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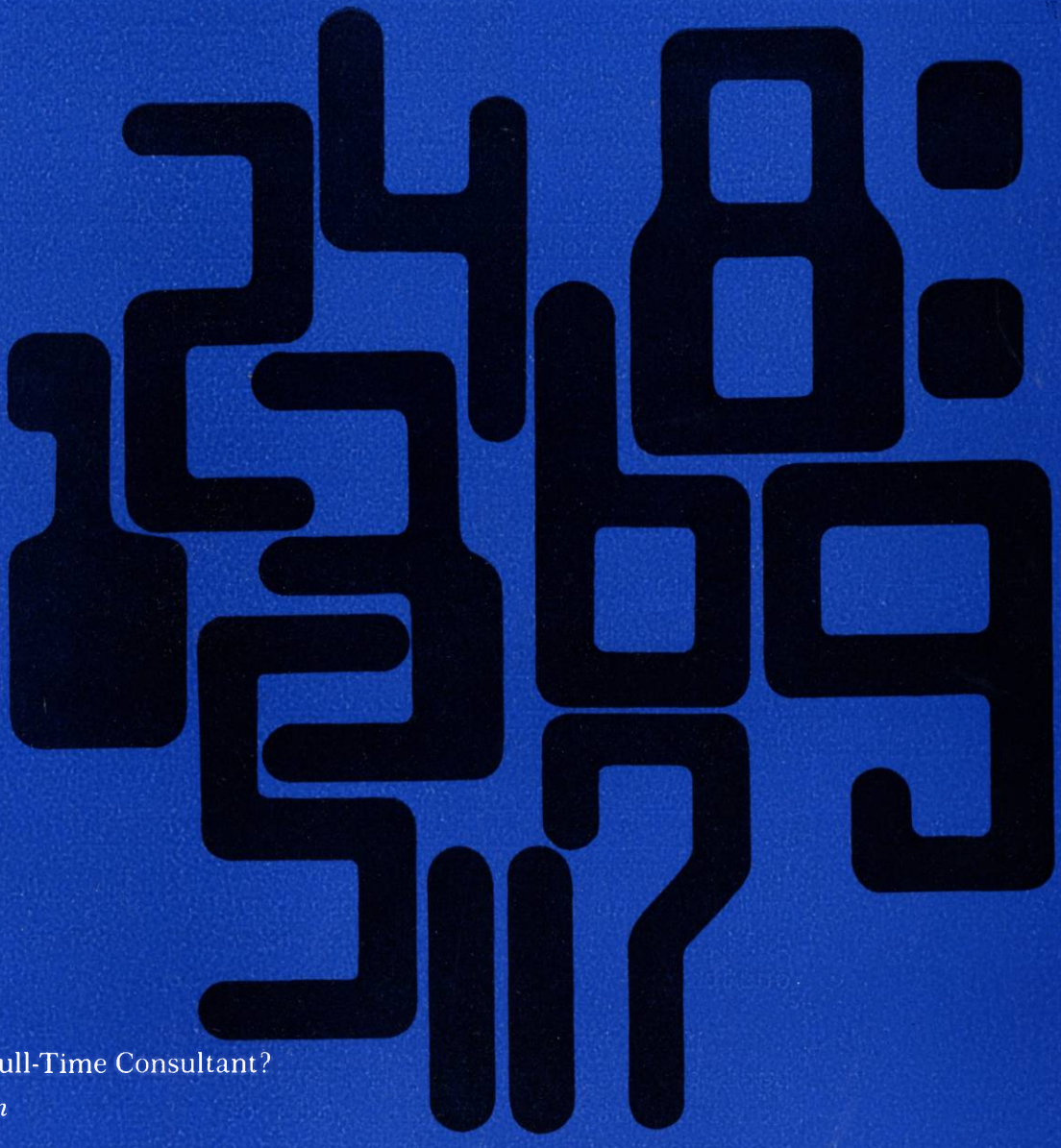

A Publication of the American Institute of Certified Public Accountants

Moore New Ideas for Business

Simple way to update mailing lists

Mailing lists age rapidly unless they are cleaned regularly. And an out-of-date list wastes time, postage, printing, and labor. Moore has a simple system that makes it easy to verify names and addresses and then keep the list up to date. It even paves the way for turning the mailing chore over to an ADP service bureau. Ask about "update mail lists."

No payee mixups

Moore can show you how to use ADP to: meet customers' need for duplicate invoice copies; provide additional copy to return with payment; include needed record copies; keep customer copies intact for easy handling and mailing. Ask about "collections mixups."

No more B/L hangups

Bills of lading can be troublesome when there are freight allowances to compute. Moore has a way to get exact information on bills of lading so there's instant verification. No correspondence. No delays in payment. Ask about "shipping hangups."

Multi-store inventory control

Keep track of goods even when transferred between stores or drop-shipped by vendors. This Moore system provides a central record of supplier, which store sold goods, who bought them, when delivered. There's a thank-you note for the customer, too. Ask about "stock-keeping control."

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More than 2400 Moore specialists comb the business world daily for ways to cut costs, improve control, stem the rising tide of needless paperwork. These are the kinds of ideas Moore can share with you. One Moore idea may be what you need.

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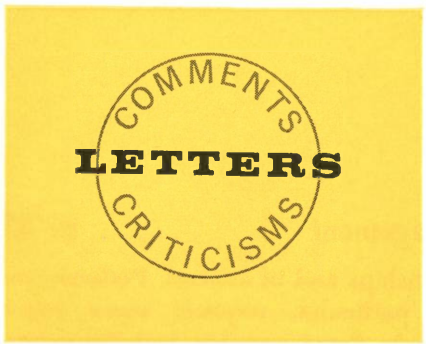
Over 675 offices and plants, 2407 salesmen in North America



Crucial points

I have read both R. L. Mathews' article ("A Computer Programming Approach to the Design of Accounting Systems," M/S July-August '68, p. 32) and G. M. Levinson's answering letter (M/S November-December '68, p. 2). Their discussion raises two crucial points.

The first deals with cost/effectiveness of different programing techniques. The argument is not really between COBOL and FORTRAN but between programs written in higher-level (compiler) languages and the far more machine-oriented assembly languages which bear essentially a one-to-one relation with the machine instruction set.

Certainly, to use a program on a production basis for a large part of available computer time, running-time efficiency must be the major concern. Running-time efficiency can be heavily hardware-dependent, as in situations where inadequate core storage is available and excessive disk access must be used instead. In these situations the heavy investment in programer time and debug time is justified from a cost/effectiveness point of view.

However, most programs do not fall into this category. Very few programs start in this category. Those programs that do fall into this category usually do so as they evolve, growing slowly from experimental programs. For this type of program the compilers, even if they generate less efficient codes (i.e., more instructions*) than a good programer working in assembly language would, would still be cost/effective because the programs can be written and debugged much faster by less skilled programers.

The proper time to write the machine code is when the program is fully debugged and its form frozen. Then the program should be carefully analyzed for time consumption and the necessary portions of the program time-optimized. Thus, in the early stages of program trial and design, ease of manipulation and analysis far outweigh running time and core storage considerations from the overall point of view of cost/effectiveness, and in this stage the matrix approach may permit great savings of time and money.

The second point raised by the article and its discussion deals with the overall approach to computers. To date, the vast preponderance of commercial computer utilization has been for doing what we've always done, only faster and, we hope, at a lower cost. However, with the availability of third generation hardware and the increasingly easy access to time sharing services, it is vital that we move beyond this stage.

The time has come when it is no longer sufficient to ask, "Can the computer do this job better?" If we are to stay competitive and use all of the management tools available to us, we must start asking, "What problems can the computer solve for us which we have been unable to solve before?"

We must consider not just what functions the computer can take over but what problems the computer can solve—in forecasting, marketing, decision making, product design, etc. It is only with this approach that management can fully utilize the economic benefits inherent in computer technology.

Richard J. Pegis
Optimization Associates, Inc.
Rochester, New York

*Mr. Levinson might give the wrong impression when he states that "compilers utilize a great deal of storage in themselves." This storage is used only during the actual compiles, not during program execution.

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PUBLISHER: Charles E. Noyes

EDITOR: Robert M. Smith
MANAGING EDITOR: Lois Stewart
ART DIRECTOR: Herb Kearse
ASSISTANT EDITOR: Johanna R. Dunn
ADVERTISING MANAGER: S. L. Mason
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people, events, techniques

Justice Department, Software Concern File Two Additional Suits Against IBM; Manufacturer Announces Pricing Structure Changes

IBM, the leading maker of computers, has been hit again with two more antitrust suits:

- The Justice Department filed suit against the giant computer corporation, alleging IBM monopolizes the $3-billion general purpose digital computer market.
- Data Processing Financial and General Corporation filed a suit charging IBM with numerous violations of the antitrust laws in the manufacturing and distribution of computer software and related products and services. DPF & G has petitioned the court to require each IBM product and service to be marketed and priced separately.

The new suits bring to a total of three the antitrust actions taken against IBM in less than two months. The first to file a civil antitrust suit was Control Data Corporation, which, like Data Processing Financial, is asking triple damages. (See news story M/S January-February '69, pp. 14-15.) All three plaintiffs have asked for jury trials.

Justice charges monopoly

The Justice Department's antitrust action climaxed a long investigation—the biggest of the Johnson era—by alleging that since 1961 IBM "has attempted to monopolize and has monopolized" the market for general purpose digital computers, which represented more that 95 per cent of all computer sales and leases.

Like Control Data's suit, the Justice Department action was filed under the seldom used Section 2 of the Sherman Act, covering monopolies. (Most Sherman Act suits are for price fixing and other conspiracies in restraint of trade, under Section 1.)

The practices complained of by the Justice Department are:

1. IBM quotes a single price for a "package deal" offering hardware, software, and maintenance services. The Justice Department contends that this device was used to discriminate among customers

"by providing certain customers with extensive software and related support in a manner that unreasonably inhibited the entry or growth of competitors."

2. IBM was charged with quashing the sales prospects of newly developed rival machines by simply announcing new products of its own—even though production was a long way off.

The company was also said to have introduced new models of computers "with unusually low profit expectations, in those segments of the market where competitors had or appeared likely to have unusual competitive success."

3. IBM was finally charged with having "dominated the educational market" for digital computers "by granting exceptional discriminatory allowances in favor of universities and other educational institutions."

The Justice Department suit asks the court to order any necessary "divorcement, divestiture, or reorganization" of IBM.

IBM rejoinder

Calling the government's charges "unwarranted and without foundation," IBM replied, "This lawsuit is the outgrowth of previously reported discussions going on for nearly three years between the Justice Department and various companies in the data processing industry. IBM has cooperated fully in this review.

"One of the key issues in these discussions has been whether there is sufficient competition in the data processing industry or whether IBM has such monopolistic power that fully effective competition does not exist.

"Evidence of the open and strongly competitive nature of the computer business is abundant. Virtually nonexistent 20 years ago, it has grown into a multi-billion-dollar industry that has attracted more than 60 manufacturers of computer systems and some 4,000 companies dealing in related equipment support and services."

Data Processing Financial, a software producer, objects chiefly to IBM's combining of software and hardware in sales. It charged IBM with discriminating in maintenance policies, intimidating users planning to acquire competitive peripheral equipment "by threatening to withdraw general technical support," and giving away software "free" to its users, which "merely forces users to pay for the software as part of a single, 'bundled' price."

IBM found DPF & G's allegations to be "completely without merit." A spokesman for IBM said that "the conditions to which Data Processing Financial apparently now objects were in effect at the time the concern went into business in 1961. Furthermore, they have been the basis of the relationships between IBM and all of its customers for many years and have been well known."

IBM noted it had already announced that by July 1, 1969, at the latest, it would make changes in the way it charges for and supports its data processing equipment, "which is apparently DPF & G's current principal complaint."

Government Issues ADP Standards

Data processing standards adopted in the Federal Government in accordance with recently enacted legislation will be reported in a new publications series recently launched by the National Bureau of Standards. It is called Federal Information Processing Standards Publication series (FIPS PUBS).

Collectively the series will constitute the official Federal Information Processing Standards Register. It will report on federal ADP standardization activity and review standards (in most cases with technical specifications) of four types: hardware, software, application, and data. The publications issued so far are available from the Superintendent of Documents, Washington, D.C. 20402, at a price of $1.30 for the seven.

New Group Formed to Set Consultants' Admission Standards

A new association of management consultants based on individual rather than firm membership, the Institute of Management Consultants, Inc., has been formed by a group of consultants.

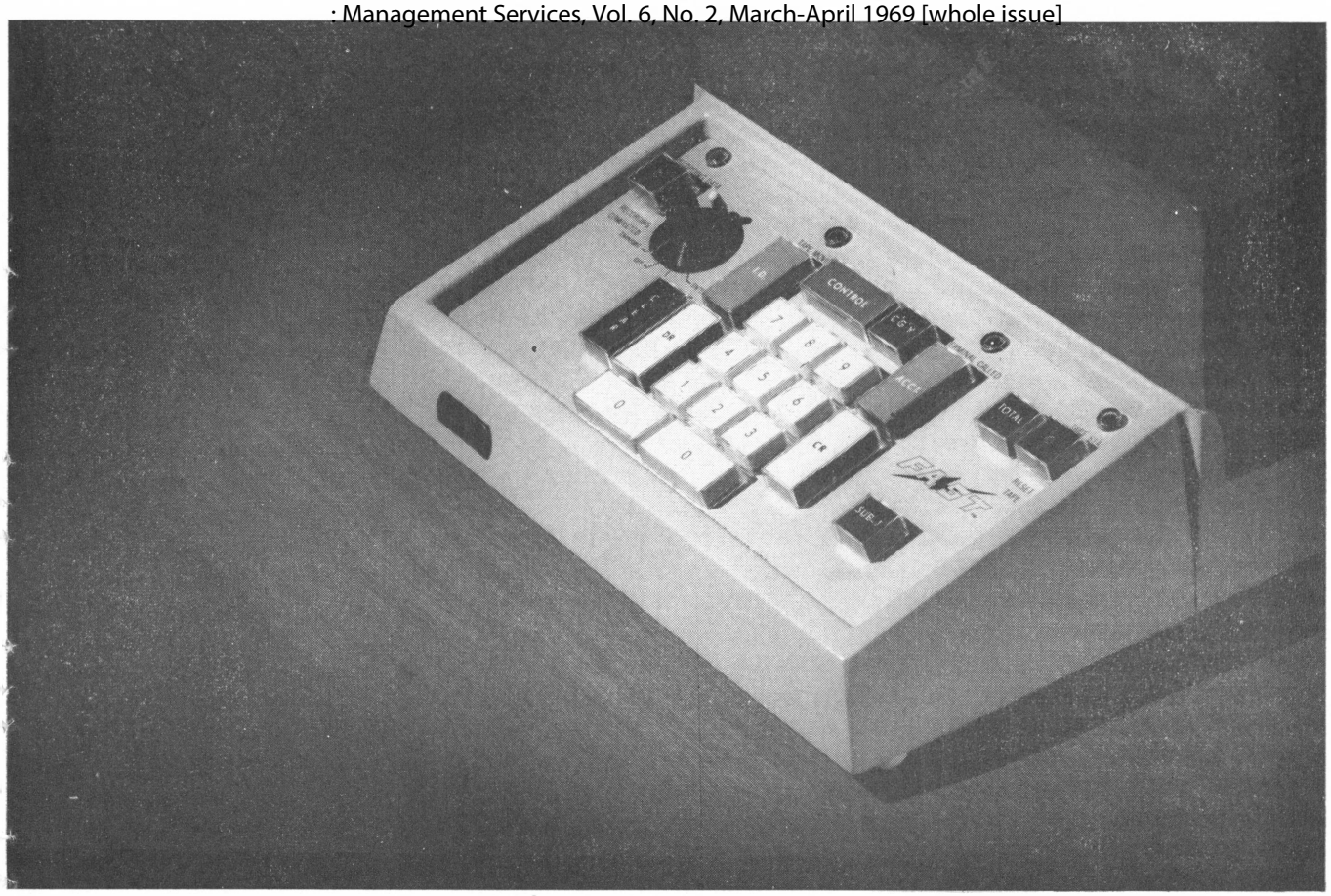
Its chief purpose is to set and administer standards for admittance to the field. Starting in 1970, it will grant accreditation to management consultants on the basis of, among other standards, the results of oral and written examinations.

Five sponsoring groups

The new institute is the outcome of a professionalization program launched three years ago by five major management consulting associations, the Association of Consulting Management Engineers, the Association of Management Consultants, the Society of Professional Management Consultants, the New England Society of Management Consultants, and the Canadian Association of Management Consultants. None of these groups, however, was in a position to undertake a certification program because all accept firms as members, and certification must be individual.

The result is INCON, organized in January with Marvin Bower, a director of McKinsey & Company, Inc., as president; Albrecht M. Lederer, president of A. M. Lederer and Co., as vice president; and Harvey C. Krentzman, president, Advanced Management Associates, Inc., as secretary-treasurer.

INCON starts with some 140 founding members, most of them senior consultants with firms that are members of ACME, AMC, SPMC, or NESMC. Another group of experienced consultants will be admitted under a "grandfather" clause later this year. Thereafter, it is planned, no members will be admitted who have not passed the qualifying examinations.



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It is the founders' hope that INCON will provide a nongovernmental means by which prospective clients of management consultants can identify individuals of demonstrated qualifications. There are, ACME notes, some 2,700 management consulting firms in North America and several thousand individual practitioners. Most of these do not belong to any professional group. Individual consultants vary widely in background and ability.

At present, an ACME report points out, "anyone is free to call himself a 'management consultant' and to seek and serve clients, and there is no publicly acceptable means by which interested parties can identify qualified practitioners in the field."

In the absence of governmental licensing (which the consultants are not seeking), INCON's certification program will be more comparable to the voluntary certification systems of the Public Relations Society of America and the Institute of Chartered Life Underwriters than to the certification granted by the American Bar Association, American Medical Association, or AICPA. Its proponents hope, however, that eventually the INCON certificate will become well enough known to give its holders a competitive edge over presumably less well trained and less ethical consultants.

The Canadian consultants, who participated in INCON's early planning, now have the jump on it.

The Institute of Management Consultants of Ontario has announced it will require written examinations as a condition of admission; the first examinations were scheduled for mid-December of 1968. A candidate for the examination must have a university degree or be a chartered accountant and must have had three years' recent experience as a practicing management consultant.

Officers of the Ontario group are Peter J. Taylor, Price, Waterhouse Associates, president; Dr. J. Kates, Kates, Peat, Marwick & Co., vice president; D. A. Sloan, Urwick, Currie & Partners, secretary; and K. R. Oswell, P. S. Ross & Partners, treasurer.

• Management Services inaugurated a new cover format with its January-February issue. The covers from now on will employ original art based on one of the magazine's several fields of interest.

The designs are the creations of Herb Kearse, Publications Division staff artist and art director for Management Services.

Management Information Systems Professional Group Organized

A new professional Society for Management Information Systems is being formed by a nine-member founding committee headed by Robert V. Head, author and consultant, and M. H. Schwartz, assistant controller, Atomic Energy Commission.

Areas of interest for the new organization are theory, applications, methodology, and techniques of management information systems. Prospective members include management systems directors, top executives served by MIS, educators in graduate schools of business, MIS resource people, and members of the general public with an interest in such systems.

Industrial Accountant Is Hero of British Television Series

While detectives, criminal lawyers, and Western heroes continue to dominate American fictional television series, the British Broadcasting System has found a leading character who inhabits a quieter, if considerably more realistic, setting.

"Hardy Heating Co. Ltd," the new program, is telecast at 11:30 on Sunday morning, a prime viewing hour in Britain. The story line deals with the career and crises of a chartered accountant who joins the Hardy Heating Co. as chief accountant. The villain of the piece —or at least the character who supplies conflict—is a works director who sees no need for an accountant in the company.

Comments link episodes

A linking commentary for each episode explains the major points made in that program's story. In addition, the BBC has produced a handbook containing explanatory texts and cases bearing on the subjects dealt with in each of the series episodes. The handbook is also designed to tie in with the commentary accompanying each program. One reassuring note for those who might feel a series built around the corporate adventures of an accountant represents too great an overreaction against too much TV violence. The actor who plays the main character, John March, is best known to British audiences for his work in two TV programs known, respectively, as *The Avengers* and *Danger Man.*

Total Systems Revision Repays Better Than Speeding Operations

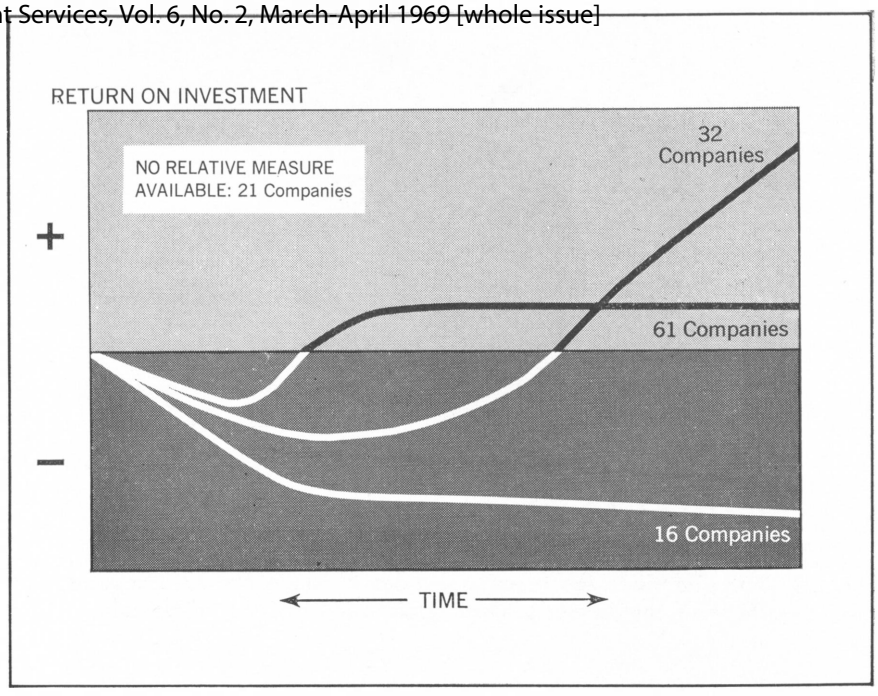
Companies that focus their computer efforts on improving their basic information systems rather than on speeding up the flow of the information they already get are most likely to show a profit on their computer investment.

That is one conclusion drawn by Lou R. Hague, a principal in the CPA firm of S. D. Leidesdorf & Co., from a Leidesdorf survey of 130 companies that use computers in their businesses.

The companies studied represented a variety of industry classifications and varied greatly in size; most had annual gross sales volumes of less than $100 million. Their experience with computers ranged from one to twelve years; the largest group had between seven and nine years' experience.

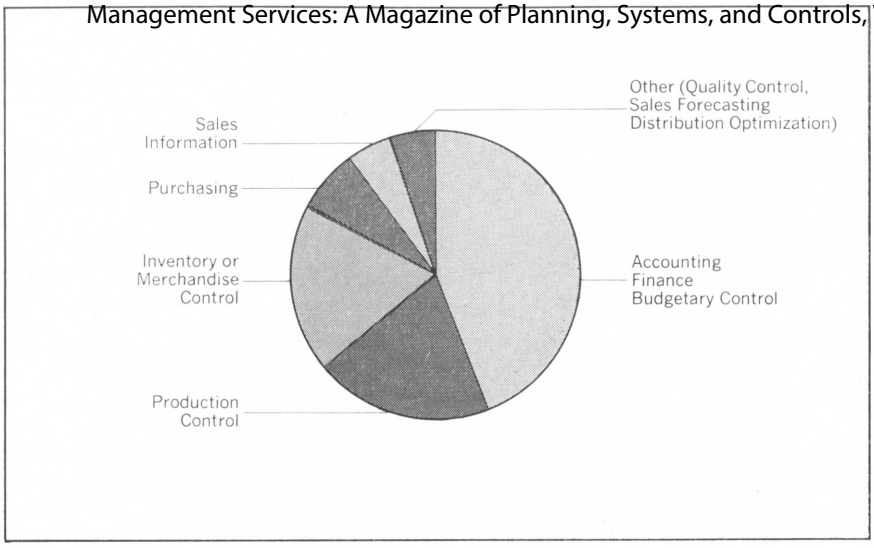
Of the 109 companies that had measured the profitability of their computer installations, all started off with their equipment running at a loss. In 16 companies the computers continued to be unprofitable; indeed, they have become steadily less profitable over time as poor systems continue to be applied to an increased volume of activity.

Sixty-one companies succeeded in reversing the initial profitability trend by changing equipment and expanding operations, thus improving the efficiency of their data processing operations. Because their changes were only in equipment, not in the management information system itself, the profitability curve of their installations soon leveled off. Their systems continue to operate at a small profit.



The Leidesdorf study found these patterns of computer profitability from the time of installation to the present in those companies that measured it.

In 32 companies, changes were made in the basic systems rather than merely in the equipment. This took longer than equipment



This pie chart identifies the functional areas in which the 32 companies with good results from their management information systems made gains.

improvement, and the computer installations in these companies took longer to become profitable than those of the 61 with level profitability curves. Once the profitability curve started upward, however, it rose sharply and is still rising.

Poor planning blamed

Mr. Hague attributes the relative lack of computer success of the 98 companies with unprofitable or low-profit installations to planning deficiencies and the absence or incompetence of functional and/or executive participation in the project. He attributes the success of the other 32 to strong management, planning, and control. This is typical of their approach to business in general, he notes; their after-tax profits on sales over a five-year period were nearly 6 per cent higher than the profits on sales of the other 98 companies.

Successful management of a computerized management information system, Mr. Hague concludes, requires an eight-step procedure: Determine the company's objectives; pinpoint the objectives of the information system; set up a plan; assign responsibility; carry out the plan; evaluate the results; respond to the results; and monitor changes carefully.

Some of the study's other findings:

The most profitable areas of computer application in the companies surveyed are: accounting and finance, production control, and inventory and merchandise control. This is not only because these are areas of high-volume data production and use, according to Mr. Hague; it is also because they are the areas most sensitive to improving control by improving information.

There is a trend toward removal of the computer function from the control of the financial organization. In 1960, 76 per cent of computer executives in the companies surveyed reported to finance; in 1968, 52 per cent. Executive management now supervises the function in 30 per cent of the companies, and in 18 per cent it reports to other areas.

Rental costs declining

Rental or depreciation of computers and peripheral equipment makes up a declining proportion of the total cost of operating an EDP system, from 55 per cent in 1960 to 41 per cent in 1968. This is the result of two factors: the declining costs of hardware on a per-computation basis and the continuing costs of software.

Communications expense (for communications tied into the computer either directly or for batching) amounted to only 1 per cent of the total computer expense in 1960. By 1968, it had grown to 13 per cent of the total.

D&B Computer Data Files Now Available To Subscribers

Dun & Bradstreet's files of basic information on more than three million commercial business establishments in the United States and Canada are now in a computer data bank—the basis of a new marketing service being offered by D&B.

The data bank, known as Dun's Market Identifiers, contains current market, sales, advertising, and research data gathered by D&B's 1,800 business reporters and thousands of correspondents in the course of their business reporting operations. The information, continually updated and quickly retrievable, can be used by subscribers to find new sales prospects, define markets, determine market potential, measure market penetration, and maintain current mailing lists.

For an initial fee of $165 per 1,000 market profiles, subscribers can select establishments by line of business, location, and/or size and obtain such facts about them as nature of business and standard industrial classification, number of employees, sales volume, credit rating, year of founding, and address and zip code. Establishments included in the data bank are manufacturers, wholesalers, retailers, and most business service organizations.

In addition to its marketing applications, D&B points out, the service can be helpful to banks and other financial firms and to research and consulting organizations.

Management by Objectives, First Visualized as Rating Method, Proves Valuable as Approach to Management, NICB Report Says

Management by objectives, originally proposed as a method of appraising management performance, has become in some companies an approach to the total job of managing the firm. The result, the National Industrial Conference Board says, has been better performance by both companies and individuals.

(The full report, published by the NICB, has been released to all Conference Board associates. Non-associates may order *Managing by —and with—Objectives* from the NICB, 845 Third Avenue, New York, New York 10022. Cost for non-associates is $17.50.)

This result, however, has not been easy to achieve. The basic idea behind management by objectives—the better you know what you are trying to do the more likely you are to succeed in doing it—is simple. Yet its application in management presents many practical difficulties. It takes most managers about two years of hard work, NICB says, before they really master the technique.

How plan works

In essence, management by objectives works this way: Managers at various levels of a company, in conjunction with their superiors, set specific goals for themselves. They then measure their performance in relation to these goals.

Many companies are using this technique for performance appraisal, manpower planning, or compensation administration. As an overall approach to the total job of management, however, it is relatively new. NICB says it had to wait six years for enough companies to accumulate enough experience to make a full-scale study worthwhile. Its study, which concentrated on companies with the "global" approach, is based on extensive interviews in seventeen companies and intensive case-study analyses of five.

The chief benefits of management by objectives, the study found, are more precise, more useful planning and tighter control. The tightening of control is combined, somewhat paradoxically, with greater freedom of action for most managers. That is because the control tends to be self-control by each manager rather than au-

thority imposed by his superior. The companies studied also reported improved relations between superiors and subordinates and between managers on the same level whose objectives must interlock.

In achieving these results the companies reported two major difficulties:

The objectives were not easy to decide on. It was particularly difficult to make sure that the goals set for all managers were compatible.

Valid measures for determining whether objectives were actually achieved were hard to find.

There were disadvantages as well as benefits: Some managers concentrated exclusively on achieving the specified goals, neglecting other responsibilities that had not been spelled out in the form of objectives. And, in many companies, to give managers the freedom they needed to set and reach their own goals required major organizational and administrative changes.

Even so, the companies surveyed agreed, the benefits far outweighed the difficulties.

Four Manufacturers Expand Activities In Time Sharing

Time sharing continues to boom as more and more suppliers of information processing services offer new services or expand old ones.

Honeywell, Inc., will offer time sharing service along with batch data processing and contract software (including systems analysis and customized or proprietary software packages) in regional computing centers to be established throughout the nation. Other types of service, such as remote batch processing and specialized systems, are being considered.

The January opening of Honeywell's first service center, at Minneapolis corporate headquarters, marked the company's entry into the field of "retailing" data processing services, a field already occupied by most of the other major computer manufacturers along with a host of independents.

Six other Honeywell time-sharing centers are scheduled to be opened this year in Chicago, Boston, New York, Cleveland, Los Angeles, and San Francisco. Over the next 18 months service centers will be organized in each of the nine cities besides Minneapolis where Honeywell now operates customer education and computing centers. An eleventh center will be established in Atlanta next year.

Honeywell's time sharing service, tailored to the remote problem-solving needs of scientists, engineers, and the like, will employ the new Honeywell 1648 time-sharing equipment announced in January by the company's computer control division.

Six cities in CDC net

Control Data Corporation also has established a national computer network to provide remote-access data processing to all major metropolitan areas.

The system, known as CYBERNET, consists of large-scale Control Data 6600 computers in strategic cities and medium-scale Control Data 330 computers and terminals in lesser cities. All are linked by high-speed telephone lines so that problems too big for the smaller units can be transferred to the larger ones.

Six cities have 6600 systems: New York, Boston, Washington, Minneapolis, Houston, and Los Angeles; one will be added soon in Palo Alto, Calif. Eighteen other cities have CDC data centers.

UNIVAC service expands

UNIVAC's Information Services Division has announced a new remote batch processing service by which customers can use large-scale UNIVAC 1108 systems from their own offices.

With this service, called RPS (Remote Processing Service), the customer leases a terminal tied in to a computer in a UNIVAC computer center. Each terminal, consisting of input-output equipment interfaced to the central computer, can communicate with any point in the UNIVAC national network of service centers. Terminals of varying speed and capacity are available.

New GE service

Another new service being offered by General Electric Company makes time on large-scale GE-600 computer systems available to businesses on a service bureau basis.

These systems can execute all three modes of data processing—local batch, remote batch, and time sharing—concurrently and against a common base. This means a user can handle all his data processing with a single system, a capability that cannot be obtained from any other system on the market, according to the General Electric announcement.

Local batch processing may be done at the GE-600 site; remote batch processing, on the user's site by means of GE-115 terminals or teletypewriters; and time sharing, at any site by means of teletypewriter terminals.

Available first in East

Initially the service, called RESOURCE, will be available only in the Washington, D.C.-Philadelphia area; customers outside this area may have it if they pay communications charges. Other RESOURCE computer centers in other metropolitan areas will follow.

RESOURCE will be offered under a new pricing structure which also is being applied to GE's regular time sharing services. Customers will be charged according to their use of "resource units" (processor time, file access time, memory, priority factors, and application factors), with quantity discounts.

Simulation Systems Used By Litton to Encourage Foreign Investment In Greek Industries

With the aid of an elaborate group of computer programs for simulation of an enterprise, Litton Industries is trying to induce foreign investors to establish businesses in two underdeveloped areas of Greece.

Under a contract with the Greek government signed in May, 1967, Litton undertook to bring at least $60 million of outside investment into Crete and the western Peloponnesus within two years. In order to do so, Litton has been making economic studies and suggesting development projects.

To ensure that these projects will turn out to be economically viable enterprises, the Litton unit doing the development planning, Litton-Greece, designed LEO (for Litton Enterprise Optimiser). LEO is a simulation system used to project the operating and financial results of proposed projects and evaluate their costs and benefits to both the investor and the Greek government.

Complete analyses furnished

For the investor, LEO produces operational analyses, including profit and loss statements, fixed and variable cost analyses, and breakeven analyses; such financial analyses as debt service schedules, dividend and depreciation calculations, annual tax returns, cash flow sheets, and pro forma balance sheets; and analyses of such key operating ratios as return on investment, return on gross assets, internal rate of return, and debt service coverage.

For the government, LEO calculates the proposed project's benefits to the economy, including value added, foreign exchange earnings, government receipts, and contribution to gross national product. It also sums up the costs that the government may have to bear, such as the costs of developing an infrastructure, temporary losses in tax revenues, losses in foreign exchange through a variety of leakages, risks taken in guaranteeing loans, and direct government contributions to the project.

Costs, benefits discounted

Costs and benefits to the government and/or the economy are presented on a discounted present value basis. These values serve as a guide to the government in deciding whether to grant any special incentives that may be sought by the investor. Such decisions may have a significant effect on the mode of financing the project, which in turn will demand a reevaluation of the project's benefits on the part of the investor.

Many of the calculations performed by LEO are straightforward computations that could be done—although more slowly—by hand. But the use of the simulation technique and of a computer (a Control Data Corporation 330) makes it possible to test a variety of management policies and compare their results.

For example, policies that can be varied include dividend payouts vs. retention of earnings for expansion or reinvestment, repatriation policies for profits and capital, depreciation and replacement policies, alternative methods of financing, and pricing policies. The results of each policy alternative can then be measured in terms of return on investment, profitability, or any other criterion the investor wants to use.

Even some of the more routine calculations are relatively complex because of Greece's investment laws and practices, which are confusing to most investors. For example:

- Depreciation laws in Greece do not require the use of a consistent formula. A given piece of equipment may be depreciated for tax purposes by 3 per cent, 17 per cent, 2 per cent, 23 per cent, 0 per cent, and 12 per cent in successive years. The usual procedure is to take as much or as little depreciation as is needed to minimize taxes in the current year.
- There is no double taxation; dividends are deductible from income before taxes. (Since a company's dividend and depreciation policies are interdependent, optimum decisions require simultaneous analysis of these variables.)
- Investment incentives are applied differently in various regions and among various industries. Even social security taxes vary in these ways.
- Repatriation of profits and capital presents distinct decision requirements for a company management. Often policies must be analyzed in detail even before the investment application is made to take maximum advantage of available incentives.

Variety of projects

So far LEO has been used in the evaluation of a number of projects, including several hotels, a cattle feed lot, a can manufacturing facility, a canning plant, a sulphuric acid and cement plant, and two versions of a diversified development corporation.

In Rating Stocks, Security Analysts Look First At Caliber of Management, According to Survey

"Caliber of management" is the prime factor in determining security analysts' evaluation of a company's stock, according to a majority of 116 security analysts from brokerage houses in New York, Chicago, Los Angeles, and Boston.

The survey was taken by The Whitehead Group of Companies, a New York management consulting firm.

Among major factors affecting stock growth, as ranked in the security analysts' view:

Top factor

Management caliber was rated among the top three factors by 78 per cent of the analysts.

After management capability, 64 per cent voted for the type of industry as a vitally important factor.

The third key factor, according to 50 per cent of those surveyed, was the company's earning history.

Forty per cent of those responding thought new products introduction was the next most important criterion of stock value.

Only 23 per cent considered price earnings ratio to be among the top three critical determinants. Forty-seven per cent ranked it in fourth, fifth, or sixth place after other factors.

Sixty-six per cent rated recent mergers or acquisitions as fourth in importance or lower in determining stock value.

A full 78 per cent found company net worth the least important factor in stock growth contribution. The explanation: This balance sheet evaluation comes into play only when a company is liquidated.

Two-thirds of the analysts surveyed said they personally interview executives in companies they research. They generally try to reach the financial vice president and if they cannot get in touch with him attempt to see the chief executive officer. Others, in descending order of importance in the analysts' view, are operations vice president, marketing vice president, research and development executive, and, finally, vice president in charge of public relations.

Fourth Federal Branch Suggested to Deal With Socio-Economic Problems

Creation of a fourth branch of the Federal Government to serve as a "national information generator" on technological and socio-economic problems has been recommended by one of former President Johnson's science advisors.

The suggestion was made in an address to the American Society of Mechanical Engineers by Dr. Nicholas E. Golovin, who was technical advisor for aviation and space technology in the Office of Science and Technology, Executive Office of the President, and is currently working, under a Ford Foundation grant, on an organizational and functional model of his proposed fourth branch of government.

This new organization, perhaps to be called the "evaluation branch," would be concerned with "the longer-range, inter-branch, inter-agency, interdisciplinary issues which the existing organizational structure finds difficult to face, to understand, and to resolve." It would collect, interpret, and analyze information; define potential problems and needs; develop pertinent alternative action plans; evaluate results of established programs; and keep the government, business community, and public informed.

Provide planning guidance

As envisioned by Dr. Golovin this new mechanism would provide guidance for national, regional, and local planning and evaluation from a position outside the existing governmental structure. It would be relatively powerless itself; its basic role would be that of "a catalyst in helping to solve many of our complex national problems." It would, however, be "the natural locus for a national economic and technical data bank, for data processing, and for information dissemination."

Kimball Systems Offers Retail On-Line Processing Program

A system for on-line processing of retail sales data direct from the point of sale has been introduced by Kimball Systems Division of Litton Industries.

The system, known as SPAN, combines punched sales tickets with data transmission equipment to provide instantaneous remote computer processing of sales statistics.

A number of stores are now using sales tags prepunched with product-descriptive codes for computer data processing. Typically, if the computer is not on the premises, the tags are bundled and mailed to its location.

Using Kimball Systems' new SPAN system, a shoe store manager transmits a day's sales statistics to a remote data processing center over telephone lines. The telephone handset is inserted in the cradle of the transmitter.

Delays, mistakes eliminated

The SPAN system is designed to eliminate tag handling, mailing delays, and data inaccuracies resulting from loss of tags. Data captured directly from the punched tags, combined with variable information entered by keyboard, are recorded on magnetic tape for instantaneous or subsequent transmission, via ordinary telephone lines, to a distant computer. Kimball's data collection terminal device is interfaced with communication equipment manufactured by Digitronics Corporation.

All the elements of the system—punched tags, a punched tag reader, a keyboard for entering variable data, a magnetic tape recorder, an acoustic transmitter, and a computer-compatible converter-receiver—are now available individually. This is the first time, however, according to Litton, that they have been combined into a single system.

SPAN is primarily designed for use by multi-unit chains with a central computer or by retailers that process data at service bureaus. It would also be suitable, Litton suggests, for such industrial applications as production control and control of work-in-process and finished-goods inventory. Terminal devices could be installed at production points for direct data entry.

Since last June the system has been in operation on a test basis in six J. C. Penney stores and six shoe stores operated by the Meldisco Division of Melville Shoe Corporation. It is being offered for midsummer delivery to other customers.

Flexible Sound-Slide System Introduced By 3M Company

A projection system for sound-slide presentations that can be revised without resynchronizing a sound track has been developed by 3M Company.

Instead of a synchronized tape, the system records sound on a detachable magnetic track around each slide holder. Thus, any portion of a sales, management, or training presentation can be revised individually.

The picture can be changed by inserting a new slide; the sound can be changed by erasing the message on a single sound track and recording a new message or by substituting another detachable sound track; and both picture and sound can be changed by removing, adding, or replacing a slide holder.

A standard television set has been adapted to serve as a computer graphic display terminal in this experimental system designed by IBM for RAND.

New Video Display System Employs Ordinary Television Sets as Data Receivers

An experimental computer-based "image distribution system" that could some day make the television set as useful in the office as the telephone has been developed by IBM for The RAND Corporation.

Images can be altered

As with other video display systems, the user can call up pictures, graphs, or text stored in the computer and can change them or superimpose on them by means of a keyboard or a light pen. The gimmick is the use of standard 21-inch television sets as computer terminals.

Defense-supported

Turning out the programing for the tv screen are an IBM 360/40 computer, an IBM 1800 data acquisition and control system, a scan converter to convert digital data into television signals, and a video-buffer disk. The system can feed 32 remote tv sets simultaneously; RAND has three now and plans to add 29 more next year. The entire project is supported by the Department of Defense.

National Listing of Lawyers Available

A nationwide directory of more than 300,000 lawyers, recorded initially by the nonprofit Practicing Law Institute, has been fully computerized.

From now on, under a new contract between the institute and Fisher-Stevens, Inc., a computerized direct mail service organization, the latter will be the only authorized source for the P. L. I. list, maintaining and updating it.

Lists of attorneys may be retrieved by field of specialty (patents, antitrust, corporate, estate planning, international, labor, matrimony, real estate, taxation); by year of admission to the bar; by employment category (law firm, corporation, or individual practitioner); by state; by size of law firm; by sales volume of corporation; by number of employees; and by various other criteria.

Western Union Will Take Over TWX from The Bell System

The nation's two major telegraph exchange services, Western Union's Telex and the Bell System's TWX, are finally about to be combined. The two companies have worked out an agreement for WU to buy TWX (Teletypewriter Exchange) for about $80 million.

Subscribers to each of the services can exchange typewritten messages and data with other subscribers of that service. TWX, established in 1931, has about 40,000 teletypewriter machines in customer service, with annual revenues of approximately $72 million. Telex, introduced in 1958, has more than 26,000 subscribers and annual revenues of about $41 million.

Unified service

The purchase, said Western Union Chairman Russell W. McFall, "will make it possible for the nation to enjoy the benefits of a unified record message service, just as it has long had a unified voice service. Western Union is engaged in building an integrated record communication system to serve all types of customers . . . The acquisition . . . will . . . broaden the base for providing the nation with new shared-use, computer-controlled record communication services."

History of negotiations

Western Union has negotiated with AT&T for TWX off and on since 1943. The acquisition was recommended by the telephone and telegraph committees of the Federal Communications Commission in 1966 to create an "integrated record message service."

Teletypewriter machines used by Bell System customers of dataphone service are not included in the sale, nor are teletypewriter machines used by Bell to provide private line teletypewriter services.

Korvette Discount Chain Installs Electronic Credit Checking Plan

Sales clerks in stores of the E. J. Korvette, Inc., chain now can verify a charge customer's credit in 25 seconds with the help of a "talking computer."

The new electronic credit verification system is operated by NAC Credit Corporation, which is, like Korvette, a subsidiary of Spartans Industries, Inc. It combines an IBM System/360 Model 40 computer with an IBM Audio Response Unit, IBM 2260 CRT television-like display units, and Dictaphone units.

When a customer presents a credit card, the cashier dials the computer center in Baltimore on a touch-tone telephone, punching in the sales data and account number. The computer automatically compares stored account data with the credit request; if criteria are satisfactory it authorizes credit by voice, using a 48-word prerecorded vocabulary. If the credit request is questionable, it is passed on to the authorization department, where human clerks, viewing the credit data automatically displayed on the display units, make the decision.

First use in chains

This is the first application of the IBM electronic verification system to the chain store field, linking a multiple-city network of stores, according to Spartans. More than half the 45 Korvette stores have it.

The advantages for the store are better control of credit and faster service to customers; the new system makes credit purchases nearly as fast as cash purchases.

From this system, says NAC, it is "a small step, technologically speaking" to a system capable of letting customers make purchases from their own homes by phone, with the computer automatically care of billing. However, NAC "does not plan to undertake this step in the immediate future."

Remote Terminal Unit Designed for Accountants Introduced by Wang

Wang Laboratories, Inc., a small New England computer manufacturer, has announced that it will introduce this month a remote-terminal data processing system that was designed especially for accountants.

Special keyboard

Under its projected FAST (Financial Accounting Services and Terminal) System, accounting details are entered on a specially designed keyboard at the Wang input terminal in the accountant's office. There are separate keys for debits, credits, account numbers, I.D. numbers, categories, etc. Each keystroke at the terminal is recorded on a magnetic tape cartridge and also is registered on a tape to provide a complete audit trail.

At the close of each business day, the FAST terminal is connected to a telephone. During the night a computer at Wang headquarters calls the phone, identifies itself, and commands the transmission of all data stored during the day. At the central computer, all data are updated, reports are printed in the form desired by the individual accountant, desired ratios for analysis are computed, and shipping labels and charges are prepared. The morning after the initial recording of the data, duplicate statements, with supporting documents, are returned to the accountant by mail.

Further information can be supplied by Stuart Roberts, Wang Laboratories, Inc., 836 North Street, Tewksbury, Massachusetts 01876.

Programed Management Courses Offered by Educational Group

A group of 45 programed courses, developed by faculty members of the Harvard Business School and M.I.T., are being introduced by Education for Management, Inc., Boston.

So far, ten of the courses, in the disciplines "Marketing and the Computer" and "Marketing Management," are available. The other thirty-five, divided into seven disciplines, will be offered through the remainder of this year.

Education for Management, the sponsor, is a subsidiary of the Robert A. Farmer group of companies, management training specialists, whose clients include the AICPA, the American Institute of Banking, and the American Management Association.

Each of the course packages has been designed for use by all levels of management. This can be done through the selection of case material for each course appropriate to the management level being taught. Basic conceptual material for each course is the same for all levels.

Cases used in the courses are selected from the Intercollegiate Case Clearinghouse at the Harvard Business School.

A final case problem will be used for the examination in each course. Participants will propose a written solution to the problem, which will be evaluated by the staff.

EFM says the average participant will devote approximately 12 hours to each course, plus an estimated three hours to prepare his written analysis of the examination case.

Courses which will become available later in the year include "Organizational Behavior"; "General Management"; "Production Management"; "Managerial Finance"; "International Business"; "Business Policy"; and "The Control Function."

What's one life to a guy who thinks he's a cat.

You think it's easy for us to talk to a person who treats his life as though he's got eight more to go?

Or to reason with someone who tells you it can't happen to him, he's different?

Or to make any headway with a fellow whose mind is closed tight?

Or to try to convince one of those dare-devil types that his life is precious?

Or to talk a Scrooge into paying someone just to find out he's as healthy as he thinks he is?

Or to tell a guy who thinks he's some kind of superman that his life isn't really charmed?

Believe us, it's no picnic.

We know how deadly cancer can be if it's not caught in time. And we know that thousands more could be helped every year merely by going for a checkup when they thought they were healthy.

There are 1,500,000 people, leading active lives today, who are living proof that many cancers are curable.

We know how important checkups are. But for the life of us, we can't seem to convince enough people.

200,000 were saved last year. Annual checkups can help us save thousands more. What are you waiting for?

Help yourself with a checkup. And others with a check. **American Cancer Society**

THIS SPACE CONTRIBUTED BY THE PUBLISHER AS A PUBLIC SERVICE

Some feel accountants have become too heavily engaged in management services since the War. Not so, says this article. If anything, they have missed many opportunities that were actually their responsibility —

ARE YOU A FULL-TIME CONSULTANT?

by H. G. Trentin
Arthur Andersen & Co.

THERE are some CPAs still who feel somehow uncomfortable and uneasy that their profession has become so heavily involved in management services in the years since the end of World War II, as though such activities were in some way unprofessional and unbecoming.

Ours is a different thesis. Believing as we do that the reasons for such CPA involvement are very real and very compelling, we think that CPAs generally, both in private practice and in industry, have on the average neglected their professional responsibilities and opportunities by becoming too little involved in management services. In the one instance, they have not done the best possible job for their clients; in the other, for their employers.

Let's take the accountant in industry as an example, since his responsibility in the management services area is more clear-cut than is that of the CPA in private practice. The record seems to us to be clear; he has not kept pace with management's needs for services from the financial and accounting sector.

One example (repeated ad infinitum in our experience): The president of a manufacturing com-

pany decides that he needs outside assistance in developing an improved management information system and better cost accounting, to service both his marketing and manufacturing people. He calls in his company accountant one sad day and goes through the list of complaints about the cost accounting system: The standards are not constructed in such a way as to support the objectives of a variable budget or direct costing; generally, both marketing people and manufacturing people complain that what they get is too little, too late, and sometimes wrong.

The company accountant, of course, is aware of some of these deficiencies, even though he's convinced the president's recital is exaggerated. He begins to explain to the president that he agrees that the time has come to modernize the system.

We have found in our experience as consultants that the company image of its own accounting staff is generally quite poor . . . we all too often hear the staff man described as too technical, too conservative, or else as lacking understanding of business and management problems.

Already too late

The trouble is that he's already too late. Before he has an opportunity to launch into an appeal for the opportunity to change the system, he is hearing from the president that the operating committee has decided to engage outside consultants to review the system and suggest changes.

We do not want to suggest this is a bad thing. There are a variety of reasons for calling in outside consultants and most of them are justified. But all too often we are called in to recommend changes which could and should have been made by the company accountants. The company has had to call in outsiders because of the default of its own people.

By not anticipating the needs of management, they have, to a degree, fallen down on their obligation to management.

The consultants called in from the outside could be from a management consulting firm, or the management services division of a CPA firm, which would usually be the firm that audits the accounts of the company. The company man ordinarily finds it easier to accept the non-CPA firm in the outside consultant role, even though it may become deeply involved with his cost accounting system. The deeper wound is felt when he is superseded by CPAs, people with exactly the same training as himself.

Sign of failure

But perhaps the most striking sign of the failure of the company accountant to serve management needs occurs when his president tells him that he intends to make a start on solving the problems by giving project responsibility, not to an outsider, but to some other company professional: an industrial engineer, a systems man, a data processing specialist, or a bright young MBA. Many successful projects are organized in this way, but each one is a clear sign that the company accountant has somehow failed to keep pace with his responsibiilties.

One further observation that bears on this all-too-common failure: We have found in our experience as consultants that the company image of its own accounting staff is generally quite poor. In discussions with management as to whether their accountants could direct a project to cure existing deficiencies, we all too often hear the staff man described as too technical, too conservative, or else as lacking understanding of business and management problems.

H. G. TRENTIN, CPA, is partner in charge of administrative services at Arthur Andersen & Co., New York. Mr. Trentin served on the original board of consulting editors for MANAGEMENT SERVICES. He is a member of the National Association of Accountants and has served on the management services committees of the American Institute of CPAs and the New York State Society of CPAs. In addition, he holds membership in several state CPA societies. Mr. Trentin has written and lectured extensively on management control subjects and is the co-author of two books on management control published by the American Management Association.

Our own experience in qualifying as consultants bears out this image problem. On our consulting staff we have accountants and non-accountants; very often our assignment requires men with a non-accounting background. Sometimes the company officer sponsoring us in a client situation where our non-accountants are to be important members of the systems task forces suggests that we emphasize to the president in establishing our qualifications that, even though we are members of an accounting firm, we are from a different division of our firm, a division where many non-accountants are used.

Unfortunately the neglected accountant very often deserves his minor role in important new developments.

Broader horizons

We firmly believe that management deserves better service than it is getting from *many* management accountants; we underscore *many* since there are notable exceptions. Actually, accountants as a class should advance their own cause by doing a better, broader-gauged job. Some have the educational and skill requirements but need a change in objective and outlook. For these, all that is needed is some example of what is possible and encouragement to "get with it." Other accountants may be obsolescent and may need training.

There are many good opportunities for training which should do the job. Universities, the AICPA and state CPA societies, the National Accountants Association all offer training courses. So do such organizations as the American Management Association, the Systems and Procedures Association, etc. Much, too, can be accomplished by home study of the wealth of literature in the field.

Facing the challenge

It is a tragedy that more accountants do not avail themselves of the excellent training material which would equip them to play a dynamic role in modern developments. To illustrate, we would like to recall an experience during a recent talk to a group of some 70 accountants from industry during which we stressed this educational theme. One of the accountants said he did not understand the statement that many accountants were poorly equipped to cope with the new demands on them and said that he was impressed with the educational program of the NAA. Since this was an NAA audience, we suggested that the problem might lie in the fact that members did not take sufficient advantage of their training opportunities and asked permission of the chairman to poll the meeting. We asked how many had taken at least one NAA course; the show of hands indicated about five. We then asked how many had taken more than one course and one hand was raised.

This individual indicated that he had attended two courses.

Selecting personnel

One opportunity the obsolescent accountant should not overlook is that provided by the large number of bright young men emerging from our colleges today. These men, particularly the MBAs from some of our better schools, have excellent technical skills. They lack only the experience and the business knowledge which could be provided them on an accounting staff. Hiring some of these young men, together with some additional education on the top man's part and a change in attitude, is all that it takes to earn a chance to participate in exciting new activities.

At this point it might be well to ask what has changed to cause some accountants to be as inadequate as implied in our previous comments. The initial role of accountants involved record keeping, the furnishing of historical financial information, and a custodial function which guarded against the loss of assets. Business

Sometimes the company officer sponsoring us . . . suggests to us that we emphasize to the president in establishing our qualifications that, even though we are members of an accounting firm, we are from a different division of our firm, a division where many non-accountants are used.

men were satisfied to have a record of what happened to the resources of the business and what was left and that there was some assurance that the assets and revenues were audited and subject to prudent controls. As businesses became more complex, business managers required more information for the interpretation of results and deciding future courses of action. They were no longer satisfied with explanations of "what happened" but began to ask "Why did it happen?", "What should have happened?", "What can we expect in the future?", and "How can we make it come out differently?" Shortly after World War II certain developments provided the business manager with the means for answering some of his questions.

Inherent advantages

Actually, accountants as a class should have been the natural heirs to a new role within the business because of their preparation for participation in these new developments, which were:

Increased emphasis on quantitative analysis for business decisions;
Greater appreciation of the role of a management information system in business planning and control; and the
Advent of electronic computers.

Now let's take a look at each of these three developments and where the accountant might fit into the picture.

Quantitative analysis

Most of us are familiar with the story of how mathematicians and operation researchers applied mathematical techniques to the solution of military problems in World War II and then carried these techniques over to the solution of business problems in the postwar period. The operations research approach, simply stated, involves a study of costs and revenues likely to result from alternative decisions. The purpose is to develop systems or models to help the business manager with decisions.

An obvious partnership

The industrial accountant obviously deals with the same elements of costs and revenues and is generally asked by the operations researcher to provide the values needed in his formulas. For example, in the development of an inventory management system, the operations researcher will ask the accountant to provide such things as the cost of placing an order, the cost of carrying inventory, and similar values. Actually, the best result is obtained in operations research studies and solutions when the company accountant and the operations researcher work closely together.

The unprogressive accountant who is either unprepared or not equipped to work with the OR man is left out of the picture. The progressive accountant who winds up as a valued member of the management team generally has learned as much as he can about operations research and mathematics, possibly from courses like "Mathematics for Business Management" offered by the NAA Educational Program. This excellent course offers all that any accountant need know to participate effectively in this area. Probably the progressive accountant will have a young operations research man on his staff so that the accountant's general understanding will be supplemented by proficiency in the application of techniques. With such an arrangement there is no reason why he cannot take the initiative in providing better quantitative analysis for management, rather than wait for the president or some one else in the company to feel the need and request assistance from some other sources.

Summary of techniques

So as to make clear what some of the principal techniques are in this area, we have summarized them below with a brief description:

Probability Statistics—The business man has to make frequent decisions regarding borrowing, plant additions, inventory commitments, and other matters of important financial consequence based on forecasts of sales and alternative options. Such forecasts are most reliable when they are developed through the use of probability statistics applied to a sound analysis of past occurrences.

Correlation Analysis—Every accountant is familiar with the difficult problems involved in separating variable elements of cost from those that are fixed and semivariable. In many of these situations the scatter diagram method of reaching a conclusion is inadequate, and there are now available more sophisticated methods such as the "least squares" technique, which is particularly useful when three or more elements are involved.

For example, such an analysis may permit identification of costs that are fixed and independent of both production level and the number of machine set-ups; costs that are variable with production level but not with machine set-ups; and those that are variable depending on the number of machine set-ups but not on the production level.

Linear Programing—Techniques in this class of approach are extremely useful in arriving at the optimum solution to problems where the business man wants to find the least-cost distribution system in a scattered network of plants, warehouses, and customers. In a situation where he has several plants, many warehouses, and customers spread throughout the country who could be served from different plants and warehouses, the right answer is available only through the use of these techniques. Their application has become relatively simple and inexpensive through the development of standard computer programs

which are generally available through computer service bureaus.

Network Diagramming — These techniques have proved to be most valuable in the construction industry but are also useful in many other situations involving interrelationships among many activities needed to complete a project. Again, critical path methods and PERT techniques have become relatively easy and economical to apply because of the availability of computer programs at service bureaus.

Probability statistics

The interested accountant could capture the thrust and possibilities of any of these techniques by working through a few problems or analyses in connection with his study or reading program. To illustrate the applicability of probability statistics in business decision making, we have used on several occasions in the past the following highly simplified example:

Computing saleable output

Consider the problem of a baker who decides how many loaves of bread to produce on a given day of the week, say Friday, on the basis of the number sold on Fridays in the past. An analysis of historical sales may result in the probabilities shown in the following table:

PROBABILITIES OF ACHIEVING VARIOUS LEVELS OF SALES

Probability	Number of Fresh Loaves
1 out of 10	1,500 or more
5 out of 10	1,000 or more
8 out of 10	900 or more
10 out of 10	700 or more

The average number of loaves sold on Fridays was 1,000. The baker also knows that it costs him 32 cents to bake a loaf and that he can sell it for 40 cents as a fresh loaf on the same day but has to reduce the price to 20 cents if it is to be sold as one-day-old bread on the next day. With this information, the baker can now determine what his best course of action would be.

Mathematical analysis would show that he would do best by baking about 975 loaves of bread, even though the first reaction might favor the average of 1,000 loaves. At this level he would have a 60 per cent probability of making the sale of an additional loaf with a profit of 8 cents and a 40 per cent probability of finding himself left with one loaf to be sold the next day at a loss of 12 cents. The "expected value" of the gain ($8¢ \times 60\% = 4.8¢$) would equal the "expected value" of the loss ($12¢ \times 40\% = 4.8¢$).

Information systems

The second major development which has contributed to the new environment in which the accountant must operate is the increasing appeal of management information systems to the business manager. He must make a variety of decisions daily and generally wishes that he had more pertinent and timely information at a reasonable cost. Accordingly, such systems have flourished to help in his planning and control decisions, and any examination of them reveals the very high financial and accounting content.

Typical of the kinds of reports which would be included in a comprehensive system of information would be the following:

- Historical reports for planning
- Financial and operating budgets
  - Long-range
  - Short-range
- Monthly financial and operating statements
- Forecasting and sales order statistics for:
  - Sales quotas;
  - Salesmen's compensation;
  - Purchasing;
  - Manufacturing; and
  - Shipping
- Reports to service various control systems such as:
  - Sales forecasting;
  - Shipping and warehousing;
  - Finished goods replenishment;
  - Production control;
  - Materials management;
  - Manufacturing cost control;
  - Personal skills and manning controls; and
  - Management incentives.

Because of the need to use personnel from the various functional areas of the business and with various technical skills, we like to organize a management information system development effort in a steering committee and subsidiary task force arrangement under which these persons are assigned to the respective task forces or steering committee as required to accomplish the missions. In this process leaders of the steering committee and of the various task forces must be selected. Here is another point at which the accountant faces the moment of truth as to his influence with management. The progressive accountant should be an important member of these teams and leader of some; if he is not selected for these roles, he has rather clear evidence that his service to management in the past has not been particularly inspiring.

One specific example

We would like to be somewhat more specific on how the accountant could serve a very useful function in management information systems projects. The marketing function is generally regarded by many observers as being beyond the scope of service of the average accountant. However, a close examination will reveal that this is a legitimate field of activity for the accountant and that he would be failing to serve management properly if he did not become involved. Let's try to sketch the development of this notion by describing the marketing function in its broad modern context and how the accountant would fit into this kind of a program.

The marketing concept

It is becoming increasingly common to define marketing operations as having substantially wider scope than merely selling products to

consumers. This newer concept begins when the company

1. Interprets the consumers' needs and desires, both qualitatively and quantitatively;
2. Follows through with all the business activities involved in the flow of goods and services from producer to consumer; and
3. Ends with those services necessary to aid the consumer in getting the expected utility from the products he has purchased. Along with this expended scope, the marketing operation has begun to feel the effect of more sophisticated approaches to organization and the uses of quantitative techniques — ideas that have had much wider application in manufacturing. For these reasons the marketing function requires planning and control systems that have been largely neglected by many companies.

Very often the cost of marketing operations exceeds the cost of raw materials and manufacturing. It is also normally true that much less attention is directed to the control and evaluation of marketing operations than is devoted to manufacturing.

Very often the cost of marketing operations exceeds the cost of raw materials and manufacturing. It is also normally true that much less attention is directed to the control and evaluation of marketing operations than is devoted to manufacturing. This situation arises from the fact that manufacturing is often easier to quantify in terms of units, dollars, budgets, and results and from the fact that manufacturing has fewer mysteries for most members of top management.

The accountant's role

Even more important than the dollar expenditures are the decisions that come from the marketing function. The sales forecast is the starting point for every manpower plan, manufacturing schedule, and inventory plan. Pricing policies directly influence cash flow and capital budgeting. Product planning establishes the basis for growth through new or improved products.

The accountant can play a vital role in serving marketing management by providing or helping to provide the necessary data, documents, systems, and procedures (usually called the Marketing Management Information System) to enable management to establish, execute, and evaluate marketing decisions. The accountant generally should not comment on the quality of these decisions. Because both the experience and responsibility of the accountant are directed to activities other than the marketing function, he should examine only the major aspects of the firm's marketing operations. Even with such a top-level review, it is possible for him to identify significant opportunities for improvement.

His specific contribution

An easy guide to the manner in which the accountant can make his contribution is provided by the information requirements necessary for the effective management of the marketing function. The following outline indicates the nature of such requirements:

Sales forecast

Marketing management should prepare a sales forecast for both short- and long-range time periods. The forecast serves as the basis for production planning, manpower planning, and financial forecasting. Forecasts should be reviewed formally. Each forecast should include:

- Sales by product group or brand;
- Sales by territory;
- Comparison to previous forecast or marketing plan;
- Sales by end-use group or customer classification (for planning purposes).

Sales analysis

Marketing management should be provided with reports that detail where, how, and to whom sales are being made, in order to evaluate the performance of salesmen, promotional efforts, and marketing plans. These reports should show:

- Where sales are made, geographically;

Who is buying, by class of trade, channel of distribution, or end-use category;
Effects of special promotions or price policies;
Comparative statistics on salesmen, territories, or channels of distribution.

Marketing costs

The accountant should provide marketing with the following information to permit effective evaluation and control of marketing costs:

Profitability by product group or brand, package size, territory, and salesman;
Fixed and variable selling expenses by product group or brand, detailed by nature, such as commissions, freight, etc.;
Costs by class of trade or channel of distribution;
Customer profitability; and
Hiring and firing costs for sales personnel.

Marketing management should prepare and be responsible for budgets detailing planned fixed and variable selling costs.

Distribution

Marketing management should budget and control distribution costs through a reporting system that includes:

Policies and results on minimum order quantities and returns;
Outbound freight by channel of distribution and geographic area;
Channel margins and inventory levels;
Warehousing and handling costs; and
Inventory positions of distributors, including stocking policies.

Pricing

Pricing policy should be contained in specific documents that include approval schedules for adequate control. The authority to change prices should be clearly defined as to individual and operative range.

Price reporting should facilitate the following kinds of analysis:

Marginal costs and profits at various price levels;
Historical price/volume relationships; and
Effects of intra-company transfer pricing policies.

Customer service

The marketing function should document the quantitative aspects of customer service policies, i.e., to service all or some percentage of customer requests within a given period of time; to include $X per unit for expected service expenditures, etc. A non-quantitative service policy has no use for cost control and evaluation.

Historical records of the cost of service by model or brand should be available to the marketing function, as well as performance reports on customer service segmented by product and class of customer.

Responsibility reports (general)

Lines of responsibility and authority should be followed by definition of task and control documents. Performance reports should be structured to measure individuals as well as functions for which overall responsibility can be defined.

Competitive intelligence

Procedures should be developed for the collection and evaluation of information concerning the activities of present and potential competitors. A spotty system of occasional memoranda does not suffice for this purpose.

Market plan

The company should have a marketing plan spelling out the current situation, assumptions concerning the future, and goals for each area of marketing activity. The lack of a formal marketing plan suggests a missed opportunity to examine and formulate policy for the company as a whole, rather than for individual pieces.

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a group of top executives (hopefully served by the accountant) selected for this purpose, whose responsibility it is to review and revise the plan at specific times during the year.

Setting exact objectives

The plan should set objectives in quantitative terms that provide the basis for decision making by the various functions of the business. These objectives must be susceptible of measurement as a means of control and evaluation. (An "improved image" is a useless objective unless the measurement technique and basepoint are also specified.)

The plan lays the groundwork for all of the information system requirements already outlined.

The electronic computer

The third important development providing an opportunity for closer involvement by the accountant with management has been the advent on the business scene of the electronic computer. Actually, most business computers immediately after World War II were applied to accounting operations like payrolls, billings, inventory records, and similar applications. Today, although they have continued to be used for this purpose, there is somewhat general agreement that they have a higher payout in applications involving quantitative analysis and management information systems such as those we have discussed in this article. The fact that there has been a recent trend to remove the computer from the financial and accounting jurisdiction, where it was first most frequently found, to an area in the business where management feels all functions would be served to greater advantage is another rather pointed indication that the accountant has not kept pace with his opportunities in this area. This trend is not a sporadic thing but is being recommended in certain major industries by esteemed consultants who say that the non-financial computer needs of the business are not adequately recognized by the accountant.

EDP responsibility

To illustrate this trend, a recently released American Management Association research study (#92) entitled *Organizing For Data Processing* opened with the following paragraph:

> "Will a computer-based information system function differently if the responsibility for it rests with the controller rather than with the operations vice president or a vice president of information systems? Based on findings reported in this study, the answer is that it will. The location of the responsibility for EDP activities has a great deal to do with the nature of that responsibility and the effectiveness with which it is carried out."

The study concludes that the function should report directly to top management.

Why not the accountant?

We feel very strongly that there is no reason why the accountant should default in this area for the following reasons: He is a major user of computer services for his own operations. If he has the type of training and outlook suggested in this article, he is in as good a position as anyone, if not better, to provide computer service to all areas of the business and to management. As a matter of fact, the tendency toward the creation of large data banks which will be accessible on a common basis to all interested functions places increasing stress on the validity of data in the computer system. Some recent experiences have indicated to us that the accountant is best qualified to ensure the integrity of information in such data banks regardless of the departmental source of origination. Accordingly, the accountant who feels that he might be losing ground in his own company might take a look at this aspect of computer plans.

Conclusions

In summary, because of the increasing complexity of business and the problems of the economic and political environment he confronts, the business manager needs better service (1) in the area of timely and pertinent information to help in decisions and (2) in the development of systems which will provide such information in an orderly and useful manner. New techniques and equipment have been developed to meet these needs, and the accountant who will make the effort to prepare himself and take an interest in these developments is probably as well qualified as any other member of the company to play an important part in satisfying management requirements. Accordingly, we suggest that accountants as a class should be striving to reclaim their leading roles on the management team by participating in or spearheading these important new developments in their companies.

The task force—a working group formed to handle one specific project—is a new and promising approach to management problems. But, new as it is, it demands an original approach to accounting measurement—

TASK FORCE ACCOUNTING FOR TASK FORCE MANAGEMENT

by John P. Fertakis
Washington State University

A new approach to management, the task force, is coming into use in many organizations today. This approach, at least in its present form, probably originated with the Navy. A tailor-made grouping of personnel from different units for accomplishment of a particular task was found to improve communication and coordination among diverse specialties in combat operations. The task force, as the Navy called it, became an important tool of military operations during World War II.

Later, as business firms found themselves confronted with rapid changes in the economy, in population, and in technology, they also sought a systematic, unified approach to problem solving and project management. One result was the formation of "free form" management groups with diverse talents brought together for the solution of specific assigned problems under the command of project managers. This was found to be an efficient method of work accomplishment as well as an excellent training experience for middle-level managers. The construction industry for many years has organized its projects in this way, with groups led by project engineers.

Task force organization has proved effective in situations in which there is a definable mission to be accomplished. It does, how-

This article... identifies the inadequacies of some currently used accounting control tools...

ever, create problems in organizational relationships and particularly in performance measurement, a topic of special interest to accountants.

Special control problems

This article examines some of the control problems presented by task force management. It identifies the inadequacies of some currently used accounting control tools and suggests some ways in which accountants might adapt their work to provide realistic and practical methods for measuring task force effort and accomplishment. Several potentially useful methods already existing in certain areas of accounting are cited, and other management control methods are suggested in broad outline. The article concludes with suggestions as to how accountants can aid management in improving the use of the task force concept.

Task force concept

Wickesberg and Cronin describe the task force approach as a team effort for accomplishment of a specific objective or mission.[1] The task force has an independent organizational status that cuts across the usual functional and departmental lines. Membership of the task force group is fluid. New personnel are assigned to it as needed, and other personnel, upon completion of their particular functions, depart for their permanent functional or departmental posts.[2] The task force management group, however, is relatively permanent for the duration of the task.

Product mission group

Another term applied to the task force is that of a product mission organization.[3] The task assigned is related to a mission in terms of perceiving a need, designing or developing a successful product, producing it efficiently, stimulating demand, providing for distribution, and educating potential users.

Yet a third conceptual scheme is that of a matrix organization.[4] This view of task management is related to organizational structure somewhat as shown in Exhibit 1 on page 29, using a product mission as described above for an example.

In a research orientation, E. Duer Reeves describes the duties of the task force manager as the following: (1) analysis of the business objectives of an area of operations, (2) determination of opportunities for the effective use of technology, (3) proposal of strategies and specific technical projects to support those strategies, and (4) the coordination and execution of those strategies accepted.[5] Johnson, Kast, and Rosenzweig mention five functions along slightly different lines: (1) perception of need, (2) design, (3) production, (4) delivery, and (5) utilization.[6]

Thus the task force concept in business use may be defined in a number of ways. A common outline may be discerned, however, indicating some basic attributes of task force management systems:

(1) a project or mission orientation

(2) lines of authority and communications cutting across organization functional areas

(3) an ability to draw on needed resources and release those not needed

(4) A management carrythrough of project or task responsibility from beginning to end.

(5) Orientation to solution of one-time problems or projects

(6) An unknown but finite life span for the task force.

Organizational configuration

The task force group cannot be meaningfully considered in a committee context or in a line-staff relationship with the rest of the organization. Authority relationships and the relationships of task force members to others tend to be unique with each such group.

Such units range from an informally constituted temporary group to study and resolve a production or marketing problem to the creation of a long-lived corporate division to design, produce, and market one of a family of products. At these extremes, few special accounting, reporting, or evaluation problems are encountered. Members of the informal group remain attached to their departmental units, and their work can be considered as a contribution of their "home" departments to the solution of a problem. This can be viewed as similar to lending a manager for committee service. The corporate division becomes a separate accounting entity, and traditional accounting methods and reports are adequate for the needs of the par-

JOHN P. FERTAKIS, D.B.A., is assistant professor of business administration at Washington State University in Pullman. A graduate of Eastern Washington College, Dr. Fertakis received his master's and doctor's degrees from the University of Washington. He is a member of the American Accounting Association and the American Association of University Professors and is listed in **American Men of Science**. He has written a number of articles on budgeting, systems, planning, and control for professional journals.

...and suggests some ways in which accountants might provide realistic measurements

ent management group. Between these extreme positions, however, certain task-related features require unique organizational and accounting solutions.

In practice, four general types of task force configuration can be usefully considered:

(1) Task force members remain in their usual employment locations under departmental management, but their work on task force assignments takes priority over departmental work. Examples might be draftsmen, purchasing agents, personnel clerks, and so forth.

(2) Task force members remain in their usual work locations but are assigned to the task force manager for work scheduling and other administrative purposes. Computer programers and research staff members might be assigned in such a manner.

(3) Task force members are located temporarily away from their usual employment locations and are grouped with other project personnel in an area assigned to the project. Engineers, sales managers, and accounting personnel might be so located.

(4) Task force members are located physically outside the firm but under the authority of the project manager for the duration of their ability to contribute to the mission. Technical advisors to vendors, project engineers, and technical sales representatives might be in this type of relationship to the parent firm and the project manager.

Long-range planning

Yet another concept of the task force arrangement within a firm is presented by Ronald J. Ross,[7] who describes a permanent, task-like structure for the management of continuing long-range planning activities.

Additionally, within the area of responsibility of the task force management group a combination of these organization patterns may be developed. Such combinations are described by Johnson, Kast, and Rosenzweig as follows:

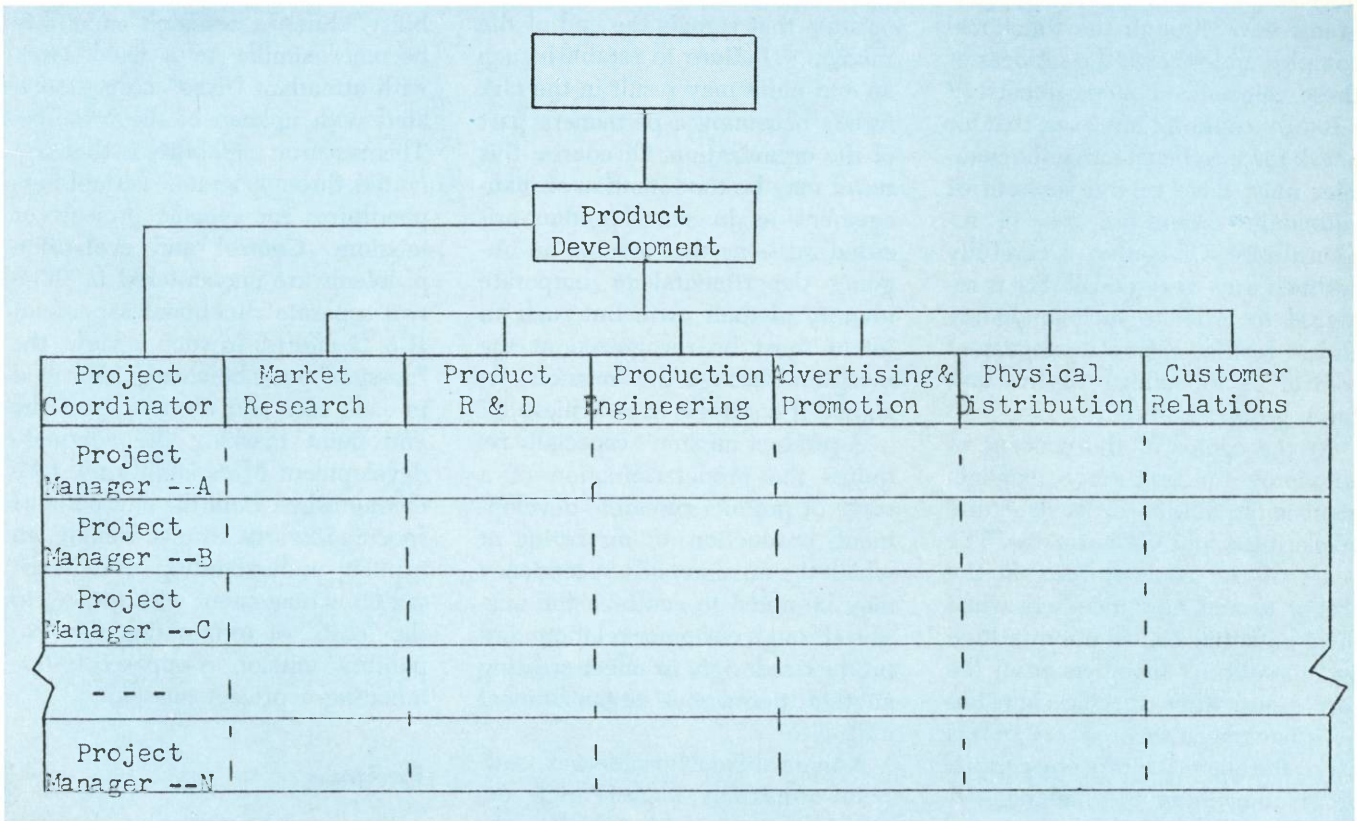
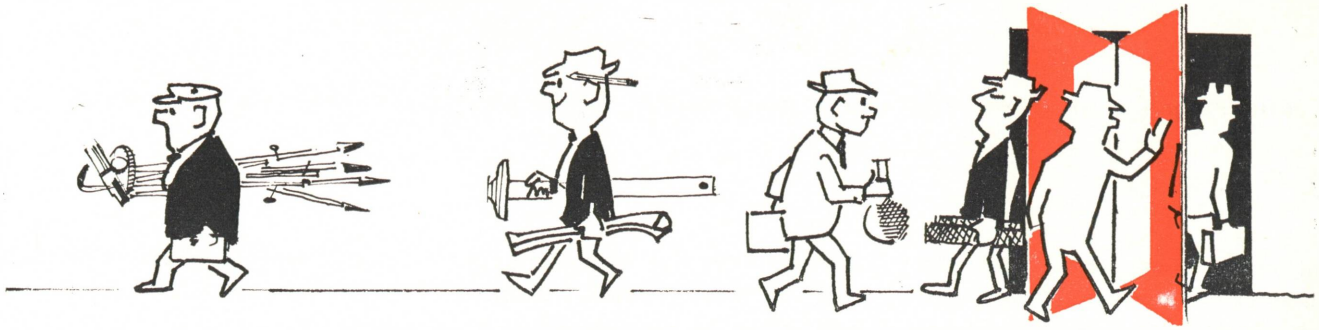


EXHIBIT I

A Matrix Organization



The heart of the task force concept is the ability to add new members when their contribution is needed and subtract members not needed.

"When an organization has a variety of projects, ranging from large to small, it is often desirable to use a mixed organization. For programs of major magnitude a program type management may be established, but the rest of the operations may be carried out by the functional organization. When an organization is dealing with numerous smaller projects, a matrix may be used where there are well-established functional departments which have special skills and capabilities for performance on a variety of programs. Essentially, programs flow through the functional complex and receive the services of these specialized departments. . .[8]

Reeves cautions, however, that for a task force to be effective the manager must have a large amount of autonomy within his area of responsibility. Of course, a carefully outlined area of responsibility is required to promote such autonomy and to further ensure management control of the efforts of the task force group.[9]

At the center of the concept of autonomy for task force management is the fluidity of its structure. Wickesberg and Cronin note, "The heart of the concept rests in the ability to add new members when their potential contribution is high and to subtract members from the core group when specific contributions have been secured. . . . In this way, the team approach permits rapid adjustment to changing demands and requirements."[10]

The task force idea is of necessity related to a specific task or goal. Efforts of the group must be managed in such a way as to ensure both efficient operations and effective performance toward goals. The "mission" or task represents the orientation toward the completion of an assigned objective and a clean cut-off at the culmination of the project. Toward this end autonomy and flexibility are considered essential.

Need for end point

Also essential is the need for a clearly assigned end point, an event or state that signals the end of the mission.[11] Failure to establish such an end point may result in the task force's becoming a permanent part of the organization. Of course, this result may be the intention of management—as in some product-oriented missions that assume an ongoing departmental or corporate identity of their own. But such an intent must be recognized at the inception through the "mission" assigned if control is to be achieved.[12]

A product mission[13] especially requires the predetermination of a stage of product research, development, production, or marketing at which the mission ends. A tendency may be noted to continue the mission through customer relations and product redesign, in effect creating another permanent organizational unit.

A more difficult problem of end-point-of-mission identification occurs in technological and research-oriented tasks. A "satisfactory" solution as opposed to a perfect solution is in large part an area of judgment which is impossible until at least one solution is available. Selection of such an end point will require a clear organizational view of the goals to be reached and the parameters within which the solution should fall.

Research objectives

Research tasks have in reality two separate objectives, according to Reeves.[14] Management effort in research is first expended on the creation of a desired "research capability." Such a research capability becomes similar to a fixed asset, with attendant "fixed" costs associated with upkeep of the resource. This research capability is then operated through annual variable expenditures for specific projects or missions. Control and evaluation problems are encountered in these two separate functional aspects of R & D efforts. In such a view, the "mission" must be clearly identified in each case and the nature of the end point marking the adequate development of capability must be distinguished from the end point of specific research results. Finally, an explicit understanding must exist within management with respect to the "costs" of terminating the "capability" mission as opposed to terminating a project mission.

Problems

The need to control task force groups and assure progress toward goals gives rise to several problems

related to measurement. Scott enumerates three organizational problems of task force groups within a "traditionally" constituted organization framework. First, the principle of unity of command is violated. Each man has an administrative head and a task force manager, too. Second, the scalar principle is inapplicable because the task force does not lend itself to hierarchical concepts.[16] Third, no meaningful line-staff or committee-like[17] relationship exists between the task force group and the rest of the organization. The task force tends to be functionally managed along the lines suggested by Frederick Taylor in his principles of scientific management.

Scott goes on to say that the task force orientation of certain groups accentuates accommodation activities less common in the conventional organization structure. "The scalar indeterminacy which exists between project managers and department managers gives rise to a transactional climate where bargaining and compromise are common in resolving conflicts over the allocation of personnel and performance appraisal."[18]

Other problems

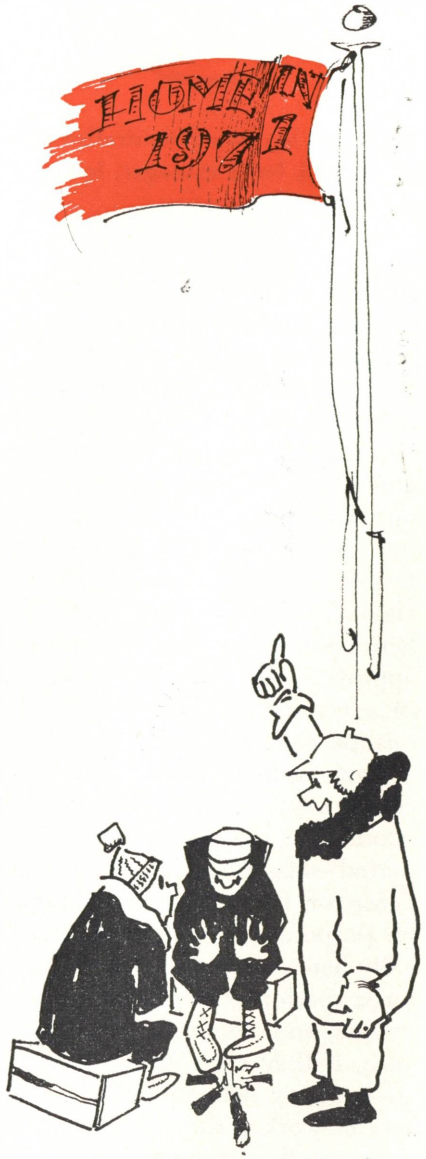
From an accounting standpoint, other issues arise in the area of control through traditional reporting methods. First, periodicity is not a valid rule for providing information to managers when the project or task life might be in terms of days, months, or years. Second, expense classification systems based upon natural or departmental lines require some modifications when functional authority may be divided. Third, the revenue-recognition aspect of a project that may end when marketability is assured causes some matching problems. A good case could be made in such circumstances for capitalizing project costs—if the eventual marketability of project results could be assured. The cost structure of a task force project is not amenable to the setting of cost performance standards and measuring degrees of task accomplishment for control purposes. Other problems of cost allocation, classification, and reporting permeate the function of supplying information for a task-oriented management group. The need for and relevance of nonfinancial criteria for task evaluation can potentially divide the information-gathering function. Multiple information sources often make control and evaluation processes cumbersome.

New evaluation and reporting concepts are needed in accounting for task force management. The medium of accounting reports appears to offer the greatest potential for facilitating a coherent control process. A part of the design of the task force group should be a determination of the information needs of its management and of the parent group. These data must be adequate "in terms of relevancy for setting objectives, for shaping alternative strategies, for making decisions, and for measuring results against planned goals."[19]

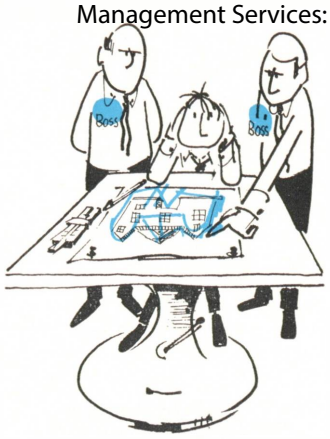
'Traditional' accounting

Some of the methods used in accounting for functional areas of business performance at first appear suitable to the purpose of accounting for a task force type of management unit. Only a brief excursion into some of these areas of accounting is possible here, but some shortcomings of these approaches should be presented before an attempt is made to suggest additional methods of accounting measurement and evaluation.

Budgets and appropriations—A primary control tool over task force management has been the review and analysis associated with budget formulation and the measurement and reporting systems associated with budgets. An appropriations budget or "program" budget allows management to periodically review the resources devoted to a task in view of past and/or anticipated performance. Under such a system control is periodic and minimal since a real analysis of technical aspects of task accomplishment is



Failure to establish a clear-cut end point can result in the task force becoming a permanent part of the organization.



Each man has an administrative head and a task force manager, too.

difficult at best for general management. In most cases budgets are routinely approved, and control is left to a tenuous assumption of professionalism of the task force managers. Or, worse yet, the appropriation may be tied to some other operating figure such as sales. Under this concept the mission of the task force group is relegated to the class of a necessary evil. Budgeting here becomes a sort of expenditure-approval type of control and is thus completely unrelated to the mission concept.

Cost centers—Under the cost center method, costs of task force efforts are accumulated and reported—sometimes by budget expense or functional classifications for purposes of comparison. A difficulty here is that the nature of task force performance tends to be unique, and standards of performance, if they exist, tend to be inadequate or not applicable to the specific work of the task force. Cost data are thus relegated to a role of classification rather than control over performance.

Internal control over expenditures—Expenditure control usually operates through specific requests and authorizations. These tend to be procedural and ineffective since the personnel making payments are unfamiliar with task force needs. If authorization for expenditures is vested in a person outside the task force group, the function becomes procedural and custodial in nature since he is even less likely to understand the nature of the items he is approving than an inside source of authorization.

Hierarchy—Attempts to achieve control through formal superior-subordinate relationships may be effective if the task force is considered an organizational unit under a line department. To the extent that the superior understands the mission and the nature of the tasks entailed, some effective control may be possible. This latter condition is not likely to be met, however, and this method then carries all the shortcomings associated with cost centers and expenditure control. Since the task force group may operate across organizational lines of hierarchy in at least some stages of its work, there is little reason to expect a single superior outside the task force group to be an effective control over its activities unless he has an adequate information system for the purpose.

Periodicity—A type of accounting control over the usual organizational component is obtained by a periodic closing of the books. An "accounting" or "audit" of the function often serves to put managers in the position of having to show results or at least a position. In addition to the audit, revenues and expenses are compared, or costs are classified and compared with budgets.

Varying life span

The indeterminate life of a task force group and the lack of real information (cost and performance standards) for the accounting audit function permit no control points such as in the periodic closing of other organizational units' records. Since revenue is seldom a consideration in task force management, such a check point is not usually found. Where revenue or specific savings are a part of the mission, of course, this approach is useful. Furthermore, the entire life of a task force group may occur between the dates of the periodic accounting closing and audit. The task force may complete its mission or be abandoned without such a formal audit of the task force records' having occurred. The post audit is, of course, unable to serve a control or performance review function.

Responsibility reporting—While the responsibility accounting concept appears suitable for task force management control, its shortcomings are obvious when it is remembered that specific cost responsibility is normally procedural and not significant for management evaluation when standards of adequate performance do not exist. Assuming that costs could be related to measures of performance, say, at the laboratory technician, draftsman, or copywriter level, responsibility reporting does have limited usefulness for the task force manager, though not for his organizational superior. Where neither specific standards nor measures of adequacy of performance are available, the responsibility reporting concept simply cannot serve as a control tool.

Natural or functional cost classification—Finally, the gathering of control data along natural or functional lines may be useful if in fact the task force is so organized. However, the usefulness of these data

In most cases budgets are routinely approved. The mission of the task force group is put in the class of a necessary evil. Budgeting here becomes a sort of expenditure-approval type of control and is completely unrelated to the mission concept.

The relationship of various costs to the "mission" of the task force group must be carefully thought out if a proper control system is to be developed.

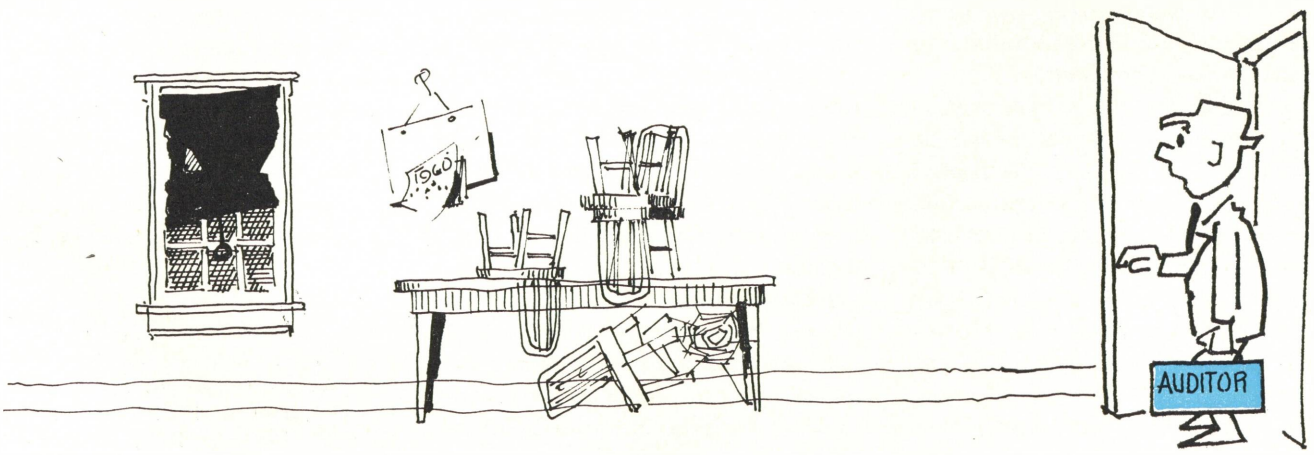
would lie primarily along the previously mentioned dimensions of budget control, expenditure control, or cost center control. Again, however, a cost figure means little in terms of control just because it happens to fall within the budget or appropriation limits. Control still requires a determination of cost as an input compared to work performed or value received as an output. Neither of these measures is obtainable for one-time task force problem solutions except by highly technical personnel within the task force working closely with accountants.

New control measures

New accounting concepts are required for the control of "management by task force." Some measurement and evaluation techniques already being used in other accounting and management areas are amenable to the problems of task force control when used in conjunction with concepts of general management. In addition, new accounting concepts might be developed to promote optimum organizational control of task-force-oriented operations. A few of the possibilities are discussed below.

Account classification and internal check—A *sine qua non* of control for task force management groups is a good system of functional and organizational cost classification. The task force project will probably consist of functional specialties with cooordinators, "in charge" personnel, and/or areas of assigned responsibility. The mechanics for tracing and allocating costs along these lines already exist and simply need to be adapted to the organization of the task force unit or to the elements of the missions assigned. Source documentation and procedures and charts of accounts should be established for the task group. The system must be quite flexible to handle one-of-a-kind transactions often requiring special analysis before being entered. Fixed assets might be "owned" by the task group or "borrowed" from the parent. The assignment of such costs to the project in meaningful ways will require original investigation and thinking on the part of the accounting staff. The relationship of various costs to the "mission" of the task force group must be carefully thought out if a proper control system design is to be developed.[20] Perhaps a general classification system might class costs as task-operational costs and task-allocable costs. With such an underlying system of information gathering and reporting, coupled with internal checks, the basis for more advanced control concepts will have been established.

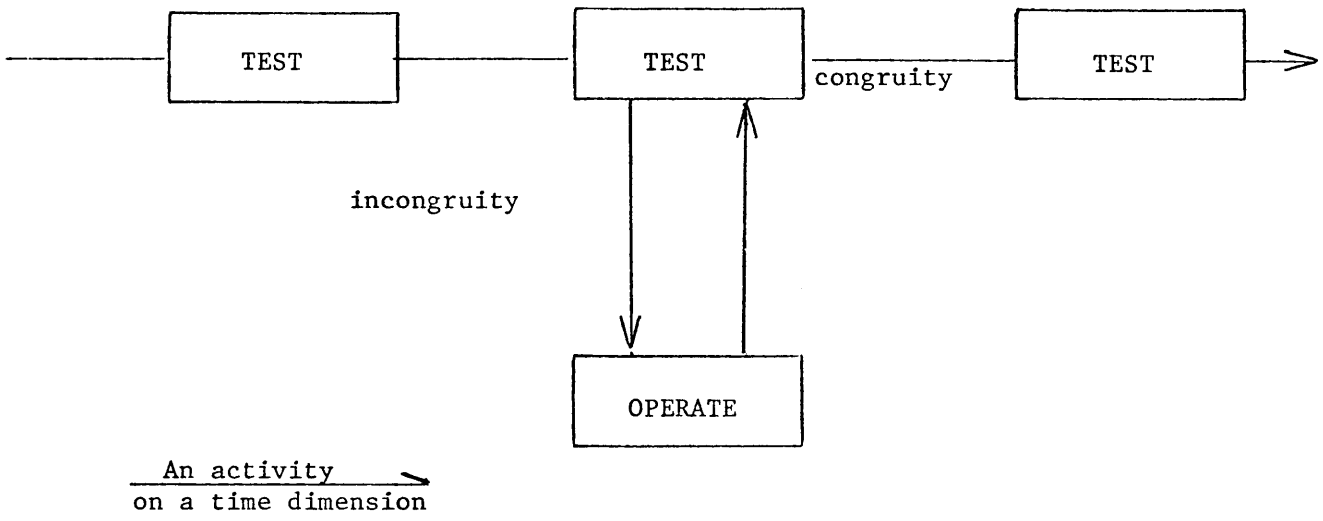
Intermediate objectives—In many task force projects, systems such as the Critical Path Method (CPM) and Program Evaluation and Review Technique (PERT) are already being used for scheduling costs, efforts, and activities. These techniques clearly set forth degrees of accomplishment expected at each step or time period in a manner similar to a budget. Also, an overall measure of status is usually



The entire life of a task force group may occur between the dates of the periodic accounting closing and audit. The task force may complete its mission or be abandoned without a formal audit having occurred.

EXHIBIT 2

The TOTE Unit *



maintained with these techniques showing time ahead of or behind schedule in comparison to planned performance. These methods of project planning usually include both cost and result expectations at stages during the project life. The accounting system can thus arrive at a performance measure in terms of costs expended and the effectiveness of costs already incurred. An adaptation of PERT, PERT/Cost, is particularly suited to such reporting. Management control of task force groups is enhanced to the degree that these techniques are incorporated in project plans. Scott states:

"In summary, the matrix organization must be conceptualized as a total system which is constructed to achieve maximum coordination. Because of its reliance on networks of functions, communication, and decision making, it is particularly adaptable to such advanced planning and control techniques as PERT and CPM. These devices place great stress on coordination and synchronization of activities to achieve the optimum utilization of resources available in that part of the organization defined as the project system."[21]

Operational objectives—In those organizations that assign task forces to operational groups for specific problem solutions, it may be possible also to assign task force costs to the operating group. This procedure would ensure that the task force efforts would be coordinated with the needs of the operating groups. In addition, the operating manager would be better able to ascertain degrees of task force accomplishment, efficiency, and effectiveness. A built-in control exists if the operating manager can request management to terminate the task force group when in his judgment it is finished or unable to show progress toward its mission or if costs and benefits are too tenuous in the profit area of his department.[22]

Random audits—A system of saturation measurement such as that used in bank audits has some potential in task force control. Instead of periodic accounting measurements, a system of random audits by specialists might provide measures of task force progress and efficiency of resource use.[23] A concept developed by Miller, Galanter, and Pribram[24] called the TOTE unit (Test, Operate, Test, Exit) is interesting in its possible application to task force evaluation.

Exception correction

Briefly, an ongoing activity may be considered as in Exhibit 2 on this page. Periodically a test or measurement is obtained and evaluated. Should the result indicate congruity, or satisfactory relationship with policies and objectives, no change is made. If incongruity is found as a result of the measure, management should operate—initiate activity—to correct the unsatisfactory conditions giving rise to the incongruity. Such a procedure is based on an active investiga-

*Adapted from Figure 1, "The TOTE Unit," from *Plans and the Structure of Behavior* by George A. Miller, Eugene Galanter, and Karl H. Pribram. Copyright © 1960 by Holt, Rinehart and Winston, Inc. Adapted and reprinted by permission of Holt, Rinehart and Winston, Inc.

Since periodicity is not an important or relevant aspect of task force management, random audits could be scheduled whenever accounting and other staff was available . . .

tive and goal-seeking management rather than a passive management responding to periodic stimuli such as budget variances. The test procedure might vary from a full financial audit of the activity on the system to an audit of some aspect of individual performance areas.

Management reassurance

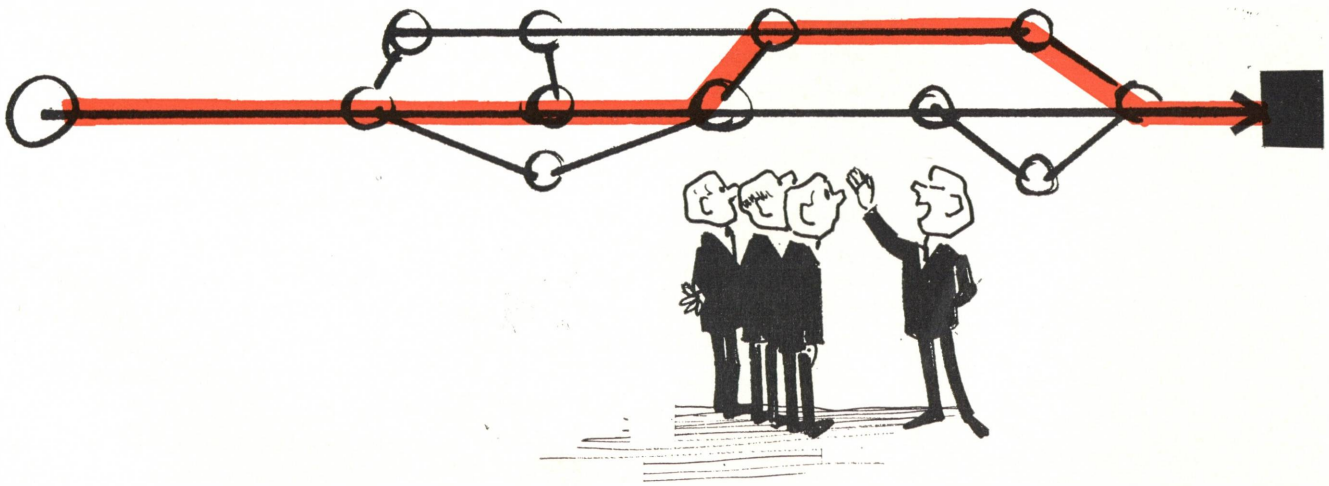
Such a random audit measurement technique would serve to assure management of the task force that its policies were being followed and would communicate to task force members the importance of having short- and long-term goals against which progress could be measured.

Random closings—A random closing of financial records, together with an audit of work performed and/or a management audit, could lead to a random pattern of obtaining balance sheets, income statements, or expense reports and performance reports of task force operations. These periodic measures of attainment should serve to improve the control aspects of systems performance. To make such an evaluation approach feasible, the latest of these reports for each task force group could be incorporated in year-end reports of the firm, thus avoiding the year-end rush on the measurement system. Such timing differences are already being satisfactorily handled by accountants in the preparation of consolidated statements for parents and subsidiaries with differing fiscal-year accounting bases.

Periodicity not important

Since periodicity is not an important or relevant aspect of task force operations, these random audits could be scheduled whenever accounting and other staff was available. This would also smooth out the work of the accounting department and allow more efficient scheduling of work and more effective internal audit performance. "Random" in this case need not be "surprise."

Management audits—Most financial audits deal with cost inputs and revenue outputs of an activity. The result is often considered a measure of efficiency. A management audit, on the other hand, begins with efficiency and goes on to develop criteria related to adequacy of procedures and effectiveness of the unit in meeting mission objectives. There would appear to be a problem in management audits by accountants of the complex and technical programs that are typical of task force assignments. However, the experience of the Government Accounting Office (GAO) and of CPA firms in their management advisory services



Task force managers should be encouraged to incorporate in task force proposals some type of schedule showing intermediate progress points and clear end-point criteria.

(MAS) work have tended to support the use of accountants for these broad-gauged audits of management performance.[25] The foremost requirement of such an audit is an understanding of the "mission" of the task force and of some financial and nonfinancial measures of the congruity of operations to the mission objectives.

Nonfinancial criteria of performance—The detailed budget usually serves as a criterion or standard against which operating department performance can be evaluated. For control purposes it should be a formula budget or a variable or flexible budget. The budget for a task force, however, is usually a "program" budget or fixed budget which cannot of itself measure efficiency except in spending the appropriated amount and no more. Task force budgeting for control purposes might well include more of the underlying data upon which money requests are based. For example, the task force budget might include such things as research time, laboratory time, man-hours of technical and scientific performance, hours of test time, and perhaps the "opportunity costs" associated with diverting resources from other organizational areas.

Task force budgeting for control purposes should begin with actual costs of the specific research hours, design hours, test time, and so forth, as compared with expected or budgeted hours at that point in time, plus planned costs and variations therefrom.

Effectiveness criteria

Task force budgets should then begin with actual costs of the specific research hours, design hours, test time, and so forth, as compared with expected or budgeted hours at that point in time plus planned costs and variations therefrom. Beginning with this base of cost control information, the appraisal function should bring accounting and technical knowledge to bear on the evaluation of managerial effectiveness with respect to the use of such hours and costs toward mission objectives.

Effectiveness criteria could be based on such things as the number of completed research or design problems, the ability of the group to progress to a subsequent phase of their mission, and other such nonfinancial evaluations as these.

The major point in the foregoing analysis is that some intermediate progress points and transition stages must be included in task force plans at their inception. At least there should be some objectives and anticipations of costs at various stages in the task force mission planning. These must be elicited by management and placed in budget format so that major deviations from such anticipated points of accomplishment can be noted as the activity progresses. These points of departure should require explanation and/or analysis just as in any other aspect of the departmental operations of an organization.

Accounting task force

Use of the preceding concepts and approaches to the measurement of task force effectiveness will allow management evaluation and control processes of some sort to take place. Not all of these techniques will be usable in every circumstance. In essence, the measurement process must become in itself a short-lived task force. Its membership must be recruited from accounting, technical, operating, and management groups. Each individual involved in such a task-force type of control mission should be familiar with the mission of the task force under review and the estimates and anticipations of progress as budgeted by the task force manager in his initial charge or proposal.

Conclusion

Management by task force will probably become a common feature of tomorrow's organizations. Some factors that make the task force approach increasingly attractive to management are shorter product life cycles, the increasing technological problems of developing new and sophisticated products, and the increasing tendency of managers to think in terms of

organizations as systems. In addition, more attention is being given by managers to the use of systematic problem-solving techniques. These same factors will also require more adequate and timely generation of control information. Accounting controls that were suitable to permanent organization structures with well defined departmental units and clear authority and responsibility frameworks are not likely to yield the types of internal information needed by task force managers. An even greater problem is the generation of information needed by the "parent" organization manager for purposes of evaluating and controlling the task force and its management.

Steps needed

For task force control purposes, accountants should undertake the following steps to establish a proper reporting environment:

1. Managers should be influenced to incorporate in task force project proposals some type of schedule showing intermediate progress points and clear end-point criteria. If at all adaptable, CPM or PERT techniques should be used in the planning of projects.

2. The accounting staff should establish a system of control and subsidiary accounts and related source documentations to provide for the classification of costs by project and by phase. Costs should be accumulated by major phases or components of the overall project, and such accounts should be closed and summarized upon termination of each phase. Comparisons should be made between each phase and the original project proposal as a routine matter.

3. Based on project plans and a system of documentation and account classification, a task force budget should be established, both in monetary and operational units of measure.

4. As in construction contracts, task force project reporting should show costs to date and expected costs to complete, with explanations of expected variations from total planned costs. Reports of results should correlate with task force budget classifications.

5. Prior to an audit, accounting personnel should be briefed on the work of the task force, its organization, its objectives, and the terms of the original project proposal. Completed phases of the project should be identified, and some bases for determining effectiveness in these areas should be established. The accounting audit staff itself should be organized as a task force, enabling the audit manager to draw upon any talent needed for a thorough audit.

The "new" accounting techniques described for the evaluation and control of task type organization subunits are in reality new applications of some already accepted techniques of accounting measurement. Beginning with a well-thought-out account classification system, comparisons can be made with intermediate planning objectives and with operational objectives and criteria of "satisfactory" progress toward them. Further techniques might include random audits, random account closings, management audits, and the use of other nonfinancial performance criteria. Each of these areas requires rethinking of basic accounting control systems and special application of the skills and knowledge of accountants working with others in the development of control-oriented measurements. It is to be hoped that this article will serve as a stimulus to encourage those who have already developed task-force-related controls to give others the benefit of their experience.

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[1] A. K. Wickesberg and T. C. Cronin, "Management by Task Force," *Harvard Business Review,* November-December, 1962, p. 111.

[2] Ibid., p. 113.

[3] Richard A. Johnson, Fremont E. Kast, and James E. Rosenzweig, *The Theory and Management of Systems,* Second Edition, McGraw-Hill Book Company, New York, 1967, p. 140.

[4] William G. Scott, *Organization Theory —A Behavioral Analysis for Management,* Richard D. Irwin, Inc., Homewood, Illinois, 1967, p. 131.

[5] E. Duer Reeves, *Management of Industrial Research,* Reinhold Publishing Corporation, New York, 1967, p. 88.

[6] Johnson, Kast, and Rosenzweig, p. 142.

[7] Ronald J. Ross, "For LRP—Rotating Planners and Doers," *Harvard Business Review,* January-February, 1962, pp. 105-115.

[8] Johnson, Kast, and Rosenzweig, p. 147.

[9] Reeves, *op. cit.,* p. 75.

[10] Wickesberg and Cronin, *op. cit.,* p. 113.

[11] *Ibid.,* p. 116.

[12] Reeves, pp. 74-75.

[13] Johnson, Kast, and Rosenzweig, pp. 140 f.f.

[14] Reeves, p. 76.

[15] Scott, p. 132.

[16] Johnson, Kast, and Rosenzweig, p. 146.

[17] Wickesberg and Cronin, p. 113.

[18] Scott, p. 132.

[19] R. Ronald Daniel, "Management Information Crisis," *Harvard Business Review,* September-October, 1961, pp. 111-121.

[20] The development of some cost guidelines is discussed in Don T. DeCoster, "PERT/COST: The Challenge," *Management Services,* May-June, 1954, pp. 13-18.

[21] Scott, p. 132.

[22] Reeves, pp. 83-84.

[23] Such a random audit technique has been suggested by Peter P. Schoderbek in "PERT/COST: Its Values and Limitations," *Management Services,* January-February, 1966, p. 32.

[24] George A. Miller, Eugene Galanter, and Karl H. Pribram, *Plans and the Structure of Behavior,* Henry Holt and Company, New York, 1960, pp. 21-40, "The Unit of Analysis."

[25] For example: "The primary purpose of GAO Audits is identified as making independent examinations for the Congress into the manner in which Government agencies discharge their financial responsibilities. These responsibilities are then broadly defined to include administration of funds and utilization of property and personnel only for authorized programs, activities, or purposes, and the conduct of programs or activities in an effective, efficient, and economical manner," Ellsworth H. Morse, Jr., "GAO Audits of Management Performance," *The Journal of Accountancy,* October, 1961, p. 43.

Computers, which have the capacity to overwhelm all levels of management with superfluous reports, are, paradoxically, ideally suited for management by exception, if the planning and programing are handled well—

FITTING OPERATIONS CONTROL REPORTS TO MANAGEMENT'S NEEDS

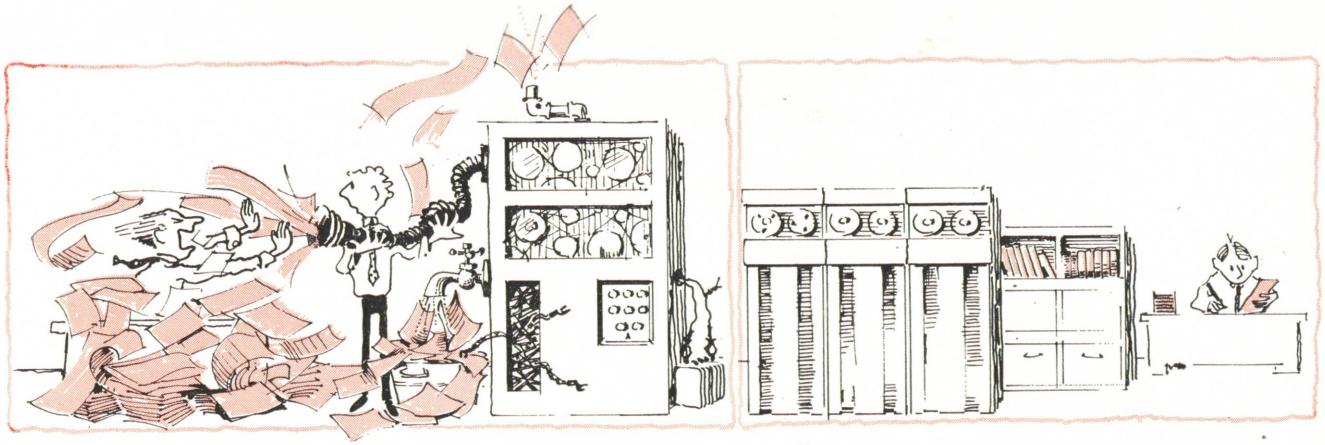
William F. Gamer

Lockheed Aircraft Corporation

MANAGEMENT by exception—via management reports that call attention to the exceptional as distinguished from the routine—is still honored more in the breach than in the observance. Yet the electronic computer is an ideal vehicle for precisely this kind of information system.

In an effort to reduce systems analysis and programing expense, the planners of many of the earlier computer installations adopted what now appears to have been a penny-wise but pound-foolish approach. They provided for routine print-outs of all data, both the usual and the exceptional. Thus, recording masqueraded as reporting, and managements were inundated with reams of tabulated data that failed to satisfy their need for identification of potential trouble spots while there was still time for corrective action.

In newer installations, in contrast, planners are incurring heavy



Many early data processing installations provided for print-out of all data, the routine and the exceptional. Planners now are wiser.

(nonrecurring) systems installation and programing expense to leave 99 per cent of the data in the computer's memory and report to management only the significant 1 per cent of unusual or exceptional information actually needed for management decisions. (Additional details can, of course, be recalled from the computer memory whenever they are needed.)

Managers at each level of the organization need timely control reports to warn them of areas in which the attainment of goals is in jeopardy. A number of reports are discussed briefly in this article. They range in subject matter from purchasing to accounts receivable and in recipient from mail room supervisor to financial vice president. Some are manually prepared; some are computer-prepared; and some are prepared by combinations of manual, computer, and/or peripheral equipment methods.

But all have certain characteristics in common. They are short. They are timely. And they are based on the exception principle; that is, their objectives are to pinpoint potential problems before they become critical, disclose significant deviations from plans, and spotlight unusual situations requiring management's attention.

Here are some examples from a cross section of control reports:

Procurement

Daily reports show:

Percentage rejects in items received

Percentage shortage in scheduled production material

Significant variances between number of requisitions per month and forecast

Significant change in average total costs of issuing a requisition

Significant difference between suppliers' performance and promised quality and time

Significant change in flow time from request to purchase to purchase order issuance.

Timekeeping

Foremen report only exceptions to employees' normally scheduled workdays.

Idle machine report

A daily report from each foreman to the factory manager (shown in Exhibit 1 on page 40) gives idle time, cause, and cost for each machine in the foreman's area.

Quality control

Each inspector's daily report indicates the quantity of rejected units, the number of units inspected, elapsed hours, units inspected per hour, standard units per hour, and comments on significant developments observed.

The quality control manager's daily report shows scrap totals and percentages, rework totals and percentages, percentages of non-inspection time, inspection cost per unit removed, and any abnormal ratio of inspection and quality control personnel to factory employees.

Construction project

Deviations from the day's scheduled progress, accidents, absenteeism, and unusual developments at the construction site requiring changes in plans are reported daily.

Research and development

Project engineers submit daily reports of unforeseen developments that could cause changes in plans.

Facilities utilization

A traditional steel industry daily report shows the actual versus planned percentage of production to total capacity. Prior periods' percentages are also shown for comparative purposes. Since the idle capacity is more symptomatic of potential problems than the productive portion, it would appear that—for control purposes—the complement of the present figures might be more appropriate.

In the hotel business, a daily internal audit report shows differences between the housekeeper's report of rooms occupied and the night clerk's report of rooms that were authorized to be occupied.

Power plant

The daily report from a factory's power plant to the chief engineer compares actual vs planned figures for fuel used, fuel on hand, steam

pressure, temperature, and other information useful in controlling power plant operations. The exception reporting principle is used on a flash basis, however, whenever any of the readings are abnormal.

Chief cashier's office

A daily control report indicates the number of uncompleted mail remittances, personnel changes, the number of change funds issued, and the time the last change fund was returned.

Accounts Receivable

The accounts receivable supervisor's daily report to his manager shows the number of sales invoices held pending receipt of missing information, the number of unposted remittances, and the number of days' charge sales not yet posted to customers' accounts.

Delivery performance

Differences between actual and planned quantity of undelivered units at the end of each day are reported.

Mail room

A daily report shows any significant deviations from: (a) normal time of receiving mail from the post office, (b) completion of sorting, (c) number of mail readers, (d) time outgoing mail was completed and closed, and (e) amount of outgoing hand-stamped mail.

Restaurant or cafeteria

The daily report shows any variance between actual and planned number of meals served. For comparison, the same information is shown for the previous day and the same day of the previous year.

Credit review

After customers' orders have been compared with credit data stored in the computer's memory bank, only those orders rejected by the computer are referred to the credit department for approval or rejection.

Sales

Many retailers are giving daily reports on "fast-moving" or "slow-moving" items to their merchandise managers.

Production control

Exhibit 2 on page 41 illustrates the principle of visual "off-limit-situation" reporting built into records. Although variations of this visual control reporting device have been adapted to more sophisticated systems, this example's simplicity focuses attention on the use of the exception principle. When the two shaded celluloid signals do not occupy the same space, actual results do not coincide with plans, and management's attention is alerted to a problem.

The production control unit ticket shown here enables a factory production manager to keep jobs moving through the plant at the planned rate. This facilitates on-time deliveries of finished units. A visible file contains one of these unit ticket cards for each job in progress. Before a job is started, the scheduled dates for start and finish of each operation are recorded on the card. The following information is recorded for each operation:

Date started (scheduled and actual)

Date completed (scheduled and actual)

Time required (scheduled and actual)

A gray translucent plastic signal at the bottom of the card shows when the next step should be finished; and a colored signal shows when the most recent operation was completed. The production control manager frequently glances at the signals on the cards to see whether work is ahead of schedule or behind schedule. If a job is behind schedule, he checks the detailed information on the card, ascertains the causes for delay, and takes corrective action.

Alternatively, manufacturers with computer capability are using computers to report "work behind schedule" and "work ahead of schedule."

Another effective production control display, which has passed the test of time, is the well known line of balance chart, which shows deviations from planned progress graphically.

EXHIBIT 1

Idle Machine Report

CAUSE	IDLE HOURS
No operator	
No materials	
Repairs	
Awaiting set-up	
Awaiting tools	
Awaiting instructions	
Total idle hours	
% of standard	
Burden rate for idle time	
Cost of idle time	

FOREMAN'S COMMENTS _____

Project management

Exhibit 3 on page 42 shows a manually prepared schedule outlook report based on computerized PERT (Program Evaluation and Review Technique) projections. This manually prepared chart uses both color coding and above or below the line positioning to distinguish between behind schedule and ahead of schedule situations.

Exhibit 4 on page 42 depicts the use of above or below the line positioning without color coding to permit computerized preparation of the schedule outlook report.

(Both these schedule outlook reports are modifications of the ace-

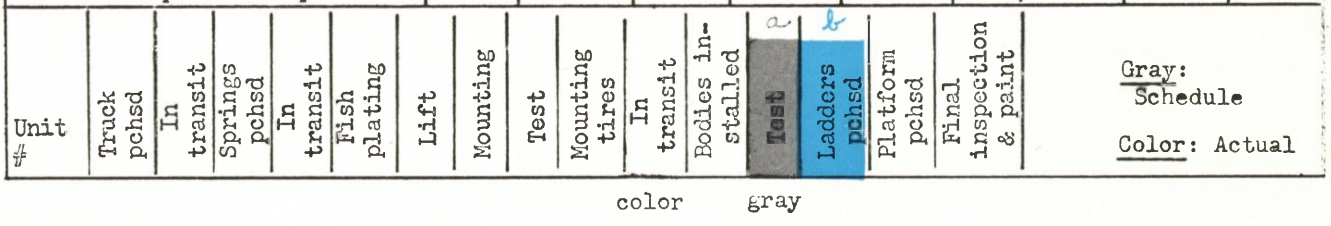
WILLIAM F. GAMER, CPA, is program cost controller at Lockheed Missiles & Space Company in Cupertin, California. Mr. Gamer formerly worked as a senior cost analyst at Autonetics Division of North American Aviation Inc. and was engaged in public accounting. He is a member of the California Society of CPAs, the National Contract Management Association, the American Accounting Association, and the National Association of Accountants. Mr. Gamer is a frequent contributor to technical publications. He is a commerce graduate of New York University.

EXHIBIT 2

Production Control Ticket with Visual, Color-Coded, "Off-Limit-Situation" Reporting

Started Date	Time	Planned completion Date	Time	Actual completion Date	Time	UNIT TICKET Unit number.....

OPERATION	Date started Sched.	Actual		Date completed Sched.	Actual		Time required Sched.	Actual	
Truck purchased									
In transit									
Springs purchased									
In transit									
Subcontracting: (at X plant)									
Fishplating									
Lift									
Mounting of lift									
Test									
Mounting of tires									
In transit									
Subcontracting: (at Y plant)									
Bodies installed									
Test									
Ladders purchased									
Platform purchased									
Final inspection & paint									



tate-covered chart illustrated on page 9 of Volume II [Instructor Guide], *Computer Assisted Program Evaluation Review Technique Simulation*, issued in January, 1965, by the U.S. Government PERT Coordinating Group.)

Cash flow

Daily reports of significant deviations from previously projected cash balances enable financial managers to investigate and take corrective action.

Sales

The extremely high speeds of computers in performing memory searching, comparing, and arithmetic computations make it feasible to obtain prompt reports of significant deviations from planned sales (by territories, products, salesmen, or other classifications). Deviations previously programed as being not sufficiently significant to warrant management's attention would not be reported unless specifically requested.

Equipment other than computers can, of course, accomplish similar results. If computer speed is not a requisite, possible computational expense savings can sometimes be an important decision making factor.

Inventory control

In some industrial stock control departments, the presence of a blue "purchase history" card behind a related red "inventory record" card showing a below-minimum balance on hand tells inventory control personnel that no purchase requisition has been prepared. (The blue "purchase history" card accompanies the purchase requisition to the purchasing agent.)

Similarly, in some airline ticket offices, the absence of a red-wrapped package of reserve supply airline tickets tells the ticket office manager that his supply of ticket forms has dropped to the reorder point.

A computer-reported ratio that has been useful in managing military inventories in excess of $15 billion is the ratio of current demand to average demand. This ratio tells military supply managers when average demand is not being experienced, thereby inviting their attention to potential management problems.

Organizational ills

Because organizational structure

EXHIBIT 3

Manually Prepared, Color-Coded
Schedule Outlook Report

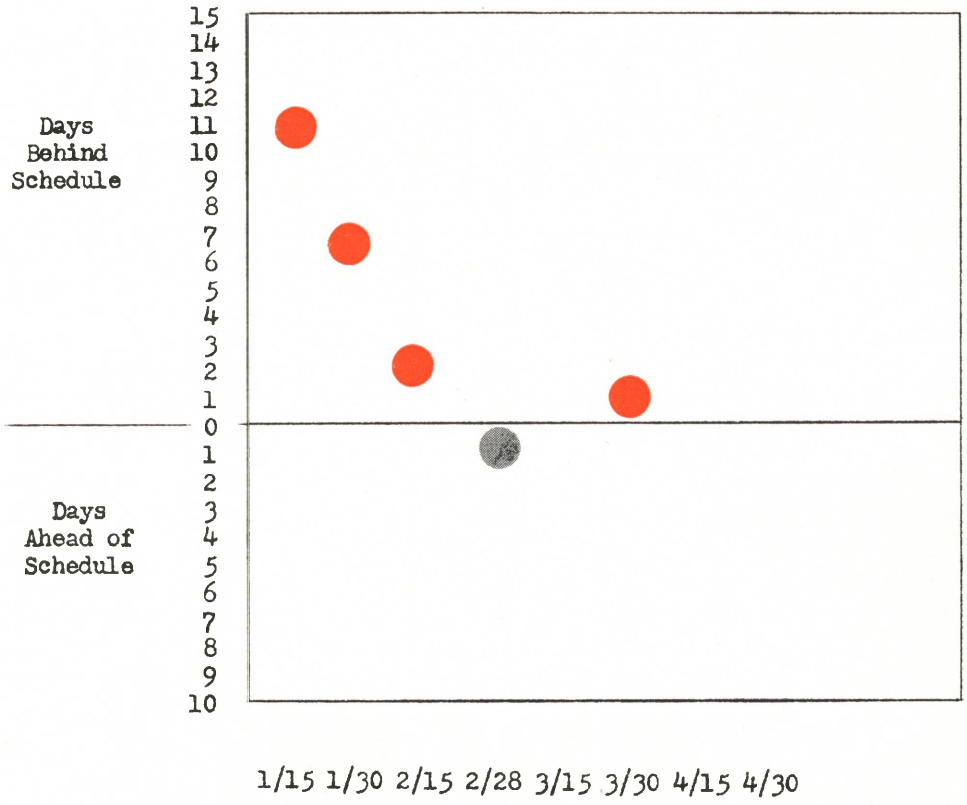
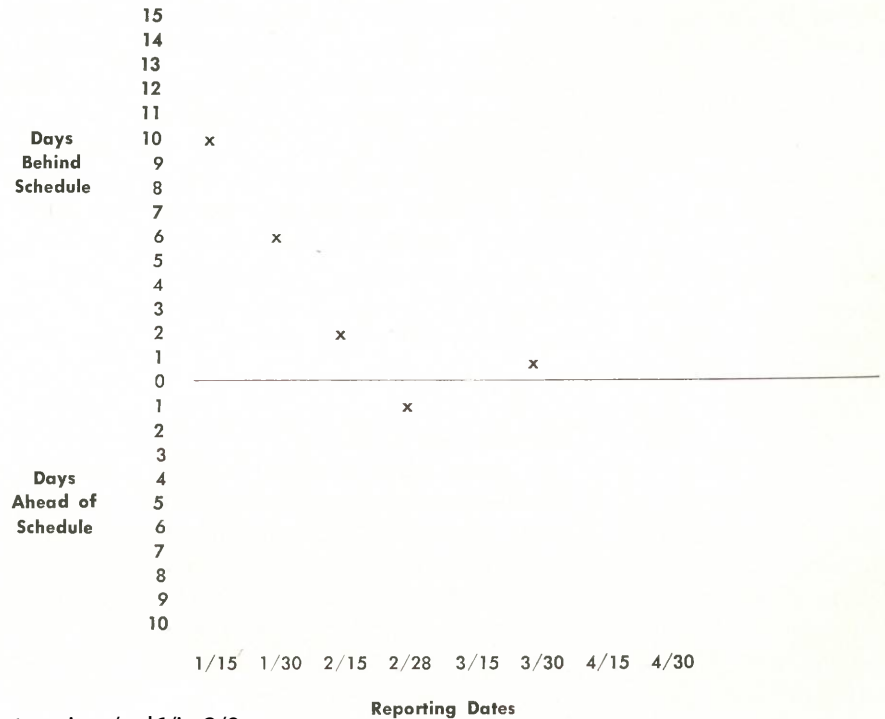


EXHIBIT 4

Computer-Feasible Schedule Outlook Report

Using above-or-below-the-line positioning
without color coding



can facilitate or hamper operational success, it might be well to consider management control reporting of organizational problems. Report format and methods of communication would be anything but routine. These reports, however, should be designed to give top management visibility into symptoms of organizational problems that could interfere with successful operations.

Problem symptoms

Top management might want to be kept informed of any symptoms of the following situations, any or all of which can spell serious corporate trouble:

Absence of teamwork

Overlapping or duplication of authority

Workers reporting to more than one superior

Vague or ambiguous definition of departmental functions

Invisible lines of authority actually being observed at variance with those shown on the organization charts

Not enough Indians, but too many chiefs

Bottlenecks

Incompetent personnel in key positions

Faulty distribution of administrative workload

Organization structure not compatible with goals

No responsibility accountability system

Insufficient delegation

Responsibility for reliability of performance not defined

Major functions not in keeping with changed circumstances.

Conclusion

If executives have to waste their time scrutinizing piles of computer print-outs or other "raw,"" unscreened figures to find out how well their performance goals are being attained, chances are that the reporting system needs a major overhaul.

Staff specialists should coordinate the design and implementation of control reports—some manual, others computerized. (Examples of both types of reports have been presented in this article.)

Needs must be known

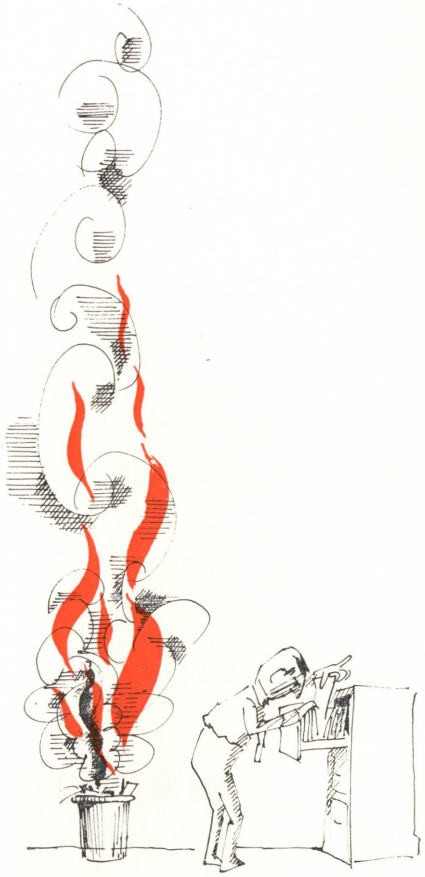
Computers can be programed to report only what management considers to be worth reporting. The best time to establish criteria, systems, and programing for selective ("off-limit") reporting is, of course, before the computer is installed. A new system's input specifications, input-sorting procedures, demand and batch processing methods, and the like depend on the desired outputs. If management's desire for exception reporting is not made known until after a computer system has been installed, the cost of adding the capability for such output to the system could well be excessive. In such cases manual exception reporting and peripheral equipment are well worth considering.

The necessary focus

The focus should be on the few significant bits of information (based on each management level's responsibilities) that will warn the responsible executive of symptoms indicating potential failure to attain goals. At the lowest levels control reports can be simple but specific.

Reports to higher management are usually less detailed but broad enough in scope to communicate the problems and offer indications of corrective measures being considered.

This is by no means the same thing as saying, "Never mind the doughnut; pay attention to the hole." A better way of putting it might be, "The unexpected should have first priority on management's time because it probably needs management action more than the areas that are normal or expected." Since managers cannot (and should not) review every event or bit of data, the reporting system should be designed to focus management's attention automatically on problem areas. More mundane matters can wait until the emergencies have been handled.



The reporting system should be so designed that it focuses management attention immediately on problems.

The bill of materials processor, a software package offered by many computer manufacturers, fills the obvious uses for which it was designed. But, beyond that, the author's company has applied it in many cases where traditional methods can't work well—

EXPANDING THE USES OF THE BILL OF MATERIALS PROCESSOR

by Jonathan Bayliss
The Gorton Corporation

THE so-called bill of materials processor, a computer software package offered by IBM, Honeywell, and other computer manufacturers, is a tremendously powerful tool.

The bill of materials processor is a package of programs that will create, maintain, and retrieve in various forms the bills of materials of a manufacturer, particularly those of a fabrication and assembly manufacturer. With suitable customizing it will provide three kinds of explosions — single-level, indented, and summarized. It also will give the same three kinds of implosions. In other words, the bill of materials processor will retrieve, extend, and organize a manufacturer's material requirements, past or future, six different ways.

All this is impressive enough. But it is only the beginning of what the bill of materials processor can be made to do by a skillful user.

More than a package

Actually the bill of materials processor is not a programing package in the ordinary sense of

the word but a basic piece of software of far more general significance. It is a method of file organization; it is a package system that can be applied to many requirements for which the usual methods of file organization are unsatisfactory.

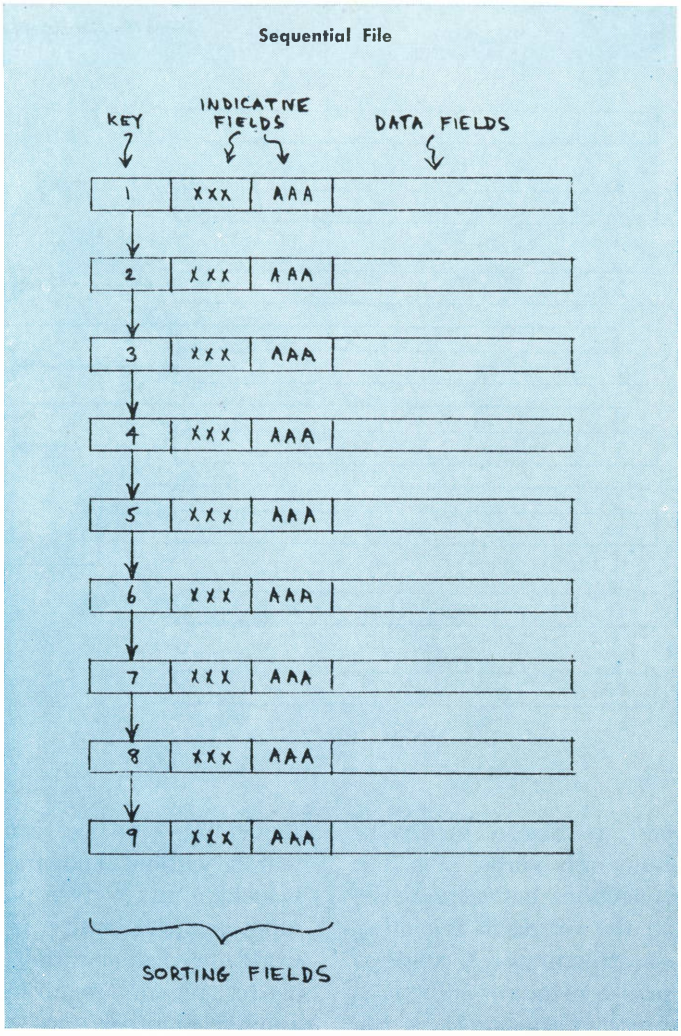
At Gorton (a frozen seafood processor with national distribution and international resources, which recently merged into General Mills) we use the bill of materials processor for operational cost control and logistical control, and we plan to use it soon for property administration. These three applications are described in some detail in this article. They do not begin, however, to exhaust the possibilities of this versatile tool. Once the principles of its use are understood, it can be adapted by an ingenious systems man to a wide variety of applications.

File organization

On our IBM System/360 Model 30 we basically use three different kinds of disk files:

We use sequential files (Figure 1 on this page) generally for high volumes of data with very high growth rates, when the records have coded connections to each other, when mass high-speed processing is required, and when there is little need for random access. With such files we rely on selection and sorting techniques to a very high degree, and it is in this manner that we establish the relationship between records. Our general data base for sales statistics, accounting, and inventory is a multi-pack sequential file.

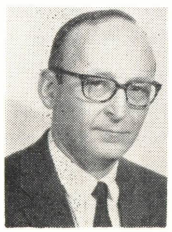
FIGURE 1



Random access files

We use index sequential file organization (Figure 2 on page 46) when the records are sometimes used in sequence but often accessed randomly. In this case the relationship between records depends primarily upon the key. These files are used primarily for master reference and are almost always on line for purposes of supplying constant information in a nonredundant manner. Master reference data, such as product description and standard costs, appear only once in the system, and the file which contains them is usually running in parallel with one of the other two types of files.

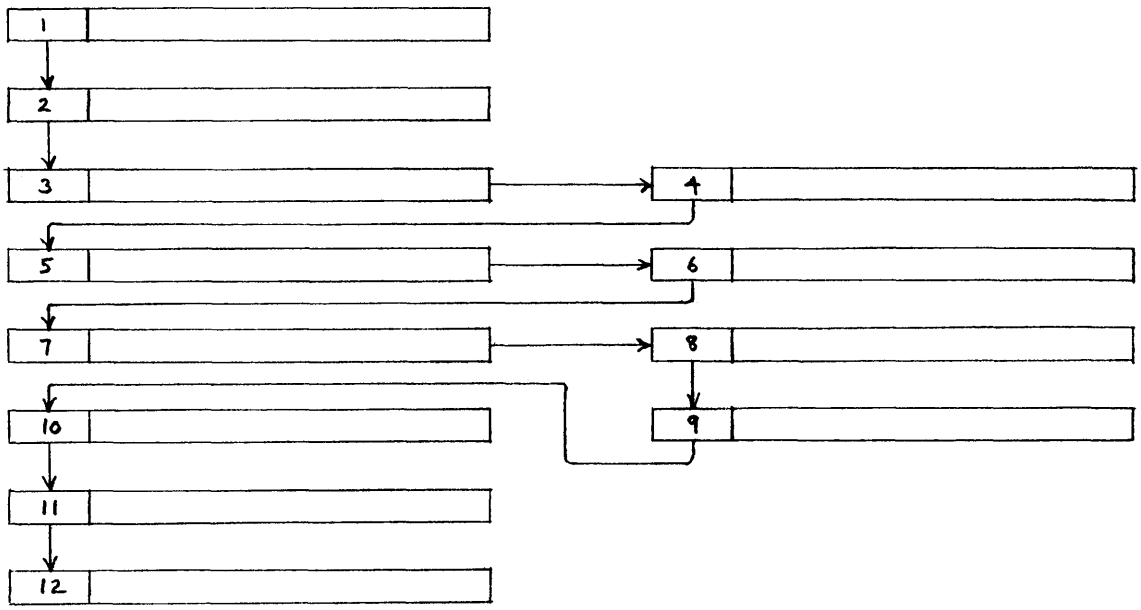
The third type of file is the bill processor (Figure 3 on page 47). It is used for establishing relationships between records which need not be related by key or by other coding characteristics. These relationships may be changed, and so may the data content of the records. This statement will be explained more fully later in the article. For the moment, suffice it to say that this kind of file organization is really an organization of two files—a master file and a structure file. The master file contains constant, semi-constant, or completely variable data pertaining to an entity. The master file is like a dictionary that contains only nouns. The structure file, on the



JONATHAN BAYLISS is director of management services at The Gorton Corporation in Gloucester, Massachusetts. He is a member of the American Production and Inventory Control Society, The Institute of Management Sciences, and the administrative systems committee of the Grocery Manufacturers of America. Mr. Bayliss had previously been a consultant, a sales analyst at The Carter's Ink Company, and an administrative assistant to the sales manager at the Malsbury Manufacturing Company. He attended Harvard College and was graduated from The University of California (Berkeley), where he was elected to Phi Beta Kappa.

FIGURE 2

Index Sequential File



other hand, is like a dictionary that contains only verbs, in that it shows connections between, or the actions of, the words in the other file. These structural relationships may be semi-constant or fully variable, and this characteristic is the key advantage of this kind of chained file.

The three types of files are compared in Figure 4 on page 48. The sequential file is like a straight line whose points can be rearranged to a limited degree. The index sequential file resembles a curved line that can be followed in one direction only. The processor files, however, are like a network. It is possible to travel in either direction and to get from any one point to any other point. For this reason we often call the "bill processor" a network file.

Network files

With a network file—or two files or even three if it is desirable to add a third dimension—the user can reverse or alter his search (unlike with a sequential file) without sorting, and (unlike with an index sequential file) he can make a search without knowing what he is looking for. A given point, which represents an entity in the real world, need appear only once as a master record, regardless of the number of other entities it is related to. Connecting lines can be changed without changing the identification of the entities involved. In other words, the file provides the tools of construction; it offers a way of putting building blocks together like a limited number of atoms which can make up an astronomical number of different molecules. There are converging networks and diverging networks and hierarchical networks —all of which can be modeled with this kind of file. (See Figure 5 on page 49.) And there are also networks that are composites of these.

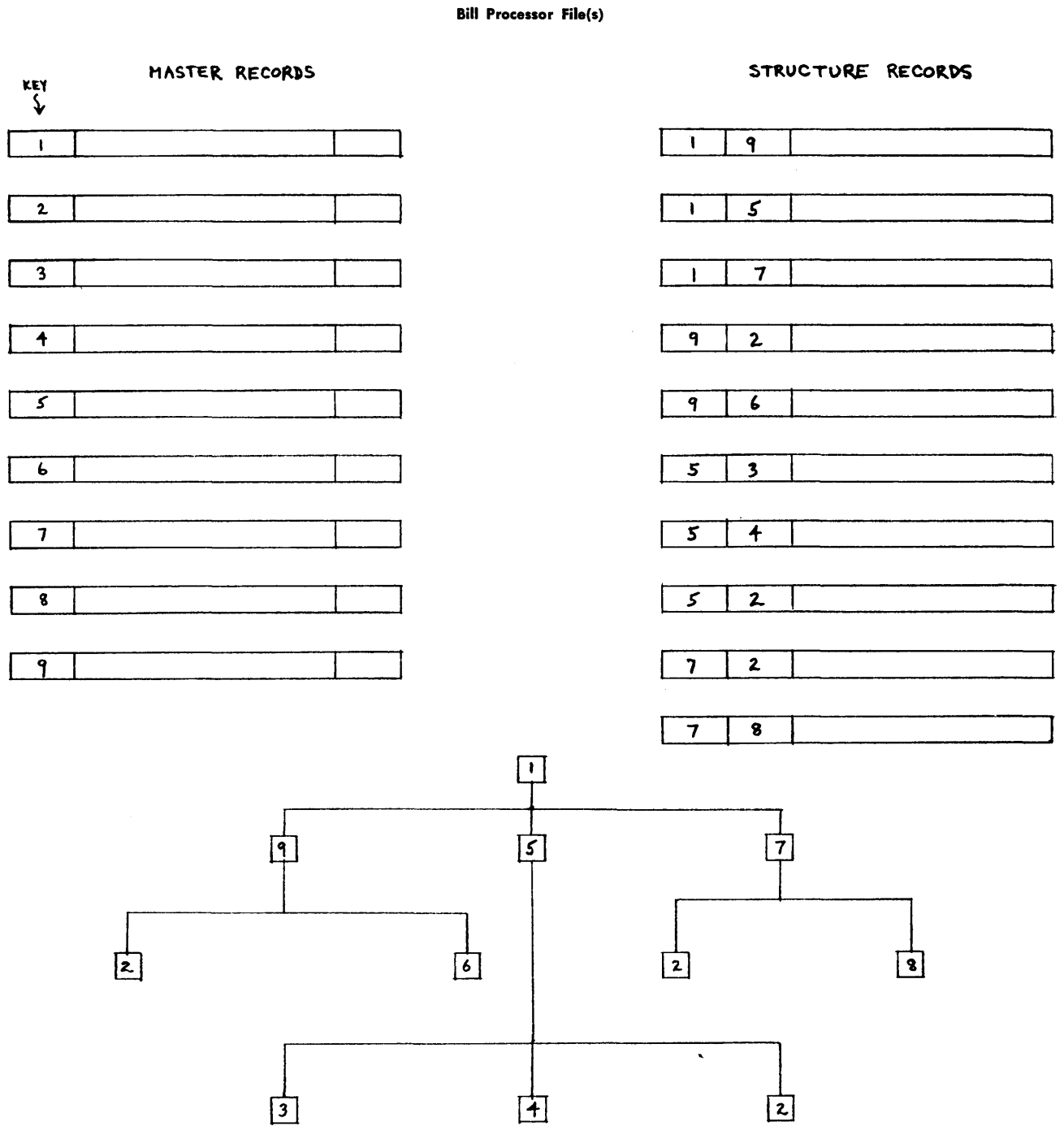
The thing that makes a network file much more powerful than it may have seemed from the discussion so far is the possible uses of the structure records, which are represented by the lines between the points in the diagrams. In the earlier figures most of the records were left blank. In Figure 6 on page 50 these fields are filled in. The master records can have as many fields as the user wishes, and these fields can each be updated in the course of processing—each according to its own programed rules. In other words, variable quantities can be assigned to points in the network, and each point can actually be a cluster of smaller points.

Field as valve

More important, however, is what can be done with the fields in the structure records. One field (S1 in Figure 6) would normally be a coefficient. It could be thought of as a valve that is set at any point between fully on and fully off. The several valves through which the data flow—let's say, on the way down from the top—thus determine the proportion of the flow that takes one branch or the other. When there is only one connecting record, naturally, 100 per cent has to flow in that one direction only.

The second field, shown in the structure record (C1), which again may be made up of several

FIGURE 3



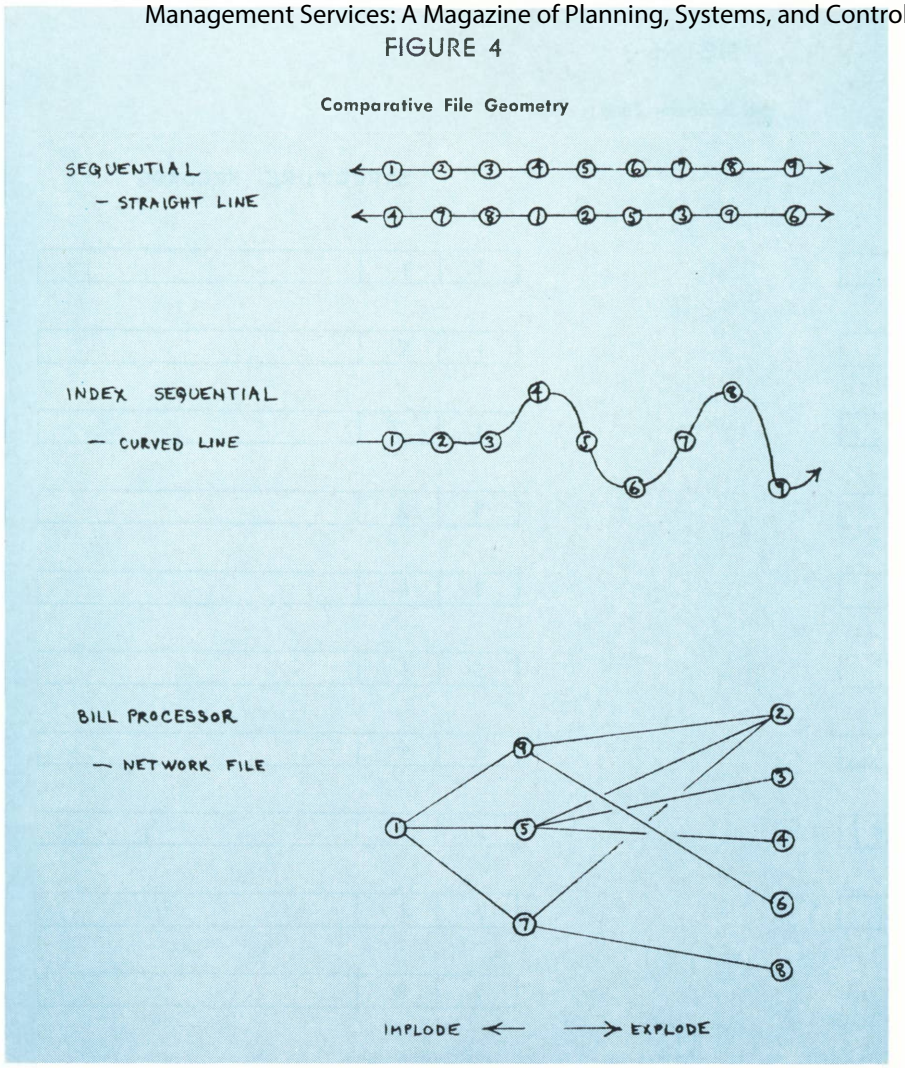
sub-fields, may contain control data of its own. This data also may be updated during processing. It may measure the flow through its leg of the system. Or it may shape or modify the information that is flowing through the system according to certain characteristics.

The diagrams of these network types should suggest many applications of the bill of materials processor. A manager who needed a PERT or a CPM program and lacked a specialized package could use the network file to tailor his own planning system. It could be used in library management for cataloging books and retrieving bibliographic cross-references by subject, by author, by title, etc. It could be used for organization charts that show functional and working relationships as well as nominal chains of command. It could be used for complicated cost allocations in an accounting system.

Uses of program

It can be used for almost any purpose that is best served by a structural model when both the structure and the content are variable. It can be used for chaining

FIGURE 4



historical facts in a cumulative fashion so that when reference is made to the present condition of, say, a person in a hospital, it is also possible to retrieve an unlimited number—a variable number—of previous status reports as well as all the connecting events between them, such as medication or surgery. Theorists say that a system can never be fully designed. This is all the more reason to use a network file, which can grow and change as the real world grows and changes.

Bill of operations

At Gorton we are applying network file technique in three ways. One subsystem has been operational for over a year. Another is approaching the first stage of implementation. For the third programing has barely begun.

The first subsystem is our bill of operations, illustrated in Figure 7 on page 51. This includes the conventional bill of materials, but we call it a bill of operations because it includes more than just materials. It also contains, in effect, elements of processing itself—such intangibles as fixed overhead, labor, storage and handling, and other nonphysical components of our finished products. With this subsystem we update our standard costs, usually once every four weeks, by changing the cost of individual components that may be common to many finished products. We thus can very quickly explode the effect of a change in the world commodity market and swiftly adjust our prices to follow the domestic market without distorting our gross margins on sales. Our reaction time has improved by at least a month.

The bill of operations can be used to simulate tentative cost schedules and—once the sales budget is locked in—to project material requirements for the year ahead and cost them out, period by period, to form the basis of the company's expense budgeting. Naturally, we also explode short-term revised production forecasts for a limited number of time periods. These are known as "summary explosions."

"Indented explosions"

"Indented explosions" are used for audit trails or special analyses (such as in the case of anticipated shortages) to give us the cost and quantity of materials and services required for any given quantity of any given finished product.

A "where-used" retrieval listing is made periodically for each component as a reference manual for the purchasing and cost accounting departments.

"Summarized explosions" are the ones often used. They take several forms. In one form, the summary goes down one level only in the product tree, to what we call "cost categories." These are accounts from our chart of accounts. This summary gives us our standard cost absorptions for posting to the books. Other summarized explosions pick up materials only at their lowest level, that is to say, as purchase requirements. Still other summary explosions may be run at an intermediate level, such as an explosion of production department requirements for materials that must be immediately on hand in the warehouse, in the form and at the value of productive line usage.

In the bill of operations subsystem, since each item appears only once, it is possible to tie together rather complicated processes. For example, we are able to combine batch process accounting with production line items when some of

the components are made in batches at a previous point in time whereas others are used only on the day of final production.

Underlying our subsystem is the concept of "value added" at each step of the way. This network file is so flexible that we can usually introduce new elements of complication, new cost accounts, new processes, new value increments of any kind without changing the programs. We are able, for instance, to use a "plant cost differential" cost category for plugging and equalizing the standards for finished products made at more than one plant, with different labor rates, yields, and overhead charges.

After all this time we still have a lot to learn about how to use this versatile tool. We have a long way to go in bringing our actual cost data collection to the level of sophistication that will do full justice to the bill of operations in measuring variances by individual items.

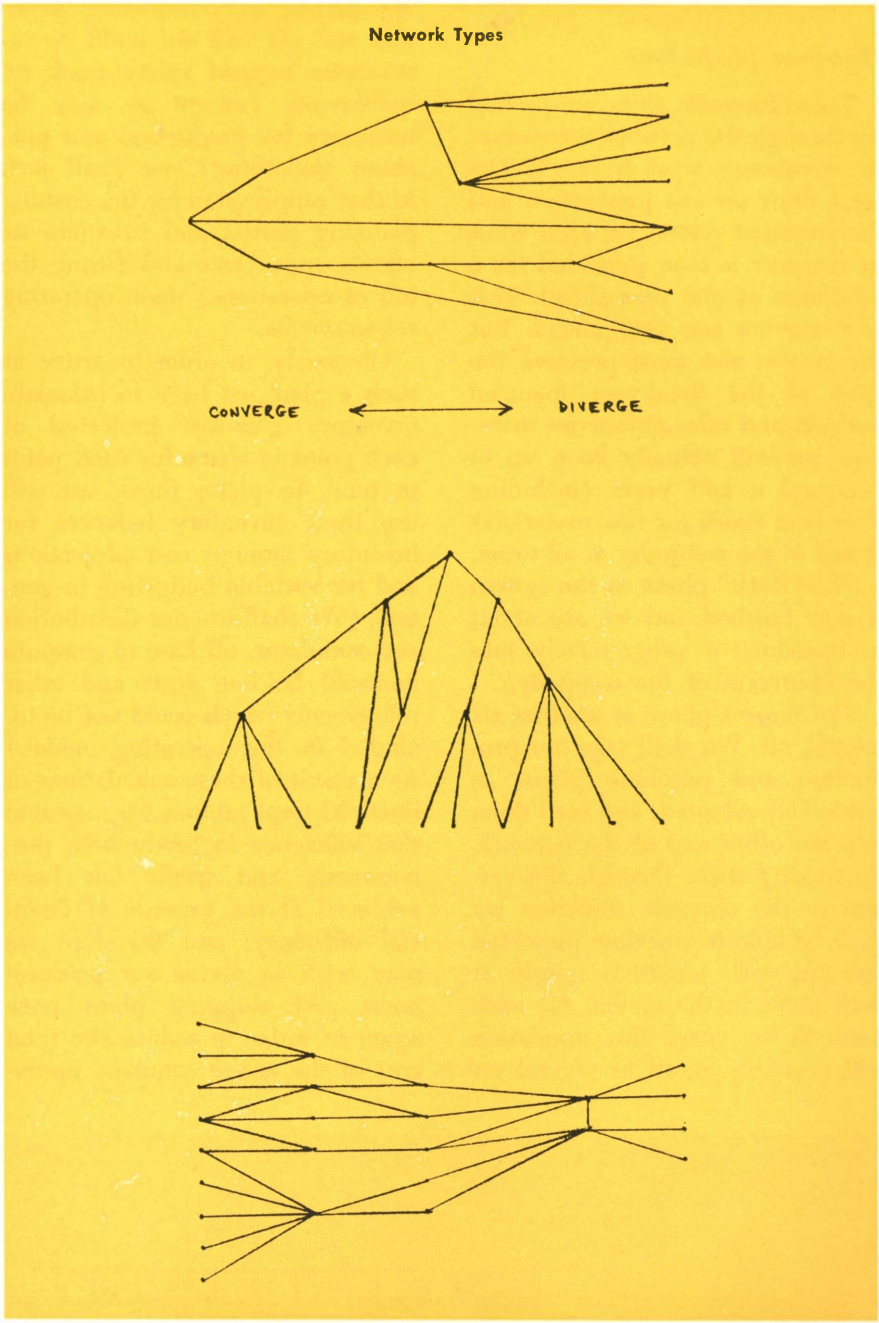
Logistical model

Our second application of network files is the most monstrous. It is huge. It is nothing less than a working model of our entire logistical system (shown in Figure 8 on page 52). It will project sales, production, purchases, and inventories for every stock-keeping unit sold in every one of several hundred markets from any one of a couple of dozen local warehouses or from any one of three distribution warehouses supplied by any of three base warehouses and procured from any production line or vendor.

But we are an inventory management business, and it's worth the effort. And this vast detail—thanks to network files—is not as overwhelming as it appears. Once the model is built in simplified form, it can be expanded in structure step by step, and it can be updated in data content by selective changes as conditions warrant. In other words, our annual fiscal-year budgeting (which centers in sales and logistics) will be in process all year long. Once the initial budget is fixed for the fiscal year, the operations planning system will be used to revise it market by market, item by item, warehouse by warehouse, freight rate by freight rate, etc. This continuously revised budget constitutes the operating plan according to which all operating decisions are made.

Hitherto our operating forecasts, although we have revised them periodically, have not represented a synthesis of local forecasts. The planning has been limited—as most such planning is, everywhere—to the major base and distribution warehouse level. There has been no way to reflect changes in markets, local promotions, loss of major customers, gain of major customers, or special local competitive situations. In other words, we have had no way of formally gathering and reflecting the knowledge of the man in the field. Now, in contrast, the effect of a change in major customers in San Fran-

FIGURE 5



cisco will be fed in the production division of the supply plan. Operation planning for the following period.

One-year projection

These forecasts, then, are pushed up through the network warehouse by warehouse, week by week. The total draft on our production and procurement system for each week in the year is then projected for a minimum of one year ahead. This is a moving one year ahead. But the system also must preserve the span of the fiscal-year financial budgets and sales objectives; therefore we will actually keep up to two and a half years (including long lead times for raw materials) stored in the computer at all times.

This "draft" phase of the system is now finished and we are about to introduce it progressively into the lifestream of the company.

The second phase is another six months off. We shall take our production and purchase plans, as tentatively adopted, and feed them into the other end of the network. By forcing them through the system in the opposite direction we shall be able to correlate projected demand with tentative supply at each point in the system for each week in the year. This simulation will probably result in several revisions of the supply plan. Once a supply plan is found which will not permit an out-of-stock situation and yet will not build up inventories beyond safety stock requirements (except as may be necessary for production and purchase smoothing), we shall lock in that supply plan for the ensuing planning period and calculate its effects upon costs and (using the bill of operations) upon operating requirements.

Obviously, in order to arrive at such a plan, we have to calculate inventory balances projected at each point in space for each point in time. In phase three, we will use these inventory balances for inventory storage cost projections and for variable budgeting in general. (We shall use our distribution cost simulator, off line, to compute financial holding costs and other refinements which could not be included in this operating model.) As a result of these calculations of financial implications, we may find that efficiency in production, procurement, and traffic has been achieved at the expense of financial efficiency, and therefore we may wish to revise our procurement and shipping plans once again in order to reduce the total cost of the entire company operation. In short, the operation planning system is itself a simulator.

It is also the framework within which all other logistical uses of the computer will fit. For example, as an extension of our present distribution warehouse replenishment calculation, we are about to install the new IBM Inventory Control System, which is a sort of manufacturer's version of IMPACT.* The intrinsic forecasting involved in this subsystem will act as a kind of governor on the long-range extrinsic master forecasting that I have just described. They will couple with each other, and we hope to get the best of both worlds. Also, sooner or later we expect to develop our own production scheduling matrix (probably a simulator of some type) for balancing up production lines in time and relative load for the purpose of achieving the best practical production efficiency consistent with the seasonal variables of both sup-

*IMPACT (Inventory Management Program and Control Techniques) is a programing package for inventory control supplied by IBM. Its operation was described in some detail in an earlier article in MANAGEMENT SERVICES ("An Inventory Control System with Profitable By-Products" by Anthony A. Vallario, January-February '67, p. 31).

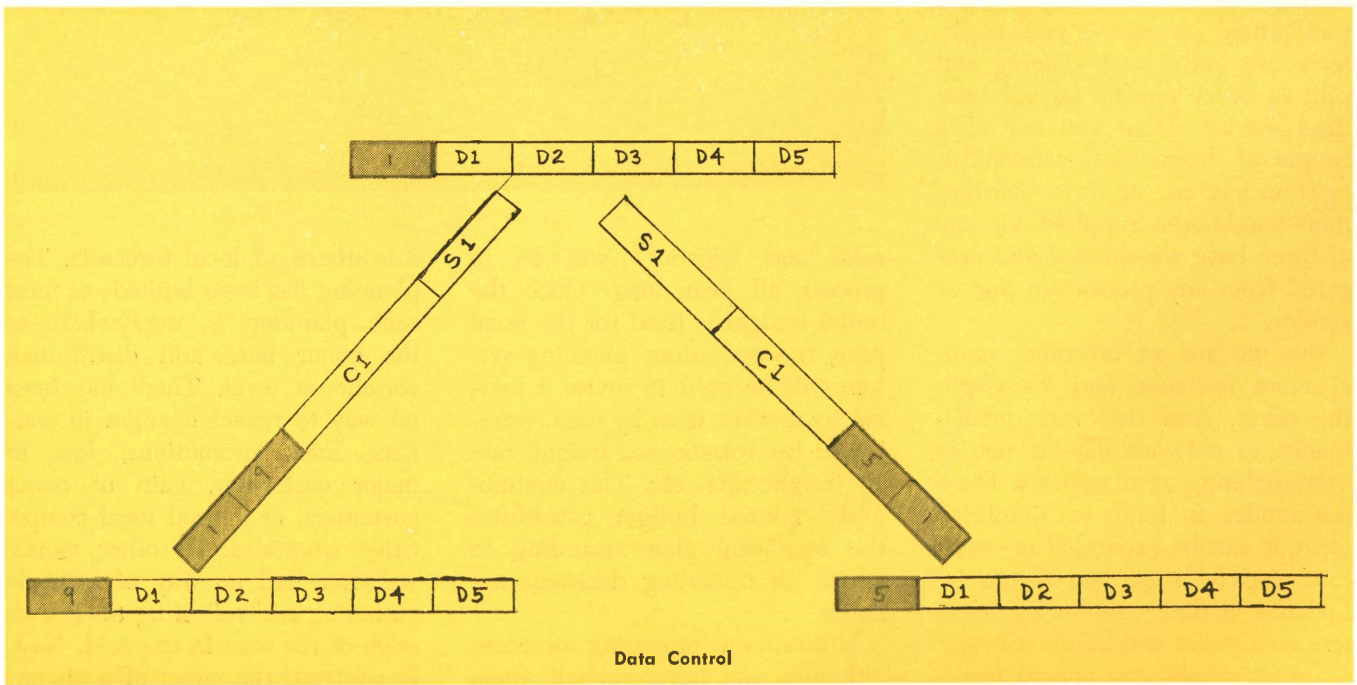
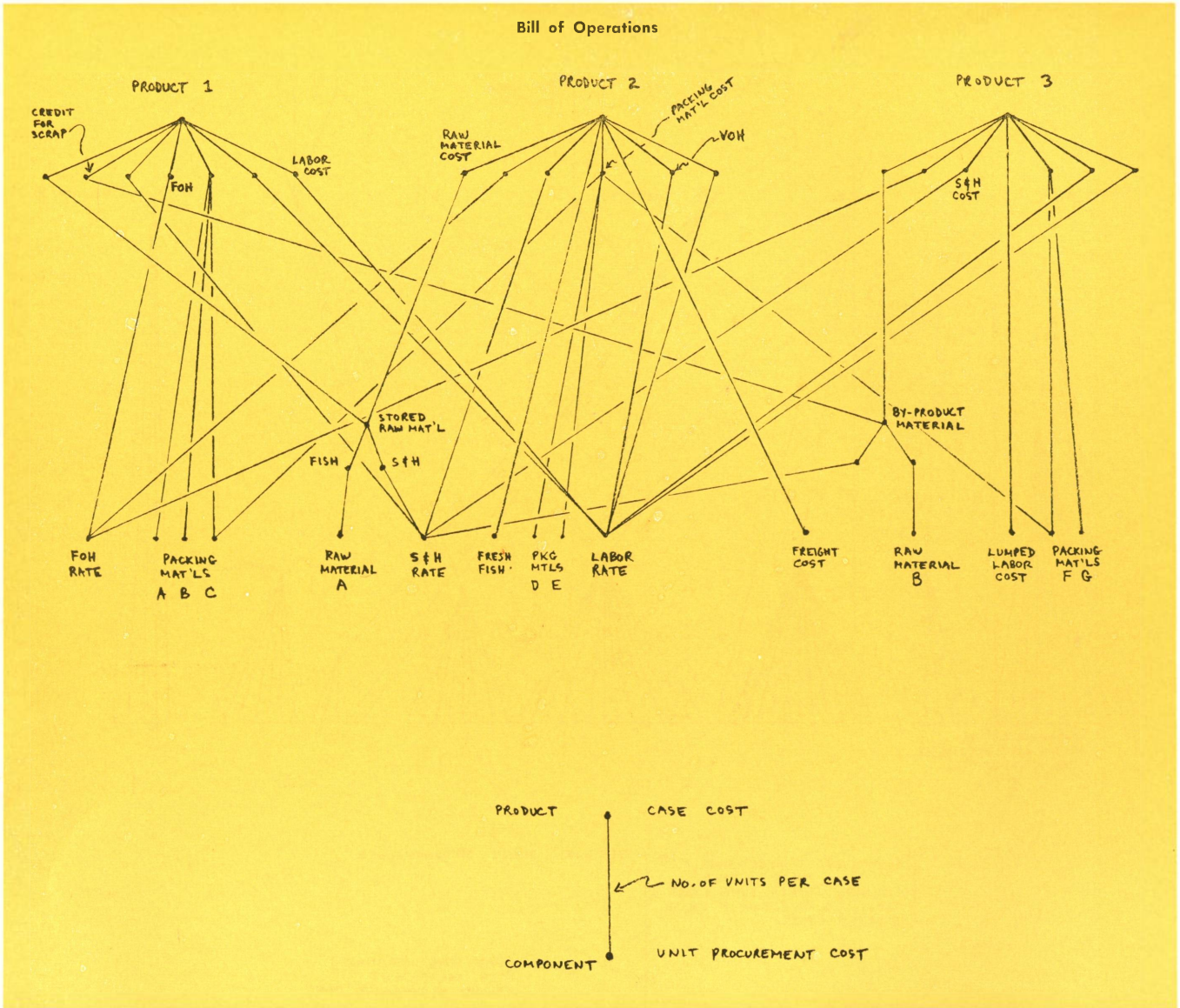


FIGURE 6



ply and demand. This production scheduling subsystem will then create the production plans that are fed into the main frame of the operations planning system in order to test their ability to meet demand for all products in all markets every week and their effect on total cost.

We expect many heartaches in developing this system — particularly in terms of storage capacity and processing speed problems, and even more in making it work for operating people. I am sure it will take five years and a larger computer to exploit the system fully. However, because of the versatility of network files, we can proceed gradually, we can introduce concepts step by step, and yet we can begin to benefit almost immediately from the system's tremendous value for many different aspects of management.

Property administration

Our third application of network files is not yet fully developed even in terms of our own thinking. This is our projected property administration system, illustrated in Figure 9 on page 53.

Our objectives in property administration are these:

(1) To record, maintain, and retrieve property lists by location and/or by custodial entity and/or by department charged (This inventory of properties is to include capitalized items, written-off items, and expensed items of sufficient interest.)

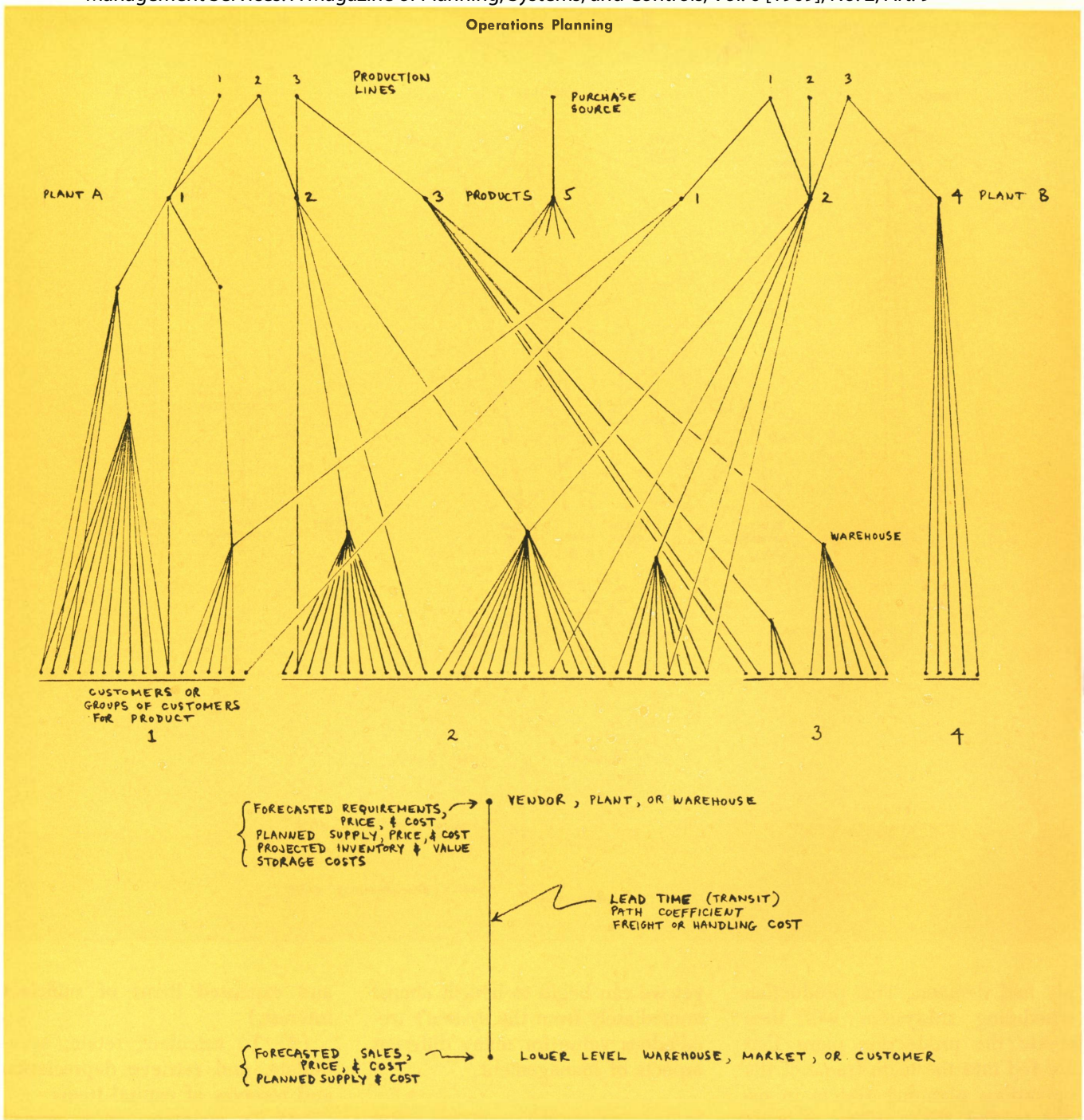
(2) To calculate, retain, accumulate, and retrieve depreciation and reserves of capital items

(3) To maintain, on a current basis, records of property *configurations*—such as properties that are assembled into a single production line or office equipment made up of modular units

(4) To produce, publish, and control equipment maintenance schedules and records of maintenance performed; also, to log equipment operating time or production figures for purposes of actual depreciation studies and maintenance control

(5) To control capital expenditures by means of matching au-

FIGURE 8



thorizations and estimates with actual purchases and with all actual costs pertaining to the purchase

(6) To create a job order system which gathers and controls all costs pertaining to individual construction orders or work orders, providing for partial capitalization without losing any significant element of job expense history (This generalized job order accounting aspect could form the basis of the entire cost accounting system in a different type of business. Note the similar function of our bill of operations.)

(7) To record and control leases and rentals, with a cumulation of payments and a continuous record of payout status

(8) To review and control insurance on all properties individually

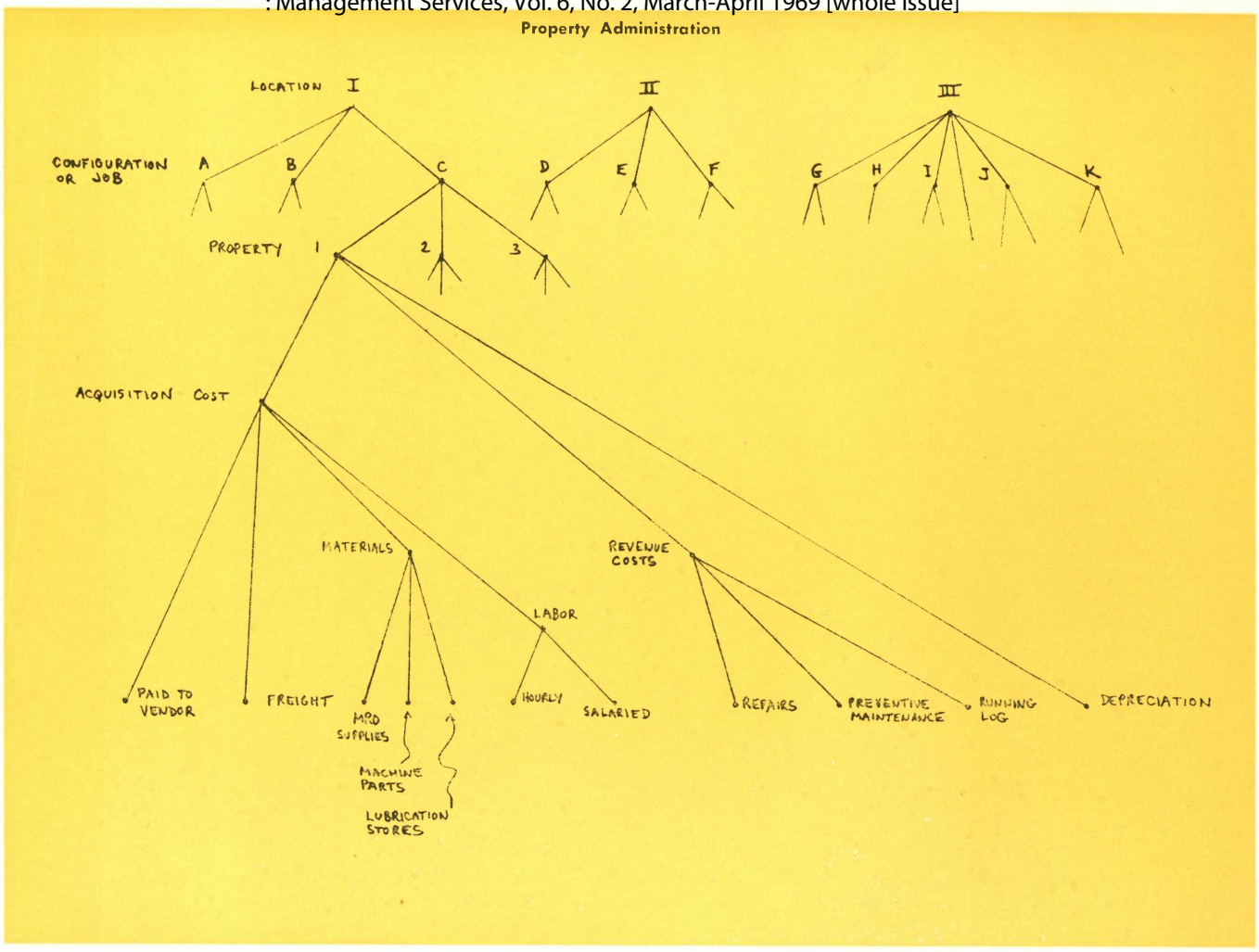
(9) To provide for control of off-premises properties (such as electric motors sent out for rebuilding)

(10) To provide for intracompany transfers of properties as well as trade-ins, sales of properties, etc.

Cost advantage

There is nothing unusual about these objectives. But we cannot afford major effort or major overhead in all or several of these areas; we must try to achieve them all with one computer subsystem and with an irreducible minimum increase in clerical staff. I think

FIGURE 9



that with network files we can kill all these birds with one stone.

Again, we shall start slowly and work in limited progressive steps. Our company has a tremendous need in all these areas, yet we cannot make this need a top priority computer application. Its purpose is more defense and control than direct profit making. The bill of operations, the operations planning system, and other programing projects will have far faster and greater payoffs. Yet by taking advantage of the powerful software available to us in the form of network file organization, we can move in this direction many man-years faster than we could with a conventional and piecemeal approach.

Conclusion

In all three of these applications the key is flexibility – ease of change of value and structure. File maintenance is more sensitive, more comprehensive, and administratively far cheaper than it would be with any other kind of file organization (that I know of) designed to serve the same purposes. It gives fingertip control, fine-tuning capability. And it gives the accuracy that can be achieved with nonredundant records serving multiple purposes.

Thesaurus approach

But its development is not easy. Although the software is written by the manufacturer, these packages take a great deal of study, and their programing structure is very difficult to master. Very good people are required to tackle something like this. No one should bother with the network file—I would say—if he has constant relationships between records or very few changes to make in existing records. In such a case, for instance, it might be better to use matrix algebra for explosions and retrievals.

However, when the nature of the operation justifies the effort, network files will provide a thesaurus instead of a dictionary. When someone knows the meaning of a word he wants but can't think of it, a dictionary does little good. Instead, he goes to Roget's *Thesaurus* to find a key word in the definition he is thinking of, or a related word, or even the opposite word, and the book will retrieve for him almost every conceivable cross-relationship. A thesaurus is an information retrieval system developed a hundred years before the computer. A network file approach may provide all the advantages of Roget's logic of association without hedging the incredible power of the computer.

TENTATIVE DESCRIPTION OF THE NATURE OF MANAGEMENT ADVISORY SERVICES BY INDEPENDENT ACCOUNTING FIRMS

Statements on Management Advisory Services No. 1
by the AICPA Committee on Management Services

Introduction

1. An independent accounting firm's purpose in engaging in management advisory services is to utilize the essential qualifications it has available to provide advice and technical assistance which will enable client management to conduct its affairs more effectively. These essential qualifications are based in part on attributes acquired in conducting other aspects of practice and include technical competence; familiarity with the client's finance and control systems and his business problems; analytical ability and experience in problem solution; professional independence, objectivity, and integrity. Although not always identified as "management advisory services," independent accounting firms have rendered advice and assistance to clients outside the accounting, auditing, and tax areas for as long as the accounting profession has existed.

Role of CPA

The role of an independent accounting firm in performing management advisory services is to

provide advice and technical assistance, and should provide for client participation in the analytical approach and process. Specifying this as the proper role recognizes both the appropriate place of management advisory services and the realities of practice. This is the only basis on which the work should be done and it is the only basis on which responsible management should permit it to be done.

When the services to a client also include expression of an opinion on the fairness of financial statements, the matter of role has special significance, since it also relates to the independence of the accounting firm. Opinion 12 of the American Institute of Certified Public Accountants' committee on professional ethics is explicit on this point. The accounting firm's role is to provide advice and technical assistance and to avoid making management decisions or taking positions that might impair the firm's objectivity.

2. In recent years, management advisory services have been in an accelerating process of evolution, with the profession's participation growing in response to requests from clients for assistance. In many instances, management needs and problems are more complex and the techniques involved in their solution more sophisticated than ever before. The profession's response to the demand for advice has been to develop a broader range of services.

3. The American Institute of Certified Public Accountants set forth the Institute's basic policy regarding management advisory services in the following resolution adopted by Council in April, 1961:

"It is an objective of the Institute, recognizing that management service activities are a proper function of CPAs, to encourage all CPAs to perform the entire range of management services consistent with their professional competence, ethical standards and responsibility."

The committee on management services believes that an interpretation of the phrase "the entire range of management services consistent with their professional competence, ethical standards and responsibility" will contribute to the orderly implementation of this policy throughout the profession.

Subsequently, Council, in October, 1966, adopted "A Description of the Professional Practice of Certified Public Accountants." Within the framework of this description, the committee believes that a further description of that portion of the practice generally referred to as management advisory services is desirable. Such an interpretation and further description will, among other things, serve to:

a. Guide independent accounting firms in selecting and practicing in areas of service in which they can and wish to render advice and technical assistance to clients beyond those relating to auditing, financial accounting, and taxes;

b. Assist those responsible for developing and conducting educational programs for CPAs;

c. Provide a basis for the general business community to become better informed regarding the nature of management advisory services as performed by independent accounting firms.

Description of management advisory services

4. Management advisory services by independent accounting firms can be described as the function of providing professional advisory (consulting) services, the primary purpose of which is to improve the client's use of its capabilities and resources to achieve the objectives of the organization. This can relate to areas such as:

- The management functions of analysis, planning, organizing, and controlling
- The introduction of new ideas, concepts, and methods to management
- The improvement of policies, procedures, systems, methods, and organizational relationships
- The application and use of managerial accounting, control systems, data processing, and mathematical techniques and methods, and
- The conduct of special studies, preparation of recommendations, development of plans and programs, and provision of advice and technical assistance in their implementation.

In providing this advisory service, the independent accounting firm applies an analytical approach and process which typically involve:

- Ascertaining the pertinent facts and circumstances
- Seeking and identifying objectives
- Defining the problem or opportunity for improvement
- Evaluating and determining possible solutions, and
- Presenting findings and recommendations,

and following the client's decisions to proceed, the independent accounting firm may also be involved in:

- Planning and scheduling actions to achieve the desired results, and
- Advising and providing technical assistance in implementing, in combination with knowledge and experience in such areas as:
- Organization and management methods
- Office and management functions
- Systems and procedures
- Data processing methods
- Quantitative methods (mathematics, statistics, etc.), and
- Financial management,

to produce solutions such as:

- A management information system
- A sales reporting system
- A cost accounting system
- A work measurement program
- Improved production control
- An organization plan with statements of duties and responsibilities, or
- An electronic data processing system.

5. The above represents a con-

This statement, whose exact text is reproduced here without editing by Management Services, represents the opinion of the committee on management services as to the best practices in this field.

ceptual description of management advisory services rather than a definition in terms of area of application of the services. The committee believes that the adoption of an itemized "list of acceptable areas of service" would be useful; however, no generally accepted classification of subject matter currently exists for this purpose. Also, the validity and acceptability of such a list would have to be dependent on there being clearly discernible criteria for differentiating among the range of possible subject matter, and no such precise bases have yet been found.

There are several further reasons why the development of such a list appears to be unattainable. In the first place, many of the subject areas themselves do not have definitions which are precise and exclusive enough to be usable or acceptable in preparing the list. Second, the decisions regarding many of the subject areas, as being an "acceptable area of service," could depend on considerations of the underlying subareas with which the independent accounting firm was concerned (e.g., research per se vs. a system for the planning and control of manpower participating in research). Third, the circumstances under which services are to be rendered in a particular subject area (a large vs. small client; a simple vs. complex problem) and the role of the independent accounting firm (as a fact-gatherer vs. a recommender vs. a technical implementor) would also be pertinent in the determination of the list.

Determining a scope of service

6. The committee believes that an independent accounting firm in reaching a decision as to the scope of its management advisory services should be guided by certain significant criteria established by the profession, such as competence and independence. Certain criteria will apply primarily to the profession as a whole, while others will be more relevant to the particular independent accounting firm or engagement.

7. The CPA's ability to learn and successfully apply the basic analytical approach and process is well recognized. The more difficult questions which must be answered by an independent accounting firm in determining a scope of management advisory services, however, relate to the depth of knowledge and experience required in the various subject areas and kinds of problems and solutions with which the firm might become involved. Since it is not possible to specify all the subject areas and types of problems with which independent accounting firms may be called upon to deal, the committee suggests the following guidelines which should be useful in selecting a scope of services.

General guidelines

8. *Responsibility to Establish Scope of Services.* Each independent accounting firm has the responsibility to determine the scope of services it is competent to offer to the public, subject to the pronouncements of the profession. Each independent accounting firm should make its own decisions in accordance with the type of practice which it desires to conduct. It is anticipated that many firms will not choose to render management advisory services in all subject areas.

9. *Independence.* When providing management advisory services, the independent accounting firm must, as in all areas of practice, give particular consideration to both independence and the appearance of independence as set forth in the Code of Professional Ethics particularly in Rule 1.01. This rule states in part:

"Neither a member or associate, nor a firm of which he is a partner, shall express an opinion on financial statements of any enterprise unless he and his firm are in fact independent with respect to such enterprise.

"Independence is not susceptible

of precise definition, but is an expression of the professional integrity of the individual. A member or associate, before expressing his opinion on financial statements, has the responsibility of assessing his relationships with an enterprise to determine whether, in the circumstances, he might expect his opinion to be considered independent, objective and unbiased by one who had knowledge of all the facts."

Ethics committee statement

In addition, the committee on professional ethics concludes with the following statement in its Opinion No. 12:

"The committee does not intend to suggest . . . that the rendering of professional services other than the independent audit itself would suggest to a reasonable observer a conflict of interest. . . . In the areas of management advisory services . . ., so long as the CPA's services consist of advice and technical assistance, the committee can discern no likelihood of a conflict of interest arising from such services. It is a rare instance for management to surrender its responsibility to make management decisions. However, should a member make such decisions on matters affecting the company's financial position or results of operations, it would appear that his objectivity as independent auditor of the company's financial statements might well be impaired. Consequently, such situations should be avoided.

"In summary, it is the opinion of the committee [on professional ethics] that there is no ethical reason why a member or associate may not properly perform professional services for clients in the areas of . . . management advisory services, and at the same time serve the same client as independent auditor, so long as he does not make management decisions or take positions which might impair that objectivity."

10. *Competence.* The scope of management advisory services of an independent accounting firm also depends on another fundamental and obvious matter—competence. Independent accounting firms have the responsibility to evaluate their ability to render management advisory services of a professional quality in each specific area. They also have the responsibility to refrain from representing themselves as qualified and willing to accept work in areas where they do not possess the required competence. Competence in professional work involves both the technical qualifications of staff personnel and the firm's ability to supervise and evaluate the quality of the work performed. Competence embraces both the analytical approach and process and the subject matter of the areas involved.

The degree of competence required will naturally vary according to the degree of difficulty of the engagement and the importance of the recommendations for which the independent accounting firm will assume responsibility. It will also vary according to the role assumed by the firm—i.e., as an advisor, fact-gatherer, or technical implementor.

The independent accounting firm will not always begin an engagement with a full and detailed knowledge of the characteristics of the business or of all of the techniques available for the solution of the problem, for no two situations faced by a firm are ever exactly the same, nor are the technical procedures required to achieve the desired result identical. The firm is expected to adapt its procedures and knowledge to the circumstances of the particular case and to research unfamiliar subject matter involved in the solution of the problem. In those instances in which the acquisition of the necessary knowledge is not a natural part of the conduct of the engagement as a result of the fact-gathering procedure or of the normal research process, the independent accounting firm should question its competence to carry out the engagement.

With this statement, the AICPA committee on management services launches a new series of opinions comparable to those that provide guidelines in accounting, auditing, and taxation. The second statement in the series, on competence, will appear in the next issue.

This matter is considered more fully in Statement on Management Advisory Services No. 2, *Competence in Management Advisory Services.*

Other considerations

11. *Other Considerations.* The scope of management advisory services is such that no one person can be expected to develop sufficient specialized knowledge and skill in all areas in which clients might require assistance. A wide range of management advisory services can normally be performed only by a firm which includes both generalists and individuals who have acquired specialized qualifications in the subject matters or techniques involved. Accordingly, the requirements for specialization in certain areas may limit the scope of management advisory services offered by any given independent accounting firm. As a result, many independent accounting firms will decide on a scope of practice which does not include areas of service offered by others in the profession.

The scope of services offered by the independent accounting firm also should be adequate to identify and resolve the clients' basic problems and not just problem symptoms. If the scope is excessively narrow, there is a danger that the problem may be defined and solutions developed from too narrow a point of view to be really useful to the client.

Referrals

12. *Referrals.* Referral of management advisory services work to other independent accounting firms is an alternative course of action to that of developing individual or firm capability. Recognizing the depth and breadth of skills required to deal effectively with the clients' basic problems and the economic limits of practice, the independent accounting firm's sense of responsibility to its clients may in some or all instances lead it to refer the management advisory services requirements of its clients to others. The referral arrangement may provide for a joint effort or provide for the services to be performed solely by the referee brought in for that purpose. In any event, to the extent that the independent accounting firm finds an effective way to co-operate with others, it may thereby expand its own knowledge and extend its own scope of service toward providing the full range of management advisory services.

13. *The Code of Professional Ethics.* The applicability of the Code of Professional Ethics to management advisory services was clarified by Opinion No. 14 of the American Institute of Certified Public Accountants' committee on professional ethics, which states, ". . . It is the opinion of the committee that all provisions of the Code of Professional Ethics apply to management advisory services, except those rules solely applicable to the expression of an opinion on financial statements." It is, therefore, the responsibility of the independent accounting firm to itself that the nature and scope of the management advisory services it elects to offer are in conformity with this requirement.

Conclusion

14. The American Institute of Certified Public Accountants, recognizing the needs of the business public and the long record of substantial and varied accomplishments by independent accounting firms in rendering management advisory services, has encouraged and continues to encourage firms to develop their capabilities in this expanding field.

The appropriate range of services for the profession and the accounting firm should depend on considerations of:

- Responsibility of the independent accounting firm to establish its scope of services
- Independence
- Competence
- Requirements for specialization
- Attention to the client's basic problems
- Referral arrangements, and
- The Code of Professional Ethics.

This Statement has described the nature of management advisory services by independent accounting firms and is intended to provide guidelines for determining a scope of service and to serve as a basis for future statements in this area of practice.

The Statement entitled "Tentative Description of the Nature of Management Advisory Services by Independent Accounting Firms" was adopted by the assenting votes of nineteen members of the committee. One member, Mr. Carrico, dissented.

Mr. Carrico dissents because he feels the Statement does not provide the needed delineation of proper scope of CPA practice in the management services area.

He believes that the CPA should limit himself to areas of practice which would be pertinent to management information and control systems based largely on accounting, economic, and other pertinent data. This would also include procedural, data processing, and organizational assistance necessary for the effective development and utilization of such information.

NOTES

This Statement is published for the guidance of members of the Institute in carrying out a management advisory services practice. It represents the considered opinion of the committee on management services and, as such, contains the best thought of the profession as to the best practices. Members should be aware that they may be called upon to justify departures from the committee recommendations.

COMMITTEE ON MANAGEMENT SERVICES (1968-69)

what people are writing about

BOOKS

The American Challenge by J.-J. SERVAN-SCHREIBER, Atheneum House, Inc., New York, 1968, 291 pages, $6.95.

American business is on the verge of reducing Europe to the status of a colony, this French journalist warns in a best-selling book that is interesting to Americans as much for its breathless admiration of American society as for its call for Europeans to man the economic battlements against the bloodless invasion.

American, not European, management has seen the potential of the European Common Market and is capitalizing on it. Already, with $14 billion of U. S. capital (in fixed assets) invested, the European market is basically American in organization, Mr. Servan-Schreiber asserts. "Fifteen years from now it is quite possible that the world's greatest industrial power, just after the United States and Russia, will not be Europe, but American industry in Europe."

While European companies are still waiting for a Common Market statute to permit European-wide businesses, American companies manufacturing on the Continent are treating Europe as a single market. And they are, says Mr. Servan-Schreiber, capturing "those sectors of the economy most technologically advanced, most adaptable to change, and with the highest growth rates." He is most concerned about their growing dominance in the electronics industry, "the base upon which the next stage of industrial development depends."

This trend, the author feels, is not likely to be reversed. "During the next few years American investment in Europe will continue to grow far more rapidly than European investment. Its profits are already half again as large as

ours. It is assuming the major role in strategic areas of development. This is not happening through ordinary investments, but through actual takeovers of European firms that Americans then transform into rich and powerful corporations."

They do this, Mr. Servan-Schreiber points out, "with European money that our own businessmen do not know how to use . . . Nine-tenths of American investment in Europe is financed from European sources. In other words, we pay them to buy us."

Consumer benefit

Mr. Servan-Schreiber does not deny that European consumers have benefited from the resulting prosperity. Even so, he feels, this peaceful invasion is a bad thing.

"To ask if the Europeans should turn an increasing share of their industrial development over to the United States is like asking whether it is better to be a wage earner or a factory owner . . . foreign investment imposes strict limitations on national development, limitations inherent in the very process of industrial creativity." Assigned to produce only established products, Europeans will be cut off from the possibilities of rapid expansion that result from innovation.

Search for solution

What, then, can be done? Mr. Servan-Schreiber is not in favor of national restrictions on American enterprise, which would simply result in a shift of production to another Common Market country, or even Europe-wide restrictions. For the fault, he feels, lies in European, not American, industry.

This is not an anti-American book. Indeed, Mr. Servan-Schreiber yields to no man in his admiration of American enterprise and American institutions. He wants Europeans to imitate the very characteristics of American society about which Americans themselves are uneasy—the educational system and the research partnership among business, government, and the universities which he calls the "industrial-intellectual complex."

This book has been faulted by economists and other critics for failing to back its sweeping assertions with supporting data. It is true that Mr. Servan-Schreiber's sources are few and loosely identified. They also vary widely in quality; he leans heavily, for example, on forecasts made by Herman Kahn's Hudson Institute, treating them as if they were facts rather than projections. The force of some of his examples has already been destroyed by the march of events; his choice of the sweepwing plane to demonstrate American technological superiority was unfortunate, to say the least.

However, Mr. Servan-Schreiber is a journalist, not a scholar, and his book does not pretend to be more than a popularization. Furthermore, the real thrust of his book lies in its psychological rather than its factual truth. Whether these things are really happening or not is less significant than whether Europeans believe they are. And the extent of European belief is demonstrated by the impact of the book, which in its first three months sold more copies than any French book published since World War II.

Thus, this is a significant guide to European attitudes and European thinking for any businessman operating—or thinking of operating—there. Even those who have no interest in Europe will be fascinated by its picture of the United States.

Managing Growth Through Acquisition by DAVID F. LINOWES, CPA, American Management Association, New York, 1968, 192 pages, $8.25.

A CPA with a lot of experience in acquisition counseling distills some of that experience for the benefit of merger-minded managers.

Growth is the current corporate passion, and merger is the most popular route to it. These trends make this discussion of when and how to go about acquiring both timely and useful.

After a down-to-earth analysis of when to expand (and when not to) and when expansion should be internal, when by acquisition, Mr. Linowes gets down to specifics: how to organize an acquisition program, how to get leads to prospects, how to negotiate a deal, how to evaluate a candidate's financial position and its management, how to avoid government intervention, and finally how to integrate the new and old companies.

Mr. Linowes is a lively writer; his book is liberally sparked with anecdotes based on his own extensive experience in this field. His approach is practical; the book is full of checklists and lists of do's and don'ts. And he is highly knowledgeable; if every would-be acquirer heeded all his caveats, there would be many fewer—but many better—mergers.

For the executive or consultant who is a neophyte in this field, this book offers a valuable basic guide. Even the expert may find some new insights in it.

(Note: A large part of this book, in somewhat different form, appeared in various articles contributed by Mr. Linowes to MANAGEMENT SERVICES.)

MAGAZINES

Old and New Productivity Techniques Start Closing Gaps by JAMES H. DUNCAN, *Columbia Journal of World Business,* January-February, 1969.

Europe can meet the "American challenge" if it tries, says this management consultant specializing in work measurement. Not surprisingly, his recommendation is more use of work measurement to improve productivity without increasing payrolls.

Capitalizing on the attention gained by J.-J. Servan-Schreiber's *The American Challenge,* Mr. Duncan takes the opportunity to sing the praises of industrial engineering, particularly work measurement, and suggest it as the solution to Europe's economic dilemma.

Mr. Duncan agrees with Mr. Servan-Schreiber that the gap between Europe and the United States is not basically technological, citing a number of technical advances—from cryogenics to the computer—that were pioneered in Europe. Nor, he agrees, is it totally managerial.

Boost productivity

Like Servan-Schreiber, he criticizes the educational system and social structure that lead to top management rigidity and condescension toward middle management, supervision, and technical specialists. If European management really wanted to, he concludes, it could do much to boost productivity, "always a fundamental element in economic growth."

To advance productivity, Mr. Duncan prescribes, European industry must overcome these weaknesses:

Overcome weaknesses

Lack of motivation for improvement (partly the result of high income taxes)

A tendency to prefer theoretical to pragmatic solutions

Lack of understanding of the need for efficiency and clear-cut objectives

Ineptness in dealing with unions

Reluctance to train and discipline employees

Lack of know-how in such areas as computers, automation, industrial engineering, and marketing.

Mr. Duncan's basic prescription for these woes is more and better use of sound work measurement techniques. He cites examples of European managers who attained dramatic productivity increases in this way. For example, one electrical components manufacturer in Great Britain doubled his output in three years without increasing his labor force.

Sound work measurement techniques, says Mr. Duncan, constitute an option open to every nation of the world. With them, "what is now considered 'the American challenge' could, in the coming decade and a half, be met by 'the European challenge.'"

Robustness in Sequential Investment Decisions by SHIV K. GUPTA and JONATHAN ROSENHEAD, *Management Science,* October, 1968.

A new investment criterion called "robustness" is presented for long-range sequential investment decisions where there exists considerable uncertainty about the outcomes of certain future events. Under these conditions it is suggested that initial investments should be chosen according to the magnitude of their robustness, i.e., the number of good end states left open in the uncertain future when the initial irreversible decisions are made.

This decision criterion was developed from a linear programing model in which this concept was used to choose geographical locations for the construction of new facilities to meet expected increases in product demand over a ten-year period where the outcomes could be estimated but their probabilities of occurrence could not. The advantages of robustness might suggest the adoption of this criterion on a broader basis in other decision making situations. But the assumptions upon which its use is based may prevent such a general adoption.

In the example given, the decision to expand production facilities for a product line had evidently already been made. If this were a one-product firm there might have been no substantial alternative investment available, and if the initial investments looked profitable, the robustness criterion could apply. But in most firms a limited supply of investment funds exists, and investments into several new and existing product lines vie for these funds. In order for an investment proposal to be selected to use a portion of these funds it must meet two requirements: (1) It must meet some minimum standard such as covering the cost of capital, and (2) it must have a criterion outcome greater than or equal to the outcomes of other proposals not selected. The robustness criterion will not enlighten management on an investment's ability to meet the first requirement. In order to make such decisions, criteria such as absolute profit and rate of return on investment are used. The outcomes of these criterion events are best expressed in the form of density functions, for which David Hertz* has developed a method of derivation. Usually, when outcomes of future events can be estimated, some subjective probabilities for the events can also be estimated, and, even though these are subjective in nature, they provide more information for better decisions than if uncertainty is assumed to prevail. Therefore, "robustness" cannot "replace" the traditional decision making criteria.

Aid in planning

But the concept of robustness can make a contribution to decision making. Long-range planning is becoming increasingly important, and future events, even though they may be uncertain, must be taken into consideration. The robustness criterion can aid the decision maker in taking these events into consideration in two primary ways:

First, the robustness data can be used as supplemental information for making initial investment deci-

*Hertz, David, "Risk Analysis in Capital Investment," *Harvard Business Review,* January-February, 1964, pp. 95-106.

sions. Two main alternative uses can be made of this supplemental information: (1) It may be used as the final criterion to break ties between alternative investment proposals, and (2) its importance may be elevated to the point where it is given a weight in determining the final ranking of alternative investments. How this weight is to manifest itself may vary with each firm.

Secondly, the technique may be used as it was in the example given in the paper, where it is used for selection of investment alternatives under assumptions similar to those in the example. In such a role it aids in the implementation of a sequential investment plan.

Robustness should not be considered as an alternative for the traditional methods of investment analysis but as a technique for providing additional information on which decisions can be based. The limitations on its value should be recognized, and restraint must be used in its application to the decision making process.

STEPHEN R. HEIMANN
The Ohio State University

Clerical Cost Control by BRUCE PAYNE, *Business Automation,* November, 1968.

The author argues that management can reduce clerical costs by 20 to 25 per cent through work measurement.

Whereas work measurement techniques, including methods-time-measurement (MTM), are used to measure performance of over 80 per cent of all blue collar workers today, less than 5 per cent of white collar workers are measured against accurate standards. By 1970, however, it is expected that there will be 37 million white collar workers as compared to 30 million blue collar employees.

Mr. Payne recommends the use of MTM to measure office workers' performance, although the basic "time measurement units" (the time it takes to perform basic tasks) must be broader than for blue collar workers because of the varied nature of office workers' tasks. Such a program must be permanent, with work standards audited frequently; it must be accepted by all levels of management and workers; and it must be positive (management improvement) in approach rather than negative (cost cutting).

PAUL PACTER
AICPA

Internal Auditing and the Information Explosion by R. L. MARTINO, *The Internal Auditor,* March-April, 1968.

The electronic computer has been the catalyst for today's technology and information revolution. The production of knowledge and information as a service industry is rapidly overtaking manufacturing as the primary economic focus of attention. The manager, faced with this mass of data, needs help in translating facts into information that is relevant and meaningful to him. The internal auditor can augment his traditional role by assuming the role of translator, or management advisor.

The auditor's role has been changing over the decades. From the historic responsibility of the post audit to determine the operating effectiveness of a company's control system, his role has extended to determining whether the requirements of the total control system are being effectively met and to appraising the adequacy of the system in meeting management's needs.

The advent of the computer has accelerated the information explosion. The challenge of management today lies in its ability to separate out from the voluminous data which have been thus generated the facts that provide pertinent and meaningful information as a basis for successful decision making.

To demonstrate his thesis, the author first analyzes a typical business decision as composed of three steps—anticipation (or forecast), preparation, and action. He maintains that the main problem area centers around the forecast; costly errors may result if there is no control mechanism to minimize the gap between actual and forecast events when deviations occur. According to the author, the key to a successful decision is reaction time —the time necessary for this adjustment.

New tools

Three new operating tools are invaluable aids in solving this problem:

(1) the electronic computer to perform complicated arithmetic calculations and logical selection
(2) mathematics as a common language in business to formulate and solve problems
(3) systems analysis.

How does the auditor fit into this picture? His involvement in three associated problem areas can prove very beneficial. The increasing complexity of computer equipment (hardware) and systems design and the problems of comprehending computer language have created the need for an enlarged scope of audit verification. This requires an increase in the auditor's educational requirements to enable him to understand not only the computer itself but also the way it is operated by the company's personnel.

New language needed

This author feels that there is a need for a new universal language to better identify the interrelationships within a system and to replace the present, to him, inadequate, method of block diagramming, which does not facilitate interpersonal communications. Decision tables are recommended as a common language and visually ori-

ented reports to simplify communication between technician and manager.

He further proposes design of management information systems (MIS) oriented toward management's objectives and requirements. However, first the manager must have an appreciation of the computer's utility as a day-to-day tool in the production process and of the paramountcy of the design of, rather than the hardware in, the system.

Key elements

The key elements in an MIS, says the author, are the communication of information—facts and figures—to management and its dissemination, together with an explanation of individual responsibilities, to all concerned.

Management needs pertinent, up-to-date information to evaluate the risks involved in a decision and a feedback process to inform it of the outcome.

Basic features

The author outlines three principal features that an MIS must have. It must be capable of:

(1) measuring the effect of a decision ex post or ex ante
(2) measuring changes in the external environment
(3) permitting timely reaction to potential problems.

The computer can help the system meet these requirements by testing decision patterns prior to selection of a course of action and checking decisions during the actual processes they affect.

Auditing is part of this entire management information processing system. The system's control is the subject of the internal auditor's evaluations; its performance, that of the manager's.

The problems involved in establishing and auditing a management system—a system designed to reinstate the manager as the holder of the corporate reins by providing him with the necessary pertinent information—provide the theme for this article. The internal auditor appears as the middleman between technician and manager—the new translator.

IVAN N. GELLERT
University of Florida

Assignment of Costs to Joint Products in a Decentralized Firm by MYRON J. GORDON and CHARLES YING, *Journal of Business,* July, 1968.

A model is presented which assigns costs to joint products for transfer pricing purposes so that the decision on the level of marketing expenditures made by the sales manager of the product, who has been delegated authority over marketing policies, will be goal-congruent to the central authority's goal of maximizing profit. Rules for the assignment of a transfer price are developed so that the level of sales decided upon by the sales manager will be the same as that determined by the central authority.

The very restrictive assumptions made by the authors in developing this model made it relatively easy to derive the optimal sales expenditure and the appropriate transfer price, given a certain level of expenditure, and to develop the proof of goal congruence of the decisions of the sales manager of a particular product. Elaborations of the model can easily be made by relaxing some of these assumptions, although the proofs of congruence may become involved. But this difficulty does not restrict the ability of the techniques presented to derive rules of transfer pricing, given certain conditions, whose use will result in goal-congruent decisions, which has been an old and basic accounting problem.

The values which are assigned as the transfer prices in the set of rules developed are not necessarily unique, and no reason is given for those values selected. In an actual application, external conditions such as the psychological effect of the price assigned would dictate which of the alternative values would be chosen.

The "certain conditions" previously referred to, under which the model is applicable, are that both the central authority and sales manager have the same knowledge about the demand function or its distribution. It might be said then, as pointed out by the authors, that the calculation of the appropriate level of expenditures by the sales manager is redundant and unnecessary since the central authority must also calculate it for the assignment of an appropriate cost. But for psychological and motivational reasons this redundancy may be acceptable or even preferred since it allows the sales manager to make the decision. The model provides a mathematical approach to the determination of transfer prices which should result in goal-congruent decisions, and it may inspire the creation of other more general models that will help solve the accounting problem of determining appropriate transfer prices.

STEPHEN R. HEIMANN
The Ohio State University

Audit Responsibility and Utilization of EDP Equipment by P. R. ALLEN, *The Internal Auditor,* March-April, 1968.

The auditor's task is to provide top management with a service. Yet changes in auditing theory have not kept pace with the rapid technological developments in the field of data processing, which have become a part of the auditor's environment. To fulfill his audit responsibility, the auditor must learn to utilize the capabilities and potentials of the computer.

The author emphasizes that by using EDP equipment in his audit the auditor can realize important control benefits in addition to having much of the massive volume of detail audit work performed by

the computer. A prerequisite for the success of such an engagement, in terms of management services, improvement of the quality of the audit, and substantial saving in man-hours, is a closer alliance between the operational auditing and management services divisions.

Tests emphasized

New audit techniques will be necessary if the computer system is to be successfully utilized. The emphasis will be on designing tests of the system's control aspects rather than of the human factors involved.

The author outlines three areas with which the auditor should be familiar to increase his comprehension of the EDP system:

(1) work flow charting—involving the symbolic representation of procedures
(2) testing techniques, including block testing, random sampling, and statistical sampling (random sampling with statistical measurement)
(3) hardware (the machines in the system) and software (the programs with which to operate the system).

Procedures suggested

In the actual audit and evaluation of the computer's performance, the author suggests the following procedures:

(1) employment of test checks to evaluate the quality of the data processing system
(2) use of special audit programs designed to examine the quality of the information output of the system through detailed tests, computations, and exception reports
(3) evaluation of the internal control of the entire physical maintenance and processing procedures in the system—this internal check to be built into the processing routines themselves.

The author maintains that with increased understanding of the operations of a computerized data processing system the auditor can utilize new developments, such as daily processing of exception reports, to achieve the dual purpose of using the computer as a continuous audit tool and performing a 100 per cent audit.

Though somewhat generalized in its approach, this article successfully points up the need for a new breed of auditor, instilled with a greater knowledge of, and insight into, the mechanics of the computer age and the benefits that accompany it. The auditing profession must adapt to this changing environment if it is to continue to provide a vital and flourishing service.

IVAN N. GELLERT
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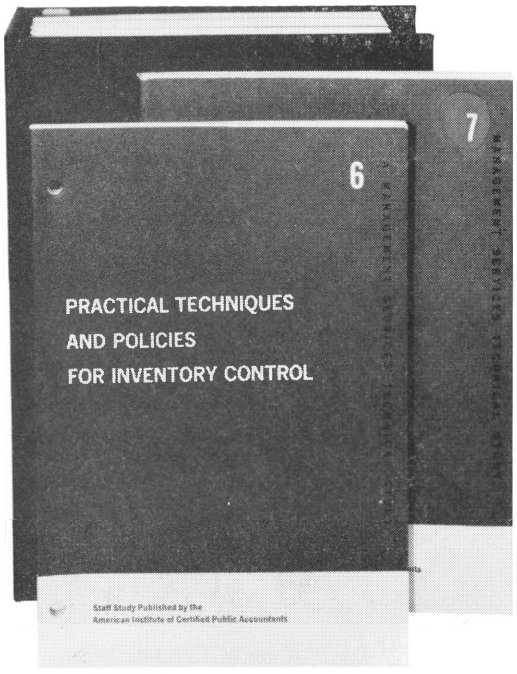

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