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American Institute of Certified Public Accountants

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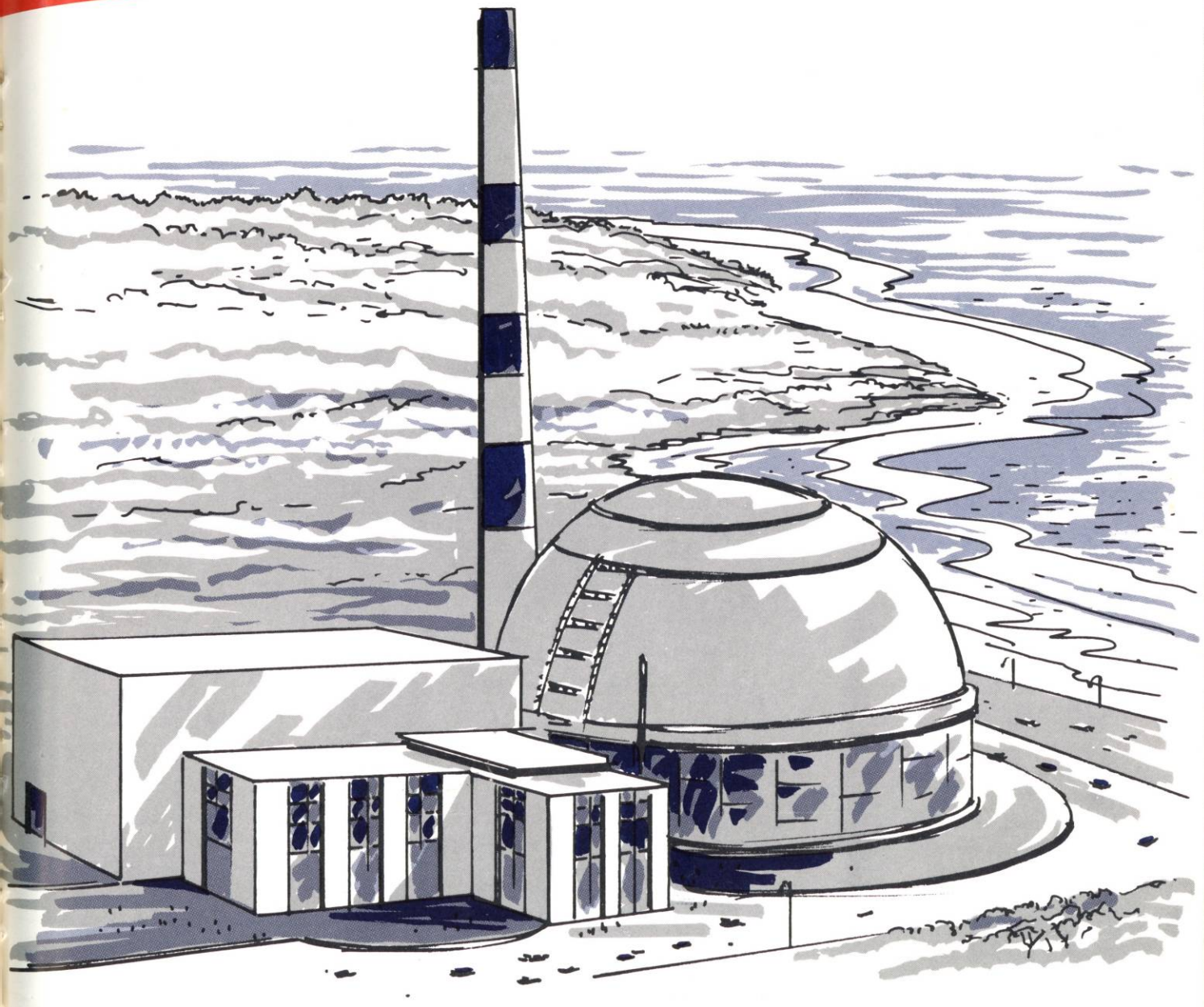
Cost Accounting to Adapt to Nuclear Energy Needs

Thomas S. Dudick



A Publication of the American Institute of Certified Public Accountants

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pervenerint salutem.
Praeses Sodalesque Collegii Radcliviani in Comitiis sollemnibus
Annam Tolstoi
alumnam in cursu academico ——— studiis
praestantem ad gradum Baccalaurei in Artibus cum laude admiserunt eique
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W K Jordan Praeses
Collegio Radcliviano discipulam supra dictam ad gradum Baccalaurei in Artibus ad-
mittenti Praeses Sociique Collegii Harvardiani ex lege de Collegio Radcliviano instituendo
postquam comperierunt omnia ei esse ad impleta quae in Universitate Harvardiana
iniunguntur eiusdem gradus candidatis consenserunt.
James Bryant Conant Praeses

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(formerly *Management Services*)

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Tenth annual AICPA conference on computers and information systems

MARRIOTT MOTOR HOTEL / CHICAGO, ILLINOIS / MAY 6-8, 1974

Are you involved in some way with EDP? Are your clients? The Tenth Annual AICPA Conference on Computers and Information Systems offers you a unique opportunity to bring yourself up-to-date.

This highly successful program offers important practical benefits to every CPA who is involved with some aspect of EDP . . . or who may become so involved.

The 2½-day Conference represents a unique opportunity for you to bring yourself up-to-date on the current "state of the art"—with the help of experienced CPAs and experts in related fields, and in the company of professional colleagues who share your interests, needs and concerns.

In addition to practical sessions dealing with various aspects of computers and information systems, the Conference will include informal orientation sessions and round table discussions —two features that have been enthusiastically received in the past. And throughout the program, there will be provisions for discussion from the floor in connection with each of the topics covered. A visit to the AFIPS National Computer Conference Exhibition of EDP equipment and related services —the world's largest—will be a special feature of this year's program at no extra cost.

To supplement the regular program, ample opportunity has been provided for informal discussions and associations that have proved extremely valuable in the past. And a special program of interest to wives is being planned—at no additional ladies' registration fee.

TECHNICAL PROGRAM HIGHLIGHTS

Auditing in an EDP Environment—A Mid-1970's Update—including Advanced Electronic Data Processing Systems and the Auditor's Concerns

"Computer Abuse" and the Auditor

PARALLEL SESSIONS COVERING THE FOUR PRACTICE AREAS OF AUDITING, MAS, PRACTICE ADMINISTRATION AND TAXATION

Auditing—How to Approach EDP Auditing; EDP Audit Techniques . . . Auditing Research—A Description of the NAARS System . . . Statistical Sampling in Auditing . . . Auditing of Service Center Produced Records.

Management Advisory Services—Minimum Control Standards for Design of EDP Systems . . . EDP Feasibility Studies—including "How To" examples . . . Allocation Of Computer Costs to Users.

Practice Management—Manpower Requirements . . . Time Reporting, Cost Accounting and Accounts Receivable . . . "The Computer Is Really Good For Something After All!"

Taxation—The National Tax Research System . . . Income Tax Planning via Time-Sharing . . . Trust Accounting With the Aid of a Computer . . . Pension Plans and Allocation of Partnership Income . . . Estate and Gift Tax Planning . . . What's Available in Computerized Tax Preparation and How to Use It.

SIMULTANEOUS ROUNDTABLE DISCUSSION SESSIONS INCLUDING

Basic and Advanced Time-Sharing . . . Mini-computers for Business Data Processing . . . Use of Audit Software . . . Managing a Data Processing Center . . . EDP Security . . . Computerized tax Preparation . . . Auditing EDP Installations.

Registration Information—Single registration fee for the Conference is $110. The fee for additional registrants from the same firm is $95. This fee covers all sessions, materials, luncheons and coffee breaks on all three days as well as the reception on Monday evening. Hotel accommodations and other meals are not included.

Hotel reservations should be sent to the Reservations Department, Marriott Motor Hotel, 8535 W. Higgins Road, Chicago, Ill. 60631. Tel. 312-693-4444. Mention AICPA Computer Conference.

If you require additional information about the program, please write to Mr. Noel Zakin, Manager, Practice Applications, AICPA.

To register, send names of registrants with check (payable to AICPA) to the address below.

American Institute of Certified Public Accountants, 666 Fifth Avenue, New York, N.Y. 10019

people, events, techniques

Better Balance Between Private, Public Control of Most Institutions May Be Necessary To Solve Increasing Problems, Consultants Told

We need to care more was the message, not of a love-in but of the Third Annual North American Conference of Management Consultants, held in New York January 22.

"We need people who care for institutions. Change in institutions will only come about if we care for them," said the conference keynote speaker, Dr. Howard W. Johnson, chairman of the corporation of the Massachusetts Institute of Technology.

He stated that our society is suffering from disorder because institutions are falling short, in the people's estimation, of what they are expected to attain with their resources. The management consultant is in the position to help institutions take the long view, Dr. Johnson said.

Responses are extreme

"Foresight is the central ethic of leadership. So many bad decisions are made when there are no other choices left," he observed. Extreme responses to problems have occurred because advanced planning has not been done. In our recent past, he cited the strong swings to and away from scientific research, the youth culture, environmental protection, and the energy issue as examples of these extreme responses.

"By the end of this century, private institutions as we know them may not exist," Dr. Johnson warned. "I would prefer self regulation and discipline, but that may not be adequate." He suggested that perhaps the best solutions to problems will arise from a balance of private and public administration; the private sector providing initiative and efficiency, and the public, protection and large-scale equity.

"We are all publicly accountable for everything we do," he stated.

Several conference speakers re-

ferred back to Dr. Johnson's suggestion that consultants aim to get people to care about institutions. However, the talk that probably provoked the most comments was quite a bit more pragmatic. Brian P. Smith, managing director, PA International Management Consultants Ltd., presented what was also dubbed a "keynote speech" on "The Marketing of Management Consulting Services."

"Our choice is not commercialism or professionalism but good or bad marketing," Mr. Smith said. "Most of us believe that we need a selling effort in order to survive and succeed."

"Dignified image" exaggerated

"Although there is a danger of being unprofessional, sensibly commercial, there is a more insidious threat in being so caught up in chasing a dignified image that we become commercially ignorant of our own marketing needs and are seen by our public as being so." He compared a consultant who is a business failure to a penniless stockbroker, neither generating much public confidence.

"Segmentation is the key to the marketing plan," he advised. The number one cause of consulting firm failure is growing too fast. He suggested the firm choose a market segment and adhere to its marketing plan constraints.

Management consultants are bad at sales promotion, Mr. Smith observed. He listed as sources of media communication the consulting firm's past and present staff, professional associations, suppliers, and other consultants. Some of the available media tools are conference speeches, teaching, seminars, receptions, pamphlets, letters, phone and personal calls, and press advertising and articles.

Many professional organizations guide rather than prohibit press advertising, the consultant said. However, in his own nation, Great Britain, his consulting association prohibits press ads for all but management recruiting organizations and management education. He showed an example of advertising for a consultants' organization in Sweden which he felt to be imaginative yet dignified.

[According to the *AICPA Code of Professional Ethics,* Rule 502—**Solicitation and advertising**, "A member shall not seek to obtain clients by solicitation. Advertising is a form of solicitation and is prohibited."]

Management consultants make headlines when they don't want to, Mr. Smith observed. "We make the most news when we fail. We presume to give advice to others, yet we are visibly imperfect. The higher we rise, the harder we fall," he mused.

Peat, Marwick man disagrees

One speaker who took issue with Mr. Smith's "Better-too-commercial-and-alive-than-too-professional-and-dead" stand was Stanley R. Klion, partner-in-charge of the New York management consulting department of Peat, Marwick, Mitchell & Co., a leader of one of the afternoon workshops.

"I am not yet persuaded that professionalism is uncommercial. A definition of a professional is putting your client's needs before your own. That doesn't mean you have to run your business at a loss."

Another CPA addressed the conference on consulting growth opportunities in the private sector, particularly in the personal and business service area. Max F. Sporer, national director of management services for Touche Ross & Co., said that even management consulting itself could profit from some consulting work.

He pinpointed five projects in this area: Will consumerism force a change in the management consultant's fee structure? Are the consulting firm's quality control review procedures adequate? How can the consulting firm minimize its legal liability? Should the consulting firm be a multidisciplinary organization, perhaps including clergymen, attorneys, doctors, and others? What impact will management consultant licensing have on the firms?

Personal and business services represent the greatest growth segment in the work force in this decade, Mr. Sporer observed. He suggested there are unique features of this segment that make certain types of consulting projects necessary. These projects include: projects to increase the economies of scale, to eliminate waste, and to increase the quality of services and perhaps even the quality of consumer.

1974 Decrease in Executive Demand Foreseen by Roche

Although demand for executives will remain relatively high during 1974, the early part of the year will continue to show a downward trend in visible demand which began in late 1973, Heidrick and Struggles predicts.

The executive search firm makes this observation on the basis of its continuing survey of display advertisements across the nation.

Gerard R. Roche, the firm's vice president, said he believes management will be concentrating on immediate rather than long-range planning. He believes middle management and staff positions will feel the dip in demand most but Europe will continue to look for U.S. executive talent.

"Organizations will continue to need senior executives with records of success, particularly in finance and manufacturing rather than marketing," Mr. Roche said.

Handy Associates points out that the number of executives seeking jobs in 1973 was the highest in the past six years. The executive search firm attributes this to "the uncertainty of the economy."

James R. Clovis, Handy vice president commented, "The most startling development of the year is the significant increase in availability of general managers during the fourth quarter. Because of the economic uncertainty, companies are going through another period of consolidation which is eliminating unprofitable or marginal divisions and subsidiaries and the general managers who run them. Additionally, in their programs of cost reduction, many companies are cutting what they consider executive deadwood."

According to Handy's statistics, in the fourth quarter of 1973 there was a 56 per cent increase in the number of general managers in the marketplace over the previous quarter. Handy further notes that executives over 50 years of age comprised 17 per cent of all managers in the job market in the fourth quarter of 1973. Women executives accounted for four per cent in the same quarter.

Pennsylvania Sets Up Computerized System To Allocate Fuel Oil

Pennsylvania has established a Fuel User's Emergency Line (FUEL), a computerized emergency allocation system to aid its citizens during the energy crisis.

When a citizen calls the FUEL number an operator in Harrisburg enters information about his case on the UNISCOPE 100 visual terminal. The data is entered via the terminal into a UNIVAC 1108 computer at the management information center and concurrently is printed out by a UNIVAC 8541 communications output printer. A 22-member staff makes the necessary follow-up calls. Then the state makes the complete information available to a Federal allocation officer with a recommendation for emergency relief. As further action on each case is taken, the file is updated.

Suppliers on computer

Pennsylvania maintains a computerized file on about 22 fuel suppliers and approximately 1,200 wholesale dealers in the state, including their allocation quantity. How much oil is allocated to various counties or municipalities can be learned from the computer file.

Each state is allowed a ten per cent emergency fuel reserve under the Mandatory Allocation of Distillate Fuels Program of the Federal Government. If an emergency allocation is authorized, a copy of the approval form is sent by the system to the supplier telling him to release the fuel.

The system can issue reports on the amount of fuel allocated to hardship cases by regions or individual areas and it can also show the percentage of requests approved or disapproved.

J. Robert Ippolito, director of Pennsylvania's Central Management Information Center said, "The system saves us time, personnel, and paperwork. It allows us to service hardship cases very quickly without being held up by mailed forms."

Snakes Anyone? Airline Finds Use for Them

St. Patrick may have driven the snakes from Ireland, but Emery Air Freight is sending them to Puerto Rico (rubber ones, that is).

It seems the Emery Air Freight terminal building in San Juan became a choice location for nesting birds. The company's southern regional headquarters staff remembered that snakes and birds don't mix and came up with the idea of using synthetic snakes to keep the terminal from becoming an aviary.

Service Manager Frank Zirpoli and Administrative Manager David Braun are credited for this novel idea. To test it out, areas of the San Juan terminal building were supplied with rubber snakes while others remained without the decoys. Those areas that housed the rubber reptiles remained bird-free while the others had their usual share of nesters.

Emery intends to supply its terminal with a steady supply of rubber snakes and offers its technique to neighboring industrial concerns without thought of proprietorship. This may herald a real boom in the rubber snake market.

Productivity and Job Satisfaction Not Incompatible, Report Says

A productive work place is not incompatible with a high quality of working life, the final report of the 43rd American Assembly states.

The Assembly, a meeting of 80 people with various viewpoints that was underwritten by The Ford Foundation, addressed itself to "The Changing World of Work." Prentice-Hall has just released a book based on the meeting's proceedings. *The Worker and the Job: Coping with Change,* edited by Jerome M. Rosow of Exxon Corporation, is available as a paperback for $2.45 and in a clothbound edition for $6.95.

While maintaining that the work ethic is deeply embedded in American culture values, the Assembly's final report notes that worker disaffection and discontent exist due to rising aspirations and educational levels.

"Union leaders, for their part, are concerned about the talk of 'job

enrichment.' Many suspect it is a code word for speedup or a device to undermine unionism. The challenge now is for labor and management to work at resolving the issues at the work place in a nonadversary atmosphere, with a goal of improving the quality of working life," the report states.

Work is so critical to the lives of individuals that, the report suggests, workers should be given more of a voice in decision making. Competence and contribution, rather than just arbitrary rank, should be the basis of decision-making authority, it recommends.

Experiments to improve the quality of the working life should be undertaken by employers, the report continues, despite potential staff resistance.

"To advance such experiments top management must recognize and seek to allay the insecurities of their middle managers, foremen, and workers. Middle managers and employees often resist any reduction of their power and authority since this may be viewed as a threat not only to their authority but to their jobs."

Human dignity at work is an important national goal and the Government should encourage "'research and development in work design, fund experiments, convene national conferences, support worker exchange programs, distribute literature, stimulate and perhaps subsidize these efforts," the report says.

It concludes by saying it is time all the fine talk about job enrichment and job humanization be put into action.

Motivation Skills Taught in New Course

Specific skills for motivating people are taught in a new program for managers being offered by Xerox Learning Systems, Stamford, Conn.

"Managing for Motivation" is a six-unit course that takes four days to complete either in the manager's own company or at a Xerox location. Managers may be taught to administer the program themselves and thus eliminate the need for a professional instructor, Xerox states.

Skills taught include: listening and responding, constructive criticism, building on employees' ideas, managing differences, crediting, and leading group discussions.

Xerox administered tests to managers in two organizations before and after their participation in the program. The test measurements showed that the program had improved the managers' working relationships and led to greater productivity, Xerox reports.

Energy Crisis May Benefit Customer Service Studies

The energy crisis will force many firms to pay considerably more attention to the entire customer service area as a matter of practical necessity, Herbert W. Davis, vice president of William E. Hill & Company, Inc., believes.

Inefficiencies in a firm's distribution system, which in normal times can be overcome by the combination of product availability and good transportation, are exacerbated when there is a decline in transportation service, the consultant wrote in a recent memorandum.

"Under normal conditions, orders that cannot be filled from one location are frequently 'bumped' to the next location where stock is available, or simply held for a brief period until new stocks are received. With longer transit times and reduced availability of premium transportation, however, stockouts at the local level can have far more serious impact on customer service and hence competitive position in the particular market," Mr. Davis said.

He cited the case of a company that had fought the innovation of increasing customer order sizes to match the capacity of its trucks. The energy crisis helped to spur sales management on to the change.

Customers welcomed change

"It took no great persuasion to convince sales that it would be easier to sell customers on upgrading order size than it would be to reconcile them to the erratic and uncertain customer service that would be almost inevitable under present arrangements. Customers themselves were much more interested in reliable delivery dates than in fast service per se (a fact which many firms overlook), and when the chips were down they were willing to pay the price of such reliability: slightly longer lead times, less frequent deliveries, and order upgrading to full truckload weight in order to assure adequate inventories between deliveries."

"It was a game in which everybody won: the manufacturer, by upgrading order size and increasing capacity utilization of its highway equipment; customers, by insuring reliability of deliveries and adequacy of stocks in a time of uncertainty."

Construction Firms Warned to be Alert To Conservation

Although "Hard Hat University" conjures up images of men in coveralls poised on girders as they listen to a fortissimo lecture on riveting, F. D. Rich Housing Corp., Stamford, Conn., is using the title for a company lecture series.

Hard Hat U. gave Haynes N. Johnson, Esq., of Bryan, Parmelee, Johnson and Bollinger, the dubious distinction of being the recipient of its "B.S. Degree." Mr. Johnson addressed a company class on "The Environmental Aspects of Construction." He told the Rich staff

that the construction industry should expect to hear from the public on environmental issues.

"Many government agencies and developers in the past have not done their homework . . . have not fully evaluated how a major project will affect an area. As a consequence, often unexpected and unwanted problems result. The public, through their legislators, has served notice that those days of environmentally unplanned development are over," the attorney said.

If all pertinent environmental statutes are not complied with, a construction project may be halted by a lawsuit, he warned. He suggested that construction industry leaders be knowledgeable in Federal and state environmental protection legislation.

"Responsible leaders in the construction industry, such as you, should be pushing just as hard for adherence to reasonable environmental standards as professional environmentalists," Mr. Johnson said.

Hard Hat University meets twice a month for several hours. Its class embraces Rich's president as well as its clerical staff. Other lessons have been devoted to contracts and specifications, corporate financial reporting, and construction management and administration on-site.

Insurance Industry Gets Mixed Reviews in Harris Consumer Poll

A Louis Harris & Associates national opinion study on attitudes toward automobile and homeowners' coverage has found that the insurance industry "has not yet come into the eye of the consumerism hurricane."

The study was commissioned by Sentry Insurance and was conducted by the Harris organization in cooperation with the department of insurance of the Wharton School at the University of Pennsylvania. An intensive survey of 2,462 households across the nation was conducted in the late summer and early fall of 1973. Its findings were released in mid-January.

Warning signals

According to Louis Harris, some of the warning signals the insurance industry should heed from this survey are:

"—A substantial 78 per cent of the public believes that 'most companies will refuse to insure high risks.' Basically, people are saying that the industry is selective at best, that it is not stretching to give the consumer a break.

"—By 50-29 per cent, a plurality feel that 'auto insurers are too quick to drop people after one accident.' . . .

"—A significant 49 per cent of the total public feels that 'young people are treated less fairly than other people' in the way auto and homeowners' insurance is meted out to them. The young people under 30 feel discriminated against to the tune of 66 per cent . . .

"—By 74-16 per cent, a big majority feel that 'if you don't look at the fine print when you buy an automobile or homeowners' insurance policy, you are likely to find you are not covered in an emergency.' This deep concern about the unknown has created a climate of an adversary relationship between the consumer and the industry. . . .

"—This sense of suspicion, in turn, has fostered a feeling by a 46-40 per cent margin, on the part of most people that 'in settling a claim with an insurance company, you might as well get all you can from them, since they'll pay you only what they have to.' . . .

"—By 41-18 per cent, a plurality also think that the profits of auto and homeowners' insurance companies are 'higher than most other businesses.' It must be noted that another 41 per cent just are not familiar enough with the profit picture to comment, but it should be pointed out that the better educated and more articulate segment of the public tends to be most critical on this profit dimension."

Positive attitudes

Mr. Harris noted that the public holds some very positive attitudes about the insurance industry. For instance, 81 per cent of those questioned feel that in "giving people automobile and homeowners' insurance, the insurance industry is performing an important public service." Eighty per cent rated the industry positively for "its integrity." The survey found 82 per cent of the respondents believe that "considering how you need it when trouble strikes, automobile and homeowners' insurance is a good buy for the money."

The study recommends, based on its findings, the insurance industry would be well advised to: make it mandatory for insurance agents to review auto and homeowners' insurance policies on an annual basis; clarify the language in policies so that policyholders could easily understand what they are and are not covered for; and provide better complaint channels for policy holders.

Sponsor offering findings

Sentry Insurance is making the study's findings available to the entire insurance industry, libraries, universities, state insurance commissioners, and state and national legislators. Copies may be obtained without charge from Michael Dry, Sentry Insurance, Stevens Point, Wisc. 54481.

In explaining why his company has chosen to distribute its study, John W. Joanis, chairman of the board of Sentry Insurance, said, "Our reasoning for sharing this study with our competitors is . . . entirely pragmatic. Where we have industry problems or where public opinion opposes us, only industry-wide response and action can be meaningful. Our company alone will make little or no impact on a public asking an entire industry to change its ways."

For the Executive in Finance—

More than 70 Per Cent of Firms Surveyed Think Supervisory Training Not Primary in Increasing Efficiency

Over 70 per cent of the respondents to a recent Conference Board survey prescribe actions other than training as the most effective means for improving first-line supervisory performance.

Walter S. Wikstrom, author of The Conference Board's *Supervisory Training* research report, received 228 responses from organizations of different sizes and industries. It was found that there was almost no variation in responses from various industries, apart from obvious ones.

" The [supervisor's] job itself has to be changed by the actions of higher management. This does not imply that supervisory training is not needed or desirable; rather it suggests that, in the opinion of these respondents at least, supervisory training alone cannot create good supervisors. The unplanned 'on-the-job training' represented by each supervisor's experiences in trying to deal with the pressures of a difficult job will have the greatest influence in determining how effectively he performs," the report states.

In 14 per cent of all the responding organizations all the training is done on the job (which includes 11 per cent of the respondents who reported administering no formal supervisory training of any sort) and 86 per cent had a form of in-company classroom training.

The longest continuous off-the-job program reported was a 15-week course conducted by a Canadian bank. More typically, the upper limit of these programs is 80 hours, two full weeks, of training. The median total time was 30 hours. One respondent, a medium-sized furniture manufacturer, described its "initial supervisory training" as lasting one hour per week, 48 weeks per year, for 3½ years.

Sixty-one of the responding units said they had planned programs of on-the-job supervisory training.

The respondents said flatly that only two of the 368 programs of various types reported had not met their objectives. The study points out that these evaluations are mainly based on verbal feedback, not performance. However, a few organizations interviewed take a strong stand against any training that cannot be precisely defined in behavioral terms and measured quantitatively. Most training directors would envy this situation, Mr. Wikstrom comments.

"Many supervisory training programs are conducted because management believes that 'something needs to be done' about some problem in the lower levels of the organization, and training is believed to be the answer . . . In these cases, management very seldom takes the time or trouble to determine precisely what change in performance it wants the training program to bring about."

The report describes Lockheed-Georgia Company's and the Chrysler Corporation's training programs. The report also includes course outlines from other responding organizations.

Supervisory Training is available at $3.00 per copy to associates of The Conference Board and educators, and at $15.00 to all others. The Conference Board is located at 845 Third Avenue, New York, N.Y. 10022.

Only Half of U.S. Firms Have Evaluated Cost Impact of Energy Conservation

Most corporations have appointed energy conservation committees to deal with energy cutbacks, a survey commissioned by McGraw-Hill has found.

Executive Enterprises, Inc., a New York management education and consulting firm, conducted the poll of 53 corporations. Seventy-seven per cent of the polled organizations had enacted corporate energy conservation programs. However, only about 50 per cent had reevaluated the cost impact of energy conservation programs on pricing and product line profitability, reports Executive Enterprises president, Lewis Abrams.

Of the polled companies, 81.1 per cent had established energy contingency plans and the same percentage had energy planning and conservation guidelines and standards for corporate use. About one quarter of the organizations said they had initiated their corporate energy programs from January, 1973, through June, 1973.

"Many of these companies cited energy conservation measures recommended by the Office of Energy Programs, U.S. Department of Commerce," Mr. Abrams reported. "The companies polled included firms such as: Portland General Electric; Pittsburgh Plate Glass; H. P. Hood, Inc.; Triangle Industries; Hamilton Standard (a division of United Aircraft Corp.); Hayden Island; Republic Steel Corporation; Dow Chemical Company; Sears, Roebuck and Co.; Alcoa Aluminum; and the Dupont Corporation; which leads us to believe

that this 'energy consciousness' extends to a cross-section of American business."

For Consultants—

GE Introduces Software System to Check Designs In Planning Stages

General Electric is using a computer software system to statistically discover potential trouble spots in its products prior to production.

Users of the system, STATPAC, need to be familiar with their own data, but do not have to know much about computers or statistics. The computer responds to commands such as "list," "plot," "tabulate," and "read." In a matter of seconds it can process 500 questionnaires, each containing 30 questions.

A design engineer can request a histogram or bar chart be produced to show a product's test performance data as collected over several years. This will enable him to pinpoint a possible shortcoming and redesign the product accordingly.

In checking heavy rotating equipment, GE engineers once had to plot manually the stresses of every unit in service. The company estimates this plotting cost about $500 and now the same task is being accomplished for $5 in computer time costs.

The data being analyzed in GE's statistical program comes from service shops, warranties, customers, laboratories, and production lines.

The company says it is using the software package for development of business forecasting models and identification of design tolerances that affect turbine efficiency and horsepower.

STATPAC was developed by GE staff members over a three-year period. It includes 250 computer programs and was designed for remote batch operations for the Honeywell 600 and 6000 series of computers used within General Electric.

Since its inception, MANAGEMENT ADVISER has never published an obituary. We feel in the case of Robert M. Trueblood an exception to this policy is more than justified.

Mr. Trueblood died February 7 after a long illness. He was 57 years old.

A past president of the American Institute of Certified Public Accountants and chairman of the board of Touche Ross & Co., he most recently served as chairman of the Institute's Study Group on Objectives of Financial Statements. Commenting on that group's findings in his firm's quarterly, *Tempo*, Mr. Trueblood said:

"To me, the overriding assumption of the Study Group's Report is that everyone associated with the preparation and certification of financial statements approaches the responsibility with a commitment to inform based on a fundamental sense of integrity. That assumption cannot be legislated. It is perhaps best expressed in the report's reemphasis of the priority of substance over form—no matter what practice, tradition, legal formality, and convention allow. Integrity is the foundation of it all: integrity is the bottom line, not income."

Philip Morris Automates Its Entire Production Quality Control System

Philip Morris, Inc., is installing a computer-based management-control system which operates from the raw materials purchasing stage through the delivery of the finished products.

More than 20 computers are organized in a hierarchical arrangement in this system. At the top of the hierarchy are the financial and manufacturing computers for top management's information needs. At a lower tier is a series of specially designed minicomputers that guide such specific operations as the stacker cranes that put cases of cigarettes into the warehouse and then pick them to fill allocations for each of the 69 field warehouses.

Employees wear computer-readable badges so that if someone is missing on a shift, the necessary replacement will be dispatched to the appropriate station in a matter of minutes. A computer-controlled spare parts program is also included in the system. It identifies preventive maintenance requirements to minimize machine breakdowns and processes machine repair requirements.

Each piece of hardware and software designed was built and tested in the existing Philip Morris operation before it was incorporated into the new system.

Philip Morris worked with the management consulting firm of Dasol Corporation, New York. The cigarette company expects to have the whole system operational by the end of 1974. It anticipates the system's output will increase over the next several years until it reaches its planned capacity of over 100 billion packages of cigarettes a year. Obviously, the company does not believe everyone is going to "kick the habit."

CBEMA Warns of Energy Cut Effect On Computers

When utility companies announce voltage reductions, the actual voltage drop at the customer end of the line could exceed that amount and present the risk of equipment malfunction, warns the Computer and Business Equipment Manufacturers Association (CBEMA).

"Experience has shown that, in

some severe cases, when voltage was reduced 8 per cent from nominal, computer and business equipment operation was not unduly impaired, if the input voltage to the equipment was at nominal before the voltage reduction. However, now there is also an increased probability that power line transient disturbances due to load shedding and line switching could impair equipment operation while voltage reductions are in effect. If the input voltage to the equipment was not up to nominal level prior to the utility reduction in voltage delivered, equipment malfunction or shutdown could occur," a statement issued by CBEMA says.

Customers should contact their local utility representative to determine the status of power in the area. Periodic checks should be made to determine if input line voltages are nominal, CBEMA advises. If, before voltage reductions are put into effect, voltage is nominal then "the probability is high that the operation of computing or business equipment will not be impaired," the manufacturers' association states.

The association suggests that to assess risks of a brownout to his equipment, especially an 8 per cent voltage reduction, the customer should confer with his utility representative and manufacturer.

Honeywell Says Laws Regulating Data Bank Privacy Are 'Inevitable'

Legislation to prevent computerized data banks from impairing individual privacy "appears all but inevitable," said a Honeywell executive.

William T. Bayer, Jr., vice president of technical resources planning for Honeywell's computer operations, told the Rotary Club of Seattle, that laws governing access to computer files would be "the single most effective measure to protect privacy." He suggested that legislation be drafted that provides for notifying an individual that a file is being kept on him "for allowing the person to examine his file and change erroneous information, for informing him when and to whom the information in the file is being released, or for securing the person's permission before the information is disseminated."

Mr. Bayer sees a coming age of computerized knowledge banks for which high standards of privacy must be developed and upheld. He advocated a campaign to teach the public about the advantages and disadvantages of the computerized society. Also, in selecting data processing personnel, computer users "must exercise a special sensitivity."

"The problems of privacy will not be solved when, or if, an absolute 100 per cent secure system is devised. It is ultimately the people who operate the system who are responsible," he observed.

MAS Will Be Discussed At AICPA Tenth Annual Computer Conference

Management advisory services will be one of the focal points of the Tenth Annual AICPA Conference on Computers and Information Systems, May 6 to 8 at the Marriott Motor Hotel, Chicago.

Arnold Schneidman, chairman of the computer services executive committee, explained, "The roundtable discussion groups and informal evening sessions are again included while the parallel sessions have been structured along the lines of the four major practice areas—auditing, management advisory services, practice management, and taxation. Each member of the firm will, therefore, find some aspect of the program of particular interest to him, even if he is not directly involved with EDP."

Topics to be discussed at the MAS session include: "Minimum Control Standards for Design of EDP Systems," "EDP Feasibility Studies," and "Allocation of Computer Costs to Users."

The AICPA conference has been planned to overlap the American Federation of Information Processing Societies, Inc., 1974 National Computer Conference & Exposition, which will be held May 6 to 10 at McCormick Place, Chicago. Transportation and registration to one afternoon at the NCC's exhibits is included in the AICPA conference registration fee.

Registration for the AICPA conference is $110 and for additional registrants from the same firm $95. More information about the program and registration may be obtained from Noel Zakin, AICPA, 666 Fifth Avenue, New York, N.Y. 10019.

More information about the AFIPS conference and its separate registration may be obtained from AFIPS, 210 Summit Avenue, Montvale, N.J. 07645, ATT: 74 NCC. Lower rates are available for those who register before April 15 and to AICPA members.

The AICPA is a constituent society of AFIPS.

Remote Computing Plans Get Good Marks Overall; Individual Services Rated

Users of remote computing services say they are pleased with the services' overall effectiveness, but indicate that their technical support, economy, application programs, and response time need improvement, a Datapro study reports.

All About Remote Computing Services, a 39-page special report, is available from Datapro Research Corporation, 1805 Underwood Boulevard, Delran, N.J. 08075, at $10 per copy.

Remote computing services are either interactive time-sharing or remote batch processing services,

the report explains. Until 1973 General Electric company was the leading supplier of remote computing services, but when Control Data Corporation acquired IBM's Service Bureau Corporation (see M/A, March-April, 1973, pp. 7-8) its remote computing services became the largest.

Datapro received evaluations from 141 remote computing service users. They rated the suppliers on a one, poor, to four, excellent, scale. Five or more users judged the following services as excellent: International Timesharing Corporation (average score: 3.20); Cybernetics Corporation (3.17); Computer Sciences Corporation (3.15); Rapidata, Inc. (3.12); On-Line Systems, Inc. (3.03); and The Service Bureau Corporation, now a Control Data subsidiary, (3.01).

Consultants Not Uniform In Scheduling Holidays For Their Organizations

At the beginning of this year the Association of Consulting Management Engineers, Inc., asked 160 consulting firms which holidays they would observe. Eighty-two firms responded. All will observe the three-day Labor Day holiday, but that's the only long-weekend under the Uniform Holiday Act they will all be closed.

As for the other holidays under the Act: sixty-five were closed for Washington's Birthday, February 18; eighty will close for Memorial Day, May 27; forty-seven will close Columbus Day, October 14; and forty-five will close Veterans Day, October 28.

Fifty-five of the firms will be closed the day after Thanksgiving but only 44 will be closed the day after Independence Day. Twenty-six will close for the entire day before Christmas and 24 will only work a half-day. Thirteen will close for the full day before New Year's but 51 will close for a half-day.

Only three of the firms will be closed the entire day Election Day, November 5, and eight for a part of the day. Two firms that will be open will give their employees time off to vote.

After studying this survey's results, one thing can be concluded: Consultants need a union!

New Products and Services—

NCR Shows New Line Of Minicomputers With Optical Scanning

National Cash Register Company has introduced a new family of small electronic data processing systems designed primarily for businesses with fewer than 150 employees.

The NCR 299 is a minicomputer with microprograming in a read-only memory. User programing is stored in a separate read-write core memory. It is designed for such purposes as billing, payroll preparation, general ledger accounting, processing purchase orders, budgetary accounting, and job costing and estimating. The basic 299 system is priced at $7,250.

The system includes an optical scanning device. Program assembly cards are marked with a pen or pencil and read by the scanner. The minicomputer has a lead-through capability, which, through a series of lights, can guide an operator in entering data.

According to NCR, "Because installation of the computer is so easy, both programing and training will be handled by salesmen. This eliminates complicated installation procedures involving systems analysts and instructors. A machine delivered in the morning will in many cases be productive before the end of the business day."

A library of standard accounting application programs has been developed for the 299. Special programs can be developed at the customer's site for $4.50 a step. A basic 46-step program, such as accounts receivable, will cost $120, and a more complex 63-step standard program, such as payroll preparation, will cost $150.

IBM Introduces Two Work Stations for Its 3740 Systems

IBM has introduced two new programable work stations for the 3740 data entry system, 3741 Models 3 and 4, which can process and edit information before it is entered into a central computer or they can write and execute their own 3741 programs.

Datapro Newscom commented, "In fact, the new 3740's, upon unveiling, are clearly minicomputer-based, although IBM painstakingly avoids all use of the term minicomputer in its sales and technical literature, lest it frighten its non-sophisticated customers and unduly alert its competitors."

Can use ACL

The new units can operate with programs written by their users in Application Control Language. An optional ACL translator is available for changing ACL source programs into machine-readable object code.

The company suggests that the new work stations can be used in remote warehouses to print sales invoices or warehouse picking documents on the site and at the same time store data on diskettes for later use by the host system for accounts receivable, inventory control and reordering, and sales analysis.

Monthly rental charges for the new Models 3 and 4 range from $215 to $288 per month and sell for from $8,600 to $9,850. Field conversions of 3741 Models 1 and 2 and customer shipments of Models 3 and 4 are scheduled to start in the fourth quarter of 1974.

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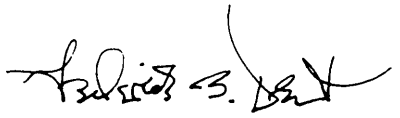

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Secretary of Commerce

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Manufacturers making components with loose tolerances, and also specialized parts where extremely close tolerances are essential, (such as parts used in nuclear power plants) must realize that all costs rise sharply for the latter and adjust their . . .

COST ACCOUNTING TO ADAPT TO THE NEEDS OF NUCLEAR ENERGY PLANTS

by Thomas S. Dudick
Ernst & Ernst

WITH THE START of the nuclear age in the early 1940's, it was generally expected that interest in harnessing atomic energy for peaceful uses would eventually develop. Within two decades a number of industries were engaged in the production of components for nuclear applications.

The energy crisis has accelerated that relatively slow and easy development. There is now renewed emphasis on nuclear power as an eventual source of energy. Coal promises a quick, but temporary, solution to our energy needs—and an endless struggle with environmentalists. Geothermal and solar energy sources offer great possibilities but they are potentials only; their application on a large scale is a long way off. Nuclear power plants represent the only well developed technology that can be brought into production in a relatively short period of time.

It is a field that has come a lot farther than most people realize. The *New York Times* reported on its business page January 16 "Industry Report Asserts Nuclear Power 'Came Into Its Own in 1973'" and buttressed the report with a summary of its own showing that 42 plants with a generating power of 25½ million kilowatts are in operation now, that 56 plants are under construction, and that there are firm orders for 101 more.

But it is an industry that has encountered fierce citizen resistance, too, mainly because of the fear of nuclear disasters that might occur if anything went wrong.

Early components of nuclear power were built to existing specifications, used for commercial applications. Although some of these specifications were tightened for nuclear components, the Atomic Energy Commission (AEC) was not satisfied. Its concern was satisfying the developing fears on the part of the public about radioactivity from nuclear power plants. The AEC, as a result, pressed all manufacturers of nuclear components to come up with specifications that would guard against any remote possibility of accidents.

This pressure ultimately resulted in an expanded Section III of the ASME (American Society of Mechanical Engineers) Code. Before the expansion, only vessels had been covered. Certificates of authorization are now required of manufacturers of such nuclear com-

ponents as valves, pumps, pressure vessels, reactor vessels, safety valves, and piping.

But manufacturers have found that the Code's requirements have not resulted in greater standardization, as some had expected; individual customers have established even stricter requirements than those called for in Section III. In effect, each nuclear component is a custom job. As an engineering executive of one producer put it: "The Code sets minimum quality levels but this does not result in standardized manufacturing procedures because each customer modifies to suit his own needs. As a result, each manufacturer has become a specialty house."

The advent of these stricter requirements has naturally had a great impact on the amount of inspection, quality assurance effort, engineering, contract administration, and rework. Additionally, the manufacturing cycle is greatly lengthened because of the many interruptions for inspection and the need for rework to meet Code and customer requirements.

Yet the manufacturers of these valves, pumps, piping, and safety vessels were mainly commercial concerns, the bulk of whose products required no such care in manufacture. Nuclear components posed all the problems of manufacturing to extremely close tolerances, in other words, whereas the manufacturers were accustomed to dealing with relatively loose tolerances; their business methods had been built on these practices.

This is a situation which does not apply to too many manufacturers yet, but it is spreading fast. As more and more emphasis is put on nuclear energy, we can expect to see more and more business problems arising among a growing number of manufacturers.

Impact of tighter specifications

The examples used to demonstrate the cost of impact of this new development and recommended treatment in the cost system have been taken from a study made for the valve manufacturing industry.

The importance of nuclear power production in the energy crisis has been heightened by the Administration's obvious dependence on it to help overcome the oil shortage. This was highlighted by energy chief Simon's recent paper, distributed to the international meeting of delegates from the petroleum-consuming countries, suggesting that floating nuclear plants anchored off coastal shorelines could be mass produced rapidly.—Editor

Inspection—The cost of inspection for nuclear valves is more than double that required for industrial type valves. There can be as many as 900 inspection, hold, witness, approval, and verification points by manufacturer, AEC, and customer. In addition to inspections during the manufacturing process, there would be inspections at vendors and review of procedures and drawings prior to manufacturing.

Manufacturing Interruption — The impact of increased inspection, not only by the manufacturer's personnel, but by customer representatives and third party inspectors, results in production delays and, consequently, a much longer manufacturing cycle during which costs keep accumulating and large amounts of investment are tied up.

Quality Assurance—In the manufacture of industrial type valves the quality function does not go much beyond the inspection stage. With the more demanding requirement for Code adherence in making nuclear valves, the quality assurance function must relate to the total controlled manufacturing system. To do this, quality assurance must take responsibility for:

- audit and control of suppliers to assure conformance to code and contract requirements
- internal training of inspection personnel
- audit and control of internal departments for conformance to code and contract requirements
- control of internal quality standards
- development and monitoring of programs for calibration of measuring equipment
- control of quality documentation.

The net effect is that the cost of assuring conformance can more than triple the cost of the quality function.

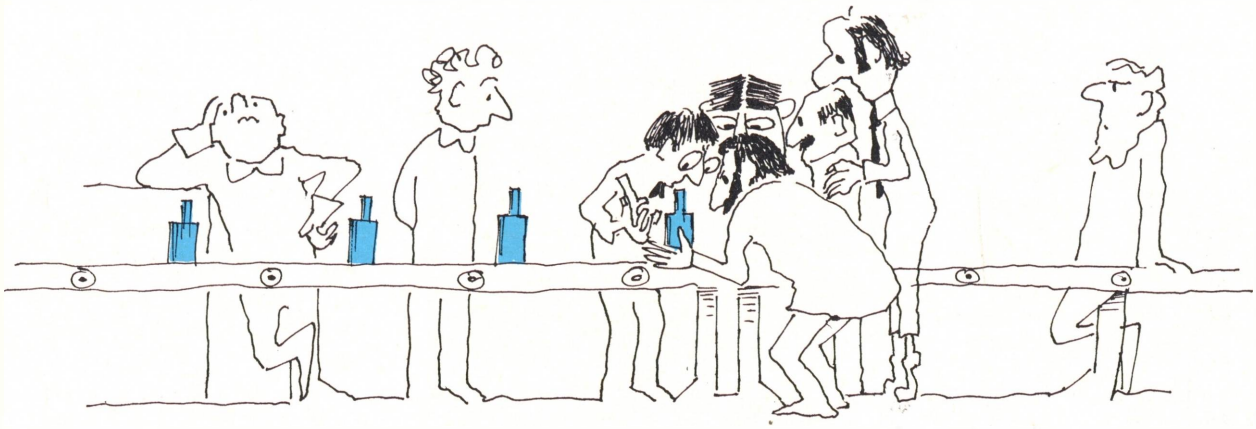
Engineering—Engineering must also expand its role. It must go far beyond its original mission of rendering assistance to the factory. Now, for each and every contract, engineering must:

- design the product
- certify that the design meets code and contract requirements
- spell out specifications for purchase of material
- make detail drawings for the shop and write instructions
- write test procedures
- coordinate customer requirements with manufacturing procedures.

As a result, engineering costs for a nuclear valve can be expected to be double or triple the cost of the industrial valve.

Contract Administration—In any product in which manufacturing procedures are spelled out in great detail and documentation for each step is required, a close liaison must be maintained between the manufacturer and the customer. This liaison goes much further than the conventional customer service function. It is called contract administration and has the following requirements:

- act as contact with the cus-



The great number of inspections required in nuclear valve manufacture can raise production costs tremendously . . .

tomer—providing the necessary liaison on all matters relating to the contract
- monitor status of the job and prepare progress reports
- review all correspondence relating to the contract
- furnish customer with any information required by him
- monitor witness inspection dates
- close out orders and finalize documentation.

Rework—In an industrial type valve, rework would normally be considered as overhead. In many cases, the parts would be scrapped rather than investing additional labor and overhead in salvage. In nuclear valves, rework is an unavoidable cost and should be considered as direct rather than overhead.

Mixed Production — Companies manufacturing the industrial type valve in the same facility that is used for making nuclear valves can expect to find costs of the industrial type increasing. This is due to the normal tendency to upgrade lower graded products when two disparate types are being manufactured.

The foregoing are some of the factors that will greatly impact the need for a more definitive interpretation of costs—particularly when industrial and nuclear type valves are being made in the same facility. Costs that have traditionally been classified as indirect must now be considered as direct. The "purist" definition of what is direct and what is indirect must be abandoned in favor of a definition that will recognize costs that are identifiable and supportable as direct charges to each contract. What these costs are and how they should be measured will be the subject of the sections that follow.

Identifying costs

It has been traditional in some valve manufacturing companies to consider as overhead such items as packing, gaskets, bolting, welding material, purchased services, incoming freight, shipping preparation, engineering/drafting, rework, and other costs. In light of the more demanding requirements in nuclear work, these costs have increased greatly in magnitude. They can also vary quite radically from one contract to another. Because of such variations, inclusion of these costs in the overhead rate could result in allocations to contracts that are quite different from reality.

A discussion of the various costs that should be identified more specifically follows:

Supply Type Items—In most accounting systems items of relatively small value are expensed at time of purchase and charged into an overhead account. The allowance in product cost is determined through an overhead rate usually applied to labor.

This is an acceptable expedient when items like a nut cost only five cents each, gasket material only a few cents per sheet, and welding material so little that it can practically be ignored. However, the aggregate cost of "supply type" expenses like the foregoing can amount to as much as $1,500 for a nuclear valve; it is thus highly desirable that such items be considered to be direct material and charged directly to the valve on which they are used.

Incoming Freight—In some companies, incoming freight is treated as an overhead expense. When valve manufacturers were, by and large, making castings in their own foundries, incoming freight was not as substantial an item as it is now, when many companies purchase their castings from outside foundries. If these higher costs are included in overhead as in the past, and allocated to the various valves on the basis of an overhead rate applied to direct labor, the amount charged to individual valves could

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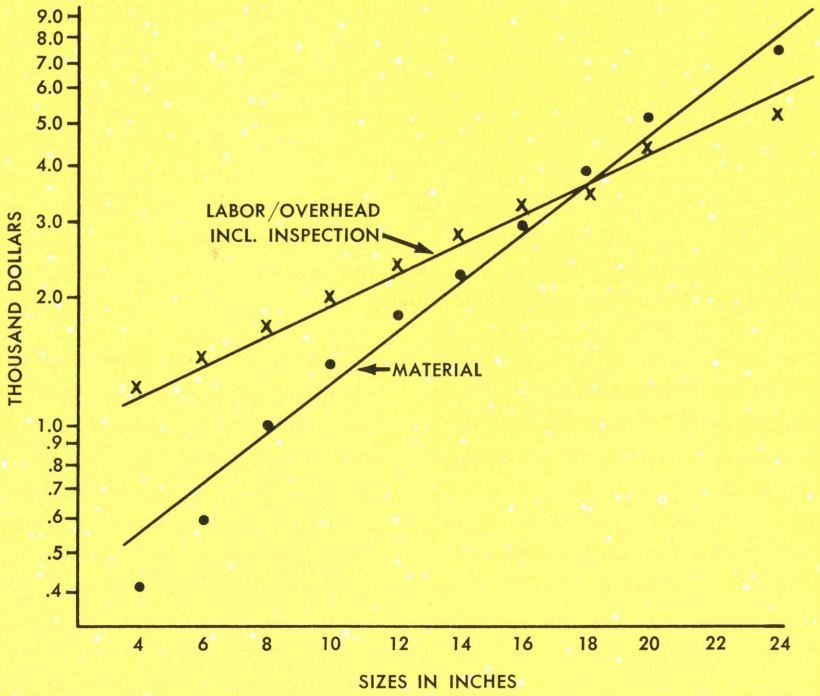
EXHIBIT 1

COST COMPARISON

LABOR/OVERHEAD CONTENT VERSUS BASE MATERIAL FOR THE 600# CS PRESSURE SEAL VALVES



be greatly distorted. This distortion occurs because the labor content in a valve does not correctly reflect the material content. Note in Exhibit 1, above, that the line representing material cost in the various sizes is quite different in slope than the line representing labor cost.[1]

A more accurate approach would be to identify the amount of incoming freight actually incurred for each casting and to add this amount to the cost of the casting as material.

Rework—The requirement for non-destructive examinations means that certain additional operations will need to be performed when defects are found. These are:

- gouging
- welding
- grinding
- hand dressing
- x-ray (if rejects still present, cycle starts again)
- heat treat
- remachining
- inspection.

Companies that include rework as part of overhead are allocating such costs to the various valves on the basis of the amount of direct labor required to make the valve. Obviously, when the rework operations can be specifically identified with the valve on which they are being performed, it would be more accurate to have the individuals doing the work charge their time to the specific valve and charge it as direct labor.

Special Tooling, Fixtures, and Patterns—Although the cost of these items could have a wide range, special tooling could cost $16,000-$18,000. Patterns and fixtures could cost $5,000.

Since these items are usually made for a specific valve, the cost should, like material, be charged directly to that valve rather than spreading such costs through an overhead rate. It is conceivable that fixtures, tooling, and patterns could be used for a subsequent order. The method of amortizing such costs against orders is a separate matter, the treatment of which depends upon the negotiations made with the customer.

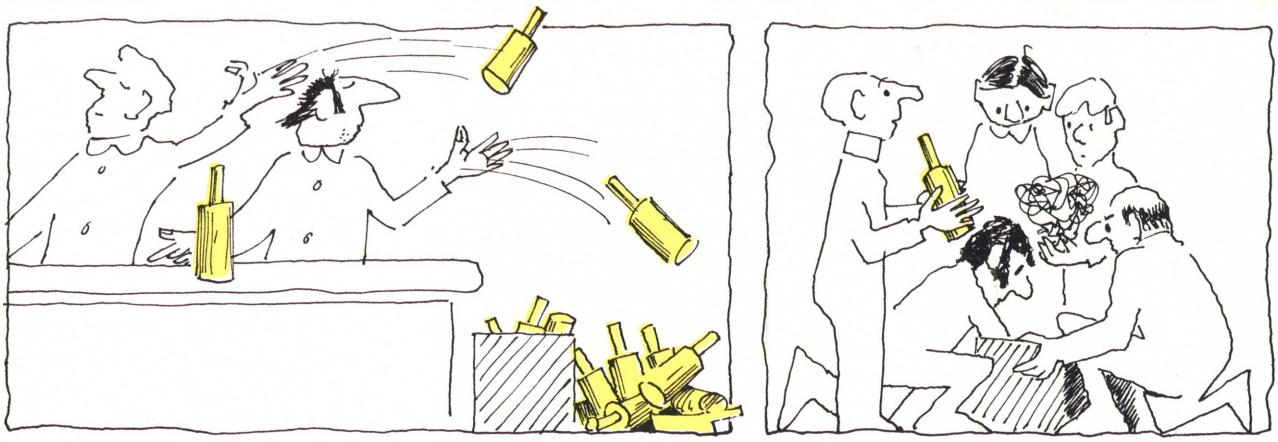
Shipping Costs – Traditionally, some companies consider shipping to be part of the selling group of expenses, rather than identifying them as part of the manufacturing cost. Before the advent of the nuclear valve, the industrial types could be loaded on trucks with little or no protective packing so that shipping cost was merely a handling expense.

This is no longer the case with nuclear valves, which must be crated to protect the weld end and the operating mechanisms. The crating of a large valve could amount to as much as $2,500. The operations required to prepare the valve for shipment should be identified as direct labor and charged to the specific valve.

Engineering/Drafting—The concept of product engineering has been expanded greatly with the introduction of nuclear valves. The function now includes design, writing instructions to the shop and the purchasing department, preparing detail drawings, writing test procedures, and coordinating with the customer. Engineering/drafting effort can start as much as a year before the shop begins to build the valve.

Because of the foregoing factors, and in the interest of matching costs with revenues, engineering—as well as other related items—must be charged as direct costs when incurred. Application of such costs through a manufacturing overhead rate (or a general and administrative, G&A, rate) rather than a direct charge, will not yield correct product costs. Take the case of one customer ordering two or more valves of the same type while another customer orders the same number of valves but each of a different type. Application of this cost through an overhead rate would overstate the cost

1—The plottings in Exhibit 1 are made to a semi-logarithmic scale. A line on such a scale reflects percentage, rather than absolute dollar changes.



Such a simple matter as crating a nuclear valve must be done so carefully that shipping preparation becomes a significant cost item.

of engineering/drafting to the first customer and understate it to the second.

The proper way of charging this function to the product is to identify the charges as direct costs to the specific product. Engineering/drafting, then, would become direct labor to which the engineering overhead rate would be applied. The same principal would apply to quality assurance.

If there are individuals in a company making both industrial and nuclear valves who find it impractical to charge their time to specific products, a nuclear material buyer, for example, it may be preferable to develop a nuclear overhead rate applied to nuclear direct labor.

Contracts Administration—Contract administration is a liaison function in which the administrator, or project manager, acts as a coordinator between the customer and the company. He must review all correspondence, must monitor the status of the job, advise the customer of witness inspection dates, and he must close out the orders and finalize the documentation.

The effort required for each contract is not likely to vary with the amount of shop labor required to make the product, so this expense should not be allocated through an overhead rate—it should be considered as a direct charge supported by time charges.

Those nuclear component manufacturing companies that do not have a "contracts administration" group must perform the function nonetheless. Undoubtedly the work is being performed by several individuals in such departments as production control, purchasing, accounting, or some other service department. If so, then the cost of the function is most likely being included in the product through application of the overhead or G&A rate—causing distortions.

The contracts administration function, whether a separate department or not, must recognize the amount of cost incurred against each contract and must be so charged to assure proper costing.

Which cost system is correct?

There is no pat answer to this question. The accounting system must adapt to the state of technology. When a product is new, unit volume small, and changes frequent, a job cost system is the most appropriate—it provides the means for identifying each cost as it relates to the specific job.

Standard Versus Custom Engineered Valves—As certain valves became standardized in past years, those companies that specialized in these types quite correctly adopted a standard cost system of accounting. Standard costs were predetermined—these became the costs of production and the inventory values from which variances were calculated.

Predetermined Standard Costs Versus Job Costing – However, when the complexity and proliferation of specifications expands, as it did for nuclear plant requirements —the valve can no longer be considered to be standard. Each one can be quite different in its specifications—each customer buying the same valve can have different requirements for the same valve. Also, purchases are low in terms of units purchased. Since the nuclear valve is not standard, then standard costs cannot be used for costing—a job costing system accumulating actual costs is mandatory. It is entirely possible that as nuclear plant production becomes standardized that nuclear components too will achieve a greater degree of standardization at some future time.[2]

Companies making standard type components which then add some nuclear components to their line are in the most vulnerable position when it comes to proper costing; they are not likely to change their cost system to accommodate the few nuclear items that have just been added to the line. Such costs as engineering, quality assurance, and contract administration, which are substantially larger for nuclear products, are likely to be included in the overhead rate

2—See *Engineering News Record,* July 26, 1973, page 11, "Utility Group Orders Six Identical Nuclear Units."

EXHIBIT 2

	BREAKDOWN OF HOURS			BREAKDOWN OF DOLLARS		
	Budgeted Hours	Actual Hours To Date	Estimated Hours to Complete	Budgeted Dollars	Actual Dollars To Date	Estimated Dollars to Complete
Labor and Overhead	1,655	—	1,655	$ 27,608	—	$ 27,608
Rework	279	—	279	4,655	—	4,655
Material	—	—	—	110,190	—	110,190
Engineering	264	214	50	1,588	$ 3,110	—
Drafting	250	293	—	1,504	2,819	—
Direct Charges	—	—	—	12,875	23,108	—
TOTAL	2,448	507	1,984	$158,420	$29,037	$142,453

and allocated on the basis of direct labor or in the G&A rate.

Thus, if nuclear items make up only 10 per cent of the business, the additional costs applicable to this 10 per cent will be spread over all products. The excess costs charged to the industrial types will probably not be noticed, but the cost of the nuclear will appear to be substantially lower than the true cost. Because the undercosted nuclear components will appear to be highly profitable, management will be encouraged to bring in more such business. As the proportion of nuclear business increases, the costing inadequacies of the standard cost system will become evident as the overcosted industrial types indicate lower and lower profitability. This situation bears out the observation made by one executive who states:

"We continued to use standard costs to value our castings after we sold out our standard line. When non-destructive examinations [NDE] became a larger and larger factor on nuclear castings, our variances from standard became correspondingly larger. The variances identified the excess cost all right, but they didn't tell us what product the variances should be charged to. We considered building the NDE costs into the standards since we recognized this was part of the material cost, but gave up the idea because of the infinite number of standards we would have had to keep in file.

"After this experience, we gave up on standard costing of nuclear valves and went to job costing."

Another company executive had this to say:

"A custom engineered product produced in a manufacturing system designed for standardized volume production creates costing problems which need far more attention than management generally gives."

Format for Accumulating Job Costs—The conventional job order cost system used by many companies accumulates three categories of cost. These are:

Material
Direct Labor
Overhead (usually applied on direct labor).

Under this conventional format, such costs as engineering/drafting, quality assurance, and rework would be included in overhead. Since overhead is usually applied to products through a departmental overhead rate based on direct labor, these costs are distributed in proportion to the amount of labor contained in the various products.

When custom engineered products such as nuclear components are made in the same facilities as standard products, use of this conventional format will result in the spreading of too much overhead to the standard products, which properly belongs with the custom engineered items.

More and more companies dealing in Government contract work have added an additional category called "Direct Charges" to identify such costs as special tooling or special equipment purchased for a specific job. This does not, however, provide for specific direct charging of such costs as engineering/drafting and quality assurance if these are left in the overhead category.

A more appropriate format would be one that recognizes as direct cost items the following:

Engineering/Drafting
Quality Assurance
Rework.

An example of such a format in use by a company making both nuclear and high specification special valves is shown in Exhibit 2, at left.

Estimate to Complete—The budgeted hours and budgeted dollars are synonymous with "estimated," the budget being based on the original estimate used to establish the selling price. The estimated hours and estimated dollars to complete are represented by the difference between the actual accumulated hours and dollars and the cumulative budgeted hours and dollars. If it appears that the budgeted hours and dollars remaining are not sufficient to complete the job, the estimate to complete is increased over and above the budget.

Reasons for deficient estimates

The importance of good product costing for custom engineered products cannot be overemphasized. Some of the reasons for deficient cost estimates are:

- arbitrary costing through use of predetermined standards
- failure to take into account cost escalation factors
- requests for changes
- hasty estimating.

Arbitrary Costing—Standardized products can be costed at predetermined standards with a reasonable degree of accuracy. Custom engineered items such as nuclear valves, cannot be costed through use of predetermined standards because of the many variations and differences in customer requirements that make it impractical to establish individual standards for all the possible combinations. Nor does the answer lie in "guesstimated token adders" that are used

to adjust a predetermined standard to arrive at an actual cost. (If adders are used, there must be assurance that the costs they represent will be fully absorbed. Consequently, custom engineered products must be costed through a system that will identify the actual costs incurred for each job (see "Format for Accumulating Job Costs" in preceding section). Availability of the actual costs, correctly compiled, will provide a basis for monitoring performance as well as providing feedback on the correctness of the estimates.

Cost Escalation on Future Commitments—Cost estimates that may be correct at the time they are prepared could become very inaccurate if escalation factors are not taken into account to provide for cost increases with the passage of time. This is important when one considers how many commitments are made for delivery a year or more hence—during which inflationary cost factors continue with unrelenting pressure.

Requests for Changes—Requests for changes are frequently accepted from the customer with insufficient consideration of the impact of such a change in terms of additional out-of-pocket costs or the extended time during which inventory investment is tied up. Requests for changes should be handled in the same manner followed in making all cost estimates. The amount of additional cost required to comply with the change should be known to management as soon after receipt of the request as possible.

Hasty Estimating—There is no better way to assure faulty cost estimates than to make them in haste to meet an unreasonable deadline. One way to assure better utilization of a limited time allowance (though every effort should be made to obtain a reasonable amount of time) is for extra copies of the customer's order to be made available for purposes of obtaining, simultaneously, the various segments of information that are required in putting together an estimate. Availability of reliable history on past jobs can also be very helpful in cutting time requirements for making cost estimates.

Verification of cost estimates

A cost system provides the basis for regular accumulation of costs. In the accumulation process the system must correctly reflect actual product costs that can be used to verify the correctness of the cost estimates. And, even more important, the comparison of the actual with estimate is the basis for control—assuming that the estimates have been correctly determined.

Illustrative of this is the 12″ 900# carbon steel valve for which the actual cost of the body was $3,123 while the original estimate called for $2,138. The difference of $985 in excess costs is explained in Exhibit 3, at right.

The estimate, which was incorrectly made, assumed that an elliptically shaped body would be used. Since a round shape was called for, more pounds of material were required. These were purchased at a higher cost per pound than was estimated. In addition, certain other costs listed above were not recognized or were understated.

Companies that fail to compare actual costs with the original estimate are missing an important step in the process of management control.

Summary

Costs such as engineering, quality, and rework, which are normally part of overhead and applied through an overhead rate based on direct labor, cannot be allocated in the conventional manner when nuclear components (or other close tolerance products) are being made. Costs of this type, that are substantially greater for nuclear components, must be excluded from the overhead rate and applied to the jobs on a "direct charge" basis in much the same manner as material is identified by job. Companies with sophisticated systems in which predetermined standards are used

EXHIBIT 3

	Estimate	Actual
Body Weight (lbs.)	1450	1810
Cost of Body	$1,888	$2,444
Heat Charts	—	15
Sharpy Tests	—	45
Film	200	455
Rough Machine	50	164
Total	$2,138	$3,123

are particularly vulnerable to this type of cost distortion.

When inadequate accounting procedures are being followed there is every likelihood that these deficiencies will be carried over into the estimating process. For this reason, the following basic guidelines should be followed:

1. The cost system must provide for direct charging of major costs that are identifiable with a job.
2. When "adders" are used to adjust for differences among jobs because direct charging is impractical, these adders must be tested to assure that they will be recovered in the normal volume of business.
3. Estimates must provide for inflationary factors. The time phasing of such escalation must be explicitly stated and firmly enforced.
4. The cost impact of all engineering changes must be estimated in the same manner as if a new job were being estimated.
5. The cost system must go "full circle" to provide feedback through a comparison of actual costs with the original cost estimate used for quoting the job.

Must identify differences

The tighter specifications called for in nuclear components, the rigid documentation requirements, and the multiplicity of different specifications for the same product ordered by different companies add up to substantially higher costs for nuclear components than for their industrial counterparts. The adequacy of a cost system is not measured by its degree of sophistication but by its ability to identify these product cost differences and to relate them to the cost estimate.

Many CPAs have questioned why or how they have a vital interest in ecology, aside from their normal responsibilities as citizens. This study of ecological problems raised by an airport improvement in the Northwest makes it clear why —

CPAS HAVE A VITAL ROLE IN ECOLOGY

by Robert L. Sullivan
Peat, Marwick, Mitchell & Co.

THOSE who live near airports, particularly in the flight approach patterns to airports, suffer, with varying degrees of patience, the noise of arriving and departing aircraft. As air traffic has increased and as planes have grown larger, the problem has become more and more acute.

The passage of the National Environmental Protection Act of 1969 brought the problem to a head. For a provision of the Act required that all major Federal actions significantly affecting the quality of the human environment would require a detailed statement of the environmental impact of the proposed action. Since most major airports have a portion of their operating costs and capital expansion or improvement costs supported by Federal grants-in-aid, they are required under the 1969 law to file an Environmental Impact Statement when any expansion or improvement is planned. With noise being a major factor significantly affecting the quality of the human environment in the vicinity of an airport, the Environmental Impact Statement requires a demonstration of how Federally defined standards for maximum permissible noise levels will be achieved by the airport.

What has all this to do with either CPAs or management consultants? Simply this: Determination of the best alternatives for achieving an objective (e g., noise standard) involves making a cost-benefit study; getting the best possible relationships for the least possible cost. And here, very definitely, is where consultants are needed.

CPAs, whether interested in ecology or not, are also involved not only because of their obvious role in cost-benefit studies but also because of the long-range impact such studies may have on the entire tax structure of the community served. Finally, all CPAs could be involved in ecology because the Securities and Exchange Commission has ruled that the probable environ-

mental impact of any development plan for any firm listed on the exchange must now be given in the company's annual financial statement.

Airports are just one example, of course, of areas where consultants and CPAs play a major role. Environmental Impact Statements have to be filed for many other industries requiring Federal licensing as well: for public utilities, for railroads, for any undertaking that has any Federal financing, whatever. At airports a key problem is simply one of noise pollution.

We became involved recently with a major expansion program in a large airport serving two metropolitan areas on the West Coast. An Environmental Impact Statement had to be filed, of course, and it showed very clearly that one of the expanded north-south runways would increase the noise level of a heavily populated area to unacceptable levels.

The measurement of noise impact reductions that are likely to be brought about as a result of changes in policies of airport operation or land use development is relatively simple and straightforward. First a study unit must be selected to relate data to some common base. The study unit chosen here was a 1/16 section cell (containing approximately 40 acres). Initial input requires analysis of existing land use and airport noise characteristics within each cell. Land use information on the acreage and number of structural units by land use type is assembled as illustrated in Exhibit 1, below. Using Department of Housing and Urban Development (HUD) criteria for the sensitivity of land use to noise, each type of land use in the cell is assigned a sensitivity value. Then if the land use should be changed at some future date or if the land use policies to be evaluated create changes in land use, the sensitivity value can be modified to reflect such changes.

Thus, any land use policy or set

EXHIBIT I

SUMMARY OF LAND USE INFORMATION
Example for Cell J-6

Land Use	Acreage	Units	HUD Land Use Sensitivity Value
Single Family Residence	17.1 Acres	100	1
Multi-Family Residence	2.34 Acres	16	2
Commercial	3.58 Acres	4	3
Public/Semi-Public	0.39 Acres	1	2
Vacant, Private	6.2 Acres	N/A	0

N/A indicates Not Applicable

. . . in our West Coast example, the north-south runway was essential and the topography of the countryside, mountains on one side, the sea on the other, made it impossible simply to shift the runway a few miles to the east or the west . . .

of policies can be represented by a set of sensitivity values for each land use in each cell.

The existing noise characteristics are measured by modeling on a computer the actual airport operations and sounds these operations produce. The result is a set of Noise Exposure Forecast Curves. The results of such modeling are then compared to actual noise measurements and cell value of noise exposure is determined.

Then, if airport operations are changed in some manner, or if the airport policies to be evaluated create changes in airport operations, the cell noise value can be modified to reflect such changes.

In this manner any airport operational policy or set of policies can be represented by a related set of noise exposure values for each cell.

The next step requires matching the sensitivity values in each cell, which represent that land development policy, with the noise exposure values in the same cells, which represent the given airport's operational policy. Then we can get some measure of relative impacts. If the ratio of exposure values (E) to sensitivity values (S) is two or less, the impact (I) is acceptable. When the ratio exceeds two, the impact is not acceptable, and one or both of the policies being evaluated, land development policy and airport operational policy, must be discarded or modified.

Yet in our West Coast example, the north-south runway was essential and the topography of the countryside, mountains on one side, the sea on the other, made it impossible simply to shift the runway a few miles to the east or the west.

So, the first of two possible solutions to airport noise pollution levels was ruled out: adaptation of the airport policies to lessen noise impact. The north-south runway was fixed in location by topography. The only remaining approach we could use was to measure the costs required to reduce any residual noise impact to acceptable levels.

Federal regulations do not demand ceiling noise levels in open, unprotected approach areas. The measurement of the noise impact is within area buildings, either residential, industrial, or commercial.

Possible solutions

Basically, in a situation such as we faced on the West Coast, an irresistible-force-meeting-an-immovable-object kind of situation, there are solutions. They vary in attractiveness according to the area within the approach pattern.

1. Buy up all the property in the approach pattern, relocate the people, and destroy their homes. This obviously can work only in sparsely populated areas if prohibitive costs are to be avoided.

2. Insulate existing houses and buildings so noise levels will be within acceptable limits.

3. If the area is not too heavily developed already, zone it for industry rather than residential future development.

4. Ignore present buildings on the theory that people who bought them knew they were near an airport, and therefore took the risk of high noise levels knowingly. But ensure that all future construction meets structural and insulation levels needed for good noise control.

This brings the CPA squarely into the picture, whether he is a management consultant or not. For these are obvious cost-benefit questions. Which of the various solutions would achieve the greatest good for the lowest cost? And also,

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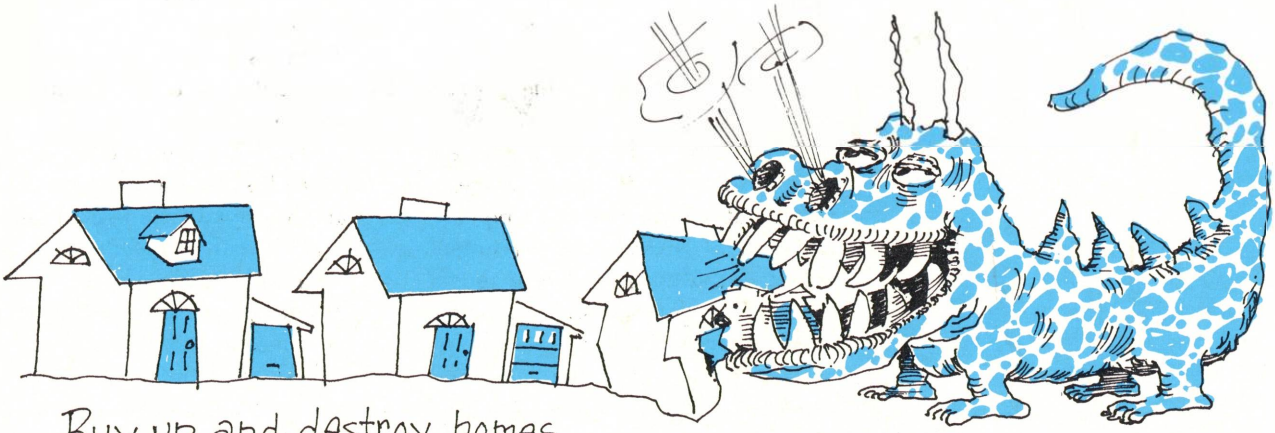
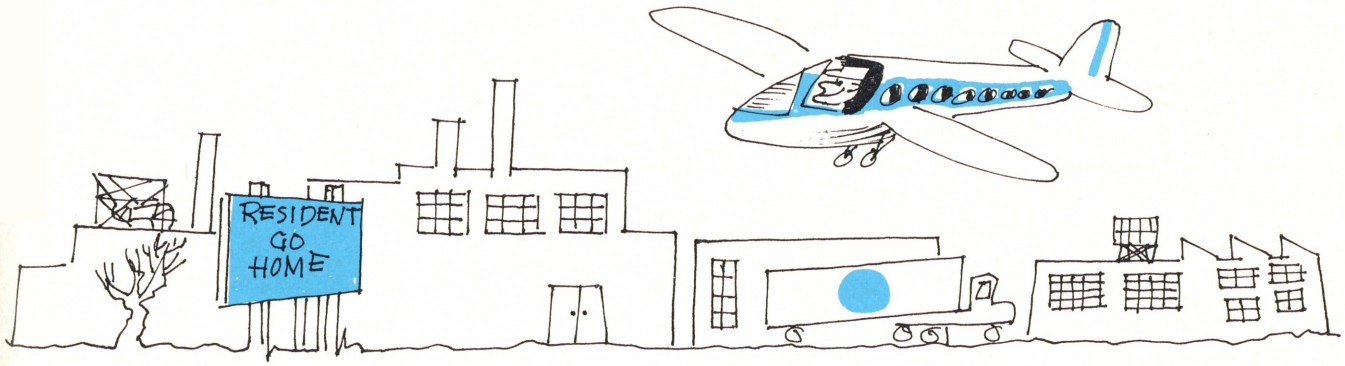


Buy up and destroy homes

Insulate all houses



Zone it for industry

Ignore them

what would its influence on the future of the area be? On the community tax base?

In the West Coast project we have been describing, the first of our four options—buy up all the land and destroy existing structures—is not out of the realm of possibility. The Federal Government would provide an attractive incentive in the form of a grant of up to 50 per cent of the cost of purchasing outright all the land and buildings. However, the land held not only homes but a school and other public facilities. Relocation of the school or redistribution of its students to other school districts would add an extremely onerous, if not insupportable, tax burden to the other districts. Elimination of the homes would remove a substantial source of tax revenues. In a similar situation in a community in the southeast part of the United States, redefinition of land use due to a large development project and the resultant rezoning and loss of tax revenues, was projected to result in the city being unable to meet debt service on its general obligation bonds unless the legal limitation on the tax rate, which is controlled by state law, could be changed. Whether the West Coast airport improvement will have a similar impact is presently under examination.

. . . the first of our four options—buy all the land and destroy existing structures—is not out of the realm of possibility . . . However, the land held not only homes but a school and other facilities. Relocation of the school or redistribution of its students to other school districts would add an extremely onerous, if not insupportable, tax burden to the other districts.

We have not yet come up with an answer to the problems involved in the improvement of the West Coast airport. The noise problem is only one element of the Environmental Impact Statement and study and evaluation is continuing of the other impacts of the airport expansion such as:

- Impacts on the ecology of the area, i.e., on drainage conditions, soil conditions, and topography;
- Possible changes in the quality of the air around the airport, year round, under all conditions of weather and airport use;
- Changes in the visual appearance and aesthetics of the area;
- Changes that might be anticipated in community attitudes toward the airport by citizens living in the vicinity as determined by a special survey;
- Impacts on direct and indirect employment in the surrounding communities;
- Changes in the development patterns of surrounding communities and ways to control or ameliorate them through zoning ordinances and building codes;
- Impacts on the multiple local governments and special districts involved and their ability to take coordinated action on the changes anticipated by the expansion.

All of these factors are being studied together with the noise element for a complete assessment of the environmental impacts of the airport.

In summary, this airport expansion study provides, in our opinion, an excellent example of the need for an expanded role for the CPA beyond his traditional involvement with accounting, auditing, and financial management in private business. In any cost-benefit study the determination of what costs to assign to each alternative under consideration is a key input to the study and one which the accountant is best qualified to handle. In addition, communities such as the one in which this airport expansion is being contemplated must remain financially viable by paying their expenses, including debt retirement, out of tax revenues while maintaining essential services.

The CPA, working together with the planning engineer, can translate the consequences of alternative development plans into projections of community-cash flow for a determination of which alternatives are financially responsible. Finally, most communities are audited annually by CPA firms. It seems clear that the auditor, when certifying to the financial condition of a community, should be alert to the existence of major development projects which could have a substantial impact on the community's financial viability. Unanticipated bankruptcies are not the province of private business alone.

Most progressive companies would agree that a "chargeout" system of allotting computer costs to the department using the services is wise, but they neglect some other considerations. How should the costs be broken down, where a company uses —

DIRECT CHARGEOUT OF INFORMATION SYSTEMS SERVICES COSTS?

by John J. Anderson
Kent State University

OVER the 20 years that have elapsed since the first commercial computer installation, information systems groups have grown into major corporate service departments. These departments frequently report to the top echelons of management and command substantial budgetary support. As the scope of systems services broadens there is an increasing need to exert effective management control over their mounting costs. Direct charging schemes, wherein users of services are billed directly for the costs of systems resources consumed by them, have considerable potential for facilitating such control.[1] Benefits in the form of improved project selection and more efficient systems efforts may be obtained through the creation of a heightened awareness of and concern for project costs throughout the organization. The objective of this article is to explore the nature of direct charging systems as regards the information systems area, to point out some considerations involved in developing and administering them, and to evaluate their potential advantages and limitations.

Nature of systems costs

Although there is considerable diversity in the organization of Information Systems Departments (ISD), generally they can be divided into two areas: the data processing area and the systems development area. The data processing area may be thought of as the production branch of the operation. It is responsible for the day-to-day operations involved in handling data and reports. Costs incurred in this area tend to be predominantly fixed in nature—at least within a month-to-month time frame. Hardware and software rental, supplies, and the costs of maintaining the necessary complement of machine operators, clerks, and supervisory personnel typically constitute the bulk of the costs.

The systems development area is concerned with the development of new systems applications and with the maintenance and improvement of existing systems. Projects it undertakes are normally in support of outside users, although some projects support ISD operations directly—e.g., general software development and maintenance, special operational applications such as a computer operations scheduling system. This area may be thought of as the "research and development" group whose products are typically turned over to the data processing group for operation (although some completed projects may be operated by the user or by an outside service agency). Costs in this area are largely comprised of salaries of professional systems personnel, including systems ana-

1—For a general discussion of management control requirements in the systems area and the need for chargeout systems see Dearden, John, and Richard L. Nolan, "How to Control the Computer Resource," *Harvard Business Review*, November-December, 1973.

lysts, management scientists, programers.

The ISD work effort can be identified in terms of systems projects which go through various life phases within the department. Once a project has been mutually agreed upon between the user and ISD, it enters the initial development phase in which the systems analysis, design, programing, testing, and final conversion stages are carried out. This phase primarily involves the efforts of systems development personnel, although the processes of debugging and testing programs and file conversion may involve considerable use of data processing resources.

Once the development effort is completed the project goes into a production phase and is turned over to the data processing group for operation. As the system is used it requires maintenance: correction of error conditions, modification to meet new requirements, further development to generate new reports or improve old ones, etc. The use of both data processing resources and systems development personnel are required during this phase.

The basis of a direct charge system is a bill for systems services rendered which is submitted periodically to each user of services and is then charged against his budget in an above-the-line category. The charges for systems services are handled much like charges for services acquired from outside vendors except that no actual money changes hands . . .

Nature of direct charging

As has been frequently pointed out in the systems literature, there is a strong need for more effective managerial controls and user involvement in the systems area.[2] To aid in this area, many firms have developed charging systems which facilitate the effective communication of costs of services throughout the organization and enhance user motivation to exert control over these costs.[3]

The basis of a direct charge system is the development of a bill for systems services rendered which is submitted periodically – say monthly – to each user of services and is then charged against his budget in an above-the-line category. Thus charges for systems services are handled much like charges for services acquired from outside vendors except that no actual money changes hands. The bill should be accompanied by an analysis of the charge identifying the nature of the services rendered. Complete information should be provided concerning systems development and data processing costs related to the various phases of individual user projects. In addition to providing a monthly bill, the system should develop data useful to sponsoring users in:

a. Preparing annual estimates of systems services costs for inclusion in the budget process.

b. Making estimates of development and eventual maintenance and operating costs used in evaluating proposed systems projects.

c. Monitoring monthly costs incurred in support of each active project.

Summaries accompany bills

Exhibits 1, page 29, and 2, same page, illustrate useful summaries which might accompany a monthly bill for systems services. Exhibit 1 shows a monthly analysis of current costs associated with a given user project. These costs are broken down both by type of ISD resources used and the system phase in which they are used (whether the costs were incurred in support of the initial development of the system, in operating it in a production environment, or in maintaining or improving the production system).

Exhibit 2 illustrates a report summarizing the above analysis and developing totals for each project and for each user compared to original project and annual budget cost estimates. These reports are designed to allow users to gauge

2—An excellent study in this area was recently published by the National Association of Accountants as a research report. See Sollenberger, Harold M., *Management Control of Information Systems Development*, 1971.

3—For example, the Sollenberger study reports that out of 18 major companies studied, "about two-thirds of the firms had a charge for data processing work, while approximately 40 percent charged for systems development work," ibid., p. 130.

trends in costs incurred so that they may consider appropriate actions. More detailed resource utilization reports should also be generated to permit a deeper analysis of particular problems evidenced in the summary reports, as well as to aid systems management in monitoring the use of its resources.

Development of a costing system

Implementation of a direct charge system requires the development of an integrated, comprehensive cost accounting system to supply the necessary charges. In addition to supporting the direct charge system and providing cost data to users, the system should also be capable of providing information useful to ISD management in monitoring and controlling its operations. Desirable attributes of such a system include the following:

1. *Comprehensive in scope*—All relevant ISD cost centers should be incorporated.

2. *Costs categorized by project*—All ISD costs incurred in developing, operating, and maintaining individual systems should be identified and made visible.

3. *Adequate but not excessive amount of detail regarding resources used by individual systems*—Users should receive enough information to satisfy them as to the justification of the charges and to permit them to raise general questions as to the advisability of system modifications. The information should not be so detailed as to confuse users or to generate unnecessary questions relating to transient fluctuations in the data (adequate detailed data ought to be readily available to permit research regarding special problems or questions that may arise).

4. *Understandability of cost algorithm*—The method of associating costs with services rendered should be reasonably simple and straightforward in order to encourage user acceptance and comprehension.

5. *Equitability of charges*—User charges should reasonably equitably reflect the costs of resources actually commanded by the user.

6. *Stability of charges*—Users ought not to be exposed to significant shifts in charges unrelated to changes in activity volumes or general cost trends (e.g., shifts caused by modification of cost algorithms, changes in system resources used to execute a given system, or fluctuations in systems workloads).

7. *Flexibility in dealing with special situations*—Some costs may need to be absorbed by ISD rather than recovered from users, for ex-

EXHIBIT 1

Example of a Monthly Project Cost Summary Report

PROJECT SPONSOR: International Marketing MONTH: November, 1973

PROJECT TITLE: European Sales Analysis

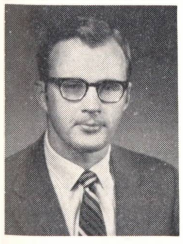
	DEVELOPMENT		PRODUCTION		MAINTENANCE	
Type of Resource Used	Volume	$	Volume	$	Volume	$
Systems Professionals:						
Analysts (hours)						
Programers (hours)					20	$ 290
Main Computer (activity units):						
Local Batch			95	$ 570		
Remote Batch					15	$ 100
Remote Interactive			41	$ 615		
Data Handling:						
Keying (hours)			500	$3,500		
Other Machines (hours)			100	$ 800		
Clerical Effort (hours)			60	$ 420		
Dedicated Devices (allocation)				$1,000		
Other Services:						
Outside Computing						$ 875
Consulting						
Other						
Project Total				$6,905		$1,265

EXHIBIT 2

Example of a Cumulative Cost Summary Report

PROJECT SPONSOR: International Marketing Month: November, 1973

		PROJECT		BUDGET	
	Current Charge	Project Cost To-Date	Project Budget	Year-To-Date Cost	Annual Budget
PROJECT: European Sales Analysis					
Development		$35,700	$33,000	$ 8,500	$ 7,000
Production	$ 6,905	$ 7,500		$50,050	$ 60,000
Maintenance	$ 1,265			$ 3,500	$ 5,000
Project Total	$ 8,170	$35,700	$33,000	$62,050	$ 72,000
PROJECT: Latin American Sales Analysis					
Development	$ 4,675	$ 9,200	$30,000	$ 9,200	$ 30,000
Production					
Maintenance					
Project Total	$ 4,675	$ 9,200	$30,000	$ 9,200	$ 30,000
Sponsor Total	$12,845	$44,900	$63,000	$71,250	$102,000



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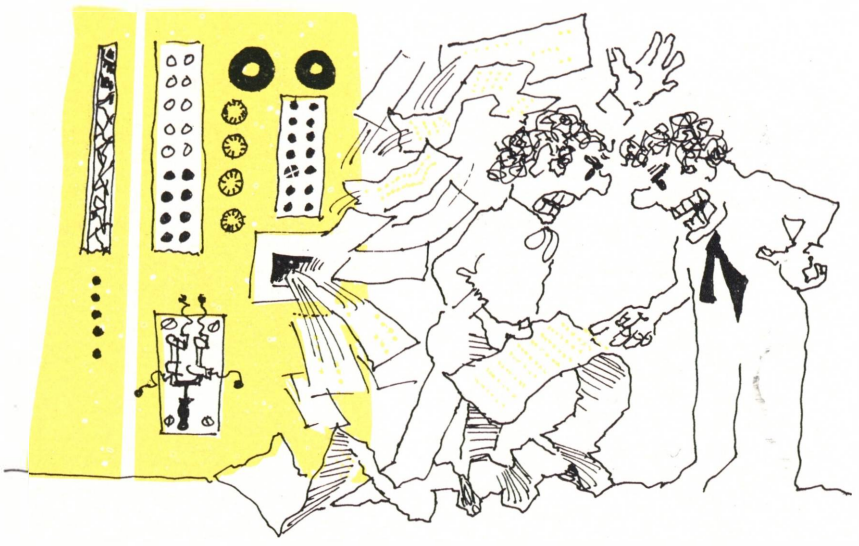


Reruns can cause insoluble problems. It's best to establish a policy of charging costs entirely to the user or entirely to the information systems department; it's easier and cheaper than investigating and determining exactly who's responsible.

ample costs of reruns resulting from ISD error, costs for projects with substantial long-run benefit to the company but with no immediate sponsor.

8. *Economy of operation*—Costs associated with collecting data and generating reports should be minimized.

Developing resource cost rates

Setting up the costing system entails the development of appropriate resources measurement subsystems and cost rates which will permit the tracing of costs to particular user projects. To facilitate this process each project undertaken by ISD should be identified with a unique number and any efforts undertaken in support of that project should be identified according to the reporting categories desired. Specific suggestions for dealing with major cost areas are discussed in the following paragraphs.

1. *Professional Systems Personnel*—The costs of professional systems personnel should be charged to projects on a time and hourly rate basis. This entails the development of a timekeeping subsystem wherein each employee identifies his time with particular phases of individual projects. It is desirable to set different cost rates for different classes of personnel, i.e., to charge out junior analysts at lower rates than senior analysts, etc. Otherwise, under a direct charge system, users would tend to demand only highly-qualified (and presumably more productive) personnel on their jobs in order to minimize the costs of the project. A system setting individual billing rates as a percentage of gross pay would constitute a simple and equitable way to accomplish a fair rationing of systems talent. Hourly rates should be set at a level which will permit the recovery of indirect personnel costs such as vacation pay, training and development, sick leave, and supervision.

2. *Computer Costs*—Charges for computer system costs may be developed by measuring the amount of computer time used for each "run" of a program and multiplying it by a cost rate. This rate is derived by dividing the total costs to be recovered by the estimated productive time the computer is to be used. Recoverable costs would normally include those directly associated with operating the primary computer system, e.g., rental of central processing unit and attached input-output and storage devices, storage media costs, operator costs, utilities, supplies, costs associated with scheduling and maintaining the computer system. Where several computers are in use, separate rates for each should be developed.

Such an approach will not work effectively where the computer is operated in a multiprograming mode, however. Because several programs may be sharing the use of various systems components concurrently, more sophisticated measurement methods must be used to achieve a proper allocation of costs. One general approach to this situation measures usage of a number of individual system elements—e.g., central processing unit time, amount of core memory used, number of tape drives used, duration of core or tape utilization, channel time used, etc. A separate cost rate is developed for each component based on costs associated with that component and on estimated usage. The charge to a job is then calculated using a formula which applies these rates to the specific resources used by that job. An example of such a formula is shown in Exhibit 3, on page 31.[4]

This method is designed to provide an accurate assessment of the cost of resources actually used by a job. There are several problems related to its use, however:

1—Some of the time measurements tend to vary from run to run depending on the mix of other runs in the system at the time the program being measured is executed. Thus, some of the resource times for running a particular program may vary widely depending on whether it is run during a peak time or at a time when the machine is not heavily loaded.[5]

2—The allocation of costs to individual systems components for purposes of developing cost rates

4—Adapted from a formula suggested by Philip G. Bookman, "Make Your Users Pay the Price," *Computer Decisions*, September, 1972.

5—For a more detailed discussion of this problem and means of dealing with it see, Giudice, John J., and John J. McElroy, "Allocation Job Costs for Multi-Programming Systems," *Data Processing Magazine*, Spring 1972.

tends to be arbitrary. For example, should the cost of machine operators be built into the central processing unit rate, the core memory rate, or the tape drive rate?

3—The formula may become so complex that it is difficult for users to understand and utilize the results.

4—The charge resulting from the system may tend to be unstable over time as modifications to the hardware and/or software configuration used are made.

A second approach bases the charge primarily on the volume of tasks performed by the system. Counts of such tasks as reading a card or transferring a tape record are weighted by time factors representing average times consumed by such tasks and the result summed to form a single measure of activity (typically identified in terms of number of "Machine Resource Units" or "Computer Activity Units" used). This pseudo-measure is then multiplied by a single cost factor to get the charge. An example of a formula based on this approach in use at a major oil company is shown in Exhibit 4 at right.[6]

Because of the approximations built into the time factors, this method tends to compromise the equitability of the resulting charge. It does, on the other hand, tend to provide a reasonably stable charge —both from run to run and over time—because of its freedom from measurement of specific resource times. Thus, in providing a single measure of the volume of computer activity used to support a job and a single rate to be applied to that measure, it provides a relatively simple, understandable, stable measure at the sacrifice of some accuracy and equitability.

On balance, it would appear that the latter type of system would be more reasonable to use within a direct charge system because of the virtues cited. However, the more detailed approach would probably provide more useful information for evaluating system design alternatives within ISD itself. Either system may require some modification of standard systems software in order to collect and make available the necessary data to support the charge.

Another question relating to computer operations is the manner in which reruns are handled, i.e., jobs which must be reprocessed because of a problem occurring during the original run. It's both more equitable to users and useful to ISD management (as a means of measuring the overall efficiency of the computer operation) to identify rerun costs within the cost system and to treat them separately from normal runs. Costs of reruns caused by users would be directly chargeable to them while the cost of other reruns would be absorbed by ISD. The difficulty of identifying the nature of the problem necessitating the rerun and the procedural changes necessary to capture the data required may make the cost of this refinement exceed its value, however. It would be far simpler to charge the costs of rerun time either entirely to the user or to ISD itself. Serious misallocations of costs arising in particular cases could be handled through special credits initiated after the fact.

It may also be desirable to charge varying rates for different classes of service. Thus a user desiring fast response as in a time-sharing or real-time application

EXHIBIT 3

Example of a Computer Billing Formula Based Primarily on Detailed Resource Measurements

$$\text{Charge} = Q\,[Cr_1 + Rr_2 + Pr_3 + Lr_4 + (C + I + W)(Tr_5 + Dr_6 + Kr_7) + Or_8 + Xr_9]$$

Where:

- Q = priority factor
- C = central processing unit time used
- R = cards read
- P = cards punched
- L = lines printed
- I = channel time used
- W = voluntary wait time (time a job spends waiting for completion of input-output operations)
- T = number of tape drives used
- D = number of disk drives used
- K = amount of core memory used
- O = number of operator interventions
- X = terminal connect time in seconds

and

- r_i = cost rate for i^{th} resource

EXHIBIT 4

Example of an Activity Unit Type of Cost Algorithm Based Primarily on Transaction Counts

$$\text{charge} = c \cdot \text{CAUs}$$

Where:

- c = overall cost rate for computer system
- CAU's represent Computer Activity Units which are computed $= (K/a_1)\,(C + a_2\,TR + a_3\,DR + a_4\,SR)$ given that
- K = amount of core memory requested
- C = central processing unit seconds used
- TR = number of tape records transferred
- DR = number of disk records transferred
- SR = number of slow-speed records transferred (e.g., cards, printer lines, teletype lines, etc.)

and

- a_1 = a standard core utilization factor
- a_2, a_3, and a_4 = estimates of the average number of seconds typically required to transfer records on each respective device.

6—This particular formula contains some elements of the first approach discussed, inasmuch as it uses direct measurements of CPU time and core utilization in measuring a run's actual computing requirements.

might be charged a higher rate for resources used than would a user content with overnight response. The lower rate for the latter type of service reflects the increased efficiency with which ISD can operate its installation when it has time flexibility in scheduling individual runs.

3. *Other Data Handling Costs*—Costs of general purpose data handling equipment (e.g., small computers, keypunches, communication devices, etc.) should be charged out on the basis of an hourly cost rate applied to the amount of time used by each project. The rate should include at least the device rental and the operator's compensation.

Such a system requires the routine collection of machine usage data, such as counting key depressions for keypunching or maintaining manual time logs for other devices. Where a device is dedicated to a given project or to a very few projects, it may be expeditious to simply allocate all or some appropriate fraction of the total monthly cost associated with the device to these projects rather than applying a cost rate to actual time usage measurements.

All costs of clerical efforts (data control, customer service) should be charged to systems on the basis of an hourly cost rate applied to the estimated amount of time spent on the system. This method also necessitates the initiation of a personnel timekeeping system. It may be expeditious to treat the wages of some employees as overhead items and to build their costs into rates applied to other resources. However, it is advantageous to identify specific costs with specific projects to the extent feasible in order to produce "actionable" information, i.e., information which user and ISD management can use as a basis for making decisions concerning systems alternatives.

4. *Other Costs*—Costs of outside services such as consulting work, contract keypunching, and time sharing, which can be traced directly to individual projects, should be charged directly based on invoices received. In general, other ISD costs should be treated as general overhead and included in the rates charged for other services more directly associated with projects or systems. These costs may include general administrative costs, corporate charges for occupancy, etc. It may be useful, however, to eliminate some of the administrative costs from the charging algorithms. While these costs are legitimate and necessary costs of operating a systems group, they are, for the most part, not influenced by users even in the long run, and their inclusion would seem to contribute little to the effectiveness of the direct charge system.

4. *Modification of Cost Rates*—In general, cost rates for each specific resource should be developed so as to allocate as objectively and accurately as possible the costs of the resources to those jobs using it. However, it may be useful in some cases to set cost rates arbitrarily high or low so as to discourage or encourage use of particular resources in line with long-range ISD objectives. Thus, for example, it may be useful to encourage users and systems designers to make more use of disk and less of tape by arbitrarily raising the cost rates associated with tape and/or lowering those associated with disk. Similarly keypunch rates might be raised arbitrarily for certain classes of jobs where it is desired to encourage users to switch to remote data entry systems.

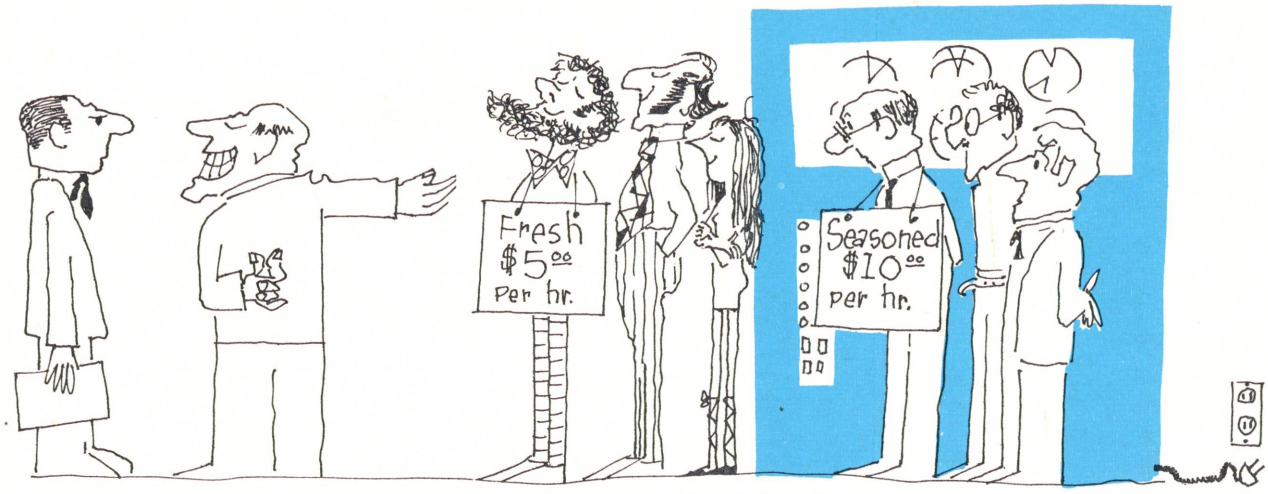
It would also be useful to establish the prices at which comparable services could be obtained outside the company as maximum prices for specific services. Thus, for example, the costs of keypunching data or of running a time-sharing application should not exceed that which users would incur by patronizing a local service bureau. Failure to maintain a flexible rate structure in this regard may induce particular users to attempt to save money by buying services outside at what appears to be a lower cost. This would probably be detrimental to the company as a whole, however, because of the circumstance that many of the costs built into the internal price are fixed in nature.

Another approach that could be used to eliminate this problem would be to include only marginal, direct costs in the internal rate. In the systems development area such rates would be relatively close to full-cost rates since the costs of systems professionals' time is essentially marginal (in the sense that many projects are typically competing for their time). In the data processing area, however, the magnitude of fixed costs involved would result in such low rates under this approach as to sacrifice most of the advantages of using the direct charge system. Also the necessity of making adjustments to rates to meet competitive prices would be useful inasmuch as it may call attention to possible inefficiencies in ISD's operations (or situations in which a service offered by ISD should be dropped altogether in favor of using the outside service).

Advantages and limitations

The basic rationale for the direct charge system is that user managers will become more aware of costs incurred in support of their operations and will be more motivated to take appropriate action regarding those costs if they are charged against their budgets on an as-incurred basis. This may lead to better decisions regarding the initiation of new services and the continuation or alteration of existing services. It may also induce users to play a more active role in exerting control over the efficiency and quality of services rendered.

The primary arguments against the direct charge method concern the possibility of discouraging the development of worthwhile applications and the potential expense involved in developing and maintaining the underlying cost system and in dealing with user concerns associated with the system.



The cost of professional systems personnel should be charged to projects on a time and hourly rate basis, with different cost rates for different classes of personnel.

To ensure that the benefits obtainable from the system are realized, the system must be fully integrated into existing planning and control systems. User management should be encouraged to actively participate in systems planning activities and to utilize costs generated by the system in these activities. Thus, users should be encouraged to budget systems costs as they would other expense items and to defend the budgeted costs to senior management. Further, all proposals for new projects should contain explicit estimates of all related development, operations, and maintenance costs to be transferred from ISD to the user department over a reasonable time horizon—say, three to five years. The effects of these policies should be to impel user managers to deal with and come to understand the costs involved and to encourage them to effectively consider alternatives.

However, the system must also be administered with sufficient flexibility to minimize the risk of turning off applications with merit because of user unwillingness or inability to pay the real costs involved. ISD should retain enough budget flexibility to provide support for projects with long-run and/or broad benefits to the company. Thus, worthwhile projects with no sponsor willing to pay the bill could be encouraged through ISD partial or total support in cases where ISD management feels this to be in the best interests of the company. Further, ISD management must continue to play an active role in allocating systems resources to users through maintaining effective communications with them and encouraging worthwhile use of the resources. The direct charge system should be viewed as a means of supporting ISD management in this role rather than supplanting it.

Summary

The securing of effective communications between systems groups and user management is becoming particularly important as companies move beyond the process of automating basic data flows. The current trend is to build on existing data bases to provide more accessible and useful information to support management. These applications are justified more on the basis of intangible benefits than on cost savings. In order to ensure that such applications are warranted, it will be increasingly necessary to make management both aware of and attentive to the costs associated with them.

The direct charge system as described herein has considerable potential for facilitating control of systems costs and encouraging effective use of systems resources. If properly implemented and administered, the system can also encourage more effective communication of the realities of the costs of systems services.

Other cost allocation methods less drastic than the direct charge system might be adopted as means of achieving similar ends at less risk or cost. Annual budget allocations based on anticipated resource utilization could be developed. Such a system could be supplemented by a memo billing mechanism generating monthly or quarterly reports to users detailing the resources actually used by them during the period. The system could be further modified by instituting a mid-year budget adjustment designed to correct the original allocation by taking account of actual trends in usage. While these measures would serve to put more cost information in the hands of users, they do not seem to have the potential of the direct charge system for motivating managers to use the information effectively and to take a more active role in the commissioning and monitoring of systems projects.

Some errors of omission that occurred in an article "Interactive Accounting on the Shared Computer?" Management Adviser, November-December, 1973, are pointed out by the author —

INTERACTIVE ACCOUNTING—A RESPONSE

by George E. May
Alexander Grant & Company

A RECENT article in MANAGEMENT ADVISER bothered me, not because it was inaccurate in any way, but because it left out so much that I fear it may leave a misleading impression.

The article, entitled "Interactive Accounting on the Shared Computer?" by Allen P. Vollen (M/A, Nov.-Dec., '73, pp. 46-50) made a good case for interactive accounting on the shared computer, but it seems to me that it left out so many of the countervailing arguments that, in effect, the article was misleading. The sins were those of omission rather than commission but for businessmen seeking guidance in a field that's pretty much unknown territory the effect is still misleading.

Take the statement, "Assuming the businessman is willing to devote the funds, time, and space necessary for launching his system operation, he still faces the biggest hurdle: recruiting and retaining analysts with the ability to design and develop systems not only geared to the needs of the particular business but also to bring about healthy utilization of the computer's capacity." The inevitable conclusion: "the shared computer concept seems to be the answer to the problems of the in-house or service bureau system."

But we live in a real world, one of dimensions and time and needs. A great many well-trained people for staffing data processing installations are no great problem in New York or Boston or Chicago, although they may well be in Peoria or Pascagoula. By the same token, there are good service bureaus and there are very poor ones. Any large metropolitan area will have several of each, but there will always be some excellent ones among them.

Also, although we have to agree with many of the points made in the article with respect to the high costs and staffing problems associated with the more traditional approaches, we also feel the article showed bias in failing to discuss either the turnkey* approach or other packaged offerings of data processing organizations or the disappointment many users have run into with interactive systems.

We shall endeavor in this article to present "the other side" of this issue.

Interactive accounting systems can provide savings and other benefits over in-house systems or batch-oriented service bureaus. A shorter and less costly implementation period is usually cited as the most attractive feature of the inter-

* Turnkey—A turnkey package is one in which all developmental activity has been performed by an outside organization and the "key" is then turned over to the customer when the system is fully operational. A one-time fee is usually charged.

A great many well-trained people for staffing data processing installations are no great problem in large metropolitan areas.

active system. Lower continuing operating cost is a second advantage and more timely and better integrated management information is a third benefit commonly cited.

Perhaps the primary prerequisite for low conversion costs and a short time span in installing an interactive system is the "snug fit" between the "package" offered by the vendor and the customer's needs. Although many interactive vendors now offer a variety of options with respect to report formats, file content, and the like, the options are still rather limited in comparison with the degree of flexibility which in-house systems or "customizing" service bureaus provide. Several shared computer organizations with which we are familiar will provide a degree of customizing comparable to that possible with in-house systems, true, but at costs which have staggered the first-time user who learns rather late that the "snug fit" is really pretty poor.

We do not wish to imply that shared computer firms in general will "lowball" or otherwise deceive a prospect and hope to recover unrealistically quoted operating charges through inflated customizing charges. Not surprisingly, however, there are less than ethical vendors in this segment of the data processing world as there are in all other segments. Perhaps "Let the buyer beware" must be even more scrupulously observed where a salesman offers an answer to data processing needs which seems to promise the best of all possible worlds.

The comparison of interactive system costs with prior systems costs in the November-December article is interesting, but certainly not conclusive. One must wonder what competition, if any, the selected interactive system faced. We would prefer to see "good fit" manufacturers' packages, such as IBM's Application Customizer Service or similar offerings, compared to the interactive system. This would be more meaningful than the prior system vs. selected system comparison provided in the article. How insufficient and overly expensive were the old systems? Perhaps a conversion to *any* new system, interactive or not, would have been less costly than the old system.

Other questions which must be answered include, to list a few:

Which reports, if any, are produced on the customer's terminal and which are prepared at the vendor's facilities and mailed or delivered later? Is the system truly real time; that is, do all transactions entered via terminals update the customer and inventory files immediately so that inquiries or subsequent transactions reflect the current file status, or are they collected and used to update the files overnight? Can inquiries be accommodated via the same terminal as transactions, or is a second terminal or ancillary printer required to handle them efficiently?

We have previously referred to one advantage which in-house systems offer over shared systems: namely, flexibility. Determining the real need for flexibility, however, is never a simple task. In general, the accounting requirements of a distributor or wholesaler are simpler and therefore more "packageable" than those of most manufacturers or retailers. If raw material and in-process inventory control is a required machine application (in addition to a finished goods inventory control system), there will probably be significant additional one-time costs entailed, assuming the shared computer organization is willing to address these problems at all. In addition, any but the simplest cost accounting will most likely also present "fit" problems for the shared system.

In summary, it is essential to evaluate the kinds of processing job, their mix, and their need to interface with each other, in order to determine the attractiveness of any system. It is also necessary to know the area in which the company is located and the alternative data processing options available there. As the MANAGEMENT ADVISER article did not discuss these critical questions here "answered," I believe the conclusions presented must be evaluated in the light of those omissions.

With respect to service bureaus' "not delivering to the customer the kind of service promised," this was sadly true too often in the past; it is not nearly as true today. I would have no hesitation about recommending half a dozen such firms to our clients in the New York metropolitan or rural areas. The ingredients necessary for the successful employment of any data processing method, in addition to proper vendor selection, must include the following:

1. Proper definition by management of objectives.
2. Proper involvement by management—a company can't "buy" an effective system but must invest time as well as money.
3. Adequate orientation and training of the users as well as of the system operational staff.
4. Obtaining professional help in making the major decisions as one would from physicians, attorneys, architects, and the like.

Availability of personnel

Interactive systems are not new; Keydata has been in business since 1966, airlines and banks have used comparable on-line systems since the late 1950s.

Mr. Vollen observes that personnel competent to install and operate in-house systems are scarce and expensive. This is mainly true only in smaller cities, and it has been recognized by the major computer manufacturers (in-house vendors) and by others and has been in part responsible for the development of several new approaches and techniques for meeting this problem. Interactive systems represent one of these but certainly not the only one.

Others are:

1. The availability of operator-oriented small computers
2. IBM's Application Customizer Service which employs a management checklist and uses larger computers to prepare programs
3. Turnkey arrangements using major vendor computers
4. Turnkey arrangements using minicomputers
5. Organizations offering both interactive and batch services
6. Facilities management arrangements for smaller systems now being offered by some organizations.

In addition:

1. On-line systems can now be implemented in-house (if real need exists) on small computers
2. Availability of "good fit" software is greater each year
3. One approach is not always "best" or most economical, but a combination can be; e.g. billing interactive payroll by a bureau or a bank, financial statements manually.

Conclusion: Interactive accounting *may* be a better answer for a company requiring data processing methods, but the choice must stem from the same careful evaluation of all pertinent factors which the intelligent businessman employs in areas more familiar to him.

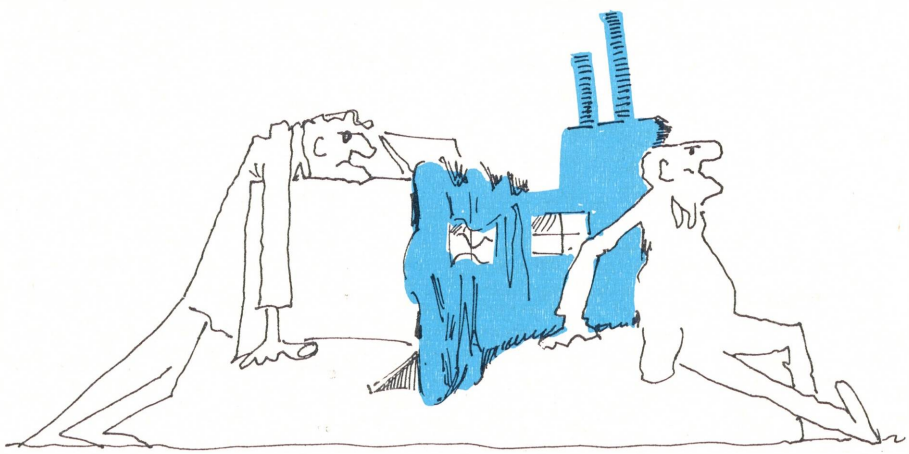
Perhaps a summary here of two recent data processing consulting engagements conducted by our management advisory services staff will serve to illustrate the kinds of situations in which an in-house system or a combination of systems can be a better answer for the first-time computer user than an interactive system.

The Smith Company illustrates the former case; the Jones Company the latter.

The Smith Company had been engaged in the distribution of a broad line of consumer products for many years. The company had been soundly managed and had experienced a growth rate of over 15 per cent a year for the past several years, reaching $7,000,000 in sales volume last year. In achieving this growth, the accounting volumes were increasing correspondingly and management found it more and more difficult to keep current with day-to-day processing. In addition, management recognized that better cash management procedures, better inventory management, and improved information on profitability were essential if they were to continue to grow in a profitable manner.

Our initial analysis indicated that only an in-house system or an interactive accounting service could provide the kind of integrated accounting and information system this company needed. Neither the traditional batch-oriented service bureaus nor accounting machines could provide the timeliness or completeness of information necessary.

We prepared proposal specifica-



A primary requisite for low conversion costs and short installation time is a "good fit" between the EDP "package" and customer needs.

EXHIBIT I

	FACTOR	VENDOR A IN-HOUSE	VENDOR B IN-HOUSE	VENDOR C IN-HOUSE	VENDOR D INTERACTIVE
I	Package's Applicability	Good	Very Good	Very Good	Very Good
II	Vendor Performance Record in this Area	Good	Excellent	Very Good	Unknown
III	Conversion Period	4-6 mos.	3-6 mos.	3-4 mos.	3-4 mos.
IV	One-Time Costs	$7,000	$9,000	$6,000	$4,500
V	Continuing Costs	$2,500/mo.	$2,800/mo.	$2,400/mo.	$2,700/mo.
VI	Ease of Expansion				
	A. Volumes	Excellent	Good	Very Good	Very Good
	B. Applications	Excellent	Very Good	Unknown	Unknown
VII	Ability to Handle Special Reports	Good	Good	Poor	Poor
VIII	Vendor Experience in Industry	Very Good	Excellent	Good	Unknown
IX	Vendor Financial Condition	Excellent	Excellent	Excellent	Good
X	Auditability	Very Good	Very Good	Good	Poor

tions and submitted them to four well known vendors: two manufacturers of computing systems and two time-sharing organizations whose services seemed most closely to match our client's needs.

Evaluation of the proposals submitted indicated that while the in-house systems were somewhat more costly to install initially, their continuing operating costs were somewhat lower than the interactive system costs. In addition, the greater ability to increase the sophistication of sales forecasting and inventory control procedures in the future was a plus for the inherently superior flexibility of the in-house systems. It might be mentioned that both systems were operator-oriented and that transaction volumes could be entered via a keyboard as they would be with interactive systems and they were on-line with the pertinent data files. If the company's growth continues at the anticipated rate, the increased input volumes can be accommodated by either adding on more keyboards or by the addition of a punched card reader. One-time or special reports can be prepared at less cost and more rapidly than by an outside vendor.

Exhibit 1, above, identifies the comparison factors, including costs, which we evaluated in arriving at our recommendation.

The company has had their system in operation for five months and they are profitably using the information produced. Both the conversion period as well as the costs are quite close to the vendors' estimates.

The Jones Company is engaged in the light manufacturing and distribution of consumer products. Their growth rate had been nowhere near as spectacular as that of

. . . evaluation of the proposals submitted indicated that while the in-house systems were somewhat more costly to install . . . their continuing operating costs were somewhat lower than the interactive system costs.

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A fully integrated information system would have been ideal but savings were unlikely . . .

the Smith Company, increasing at a 3 to 4 per cent annual figure. Total sales volume, however, was around $12,000,000 in 1973.

They had utilized the services of a bank for their payroll processing and were very satisfied with the service. Their plant payroll was relatively uncomplicated; there were no incentive systems to handle and minimal payroll distribution problems.

Billing by service bureau

Billing was prepared by a simple billing machine which prepared paper tape as a by-product. This taped data was then sent to a service bureau which prepared monthly sales analyses.

Accounts receivable processing was handled manually as were accounts payable and the general ledger. Production scheduling and control was also handled on a manual basis. Inventory control was effected by a visible card system and presented no special difficulties, although the workload was increasing.

While our analysis indicated that a fully integrated information system beginning with order entry and including the billing, receivables, inventory control, and sales analysis applications would be the "ideal" approach for this company, it was also apparent that any real-time or cost savings possible through utilizing this approach (whether on an in-house system or via an interactive system) were unlikely. Although this company may be somewhat atypical in this respect, it was determined that order volumes, production cycles, lead times, and vendor supply situations were such that no real advantages would accrue in having faster reporting cycles. It was therefore concluded that until such time as the company's volume grew by one-third or until there were significant changes in products or production methods, a less than "totally integrated" or real-time system would prove entirely adequate. As a result, we recommended that:

1. Payroll processing be retained at the bank
2. That the service bureau handle accounts receivable processing as well as sales analysis, and
3. That a small accounting machine be obtained for billing, accounts payable, and general ledger operations to replace the slower and less capable billing machine.

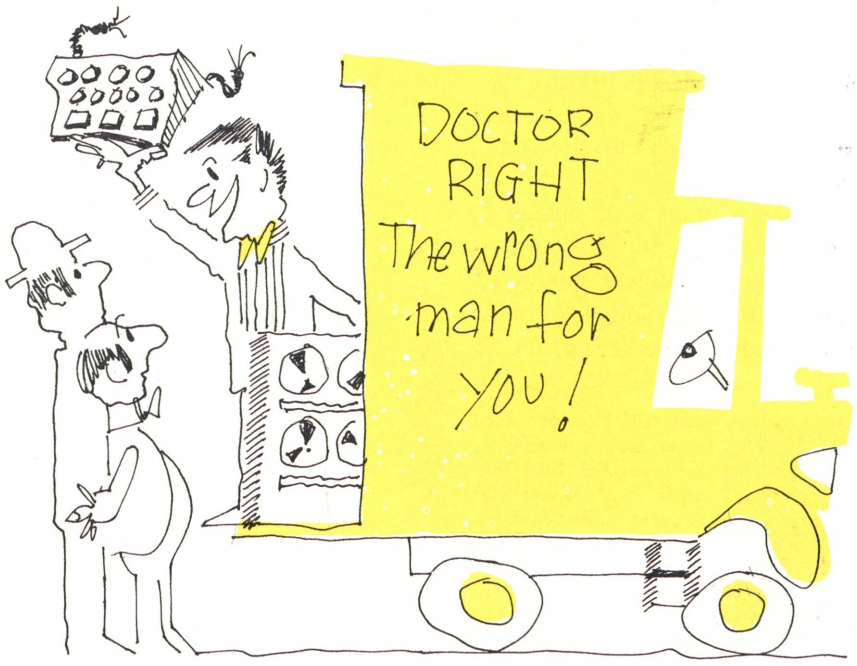
We also recommended that the service bureau handle finished goods inventory reporting and that an improved manual system for in-process inventory and production control be developed.

In utilizing this combination of methods and services, conversion costs and time were kept to a minimum, re-orientation of personnel was less catastrophic than might have been the case with a more radical change, and the company has obtained a realistic and usable improved information system at little additional cost.

No single solution "best"

In order words, all our experience has shown that there is no "one best" possible solution to data processing applications. What is appropriate for one vast national firm is seldom the solution for a small, one-city establishment. The business the firm is engaged in, its competitive position, its geographic area—all these play a vital part in reaching the right decision as to what is best for that particular firm.

This is vital and it's not understood well enough. Patent solutions are like patent medicines. They may make you feel better. They may also kill you.



Patent solutions are like patent medicines. They may make you feel better. They may also kill you.

Discounted cash flow is generally considered the most exact approach to return on investment calculations. Yet it's often not used because calculations are so cumbersome. The author suggests a simple solution —

A GRAPHIC SOLUTION TO DISCOUNTED CASH FLOW PROBLEMS

by Donald Dewayne Martin
University of Missouri

BASIC AND VITAL to a business organization's continued well-being is its effective use of capital. The comparison of return from a particular investment, segregated division, or complete organization to invested capital is often used as a measure of unit effectiveness. And, while not usually the sole criteria, this return on investment is often a major influence in managerial decision making.[1]

This widespread acceptance of return on investment, in at least one usage, is indicated by the results of a survey conducted by Mauriel and Anthony.[2] Based on responses from 2,643 of the largest companies in the United States, 75 per cent of the 3,525 companies contacted, this survey reports that almost 60 per cent of these organizations employ return on investment in evaluating divisional performance.

Over the last several years, various discussions have appeared in the literature as to the appropriateness of the possible measuring techniques within return on investment (ROI). Authors have urged, for various reasons, the adoption of less exact methods,[3] methods which are substitutes to the true yield as established by the technique of discounted cash flow. But, as decision makers have continued to discover, discounted cash flow is still the most exact and logical way to measure return on invest-

[1] For an interesting discussion of how a hierarchy of criteria, including return on investment, is used for appraising managerial performance, see N.A.A. Research Report No. 35, *Return on Capital as a Guide to Managerial Decisions,* December 1, 1959.

[2] Mauriel, John J., and Robert N. Anthony, "Misevaluation of Investment Center Performance," *Harvard Business Review,* March-April, 1966.

[3] See, for example, Solomon, Ezra, "Return on Investment: The Relation of Book-Yield to True Yield," *Research in Accounting Measurement,* eds. Robert K. Jaedicke, Juji Ijiri, and Oswald Nielson, Chicago, American Accounting Association, 1966. See also Solomon, Martin B., Jr., "Uncertainty and Its Effect on Capital Investment Analysis," *Management Science,* April, 1966.

EXHIBIT 1

DCF WITH CONSTANT CASH FLOWS

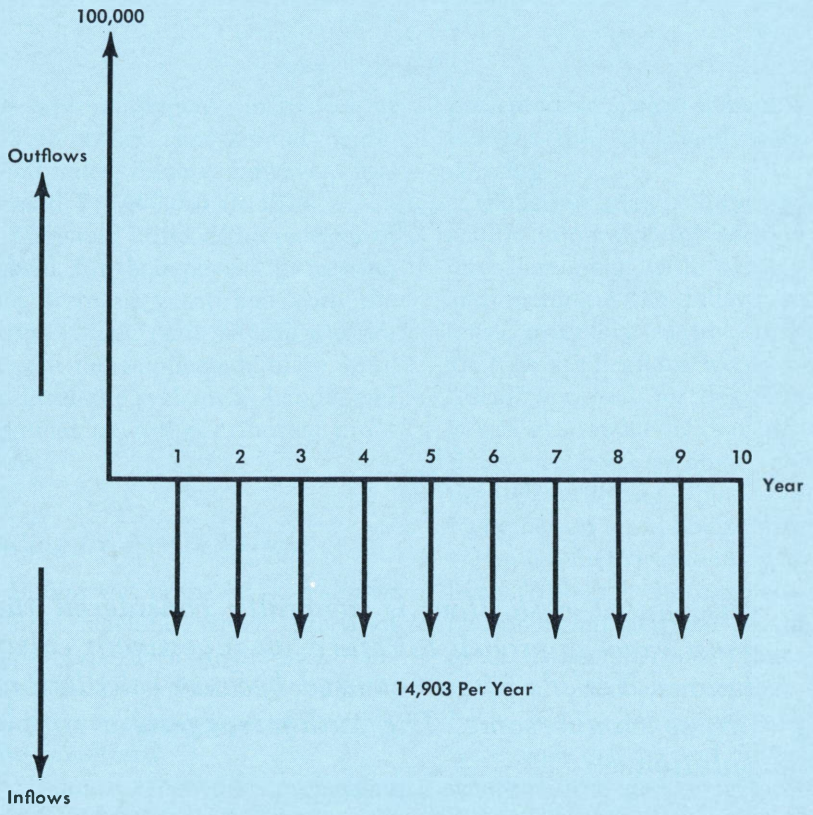
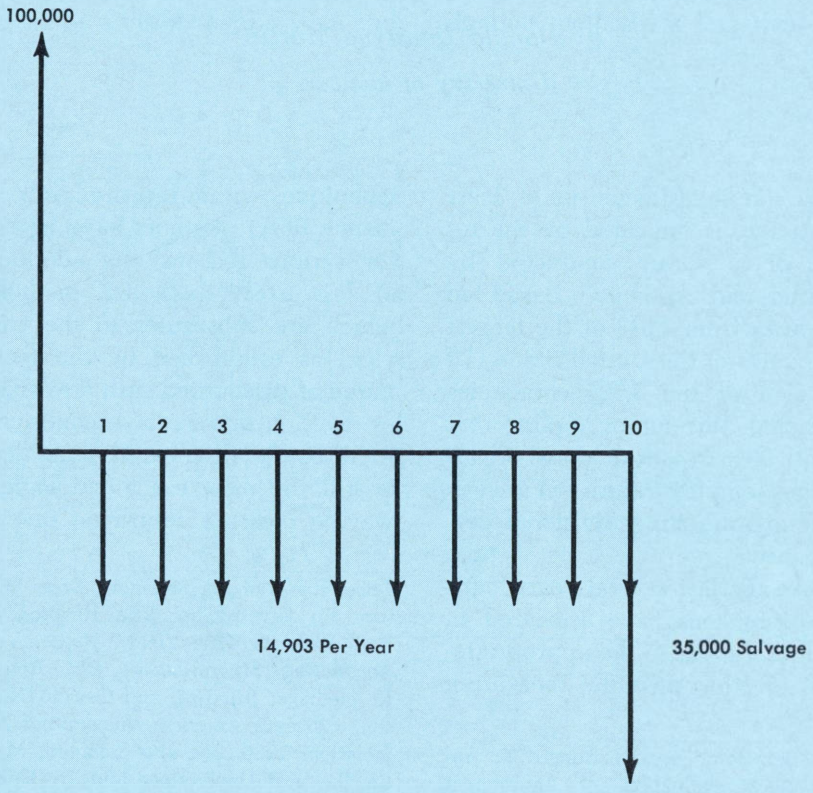


EXHIBIT 2

DCF WITH IRREGULAR FLOWS



ment. The true yield as found by discounted cash flow is an intact criterion upon which no adjustment, due to method inadequacies, is required.

Discounted cash flow

Yet, there must be reasons for the continued non-acceptance of the theoretical discounted cash flow technique. A study by Robichek and McDonald indicates that of 163 companies selected from the FORTUNE 500 companies, less than half, employ theoretical DCF at any level of decision making.[4]

Discounted cash flow's superiority over the other possible ROI methods has been convincingly argued many times. This superiority is usually constructed upon the following factors:

- Constantly increasing project size and investment is focusing interest on even small differences between investments.
- Diversity of projects and the always apparent scarcity of resources is demanding some methods of precise comparison.
- Focus in DCF is upon relevant input-output, cash flows; hence, depreciation and capitalization are irrelevant to decision making except in tax effects.
- Most important, DCF explicitly recognizes the time value of money.

[4] Robichek, Alexander A., and John G. McDonald, *Financial Management in Transition,* Menlo Park, Calif., Stanford Research Institute, 1965, p. 7.

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With these important rewards being offered by DCF why is it not enjoying a larger degree of practitioner acceptance?

Two disadvantages

In an attempt to answer that question, this article focuses upon two of the disadvantages inherent in DCF. These particular disadvantages arise from the complex calculations which form the foundation of DCF. Briefly stated these disadvantages are: one, the complexity of the technique is still a hindrance to some users, and, two, even the usual solution requires a trial and error approach which is cumbersome and time-consuming. These two factors alone usually cause serious consideration to be given to the less precise but easier to calculate alternatives to DCF.

To help overcome these disadvantages, a graphic method is presented as a DCF simplification. This method utilizes a graph, called a nomograph, that enables the decision maker to read the true DCF yield after establishing two easily calculable benchmarks. As the following cases illustrate, with this nomograph method, no longer will the discounted cash flow technique be so time consuming and tedious that its use will be waived for a less exact method.

For our examples, two types of investments are considered: investments with constant returns and the more numerous investments which have irregular cash flows. The nomograph utilized is taken from the technique as developed by Park and Jackson.[5]

EXHIBIT 3

DCF WITH REALISTIC FLOWS

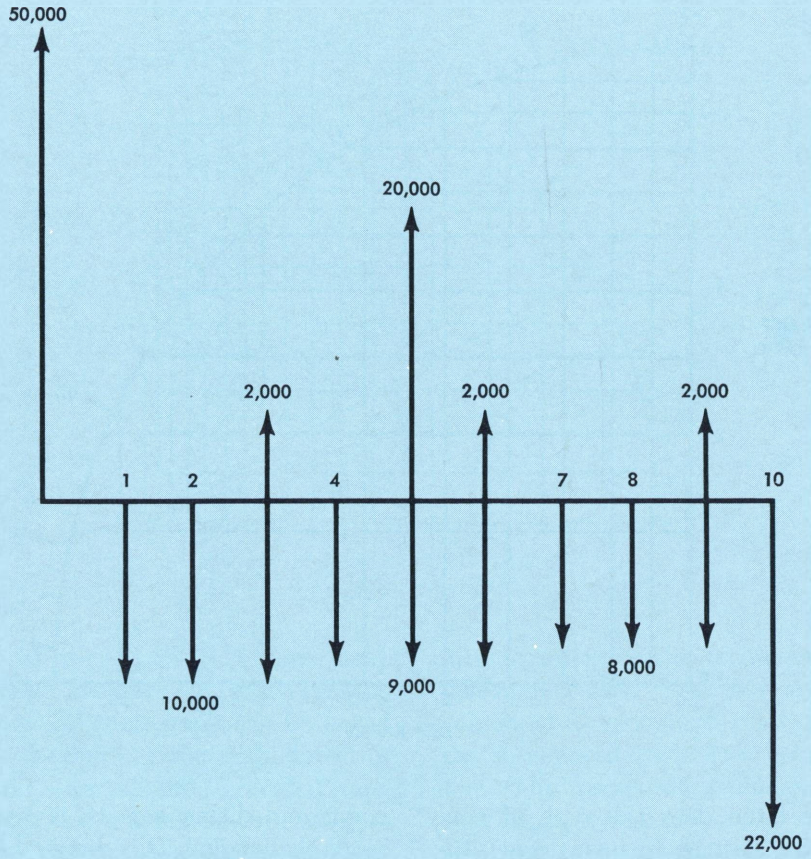

EXHIBIT 4

STEPS IN USE OF DCF NOMOGRAPH

1. Net each year's receipts and disbursements.
2. Calculate NCF ratio as the ratio of the summed inflows to the summed outflows.
3. Calculate present value of each year using a 40 per cent discount table. For years in excess of 10 use a factor of zero.
4. Calculate DCF ratio as the ratio of the summed discounted inflows to the summed discounted outflows.
5. Locate the intersection of NCF and DCF on the nomograph.
6. Using the origin and this intersection extend a straight line.
7. The yield is read on the curve.

Current DCF solution

Suppose a $100,000 investment will yield an annual pre-tax return of $14,903 for the next 10 years. Given a zero salvage value, what is the pre-tax discounted rate of return? Let's illustrate the cash flows as shown in Exhibit 1, page 40. With constant cash flows such as this, it is relatively easy, with proper reference to a DCF table, to find the before-tax yield.[6]

Outflow = (Factor) Constant Inflow

$100,000 = (Factor) $14,903
100,000 ÷ 14.903 = Factor
6.710 = Factor at 10 years

In this case by referring to a DCF table the rate is found to be 8 per cent. As can be seen, there is little difficulty encountered in the constant return case; little computation complexity occurs. Quick reference can be made to a DCF table and the true yield readily found. But

[5] Park, W. R., and D. E. Jackson, "New Tool for Cash-Flow Analysis: The Investment Profit-Prophet," *Chemical Engineering*, Jan. 1, 1968.

[6] See interest tables in Grant, Eugene L., and W. Grant Ireson, *Principles of Engineering Economy*, New York, Ronald Press, 1964.

EXHIBIT 5

DCF NOMOGRAPH

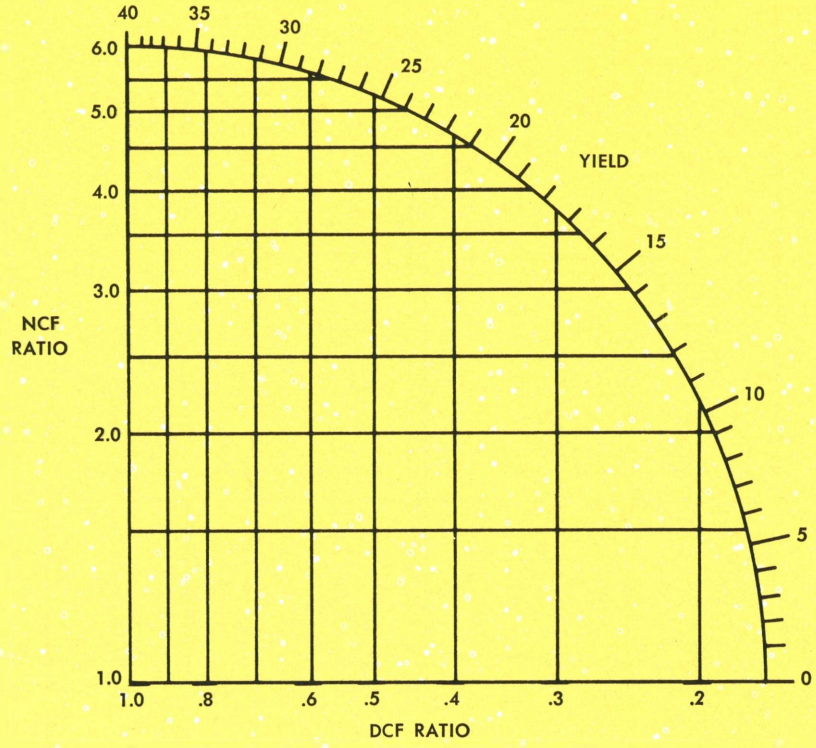

EXHIBIT 5 (cont.)

Table of 40 Per Cent Discount Factors

Year	Amount
0	1.000
1.0	0.714
2.0	0.510
3.0	0.364
4.0	0.260
5.0	0.186
6.0	0.133
7.0	0.095
8.0	0.068
9.0	0.048
10.0	0.035
Over 10 years	0.000

how often does this type of simplicity exist in an investment situation?

More usual case

More realistic is the investment that has irregular cash flows. The general algorithm in this case, for seeking a rate of interest yield when applied to anticipated receipts and disbursements, is much more challenging. It is directed toward finding the interest rate which will equalize inflow and outflow values as of investment commencement. An interest rate is selected and cash flows are discounted over time. If the sum of all discounted inflows exactly equals all discounted outflows, then the correct rate has been chosen. Otherwise, the complete process is repeated until the correct rate is found.

Our next case treats a somewhat more complex, irregular cash flow, of this second type, but one which is still characterized by relative simplicity. As is shown in Exhibit 2, page 40, the same $100,000 investment is now believed to have a salvage value of $35,000. Solution of this problem with even the one additional cash flow will require the above given trial and error algorithm.

EXHIBIT 6

Case Two Reworked

Year	Net Cash	Discounted Net Cash @ 40%
0	(100,000)	(100,000)
1	14,903	10,641
2	14,903	7,601
3	14,903	5,425
4	14,903	3,875
5	14,903	2,772
6	14,903	1,982
7	14,903	1,416
8	14,903	1,013
9	14,903	715
10	49,903	1,747

$$NCF = \frac{\text{Cash Inflows}}{\text{Cash Outflows}} = \frac{184,030}{100,000} = 1.84$$

$$DCF = \frac{\text{Discounted Cash Inflows}}{\text{Discounted Cash Outflows}} = \frac{37,187}{100,000} = .372$$

Outflow = (Factor 1) Constant + (Factor 2) Salvage

$100,000 = (Factor 1) 14,903 + (Factor 2) 35,000

Trial at 12 per cent

$100,000 ≠ (5.650) $14,903 + (.3220) $35,000

$100,000 ≠ 84,202 + 11,270

$100,000 ≠ $95,472

Trial at 10 per cent

$100,000 ≠ (6.144) $14,903 + (.3855) $35,000

$100,000 ≠ 91,564 + 13,493

$100,000 ≠ 105,057

Having bracketed the before tax yield between 10 and 12 per cent, repeated trials will complete the calculation. The yield is found to be between 11 and 12 per cent with further interpolation requiring increasingly detailed DCF tables.

As additional irregular cash flows occur in projects, DCF computational complexity increases tremendously. Who then can blame the decision maker when he looks to alternative methods? For example, consider the third case shown in Exhibit 3, page 41, a cash flow diagram more typical of a true investment. In an investment of this type no initial yield can even be guessed at. No wonder the manager looks to surrogates of the discounted cash flow technique.

Nomograph solutions

To avoid this laborious trial-and-error approach, use can be made of the DCF nomograph. This entails using a graphical relationship which allows the rapid solution of even the most complex cash flow problem. The method gives a quick approximation of the DCF yield for capital investments having an estimated life of five to 15 years and an interest rate of zero to 40 per cent. Finding the rate involves the steps given in Exhibit 4, page 41, and the nomograph presented in Exhibit 5, page 42.

Using this approach let us rework the given cases two and three, see Exhibits 6 and 8, page 42 and at right.

Using the nomograph, the discounted cash flow yield is read in Exhibit 7, above, as approximately 11.7 per cent. A result which is substantiated by our previous trial and error calculations.

But it is case three where the nomograph's calculation advantage is truly illuminated. Remember, that with the previous trial and error method, even the surmising of an initial benchmark was difficult. Following the same procedures and going again to Exhibit 7 the discounted cash flow yield is found to be very close to 8.6 per cent.

The accuracy of each reading from the nomograph can be tested by discounting the cash flows for each year at the indicated rate. With only a small amount of practice the decision maker can become proficient in use of the nomograph and use will show that the more complex cash flow problems demand little more time than the non-complex.

Conclusion

To help overcome the disadvantages of complexity and trial and error inherent in the technique of discounted cash flow this article presented a nomograph solution to the discounted cash flow calculation. This presented technique is easy to apply and allows the rapid solutions to even massive, irregular cash flow problems. The technique is an excellent one for the manager and decision maker who wants an immediate, ready solution to a cash flow investment. The benefits of the return on investment approach which are ably supported by the discounted cash flow technique may now be more easily implemented.

EXHIBIT 7

SOLUTIONS USING NOMOGRAPH

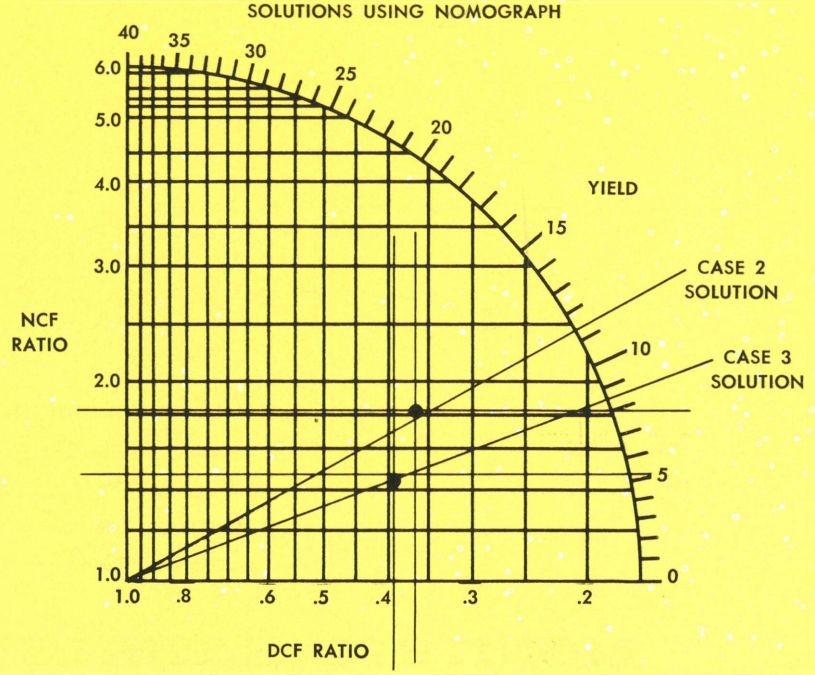

EXHIBIT 8

Case Three Reworked

Year	Net Cash	Discounted Net Cash @ 40%
0	(50,000)	(50,000)
1	10,000	7,140
2	10,000	5,100
3	8,000	2,912
4	9,000	2,340
5	(11,000)	(2,046)
6	7,000	931
7	8,000	760
8	8,000	544
9	6,000	288
10	22,000	770

$$NCF = \frac{88,000}{(61,000)} = 1.442 \qquad DCF = \frac{20,785}{(52,046)} = .399$$

Unlike normal accounting, management of lump-sum grants presents peculiar conditions. Sums spent must be enough to sustain normal operations, but they should also be sufficient to exhaust the fund at the time allotted —

MONITORING THE LEVEL OF SPENDING EFFORT FOR LUMP-SUM GRANTS

by James B. Edwards
University of South Carolina

One of the major operational problems faced by managers of lump-sum grants is the monitoring of the level of spending effort. Generally, it is desirable to approach the concluding date of the grant period with the level of spending effort under control. The amount of funds available during the later part of the grant period should be sufficient to provide for a normal operation of the activities for which the grant funds were provided. In addition, assuming that the appropriations were properly determined, it is desirable that the entire fund amount become exhausted on a timely basis. The existence of significant variances (over or under) is an indication of mismanagement of the activities—maximum benefits of the program were not achieved in an orderly manner.

In order to overcome such difficulties, an operational reporting system is needed which will guide management toward appropriate levels of spending effort. When the variances exceed the limits of tolerance, some management action is needed. However, action can be taken only in the present and/or the future—it is important to know what has happened, but greater assistance comes from a simulation of what levels of future spending effort are necessary in order to bring performance back within the acceptable ranges of tolerance. In the words of August Detoeuf: "The only sure thing in this world is the past, but all we have to work with is the future" [from *Comments of a Candy-Maker*]. The utility of operational reporting systems lies in an ability to assist the process of developing insights into the future. In other words, the real question becomes, "Where to from here?"

Work with appropriations

A mature budget process cannot be separated into distinct stages such as policy determination, projections, and execution, but is a continuous process with the activities of these stages overlapping and merging. However, in many cases the appropriations cycle, rather than the anticipation of future objectives, tends to dictate the pace and posture of spending—working with what has actually been appropriated. Actual appropriations provide the working environment for operational managers. Whether this reality is desirable or not, is not within the scope of this article. Rather, this article presents a technique for monitoring the level of spending effort for actual appropriations.

The technique

The technique, presented herein, is quite simple—modify the spending targets for each remaining report period (quarter, month, week, etc.) based on the surviving funds (unspent amount of appropriations available). This technique, when utilized over the entire period of the total appropriation, gradates the spending targets so that man-

EXHIBIT 1

LEVEL OF SPENDING REPORT

1. Reporting Period	2. Target (5÷6)	3. Actual Spending	4. Variance Over (Under)	5. Fund Balance	6. Periods Remaining
0				$120,000	12
1	$10,000	$ 8,900	$(1,100)	111,100	11
2	10,100	12,100	2,000	99,000	10
3	9,900	27,000	17,000	72,000	9
4	8,000	7,200	(800)	64,800	8
5	8,100	8,590	490	56,210	7
6	8,070	2,030	(6,040)	54,180	6
7	9,030	8,680	(350)	45,500	5
8	9,100	13,500	4,400	32,000	4
9	8,000	7,340	(660)	24,660	3
10	8,220	8,660	440	16,000	2
11	8,000	6,436	(1,564)	9,564	1
12	9,564	9,250	(314)	314	0

EXHIBIT 2

LEVEL OF SPENDING REPORT

1. Reporting Period	2. Planned Target	3. Adjusted[a] Target	4. Actual Spending	5. Variance Over (Under)	6. Fund Balance	7. Periods Remaining
0					$120,000	12
1	$ 6,000	—	$ 8,900	$ 2,900	111,100	11
2	10,000	9,746	12,100	2,354	99,000	10
3	12,000	11,423	27,000	15,577	72,000	9
4	15,000	11,739	7,200	(4,539)	64,800	8
5	12,000	10,099	8,590	(1,509)	56,210	7
6	11,000	9,512	2,030	(7,482)	54,180	6
7	10,000	10,033	8,680	(1,353)	45,500	5
8	9,000	9,307	13,500	4,193	32,000	4
9	10,000	9,143	7,340	(1,803)	24,660	3
10	9,000	8,787	8,660	(218)	16,000	2
11	8,000	8,000	6,436	(1,564)	9,564	1
12	8,000	9,564	9,250	(314)	314	0

[a]Column 6 multiplied by the adjustment factor. Exhibit 3, page 46, shows the factors used in making the adjustments.

Lump-sum grants have the connotation for most people of charitable or educational projects. Actually, they're used widely in Government grants for research, nearly all municipal budget allowances, and for capital budget authorizations in industry.

agement can maneuver the level of spending effort with full cognizance of past experience (expended funds) and future opportunity (unexpended funds and the time remaining in which to spend the unexpended funds). For example, assume a simple case—the planned level of spending is equal for each reporting period throughout the entire grant period. If the grant amount is $120,000 and there are 12 reporting periods, the planned level of spending for each reporting period would be $10,000 ($120,000 ÷ 12). Exhibit 1, above, demonstrates a typical experience for this simple case.

Reading from Exhibit 1, a new target is derived for the succeeding period by dividing the remaining funds by the number of remaining periods—simple averaging. The technique does not necessarily correct the spending pattern, but it does help to inform management of the gravitational trend. It is up to management to take corrective action when such awareness indicates the need. Operational reporting, using this technique, simply discloses current status and adjusts the immediate spending target based upon the reality of the situation.

Assume another case—the planned level of spending is not equal for each reporting period throughout the entire grant period. Exhibit 2, above, demonstrates a typical experience for this case.

Reading from Exhibit 2, a new

EXHIBIT 3

FACTORS FOR ADJUSTMENTS
(relativeness of each reporting period to the remaining whole)

Reporting Period	Planned Targets Remaining										
	11	10	9	8	7	6	5	4	3	2	Factor
2	$ 10,000										10/114
3	12,000	12,000									12/104
4	15,000	15,000	15,000								15/92
5	12,000	12,000	12,000	12,000							12/77
6	11,000	11,000	11,000	11,000	11,000						11/65
7	10,000	10,000	10,000	10,000	10,000	10,000					10/54
8	9,000	9,000	9,000	9,000	9,000	9,000	9,000				9/44
9	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000			10/35
10	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000		9/25
11	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8/16
12	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8/8
	$114,000	104,000	92,000	77,000	65,000	54,000	44,000	35,000	25,000	16,000	

EXHIBIT 4

MANAGEMENT ALERT

Period:	1	2	3	4	5	6	7	8	9	10	11	12
Target:	$6,000	9,746	11,423	11,739	10,099	9,512	10,033	9,307	9,143	8,878	8,000	9,564
Actual	$8,900	12,100	27,000	7,200	.8,590	2,030	8,680	13,500	7,340	8,660	6,436	9,250
Variance:	$2,900	2,354	15,577	(4,539)	(1,509)	(7,482)	(1,353)	4,193	(1,803)	(218)	(1,564)	(314)

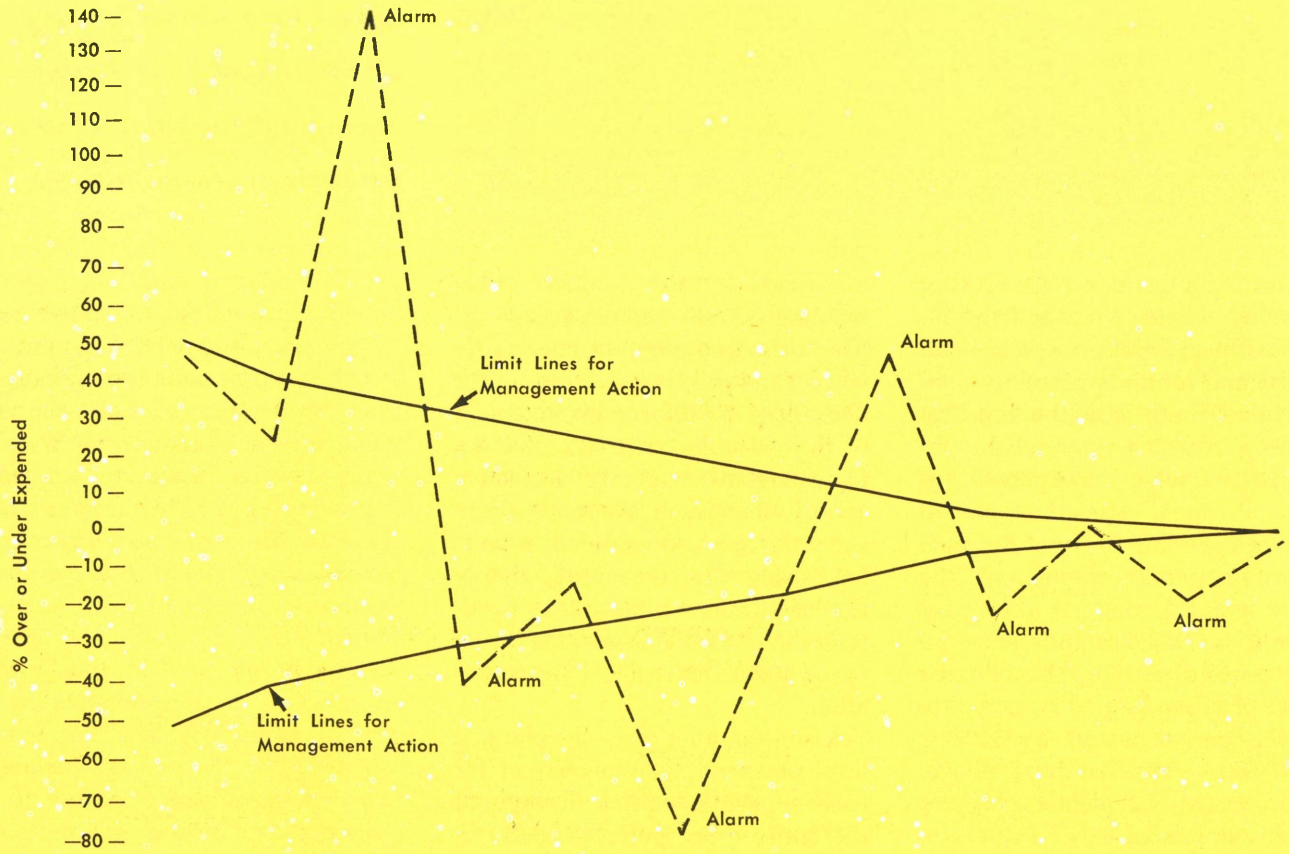

EXHIBIT 5

PERIODIC WORKSHEET

For Period Ending 6-30-72 Control Number 6-3

1. Grant #	2. Effective Date	3. Ending Date	4. Manager
124-1574	1-1-72	12-31-72	John Doe

5. Total Grant	6. Funds Expended To Date	7. Funds Remaining	8. Periods Total	Elapsed	Remaining
$120,000	$65,820	$54,180	12	6	6

9. Planned Targets (Circle Current Period):	1	2	3	4	5	(6)	7	8	9	10	11	12
	$6,000	10,000	12,000	15,000	12,000	11,000	10,000	9,000	10,000	9,000	8,000	8,000
10. Planned Target Residuals	1	2	3	4	5	(6)	7	8	9	10	11	12
	—	$114,000	104,000	92,000	77,000	65,000	54,000	44,000	35,000	25,000	16,000	8,000
11. Adjustment Factors:	1	2	3	4	5	(6)	7	8	9	10	11	12
	—	10/114	12/104	15/92	12/77	11/65	10/54	9/44	10/35	9/25	8/16	8/8
12. Adjusted Targets (To Date):	1	2	3	4	5	(6)	7	8	9	10	11	12
	—	$9,746	11,423	11,739	10,099	9,512						
13. Tolerance By Periods:	1	2	3	4	5	(6)	7	8	9	10	11	12
	50%	40%	35%	30%	25%	20%	15%	10%	5%	3%	1%	0%

14. Current Computations:

A. Adjusted Target For Current Period $9,512

B. Actual Expenditures For Current Period $2,030

C. Variance (A — B) ..... Over $ _____ Under $7,482

D. Percentage Variance (C ÷ A) Is 78.6% ALERT ☐ No ☒ Yes

15. Adjusted Target For Next Period:

Item 7 X Item 11 for the next period = $10,033

target is derived for the succeeding period by allocating the remaining funds on a relative basis, as illustrated in Exhibit 3, page 46. In order that the posture of the planned targets be retained in the adjusted targets, the factors for adjustment are accomplished by the development of a ratio. The numerator is the original planned target for the immediate reporting period; and the denominator is the summation of the remaining planned targets beginning with the immediate reporting period. The fund balance (surviving funds) at the beginning of the immediate reporting period is multiplied by the adjustment factor—thus, deriving the immediate adjusted target.

Another feature of this technique provides for the establishment of tolerance limits on the levels of actual spending. It is unrealistic to assume that actual spending will equal prescribed targets in any given reporting period. However, as the concluding date of the grant period nears, the range of tolerance diminishes. Management alarms need only be sounded by the reporting system when actual performance lies outside the range of tolerance for any given reporting period—management by exception. Exhibit 4, on page 46, illustrates the point.

Suggested periodic worksheet

In order to assist readers in developing a worksheet for the implementation of this technique, Exhibit 5, shown above, demonstrates a suggestion designed for this purpose.

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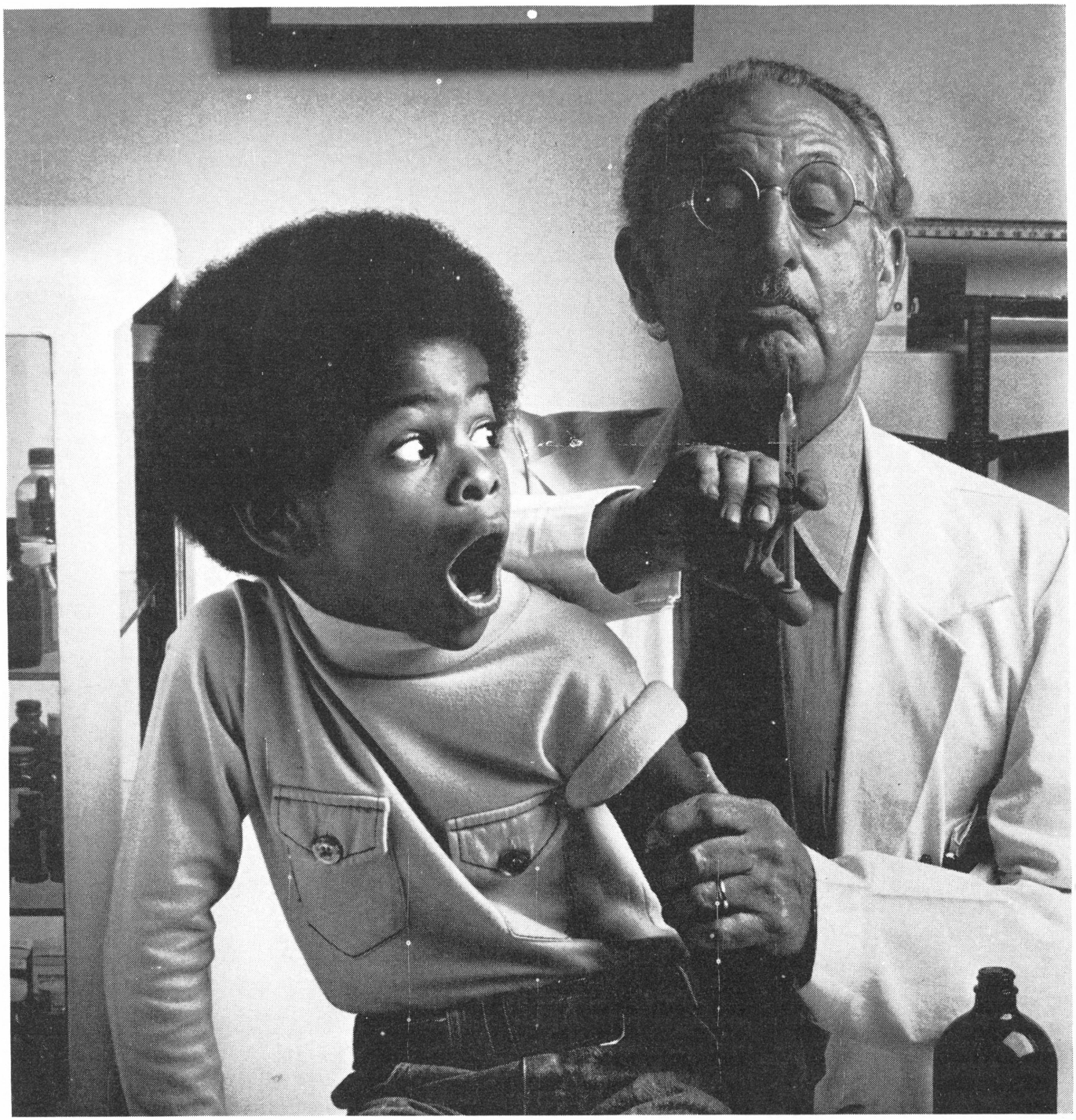

A shot against cancer?

One day the scariest thing about cancer may be the needle that makes you immune to it.

The theory: build up the body's defense to fight off a disease naturally.

Dramatic research in this direction is going on right now.

Scientists are working on mechanisms to make the body reject cancer.

And the promise for the future is staggering.

Wouldn't you feel good knowing you contributed to the research?

Feel good.

Please contribute. Your dollars will help further *all* our cancer research.

We want to wipe out cancer in your lifetime.

American Cancer Society

what people are writing about

Long-term readers of this magazine will be surprised at the length of this month's review of books and magazines. The reason is the extreme length of the review of *Management: Tasks, Responsibilities, Practices* by Peter F. Drucker, which opens this section. The editors believe, however, that the importance of Mr. Drucker's latest work to all who are concerned with any aspect of management is so great that the expansion of the review section in this issue is completely warranted.

Management: Tasks, Responsibilities, Practices by PETER F. DRUCKER, Harper & Row, New York, 1973, 839 pages, $15.

Which modern company would come to mind first as an outstanding example of the best in management—Sears, Roebuck or General Motors?

Sears, Roebuck on all counts is the unequivocal answer of Peter F. Drucker in his new book, *Management: Tasks, Responsibilities, Practices.* Sears, Roebuck meets almost all his criteria for the well managed business.

First it identified its particular market, one that had never been tapped before; the country's vast number of farm families who were totally isolated when Sears was first organized and who had no means

of shopping except on rare visits to the nearest community. Second, it developed a means of presenting a quantity of every conceivable kind of goods for such families to choose from, showing them pictorially through its ubiquitous mail order catalog. Third, reliability of all the goods and complete honesty in their presentation were decreed as essential since the farmers' very isolation made it impossible for them to return unsatisfactory merchandise.

All of these criteria Sears has met brilliantly, according to the author, for nearly three-quarters of a century. Mail order selling before Sears' arrival had been a frenetic business, consisting of disposal of remnants at inflated prices through exaggerated claims in the mails. Sears reversed all these premises. Its catalog published regularly, became a "wish book" for its farmer clients, and its reputation for complete reliability in what was promised and what was delivered soon became a byword. *Caveat emptor* became *caveat vendor*—Sears' policy from the very beginning was "Your money back and no questions asked" for any dissatisfied customer.

New work approach needed

This radically new approach to selling demanded many things of management that were totally new, buyers for this kind of operation, accountants who could devise controls for the enormous and fast moving inventories necessary, and clerks who could handle the mail orders promptly and accurately.

It even had to develop the first mass production plant in the world. Five years before Henry Ford started his first automobile down the assembly line, Sears had a mail order plant with the "breakdown of all work into simple, repetitive operations, with an assembly line, conveyor belt, standardized, interchangeable parts and, above all, with planned plant-wide scheduling."

Moreover, Sears has kept up with its market. With the coming of the automobile and the end of the farmer's absolute remoteness from even small-town stores, Sears kept pace by opening retail stores in the towns to serve both the old farm customers and the urban working class, now earning more money and wanting a different type of goods. It was still a market with limited purchasing power, but it now wanted what its more affluent countrymen could afford. It was Sears' business to find manufacturers who could supply this market—and to offer them enough sales volume to make it worth their while. So Sears began to manufacture its own goods in such fields as refrigerators, radios, and, later, washing machines.

In effect, a merchandising empire (the most successful in history, according to Drucker), had been built on three cardinal precepts: absolute identification with the customer in a specialized market, scrupulous research into his needs, and absolute honesty in dealing with him.

This has always been Sears' basic operating philosophy: everything for the customer, everything to meet his needs. It has carried the merchandiser into such new fields as high fashion merchandise (as customers' incomes have risen); and into all types of insurance.

General Motors, although it gets high marks for its management from Drucker, doesn't come off nearly as well as Sears. It has been immensely more profitable than Sears, but profit is is not the end result of the most successful management, according to the author.

"The first test of any business is not the maximization of profit but the achievement of sufficient profit to cover the risks of economic activity and thus to avoid loss," says Drucker.

His book, which is far too long, 839 pages, is divided into three sections, "The Tasks," "The Manager, Work, Jobs, Skills and Organization," and "Top Management; Tasks, Organization, Strategies." Of these, the third section is by far the best, except for a fascinating picture of the differing approaches to management training in a Japanese company, a German company, and an American company, which appears in the first section.

Japanese "system"

The typical Japanese company looks like the extreme of the Theory X of management, the carrot and stick approach to working relationships, at first glance. But closer examination betrays some very significant differences that exist between Theory X and the Japanese manufacturing company.

The Japanese worker, bound to his company almost for life, is subject to the same pressures from management and industrial engineers that assembly line workers in Detroit are. But then:

". . . the Japanese industrial engineer does not organize the worker's job. When he has reached the point at which he understands the work, he turns over the actual design of jobs to the work group itself. Actually, the industrial engineer begins to work with the people who have to do the job long before he finishes his analysis. He will study the work the same way his Western counterpart does. But he will, in his study, constantly use the work force itself as his 'resource.' When he has finished his analysis, the synthesis will essentially be done by the work group itself. The industrial engineer continues his activities, but he does so as 'assistant' to the work group rather than as outside analyst."

The Japanese worker also takes responsibility for improving his tools. Machines are, of course, designed by the engineer, but when a new machine or a new process is being introduced, workers are expected to take an active part in the final adjustment. In many instances, the work force actually participates in machine design; it acts as a resource to machine or process designer.

This system is reinforced by continuous training. Every Japanese

employee, including top managers, keeps attending weekly sessions from employment until retirement. Sessions are not run by trainers, but by the participants themselves and their supervisors. The sessions do not focus on any one skill. They are attended by all workers on a given job level; and they focus on all jobs within the unit. Their focus is the working of the entire business rather than the individual job of any one man.

The "godfather"

There is another peculiarity of the Japanese "system" which produces uniformly good results—a "godfather" training approach that has more than a few of the characteristics of the old apprenticeship, which produced the workmen whose loss we have been lamenting for years. Japanese workers under their industrial system are divided into three classes: industrial workers, clerical workers, and management workers. These are rigid classes, with no crossover from one to the other. But within the managerial class, from which, eventually, top managers will be selected, each worker is assigned a "godfather," someone in the management ranks of the organization who will look after his ward, be his mentor, and guide him in the organization. He may not be the man's boss, although he is always in a superior position, he may not even be in the same division, but he is always there for advice, for counseling—and for evaluation.

For it is his godfather who determines the young manager's ultimate destiny. Once a man has been accepted into the managerial group in a Japanese company his career is set. Whether good or bad, he will be given the same promotions and the same increases in the company. If he is impossibly bad, he may be shunted off to a dead end job. It won't affect his seniority or the pay increases based on seniority. All continues this way until he is 45. Then everything changes. The future directors of the company are chosen, the future top management. The others of their age group are retained in management but their chances to reach the top have vanished. They will work, still getting their seniority raises, until they are 55. Then retirement.

Those selected for the top positions, however, can work as long as they are able. There is no mandatory retirement at the top.

And the godfathers of the young candidates have a very influential, although not precisely spelled out, role in deciding who is top management material and who is not.

The examples of successful managements Drucker draws from Germany and the United States come significantly from one company in each instance instead of an entire business community. Moreover, the two companies chosen, the Zeiss Optical Works in Germany and IBM here, share at least one of the characteristics of Japanese industrial organization. At Zeiss the great innovation was participation by the skilled worker together with the university-trained scientist in the design of the most complicated types of optical glass. Zeiss also introduced continuous training for even the most highly skilled workers as well as the scientific designers. The focus, as in Japan, was not on training for promotion but on training for improvement of skill, tool, process, and product.

"Feedback" introduced

Zeiss added one ingredient not in the Japanese formula: feedback. "A craftsman is always in control of his work" was the company byword, and this meant constant flow of information back to each worker on his output and its quality.

The third example of a highly successful management, IBM, uses adaptations of the same Japanese and Zeiss principles. IBM makes incredibly complex machines, using only semiskilled labor for the most part. Each stage in the assembly is broken down into a homogeneous group of tasks, each well within the competence of the worker. The operations themselves are engineered to be as simple as possible, but each worker is trained to be able to do as many of them as possible.

IBM's "assistants"

IBM also discarded supervisors. It has instead "assistants." This is not a mere change in terminology. "Assistant" is exactly what he is. Assistants are there to make sure workers know their jobs and have the proper tools. They are not bosses and they have no disciplinary powers.

In each department there are also job instructors—senior workers who help the other workers learn higher technical skills and solve particularly knotty job problems.

Finally, IBM has another characteristic that is shared by both the Japanese system and the Zeiss Optical Works. In IBM's case it seems to have developed more by accident than by design, but it proved so successful an accident that it immediately became standard operating procedure for the company. One time a computer model had fallen well behind schedule, so much so that production had to begin before engineering work was fully complete. Final details had to be worked out on the production line with engineers consulting constantly with "assistants" and workers. The result: a much better computer than any the company had ever produced.

Ever since then, before IBM launches a new design or a major renovation of an old one, the project is assigned to a work crew before it is fully designed. The "assistant" on the floor becomes boss of the crew working in it and he, his workers, and the engineers create the final design. Then assistant and workers plan the production layout and set up the individual jobs needed to produce the new machine.

The one characteristic that distinguished these three national examples, according to Drucker:

"The Japanese, Abbe at Zeiss, and Thomas Watson, Sr., at IBM based managing workers on workmen organizing responsibility."

The last third of the book defining top management—tasks, organizations, strategies—is the one that will probably be of greatest value to readers of this magazine. Drucker starts by summarizing the basic specifications of a top management structure:

"The starting point is an analysis of the top-management tasks.

"Each top-management task must be clearly assigned to someone who has direct and full responsibility for it.

"This requires a top-management team, with responsibilities to fit the personalities, qualifications, and temperaments of the members.

"Whoever has assigned responsibility for a top-management activity is 'top-management' whatever his title.

"Except in the small and simple business no one who has top-management responsibilities does any but top-management work.

"The complex business requires more than one top-management team, each structured according to these rules."

The most significant question any management can face, according to Drucker, is "what is our business and what should it be?" And only top management, unhindered by operating or functional duties can answer that. Sears, Roebuck, with its simple mission, to supply all the needs of an isolated, rural population well, reliably, and honestly, saw that and prospered. RCA, in spite of its leadership in radios and phonographs, failed miserably when it attempted to merchandise a line of kitchen appliances. Radios and phonographs are "furniture." Kitchen appliances are kitchenware. The buyers are the same but they have distinctly different ideas of the two products. They are, in effect, two different markets, and woe to the manufacturer who ignores this.

Other examples abound. General Motors, which, when it began manufacturing diesel engines, set up an elaborate separate organization for railroad diesels, recognizing that it had little experience with railroading and would have to approach it carefully. But with airplane engines? Just another variation on the automobile business. Only it wasn't. General Motors launched a fine and healthy diesel locomotive business which soon dominated the market; its Allison Division, which manufactured the airplane engines, never did too well.

State of the board

Mr. Drucker discusses the board of directors, which he thinks in its present state in this country is a dangerous anachronism serving no useful purpose. However, he believes a board is necessary and proposes two different kinds.

One: A business board, which can act as a group with whom top management can consult, which can serve as a review organ on management's acts, which can review top management and fire it if necessary, a control group in other words.

Two: A public and community relations board to represent all the constituencies that management can never know until it is too late: the community, the workers, the customers. Each of these has a legitimate interest in the company and its products, and its voice should be heard. Moreover, its value to management lies in what it can reveal as to the public's thinking about the company.

It would be interesting to imagine just what the oil companies' public status would be right now if any one of them had had such a public interest board at the beginning of the Arab oil embargo. Undoubtedly many of them viewed the embargo as an unparalleled opportunity to increase their profits. What it has turned out to be is an unparalleled opportunity to attract consumer fury, to invite searching Government inspection, and to create public demand for inquiry into taxes, oil records, oil assets, Administration cooperation, and a host of other matters the oil companies could very well have done without.

The bulk of the Drucker book is given over to discussions of top management organization, the pros and cons of strategies and structures, of whether it is better to build from within or acquire another company, when it is best at all costs to not acquire another company, the sympathetic "fit" and the totally alien "fit" if another acquisition is made, the right size for a company, and how to build to that size if too small, how to cut down to that size if too large.

For example, Drucker cites American Motors (before the gasoline shortage) in spite of its large size in terms of total volume, 300,000 cars in annual production, and sales of $1 billion, as being still too small to be viable against the Fords, the Chryslers, and the General Motors. Making the same kinds of cars these giants do, forced to the same annual rhythm of model changes, American cannot possibly build the distributorship and service network needed to sustain its market, he maintains.

Volkswagen, however, which capitalized on the fact that it never did have a model change, could and did remain viable, with a far smaller total volume than American Motors.

One company had found its market—or its niche in the total market—appealed to it, and merchandised a product almost exclusively for it. It prospered. Another, much larger, attempted to attack the giants of its industry, instead of finding its own niche in the market. As a result, it was floundering until the wholly fortuitous gas emergency suddenly gave its sales a shot in the arm even while it crippled its competitors.

But if the competitors—or even one of them—can recover fast enough, and grind out enough small, low gas-consumption cars to compete with American, then their superior distribution and service network could turn the tide again.

The Drucker book is, as already has been pointed out, far too long. But that does not detract from its essential richness. Nor its essential accuracy. For example, consider how many of the cardinal management rules have been conspicuously flouted by major American companies that have become most famous for their spectacular failures. Take just one, the Penn Central railroad, up to its time, the greatest bankruptcy in American history.

"1. The starting point is an analysis of the top management tasks . . ."

Penn Central's most salient characteristic was complete confusion at every level of management. Every executive had as deputy someone from the other railroad, so that no one ever knew from minute to minute what decision would come from any given office. Whoever was sitting at the desk at the time . . .

"2. Each management task must be clearly assigned to someone who has direct and full responsibility for it."

See 1 above.

"3. The complex business requires more than one top-management team, each structured according to these rules."

Here Penn Central exceeded the precepts, having no less than three management teams. The trouble was, that not only did each executive on each team have a deputy who didn't know what his chief was doing; no division knew what the other divisions were doing. A worker in the financial division could be fired—and often was—if he was observed talking in the hallway with someone from an operating division.

Summary

Mr. Drucker has written his usual thoughtful work, and he has shared many provocative insights, as well as much knowledge of management in all its aspects in nearly every nation. The book covers its subject in every possible guise and abounds with examples of companies that nearly made it but didn't quite. It's a compendium of mistakes, with names, dates, and reasons, as well as a brief recital of the success stories.

It's a good book, in other words, and one that every manager should read carefully.

R.M.S.

The Encyclopedia of Management by CARL HEYEL (Editor), Second Edition, Van Nostrand Reinhold Company, New York, 1973, 1,152 pages, $32.50.

Every broad-gauged adviser to management can recognize the need for a concise but comprehensive reference work covering the full spectrum of managerial disciplines. This appears to be the need which the one-volume Encyclopedia of Management *was designed to fill. It does a commendable job.*

This revised edition of a book originally published in 1963 contains over 300 alphabetically arranged entries prepared by 200 contributing authors. Each entry provides a "quick study" briefing on a specific management function or science. The length of the individual entries averages about 3½ pages (2,500 words), but ranges from an overly ambitious 33 pages on "Statistics" to a surprisingly superficial half-page on "Accounting." (In fairness it should be mentioned that the "Accounting" entry is followed by over 20 cross-references to other sections of the book.)

You will not become an expert on anything from the pages of this book. But the researcher who wants ready access to a quick and authoritative overview of a particular discipline, along with a useful exposure to its "buzz words," will keep the volume within easy reach. The typical entry provides an intelligible introductory briefing on a single topic, along with cross-references to related entries. Each entry also cites a well-chosen and, mercifully, limited selection of books, articles, periodicals, and trade associations suitable for further research.

The editor uses an interesting technique to make the book more attractive to the serious reader despite the necessary shallowness of some of its individual entries. For each of 25 broad topics (such as executive development, accounting and control, public relations), a "Guide to 'Core Subject' Reading" lists pertinent entries as recommended reading. By studying each of these entries in a specified sequence, the reader can (it is claimed) obtain in-depth information on the selected topic.

Subjective bias is an unavoidable factor in editing an encyclopedia—and also in reviewing one. Still, to this reviewer, there appear to be a number of flagrant imbalances in the subjects covered and in the space allotments. The justification for devoting 2½ pages to an obscure and arcane concept called "Operating Margin Analysis" is not clear. The discussion of "Punched Card Data Processing," complete with functional descriptions of collators, interpreters, and summary punches will impart more nostalgia than useful information. Yet nowhere in the eight-page "Index" can mention be found of such accepted techniques as direct costing, profit planning, sensitivity analysis, or short interval scheduling. Also lacking from the "Index" are the words ecology, environment, and energy.

On a subject of somewhat personal interest to this reviewer, it would seem desirable to combine the entry on "CPA: Role in Management Services" with that on "Management Consulting." Though each of these essays is informative and well-written, they present surprisingly dissimilar parochial perspectives of the same basic topic.

On balance, though, it is a very valuable book, particularly to the management generalist.

JOHN R. MITCHELL
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How to Manage the Boss or The Radovic Rule by IGOR RADOVIC, M. Evans & Company, Inc., New York, 1973, 155 pages, $5.95.

Written for the "genuine" subordinate who holds no dreams of ever being propelled into the ranks of superiors, this book provides a humorous look at how executives appear to their underlings.

First look at this title tells the potential reader, "Here's another one of those 'rib ticklers' on how to make it into the executive suite." Blessedly, this book has a different twist to it.

Advantages of subordinates

The author "has a very powerful subordinate position at a large international bureaucracy," and, as he tells his readers, it is this type of job that allows the average individual to achieve independence and success on his own.

"In comparison with the executive aspirant, the real subordinate fares infinitely better: He does not depend on his Superior for the fulfillment of his ambitions, for he already has the job he wants; and he does not have to worry about keeping his job either, for few positions are as secure as those that are shunned by job seekers and are difficult to fill. The real subordinate can have both the satisfactions and advantages of being his own master and pay no price for it."

If this is true, why are so many people scrambling to get on up the corporate ladder? Dr. Radovic says that it is because common sense is uncommon, but vanity is rampant. While executive jobs may be in short supply, there will always be subordinate posts, he assures his readers.

"With technology on the march, and its administration more than keeping step, there is no danger of the bountiful supply of seemingly repulsive jobs drying out in the foreseeable future. (Remember the computer, heralded as the bane of drudgery and the greatest labor-saving device of all time, which ended up creating many more unpopular jobs than it ever eliminated?)"

In whatever job the subordinate chooses to roost, he must demonstrate "expertise," never "ability" (which implies promotability). "Expertise" is easily acquired by anyone, the good doctor states, simply by "smothering the obvious in the irrelevant and the obscure, preferably to the accompaniment of solemn motions and oracular incantations."

Dr. Radovic advises that once a suitable niche has been found, the subordinate should diligently study the rules and regulations of the large organization. It is through the strict adherence to these that such jobs as those of elevator operators in automatic elevators and firemen on diesel and electric trains have been preserved, he notes.

Dependence of superiors

The superior's dependence on the subordinate can be used to make the superior more receptive to the dominant management role of the subordinate, he states. He gives the example of an assistant to the controller in a Minneapolis-St. Paul furniture company. The assistant would have to coach the controller for days in order to enable him to make a presentation of the balance sheet and income statement at the quarterly Board of Directors meeting. The assistant was never given any recognition by his boss. However, once the assistant became ill and the controller had to prepare the presentation on his own, nearly costing him his job. When the assistant returned his boss was very considerate of him.

"The assistant quickly pieced the new picture together, saw the light, and then made sure the change was permanent by regularly mentioning recurring kidney-stone troubles at about the times the Board of Directors was due to meet," Dr. Radovic recalls.

Other advice given: Subordinates should help their superiors by passing on news of executive in-fighting, thus diverting the superior's attention. Also the subordinate should develop friendships with VIPs, securing his place in the eyes of his supervisor. A few compliments to superiors are often in order, but on occasion egos must be brought down to size lest the executive suffer from the "Black-and-Blue Chest Condition brought on by relentless chest thumping. This affliction is in turn usually accompanied by a severe cranial tension which is the result of an ego much too big for the size of the sufferer's head (and leaving no space in it for any thought and concern for the subordinate's welfare)." Dr. Radovic's remedy for this disease: "laudatory Chinese acupuncture, to bring down the pressure in the head and numb the simian chest-thumping impulse."

Another Radovic observation is that "the role of the secretary is not decorative but strictly functional." He suggests that a subordinate and his secretary should work as a "partnership." But he is not above male chauvinist attitudes when he: heads a chapter "The woman executive"; quotes Sigmund Freud; writes *"Defies analysis. Best avoided";* and thus concludes the chapter.

This little book should be entertaining to anyone who has ever been someone's subordinate (which excludes very few people) and especially valuable to the executive who has forgotten how much he depends on his subordinate.

L.H.D.

How to Cost Your Labor Contract by MICHAEL H. GRANOF, The Bureau of National Affairs, Inc., Washington, D.C., 147 pages, $10.

A CPA reports and evaluates the way in which eleven large U.S. corporations cost out their labor contracts. He suggests that the discounted cash flow model may be an important aid in collective bargaining.

"Presently used procedures to evaluate contract changes do not provide labor relations managers with an adequate understanding of the potential impact on profits of alternative proposals under consideration," this author charges. With few exceptions, he states, procedures used to evaluate contract changes are deficient because they: 1—Utilize cost calculations that are oriented toward the past; 2—Consider only the direct ramifications of contract changes and emphasize cost rather than effect on profits; 3—Use algorithms that are sometimes improper (for instance, neglecting changes in benefits negotiated).

Applying DCF to contracts

The discounted cash flow (DCF) method requires that cash flows be adjusted to reflect interest that is gained or lost because cash is received in the future rather than in the present. Both capital expenditures, to which DCF is often applied, and labor contracts involve long-term commitments and varying patterns of cash flow. In fact, Dr. Granof notes, if one accepts a sufficiently broad definition of "capital expenditures," labor contracts could be considered one type of them.

Among the reasons the author gives for finding DCF particularly attractive for making labor contract decisions are:

"1—The model specifically takes into account the time value of money.

"2—The model provides a frame of reference for a thorough and systematic analysis of the financial impact of a proposal. It enables management to take into account operational changes that the firm is likely to make in order to adjust to the new contract.

"3—The information returned by the model is easy to understand, and since the model summarizes the value of a proposal in a single figure, it facilitates comparisons among alternative proposals.

"4—The model avoids problems of allocations inherent in evaluation techniques based on 'accounting' income."

Common practice in labor negotiations is to evaluate contract proposals by comparing their cents-per-hour effects. Dr. Granof believes that the traditional cents-per-hour figure is inappropriate since it is based exclusively on historical information.

The cents-per-hour cost represents: the net cash effect of contract proposals for a given projected operating response divided by the number of anticipated productive hours.

"The basic characteristic of the required data is that they must represent the labor input of future activities and must recognize the interrelationships between labor costs and other aspects of the firm's operations," the author points out. He describes the factors that must be considered in determining the cents-per-hour cost. These include: effect of direct wage increase on fringe benefit costs, cost-of-living adjustments, compensation for time not worked, and overtime premiums and shift differentials. He gives an illustration of how the cents-per-hour cost of a multi-year contract would be computed for the first year.

Although the author concedes that few, if any, firms currently use the discounted cash flow model for evaluating contract proposals, he believes that it is a feasible technique. One of the eleven firms he studied identifies critical cash flows associated with contract changes, gives consideration to modifications in its operations, bases all labor-cost projections on its "estimated planning volume," and determines the impact of contract revisions on cash flow and profit. For this firm, and others like it, the discounted cash flow model could be used with only a relatively minor extension of the techniques presently employed, Dr. Granof states.

"The model enables firms to utilize information which they currently compile and which would be available to them at no additional cost. Even if companies elect not to introduce present value into their evaluations, the analysis that they perform is likely to lead to greater understanding of the effect on profits of contract revisions," the author concludes.

Dr. Granof's research was supported by the William Paton Fund of the University of Michigan Graduate School of Business and the accounting firm of Ernst & Ernst. L.H.D.

The Management of Problem-Solving: Positive Results From Productive Thinking by GRAHAM TARR, Halsted Press, New York, 1973, 160 pages, $11.75.

As CPA consultants become more involved in social problems, interdisciplinary teams are being organized. How these and other think-tank groups can be managed most effectively is discussed in this book.

Graham Tarr's career has moved from engineering, to applied technological research, to a techno-military think-tank, and then to civil operational research and economics. He headed a group of projects for the United Kingdom and led a United Nations team.

Unfortunately he does not offer any sure ways of controlling the costs for a problem-solving group. He suggests that the group leader should give the project leader a budget that is a little tighter than he finds comfortable and then add on a contingency for the unknown.

"Some time ago I tried to keep contingencies secret, and went as far as having two separate and detailed project budgets (one for management, and one for the project team), but it was not much of a success. The gaff was always blown by someone. The best approach seems to be to have an openly admitted contingency, but to bring it home to all concerned that they are considered rather less successful when they eat into it."

Mr. Tarr firmly believes that fewer people working for longer is the most productive use of problem-solving groups. Crash projects produce the worse answers.

"But when the money is limited, the case for splitting it between parallel teams is very weak unless the decision-maker really distrusts all of them. A single team, well coordinated and with an imaginative approach, given all the available resources, will generally produce a better result."

Differing group attitudes

One of the major themes of the book is that more attention to human needs of the problem-solving group's members is necessary. For instance, the author suggests a spirit of "intellectual charity" be fostered in an interdisciplinary group consisting of arts, engineering, and economic types.

"The engineer sees in himself someone practical, precise, and with a sound understanding of the mechanical and dynamic behaviour of the universe; he tends to think of the arts man—and by implication the economist—as always talking about the problem but never sitting down to describe it systematically with real numbers. Engineers seem to find difficulty in believing that there is as much complexity in a piece of legislation, for example, as in the mathematical description of a mechanistic system, and that the intellectual and logical demands made on the arts professions are equal to those made on his own.

"The arts man, on the other hand, knows that the world is full of people and feels that if you can solve the problem in human terms you have done the hard part; he has nothing against the engineer, but thinks of him as a technician to look after the nuts and bolts of the problem after he has finished with it. The economist veers backwards and forwards . . . and believes he understands both approaches and can do a better job on each of them."

Mr. Tarr warns that lack of charity is even more common in examining the work done by outside groups. He pragmatically notes, "This is less harmful, of course, and does at least liven up the day: what happier sight than an analyst guffawing over the fatuity of someone else's report, or showing it to his colleagues in amused disbelief. It allows him full rein of his critical powers without the need to be polite, which is a healthy form of relaxation."

However, after such relaxation, Mr. Tarr recommends someone bring the group down to earth by saying, "Ah, well, I expect they're saying the same about our last report."

Using assistants to do routine work is a waste of professional staff time. The author suggests that instead temporary employees be recruited from the computer department's key punchers or local college undergraduates or the clerical staff of the organization being analyzed.

Another suggestion he makes to group leaders is that they spend a good deal of time making rounds from one desk to another discussing techniques and making suggestions.

Mr. Tarr's book is rich in team management suggestions, yet not cursed with dogmatism. Sometimes he strains for folksy analogies ("Problem-solving is more like the painting of a picture than the painting of a house"), but generally his writing is succinct and thought-provoking.

L.H.D.

How I Turn Ordinary Complaints Into Thousands of Dollars: The Diary of a Tough Customer by RALPH CHARELL, Stein and Day, New York, 1973, 192 pages, $6.95.

Mr. Charell has been cited in the Guiness Book of World Records *as "the world's most successful complainer." In his book he tells how he defended himself, profitably, against adversaries with greater resources than his own.*

The voice of the irate consumer is being heard more often these days and most companies are aware of it, willingly or unwillingly. One of those who is not content to grin and bear it is Ralph Charell, a Columbia Law School graduate and a former television network programing executive. He has made a hobby of speaking up when he thinks he's been wronged.

"More and more often, we are forced to deal with unaccountable employees of large conglomerates, or faceless bureaucrats whose telephones are busy, out of order, or worse, left unattended while they filch an extra coffee break or otherwise extend their on-the-job semi-retirement. Shoddy, overpriced goods and poor services are a commonplace," Mr. Charell writes.

Unnecessary fears

"What can be done to correct these imbalances? All too often, the amount of time and effort involved may seem prohibitive, or we may fear that our credit rating is subject to computer annihilation if we justifiably withold payment. If we are to be relieved of being continually tossed up in blankets, thrown down interpersonal air shafts, stuffed into social drainspouts, and put on hold buttons that end only in disconnect signals, we must come up with a new approach. New methods of coping with myriad affronts, intransigent rudeness, deceits, incompetencies, obfuscations, procrastinations and other unwelcome business practices must be developed quickly if we are to survive."

Mr. Charell outlines the methods he has used in his confrontations with such opponents as Hertz car rental, New York Telephone, Con Edison, his landlord, a doctor, a lawyer, and well known New York City stores including Saks Fifth Avenue, Macy's, and Barney's Clothes. As proof of his victories, reproductions of his refunds and compensative checks are included. Copies of his letters are also provided for the reader's instruction.

Sometimes it does seem that Mr.

Charell was unreasonable and that he spent more time than was cost justified in rectifying the situation. However, he says his selected adversaries were resistant to usual appeals and he spent less time pursuing them than other people use for their hobbies (such as watching football).

Hire an actor

To carry out some of Mr. Charell's tactics you have to be pretty self assured. For instance, he often tells people his time is worth $100-150 an hour and he has already wasted too much of it on the matter in question. He suggests that when a case is likely to be settled out of court, an actor be called in to play the part of your lawyer. Not only is an actor cheaper, but you can hire one who looks exactly the way you want your attorney to look.

"Nor, as is often the case with attorneys, can he pressure you, directly or indirectly, to accept the other side's ridiculous first offer. Additionally, you, the client, will not be intimidated by your representative as is the case in the typical lawyer/client relationship. You will also not find him difficult or impossible to speak with, because you have purchased his time on a preemptive basis."

When he felt he was not given the full bonus he was promised by his former employer, Mr. Charell asked an attorney's opinion of his case. The lawyer told him without a written contract there was no case. So Charell handled the case himself and received an additional $475.

This entertaining little book shows how one angry man can fight off an army of bureaucrats. It is especially good light reading for people in customer contact jobs and for customers who have suffered inept contact.

One thing is sure: if you meet Ralph Charell, give him what he wants. It will save time all around.

L.H.D.

Corporate Wives — Corporate Casualties? by ROBERT SEIDENBERG, AMACOM (a division of the American Management Association), New York, 1973, 177 pages, $10.

Dr. Seidenberg gives further consideration to the topic he discussed in an essay in The Wall Street Journal, *"Dear Mr. Success: Consider Your Wife."*

When the author's *Journal* essay appeared, he received many letters confirming his observations. Women wrote to say that, indeed, they were losing a sense of themselves as they transferred from community to community with their corporate husbands. Although his working credentials were transferable from one job situation to the next, her community and business standing often weren't.

This is a new slant on the problem of executive mobility, a topic which social commentators have written about for quite some time now.

"People do survive a dozen or more moves—a tribute to their iron will and determination—but the cost in withering and alienation may be staggering. Biologically the human organism can withstand a great deal, as our space probers have clearly demonstrated. However, it is often the exercising of societal and community prerogatives which involve power, status, and authority, that changes *existing into living,*" Dr. Seidenberg writes.

The psychiatrist points out that the problem of losing credentials is not confined to the wife. If it were not for the emphasis Dr. Seidenberg puts on how the Women's Liberation movement is providing new moral support for women who want to follow their own interests, this book could have been called, "Corporate Families – Corporate Casualties." He tells of cases where women and children refused to go along to new communities and forsake their standings in the old ones.

"Up until now we have tried to explain these statistics and upheavals as cases of individual 'sickness,' 'immaturity,' and 'selfishness.' This type of name calling will no longer serve to deal with basic inequities and mythologies in our social structure. Our world has changed beneath our feet—past palliatives and platitudes suffice no more," Dr. Seidenberg states.

Even corporate management shows signs of being aware of the defects of executive mobility. The book cites a survey that found in 1970 two-thirds of questioned executives expected to be moved every three years, but in 1972 only 37 per cent had the same expectation.

New corporate approach

Although the book does contain a good deal of summarization of other published works, it also contains many new case histories and Dr. Seidenberg's own social observations:

"Corporate children have been witnesses to the discord and suffering of parents who have often been destroyed by the very success that was to save them. Marriage and conventional family living have little appeal for many young people today, having seen the disasters in their own well-fitted but ill-fated homes," Dr. Seidenberg observes.

He suggests that instead of ordering executives to relocate, corporations let all qualified employees know of a job opening in another area. In this way, those who want to move can and those who don't are not penalized for being "uncooperative."

"Granted that there are sharp limits to free choice in these matters, no one can deny that there is plenty of room short of anarchy for alternative ways of handling job assignments and business trips that would be entirely consistent with the movement toward humanizing corporate life," the psychiatrist writes.

Also, he believes the achievement motivation of *both* mates may one day in the not too distant future be essential factors in recruiting and transferring employees.

When the doors of the executive suite are finally open to women, "corporate wife" may take on a completely different meaning. Dr. Seidenberg comments, "Entering high-level employment successfully entails much more than opportunity, enthusiasm, and goodwill for a woman. If she is married she will be faced with handling a new creature on the domestic front—the corporate husband. Will he be able to withstand the fantasy (or reality) of being 'cuckolded' by his wife for another interest that takes her away from him? Will he feel comfortable about her missing dinner for that evening meeting or being absent for days on an important business trip or convention? And what will happen when a company has to transfer a female executive from one city to another?"

These are only some of the provocative questions that this book raises and that, one day, corporations and the individuals who staff them will have to answer for themselves.

L.H.D.

Strategies for Survival by DAVID F. LINOWES, AMACOM (a division of the American Management Association), New York, 1973, 231 pages, $9.75.

In the face of current social problems, this CPA suggests that proven business and management techniques be applied to the public sector. Some applications of socio-economic management are taking place, but "we cannot afford so slow a pace," Mr. Linowes warns.

David F. Linowes is a partner in Laventhol Krekstein Horwath & Horwath, vice chairman of the AICPA trial board, and a member of its committee on social measurement. He is also a prolific writer on the topic of socio-economic management and has written articles for *Nation's Business, The New York Times,* and *Journal of Accountancy.* This book gives him a chance to fully explain his ideas about how business skills can aid in curing society's ills.

"What we desperately need are ways and means of improving social earnings (fulfilled human needs) along with traditional corporate earnings. Part of the solution lies with the technology, the very phenomenon that has contributed to so many of the problems. . . . I refer specifically to those aspects of technology that deal with management systems and management information—computer technology, the technology of cost effectiveness, and accounting technology," he writes.

Socio-economic rules

Socio-economic management is based on the premise that profit can be measured in terms of human needs met, as well as dollars earned. He sets forth ten rules of socio-economic management:

"1—Tie standards and goals to proven human needs.

"2—Apply funding by results.

"3—Use discretionary funding as incentives.

"4—Use multidisciplinary planning.

"5—Set up social profitability audits.

"6—Establish public visibility.

"7—Prune and restructure for dynamic growth.

"8—Vary the input mix.

"9—Stir up social competition.

"10—Fix responsibility for applying SEM [socio-economic management]."

He is completely opposed to putting money into social programs that do no achieve their goals. Funding without measurement of achievement doesn't work.

"New York City is perhaps the furthest along in the implementation of sophisticated measurement and, hence, productivity improvement techniques. In the late 1960's, it set up a modified planning-programming - budgeting system (PPBS) to analyze its operations. Among the results were a new fire response policy, the use of 'slippery water' in fighting fires, and new air pollution legislation."

But socio-economic management has been applied in other areas. He describes projects in: Cook County, Ill., Sewickley, Pa., Phoenix, Ariz., Charleston, W. Va., Denver, Colo., and Richmond, Va.

Socio-economic management is being applied to social institutions but the pace is too slow. He makes some action recommendations designed to hasten the applications:

"1—Create exciting incentives.

"2—Cash in on over-60 expertise.

"3—Refine and expand the art of technology transfer.

"4—Enlarge funding of social research groups.

"5—Launch a 'businessmen for SEM' movement.

"6—Educate young SEM activists.

"7—Sell Madison Avenue on 'selling' America.

"8—Create 'Distinguished Social Service Awards.'

"9—Expand SEM task force activity.

"10—Activate political support for SEM."

Although a few experiments in public problem solving have been made in the areas of health, education, and city government, they have been extensively publicized; and they have been only experiments after all. There is a mass of stagnation in the public sector, Mr. Linowes observes, and it is time to make waves.

L.H.D.

The Use of Computers for Management in Industry, INTERNATIONAL CENTRE FOR ADVANCED TECHNICAL AND VOCATIONAL TRAINING, Turin, Italy, 1973, 272 pages, $3 (paperbound). The book can be ordered from the Bookshop, International Centre for Advanced Technical and Vocational Training, 140 Corso Unita d'Italia, I-10127 Turin, Italy, at $3 per copy plus $2 postage for North America.

This paperbook, the proceedings of a symposium of U.S. and Russian

computer specialists, is probably of value more as a symbol of an unusual event than for the actual content, but those with professional interest in either the USSR or computers may find something of technical use in some of the papers.

"The unprecedented seminar" on which this book was based took place in July of 1970. The Soviet group, led by Dr. J. M. Gvishiani, deputy chairman of the state committee of the USSR Council of Ministers on Science and Technology, included economists, industrial ministers, systems managers, and professors. The American delegation, led by Richard M. Cyert, then dean of the Graduate School of Industrial Administration of Carnegie-Mellon University, Pittsburgh, included mostly professors and deans, with a few representatives from industry.

Twenty-one papers are reproduced in the book. The American ones dealt with such subjects as the impact of computers on management, a model for resource management in a growing market, techniques of systems analysis and design, industrial applications of linear programing, simulation of the job shop process, applications of microsimulation to production management, forecasting, the use of data transmission in large American corporations, how to organize the introduction of computers, computer languages and systems development, and the role of industry in education for information processing. For the most part they plowed familiar ground, probably reflecting uncertainty as to just how familiar the Russians were with American computer development.

The Russian approach

The Russian papers, in contrast, dealt with such topics as an economic model of the management of an industry, mathematical modeling and optimization methods in control of discrete production, some aspects of software for program control, long-term technological forecasting, problems in design of real-time control systems, methods of optimization of the size of an industrial enterprise, stages of development of automatic control systems of enterprises, university programs for training specialists in automated management systems, and training of industrial personnel for work with computerized management systems. All were highly mathematical, apparently designed to impress the Americans with Soviet technical expertise. Whether they are impressive or not is for the computer specialist to judge.

This book will probably be of great value to professional Russia-watchers and possibly to some computer specialists. For the rest of us its significance lies in the fact that the conference took place and that there probably will be others.

L.S.

I Hate to See a Manager Cry or How to Prevent the Litany of Management from Fouling Up Your Career by MARTIN R. SMITH, Addison-Wesley Publishing Company, Reading, Mass., 1973, 209 pages, $5.95.

The worst possible error made by men who seek to improve their business performance by study is to believe all the junk prescribed by lecturers and texts on achieving management success, this author declares. Instead, he suggests, aspiring businessmen should try the advice contained in this particular management text.

The author of this book describes himself as "an insider" in management. He says he has managed functions in production, quality control, industrial engineering, and production control; was associated for a time with a national management consulting firm; and currently is an independent consultant.

This biography, which specifies no corporate names, is somewhat vague, to say the least, and the reader is left to wonder whether Mr. Smith so veils his identity because he fears that the iconoclasm of his style will hurt his professional reputation or whether he is genuinely obscure. After reading the book you will be inclined to suspect the latter.

For Mr. Smith's iconoclasm, as is the case with so many books of this genre, turns out to be little more than a device to attract attention. He starts off boldly enough attacking "the following golden rules (or variants of them) for achievement of executive success:

"1. Be nice to people. 2. Learn technical competence. 3. Don't pass the buck. 4. Admit your mistakes. 5. Give credit where due. 6. Act inspired. 7. Communicate well. 8. Plan ahead. 9. Be loyal. 10. Think."

Promise soon evaporates

"Unsuspecting managers who allow themselves to be influenced by all of this are not only headed for ignominy, but they are liable to become raving idiots to boot. Even if it were possible to assimilate and practice all of these rules, they are no guarantee of success. In fact, they are misleading if only because they neglect to establish the hard core business realities—the way things really are."

But when he gets down to cases in the main part of the book, his advice is far from earth-shaking. All of it has been said before—much of it by Robert A. Townsend, whom the author admires, but much of it also by Lyndall F. Urwick and other authors on management of more academic bent.

Book of moderate benefits

The book consists of a series of brief prescriptive essays, loosely grouped under such headings as "Recognizing Management Diseases"; "Circumventing Corporate Politics"; "Handling Corporate Personalities"; "Debunking Accepted Personnel Theories"; "Getting There: Selecting the Right Job"; "Staying There: Techniques for Success"; and "Moving Ahead: Doing the Right Things." The advice is for the most part sound, and the style is lively and anecdotal. All in

all, this is an entertaining, moderately worthwhile book but not one that is likely to change anyone's life.

L.S.

Briefly listed

Selection of Terminals and Data Protection by the ASSOCIATION FOR SYSTEMS MANAGEMENT, 24587 Bagley Road, Cleveland, Ohio, 1973, 38 pages, $4 (paperbound).

This booklet is designed to assist the manager in selecting remote terminal computer equipment suitable for his needs.

The components of a remote terminal system are discussed in the first, and longest, section of the booklet. It includes descriptions and definitions of equipment and services involved in time sharing.

A method of selecting appropriate equipment to do a specific job is presented in the second section.

A short final section is about the security of terminal systems and how to protect them from theft, fraud, sabotage, malfunctions, human errors, and effects of Nature.

MAGAZINES

A Scoring Methodology for Assessing the Suitability of Management Science Models by WILLIAM E. SOUDER, *Management Science*, June, 1972.

A study, based partly on a doctoral dissertation, develops a suitability index for evaluating project selection models. By a series of personal and telephone interviews with R & D administrators and management scientists, five major criteria, together with a list of characteristics pertaining to each, are combined to form an overall rating system. The reliability and the validity of the rating system are diagnosed in an application to 26 R & D selection models.

In obtaining a list of potentially suitable criteria and criterion characteristics, 52 subjects were interviewed for this purpose. Twenty-six were R & D administrators selected from large firms in the chemical, electronics, pharmaceutical, and aerospace industries, and 26 were practicing management scientists. Then, by re-interviewing the above respondents, the list was narrowed to five suitabilty criteria, each with its own small list of (suitabilty) characteristics. The five criteria are: realism, flexibility, capability, ease of use, and cost.

Scoring method

With the five criteria and their characteristics, the following procedure is used to construct the scoring index. First, the raw scores are developed. A '1' and a '0' are assigned to the respective presence or absence of a criterion characteristic in a particular model being examined. The '1's and '0's are added for each criterion and expressed as a fraction of the criterion's total possible score. These are called relative scores. To construct the overall suitability index, a set of weights is established. In terms of importance realism is weighted four units; flexibility, three units; capability, two units; use, two units; and cost, one unit. The suitability score of a model is the weighted sum of the relative scores. The weights are average rankings based on data provided by the interviews.

As the suitability measures may not be completely accurate, the possibility of random error is accounted for by using confidence intervals. The intervals are arbitrarily chosen as ± 1 for the relative scores of each criterion and then weighted in the same manner as described in the construction of the suitability score errors: for any one model to be significantly more suitable than another, its score must exceed the others by at least twice the magnitude of its score error. This is somewhat analogous to a statistical test of significance at the 95 per cent level.

By this method a model can be assessed as significantly more suitable than another. Furthermore, models can be evaluated in terms of their five component criteria.

When applied to 26 R & D project selection models, the index failed to detect any significant differences in four linear models selected. Five nonlinear models were tested and only two were indicated as different. The methodology could neither discriminate between any of the zero-one models nor any of the scoring-type models. One out of nine selected profitability models was found to differ in the test. Notwithstanding the poor performance of the index on an aggregate basis, comparisons of individual criteria highlighted a number of dissimilarities. For instance, it is shown that the linear, non-linear, and zero-one type models have the highest realism, flexibility, and capability, whereas the profitability and the scoring index variants have the superior use and cost performance scores.

Choosing best model

Choosing the most suitable model is a problem that is not only faced by R & D administrators. The ranking of alternative frameworks for resource allocation decisions is one that concerns accountants too. For example, a number of capital expenditure proposals might be evaluated according to payback, average annual return, rate of return, net present value, and risk adjusted return on investment. Some persons would seek to ascertain which project was the best performer across a broad range of investment selection methods: the methodology outlined in this study, however, attempts to reduce the number of selection models, thereby enabling the decision maker to discard those considered as unsuitable and to focus his attention on one or a few that have been indicated as significantly more suitable than others.

Two types of objections may be raised to the scoring methodology:

one relating to its external validity, the other to the authenticity of its theoretical assertions.

Within the R & D area future application would appear doubtful for a pragmatic reason. For firms to develop their own sets of criteria and associated characteristics the costs would be high: the weights would differ according to major classes of R & D, firm adaptation over time, and the changing availability of funds. Continuous update and revision would therefore be necessary. If the methodology is extended into other areas, there would be similar impracticalities. Without tangible evidence that the benefits of (say) rejecting a significantly unsuitable selection model outweigh the costs anticipated, and, that the net benefit to be gained is greater than that associated with the *ad hoc* methods presently used, the value of the methodology must remain unsubstantiated.

Irrespective of the costs and benefits, the question is whether or not the measure is internally sound. The author's application to 26 models cannot be regarded as validating or invalidating the index. Even though the results illustrate very little discrimination between the models this can be interpreted positively as meaning that the models were similar, or negatively in that the models were very different and the index failed to recognize this. The only criterion used was that the models represent a cross-section of model types.

The application of the importance-weights highlights another limitation of a measurement-theoretic kind. In the research, the R&D respondents were required to rank order the five criteria from most important to least important using a 1-5 scale. But by the placing of numbers on these criteria rankings, an arbitrary measurement unit is implied. An ordering makes no assertions about the intensity of the measure—common sense dictates that one cannot maintain that 65°F is twice as hot as 32°F (freezing point).

Despite the failure of the author to successfully validate the index as a meaningful study of the suitability of a management science model, the study is of interest.

PAUL A. GRIFFIN
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The Case for Universal Professional Development by W. P. SPRAGUE, *The CPA Journal*, September, 1973.

Mr. Sprague gives argument to the position of requiring continuing education of practitioners in order to renew their licenses to practice public accounting.

The article first considers the fact that many CPAs are alarmed at the thought of anyone requiring them to continue their education or lose their CPA certificates. The real effect of requiring continuing education would be upon the practitioners; the practitioner would participate in continuing education or his license would not be renewed. Consideration of the objections to continuing education indicates that the key issue is whether universal professional development is unreasonably burdensome.

Since most sources favor 40 hours of continuing education to be an acceptable goal, the question of "unreasonably burdensome" must be centered upon factors other than time. Mr. Sprague offers several avenues of approach around problems of cost, convenience, and availability. These avenues include more AICPA and state society programs, closed circuit television, and home study courses.

Education

Mr. Sprague suggests the implementation of a required continuing education program should include a complete freedom of choice as to the subject matter except for the requirement of a single course of study in current matters significant to all aspects of public practice. The article lists several possible sources of education, indicating that all practitioners, whether from a large firm or a small firm, could reach the required level of education.

Enactment of substantial penalties for non-compliance and the random inspection of individual records could help solve the problem of enforcing continuing education requirements. Mr. Sprague also suggests use of license renewal forms which would require listing of courses taken during the year.

Application of continuing education requirements should be modest at first. Greater requirements may be implemented after initial acceptance by the profession. Mr. Sprague suggests several things the state societies could do to help implement any continuing education requirement. These actions include:

1. Expansion of course material to cover a broader range of professional development.
2. Differentiation of course material to fit various levels of experience.
3. Translation of course material

into workbook and cassette form.

4. Refinement of administrative procedures to include documentation of attendance and recording of quiz grades.

5. Dissemination of the programs through the available educational facilities.

Misconceptions

The article considers three misconceptions. One misconception is that continuing education is no guarantee of competence. Mr. Sprague concedes that the benefit derived from a course might vary from person to person; however, the purpose of requiring continuing education is not to insure a definable level of competence among the practitioners. The purpose of the requirement is to demonstrate to the public that the profession is concerned enough to attempt to maintain and improve professional competence. The second misconception concerns the effect that well-publicized court cases may have on continuing education. The author answers this claim by pointing out that faulty judgment on an engagement has little to do with continuing education. The hazards of the profession should not be confused with basic knowledge. The last misconception concerns the rejection of in-house training programs of the larger firms because of highly publicized lawsuits. Mr. Sprague counters that argument by pointing out the advantage that the firm has in a case such as the one mentioned. The firm can better evaluate the need of its staff, and it can require attendance by its staff.

The author concludes by noting the approaches taken by some of the states now requiring continuing education. Many of these states support voluntary rather than forced continuing education. The opponents to required continuing education stress that voluntary programs would involve the majority of the practitioners.

WILLIAM D. WALLACE
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A Typology for Participation in Organizational Decision Making by JOSEPH A. ALUTTO and JAMES A. BELASCO, *Administratve Science Quarterly,* March, 1972.

After reviewing the literature on participation in organizational decision making, it is argued that participation should be viewed as the difference between the number of decisions in which an individual actually participates and the number in which he desires to participate. A rather extensive field study was conducted in an attempt to test the usefulness of this discrepancy view. In addition to providing support for the concept, the findings indicate that some of the traditional assumptions concerning the universal desirability of increased participation in decision making should be modified.

Alutto and Belasco note that the prior literature on individual participation in organizational decision making has typically assumed a linear relationship between increased participation and such valued organizational outcomes as the willingness to adopt change, increased administrative control, and greater individual integration in the organization. Researchers and practitioners alike have suggested that by encouraging participation, the organization can increase both the likelihood that a change will be adopted as well as the overall effectiveness of the change. Others have stated that increased participation by an individual leads to greater individual job satisfaction and work achievement as well as greater individual integration into the organization. Some authors have argued that participation encourages subordinate commitment to organizational goals through involvement in the decision process, thus allowing superiors to gain both an increased certainty concerning the actions of the subordinate and an increased influence over subordinate behavior.

This view is clearly evident in the literature of accounting concerned with the control aspects of budgeting. It has been suggested that allowing the budgeted individual to participate in the goal-setting process encourages acceptance of the budget and, to some extent, insures increased performance by the budgeted individual.

In addition to the over-simplicity of the assumed relationships, Alutto and Belasco are critical of the previous adherence to an absolute measure of participation, i.e., the number of institutional decisions in which an individual participates. It is unlikely, they argue, that the desire for increased participation is equally distributed throughout the organization. To the extent that such desires are not equally distributed, the crucial variable would seem to be the discrepancy between current and desired rates of participation rather than an individual's absolute rate. One can deal effectively with decisional participation by considering a continuum of participation typified by three conditions:

(1) Decisional deprivation—actual participation in fewer than desired decisions;

(2) Decisional equilibrium—actual participation in as many decisions as desired;

(3) Decisional saturation— actual participation in more decisions than desired.

If the three participation conditions are differentially distributed throughout organizational populations, and if these conditions are related to differing organizational outcomes, then the discrepancy concept of participation has not only research and theoretical value but practical implications as well.

In an effort to test the discrepancy concept and to shed additional light upon the relationship between increased involvement in decision making and the organizational outcomes previously discussed, a field study was conducted among teachers employed by two schools in New York. Using a questionnaire survey technique, the

teachers indicated their actual and desired participation concerning 12 decisional situations varying from the hiring of new faculty members to the planning of new buildings. Based upon these responses each of the 454 teachers was placed within one of the three discrepancy conditions. In addition to demographic information, data was obtained concerning six correlates of participation: (1) organizational commitment; (2) perceptions and preferences of administrative influence; (3) authoritarianism; (4) role conflict; (5) interpersonal trust; and (6) attitudes toward militancy (teacher strikes).

The authors found that organizational commitment and the personality characteristics of interpersonal trust and authoritarianism were not differentially distributed among individuals with varying decisional attributes. The most significant finding was that decisional deprivation did not lead to lower organizational commitment than equilibrium or saturation. No significant differences were evident between teachers considered decisionally saturated and those in equilibrium. However, those teachers experiencing decisional deprivation ranked school superintendents as currently more influential, desired a reduction in future administrative influences, experienced more role conflict, and were the most militant of the three groups. An analysis of the within-group variations of decisional involvement revealed that the larger the number of decisions in which participation is desired but not allowed, (a) the greater the perceived role conflict, (b) the greater the probability that the individual is a male employed in a rural secondary school, (c) the greater the attitudinal militancy, and (d) the higher the probability that the top administrative official will be perceived as relatively influential.

The study indicates that organizational typologies based on overall conditions of decisional participation are viable. Individuals experiencing high levels of deprivation do possess different characteristics than those typified by lower levels of deprivation, by equilibrium, or by saturation. No evidence was found in support of the assumption that increased participation leads to increased organizational commitment. For at least two segments of each organizational population (equilibrium and saturation) the introduction of shared decision making is not a viable administrative strategy and may prove highly dysfunctional. While further research is certainly necessary, it would appear that the notion, prevalent in accounting, that increased commitment to a budget (and thus increased performance) can be achieved by involving the budgeted individual in the goal-setting process is somewhat suspect.

W. Bruce Johnson
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The Implications for Accountants of Data Base Management Systems by Ron Weber, *The Australian Accountant*, October, 1973.

Data base management systems will become an accepted facet of commercial data processing in the near future. The purpose of this article is (1) to explain the general nature of these systems and (2) to suggest some implications of these systems for the accounting profession.

In a well-organized presentation, Mr. Weber points out that data base management systems have several aims. The first and primary aim is to reduce the duplication of data that is stored in company files. This duplication occurs frequently in traditional computer systems, and it leads to several inefficiencies in data processing. These inefficiencies are as follows: (1) more file storage space is required, (2) data are sometimes updated in one file but not in another, and (3) decision makers must search in many different files to satisfy their informational requirements. Data base management systems attempt to overcome these inefficiencies by using special file structures for data storage. These structures are designed so that the data appearing on a particular record is stored in only one place. Then, this data is systematically linked with other data to form many different files.

The second aim of data base management systems is to alleviate many of the problems associated with system development and modification. This goal is achieved by utilizing computer programs which can be quickly written and easily modified. Many subroutines are standard, and they are usually written by the computer manufacturer. As a result, there is less need for system users to write highly-detailed computer programs.

As one would naturally expect, there are some problems associated with data base management systems. One problem is that a failure in the system can be disastrous. Because of the linking network, data violations affect every file to which the data is connected. This problem is most acute to those system users who have fast retrieval requirements. Because of this problem, managers should implement appropriate recovery measures designed to reduce the impact of a system failure. These measures include dual copies of files, file moves, file dumps, and copies of journals that contain all changes in the data base.

A second problem of data base management systems is their susceptibility to violations of data secrecy. Because of this susceptibility, it is important to implement appropriate security measures such as passwords, logging-in procedures, and so forth.

Implications for accountants

The implementation of data base management systems has several implications for accountants. First, these systems facilitate the managerial accountant's work by enhancing the accuracy and reliabil-

ity of the information that he uses.

In addition, since data can be updated at tremendous speeds, these systems have a positive effect on information timeliness. Indeed, the probability of satisfying *ad hoc* information requests is greatly increased by these systems.

The financial accountant can also profit from the implementation of data base management systems. The tremendous speed and data structuring capacities of these systems greatly facilitate the auditor's work. Moreover, these systems decrease the risk of program manipulations since many of the subroutines are written by the computer manufacturer.

Mr. Weber concludes by pointing out that accountants are entering a period of rapid change. During the period, data base management systems will become an accepted facet of commercial data processing. These systems have definite implications for the accounting profession. As a result, it is imperative that accountants become actively interested in the development of these systems.

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Analysis of Current Marketing Cost Methods by L. GAYLE RAYBURN, *The CPA Journal*, November, 1973.

Despite the fact that determining marketing costs is more difficult than determining production costs, efforts should be made by both marketing and accounting people to develop meaningful controls and establish accountability of marketing costs.

This article relates the various marketing cost methods currently being used by businesses. For instance, the full costing method is most generally used; although the contribution margin approach is also in evidence. Dr. Rayburn contends that the goal of marketing management should be segmental contribution; however, in the contribution margin approaches being used, the starting point has usually been gross profit. As a result, all production costs are presumed variable with production. Since fixed production costs are in effect allocated, the segmental contribution continues to reflect some common costs.

Dr. Rayburn interviewed controllers of organizations in the South with 100 employees or more. All companies interviewed employed standards and/or budgets to reflect management's financial goals. Those marketing costs which are repetitive are subjected to the same methods of cost control as production costs. However, the standards employed for cost control are less exact than those used in production.

Nonrepetitive marketing costs, such as advertising and sales promotion, are primarily controlled through the use of budgets. Standard costs for advertising and sales promotion are not based on units which measure effort expended, but rather on units which measure results obtained. None of the companies interviewed had conducted time and motion studies of nonrepetitive marketing activities, which would identify how these employees spend their time in order to develop appropriate unit standards.

Marketing cost allocations are generally made on the basis of sales price, despite the fact that a direct relationship between orders and costs cannot be established. Marketing management often dislikes such allocations, because profit potential is not revealed.

Marketing controls neglected

Distribution cost variance analysis is virtually non-existent among the companies interviewed. Net variances may be indicated, but a breakdown into causal factors is not attempted. A substitute often followed is a comparison of current and prior period distribution costs. Such comparisons will help to identify a problem area, but fail to indicate the adjustment required.

One company indicated the use of industry statistics as a means of cost control. However, difficulties arise because of a lack of uniformity in both the methods of distribution and in the methods of charging items to distribution costs.

Generally, the survey reveals that while marketing costs are relatively large in many businesses, they have not received the attention they deserve if worthwhile control and accountability is desired. Marketing activities have changed. Today they often must create and discover demands for new products rather than merely sell what is produced. Marketing management is becoming an integral part of every phase of the production-distribution cycle. Economic factors also affect marketing costs. As more products are produced, more effort is expended to find additional customers and open new territories. All of these factors result in increased marketing costs and meaningful controls become more desirable.

Several reasons are presented for the slow application of accounting methods to marketing costs. First, the marketing environment is much more complex than that in the production area. For instance, the time period lag between cause and effect, the lack of standardization in marketing operations, and the vastly different channels of distribution available are cited as reasons for lack of cost control. Second, often quantitative factors are not available to measure the results of performance. The human element is more pronounced in marketing areas than in the production activity. Third, there has been a lack of communication between what analysis is needed versus what data are available. The accountant simply has not familiarized himself with the marketing functions to the same extent as the production function.

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