area of knowledge. "Introduction to Computer Programming" (Statistics 411) taught by Dr. Thomas Schriber and others, covers these topics with emphasis on the computer. "The Information Function in Management" (Accounting 611), taught by this writer, emphasizes the problem of systems analysis in business, but does not involve program preparation.

In addition, there should be a course permitting interested students to obtain "hands-on" experience with the computer in a business environment. This course would make them aware of the intricacies of systems analysis and the practical problems and opportunities of using computers. The desires of those who are significantly involved in

organizations is given the coverage it deserves. In addition, the book lends itself to "browsing". It can be opened at any arbitrary point and the reader can simply "start reading," coming away with something to show for having spent as little as five minutes' time in the process. This effect is unusual in the experience of most people who propose to digest textual material concerning a technical topic and find that they must adhere to a sequential approach in the process. Rather than being discouraged by a pyramiding of ideas, the tentative reader of this book will find that he can approach the fare selectively. The "reward" of real additional insight gained for each

teaching the courses would be the most powerful determinant of their content. Nonetheless I believe that this general outline would be very much more valuable to present and future management people than an approach which emphasized the technical and programming aspects of computer use.

Several Michigan MBA courses provide hands-on experience. In the Statistics department, Dr. Schriber offers courses in simulation (Stat. 474), in computer-implemented numerical methods and business applications (Stat. 579), and in computer-implemented optimization methods (Stat. 614). In accounting, I offer a course in computerized accounting systems (Accounting 628). Several other MBA courses also involve computer use by the participants.

trip back to the book, no matter how brief, suggests that it would be worthwhile to have the text within easy reach so that it can be picked up frequently, as time permits.

In his preface, Withington expresses the hope that "the objective guidance that is offered to the reader in this book should improve his ability to make intelligent decisions about the use of computers, and to live in a world that is becoming increasingly dependent on computer systems". That this hope is brought within the realistic grasp of the reader is a tribute both to Withington's perceptive experience and his gift for exposition.