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CONDUCTED BY THE OREGON STATE LIBRARY WITH DR. PRESTON P. LE BRETON FROM THE UNIVERSITY OF WASHINGTON SERVING AS THE CONSULTANT, THIS WEEK LONG INSTITUTE WAS HELD TO PREPARE LIBRARY ADMINISTRATORS FOR STATE-WIDE PLANNING FOR LIBRARY DEVELOPMENT IN OREGON. SPECIFIC GOALS OF INSTITUTE PARTICIPANTS WERE TO EXAMINE ACCEPTED MANAGEMENT AND ADMINISTRATIVE PRINCIPLES, TO DETERMINE AND IMPROVE PLANNING SKILLS, AND TO DISCOVER HOW PERSONAL VALUES AND ATTITUDES INFLUENCE ADMINISTRATION. LECTURES, PANELS, AND GROUP DISCUSSIONS COVER THE FOLLOWING TOPICS--(1) ORGANIZING FOR PLANNING, INCLUDING AN EXPLORATION OF THE OVERALL PLANNING CONCEPT AND MODEL, (2) FORECASTING TRENDS, DETERMINATION OF NEEDS, AND THE ESTABLISHMENT OF GOALS AND EVALUATION CRITERIA, (3) OPERATIONS RESEARCH AND ITS SIGNIFICANCE TO MANAGEMENT, WITH DISCUSSION OF QUANTATIVE ANALYSIS AND SYSTEMS ANALYSIS AS AIDS TO PLANNING AND DECISION MAKING, AND (4) COMPREHENSIVE PLANNING IN OTHER FIELDS, COVERING STATE AND LOCAL PLANNING AND ASPECTS OF ELECTRIC UTILITY INDUSTRY PLANNING OF INTEREST TO LIBRARIANS. APPENDIXES INCLUDE A SELECTED READING LIST ON PLANNING AND BIOGRAPHICAL SKETCHES OF INSTITUTE SPEAKERS. THIS DOCUMENT IS ALSO AVAILABLE FROM THE OREGON STATE LIBRARY, SALEM, OREGON 97301, FOR $2.00. (JB)

Institute On Planning

PROCEEDINGS

Oregon State Library, Salem

INSTITUTE ON PLANNING

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RICHARD B. ENGEN, Editor

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1965

Table of Contents

I INTRODUCTION

The "Why" of the Institute

ELOISE EBERT

Welcome, participants in the Institute on Planning. May I express my appreciation for your confidence that this institute will be rewarding to you personally. I hope that what we learn through the coming week will contribute to a PLAN FOR LIBRARY DEVELOPMENT IN OREGON.

I should like to share with you the thinking which has gone into this institute. In studying planning which has been done in Oregon, and in the library profession generally, it appears that often major factors in the planning process were ignored, not considered, or unrecognized as significant. One is plagued with the thought that perhaps those who were planning didn't know how to plan. One could ask, "Do *I* know how to plan?"

The State Library has a responsibility for providing leadership in library development. The State Library also has a responsibility for coordinating planning for improved library services. The State Library should provide the opportunity for us to meet together and discuss mutual problems.

In March 1964, after the document *Public Library Service: Oregon Standards for the Headquarters of a Library System* was completed, I wrote to Carl Hintz, Chairman of the OLA Standards Committee, asking for an opportunity to discuss a university-based institute which might set the stage for the development of a statewide plan. His reply was enthusiastic.

The State Library Board of Trustees subsequently approved of the idea of an Institute on Planning but not without discussion on "Can you talk for a whole week on planning without planning something?" I assured them that this would follow!

Once the Board had approved the budget came the problem of finding a consultant to direct the institute—someone experienced and qualified. This was a major assignment, but after reading the book *Planning Theory* I knew Preston P. LeBreton was the man who could do the job!—and believe it or not, he was in the Northwest! In reply to my letter he said, "I share your view that effective planning is possible only when individual administrators are properly trained in the many complexities related to comprehensive planning. In the field of library administration your institute will be a pioneering venture. I would be pleased to participate with you in this important project."

From last October until today we have been planning this institute. Conferences with Dr. LeBreton were held in Portland, Seattle, and Olym-

pia. Tom Loeber, under the direction of and with the assistance of Dr. LeBreton, worked more than six months on the preparation of case studies which will be used in our discussion groups to illustrate principles of planning and implementation. The staff of the Eugene Continuation Center have assisted in the arrangements on the campus and selected other highly competent staff lecturers whose names appear on the program. I am most appreciative of all their services.

The OLA Library Development Committee also assisted: Carl Hintz, Chairman; Ivy Grover; James Burghardt; Susan Broadbent; Winfield Atkinson; Fern Prior and Dick Engen. Some questions which needed to be answered were, "Who should come? and how should the registrants be selected?" Dr. Le Breton suggested that the group should be small so that there could be discussion. The Library Development Committee recommended that a quota be established for public librarians, college librarians, school librarians, and trustees. We also thought we should like to invite our neighboring state library agencies to send representatives. The State Library agencies of Nevada, Montana, and Texas are represented and we have one eager beaver school librarian from California. We welcome all of you; we are delighted you wanted to come.

Realizing that all who applied could not be accommodated if we kept the group small and also representative of types of libraries, an ad hoc committee consisting of Omar Bacon (immediate past president of the Oregon Library Association), Carl Hintz (chairman of the OLA Library Development Committee, and I (as the State Librarian) reviewed the applications. May I congratulate each of you in having been "selected"—it was not an easy task. The only regret of the ad hoc committee is that only a few trustees could attend. Those who are here will need to do yeoman work as they represent more than 600 public library trustees.

Now I have the pleasure of introducing to you the gentleman who will make his mark on Oregon:

DR. PRESTON P. LE BRETON, Professor, Department of Policy, Personnel Relations and Production, College of Business Administration, University of Washington, Seattle. Dr. Le Breton received his Ph.D. degree at the University of Illinois. Prior to his immediate assignment he was head of the Department of Management and Marketing at Louisiana State University. He served as a consultant to many business and government groups including Detroit Edison Company, Chrysler Corporation, Civil Servire Commission, Army and Navy Departments, Internal Revenue Service, and Seattle Public Schools, He is the co-author with Dale A. Henning of *Planning Theory* and the author of *Planning for Small Business.* His newest book, *General Administration: Planning and Implementation*, was published in 1965 by Holt, Rinehart and Winston, Inc. This fall Dr. Le Breton is stepping down as the chairman of the department at the University of Washington, a position he has held for the last five years, in order to return to full time teaching and to be able to accept more assignments as a planning consultant.

The "How" of the Institute

PRESTON P. LE BRETON, PH.D.

When a week is devoted to planning and concepts of implementation certain obvious assumptions are implied:

1. There is a body of knowledge which deals with the administrative or management process.
2. This body of knowledge can be transmitted and learned.
3. If understood and used this knowledge will assist the administrator in carrying out his assignment.
4. The administrator has the proper attitude (willingness) about using the knowledge acquired.
5. The administrator has adequate (or will develop it) skill in the use of the knowledge he has acquired.
6. There is a way to measure (audit) good and bad administrative practices.

If one believes the above is true then it is reasonable for us to seek out answers to the following questions:

1. What are the accepted management or administrative principles. That is, knowledge about what?
2. What are the skill requirements?
3. How do personal values and attitudes influence the manner in which an individual carries out his administrative assignment?

This is our purpose in being here. We shall attempt to answer the above questions in the following manner:

1. *Knowledge*
   It is recommended that each participant (though reading discussions, reflection and contemplation) work toward the selection of an administrative model. Use the library! Suggested references are included in each day's schedule of events.
2. *Skill*
   Heavy emphasis will be placed on case discussions. Special cases have been written for the Institute. Through advance preparation and class discussion, participants should improve upon their present skills of diagnosis, decision making, planning, communication and persuasion.

3. *Value-Attitudes*
Each participant should work out a personal philosophy of administration based upon his philosophy of life. A week away from the work environment should provide an opportunity for reflective, creative thinking.

II DAILY SUMMARY

Daily Summary of Planning Principles

PRESTON P. LE BRETON, PH.D.

Monday

PURPOSE

The materials presented during the first morning were designed in part to establish a foundation for the entire week and to explore the overall planning concept and model. Because of the vital planning role played by a variety of individuals and groups, the topic, Organizing For Planning, was introduced in the context of defining the concept of role.

SUMMARY OF CONTENTS

It was suggested that each participant has a vital interest and role in the growth and development of the library function in Oregon, the United States and abroad. To prepare oneself for the expanded opportunity available and to assume one's proper role as a leader in preparing programs, designing facilities, and furnishing resource materials, it is important that one take a broad stance in time. An attempt must be made to understand the *nature* of the environment anticipated in the near and distant future.

The total environment is best understood when significant influences are isolated. Among the more significant influences are:

1. Technological—for example, the computer
2. Economic—for example, a more affluent society
3. Educational—for example, a better educated society
4. Political—for example, greater centralization of primary decisions, which affect the lives of all Americans
5. Social—for example, availability of more leisure time
6. Religious—for example, less dogmatism, more individual freedom

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References: The primary reference books used in the Institute were:

1. Preston P. LeBreton, *General Administratiion: Planning and Implementation*, (New York: Holt, Rinehart and Winston, Inc., 1965)
2. Preston P. LeBreton and Dale A. Henning, *Planning Theory*, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1961)

References made throughout this summary statement are taken from either of these two references. One asterisk (*) will indicate *General Administration* as the source. Two asterisks (**) will indicate *Planning Theory* as the source.

Once the significant influences are determined, it is necessary to interpret the likely impact of change upon the task of the librarian and others interested in the growth of library services. In order to interpret the likely impact, it is useful to explore three propositions:

1. The concept of a model of the administrative process
2. The concept of role
3. The concept of knowledge, skill and value-attitudes

Model of Administrative Process. One should acquire his own model of the administrative process to be used as a frame of reference to assist him in understanding his role. There are a variety of administrative models. Among the more widely accepted models are the following:

1. Process
2. Systems
3. Decision Theory
4. Planning-Implementation or Modified Process

For purposes of the Planning Institute, emphasis is placed on the Planning-Implementation model.

Concept of Role. Three broad influences appear to have a significant impact on one's role. Each in turn is affected by a variety of factors:

1. Roles as defined by an organization
   - Position description
   - Position specification
   - Policies, Rules and Regulations, Procedures
   - Codes—prevailing philosophy of administration
2. Roles as are enforced by the organization
   - Perception of roles and their legitimacy by others
   - Reward and punishment system
   - Behavior of senior administrators
3. Roles as performed by the incumbent
   - Qualifications—knowledge and skill
   - Value—attitude
   - His perception of role and its legitimacy

The role an individual is asked to play within an organization is often defined in fairly specific terms. However, an individual within an organization must relate with others in carrying out his function. His day-to-day relationships along with his personal qualifications and interests may modify the role as defined by the organization.

Knowledge, Skill, Value-Attitudes. At this point an individual should be able to combine the concepts of an administrative model and role. Assuming the P-I model, he would think in terms of his present and future administrative role as planner and implementor. By the addition

of the concepts of knowledge, skill, and value-attitudes, he is prepared to inquire about the qualifications demanded to fulfill his future role. That is, knowledge of what? Skill in doing what? Value-attitudes toward what? When integrated into the P-I model, it appears (in summary form) as follows:

Knowledge of:	Forecasting Creative thinking
Skill in:	Decision making Organizing for planning
Attitude toward:	Testing propositions and conclusions Learning theory and practice Control programs Evaluation of data Reporting results

Planning-Implementation

The Planning-Implementation Administrative Model is made up of three parts:

1. Planning-Implementation Process
2. Dimensions
3. Relationship of Dimensions to Process

The planning process contains fourteen steps:

1. Becoming aware of a possible need for formulating a plan
2. Formulating a precise statement of the objective of the plan to be prepared.
3. Preparing a broad outline of the proposal or plan
4. Obtaining approval of the proposal
5. Organizing planning staff and assigning responsibility
6. Determining the specific outline of the plan
7. Establishing contact with all cooperating units
8. Obtaining necessary data
9. Evaluating data
10. Formulating tentative conclusions and preparing tentative plans
11. Testing components of tentative plans and making adjustments where appropriate
12. Preparing the final plan
13. Testing the plan and making adjustments where necessary
14. Obtaining approval of the plan*

The formulation of a plan begins with the recognition that a given situation deserves attention. The process is completed when a plan is submitted for approval.

Each administrator has primary responsibility for planning and imple-

mentation, regardless of his level within an organization, his functional responsibility, the size of his unit, the size of his organization, the age of his organization, or the main purpose of the organization—library service, education, manufacturing, medical, or distribution.

For a given activity some administrators have a vital role in all phases of the administrative process while for other activities they may participate in one, a few, or several parts. For example, the administrative role of a librarian may vary across the following activities:

1. Site selection
2. Building design
3. Book selection
4. Book display
5. Check-out policy
6. Working conditions

How Can One Make Sense of the Planning and Implementation Processes?

This is the role of dimensions. Although the preparation of a policy statement, rules and regulations, a procedure, programs, systems or projects may follow the broad design (planning process) indicated above, the specific and detailed way in which a planning process is carried out will be influenced by the degree of intensity with which dimensions occur. For example, the complexity factor may b efairly simple or highly complicated.

Simple or Complex or Highly Complex

The list of dimensions contains the following:

1. Complexity
2. Significance
3. Scope or Magnitude
4. Comprehensiveness
5. Frequency
6. Duration
7. Uniqueness
8. Authorization
9. Flexibility
10. Available Time
11. Confidential Nature
12. Clearness
13. Formality
14. Specificity
15. Completeness
16. Accuracy
17. Stability*

When a significant change takes place in the intensity factor for a given dimension, the impact on the administrative process is likely to be great. It is important to keep in mind that the impact of dimensions should be measured against each step in the administrative process and not simply the process as a whole.

Special Note

At a given point in time, a particular planning or implementation situation occurs within an organization which has:

1. A history of success and failures
2. A management philosophy—acceptable behavior practices
3. Participants with different:
   a. Levels of experience
   b. Levels of training and knowledge
   c. Levels and kinds of skills
   d. Interests and ambitions
   e. Personal qualities
4. Existing policies, rules and regulations and procedures

While it is important to understand how the above influences may shape a planning or implementation situation, an administrator interested in *learning about the model* might find it useful to concentrate on the nature of the administrative need (designing a new library, introducing bookmobile service for the first time) rather than the organizational complexities of a given situation.

Tuesday

PURPOSE

The lesson plan was designed to introduce the participants to the most vital part of the administrative process—the awareness of needs. The scope of the presentation was to include the establishment of goals and objectives, the preparation of a format for submitting proposals and the establishment of evaluation criteria. The above topics were selected to be presented as a unit because they may be thought of as an integrated sub-grouping of the overall process.

SUMMARY OF CONTENTS

As one views an organization it is useful to reflect upon the fact that more often than not an individual observes a unit in motion. That is, an organization which is being directed toward a given goal or objective.

As an administrator guides an organization toward long-range objectives, it is vital that he keep in touch with and sensitive to:

1. Changes in the internal environment of his organization
2. Changes in the external environment in which his organization performs
3. Established objectives (perhaps changing conditions may suggest the need for revision)

Need Determination. Although it may be obvious, it is useful to remind oneself that a plan is never formulated until an individual becomes aware of the need to take action. More important, the quality of a plan may be greatly influenced by the way in which one becomes aware of the need to develop a plan.

Among the sources of ideas of possible importance to a senior library administrator are the following:

1. Formal controls
2. Systematic audits
3. Unit demonstrates the need
4. Employee suggestions and recommendations
5. Outside initiative
6. Perpetual study
7. Management observations and contemplation
8. Management suggestions and directives
9. Board of trustees' suggestions and directives*

The alert administrator might think in terms of the sources of ideas which are available to him and ask himself whether or not his sensing devices (antennae) are properly placed and sensitive to indication of needed change.

Each source of ideas must be developed, cultivated, and then used. For example, an effective relationship with one's superiors, peers or subordinates does not occur automatically.

When an administrator has a good feedback system in operation, he may discover that many of his antennae are vibrating almost constantly.

When this condition develops, he must have the ability and insights which will allow him to discriminate between legitimate indications of change and those which may be only suggestive of short-range adjustments. Once an administrator embarks on a given plan it reduces the time he has available for preparing and implementing other plans. In a modified way, the overall planning process could be used to determine

whether or not an indication of change deserves the attention of a formal planning effort.

Establishment of Goals and Objectives. Once the administrator has made the decision that he has a legitimate planning opportunity, he will be well advised to concentrate on isolating the true causes of his planning need before determining his objective.

A simple case for purposes of illustration only:

> The chief librarian of a university library was concerned about the heavy turnover among his librarians. He knew his librarians received a salary 10-15% below that of librarians in comparable schools on the West Coast. He persuaded his president to adjust salaries to a level equal with competing schools. After two years he was disappointed to learn that turnover had increased even though salaries remained competitive.
>
> He called in a senior librarian and asked for help. The senior librarian suggested that only a few if any of the former librarians had departed because of dissatisfaction with the salary schedule. Naming individuals, he expressed the opinion that one had left because he was displeased with his salary relative to other librarians on the staff; a second librarian had been displeased with his rank; another had been unhappy with his job assignment; a fourth was not satisfied with promotional opportunities.
>
> After the conference, the chief librarian decided that perhaps he should seek further for additional factors which influence job stability. Although his overall objective might be to reduce turnover, a more meaningful set of objectives might include the elimination of conditions which contribute to high turnover.

Proposals. Whenever a planning effort requires the expenditure of large sums of money or manpower, it may be necessary to obtain the approval of a superior before further action is undertaken. For example, the determination of a site for a new library or the extensive rennovation of an existing facility may be of such importance that the planner would have to obtain approval of the proposition from a higher authority.

Two important considerations deserve attention at this stage:

1. Format ot be used in the preparation of the proposal
2. Administrative posture to be taken by the individual submitting the proposal to the individual or unit responsible for granting approval

Because of the similarity of this stage of the planning process and the final step when a completed plan is submitted for approval, a more detailed treatment of this subject is postponed until Wednesday.

Wednesday

PURPOSE

Up to this point the planner has been concerned with understanding his planning need and determining the specific goal or objective his planning action will seek to satisfy. It remains for the planner to assemble appropriate manpower and to guide their efforts toward the determination of a course of action. This section emphasizes data collection and data processing, problem solving and decision making, testing of plans and the preparation of a final plan.

SUMMARY OF CONTENTS

The greater the complexity, comprehensiveness and significance of planning situations, the greater the likelihood that a variety of talents will be assembled to contribute to the solution of a problem. One useful way to approach the topic "Organizing For Planning" is to think in terms of permanent committees such as a board of trustees or executive committee. Membership on these committees usually does not change relative to a given planning assignment. A second kind of committee, usually called an ad hoc committee, is formed to satisfy a given need and is dissolved once committee members have performed their assigned function. Membership on an ad hoc planning committee is often influenced by the nature of the assignment. A forecaster, accountant or attorney might be placed on a committee because of the need for his specialized talents.

Increasingly specialists are being asked to serve as advisors. As an organization grows in size the advantages of specialization may develop. Under these conditions a variety of staff specialists may be hired to assist line managers in the performance of specified administrative assignments. Crucial to the success of staff specialists (management analysts, industrial engineers, operations researchers) is the rapport they are able to establish with line managers. While few situations are identical and individuals vary in their administrative posture. certain conditions appear to increase the likelihood of an effective relationship. Among the significant factors are the following:

1. The need for staff assistance is perceived by the line manager
2. Request for assistance is initiated by the line manager
3. Staff specialist is professionally competent
   a. As perceived by line manager
   b. As indicated by results
4. Working relationship emphasizes staff service to line manager
   a. Staff assistant may suggest alternatives
   b. Staff assistant speaks in terms of likely consequences of various courses of action
   c. Line manager makes decision on course of action

5. No reports are issued by staff assistant except as requested by line manager
6. Top managers are concerned with results achieved rather than the source and nature of assistance rendered

Decision Making. There are various ways to look at a decision-making situation. One useful way is to separate out components of a decision-making situation in the following manner:

1. Significant variables
2. Relative importance of variables
3. Degree of certainty that anticipated conditions will occur as stated
4. Decision rules

A simplified example of a decision to select a site for a library follows:

1. Significant variables — 2. Relative weights

Cost	40
Accessibility to users	20
Accessibility to employees	5
Appropriateness of surrounding area	10
Size	20
Condition	5

3. Degree of certainty, where appropriate
   (low, fairly low, moderate, fairly high, high)
4. Decision rule
   Select site with highest score unless degree of certainty is moderate or below.

In actual fact, of course, a more elaborate decision process would be followed.

Testing Components. The concept of testing permeates the planning process. However, two sets of tests are of particular significance once a tentative choice has been made. The first test is concerned with the technical correctness of the decision and thus with inputs into the decision-making process. Where appropriate, a tentative plan can be placed into operation on a temporary basis to determine the extent to which anticipated conditions result as planned. A second type of test is related to the format and style of the plan as prepared for submission. The test here is the clearness, simplicity, completeness, specificity and accuracy of the materials presented.

Preparation and Submission of Plan. There are a variety of ways in which a plan might be drawn up. Among the items to be covered in the preparation of a significant, comprehensive and complex plan are:

1. Title of the plan
2. Name of persons who authorized the preparation of the plan

3. Name of persons who approved the finished plan
4. Name of persons who prepared the plan
5. Purpose or objective of the plan
6. Outline of problem
7. Recommendations—course of action to be taken
8. Expected results
9. Resource requirements
10. Supporting evidence—justifications for recommendations
11. Date plan was submitted and approved, and is to be implemented and completion dates for each component of the plan**

Perhaps more important than the format or kind of items to be included in a plan is the attitude taken by the planner when he submits his program for approval. In spite of his intense interest in a given program the planner is well advised to present his recommendations in such a way that the approving agent is sold or not sold on the basis of the evidence provided. Ideally, the approving agent makes his decision independent of the planner.

Thursday

PURPOSE

There are two excellent reasons for the introduction of the subject of implementation of plans at a planning institute. Few plans are ever developed without the expectation that they will be placed into operation at a future time. In addition, considerable planning may be required to develop a strategy for the introduction of significant change into an ongoing organization. As a plan is implemented, it is useful to keep in touch with developments to maximize the likelihood of success.

SUMMARY OF CONTENTS

The impact of complex, significant and comprehensive plans upon the individuals responsible for bringing about the change and living with the new conditions may be great. They may be asked to work in a new facility far removed from the previous site, to accommodate to a new group of subordinates, peers or superiors, learn a new technique for satisfying the needs of the community or accept a change in status or compensation.

The introduction of change can be done more easily and effectively when the implementor is sensitive to likely responses from individuals

affected by the plan. Among the questions an individual may reflect upon when faced with the need to change are the following:

1. Do I understand the desired changes?
2. Am I able to adjust to the changes?
3. Will my position be improved as a result of the proposed change?
   a. Higher salary
   b. Promotion in rank
   c. Improved working conditions
   d. More prestigious job title
   e. Increased status
4. Is the change necessary ?
5. Is the change legitimate?
6. Is the change appropriately timed?
   a. Time of introduction
   b. Implementation period
7. Is the change good for the organization?
8. Is the organization (management) doing all it can to facilitate change?
9. Am I willing to adjust to the change?

Under most conditions an implementor will discover that members within an organization will differ in the way in which they respond to the same change situation. Thus it may be desirable to use several strategies when faced with the opportunity for bringing about change.

Control As Integral Part of Implementation. Experienced administrators have discovered that an approved plan is not automatically implemented. Quite the contrary! Usually an approved plan will remain on-top-of the desk or in a file until the implementor takes positive action to get the show on-the-road. Once the journey begins, an alert administrator will find it useful to keep in touch with its progress through the final stage of completion.

One useful way to view the control function is to divide the overall responsibility into four parts:

1. Taking action to introduce the change
2. Measuring progress against stated time objectives
3. Evaluating results against expectations
4. Examining the environment to determine up-to-dateness of present plan

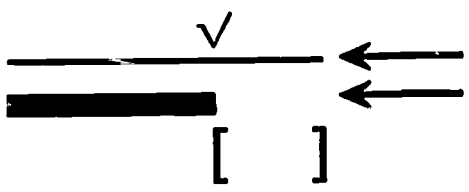
When an administrator receives an approved plan or authorizes his own plan, it is important that a starting date be established and that the required action be taken to get the ball rolling. If approval has been given

for a new set of reference books, the librarian may begin implementation action by making contact with the appropriate publisher.

After the initial implementation action has begun, it is desirable to make periodic (planned) checks on the progress of the implementation effort. For an effective control device, the following requirements should be met:

1. Standards of effectiveness
2. Measurement of results
3. Interpretation of significance of variance
4. Corrected plan of action, when appropriate

This control phase can be diagrammed as follows:



Of course, the critical parts of this control phase (assuming standards are properly set) is the interpretation of the significance of variance, the cause of the variance and the action planned to correct the problem.

Administrators are often surprised to find that after a plan has been fully implemented they still have a control function. Individuals within an organization may have changed their behavior (new knowledge, new interpersonal relationships, for example) exactly as desired in the plan. Upon checking the results of the work arrangement, an administrator may find that the desired results (improved performance, reduction in costs) have not been realized. In other words, the desired change has been brought about but the expected results did not follow.

The final control function covers the total environment in which an organization lives. Even when a plan is fully implemented and anticipated results fully realized, the control responsibility remains. Plans are prepared because conditions within an environment indicated the need for a change. After a plan has been fully implemented, it is necessary to keep in touch with significant factors within the environment so that new plans can be formulated as conditions change.

The four control stages in the implementation process can be viewed as follows:

1. Initiating implementation action
2. Measuring progress of implementation action
3. Checking results of implementation against expectations
4. Checking the on-going environment

Friday

PURPOSE

Plans are prepared in anticipation of future events and conditions. At different stages of the implementation process an administrator may discover the need to modify a plan. Not infrequently, the inadequacy of a plan or ineffectiveness of the implementation effort is not determined until the completion of the task. Every on-going organization has the need to plan to meet changing conditions. It is appropriate, therefore, for the alert manager to review his planning and implementation processes.

SUMMARY OF CONTENTS

The preparation of plans and their implementation by their very nature involve the actions of many individuals. The rapidity and magnitude of change within the United States and the world place a heavy burden upon the individuals who assume the responsibility for keeping an organization alert to changing opportunities. How does an administrator know that he is running a successful operation?

There are at least three ways to audit an on-going organization:

1. Does the organization meet its stated objectives and goals?
2. Are the members of the organization able to handle present and future challenges?
3. Are the administrative processes performed effectively and efficiently?

The more traditional method for reviewing organizational success is the measurement of performance against stated goals and objectives. There is much to be said for holding an administrator accountable for satisfying the short- and long-range goals which have been agreed upon.

Partly as a result of increased research conducted by industrial sociologists and social psychologists, a second set of measures has been introduced. It has been determined that in some cases an organization has been in danger of exploiting its human resources while it strives to meet short-range goals. When the human needs of an organization are not satisfied there is the likelihood that short-range accomplishments may not be extended into the future. In measuring the success of an organization, it may be desirable to include a check of the morale of participants.

Because the success or failure of an organization in meeting its objectives is determined by the performance of its personnel, it would seem appropriate to audit the administrative process in use. A comprehensive guide for auditing the planning and implementation processes is available.* A sample of how the administrative audit might be used follows:

* See pages 45-50; 127-132 in *General Administration: Planning and Implementation.*

The first step in the planning process is becoming aware of a possible need for formulating a plan. Among the key questions to be asked are:

1. What are the natural sources of planning ideas for each activity?
2. Who should receive the various ideas?
3. How should the ideas be evaluated?

An audit of the answers to these selected questions might include the following:

1. Are all significant sources of ideas considered?
2. Do the right individuals keep in touch with appropriate sources of ideas?
3. Are ideas properly evaluated to determine whether or not a plan should be formulated?
4. Does the organization tend to anticipate its opportunities and difficulties or are most plans formulated after the fact?

It is quite apparent that the development and use of a comprehensive, well integrated administrative audit system require talent, time and dedication.

Where Does One Go From Here? The Challenge Ahead!

An alert administrator should find it useful to undertake the following exercise:

1. Develop a personal philosophy of administration
2. Divide his organization on the basis of significant activities
3. Determine the planning-implementation model presently in use
4. Audit the present administrative model
5. As a result of the audit, make appropriate adjustments
6. Develop a format for long-range and yearly plans
7. Develop a long-range plan and each year an operating plan
8. Direct the implementation of yearly plans
9. Audit the administrative process each year

III INSTITUTE PAPERS

Forecasting and Planning

DONALD N. JOHNSON

Some Thoughts About the Past and Future of Oregon Areas

Probably the least expensive, most reliable and valuable sources of information about the United States and its states, counties, and urban areas are the many reports published by the U. S. Bureau of the Census under the headings of Census of Population, Census of Housing, Census of Business, Census of Manufacturing, Census of Agriculture, and Census of Governments. A quick look at these publications gives a good impression of the past and present social and economic characteristics of Oregon.

Oregon has a population of about 1,900,000. The Oregon population has amounted to one percent of the national population in 1950, in 1960, and in 1964. Of the 50 states, Oregon ranked 28th in terms of the amount of population increase from 1950 to 1960.

Oregon ranks 10th in total land area of the nation's states, but it is not very densely settled. It ranks 39th in population per square mile. Only North and South Dakota, the eight mountain states, and Alaska are less densely settled.

The average age of Oregonians is almost 31. This is slightly higher than the national average of 29.5.

Over ten percent of the population is 65 years and older. This is higher than the national average of 9.2 percent.

Over one-half of all Oregon residents were born in another state. This high rate is exceeded by only six other states.

About 94 percent of Oregon children 14-17 years old attend school. This is the highest rate of all states.

The median years of school completed by persons 25 and over is 11.8, that is, slightly less than high school. The relatively high level of educational attainment is exceeded by only seven other states.

The percent of employment in manufacturing is lower than the average state; the percent in white collar occupations is slightly higher.

Average family income is somewhat higher than the national average, though below Washington and California.

About 62 percent of the population live in urban areas and this

percentage has been growing at a fast rate. However, 26 states have a proportionately higher urban population than Oregon, and 23 have a lower proportion.

The percent of all employed persons who work in durable goods manufacturing, wholesale trade, and professional services is higher than the national average. At the same time nondurable goods manufacturing is considerably lower than the national average.

Oregon's population is not very well distributed. Over two-thirds of the people live within the nine Willamette Valley counties and this proportion is growing all the time. By adding five other counties, (Jackson, Douglas, Coos, Klamath, and Umatilla) 83 percent of the state's population is accounted for, but only one-third of the land area. Four out of every 10 Oregonians live in the metropolitan Portland area alone—Clackamas, Washington, and Multnomah counties.

Over 70 percent of Oregon's wholesale sales are made in Multnomah County alone, and 70 to 80 percent are made in the nine Willamette Valley counties.

The nine Willamette Valley counties account for over three-fourths of the receipts made at service outlets and for two-thirds of the retail sales.

This brief review of a few items from the censuses tells a little about what Oregon is like now. What about the future? Is it going to change? And why do we want to know?

In answer to these questions I'm going to try to explain first why and how some forecasters make forecasts; second, briefly relate some of the trends, developments, and forecasts as they appear to affect Oregon's future; third, I'm going to show a few slides that I hope will summarize these points; and finally, mention some future developments, problems, and items that may be of special interest to librarians.

Why and How Forecasting is Used

The enormous increases in urban population, car ownership and use, and in personal income levels have created national transportation problems of great magnitude. It has developed into one of the nation's most complex forecasting and planning problems. The problem is essentially one of providing mass transportation, enough street capacity, and storage space for cars in order to permit people to drive and then park where and when they want to. But to do this is to open Pandora's Box.

How do you make people ride the bus?

Where do you put the roads and the parking so that the neighborhoods and public parks are not divided by crisscrossing canyons of highways?

How do you assure the safety of school children and pedestrians who must compete with the traffic?

How do you salvage the appearance of the city?

How do you keep the central city intact?

And if you have answers to these questions: Are you able and willing to pay for your solution?

Because of the wide scope of these problems many organizations and professions are being heard: city planners, engineers, state legislatures, architects, garden clubs, American Automobile Association, save the neighborhood clubs, automobile and petroleum industries, Congress—with money in hand, and the President.

In 1963 the Bureau of Public Roads decreed that all metropolitan areas in the United States must have a coordinated, cooperative, comprehensive continuing transportation plan before that agency would provide any further funds for federal aid road facilities. The agency further decreed that in addition to the usual engineering and travel pattern factors, such planning must include analysis of social and economic factors that affect urban development.

Since all state highway departments and most urban areas have a big stake in this source of revenue, transportation planning and forecasting studies have blossomed out throughout the nation. Forecasting methods are an important part of these studies. In Oregon alone, these studies are underway in the Portland, Eugene-Springfield, Salem, Medford-Ashland areas, and will shortly be underway in Corvallis and Roseburg. If you will consider for a moment the trips that you take by car, you will agree that the traffic pattern of your town is quite complex regardless of its size. In Eugene, for example, an average house generates something like five to seven trips per day, and in some of the higher income, suburban areas the trips average from 12 to 15 trips per house per day. The location and density of houses, the income levels, the location of schools and libraries, and employment centers, and the social and economic characteristics of the residents each has an important effect and must be considered in forecasting future road needs. Therefore, to properly analyze future needs for roads the studies of urban transportation are starting off with long-range forecasts of:

the economic base of the area,

the land use and income of the community,

the population and housing units of the area,

the location of commercial and other activities,

the financial status of the area and the future ability of the citizens to pay for public facilities.

Other Organizations

Many other organizations and professions go through similar forecasting procedures in working out their needs for facilities and investments.

The planning and forecasting pattern that I've mentioned for transportation is followed with variations by the electric power and telephone industries in determining how big and where to invest their capital in power stations, substations, etc.; by market analysts who forecast the future need for and potential use of shopping centers; by real estate associations; by church organizations; and by many others.

Basic Factors Affecting Forecasting for Local Areas

Abraham Lincoln has been credited with this sentence: "If we could first know where we are, and where we are tending, we could better judge what to do, and how to do it."

For Lincoln, and the rest of us, the process of looking ahead has been a necessity. But I think that most forecasters—whether they are telling fortunes, predicting weather, or forecasting future library space needs—will agree that forecasting is a hazardous business.

Local Influences

There are a large number of factors that affect community growth. If we were going to work out a forecast of population for New York City, Grants Pass or some other community, here are some of the things we would want to know about it.

At the outset we would ignore city boundaries since they change from time to time and since their influence on where people live is either nonexistent or growing weaker all the time. This, incidentally, is quite a change from 50 years ago when urban population was tied to the street car tracks and central power stations.

We would first want to know quite a lot about the economy of the area, especially its employment prospects since—with some rare exceptions—changes in population levels within an area are closely allied with changes in employment levels. The number of nonworkers compared with the number of workers is reasonably constant throughout the United States.

In studying future employment levels the forecaster in one way or another becomes involved with the theory that the economic activities that make cities grow are normally those that make goods or supply services for use by persons from outside the area. These export industries provide a basis for the development of the local service industries that in turn make goods or supply services for local use. In other words, this theory says that there are two kinds of employes: BASIC EMPLOYES who serve outsiders, and LOCAL SERVICE EMPLOYES who serve the local

population. The number of the first kind determine the number of the second kind and, of course, the total population. A quite constant relationship exists for these local service employes and the population that they serve. For every 1,000 persons living in your area there are, for example, about 55 retail trade employes, about 25 construction workers, about 10 in finance, insurance, and real estate, and etc., including about one-half of one librarian.

This kind of forecasting, though far from perfect, provides a useful multiplier kind of approach for looking into the future of an area providing, of course, that national and regional economic cycles and shifts, and, more importantly, governmental policies will hold still.

A principal problem for the forecaster, especially in the smaller urban areas, is the potential location of unknown, footloose industries which are concerned with research and development and do not necessarily have much to do with the location of the community. These organizations tend to nestle against universities that have attractive campuses and high scientific skills in their graduate colleges. On the West Coast, California has had the main impact of the research and development program, but the location of such organizations in Portland, Corvallis, or Eugene is a possibility that makes Chambers of Commerce hopeful and forecasters uneasy.

There are, of course, other factors that affect population levels of a community such as the unemployment rate and the proportion of the population that works and the age and sex composition of the population. But once again, the underlying, basic factor affecting population levels of a community is the economy and related employment levels.

Development of Oregon

As we found out from the Census information, a great part of Oregon's population and economic activity is concentrated in a relatively small area, especially in the Willamette Valley counties.

The reason for this disparity between economic activity and population on one hand and land area on the other is, of course, related to the topagraphy, the natural resources, and the climate. The forested area—Oregon's main economic base—is concentrated in the Coast and Cascade ranges where the soil and precipitation permit fast forest growth. Unlike many of the midwestern states which have a more even distribution of high grade farm lands and population, farming in Oregon is concentrated in a relatively small space.

And further, population tends to beget population—in more ways than one. That is, an expanding area such as the Willamette Valley finds that it can supply more of its own goods and services than it could when it was smaller. A larger metropolitan market can, for example, support its own symphony orchestra, a glass container plant, a cookie factory, etc. rather than have these goods or services imported. All of this points to

the likely occurrence (and one that is frequently forecasted) of another megalopolis of a junior-sized Boston to Washington, D.C. variety, teeming with cars and people, stretching within the next 50 years or so from Portland to Eugene, and in fact, from Seattle to Eugene.

However, I have no intention of overestimating the importance of the Willamette Valley to the state's future potential. Umatilla, Klamath, Coos, Douglas, Deschutes, and Jackson counties all have important concentrations of population and forecasts indicate further increases. Jackson County especially has been growing during recent years.

However, it is difficult to look into the distant future with final certainty about the area outside of the Willamette Valley. Without question, the rural population has been decreasing for many years in Oregon and throughout the nation, as the result of increased mechanization of farms, the consolidation of farms into larger holdings, the accompanying decline of the small family farm, and the availability of higher paying jobs in urban areas. From 1950 to 1960 Oregon's rural population decreased by over 33,000 persons while its urban population increased by 281,000. Based on past and current trends, then, Oregon's rural population will continue to decrease during future years.

But even this isn't necessarily so. For instance, a plan has been suggested—though not accepted as far as I know—to move massive numbers of low income, potentially delinquent adolescents from overcrowded urban areas to farms throughout the nation in order to give them a chance to grow up in a more constructive environment. While a government program of this type wouldn't necessarily reverse the exodus from the farm to the city, the potential diversion of Pacific Northwest water to California dry areas might greatly affect this picture since a substantial benefit to Oregon might occur by siphoning off a part of the water to irrigate a vast acreage of eastern Oregon dry land at, presumably, California's expense. In anticipation of this potential diversion of water, in fact, the Oregon Water Resources Board is now sponsoring a soil classification study of the dry eastern and southeastern lands.

Now to summarize briefly, economic and population forecasting is an interesting and hazardous business undertaken by nearly any person, agency, or business which is trying to plan and look ahead. The future of any area in one way or another is inevitably related to the economic attributes that the area has, and except for some unknowns, the Pacific Northwest attributes and qualities should be reasonably apparent since we have had a good number of years to look them over since Lewis and Clark visited the area. Lewis and Clark, incidentally, were not very accurate population forecastors. They reported to President Jefferson that the miserable climate of the Oregon country made it suitable only for Indians and wild animals. Even though we know a lot about the different local areas, economic and social forecasting remains both an art and a science since changing technology, national birth rates, and economic cycles are either hard to predict, or beyond the scope of the

forecaster. For this reason a continual updating and reevaluation process is usually built into forecasting systems.

Items That May Be of Interest to Librarians

I am going to conclude by mentioning some items that I think should be of interest to you both from my point of view—city and regional planning research—and from the point of view that the library is charged with, among other things, of making man's written word available to man.

1. Population. There are about three billion people on earth today; within a mere 35 years there may be twice that—six billion. By the end of this year the United States' population will stand at about 195 million, and within 35 years may exceed 400 million. Some very interesting things are happening to the U. S. population. In 1962 the life expectancy for the entire population was 70 years, 67 for males, 73 for females. According to the U. S. Bureau of Census estimates, by year 2000—assuming rapidly declining mortality rates, life expectancy would rise to 76 years; 74 for males, 79 for females. There will be something like 200 million more people in the U. S. in 2000 than today. During the first 20 years of this period all age groups are expected to grow, but the biggest increases will be in the youngest and in the 75 and over classifications. The only group not increasing rapidly would be the 45 to 64 age groups. The 18 to 24 year group will increase something like 70 per cent.

2. Urban Development. Not only are we experiencing a tremendous surge in population, but the migration to cities is the greatest in history. What is this going to do to our urban areas? Lewis Munford has said, "The building of cities remains man's greatest work of art ranking with language itself." The state of this art as it stands today needs great improvement. Increased urbanization is sure to have an impact on all of us. If we throw in the automobile with the man, U. S. urban areas would already be among the most densely settled on earth. There is a great need for more people to become aware of the problems and to contribute to their solution if we are to hold on to the level of living that we have now, much less improve it.

3. Education. People in the U. S. and perhaps especially in Oregon, are becoming better and better educated as time goes on. In the U. S. as a whole, as recently as 1950, only one-third of the population 25 years and older had graduated from high school. In 1960, over 40 percent had graduated from high school, and the U. S. Census Bureau forecasts that by 1985 about 63 percent will have graduated from high school. College graduates will increase a teven a faster rate, from about 8 percent of the adult population in 1960 to over 14 percent by 1985. Put in other terms, the average years of schooling by the population 25 years old and over in 1960 was slightly more than a high school sophomore. It is expected

to increase to high school plus a half year of college by 1985. This, of course, will occur as persons who are now in the older age groups and whose educational level is relatively low, leave the population through death and are replaced by persons with greater amounts of education.

4. Employment. The large increase in population—especially the younger population—is going to severely test the nation's economic and educational systems. (Despite improving educational attainment levels.) During the 1960s, alone, two and one-half million new young workers entering the labor force will not have had a high school education. At the same time the kinds of jobs where high school diplomas are not needed are in fact rapidly decreasing in number. According to the Department of Labor, this points to the need to encourage boys and girls to get all the education and training possible, to develop courses of training designed to meet their needs and to provide guidance and counseling early in their school years.

Finally leisure time and personal income levels are both increasing at a fast rate for the mass of the population. And all of these factors continued: population growth—especially of the young and the old, educational advances, growing needs to better train the young population, rapid urbanization, increasing income levels, and added hours of leisure time should have an impact on the work and interests of librarians, urban and rural, and planners alike.

Discussion

QUESTION: Have the recent technical innovations, some of which we have heard about at this institute benefited the forecaster? Have these advances made his job easier?

ANSWER: Yes, the computer has made a major impact on planning. The vast amount of information, which has to be collected before forecasts are made, cannot be handled except by a computer. Studies of the flow of goods in-and-out of a region are now being made by utilizing the tapes. They would not have been possible 15 years ago.

QUESTION: With what percent of assurance can you make forecasts?

ANSWER: The smaller the area covered and the shorter the time span the more confidence you can have in a forecast. Generally speaking planning people make a continuing effort to update their forecasts.

QUESTION: Is there an exchange of information between the planner and the school authorities in the area of urban planning?

ANSWER: Yes, we at the Bureau of Municipal Research call upon school authorities for information and we receive good cooperation. The Bureau does a forecast of school enrollments.

QUESTION: In the large area studies and the transportation studies you've discussed, is the library given any consideration in the plans you might formulate?

ANSWER: We don't plan for a library since the library is already in existence, but in the detailed planning of an urban plan, space will be alloted for library building. This would be considered in the space needs of the county services.

QUESTION: There has been a good deal of talk about the property taken off the tax rolls in order to construct new freeways. Has any study been made of the effect of this loss of tax base on tax supported institutions?

ANSWER: It is not true that there is a loss of tax base. People and business relocate on vacant land. Sometimes there is shifting from one tax area to another and a small tax jurisdiction might be harder hit than a larger one but there is no overall loss.

QUESTION: You spoke of the growth expected in the Willamette Valley. What will happen in the fringe areas? Will their population expand or contract?

ANSWER: Some fringe areas, Coos Bay for example, may grow relatively faster than the valley area, but the total increase will not amount to as much. The valley's tempo seems to be self sustaining.

QUESTION: What are the qualifications of a forecaster?

ANSWER: Everyone is a forecaster but the people on the staff here at the Bureau have advanced degrees in economics and sociology. Forecasting is still something of an art. A good forecaster, in addition to his educational background, has an elusive quality that for want of a better word let's call good judgment. This quality only comes from experience.

Operations Research: A Team Presentation

Operations Research and its Significance to Management

ROBERT C. MEIER

The term "operational research" was first used by A. P. Rowe to describe the work of a section of the Air Ministry Research Station at Bawdsey, England during the years 1937-39. As Superintendent of the Station, Rowe became interested in the utilization of civilian scientists to assist the military in problems of radio-location, and he used the term to describe the work of these scientists. Among the early problems studied were the integration of radar with the ground observer corps and the performance of warning stations.

In August, 1940, Professor P. M. S. Blackett of the University of Manchester was asked to study the coordination of radar and other new military equipment. To carry out these studies, a group was formed called the Anti-Aircraft Command Research Group. In less than a year, the interest in the early successes of these research efforts led to the establishment of other operations research groups. The Operational Research Group of the Air Defense Research and Development Command was formed in May, 1941, from some of Blackett's men; this group later became known as the Army Operational Research Group. In the same year, 1941, Blackett became Director of Naval Operational Research at the Admiralty. Among the more important and well-known studies conducted at the Admiralty during the course of the war were the investigations of the proper size and tactics for convoys and the setting of depth charges used against submarines. Professor Blackett was, however, one of the first authors in the field of operations research, having written two papers "Scientists at the Operational Level" (1941) and "A Note on Certain Aspects of the Methodology of Operational Research" (1943).

These two papers contain one of the earliest published discussions of what operations research is and the philosophy behind operations research. In the first paper Blackett states that there are many war operations which involve considerations with which scientists are specially trained to deal and which the regular officers are not trained to handle and do not have time to analyze in detail.

> Operational staff provide the scientists with the operational outlook and data. The scientists apply scientific methods of analysis to the data, and are thus able to give useful advice. . . . The main field of activity is clearly the analysis of operations.

In the second paper Blackett classifies operations research studies into studies of weapons, studies of tactics, and studies of strategy, and discusses the general method of attacking such problems.

The pioneering work in the groups led by Blackett and Rowe led to operations research studies in all three armed forces in England during the war in such varied areas as the effectiveness of artillery, organization for the detection of V-2 firings, wounds, evacuation, nutrition, bombing patterns, fatigue, and diseases in desert fighting. The extent of use of operations research in the military establishment is evidenced by the fact that by the end of the war over 350 persons had worked in the Army Operational Research Groups with a maximum of 175 at any one time; 380 reports had been issued, and sections had worked with almost every branch of the British Army in all major theaters of war.

While operations research originated in the British armed forces, the value of this activity was soon realized in other countries. The United States armed forces began forming operations research groups in 1942, and Canada and Australia also organized groups during the war although they did not compare in size with the United States or British groups.

The United States first became officially interested in operations research through a visit that Dr. James B. Conant, who was then Chairman of the National Defense Research Committee, made to England in 1940. However, aside from some minor activity, the first important use of operations research by this country came in 1942 when both the Navy and Air Force established operatoins research. In August 1942 an official report on operations research in England was submitted to the Joint Chiefs of Staff after several months of observation of the work in England with the immediate result that in October of that year General Arnold suggested that all Air Force commands consider the inclusion of operations analysis groups in their staff. In the same month, the Eighth Air Force in England established such a section, one of the first assignments for this group being the study of bombing patterns. The study continued for several years during the course of which time substantial improvement was made in bombing effectiveness. On December 31, 1942 an Operations Analysis Division began operating in the Office of Management Controls of the Air Force, and by V-J Day 26 groups composed of about ten scientists each were attached to various units.

In the United States Navy, the earliest group was formed in May 1942 under Dr. Philip M. Morse, a physicist from Massachusetts Institute of Technology, and consisted of seven scientists assigned to study antisubmarine operations for the Navy. The group was not officially called an operations research group until July 1943 when the group became the Antisubmarine Operations Research Group on the Tenth Fleet Staff. The Morse group was transferred again to the Readiness Division of CominCh Headquarters in 1944 and was renamed the Operations Research Group. By the end of the war 73 scientists were working with the group, most of them attached to the headquarters at Washington with one-third or one-

fourth on rotating assignments to strategic planning officers or operations officers in the field. For his work as head of Navy operations research during the war, Morse was awarded the Medal of Merit. Morse also collaborated with George E. Kimball, a chemist by training, who was deputy director of the Navy group from 1944-46, in writing *Methods of Operations Research,* the first book length treatment of operations research to be published in the United States.

Although General Marshall recommended the establishment of operations research groups in the Army, the resulting activity was much less than that in the other armed forces. By the end of the war, only a few teams had been established by the Army Ground Forces.

Since the Second World War, operations research has continued to occupy an important position in the military establishment. In the United States in particular there are many more persons engaged in military operations research now than during the Second World War, and all three services have increased their operations research activities both by adding such groups within the existing military organization and also by contracting with outside organizations.

Operations research groups in civilian organizations were established in Great Britain earlier than in any of the other countries that had used military operations research groups during the Second World War. One of the earliest groups was the Operational Research Department of the British Iron and Steel Research Association which was organized in 1945. Other early groups in Great Britain were in the Steel Company of Wales, which set up a small department in 1946, and the Operational Research Field Investigating Group of the National Coal Board which was set up in 1948, the year after the nationalization of the coal industry. The latter group was initially headed by a mathematical statistician from an Army Operational Research Group in Burma and is distinguished by its large size for an industrial group. In 1955 the group employed 37 persons, 25 of them scientists with backgrounds mainly in mathematics, engineering, and physics. The Cotton Research Association and the Boot, Shoe and Allied Trades Research Association were two other industry groups which had become interested in operations research by 1949.

A limited survey conducted in Great Britain in 1952 revealed 37 industrial operations research sections in existence. Of these, eleven were in public utilities, seven in cooperative research agencies, and the remainder in industrial firms. They ranged in size from one to fifty persons with most groups composed of from five to ten scientists.

Interest in operations research did not develop as quickly outside the military in the United States as it had in Great Britain, and it was 1951 before any substantial activity began. In April of 1951 the National Research Council published a report titled *Operations Research with Special Reference to Nonmilitary Applications.* This report was the result of the investigations of the Committee on Operations Research of the National Research Council established in 1949 and headed by Horace C. Levinson,

a retired executive of Bamberger and Company, a mail-order house. In November of the same year, Case Institute of Technology sponsored its first Seminar on operations research during which the possible applications of operations research to nonmilitary problems were explored. This was also the year in which Morse and Kimball's book, *Methods of Operations Research*, was published in this country. At this time, however, there was relatively little actual nonmilitary operations research activity. The consulting firm of Arthur D. Little had started an Operations Research Division composed of six professionals advised by Philip M. Morse and George D. Kimball, and the group had worked with Sears, Roebuck & Company, Republic Steel Corporation, and the Simplex Wire and Cable Company on operations research projects. The Case Institute group in the Department of Engineering Administration was beginning its industrial consulting activities at this time, one of the first projects being with the Chesapeake & Ohio Railway Company. General Electric Company, U.S. Rubber Company, E. I. duPont de Nemours & Company, Monsanto Chemical Company, and Johnson & Johnson also had become interested in operations research by 1951. The total amount expended by industry in 1951 on operations research has been estimated at not more than $1 million, and the number of persons engaged in nonmilitary operations research at about 50.

Following the first publicity about operations research and its accomplishments in industry, the amount of activity increased very rapdily in the early 1950s. Some companies such as Westinghouse Air Brake Company and the Barber-Colman Company began their activities fairly independently, while other groups were formed after consulting projects by such organizations as Case Institute and Arthur D. Little. Among the companies which formed operations research departments after completing a project with one of these organizations are: Proctor & Gamble Company, General Mills, Incorporated, Cummins Engine Company, and Eli Lilly & Company.

The growing interest in operations research led to a meeting in January 1952 of a committee of persons interested in the formation of a professional society. The Committee on Operations Research of the National Research Council was also interested in the formation of a society and encouraged the early discussions, although it was not in a position to assume sponsorship. One result was that on May 27, 1952 a founding meeting was held at Arden House, at which time the Operations Research Society of America came into existence. The society began publication of the *Journal of the Operations Research Society of America* in November 1952 and the journal is now called simply *Operations Research.* A similar organization—The Institute of Management Sciences, was formed in December 1953 and has published the quarterly journal *Management Science* since October 1954.

In the approximately fifteen years that civilian operations research has

been developing in the United States, several distinct types of activity have emerged. They may be roughly categorized in the following way:

1. Operations research groups within an organization working on internal problems.
2. Individuals within an organization doing work which can be characterized as operations research, although there is no department specifically doing operations research.
3. Operations research groups within the organization of industrial firms but working primarily on military problems, usually the analysis of weapons systems. This particular form of activity is found principally in the aircraft and missile industries.
4. Consulting organizations conducting operations research studies on a contract basis.

One of the distinguishing features of the operations research movement as it has developed is the emphasis on quantitative techniques. In some cases the techniques have been developed by operations researchers, but more frequently the techniques that have been used have been adoptions and extensions of techniques already in existence. Let us consider a few of those which are commonly associated with operations research.

The differential and integral calculus was developed around 1700 by Isaac Newton and Gottfried Leibniz. Initially, the calculus was found to be useful in explaining and analyzing problems in physics and astronomy, but later the calculus was also found to have wide applicability in economics and business. Marginal cost and revenue analysis and concepts of profit maximization of the firm, for instance, are readily explained and conceptualized with differential calculus, and this was recognized long before the term "operations research" was coined. In the early 1900s it was found that economic lot size problems in the area of inventory control were amenable to solution through calculus maximization and minimization techniques. While operations researchers, then, did not initially develop either the calculus or its application to managerial and economic problems, they have greatly extended the range of application and brought widespread acceptance of the use of the calculus in solving maximization and minimization problems.

Another technique for optimization closely associated with the field of operations research is that of linear programming. Unlike the calculus, linear programming is of relatively recent origin and operations researchers have contributed much to the development of the mathematics itself. Even in the case of linear programming, however, the origins of the technique are found in work which was done before the Second World War. Two areas investigated by economists in the 1930s, although not recognized as such at the time, were closely related to linear programming. These were input-output analysis, or the study of the interdependence of the different industries in an economy, and the diet problem.

The "diet problem," first proposed by Cornfeld in 1941 and later partially solved by Stigler in 1945, is quite illustrative of the sort of philosophy and structure underlying the attempt to apply quantitative methods to management problems. Without going into detail, the problem is that of picking certain foods for a diet from a list of foods which will minimize the cost of the diet while at the same time meeting minimum standards for various vitamins, minerals, and so forth. The choice of a diet is not simple because foods, while they have a single, fixed price, yield a variety of nutritive substances so that a purchase of a food is, in reality, a purchase of a variety of elements. The consequence is that the selection of a minimum cost diet is not a simple and straightforward problem but a complex one involving the restrictions on minimum intake of various elements, cost of the available food, and proportions of vitamins, minerals, and so forth in the foods. When the "diet problem" was finally solved by Stigler, it is said that the minimum cost per year for an average adult was $39.64, in 1939 prices, but unfortunately the diet was a bit too heavy on soy beans for practical purposes.

Linear programming in its present form is an outgrowth of Project SCOOP undertaken by George Dantzig for the Air Force in 1947. This project resulted in the development of certain mathematical procedures, really quite simple ones although the theory behind them is involved, for solving linear programming problems. The results of this research became generally available in the early 1950s and extensive use has since been made of the technique in determining, for instance, the proper ingredients for feed mixes, optimum product mixes, and allocation of raw materials to products. One of the industries known to be very active in the use of linear programming is the oil refining industry which has been a leader in utilizing very large scale linear programming models in determining the optimum utilization of available crude oils within the constraints of production capacity and market limitations.

Further work in the past ten years has resulted in a variety of associated techniques—quadratic programming, stochastic programming, network flow theory. These have found application in such diverse problem areas as the determination of optimum characteristics of military transport aircraft to provide certain air lift capabilities and the analysis of construction project schedules to determine minimum cost schedules for meeting completion deadlines.

In conjunction with linear programming it is appropriate to mention game theory—another technique widely associated with operations research. The history of this technique is rather interesting in that the first paper by John Von Neumann outlining the basic concepts of game theory was published in 1928, long before linear programming was developed. In 1944 Von Neumann and Morgenstern's landmark book, *The Theory of Games and Economic Behavior*, was published; but it was not until 1951 that the mathematical relationship between game theory and linear programming was generally recognized. Game theory, which

deals with the theory of how rational opponents will act in conflict with one another, is, mathematically a difficult and complex field. Practical applications in the analysis of nonmilitary problems have been relatively few. The possible application to problems of military and national strategy, however, would seem to be quite obvious, and supposedly considerable use is made of game theoretic concepts in military planning. At this time, too little is known publicly to comment further on its usefulness in these areas.

Although many more techniques could be mentioned, let us consider just one more which is well-known—queuing theory or waiting line theory. Queuing problems have been recognized as such since the early 1900s. One of the earliest works in the field was published by Erlang in 1909. The original applications were in the design of telephone exchanges where it was necessary to analyze the waiting lines which would develop when various amounts of equipment were provided. Significant extensions to the theory and application were made during the 1920s, but the great expansion of application has come in recent years. The theory of queues or waiting lines has been found useful in the analysis of product moving through a manufacturing process, the characteristics of waiting lines at service facilities such as check out stands and toll booths, and the flow of customer orders in an order processing system.

The mathematical techniques of operations research which have been discussed comprise only a portion of those which are available. But they give some idea of the wide variety of mathematical approaches which are possible and the wide range of applications. Also, the examples which have been given illustrate the underlying operations research philosophy of quantification of phenomena and attainment of some goal based on the quantitative model. The contribution of the operations research "movement"—if one can call it that—has been to demonstrate the possibilities for scientific analysis and optimization of managerial problems which at one time did not appear to be amenable to quantification.

We have not, of course, reached a point where mathematical and statistical techniques and models are ready to take over all areas of traditional management planning and decision-making. But quantitative approaches have become the accepted mode in many areas of planning and decision-making in business and governmental organizations, both military and nonmilitary. Progress in the use of quantitative methods, however, has not been even, either in terms of the types of organizations which are utilizing them or the functional areas in which they are being utilized.

In the business field probably the widest acceptance for quantitative methods has been in manufacturing organizations in such areas as inventory control and production planning and scheduling. Progress has been relatively rapid in these areas because the problems are important, data is available, suitable analytical techniques can be found, and there

is a fairly long history of attempts to analyze the problems even before the present powerful techniques become available.

In government the most important use of quantitative methods is, of course, in the analysis of military problems in the Department of Defense. Because of the expense and difficulty—in many cases impossibility—of experimenting with a variety of weapons systems, increasing reliance has been placed on mathematical and statistical analysis of system characteristics rather than experimentation with actual systems. We find that decisions of the utmost importance for our collective and personal safety are being made, and have to be made, on the basis of information obtained from such analyses. Another aspect of Department of Defense operations into which the concept of quantitative analysis has been injected is that of budgeting and programming. Under the guidance of Hitch and McNamara, budgeting has been reoriented so that a quantitative evaluation of the costs of specific activities can be made, and these are then compared with the effectiveness of the programs in attaining various defense goals. Cost-effectiveness studies, as they are called, have become a standard tool of analysis in the Department of Defense, and the successfulness of this approach has been such that the administration has chosen to apply the technique outside the Department of Defense in the evaluation of proposals for the development of the supersonic transport.

It would be possible to continue at some length citing illustrations of the degree to which the concept of quantitative analysis has begun to infiltrate management planning and decision procedures in many different types of organizations both private and public. However, let us turn instead to another development which is of great significance—the electronic digital computer. It is generally accepted that Charles Babbage who invented the difference engine for tabulating mathematical functions and the analytical engine for performing further computational work had incorporated in his designs many of the basic concepts which are used in modern computers. However, the designs were based on the use of mechanical, rather than electrical devices, and attempts to build them in the 1830s were unsuccessful. Babbage's work was largely forgotten, but the principles were rediscovered during the early days of the development of modern computers. This work started in 1937 and resulted in the completion in 1944 of the Mark I, a fully automatic, tape controlled, calculating machine. The first electronic machine was the ENIAC, completed at the University of Pennsylvania in 1946. This machine was rapidly followed by a number of machines employing the concepts of electronic rather than mechanical operations, internal memory, and storage of the program within the machine. Initially, digital computers were designed and used for the solution of scientific and engineering problems, many of them relevant to the development of conventional and atomic weapons. By 1955, however, several machines to be used for data processing work had been delivered, and we since have seen an explosive growth of computer applications in other than military and scientific work

The current state of computer technology is much advanced from the "early days" just 10 or 15 years ago. The differences between scientific and commercial machines have virtually disappeared, simplified programming systems have become available, internal memory capacities are much larger than before, computational speeds are fantastically high, a variety of machine sizes are available so that in one way or another a computer can be made available to virtually anyone needing one, and the cost of computation has fallen rapidly and is continuing to do so. Some of the latest concepts are the use of remote terminals to send information into and receive information from the machines, time sharing of large machines by many small users, and the use of a light gun or pen to communicate with the computer via a visual display console.

There are several implications of computer technology for the utilization of quantitative techniques. One of the most obvious is that the ability to acquire and process data economically will improve both the volume and quality of data available for analysis. Analyses of data which previously could not be made because of the sheer volume involved will now become feasible. The ability of the computer to perform large volumes of computation has also made some techniques practical which might otherwise be only of academic interest, and this trend will continue. A good example of this is in the utilization of linear programming which is computationally impractical for large scale problems without a digital computer. In addition to better utilizing existing techniques, the computer opens the door to whole new possibilities for analysis. Simulation of systems and the impact of various management decisions on these systems becomes a practical approach with the availability of a computer. Another possibility is the development of integrated information and decision systems for an organization and the opportunity which then arises for embedding mathematical decision procedures in the data handling and decision procedures used in the systems.

Together the availability of a wide variety of quantitative techniques and digital computers place management in a position of being able to use truly scientific methods of planning and decision-making. The term "scientific management," coined over 50 years ago, may well in the next 50 years finally become descriptive of the process which, at this time, is still largely the art of management. We began this discussion with a brief history of the operations research movement and showed how the successes of operations researchers and their techniques have contributed to the acceptance of the use of quantitative methods in management. One might be inclined to conclude, therefore, that it will be the operations researchers who will be principally responsible for further developments. This is not likely. Small groups of specially-trained scientists cannot hope to develop and monitor all of the applications that can be developed in the future. Instead, it will be necessary for managers, at all levels of the organization, with the staff assistance of technically trained specialists

when required, to explore the technology which is now available. This places a heavy burden on managers personally in terms of reeducation, retraining, and rethinking of old concepts and ideas, but it is a burden that cannot be avoided unless we are able to ignore some of the significant technological advances of the present decade.

Aids to Planning and Decision Making: Quantitative Analysis and Systems Analysis

WILLIAM T. NEWELL

The role of the manager as a planner and decision maker is well established. The basic difference between planning and decision making is the time dimension. Planning has a time dimension as one works toward a future goal, but decision making does not necessarily have to involve future action—but can.

There are two types of decisions with which the manager will be concerned:

1. Programmed decisions are those that occur over and over again and evolve into rules, regulations and procedures. A manager is not fulfilling his true role if all his time is used in this area. It is in the area of programmed decisions that the tools of quantitative analysis may be most useful to the decision maker.

2. Non-programmed decisions are decisions that have not come up before and require a unique solution. These are the most difficult of the two and should represent the bulk of the decision making efforts of the manager.

There has been a parallel development of quantitative analysis techniques along with those of the behavioral sciences and the administrator must select from these two fields those items applicable to management planning.

To determine the place of quantitative analysis in a planning or decision process, the elements of the planning process should be reviewed.

1. Problem or need determination
2. Establishment of objectives—general and specific
3. Discover of alternative courses of action
4. Evaluation of the alternative courses of action
5. The decision or selection of a course of action

Quantitative analysis plays a significant role in the evaluation of alternatives in the planning and decision process. Quantitative techniques may be helpful in evaluating alternatives.

1. Their use requires measurable results—as the taste element in diet making
2. Their use requires definable criteria—what is good or what is bad
3. They involve the construction of a mathematical model to represent the system under study

The scientist doing the quantitative analysis should not tell the administrator that he should take this or that course of action. The scientist observes and reports the facts. He may tell the administrator the probable results from a certain course of action, but it is up to the administrator to decide which of the several alternative courses of action he will follow. The aim of quantitative analysis is to refine the decision or planning process to enable the administrator to find better solutions, and not to supplant the administrator.

Some of the quantitative tools that are available have been discussed by Dr. Meier. The digital computer is involved in calculations, information processing and retrieval, and in simulation models. Simulation, a new concept to most, was developed. Simulation can be done with physical models as in wind-tunnel testing of a scale model of a new airplane design. The same type of testing can be done with numbers. The design elements of an aircraft may be represented by mathematical formulae and confronted with another set of numbers representing environmental conditions over time.

Inventory models can be simulated which will tell the manager what optimum quantities to order or how many orders should be placed per year. Allocation models tell one how best to allocate a set of resources among various activities, including human resources. Library activity can be simulated and it would be possible to predict demands on the various points of a library system at different points of time. Computer simulation models enable one to simulate a year's operation of a system in a few seconds. Alternative decisions can be tried and results will be quickly available.

The "waiting line" model has been discussed and application made to a library circulation desk. In determining the number of clerks that should be available at the desk in relation to peak hours, vacation periods, or school assignments, two variable costs must be weighed:

1. Cost of the idle time of personnel behind the desk
2. Cost of the waiting time of the consumers

The cost of library personnel idle time can be reduced by reducing the staff serving the desk, but this would increase the cost of customer idle time. The desired solution to a waiting line problem would minimize the sum of idle time costs and waiting time costs.

This problem can be solved by two quantitative analysis methods:

1. Queuing theory, which is a mathematical analysis of the situation, or
2. By means of computer simulation

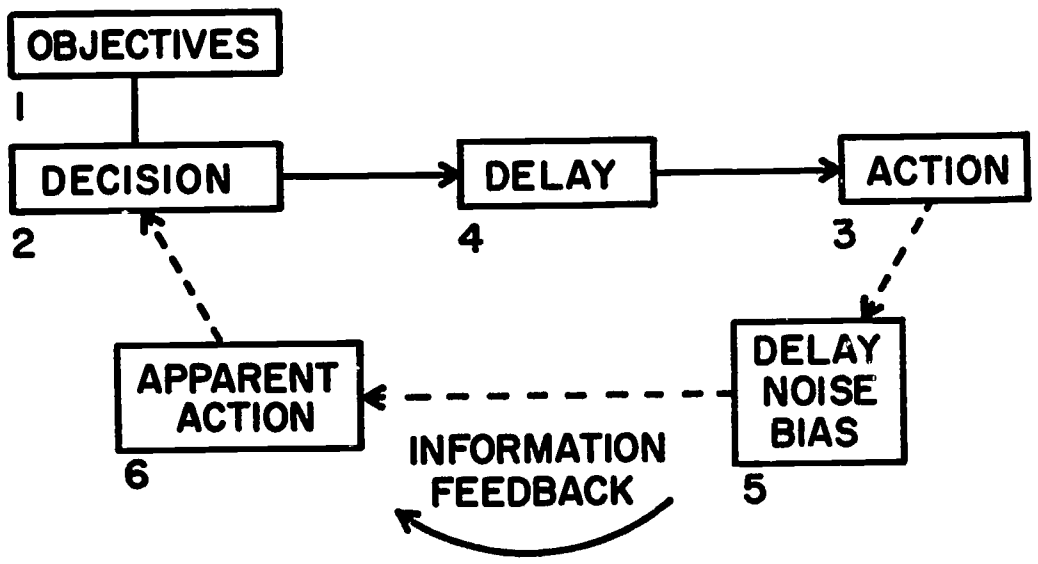
Every organization is a complex interactive system and in the planning or decision process, not just one segment or component of the organization should be considered, but the entire system. A system is an interconnected complex of related components and a decision affecting one component may very well have an effect on other components in the system. For example, the production group may decide to manufacture 2000 dozen red neckties and the sales force might plan to sell 200 dozen ties. In such a situation both groups made decisions in isolation from the total system.

Two observations of system behavior must be remembered. 1) Organizational behavior is the result of the combined effect of decisions of the individuals in the organization. 2) Decisions must be evaluated on the basis of their impact on the organization over time. The system operates in a dynamic environment and repercussions of a present decision continue over a time span.

In systems analysis the concept of a control system is of primary concern. The feedback structure of a control system is important.

The objectives (1) of the system form the decisions (2) which lead to the action (3). The feedback cycle reports back to the administrator at decision point (2) on the results of the action. This feedback enables the administrator to keep informed if his decisions are producing the desired actions. If not, he may alter his decisions in an attempt to alter the action so it will be more in line with the desired objectives of the system. If the decision creates an action, the results of which can be viewed, that is, action and feedback are immediate, the control system is effective.

However, there will be some delay (4) before the action occurs. Also there will be some delay (5) in the information feedback itself. Subordi-



nates reporting back to the administrator on the results of his decisions may have a bias which will not allow a clear picture of the action to be presented. In addition there may be other types of distortions in the flow of information which may be referred to as "noise." When there are delays, bias or noise in the information feedback, the decision maker will see only the apparent action (6) and take additional decision steps based on faulty or late data.

Thus the behavior of a control system must be carefully analyzed since there are so many variables to impede its effective action. Again, the systems analyst can build a mathematical model of the control system and observe its behavior by imposing various combinations of parameters on the model.

Computer simulation models can be built to represent the behavior of systems involving all types of goods and services. They can also be constructed to simulate human behavior. The works of J. W. Forrester, *Industrial Dynamics* and Norbert Weiner, *Cybernetics* were mentioned as pioneer works in this field.

Effective management should recognize the nature of the organization as a feedback mechanism and be aware of the dynamic interactions among components of the system. The manager must make a careful analysis of the system before he constructs the model to be studied. Systems analysis need not depend on a computer model, but the manager needs to step back and get the proper prospective of the system as a whole in order to be aware of the interaction of the various segments of the system.

Discussion

QUESTION: Would the computer be used for cataloged information?

ANSWER: (Meier); A "third generation" computer, such as the IBM 360 which is 10 to 100 times faster than older models, also has a much broader range of capabilities. Its core capacity is still limited, however, to approximately 64,000 words of memory—not sufficient storage for a card catalog. The cost of this core memory is extremely high. However, in addition to the core storage, there are disks, similar to phonograph disks, which can hold up to 13,000,000 digits and these can be used for catalog information; the only problem is that retrieval is much slower than with the core memory. Disks are going down rapidly in cost, so that these are becoming practical to use where large capacity is needed.

QUESTION: How are librarians going to make use of operations research techniques when most of them do not have a sophisticated mathematical background?

ANSWER: (Meier); Mathematics is not necessary in the solution to many problems. The important thing is to utilize some of the techniques in their simplest forms at whatever points in the management process these seem helpful.

QUESTION: How can libraries afford to use computers when they do not have sufficient budget to utilize existing instruments such as the telephone for interlibrary loans?

ANSWER: (Meier; Newell); Technology has come like a tidal wave. Librarians must learn to use these new tools and new techniques or they will become hopelessly lost in attempting to solve problems which are growing more complex every day. Long-range planning for an entire system is necessary, not for just a single unit in the system.

QUESTION: What progress is being made in information retrieval?

ANSWER: (Meier); Government is sponsoring this work, but they aren't too optimistic that large systems will be developed soon. Input is the big problem; we can catalog authors and titles, even subjects if they are limited; but information retrieval demands we catalog and cross-index the book's contents. There are limited systems such as IBM's "Key Word in Context" e.g. KWIC. Problems center in input-difficulty, and the high cost of the memory bank.

QUESTION: What about drum storage?

ANSWER: (Meier); We could put a catalog on tape, but this would result in lack of controlled access. In order to secure information located at any spot on the tape the whole reel must be searched from beginning.

QUESTION: Can small systems use computers?

ANSWER: Yes. Third generation computers—the 360 is one— are designed for time sharing. No place is too small. The technology is available. One needs to know what you want to do and how much it will cost.

Comprehensive Planning in Other Fields: A Panel Presentation

Comprehensive State Planning

SAMUEL H. MALLICOAT

In reviewing your schedule for this Institute on Planning it would appear that you have all been exposed to the elements that are involved in the preparation of a plan. Therefore, I would not presume, in the wake of that which you have heard, to attempt to analyze and discuss these elements. I am concerned, however, that you understand what I mean when I speak to you of a comprehensive state plan.

For example, I am **not** talking about a document of myriad pages of discourse, statistics, maps, etc. I am not even certain that the type of plan I am talking about needs to be put to paper as such. We view *state planning as a process for improving the decisions of the state's policy-makers with regard to the problems facing the state.*

Well, you ask, "How do you develop a plan of that nature?" "What does it look like?" "Who are the policy makers?" "What are the problems facing the state?" And as librarians you are concerned with how this type of planning relates to a librarian's problems.

In attempting to answer these questions I hope to cover the broad range of state planning and the relationship of this type of planning to that which we more commonly recognize as land use planning. (This is normally accomplished by local planning agencies.)

First, let's get into question of "Why State Planning?" The rationale for state planning rests upon two major precepts:

1. That the type of services offered by a state generally coincide with what the people want
2. That these services be performed at the least possible cost to those who finance them (generally, the taxpayer)

—In the case of state planning an additional consideration, largely of a political nature, also enters the picture. Why state planning vis-a-vis Federal or local planning?

In general, planning at the state level best reconciles the two most powerful opposing tendencies involved in public planning. These are:

1. The necessity that plans be comprehensive enough to include all

significant factors (hence the tendency to do planning at the multi-state or national level)

2. The necessity of maintaining local control of public planning in order to maintain public support (hence the tendency to develop local plans)

The state government stands out as the best level of government to cope adequately with these opposing forces by doing planning that is both comprehensive in its nature, and close to the people who live with it. This type of planning strengthens the hand of the states in our system of government.

If we recognize comprehensive state planning as a process, one that is dynamic, ever-changing and flexible, we can see that we are not really going to wind up with a "blueprint." Rather, we are going to relate our planning to decision-making to make public policy decisions more rational and comprehensive.

Two relevant questions were posed above that need to be answered:

1. Who are the policy makers at the state level of government?
2. What are the issues or problems facing the state?

To answer the first question, state policy makers are primarily the Executive Office of the Governor, the Legislature, and the various boards and commissions. The public at large, and special interests often significantly influence decision-makers (e.g., popular votes and referendums or lobbying interests). These must also be taken into consideration where their influence is relevant.

In attempting to define the problems that are of statewide nature we must limit ourselves to those which can be influenced or controlled to some degree by state action. This makes the task a little easier.

There are generally five areas of public policy which come under the influence of the state government. These are:

1. Human Resources Development
2. Natural Resources Development
3. Physical Environment Policy
4. Economic Development Policy
5. Governmental Administration and Coordination

These categories broadly define the major areas in which the state has substantial influence. This is to mean that decisions made at the state level of government can shape public policy, to a greater or lesser degree, in each of those areas. Planning for human resources development, natural resources, the physical environment, general economic development, and government administration becomes a relevant and important task for state government because state policy can help shape the future course of each of those problem areas.

These are problem areas, or areas of state influence—but what kinds of specific problems can the planning process attack? And how is this planning proces specifically applied to these issues?

To answer these two questions let's come back to these five problem areas and under each identify a few specific problems.

1. Human Resources Development Policy:
   a. Educational policy
   b. Public welfare
   c. Public health and safety
   d. Cultural development
   e. Manpower development

2. Natural Resources Policy:
   a. Rural land use policy
   b. Flood damage reduction
   c. Water and air pollution control
   d. Outdoor recreation policy
   e. Agriculture
   f. Forestry conservation and development
   g. Fish and wildlife

3. Physical environment:
   a. Urban form policy
   b. Waste disposal
   c. Transportation
   d. Public facilities

4. Economic Development Policy:
   a. Capital resources
   b. Manpower training
   c. Regional economics

5. Government Administration:
   a. State government organization
   b. Local government organization
   c. Federal-state-local relationships

These are only examples of the specific issues that need to be scrutinized by the planning process.

The next question is: How is this to be done? First, let me say that each of these issues I just listed poses certain difficult questions in search of some hard answers.

One of the prerequisites of good planning therefore is *asking the right questions first.* I think many of our plans never find the right answers because they never pause long enough to ask the right question. They go too deep into the "how" and the "where" and the "who" of the plan without paying adequate attention to the "why."

In order that the planning process be related to decision-making the following steps in the process must be adequately emphasized:

1. Identification of the issues—problems where public decisions are necessary.
2. Identification of possible public objectives related to the issue—specific guides to public policy.
3. Analysis of constraints that act to limit the attainment of some proposed objectives—these to include physical, economic, and financial, as well as political constraints.
4. Delineation of those objectives which seem feasible, based upon the results of the constraints analysis.
5. Analysis of general consequences of implementing the feasible objectives.
6. Identification of the tools of public policy that are or can be made available to attain the desired objectives.

Each of the issues listed above can be taken through this process. In this manner the policy-maker is likely to make an enlightened decision based upon the objective analysis sketched here and tempered by his own political or subjective judgment.

The significant point here is that *decisions based on the "planning" approach are going to be better than if no planning was done at all.* Moreover, the cost of instituting this process into decision making will result in less costly—more rational government.

Comprehensive Local Planning

LLOYD ANDERSON

The State Division of Planning and Development has an important and difficult task because it operates on a statewide policy level and covers such a large area; this is more difficult than local town planning because of the communications involved and because it is less specific.

As I look at the Institute program, I can see that you librarians have been learning about the broad general subject of planning. The titles—planning concept, planning process, dimensions of a plan, planning environment, data collection, processing problem solving and decision making, testing tentative plans, initiating action on approved plans, keeping up-to-date on progress of plans—make me think I am in a meeting of the American Institute of Planners, though the subject matter within any of these titles may be different.

Your relationship with your Board of Trustees is similar to a planner's relationship to his private client where the client has the controlling and final decision. In contrast, the public planner in cities and counties works with and reports to a number of different department heads who are concerned with separate and only loosely related aspects of a comprehensive plan. He deals with a number of land uses and economic factors and has to consider location of public facilities, transportation needs, and economic forces. Among these, of course, are libraries.

Library Master Plan

In one California community, San Mateo County, the library master plan was incorporated into the comprehensive plan for the county. The library element of the plan gives full consideration to the library's objectives and standards, which are: two books per capita, a full range of services to all age groups, a staff of five full-time people per 10,000 population, one-third of these professional, new sites to be established as needed, strong branches—each branch to serve 25,000-50,000 people, with all persons having library services within a 1½ mile radius. Libraries should be located in major shopping centers. 25,000 volumes are a minimum, and the library should be open 8 hours a day, 5 days a week. If a bookmobile is used, it should be air-conditioned and it should carry 3,500 to 4,000 books, with a collection of 10,000 to 15,000 books backing it up. There should be reciprocity with other libraries in the metropolitan area. A study should be made for a master plan for future expansion of the library system by a qualified librarian. The plan should be updated regularly.

Community planners are particularly interested in the librarian's thoughts and recommendations as to where the library should be located. Usually the librarian wants the library to be in a commercial area

but the city council owns property at the edge of town and that's where it ends up. However, the community planner can help librarians in formulating their plans by providing information which will act as a guide; trends in population densities, future location of business, industry, schools, and other information. The librarians should make their plans and policies well known so that they may be specifically noted for eventual incorporation into a plan. The plans for a central business district where a library may be located, are complex and involve a long process of negotiation before any action can begin. It is necessary, therefore, that the librarian keep in touch with the planner so that when the comprehensive plan is evolved the librarian's plan will be included. When the comprehensive plan is presented to the city council and approved, it then becomes a protection against future arbitrary decisions concerning the library—or any other city facility. To be of use in this way the library's master plan should include details such as location, size of building and staff, bookmobile, and other factors.

Elements of the Plan

Other elements in the comprehensive plan are: transportation; residential, commercial and industrial land use; public buildings and facilities, including schools, parks and playgrounds; and semi-public uses. Usually before these plans are made, there is the need to look at the population and economic prospects to see if and where the town will grow; or where it will change. This population and economic prospect aspect leads the planner into dealing with the compilation of accurate statistics in a manner usable for a variety of different purposes. The planner is concerned with organization of statistical information. In smaller towns the transportation elements deal with roads; in larger cities with major bus routes, freeways and major streets that are related to the movement of people. After preparing the comprehensive plan—the transportation plan, land use plan, public buildings and facilities plan—then ways to implement it must be worked out.

Implementation

Implementation is done through zoning, subdivision regulations, capital improvement programs, land acquisition and easements, to mention a few.

Zoning is one of the most common methods used and perhaps one you are familiar with, but as a device for implementing comprehensive planning, it has been generally a failure, though it has been used successfully to prevent abuse of land in residential areas by preventing the intrusion of non-residential uses into them. We have one great mess on our hands in an enormous number of areas in metropolitan America, and metropolitan America is going to continue to grow and become more complex.

Oregon between 1950 and 1960 grew 17 to 20 percent. During that same period, there was a 12 percent decline in the rural population and a 35 percent increase in urban population. People moving from the farms to the cities increase the problems within them. These problems require more sophisticated solutions and, unfortunately, the solutions we have used up to now, particularly zoning, have not been adequate. A major part of the answer, I believe, lies in public education, understanding, and insight.

Subdivision regulations, another implementation device, are adopted to control the subdivision of land, locating roads properly and setting up patterns of development in residential areas and to a limited extent, in commercial and industrial areas. Los Angeles is a good example of subdivision laid out within a framework of subdivision control.

Policies within the Housing and Home Finance Agency are encouraging other types of housing besides single family where there is increased density of population. Our private land planners are designing residential developments with up to twenty units per acre instead of three to five, as in single family dwellings, thus getting more open space, as much privacy, and better developments than in the traditional developments of single family housing. In the future there will be more of this. These policies are a significant influence in plan implementation.

Another way that plans are implemented is the use of a capital improvement program; librarians are affected by this program. A common five-year capital improvement program would list some of the following major facilities: sewers, water, libraries, and schools and show a priority for such improvements. Schools often capture a sizeable share of the tax dollar and represent serious competition in the city to other organizations trying to reach their goals. There are though, some examples of cities where this tax pie is sliced equitably and a successful program is accomplished.

Plans are implemented by acquisition of land. A stimulus to public acquisition of land is financial assistance from the Urban Renewal Administration. Large areas are cleared and redeveloped by public acquisition and then resold to private enterprise. There may be a more limited approach to land acquisition in the immediate future. This approach would be the purchase of easements rather than ownership of the land. An effort was made to pass an act during the last legislature to get easements purchase authority in Oregon. It failed but may come up again.

The nature of systematic planning in Oregon has been recognized in the last ten years. The federal grant program for planning provides funds which have assisted in the development of surveys and plans. These funds can help in library planning if the library plan is a part of a comprehensive plan.

I indicated earlier in my remarks that the way to get a successful program is through public enlightenment. Isolated pockets of good development such as the civic center in Eugene can stir the imagination of people in a community to make them wish to do better things. There is a need

now to translate such general plans into the specifics for downtown areas, parks, or recreation areas. I believe there is every indication that this is going to happen, now that there is both local and federal administration money available and widespread community interest.

Comprehensive Planning in the Electric Utility Industry

JAMES C. GRUETTER

I am particularly glad to be here today because, as an electric utility planner, I know how much we depend on our library and have a real appreciation for the work of our library staff. Certainly, no plan can be better than the sources of information on which it is based.

Today I shall sketch the nature of electric utility planning, present a few examples of utility planning problems, discuss our approach to these problems and important ways in which our library supports the planning staff.

The Bonneville Power Administration performs an electric utility function of marketing the power from all the Federal hydro-electric dams in the Pacific Northwest—some 35 plants in Oregon, Washington, Idaho and Western Montana. To carry the power from the plants to the load centers, BPA has in operation about 9,500 miles of high voltage transmission, and another 2,000 miles under construction. We sell the power at wholesale to nearly 100 electric utilities, both investor owned and publicly owned throughout the region, to very large electro-process industries, and to governmental agencies such as the Atomic Energy Commission's Hanford Works and the Puget Sound Navy Yard. At present we are supplying about one-half of all the electric energy in the region, and about two-thirds of the industrial electrical energy requirements.

Although in the industrial world generally there is an increasing reliance upon market and sales forecast in budgeting for long-term capital expenditures, the electric utility industry of necessity has been the leader in the field of long-range planning. The long life of our installations, the extensive lead time frequently required, the very magnitude of our plant and investment, the irrevocability of so many of our decisions, and the possibility that our mistakes may be equally irrevocable, have made the necessity of long-term planning well recognized in the utility field. As examples of long life we can cite the hydro-projects which, although amortized over a 50-year life, have a much longer useful life, or steel

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CONDUCTED BY THE OREGON STATE LIBRARY WITH DR. PRESTON P. LE BRETON FROM THE UNIVERSITY OF WASHINGTON SERVING AS THE CONSULTANT, THIS WEEK LONG INSTITUTE WAS HELD TO PREPARE LIBRARY ADMINISTRATORS FOR STATE-WIDE PLANNING FOR LIBRARY DEVELOPMENT IN OREGON. SPECIFIC GOALS OF INSTITUTE PARTICIPANTS WERE TO EXAMINE ACCEPTED MANAGEMENT AND ADMINISTRATIVE PRINCIPLES, TO DETERMINE AND IMPROVE PLANNING SKILLS, AND TO DISCOVER HOW PERSONAL VALUES AND ATTITUDES INFLUENCE ADMINISTRATION. LECTURES, PANELS, AND GROUP DISCUSSIONS COVER THE FOLLOWING TOPICS--(1) ORGANIZING FOR PLANNING, INCLUDING AN EXPLORATION OF THE OVERALL PLANNING CONCEPT AND MODEL, (2) FORECASTING TRENDS, DETERMINATION OF NEEDS, AND THE ESTABLISHMENT OF GOALS AND EVALUATION CRITERIA, (3) OPERATIONS RESEARCH AND ITS SIGNIFICANCE TO MANAGEMENT, WITH DISCUSSION OF QUANTATIVE ANALYSIS AND SYSTEMS ANALYSIS AS AIDS TO PLANNING AND DECISION MAKING, AND (4) COMPREHENSIVE PLANNING IN OTHER FIELDS, COVERING STATE AND LOCAL PLANNING AND ASPECTS OF ELECTRIC UTILITY INDUSTRY PLANNING OF INTEREST TO LIBRARIANS. APPENDIXES INCLUDE A SELECTED READING LIST ON PLANNING AND BIOGRAPHICAL SKETCHES OF INSTITUTE SPEAKERS. THIS DOCUMENT IS ALSO AVAILABLE FROM THE OREGON STATE LIBRARY, SALEM, OREGON 97301, FOR $2.00. (JB)

Institute On Planning

PROCEEDINGS

INSTITUTE ON PLANNING

Proceedings

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RICHARD B. ENGEN, Editor

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1965

Table of Contents

I INTRODUCTION

The "Why" of the Institute

ELOISE EBERT

Welcome, participants in the Institute on Planning. May I express my appreciation for your confidence that this institute will be rewarding to you personally. I hope that what we learn through the coming week will contribute to a PLAN FOR LIBRARY DEVELOPMENT IN OREGON.

I should like to share with you the thinking which has gone into this institute. In studying planning which has been done in Oregon, and in the library profession generally, it appears that often major factors in the planning process were ignored, not considered, or unrecognized as significant. One is plagued with the thought that perhaps those who were planning didn't know how to plan. One could ask, "Do *I* know how to plan?"

The State Library has a responsibility for providing leadership in library development. The State Library also has a responsibility for coordinating planning for improved library services. The State Library should provide the opportunity for us to meet together and discuss mutual problems.

In March 1964, after the document *Public Library Service: Oregon Standards for the Headquarters of a Library System* was completed, I wrote to Carl Hintz, Chairman of the OLA Standards Committee, asking for an opportunity to discuss a university-based institute which might set the stage for the development of a statewide plan. His reply was enthusiastic.

The State Library Board of Trustees subsequently approved of the idea of an Institute on Planning but not without discussion on "Can you talk for a whole week on planning without planning something?" I assured them that this would follow!

Once the Board had approved the budget came the problem of finding a consultant to direct the institute—someone experienced and qualified. This was a major assignment, but after reading the book *Planning Theory* I knew Preston P. LeBreton was the man who could do the job!—and believe it or not, he was in the Northwest! In reply to my letter he said, "I share your view that effective planning is possible only when individual administrators are properly trained in the many complexities related to comprehensive planning. In the field of library administration your institute will be a pioneering venture. I would be pleased to participate with you in this important project."

From last October until today we have been planning this institute. Conferences with Dr. LeBreton were held in Portland, Seattle, and Olym-

pia. Tom Loeber, under the direction of and with the assistance of Dr. LeBreton, worked more than six months on the preparation of case studies which will be used in our discussion groups to illustrate principles of planning and implementation. The staff of the Eugene Continuation Center have assisted in the arrangements on the campus and selected other highly competent staff lecturers whose names appear on the program. I am most appreciative of all their services.

The OLA Library Development Committee also assisted: Carl Hintz, Chairman; Ivy Grover; James Burghardt; Susan Broadbent; Winfield Atkinson; Fern Prior and Dick Engen. Some questions which needed to be answered were, "Who should come? and how should the registrants be selected?" Dr. Le Breton suggested that the group should be small so that there could be discussion. The Library Development Committee recommended that a quota be established for public librarians, college librarians, school librarians, and trustees. We also thought we should like to invite our neighboring state library agencies to send representatives. The State Library agencies of Nevada, Montana, and Texas are represented and we have one eager beaver school librarian from California. We welcome all of you; we are delighted you wanted to come.

Realizing that all who applied could not be accommodated if we kept the group small and also representative of types of libraries, an ad hoc committee consisting of Omar Bacon (immediate past president of the Oregon Library Association), Carl Hintz (chairman of the OLA Library Development Committee, and I (as the State Librarian) reviewed the applications. May I congratulate each of you in having been "selected"—it was not an easy task. The only regret of the ad hoc committee is that only a few trustees could attend. Those who are here will need to do yeoman work as they represent more than 600 public library trustees.

Now I have the pleasure of introducing to you the gentleman who will make his mark on Oregon:

DR. PRESTON P. LE BRETON, Professor, Department of Policy, Personnel Relations and Production, College of Business Administration, University of Washington, Seattle. Dr. Le Breton received his Ph.D. degree at the University of Illinois. Prior to his immediate assignment he was head of the Department of Management and Marketing at Louisiana State University. He served as a consultant to many business and government groups including Detroit Edison Company, Chrysler Corporation, Civil Servire Commission, Army and Navy Departments, Internal Revenue Service, and Seattle Public Schools, He is the co-author with Dale A. Henning of *Planning Theory* and the author of *Planning for Small Business.* His newest book, *General Administration: Planning and Implementation*, was published in 1965 by Holt, Rinehart and Winston, Inc. This fall Dr. Le Breton is stepping down as the chairman of the department at the University of Washington, a position he has held for the last five years, in order to return to full time teaching and to be able to accept more assignments as a planning consultant.

The "How" of the Institute

PRESTON P. LE BRETON, PH.D.

When a week is devoted to planning and concepts of implementation certain obvious assumptions are implied:

1. There is a body of knowledge which deals with the administrative or management process.
2. This body of knowledge can be transmitted and learned.
3. If understood and used this knowledge will assist the administrator in carrying out his assignment.
4. The administrator has the proper attitude (willingness) about using the knowledge acquired.
5. The administrator has adequate (or will develop it) skill in the use of the knowledge he has acquired.
6. There is a way to measure (audit) good and bad administrative practices.

If one believes the above is true then it is reasonable for us to seek out answers to the following questions:

1. What are the accepted management or administrative principles. That is, knowledge about what?
2. What are the skill requirements?
3. How do personal values and attitudes influence the manner in which an individual carries out his administrative assignment?

This is our purpose in being here. We shall attempt to answer the above questions in the following manner:

1. *Knowledge*
   It is recommended that each participant (though reading discussions, reflection and contemplation) work toward the selection of an administrative model. Use the library! Suggested references are included in each day's schedule of events.
2. *Skill*
   Heavy emphasis will be placed on case discussions. Special cases have been written for the Institute. Through advance preparation and class discussion, participants should improve upon their present skills of diagnosis, decision making, planning, communication and persuasion.

3. *Value-Attitudes*
Each participant should work out a personal philosophy of administration based upon his philosophy of life. A week away from the work environment should provide an opportunity for reflective, creative thinking.

II DAILY SUMMARY

Daily Summary of Planning Principles

PRESTON P. LE BRETON, PH.D.

Monday

PURPOSE

The materials presented during the first morning were designed in part to establish a foundation for the entire week and to explore the overall planning concept and model. Because of the vital planning role played by a variety of individuals and groups, the topic, Organizing For Planning, was introduced in the context of defining the concept of role.

SUMMARY OF CONTENTS

It was suggested that each participant has a vital interest and role in the growth and development of the library function in Oregon, the United States and abroad. To prepare oneself for the expanded opportunity available and to assume one's proper role as a leader in preparing programs, designing facilities, and furnishing resource materials, it is important that one take a broad stance in time. An attempt must be made to understand the *nature* of the environment anticipated in the near and distant future.

The total environment is best understood when significant influences are isolated. Among the more significant influences are:

1. Technological—for example, the computer
2. Economic—for example, a more affluent society
3. Educational—for example, a better educated society
4. Political—for example, greater centralization of primary decisions, which affect the lives of all Americans
5. Social—for example, availability of more leisure time
6. Religious—for example, less dogmatism, more individual freedom

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References: The primary reference books used in the Institute were:

1. Preston P. LeBreton, *General Administratiion: Planning and Implementation*, (New York: Holt, Rinehart and Winston, Inc., 1965)
2. Preston P. LeBreton and Dale A. Henning, *Planning Theory*, (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1961)

References made throughout this summary statement are taken from either of these two references. One asterisk (*) will indicate *General Administration* as the source. Two asterisks (**) will indicate *Planning Theory* as the source.

Once the significant influences are determined, it is necessary to interpret the likely impact of change upon the task of the librarian and others interested in the growth of library services. In order to interpret the likely impact, it is useful to explore three propositions:

1. The concept of a model of the administrative process
2. The concept of role
3. The concept of knowledge, skill and value-attitudes

Model of Administrative Process. One should acquire his own model of the administrative process to be used as a frame of reference to assist him in understanding his role. There are a variety of administrative models. Among the more widely accepted models are the following:

1. Process
2. Systems
3. Decision Theory
4. Planning-Implementation or Modified Process

For purposes of the Planning Institute, emphasis is placed on the Planning-Implementation model.

Concept of Role. Three broad influences appear to have a significant impact on one's role. Each in turn is affected by a variety of factors:

1. Roles as defined by an organization
   - Position description
   - Position specification
   - Policies, Rules and Regulations, Procedures
   - Codes—prevailing philosophy of administration
2. Roles as are enforced by the organization
   - Perception of roles and their legitimacy by others
   - Reward and punishment system
   - Behavior of senior administrators
3. Roles as performed by the incumbent
   - Qualifications—knowledge and skill
   - Value—attitude
   - His perception of role and its legitimacy

The role an individual is asked to play within an organization is often defined in fairly specific terms. However, an individual within an organization must relate with others in carrying out his function. His day-to-day relationships along with his personal qualifications and interests may modify the role as defined by the organization.

Knowledge, Skill, Value-Attitudes. At this point an individual should be able to combine the concepts of an administrative model and role. Assuming the P-I model, he would think in terms of his present and future administrative role as planner and implementor. By the addition

of the concepts of knowledge, skill, and value-attitudes, he is prepared to inquire about the qualifications demanded to fulfill his future role. That is, knowledge of what? Skill in doing what? Value-attitudes toward what? When integrated into the P-I model, it appears (in summary form) as follows:

Knowledge of:	Forecasting Creative thinking
Skill in:	Decision making Organizing for planning
Attitude toward:	Testing propositions and conclusions Learning theory and practice Control programs Evaluation of data Reporting results

Planning-Implementation

The Planning-Implementation Administrative Model is made up of three parts:

1. Planning-Implementation Process
2. Dimensions
3. Relationship of Dimensions to Process

The planning process contains fourteen steps:

1. Becoming aware of a possible need for formulating a plan
2. Formulating a precise statement of the objective of the plan to be prepared.
3. Preparing a broad outline of the proposal or plan
4. Obtaining approval of the proposal
5. Organizing planning staff and assigning responsibility
6. Determining the specific outline of the plan
7. Establishing contact with all cooperating units
8. Obtaining necessary data
9. Evaluating data
10. Formulating tentative conclusions and preparing tentative plans
11. Testing components of tentative plans and making adjustments where appropriate
12. Preparing the final plan
13. Testing the plan and making adjustments where necessary
14. Obtaining approval of the plan*

The formulation of a plan begins with the recognition that a given situation deserves attention. The process is completed when a plan is submitted for approval.

Each administrator has primary responsibility for planning and imple-

mentation, regardless of his level within an organization, his functional responsibility, the size of his unit, the size of his organization, the age of his organization, or the main purpose of the organization—library service, education, manufacturing, medical, or distribution.

For a given activity some administrators have a vital role in all phases of the administrative process while for other activities they may participate in one, a few, or several parts. For example, the administrative role of a librarian may vary across the following activities:

1. Site selection
2. Building design
3. Book selection
4. Book display
5. Check-out policy
6. Working conditions

How Can One Make Sense of the Planning and Implementation Processes?

This is the role of dimensions. Although the preparation of a policy statement, rules and regulations, a procedure, programs, systems or projects may follow the broad design (planning process) indicated above, the specific and detailed way in which a planning process is carried out will be influenced by the degree of intensity with which dimensions occur. For example, the complexity factor may b efairly simple or highly complicated.

Simple or Complex or Highly Complex

The list of dimensions contains the following:

1. Complexity
2. Significance
3. Scope or Magnitude
4. Comprehensiveness
5. Frequency
6. Duration
7. Uniqueness
8. Authorization
9. Flexibility
10. Available Time
11. Confidential Nature
12. Clearness
13. Formality
14. Specificity
15. Completeness
16. Accuracy
17. Stability*

When a significant change takes place in the intensity factor for a given dimension, the impact on the administrative process is likely to be great. It is important to keep in mind that the impact of dimensions should be measured against each step in the administrative process and not simply the process as a whole.

Special Note

At a given point in time, a particular planning or implementation situation occurs within an organization which has:

1. A history of success and failures
2. A management philosophy—acceptable behavior practices
3. Participants with different:
   a. Levels of experience
   b. Levels of training and knowledge
   c. Levels and kinds of skills
   d. Interests and ambitions
   e. Personal qualities
4. Existing policies, rules and regulations and procedures

While it is important to understand how the above influences may shape a planning or implementation situation, an administrator interested in *learning about the model* might find it useful to concentrate on the nature of the administrative need (designing a new library, introducing bookmobile service for the first time) rather than the organizational complexities of a given situation.

Tuesday

PURPOSE

The lesson plan was designed to introduce the participants to the most vital part of the administrative process—the awareness of needs. The scope of the presentation was to include the establishment of goals and objectives, the preparation of a format for submitting proposals and the establishment of evaluation criteria. The above topics were selected to be presented as a unit because they may be thought of as an integrated sub-grouping of the overall process.

SUMMARY OF CONTENTS

As one views an organization it is useful to reflect upon the fact that more often than not an individual observes a unit in motion. That is, an organization which is being directed toward a given goal or objective.

As an administrator guides an organization toward long-range objectives, it is vital that he keep in touch with and sensitive to:

1. Changes in the internal environment of his organization
2. Changes in the external environment in which his organization performs
3. Established objectives (perhaps changing conditions may suggest the need for revision)

Need Determination. Although it may be obvious, it is useful to remind oneself that a plan is never formulated until an individual becomes aware of the need to take action. More important, the quality of a plan may be greatly influenced by the way in which one becomes aware of the need to develop a plan.

Among the sources of ideas of possible importance to a senior library administrator are the following:

1. Formal controls
2. Systematic audits
3. Unit demonstrates the need
4. Employee suggestions and recommendations
5. Outside initiative
6. Perpetual study
7. Management observations and contemplation
8. Management suggestions and directives
9. Board of trustees' suggestions and directives*

The alert administrator might think in terms of the sources of ideas which are available to him and ask himself whether or not his sensing devices (antennae) are properly placed and sensitive to indication of needed change.

Each source of ideas must be developed, cultivated, and then used. For example, an effective relationship with one's superiors, peers or subordinates does not occur automatically.

When an administrator has a good feedback system in operation, he may discover that many of his antennae are vibrating almost constantly.

When this condition develops, he must have the ability and insights which will allow him to discriminate between legitimate indications of change and those which may be only suggestive of short-range adjustments. Once an administrator embarks on a given plan it reduces the time he has available for preparing and implementing other plans. In a modified way, the overall planning process could be used to determine

whether or not an indication of change deserves the attention of a formal planning effort.

Establishment of Goals and Objectives. Once the administrator has made the decision that he has a legitimate planning opportunity, he will be well advised to concentrate on isolating the true causes of his planning need before determining his objective.

A simple case for purposes of illustration only:

> The chief librarian of a university library was concerned about the heavy turnover among his librarians. He knew his librarians received a salary 10-15% below that of librarians in comparable schools on the West Coast. He persuaded his president to adjust salaries to a level equal with competing schools. After two years he was disappointed to learn that turnover had increased even though salaries remained competitive.
>
> He called in a senior librarian and asked for help. The senior librarian suggested that only a few if any of the former librarians had departed because of dissatisfaction with the salary schedule. Naming individuals, he expressed the opinion that one had left because he was displeased with his salary relative to other librarians on the staff; a second librarian had been displeased with his rank; another had been unhappy with his job assignment; a fourth was not satisfied with promotional opportunities.
>
> After the conference, the chief librarian decided that perhaps he should seek further for additional factors which influence job stability. Although his overall objective might be to reduce turnover, a more meaningful set of objectives might include the elimination of conditions which contribute to high turnover.

Proposals. Whenever a planning effort requires the expenditure of large sums of money or manpower, it may be necessary to obtain the approval of a superior before further action is undertaken. For example, the determination of a site for a new library or the extensive rennovation of an existing facility may be of such importance that the planner would have to obtain approval of the proposition from a higher authority.

Two important considerations deserve attention at this stage:

1. Format ot be used in the preparation of the proposal
2. Administrative posture to be taken by the individual submitting the proposal to the individual or unit responsible for granting approval

Because of the similarity of this stage of the planning process and the final step when a completed plan is submitted for approval, a more detailed treatment of this subject is postponed until Wednesday.

Wednesday

PURPOSE

Up to this point the planner has been concerned with understanding his planning need and determining the specific goal or objective his planning action will seek to satisfy. It remains for the planner to assemble appropriate manpower and to guide their efforts toward the determination of a course of action. This section emphasizes data collection and data processing, problem solving and decision making, testing of plans and the preparation of a final plan.

SUMMARY OF CONTENTS

The greater the complexity, comprehensiveness and significance of planning situations, the greater the likelihood that a variety of talents will be assembled to contribute to the solution of a problem. One useful way to approach the topic "Organizing For Planning" is to think in terms of permanent committees such as a board of trustees or executive committee. Membership on these committees usually does not change relative to a given planning assignment. A second kind of committee, usually called an ad hoc committee, is formed to satisfy a given need and is dissolved once committee members have performed their assigned function. Membership on an ad hoc planning committee is often influenced by the nature of the assignment. A forecaster, accountant or attorney might be placed on a committee because of the need for his specialized talents.

Increasingly specialists are being asked to serve as advisors. As an organization grows in size the advantages of specialization may develop. Under these conditions a variety of staff specialists may be hired to assist line managers in the performance of specified administrative assignments. Crucial to the success of staff specialists (management analysts, industrial engineers, operations researchers) is the rapport they are able to establish with line managers. While few situations are identical and individuals vary in their administrative posture, certain conditions appear to increase the likelihood of an effective relationship. Among the significant factors are the following:

1. The need for staff assistance is perceived by the line manager
2. Request for assistance is initiated by the line manager
3. Staff specialist is professionally competent
   a. As perceived by line manager
   b. As indicated by results
4. Working relationship emphasizes staff service to line manager
   a. Staff assistant may suggest alternatives
   b. Staff assistant speaks in terms of likely consequences of various courses of action
   c. Line manager makes decision on course of action

5. No reports are issued by staff assistant except as requested by line manager
6. Top managers are concerned with results achieved rather than the source and nature of assistance rendered

Decision Making. There are various ways to look at a decision-making situation. One useful way is to separate out components of a decision-making situation in the following manner:

1. Significant variables
2. Relative importance of variables
3. Degree of certainty that anticipated conditions will occur as stated
4. Decision rules

A simplified example of a decision to select a site for a library follows:

1. Significant variables	2. Relative weights
Cost	40
Accessibility to users	20
Accessibility to employees	5
Appropriateness of surrounding area	10
Size	20
Condition	5

3. Degree of certainty, where appropriate
   (low, fairly low, moderate, fairly high, high)
4. Decision rule
   Select site with highest score unless degree of certainty is moderate or below.

In actual fact, of course, a more elaborate decision process would be followed.

Testing Components. The concept of testing permeates the planning process. However, two sets of tests are of particular significance once a tentative choice has been made. The first test is concerned with the technical correctness of the decision and thus with inputs into the decision-making process. Where appropriate, a tentative plan can be placed into operation on a temporary basis to determine the extent to which anticipated conditions result as planned. A second type of test is related to the format and style of the plan as prepared for submission. The test here is the clearness, simplicity, completeness, specificity and accuracy of the materials presented.

Preparation and Submission of Plan. There are a variety of ways in which a plan might be drawn up. Among the items to be covered in the preparation of a significant, comprehensive and complex plan are:

1. Title of the plan
2. Name of persons who authorized the preparation of the plan

3. Name of persons who approved the finished plan
4. Name of persons who prepared the plan
5. Purpose or objective of the plan
6. Outline of problem
7. Recommendations—course of action to be taken
8. Expected results
9. Resource requirements
10. Supporting evidence—justifications for recommendations
11. Date plan was submitted and approved, and is to be implemented and completion dates for each component of the plan**

Perhaps more important than the format or kind of items to be included in a plan is the attitude taken by the planner when he submits his program for approval. In spite of his intense interest in a given program the planner is well advised to present his recommendations in such a way that the approving agent is sold or not sold on the basis of the evidence provided. Ideally, the approving agent makes his decision independent of the planner.

Thursday

PURPOSE

There are two excellent reasons for the introduction of the subject of implementation of plans at a planning institute. Few plans are ever developed without the expectation that they will be placed into operation at a future time. In addition, considerable planning may be required to develop a strategy for the introduction of significant change into an ongoing organization. As a plan is implemented, it is useful to keep in touch with developments to maximize the likelihood of success.

SUMMARY OF CONTENTS

The impact of complex, significant and comprehensive plans upon the individuals responsible for bringing about the change and living with the new conditions may be great. They may be asked to work in a new facility far removed from the previous site, to accommodate to a new group of subordinates, peers or superiors, learn a new technique for satisfying the needs of the community or accept a change in status or compensation.

The introduction of change can be done more easily and effectively when the implementor is sensitive to likely responses from individuals

affected by the plan. Among the questions an individual may reflect upon when faced with the need to change are the following:

1. Do I understand the desired changes?
2. Am I able to adjust to the changes?
3. Will my position be improved as a result of the proposed change?
   a. Higher salary
   b. Promotion in rank
   c. Improved working conditions
   d. More prestigious job title
   e. Increased status
4. Is the change necessary ?
5. Is the change legitimate?
6. Is the change appropriately timed?
   a. Time of introduction
   b. Implementation period
7. Is the change good for the organization?
8. Is the organization (management) doing all it can to facilitate change?
9. Am I willing to adjust to the change?

Under most conditions an implementor will discover that members within an organization will differ in the way in which they respond to the same change situation. Thus it may be desirable to use several strategies when faced with the opportunity for bringing about change.

Control As Integral Part of Implementation. Experienced administrators have discovered that an approved plan is not automatically implemented. Quite the contrary! Usually an approved plan will remain on-top-of the desk or in a file until the implementor takes positive action to get the show on-the-road. Once the journey begins, an alert administrator will find it useful to keep in touch with its progress through the final stage of completion.

One useful way to view the control function is to divide the overall responsibility into four parts:

1. Taking action to introduce the change
2. Measuring progress against stated time objectives
3. Evaluating results against expectations
4. Examining the environment to determine up-to-dateness of present plan

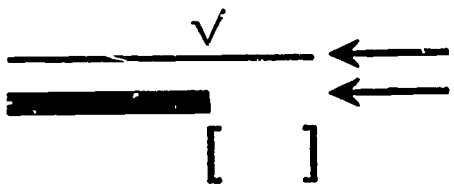
When an administrator receives an approved plan or authorizes his own plan, it is important that a starting date be established and that the required action be taken to get the ball rolling. If approval has been given

for a new set of reference books, the librarian may begin implementation action by making contact with the appropriate publisher.

After the initial implementation action has begun, it is desirable to make periodic (planned) checks on the progress of the implementation effort. For an effective control device, the following requirements should be met:

1. Standards of effectiveness
2. Measurement of results
3. Interpretation of significance of variance
4. Corrected plan of action, when appropriate

This control phase can be diagrammed as follows:



Of course, the critical parts of this control phase (assuming standards are properly set) is the interpretation of the significance of variance, the cause of the variance and the action planned to correct the problem.

Administrators are often surprised to find that after a plan has been fully implemented they still have a control function. Individuals within an organization may have changed their behavior (new knowledge, new interpersonal relationships, for example) exactly as desired in the plan. Upon checking the results of the work arrangement, an administrator may find that the desired results (improved performance, reduction in costs) have not been realized. In other words, the desired change has been brought about but the expected results did not follow.

The final control function covers the total environment in which an organization lives. Even when a plan is fully implemented and anticipated results fully realized, the control responsibility remains. Plans are prepared because conditions within an environment indicated the need for a change. After a plan has been fully implemented, it is necessary to keep in touch with significant factors within the environment so that new plans can be formulated as conditions change.

The four control stages in the implementation process can be viewed as follows:

1. Initiating implementation action
2. Measuring progress of implementation action
3. Checking results of implementation against expectations
4. Checking the on-going environment

Friday

PURPOSE

Plans are prepared in anticipation of future events and conditions. At different stages of the implementation process an administrator may discover the need to modify a plan. Not infrequently, the inadequacy of a plan or ineffectiveness of the implementation effort is not determined until the completion of the task. Every on-going organization has the need to plan to meet changing conditions. It is appropriate, therefore, for the alert manager to review his planning and implementation processes.

SUMMARY OF CONTENTS

The preparation of plans and their implementation by their very nature involve the actions of many individuals. The rapidity and magnitude of change within the United States and the world place a heavy burden upon the individuals who assume the responsibility for keeping an organization alert to changing opportunities. How does an administrator know that he is running a successful operation?

There are at least three ways to audit an on-going organization:

1. Does the organization meet its stated objectives and goals?
2. Are the members of the organization able to handle present and future challenges?
3. Are the administrative processes performed effectively and efficiently?

The more traditional method for reviewing organizational success is the measurement of performance against stated goals and objectives. There is much to be said for holding an administrator accountable for satisfying the short- and long-range goals which have been agreed upon.

Partly as a result of increased research conducted by industrial sociologists and social psychologists, a second set of measures has been introduced. It has been determined that in some cases an organization has been in danger of exploiting its human resources while it strives to meet short-range goals. When the human needs of an organization are not satisfied there is the likelihood that short-range accomplishments may not be extended into the future. In measuring the success of an organization, it may be desirable to include a check of the morale of participants.

Because the success or failure of an organization in meeting its objectives is determined by the performance of its personnel, it would seem appropriate to audit the administrative process in use. A comprehensive guide for auditing the planning and implementation processes is available.* A sample of how the administrative audit might be used follows:

* See pages 45-50; 127-132 in *General Administration: Planning and Implementation.*

The first step in the planning process is becoming aware of a possible need for formulating a plan. Among the key questions to be asked are:

1. What are the natural sources of planning ideas for each activity?
2. Who should receive the various ideas?
3. How should the ideas be evaluated?

An audit of the answers to these selected questions might include the following:

1. Are all significant sources of ideas considered?
2. Do the right individuals keep in touch with appropriate sources of ideas?
3. Are ideas properly evaluated to determine whether or not a plan should be formulated?
4. Does the organization tend to anticipate its opportunities and difficulties or are most plans formulated after the fact?

It is quite apparent that the development and use of a comprehensive, well integrated administrative audit system require talent, time and dedication.

Where Does One Go From Here? The Challenge Ahead!

An alert administrator should find it useful to undertake the following exercise:

1. Develop a personal philosophy of administration
2. Divide his organization on the basis of significant activities
3. Determine the planning-implementation model presently in use
4. Audit the present administrative model
5. As a result of the audit, make appropriate adjustments
6. Develop a format for long-range and yearly plans
7. Develop a long-range plan and each year an operating plan
8. Direct the implementation of yearly plans
9. Audit the administrative process each year

III INSTITUTE PAPERS

Forecasting and Planning

DONALD N. JOHNSON

Some Thoughts About the Past and Future of Oregon Areas

Probably the least expensive, most reliable and valuable sources of information about the United States and its states, counties, and urban areas are the many reports published by the U. S. Bureau of the Census under the headings of Census of Population, Census of Housing, Census of Business, Census of Manufacturing, Census of Agriculture, and Census of Governments. A quick look at these publications gives a good impression of the past and present social and economic characteristics of Oregon.

Oregon has a population of about 1,900,000. The Oregon population has amounted to one percent of the national population in 1950, in 1960, and in 1964. Of the 50 states, Oregon ranked 28th in terms of the amount of population increase from 1950 to 1960.

Oregon ranks 10th in total land area of the nation's states, but it is not very densely settled. It ranks 39th in population per square mile. Only North and South Dakota, the eight mountain states, and Alaska are less densely settled.

The average age of Oregonians is almost 31. This is slightly higher than the national average of 29.5.

Over ten percent of the population is 65 years and older. This is higher than the national average of 9.2 percent.

Over one-half of all Oregon residents were born in another state. This high rate is exceeded by only six other states.

About 94 percent of Oregon children 14-17 years old attend school. This is the highest rate of all states.

The median years of school completed by persons 25 and over is 11.8, that is, slightly less than high school. The relatively high level of educational attainment is exceeded by only seven other states.

The percent of employment in manufacturing is lower than the average state; the percent in white collar occupations is slightly higher.

Average family income is somewhat higher than the national average, though below Washington and California.

About 62 percent of the population live in urban areas and this

percentage has been growing at a fast rate. However, 26 states have a proportionately higher urban population than Oregon, and 23 have a lower proportion.

The percent of all employed persons who work in durable goods manufacturing, wholesale trade, and professional services is higher than the national average. At the same time nondurable goods manufacturing is considerably lower than the national average.

Oregon's population is not very well distributed. Over two-thirds of the people live within the nine Willamette Valley counties and this proportion is growing all the time. By adding five other counties, (Jackson, Douglas, Coos, Klamath, and Umatilla) 83 percent of the state's population is accounted for, but only one-third of the land area. Four out of every 10 Oregonians live in the metropolitan Portland area alone—Clackamas, Washington, and Multnomah counties.

Over 70 percent of Oregon's wholesale sales are made in Multnomah County alone, and 70 to 80 percent are made in the nine Willamette Valley counties.

The nine Willamette Valley counties account for over three-fourths of the receipts made at service outlets and for two-thirds of the retail sales.

This brief review of a few items from the censuses tells a little about what Oregon is like now. What about the future? Is it going to change? And why do we want to know?

In answer to these questions I'm going to try to explain first why and how some forecasters make forecasts; second, briefly relate some of the trends, developments, and forecasts as they appear to affect Oregon's future; third, I'm going to show a few slides that I hope will summarize these points; and finally, mention some future developments, problems, and items that may be of special interest to librarians.

Why and How Forecasting is Used

The enormous increases in urban population, car ownership and use, and in personal income levels have created national transportation problems of great magnitude. It has developed into one of the nation's most complex forecasting and planning problems. The problem is essentially one of providing mass transportation, enough street capacity, and storage space for cars in order to permit people to drive and then park where and when they want to. But to do this is to open Pandora's Box.

How do you make people ride the bus?

Where do you put the roads and the parking so that the neighborhoods and public parks are not divided by crisscrossing canyons of highways?

How do you assure the safety of school children and pedestrians who must compete with the traffic?

How do you salvage the appearance of the city?

How do you keep the central city intact?

And if you have answers to these questions: Are you able and willing to pay for your solution?

Because of the wide scope of these problems many organizations and professions are being heard: city planners, engineers, state legislatures, architects, garden clubs, American Automobile Association, save the neighborhood clubs, automobile and petroleum industries, Congress—with money in hand, and the President.

In 1963 the Bureau of Public Roads decreed that all metropolitan areas in the United States must have a coordinated, cooperative, comprehensive continuing transportation plan before that agency would provide any further funds for federal aid road facilities. The agency further decreed that in addition to the usual engineering and travel pattern factors, such planning must include analysis of social and economic factors that affect urban development.

Since all state highway departments and most urban areas have a big stake in this source of revenue, transportation planning and forecasting studies have blossomed out throughout the nation. Forecasting methods are an important part of these studies. In Oregon alone, these studies are underway in the Portland, Eugene-Springfield, Salem, Medford-Ashland areas, and will shortly be underway in Corvallis and Roseburg. If you will consider for a moment the trips that you take by car, you will agree that the traffic pattern of your town is quite complex regardless of its size. In Eugene, for example, an average house generates something like five to seven trips per day, and in some of the higher income, suburban areas the trips average from 12 to 15 trips per house per day. The location and density of houses, the income levels, the location of schools and libraries, and employment centers, and the social and economic characteristics of the residents each has an important effect and must be considered in forecasting future road needs. Therefore, to properly analyze future needs for roads the studies of urban transportation are starting off with long-range forecasts of:

the economic base of the area,

the land use and income of the community,

the population and housing units of the area,

the location of commercial and other activities,

the financial status of the area and the future ability of the citizens to pay for public facilities.

Other Organizations

Many other organizations and professions go through similar forecasting procedures in working out their needs for facilities and investments.

The planning and forecasting pattern that I've mentioned for transportation is followed with variations by the electric power and telephone industries in determining how big and where to invest their capital in power stations, substations, etc.; by market analysts who forecast the future need for and potential use of shopping centers; by real estate associations; by church organizations; and by many others.

Basic Factors Affecting Forecasting for Local Areas

Abraham Lincoln has been credited with this sentence: "If we could first know where we are, and where we are tending, we could better judge what to do, and how to do it."

For Lincoln, and the rest of us, the process of looking ahead has been a necessity. But I think that most forecasters—whether they are telling fortunes, predicting weather, or forecasting future library space needs—will agree that forecasting is a hazardous business.

Local Influences

There are a large number of factors that affect community growth. If we were going to work out a forecast of population for New York City, Grants Pass or some other community, here are some of the things we would want to know about it.

At the outset we would ignore city boundaries since they change from time to time and since their influence on where people live is either nonexistent or growing weaker all the time. This, incidentally, is quite a change from 50 years ago when urban population was tied to the street car tracks and central power stations.

We would first want to know quite a lot about the economy of the area, especially its employment prospects since—with some rare exceptions—changes in population levels within an area are closely allied with changes in employment levels. The number of nonworkers compared with the number of workers is reasonably constant throughout the United States.

In studying future employment levels the forecaster in one way or another becomes involved with the theory that the economic activities that make cities grow are normally those that make goods or supply services for use by persons from outside the area. These export industries provide a basis for the development of the local service industries that in turn mak goods or supply services for local use. In other words, this theory says that there are two kinds of employes: BASIC EMPLOYES who serve outsiders, and LOCAL SERVICE EMPLOYES who serve the local

population. The number of the first kind determine the number of the second kind and, of course, the total population. A quite constant relationship exists for these local service employes and the population that they serve. For every 1,000 persons living in your area there are, for example, about 55 retail trade employes, about 25 construction workers, about 10 in finance, insurance, and real estate, and etc., including about one-half of one librarian.

This kind of forecasting, though far from perfect, provides a useful multiplier kind of approach for looking into the future of an area providing, of course, that national and regional economic cycles and shifts, and, more importantly, governmental policies will hold still.

A principal problem for the forecaster, especially in the smaller urban areas, is the potential location of unknown, footloose industries which are concerned with research and development and do not necessarily have much to do with the location of the community. These organizations tend to nestle against universities that have attractive campuses and high scientific skills in their graduate colleges. On the West Coast, California has had the main impact of the research and development program, but the location of such organizations in Portland, Corvallis, or Eugene is a possibility that makes Chambers of Commerce hopeful and forecasters uneasy.

There are, of course, other factors that affect population levels of a community such as the unemployment rate and the proportion of the population that works and the age and sex composition of the population. But once again, the underlying, basic factor affecting population levels of a community is the economy and related employment levels.

Development of Oregon

As we found out from the Census information, a great part of Oregon's population and economic activity is concentrated in a relatively small area, especially in the Willamette Valley counties.

The reason for this disparity between economic activity and population on one hand and land area on the other is, of course, related to the topagraphy, the natural resources, and the climate. The forested area—Oregon's main economic base—is concentrated in the Coast and Cascade ranges where the soil and precipitation permit fast forest growth. Unlike many of the midwestern states which have a more even distribution of high grade farm lands and population, farming in Oregon is concentrated in a relatively small space.

And further, population tends to beget population—in more ways than one. That is, an expanding area such as the Willamette Valley finds that it can supply more of its own goods and services than it could when it was smaller. A larger metropolitan market can, for example, support its own symphony orchestra, a glass container plant, a cookie factory, etc. rather than have these goods or services imported. All of this points to

the likely occurrence (and one that is frequently forecasted) of another megalopolis of a junior-sized Boston to Washington, D.C. variety, teeming with cars and people, stretching within the next 50 years or so from Portland to Eugene, and in fact, from Seattle to Eugene.

However, I have no intention of overestimating the importance of the Willamette Valley to the state's future potential. Umatilla, Klamath, Coos, Douglas, Deschutes, and Jackson counties all have important concentrations of population and forecasts indicate further increases. Jackson County especially has been growing during recent years.

However, it is difficult to look into the distant future with final certainty about the area outside of the Willamette Valley. Without question, the rural population has been decreasing for many years in Oregon and throughout the nation, as the result of increased mechanization of farms, the consolidation of farms into larger holdings, the accompanying decline of the small family farm, and the availability of higher paying jobs in urban areas. From 1950 to 1960 Oregon's rural population decreased by over 33,000 persons while its urban population increased by 281,000. Based on past and current trends, then, Oregon's rural population will continue to decrease during future years.

But even this isn't necessarily so. For instance, a plan has been suggested—though not accepted as far as I know—to move massive numbers of low income, potentially delinquent adolescents from overcrowded urban areas to farms throughout the nation in order to give them a chance to grow up in a more constructive environment. While a government program of this type wouldn't necessarily reverse the exodus from the farm to the city, the potential diversion of Pacific Northwest water to California dry areas might greatly affect this picture since a substantial benefit to Oregon might occur by siphoning off a part of the water to irrigate a vast acreage of eastern Oregon dry land at, presumably, California's expense. In anticipation of this potential diversion of water, in fact, the Oregon Water Resources Board is now sponsoring a soil classification study of the dry eastern and southeastern lands.

Now to summarize briefly, economic and population forecasting is an interesting and hazardous business undertaken by nearly any person, agency, or business which is trying to plan and look ahead. The future of any area in one way or another is inevitably related to the economic attributes that the area has, and except for some unknowns, the Pacific Northwest attributes and qualities should be reasonably apparent since we have had a good number of years to look them over since Lewis and Clark visited the area. Lewis and Clark, incidentally, were not very accurate population forecastors. They reported to President Jefferson that the miserable climate of the Oregon country made it suitable only for Indians and wild animals. Even though we know a lot about the different local areas, economic and social forecasting remains both an art and a science since changing technology, national birth rates, and economic cycles are either hard to predict, or beyond the scope of the

forecaster. For this reason a continual updating and reevaluation process is usually built into forecasting systems.

Items That May Be of Interest to Librarians

I am going to conclude by mentioning some items that I think should be of interest to you both from my point of view—city and regional planning research—and from the point of view that the library is charged with, among other things, of making man's written word available to man.

1. Population. There are about three billion people on earth today; within a mere 35 years there may be twice that—six billion. By the end of this year the United States' population will stand at about 195 million, and within 35 years may exceed 400 million. Some very interesting things are happening to the U. S. population. In 1962 the life expectancy for the entire population was 70 years, 67 for males, 73 for females. According to the U. S. Bureau of Census estimates, by year 2000—assuming rapidly declining mortality rates, life expectancy would rise to 76 years; 74 for males, 79 for females. There will be something like 200 million more people in the U. S. in 2000 than today. During the first 20 years of this period all age groups are expected to grow, but the biggest increases will be in the youngest and in the 75 and over classifications. The only group not increasing rapidly would be the 45 to 64 age groups. The 18 to 24 year group will increase something like 70 per cent.

2. Urban Development. Not only are we experiencing a tremendous surge in population, but the migration to cities is the greatest in history. What is this going to do to our urban areas? Lewis Munford has said, "The building of cities remains man's greatest work of art ranking with language itself." The state of this art as it stands today needs great improvement. Increased urbanization is sure to have an impact on all of us. If we throw in the automobile with the man, U. S. urban areas would already be among the most densely settled on earth. There is a great need for more people to become aware of the problems and to contribute to their solution if we are to hold on to the level of living that we have now, much less improve it.

3. Education. People in the U. S. and perhaps especially in Oregon, are becoming better and better educated as time goes on. In the U. S. as a whole, as recently as 1950, only one-third of the population 25 years and older had graduated from high school. In 1960, over 40 percent had graduated from high school, and the U. S. Census Bureau forecasts that by 1985 about 63 percent will have graduated from high school. College graduates will increase a teven a faster rate, from about 8 percent of the adult population in 1960 to over 14 percent by 1985. Put in other terms, the average years of schooling by the population 25 years old and over in 1960 was slightly more than a high school sophomore. It is expected

to increase to high school plus a half year of college by 1985. This, of course, will occur as persons who are now in the older age groups and whose educational level is relatively low, leave the population through death and are replaced by persons with greater amounts of education.

4. Employment. The large increase in population—especially the younger population—is going to severely test the nation's economic and educational systems. (Despite improving educational attainment levels.) During the 1960s, alone, two and one-half million new young workers entering the labor force will not have had a high school education. At the same time the kinds of jobs where high school diplomas are not needed are in fact rapidly decreasing in number. According to the Department of Labor, this points to the need to encourage boys and girls to get all the education and training possible, to develop courses of training designed to meet their needs and to provide guidance and counseling early in their school years.

Finally leisure time and personal income levels are both increasing at a fast rate for the mass of the population. And all of these factors continued: population growth—especially of the young and the old, educational advances, growing needs to better train the young population, rapid urbanization, increasing income levels, and added hours of leisure time should have an impact on the work and interests of librarians, urban and rural, and planners alike.

Discussion

QUESTION: Have the recent technical innovations, some of which we have heard about at this institute benefited the forecaster? Have these advances made his job easier?

ANSWER: Yes, the computer has made a major impact on planning. The vast amount of information, which has to be collected before forecasts are made, cannot be handled except by a computer. Studies of the flow of goods in-and-out of a region are now being made by utilizing the tapes. They would not have been possible 15 years ago.

QUESTION: With what percent of assurance can you make forecasts?

ANSWER: The smaller the area covered and the shorter the time span the more confidence you can have in a forecast. Generally speaking planning people make a continuing effort to update their forecasts.

QUESTION: Is there an exchange of information between the planner and the school authorities in the area of urban planning?

ANSWER: Yes, we at the Bureau of Municipal Research call upon school authorities for information and we receive good cooperation. The Bureau does a forecast of school enrollments.

QUESTION: In the large area studies and the transportation studies you've discussed, is the library given any consideration in the plans you might formulate?

ANSWER: We don't plan for a library since the library is already in existence, but in the detailed planning of an urban plan, space will be alloted for library building. This would be considered in the space needs of the county services.

QUESTION: There has been a good deal of talk about the property taken off the tax rolls in order to construct new freeways. Has any study been made of the effect of this loss of tax base on tax supported institutions?

ANSWER: It is not true that there is a loss of tax base. People and business relocate on vacant land. Sometimes there is shifting from one tax area to another and a small tax jurisdiction might be harder hit than a larger one but there is no overall loss.

QUESTION: You spoke of the growth expected in the Willamette Valley. What will happen in the fringe areas? Will their population expand or contract?

ANSWER: Some fringe areas, Coos Bay for example, may grow relatively faster than the valley area, but the total increase will not amount to as much. The valley's tempo seems to be self sustaining.

QUESTION: What are the qualifications of a forecaster?

ANSWER: Everyone is a forecaster but the people on the staff here at the Bureau have advanced degrees in economics and sociology. Forecasting is still something of an art. A good forecaster, in addition to his educational background, has an elusive quality that for want of a better word let's call good judgment. This quality only comes from experience.

Operations Research: A Team Presentation

Operations Research and its Significance to Management

ROBERT C. MEIER

The term "operational research" was first used by A. P. Rowe to describe the work of a section of the Air Ministry Research Station at Bawdsey, England during the years 1937-39. As Superintendent of the Station, Rowe became interested in the utilization of civilian scientists to assist the military in problems of radio-location, and he used the term to describe the work of these scientists. Among the early problems studied were the integration of radar with the ground observer corps and the performance of warning stations.

In August, 1940, Professor P. M. S. Blackett of the University of Manchester was asked to study the coordination of radar and other new military equipment. To carry out these studies, a group was formed called the Anti-Aircraft Command Research Group. In less than a year, the interest in the early successes of these research efforts led to the establishment of other operations research groups. The Operational Research Group of the Air Defense Research and Development Command was formed in May, 1941, from some of Blackett's men; this group later became known as the Army Operational Research Group. In the same year, 1941, Blackett became Director of Naval Operational Research at the Admiralty. Among the more important and well-known studies conducted at the Admiralty during the course of the war were the investigations of the proper size and tactics for convoys and the setting of depth charges used against submarines. Professor Blackett was, however, one of the first authors in the field of operations research, having written two papers "Scientists at the Operational Level" (1941) and "A Note on Certain Aspects of the Methodology of Operational Research" (1943).

These two papers contain one of the earliest published discussions of what operations research is and the philosophy behind operations research. In the first paper Blackett states that there are many war operations which involve considerations with which scientists are specially trained to deal and which the regular officers are not trained to handle and do not have time to analyze in detail.

> Operational staff provide the scientists with the operational outlook and data. The scientists apply scientific methods of analysis to the data, and are thus able to give useful advice.... The main field of activity is clearly the analysis of operations.

In the second paper Blackett classifies operations research studies into studies of weapons, studies of tactics, and studies of strategy, and discusses the general method of attacking such problems.

The pioneering work in the groups led by Blackett and Rowe led to operations research studies in all three armed forces in England during the war in such varied areas as the effectiveness of artillery, organization for the detection of V-2 firings, wounds, evacuation, nutrition, bombing patterns, fatigue, and diseases in desert fighting. The extent of use of operations research in the military establishment is evidenced by the fact that by the end of the war over 350 persons had worked in the Army Operational Research Groups with a maximum of 175 at any one time; 380 reports had been issued, and sections had worked with almost every branch of the British Army in all major theaters of war.

While operations research originated in the British armed forces, the value of this activity was soon realized in other countries. The United States armed forces began forming operations research groups in 1942, and Canada and Australia also organized groups during the war although they did not compare in size with the United States or British groups.

The United States first became officially interested in operations research through a visit that Dr. James B. Conant, who was then Chairman of the National Defense Research Committee, made to England in 1940. However, aside from some minor activity, the first important use of operations research by this country came in 1942 when both the Navy and Air Force established operatoins research. In August 1942 an official report on operations research in England was submitted to the Joint Chiefs of Staff after several months of observation of the work in England with the immediate result that in October of that year General Arnold suggested that all Air Force commands consider the inclusion of operations analysis groups in their staff. In the same month, the Eighth Air Force in England established such a section, one of the first assignments for this group being the study of bombing patterns. The study continued for several years during the course of which time substantial improvement was made in bombing effectiveness. On December 31, 1942 an Operations Analysis Division began operating in the Office of Management Controls of the Air Force, and by V-J Day 26 groups composed of about ten scientists each were attached to various units.

In the United States Navy, the earliest group was formed in May 1942 under Dr. Philip M. Morse, a physicist from Massachusetts Institute of Technology, and consisted of seven scientists assigned to study antisubmarine operations for the Navy. The group was not officially called an operations research group until July 1943 when the group became the Antisubmarine Operations Research Group on the Tenth Fleet Staff. The Morse group was transferred again to the Readiness Division of CominCh Headquarters in 1944 and was renamed the Operations Research Group. By the end of the war 73 scientists were working with the group, most of them attached to the headquarters at Washington with one-third or one-

fourth on rotating assignments to strategic planning officers or operations officers in the field. For his work as head of Navy operations research during the war, Morse was awarded the Medal of Merit. Morse also collaborated with George E. Kimball, a chemist by training, who was deputy director of the Navy group from 1944-46, in writing *Methods of Operations Research*, the first book length treatment of operations research to be published in the United States.

Although General Marshall recommended the establishment of operations research groups in the Army, the resulting activity was much less than that in the other armed forces. By the end of the war, only a few teams had been established by the Army Ground Forces.

Since the Second World War, operations research has continued to occupy an important position in the military establishment. In the United States in particular there are many more persons engaged in military operations research now than during the Second World War, and all three services have increased their operations research activities both by adding such groups within the existing military organization and also by contracting with outside organizations.

Operations research groups in civilian organizations were established in Great Britain earlier than in any of the other countries that had used military operations research groups during the Second World War. One of the earliest groups was the Operational Research Department of the British Iron and Steel Research Association which was organized in 1945. Other early groups in Great Britain were in the Steel Company of Wales, which set up a small department in 1946, and the Operational Research Field Investigating Group of the National Coal Board which was set up in 1948, the year after the nationalization of the coal industry. The latter group was initially headed by a mathematical statistician from an Army Operational Research Group in Burma and is distinguished by its large size for an industrial group. In 1955 the group employed 37 persons, 25 of them scientists with backgrounds mainly in mathematics, engineering, and physics. The Cotton Research Association and the Boot, Shoe and Allied Trades Research Association were two other industry groups which had become interested in operations research by 1949.

A limited survey conducted in Great Britain in 1952 revealed 37 industrial operations research sections in existence. Of these, eleven were in public utilities, seven in cooperative research agencies, and the remainder in industrial firms. They ranged in size from one to fifty persons with most groups composed of from five to ten scientists.

Interest in operations research did not develop as quickly outside the military in the United States as it had in Great Britain, and it was 1951 before any substantial activity began. In April of 1951 the National Research Council published a report titled *Operations Research with Special Reference to Nonmilitary Applications*. This report was the result of the investigations of the Committee on Operations Research of the National Research Council established in 1949 and headed by Horace C. Levinson,

a retired executive of Bamberger and Company, a mail-order house. In November of the same year, Case Institute of Technology sponsored its first Seminar on operations research during which the possible applications of operations research to nonmilitary problems were explored. This was also the year in which Morse and Kimball's book, *Methods of Operations Research*, was published in this country. At this time, however, there was relatively little actual nonmilitary operations research activity. The consulting firm of Arthur D. Little had started an Operations Research Division composed of six professionals advised by Philip M. Morse and George D. Kimball, and the group had worked with Sears, Roebuck & Company, Republic Steel Corporation, and the Simplex Wire and Cable Company on operations research projects. The Case Institute group in the Department of Engineering Administration was beginning its industrial consulting activities at this time, one of the first projects being with the Chesapeake & Ohio Railway Company. General Electric Company, U.S. Rubber Company, E. I. duPont de Nemours & Company, Monsanto Chemical Company, and Johnson & Johnson also had become interested in operations research by 1951. The total amount expended by industry in 1951 on operations research has been estimated at not more than $1 million, and the number of persons engaged in nonmilitary operations research at about 50.

Following the first publicity about operations research and its accomplishments in industry, the amount of activity increased very rapdily in the early 1950s. Some companies such as Westinghouse Air Brake Company and the Barber-Colman Company began their activities fairly independently, while other groups were formed after consulting projects by such organizations as Case Institute and Arthur D. Little. Among the companies which formed operations research departments after completing a project with one of these organizations are: Proctor & Gamble Company, General Mills, Incorporated, Cummins Engine Company, and Eli Lilly & Company.

The growing interest in operations research led to a meeting in January 1952 of a committee of persons interested in the formation of a professional society. The Committee on Operations Research of the National Research Council was also interested in the formation of a society and encouraged the early discussions, although it was not in a position to assume sponsorship. One result was that on May 27, 1952 a founding meeting was held at Arden House, at which time the Operations Research Society of America came into existence. The society began publication of the *Journal of the Operations Research Society of America* in November 1952 and the journal is now called simply *Operations Research.* A similar organization—The Institute of Management Sciences, was formed in December 1953 and has published the quarterly journal *Management Science* since October 1954.

In the approximately fifteen years that civilian operations research has

been developing in the United States, several distinct types of activity have emerged. They may be roughly categorized in the following way:

1. Operations research groups within an organization working on internal problems.
2. Individuals within an organization doing work which can be characterized as operations research, although there is no department specifically doing operations research.
3. Operations research groups within the organization of industrial firms but working primarily on military problems, usually the analysis of weapons systems. This particular form of activity is found principally in the aircraft and missile industries.
4. Consulting organizations conducting operations research studies on a contract basis.

One of the distinguishing features of the operations research movement as it has developed is the emphasis on quantitative techniques. In some cases the techniques have been developed by operations researchers, but more frequently the techniques that have been used have been adoptions and extensions of techniques already in existence. Let us consider a few of those which are commonly associated with operations research.

The differential and integral calculus was developed around 1700 by Isaac Newton and Gottfried Leibniz. Initially, the calculus was found to be useful in explaining and analyzing problems in physics and astronomy, but later the calculus was also found to have wide applicability in economics and business. Marginal cost and revenue analysis and concepts of profit maximization of the firm, for instance, are readily explained and conceptualized with differential calculus, and this was recognized long before the term "operations research" was coined. In the early 1900s it was found that economic lot size problems in the area of inventory control were amenable to solution through calculus maximization and minimization techniques. While operations researchers, then, did not initially develop either the calculus or its application to managerial and economic problems, they have greatly extended the range of application and brought widespread acceptance of the use of the calculus in solving maximization and minimization problems.

Another technique for optimization closely associated with the field of operations research is that of linear programming. Unlike the calculus, linear programming is of relatively recent origin and operations researchers have contributed much to the development of the mathematics itself. Even in the case of linear programming, however, the origins of the technique are found in work which was done before the Second World War. Two areas investigated by economists in the 1930s, although not recognized as such at the time, were closely related to linear programming. These were input-output analysis, or the study of the interdependence of the different industries in an economy, and the diet problem.

The "diet problem," first proposed by Cornfeld in 1941 and later partially solved by Stigler in 1945, is quite illustrative of the sort of philosophy and structure underlying the attempt to apply quantitative methods to management problems. Without going into detail, the problem is that of picking certain foods for a diet from a list of foods which will minimize the cost of the diet while at the same time meeting minimum standards for various vitamins, minerals, and so forth. The choice of a diet is not simple because foods, while they have a single, fixed price, yield a variety of nutritive substances so that a purchase of a food is, in reality, a purchase of a variety of elements. The consequence is that the selection of a minimum cost diet is not a simple and straightforward problem but a complex one involving the restrictions on minimum intake of various elements, cost of the available food, and proportions of vitamins, minerals, and so forth in the foods. When the "diet problem" was finally solved by Stigler, it is said that the minimum cost per year for an average adult was $39.64, in 1939 prices, but unfortunately the diet was a bit too heavy on soy beans for practical purposes.

Linear programming in its present form is an outgrowth of Project SCOOP undertaken by George Dantzig for the Air Force in 1947. This project resulted in the development of certain mathematical procedures, really quite simple ones although the theory behind them is involved, for solving linear programming problems. The results of this research became generally available in the early 1950s and extensive use has since been made of the technique in determining, for instance, the proper ingredients for feed mixes, optimum product mixes, and allocation of raw materials to products. One of the industries known to be very active in the use of linear programming is the oil refining industry which has been a leader in utilizing very large scale linear programming models in determining the optimum utilization of available crude oils within the constraints of production capacity and market limitations.

Further work in the past ten years has resulted in a variety of associated techniques—quadratic programming, stochastic programming, network flow theory. These have found application in such diverse problem areas as the determination of optimum characteristics of military transport aircraft to provide certain air lift capabilities and the analysis of construction project schedules to determine minimum cost schedules for meeting completion deadlines.

In conjunction with linear programming it is appropriate to mention game theory—another technique widely associated with operations research. The history of this technique is rather interesting in that the first paper by John Von Neumann outlining the basic concepts of game theory was published in 1928, long before linear programming was developed. In 1944 Von Neumann and Morgenstern's landmark book, *The Theory of Games and Economic Behavior*, was published; but it was not until 1951 that the mathematical relationship between game theory and linear programming was generally recognized. Game theory, which

deals with the theory of how rational opponents will act in conflict with one another, is, mathematically a difficult and complex field. Practical applications in the analysis of nonmilitary problems have been relatively few. The possible application to problems of military and national strategy, however, would seem to be quite obvious, and supposedly considerable use is made of game theoretic concepts in military planning. At this time, too little is known publicly to comment further on its usefulness in these areas.

Although many more techniques could be mentioned, let us consider just one more which is well-known—queuing theory or waiting line theory. Queuing problems have been recognized as such since the early 1900s. One of the earliest works in the field was published by Erlang in 1909. The original applications were in the design of telephone exchanges where it was necessary to analyze the waiting lines which would develop when various amounts of equipment were provided. Significant extensions to the theory and application were made during the 1920s, but the great expansion of application has come in recent years. The theory of queues or waiting lines has been found useful in the analysis of product moving through a manufacturing process, the characteristics of waiting lines at service facilities such as check out stands and toll booths, and the flow of customer orders in an order processing system.

The mathematical techniques of operations research which have been discussed comprise only a portion of those which are available. But they give some idea of the wide variety of mathematical approaches which are possible and the wide range of applications. Also, the examples which have been given illustrate the underlying operations research philosophy of quantification of phenomena and attainment of some goal based on the quantitative model. The contribution of the operations research "movement"—if one can call it that—has been to demonstrate the possibilities for scientific analysis and optimization of managerial problems which at one time did not appear to be amenable to quantification.

We have not, of course, reached a point where mathematical and statistical techniques and models are ready to take over all areas of traditional management planning and decision-making. But quantitative approaches have become the accepted mode in many areas of planning and decision-making in business and governmental organizations, both military and nonmilitary. Progress in the use of quantitative methods, however, has not been even, either in terms of the types of organizations which are utilizing them or the functional areas in which they are being utilized.

In the business field probably the widest acceptance for quantitative methods has been in manufacturing organizations in such areas as inventory control and production planning and scheduling. Progress has been relatively rapid in these areas because the problems are important, data is available, suitable analytical techniques can be found, and there

is a fairly long history of attempts to analyze the problems even before the present powerful techniques become available.

In government the most important use of quantitative methods is, of course, in the analysis of military problems in the Department of Defense. Because of the expense and difficulty—in many cases impossibility—of experimenting with a variety of weapons systems, increasing reliance has been placed on mathematical and statistical analysis of system characteristics rather than experimentation with actual systems. We find that decisions of the utmost importance for our collective and personal safety are being made, and have to be made, on the basis of information obtained from such analyses. Another aspect of Department of Defense operations into which the concept of quantitative analysis has been injected is that of budgeting and programming. Under the guidance of Hitch and McNamara, budgeting has been reoriented so that a quantitative evaluation of the costs of specific activities can be made, and these are then compared with the effectiveness of the programs in attaining various defense goals. Cost-effectiveness studies, as they are called, have become a standard tool of analysis in the Department of Defense, and the successfulness of this approach has been such that the administration has chosen to apply the technique outside the Department of Defense in the evaluation of proposals for the development of the supersonic transport.

It would be possible to continue at some length citing illustrations of the degree to which the concept of quantitative analysis has begun to infiltrate management planning and decision procedures in many different types of organizations both private and public. However, let us turn instead to another development which is of great significance—the electronic digital computer. It is generally accepted that Charles Babbage who invented the difference engine for tabulating mathematical functions and the analytical engine for performing further computational work had incorporated in his designs many of the basic concepts which are used in modern computers. However, the designs were based on the use of mechanical, rather than electrical devices, and attempts to build them in the 1830s were unsuccessful. Babbage's work was largely forgotten, but the principles were rediscovered during the early days of the development of modern computers. This work started in 1937 and resulted in the completion in 1944 of the Mark I, a fully automatic, tape controlled, calculating machine. The first electronic machine was the ENIAC, completed at the University of Pennsylvania in 1946. This machine was rapidly followed by a number of machines employing the concepts of electronic rather than mechanical operations, internal memory, and storage of the program within the machine. Initially, digital computers were designed and used for the solution of scientific and engineering problems, many of them relevant to the development of conventional and atomic weapons. By 1955, however, several machines to be used for data processing work had been delivered, and we since have seen an explosive growth of computer applications in other than military and scientific work.

The current state of computer technology is much advanced from the "early days" just 10 or 15 years ago. The differences between scientific and commercial machines have virtually disappeared, simplified programming systems have become available, internal memory capacities are much larger than before, computational speeds are fantastically high, a variety of machine sizes are available so that in one way or another a computer can be made available to virtually anyone needing one, and the cost of computation has fallen rapidly and is continuing to do so. Some of the latest concepts are the use of remote terminals to send information into and receive information from the machines, time sharing of large machines by many small users, and the use of a light gun or pen to communicate with the computer via a visual display console.

There are several implications of computer technology for the utilization of quantitative techniques. One of the most obvious is that the ability to acquire and process data economically will improve both the volume and quality of data available for analysis. Analyses of data which previously could not be made because of the sheer volume involved will now become feasible. The ability of the computer to perform large volumes of computation has also made some techniques practical which might otherwise be only of academic interest, and this trend will continue. A good example of this is in the utilization of linear programming which is computationally impractical for large scale problems without a digital computer. In addition to better utilizing existing techniques, the computer opens the door to whole new possibilities for analysis. Simulation of systems and the impact of various management decisions on these systems becomes a practical approach with the availability of a computer. Another possibility is the development of integrated information and decision systems for an organization and the opportunity which then arises for embedding mathematical decision procedures in the data handling and decision procedures used in the systems.

Together the availability of a wide variety of quantitative techniques and digital computers place management in a position of being able to use truly scientific methods of planning and decision-making. The term "scientific management," coined over 50 years ago, may well in the next 50 years finally become descriptive of the process which, at this time, is still largely the art of management. We began this discussion with a brief history of the operations research movement and showed how the successes of operations researchers and their techniques have contributed to the acceptance of the use of quantitative methods in management. One might be inclined to conclude, therefore, that it will be the operations researchers who will be principally responsible for further developments. This is not likely. Small groups of specially-trained scientists cannot hope to develop and monitor all of the applications that can be developed in the future. Instead, it will be necessary for managers, at all levels of the organization, with the staff assistance of technically trained specialists

when required, to explore the technology which is now available. This places a heavy burden on managers personally in terms of reeducation, retraining, and rethinking of old concepts and ideas, but it is a burden that cannot be avoided unless we are able to ignore some of the significant technological advances of the present decade.

Aids to Planning and Decision Making: Quantitative Analysis and Systems Analysis

WILLIAM T. NEWELL

The role of the manager as a planner and decision maker is well established. The basic difference between planning and decision making is the time dimension. Planning has a time dimension as one works toward a future goal, but decision making does not necessarily have to involve future action—but can.

There are two types of decisions with which the manager will be concerned:

1. Programmed decisions are those that occur over and over again and evolve into rules, regulations and procedures. A manager is not fulfilling his true role if all his time is used in this area. It is in the area of programmed decisions that the tools of quantitative analysis may be most useful to the decision maker.

2. Non-programmed decisions are decisions that have not come up before and require a unique solution. These are the most difficult of the two and should represent the bulk of the decision making efforts of the manager.

There has been a parallel development of quantitative analysis techniques along with those of the behavioral sciences and the administrator must select from these two fields those items applicable to management planning.

To determine the place of quantitative analysis in a planning or decision process, the elements of the planning process should be reviewed.

1. Problem or need determination
2. Establishment of objectives—general and specific
3. Discover of alternative courses of action
4. Evaluation of the alternative courses of action
5. The decision or selection of a course of action

Quantitative analysis plays a significant role in the evaluation of alternatives in the planning and decision process. Quantitative techniques may be helpful in evaluating alternatives.

1. Their use requires measurable results—as the taste element in diet making
2. Their use requires definable criteria—what is good or what is bad
3. They involve the construction of a mathematical model to represent the system under study

The scientist doing the quantitative analysis should not tell the administrator that he should take this or that course of action. The scientist observes and reports the facts. He may tell the administrator the probable results from a certain course of action, but it is up to the administrator to decide which of the several alternative courses of action he will follow. The aim of quantitative analysis is to refine the decision or planning process to enable the administrator to find better solutions, and not to supplant the administrator.

Some of the quantitative tools that are available have been discussed by Dr. Meier. The digital computer is involved in calculation, information processing and retrieval, and in simulation models. Simulation, a new concept to most, was developed. Simulation can be done with physical models as in wind-tunnel testing of a scale model of a new airplane design. The same type of testing can be done with numbers. The design elements of an aircraft may be represented by mathematical formulae and confronted with another set of numbers representing environmental conditions over time.

Inventory models can be simulated which will tell the manager what optimum quantities to order or how many orders should be placed per year. Allocation models tell one how best to allocate a set of resources among various activities, including human resources. Library activity can be simulated and it would be possible to predict demands on the various points of a library system at different points of time. Computer simulation models enable one to simulate a year's operation of a system in a few seconds. Alternative decisions can be tried and results will be quickly available.

The "waiting line" model has been discussed and applicati. . made to a library circulation desk. In determining the number of clerks that should be available at the deck in relation to peak hours, vacation periods, or school assignments, two variable costs must be weighed:

1. Cost of the idle time of personnel behind the desk
2. Cost of the waiting time of the consumers

The cost of library personnel idle time can be reduced by reducing the staff serving the desk, but this would increase the cost of customer idle time. The desired solution to a waiting line problem would minimize the sum of idle time costs and waiting time costs.

This problem can be solved by two quantitative analysis methods:

1. Queuing theory, which is a mathematical analysis of the situation, or
2. By means of computer simulation

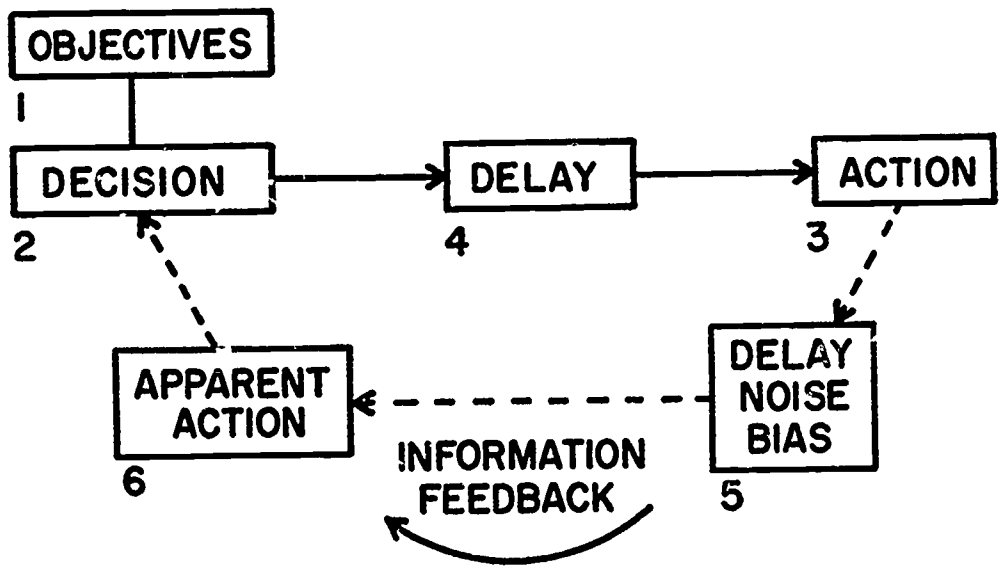
Every organization is a complex interactive system and in the planning or decision process, not just one segment or component of the organization should be considered, but the entire system. A system is an interconnected complex of related components and a decision affecting one component may very well have an effect on other components in the system. For example, the production group may decide to manufacture 2000 dozen red neckties and the sales force might plan to sell 200 dozen ties. In such a situation both groups made decisions in isolation from the total system.

Two observations of system behavior must be remembered. 1) Organizational behavior is the result of the combined effect of decisions of the individuals in the organization. 2) Decisions must be evaluated on the basis of their impact on the organization over time. The system operates in a dynamic environment and repercussions of a present decision continue over a time span.

In systems analysis the concept of a control system is of primary concern. The feedback structure of a control system is important.

The objectives (1) of the system form the decisions (2) which lead to the action (3). The feedback cycle reports back to the administrator at decision point (2) on the results of the action. This feedback enables the administrator to keep informed if his decisions are producing the desired actions. If not, he may alter his decisions in an attempt to alter the action so it will be more in line with the desired objectives of the system. If the decision creates an action, the results of which can be viewed, that is, action and feedback are immediate, the control system is effective.

However, there will be some delay (4) before the action occurs. Also there will be some delay (5) in the information feedback itself. Subordi-



nates reporting back to the administrator on the results of his decisions may have a bias which will not allow a clear picture of the action to be presented. In addition there may be other types of distortions in the flow of information which may be referred to as "noise." When there are delays, bias or noise in the information feedback, the decision maker will see only the apparent action (6) and take additional decision steps based on faulty or late data.

Thus the behavior of a control system must be carefully analyzed since there are so many variables to impede its effective action. Again, the systems analyst can build a mathematical model of the control system and observe its behavior by imposing various combinations of parameters on the model.

Computer simulation models can be built to represent the behavior of systems involving all types of goods and services. They can also be constructed to simulate human behavior. The works of J. W. Forrester, *Industrial Dynamics* and Norbert Weiner, *Cybernetics* were mentioned as pioneer works in this field.

Effective management should recognize the nature of the organization as a feedback mechanism and be aware of the dynamic interactions among components of the system. The manager must make a careful analysis of the system before he constructs the model to be studied. Systems analysis need not depend on a computer model, but the manager needs to step back and get the proper prospective of the system as a whole in order to be aware of the interaction of the various segments of the system.

Discussion

QUESTION: Would the computer be used for cataloged information?

ANSWER: (Meier); A "third generation" computer, such as the IBM 360 which is 10 to 100 times faster than older models, also has a much broader range of capabilities. Its core capacity is still limited, however, to approximately 64,000 words of memory—not sufficient storage for a card catalog. The cost of this core memory is extremely high. However, in addition to the core storage, there are disks, similar to phonograph disks, which can hold up to 13,000,000 digits and these can be used for catalog information; the only problem is that retrieval is much slower than with the core memory. Dicks are going down rapidly in cost, so that these are becoming practical to use where large capacity is needed.

QUESTION: How are librarians going to make use of operations research techniques when most of them do not have a sophisticated mathematical background?

ANSWER: (Meier); Mathematics is not necessary in the solution to many problems. The important thing is to utilize some of the techniques in their simplest forms at whatever points in the management process these seem helpful.

QUESTION: How can libraries afford to use computers when they do not have sufficient budget to utilize existing instruments such as the telephone for interlibrary loans?

ANSWER: (Meier; Newell); Technology has come like a tidal wave. Librarians must learn to use these new tools and new techniques or they will become hopelessly lost in attempting to solve problems which are growing more complex every day. Long-range planning for an entire system is necessary, not for just a single unit in the system.

QUESTION: What progress is being made in information retrieval?

ANSWER: (Meier); Government is sponsoring this work, but they aren't too optimistic that large systems will be developed soon. Input is the big problem; we can catalog authors and titles, even subjects if they are limited; but information retrieval demands we catalog and cross-index the book's contents. There are limited systems such as IBM's "Key Word in Context" e.g. KWIC. Problems center in input-difficulty, and the high cost of the memory bank.

QUESTION: What about drum storage?

ANSWER: (Meier); We could put a catalog on tape, but this would result in lack of controlled access. In order to secure information located at any spot on the tape the whole reel must be searched from beginning.

QUESTION: Can small systems use computers?

ANSWER: Yes. Third generation computers—the 360 is one— are designed for time sharing. No place is too small. The technology is available. One needs to know what you want to do and how much it will cost.

Comprehensive Planning in Other Fields: A Panel Presentation

Comprehensive State Planning

SAMUEL H. MALLICOAT

In reviewing your schedule for this Institute on Planning it would appear that you have all been exposed to the elements that are involved in the preparation of a plan. Therefore, I would not presume, in the wake of that which you have heard, to attempt to analyze and discuss these elements. I am concerned, however, that you understand what I mean when I speak to you of a comprehensive state plan.

For example, I am **not** talking about a document of myriad pages of discourse, statistics, maps, etc. I am not even certain that the type of plan I am talking about needs to be put to paper as such. We view *state planning as a process for improving the decisions of the state's policy-makers with regard to the problems facing the state.*

Well, you ask, "How do you develop a plan of that nature?" "What does it look like?" "Who are the policy makers?" "What are the problems facing the state?" And as librarians you are concerned with how this type of planning relates to a librarian's problems.

In attempting to answer these questions I hope to cover the broad range of state planning and the relationship of this type of planning to that which we more commonly recognize as land use planning. (This is normally accomplished by local planning agencies.)

First, let's get into question of "Why State Planning?" The rationale for state planning rests upon two major precepts:

1. That the type of services offered by a state generally coincide with what the people want
2. That these services be performed at the least possible cost to those who finance them (generally, the taxpayer)

—In the case of state planning an additional consideration, largely of a political nature, also enters the picture. Why state planning vis-a-vis Federal or local planning?

In general, planning at the state level best reconciles the two most powerful opposing tendencies involved in public planning. These are:

1. The necessity that plans be comprehensive enough to include all

significant factors (hence the tendency to do planning at the multi-state or national level)

2. The necessity of maintaining local control of public planning in order to maintain public support (hence the tendency to develop local plans)

The state government stands out as the best level of government to cope adequately with these opposing forces by doing planning that is both comprehensive in its nature, and close to the people who live with it. This type of planning strengthens the hand of the states in our system of government.

If we recognize comprehensive state planning as a process, one that is dynamic, ever-changing and flexible, we can see that we are not really going to wind up with a "blueprint." Rather, we are going to relate our planning to decision-making to make public policy decisions more rational and comprehensive.

Two relevant questions were posed above that need to be answered:

1. Who are the policy makers at the state level of government?
2. What are the issues or problems facing the state?

To answer the first question, state policy makers are primarily the Executive Office of the Governor, the Legislature, and the various boards and commissions. The public at large, and special interests often significantly influence decision-makers (e.g., popular votes and referendums or lobbying interests). These must also be taken into consideration where their influence is relevant.

In attempting to define the problems that are of statewide nature we must limit ourselves to those which can be influenced or controlled to some degree by state action. This makes the task a little easier.

There are generally five areas of public policy which come under the influence of the state government. These are:

1. Human Resources Development
2. Natural Resources Development
3. Physical Environment Policy
4. Economic Development Policy
5. Governmental Administration and Coordination

These categories broadly define the major areas in which the state has substantial influence. This is to mean that decisions made at the state level of government can shape public policy, to a greater or lesser degree, in each of those areas. Planning for human resources development, natural resources, the physical environment, general economic development, and government administration becomes a relevant and important task for state government because state policy can help shape the future course of each of those problem areas.

These are problem areas, or areas of state influence—but what kinds of specific problems can the planning process attack? And how is this planning proces specifically applied to these issues?

To answer these two questions let's come back to these five problem areas and under each identify a few specific problems.

1. Human Resources Development Policy:
   a. Educational policy
   b. Public welfare
   c. Public health and safety
   d. Cultural development
   e. Manpower development

2. Natural Resources Policy:
   a. Rural land use policy
   b. Flood damage reduction
   c. Water and air pollution control
   d. Outdoor recreation policy
   e. Agriculture
   f. Forestry conservation and development
   g. Fish and wildlife

3. Physical environment:
   a. Urban form policy
   b. Waste disposal
   c. Transportation
   d. Public facilities

4. Economic Development Policy:
   a. Capital resources
   b. Manpower training
   c. Regional economics

5. Government Administration:
   a. State government organization
   b. Local government organization
   c. Federal-state-local relationships

These are only examples of the specific issues that need to be scrutinized by the planning process.

The next question is: How is this to be done? First, let me say that each of these issues I just listed poses certain difficult questions in search of some hard answers.

One of the prerequisites of good planning therefore is *asking the right questions first.* I think many of our plans never find the right answers because they never pause long enough to ask the right question. They go too deep into the "how" and the "where" and the "who" of the plan without paying adequate attention to the "why."

In order that the planning process be related to decision-making the following steps in the process must be adequately emphasized:

1. Identification of the issues—problems where public decisions are necessary.
2. Identification of possible public objectives related to the issue—specific guides to public policy.
3. Analysis of constraints that act to limit the attainment of some proposed objectives—these to include physical, economic, and financial, as well as political constraints.
4. Delineation of those objectives which seem feasible, based upon the results of the constraints analysis.
5. Analysis of general consequences of implementing the feasible objectives.
6. Identification of the tools of public policy that are or can be made available to attain the desired objectives.

Each of the issues listed above can be taken through this process. In this manner the policy-maker is likely to make an enlightened decision based upon the objective analysis sketched here and tempered by his own political or subjective judgment.

The significant point here is that *decisions based on the "planning" approach are going to be better than if no planning was done at all.* Moreover, the cost of instituting this process into decision making will result in less costly—more rational government.

Comprehensive Local Planning

LLOYD ANDERSON

The State Division of Planning and Development has an important and difficult task because it operates on a statewide policy level and covers such a large area; this is more difficult than local town planning because of the communications involved and because it is less specific.

As I look at the Institute program, I can see that you librarians have been learning about the broad general subject of planning. The titles—planning concept, planning process, dimensions of a plan, planning environment, data collection, processing problem solving and decision making, testing tentative plans, initiating action on approved plans, keeping up-to-date on progress of plans—make me think I am in a meeting of the American Institute of Planners, though the subject matter within any of these titles may be different.

Your relationship with your Board of Trustees is similar to a planner's relationship to his private client where the client has the controlling and final decision. In contrast, the public planner in cities and counties works with and reports to a number of different department heads who are concerned with separate and only loosely related aspects of a comprehensive plan. He deals with a number of land uses and economic factors and has to consider location of public facilities, transportation needs, and economic forces. Among these, of course, are libraries.

Library Master Plan

In one California community, San Mateo County, the library master plan was incorporated into the comprehensive plan for the county. The library element of the plan gives full consideration to the library's objectives and standards, which are: two books per capita, a full range of services to all age groups, a staff of five full-time people per 10,000 population, one-third of these professional, new sites to be established as needed, strong branches—each branch to serve 25,000-50,000 people, with all persons having library services within a 1½ mile radius. Libraries should be located in major shopping centers. 25,000 volumes are a minimum, and the library should be open 8 hours a day, 5 days a week. If a bookmobile is used, it should be air-conditioned and it should carry 3,500 to 4,000 books, with a collection of 10,000 to 15,000 books backing it up. There should be reciprocity with other libraries in the metropolitan area. A study should be made for a master plan for future expansion of the library system by a qualified librarian. The plan should be updated regularly.

Community planners are particularly interested in the librarian's thoughts and recommendations as to where the library should be located. Usually the librarian wants the library to be in a commercial area

but the city council owns property at the edge of town and that's where it ends up. However, the community planner can help librarians in formulating their plans by providing information which will act as a guide; trends in population densities, future location of business, industry, schools, and other information. The librarians should make their plans and policies well known so that they may be specifically noted for eventual incorporation into a plan. The plans for a central business district where a library may be located, are complex and involve a long process of negotiation before any action can begin. It is necessary, therefore, that the librarian keep in touch with the planner so that when the comprehensive plan is evolved the librarian's plan will be included. When the comprehensive plan is presented to the city council and approved, it then becomes a protection against future arbitrary decisions concerning the library—or any other city facility. To be of use in this way the library's master plan should include details such as location, size of building and staff, bookmobile, and other factors.

Elements of the Plan

Other elements in the comprehensive plan are: transportation; residential, commercial and industrial land use; public buildings and facilities, including schools, parks and playgrounds; and semi-public uses. Usually before these plans are made, there is the need to look at the population and economic prospects to see if and where the town will grow; or where it will change. This population and economic prospect aspect leads the planner into dealing with the compilation of accurate statistics in a manner usable for a variety of different purposes. The planner is concerned with organization of statistical information. In smaller towns the transportation elements deal with roads; in larger cities with major bus routes, freeways and major streets that are related to the movement of people. After preparing the comprehensive plan—the transportation plan, land use plan, public buildings and facilities plan—then ways to implement it must be worked out.

Implementation

Implementation is done through zoning, subdivision regulations, capital improvement programs, land acquisition and easements, to mention a few.

Zoning is one of the most common methods used and perhaps one you are familiar with, but as a device for implementing comprehensive planning, it has been generally a failure, though it has been used successfully to prevent abuse of land in residential areas by preventing the intrusion of non-residential uses into them. We have one great mess on our hands in an enormous number of areas in metropolitan America, and metropolitan America is going to continue to grow and become more complex.

Oregon between 1950 and 1960 grew 17 to 20 percent. During that same period, there was a 12 percent decline in the rural population and a 35 percent increase in urban population. People moving from the farms to the cities increase the problems within them. These problems require more sophisticated solutions and, unfortunately, the solutions we have used up to now, particularly zoning, have not been adequate. A major part of the answer, I believe, lies in public education, understanding, and insight.

Subdivision regulations, another implementation device, are adopted to control the subdivision of land, locating roads properly and setting up patterns of development in residential areas and to a limited extent, in commercial and industrial areas. Los Angeles is a good example of subdivision laid out within a framework of subdivision control.

Policies within the Housing and Home Finance Agency are encouraging other types of housing besides single family where there is increased density of population. Our private land planners are designing residential developments with up to twenty units per acre instead of three to five, as in single family dwellings, thus getting more open space, as much privacy, and better developments than in the traditional developments of single family housing. In the future there will be more of this. These policies are a significant influence in plan implementation.

Another way that plans are implemented is the use of a capital improvement program; librarians are affected by this program. A common five-year capital improvement program would list some of the following major facilities: sewers, water, libraries, and schools and show a priority for such improvements. Schools often capture a sizeable share of the tax dollar and represent serious competition in the city to other organizations trying to reach their goals. There are though, some examples of cities where this tax pie is sliced equitably and a successful program is accomplished.

Plans are implemented by acquisition of land. A stimulus to public acquisition of land is financial assistance from the Urban Renewal Administration. Large areas are cleared and redeveloped by public acquisition and then resold to private enterprise. There may be a more limited approach to land acquisition in the immediate future. This approach would be the purchase of easements rather than ownership of the land. An effort was made to pass an act during the last legislature to get easements purchase authority in Oregon. It failed but may come up again.

The nature of systematic planning in Oregon has been recognized in the last ten years. The federal grant program for planning provides funds which have assisted in the development of surveys and plans. These funds can help in library planning if the library plan is a part of a comprehensive plan.

I indicated earlier in my remarks that the way to get a successful program is through public enlightenment. Isolated pockets of good development such as the civic center in Eugene can stir the imagination of people in a community to make them wish to do better things. There is a need

now to translate such general plans into the specifics for downtown areas, parks, or recreation areas. I believe there is every indication that this is going to happen, now that there is both local and federal administration money available and widespread community interest.

Comprehensive Planning in the Electric Utility Industry

James G. Gruetzman

I am particularly glad to be here today because, as an electric utility planner, I know how much we depend on our library and have a real appreciation for the work of our library staff. Certainly, no plan can be better than the sources of information on which it is based.

Today I shall sketch the nature of electric utility planning, present a few examples of utility planning problems, discuss our approach to these problems and important ways in which our library supports the planning staff.

The Bonneville Power Administration performs an electric utility function of marketing the power from all the Federal hydro-electric dams in the Pacific Northwest—some 26 plants in Oregon, Washington, Idaho and Western Montana. To carry the power from the plants to the load centers, BPA has in operation about 9,500 miles of high voltage transmission, and another 1,000 miles under construction. We sell the power at wholesale to nearly 100 electric utilities, both investor owned and publicly owned throughout the region, to very large electro-process industries, and to governmental agencies such as the Atomic Energy Commission's Hanford Works and the Puget Sound Navy Yard. At present we are supplying about one-half of all the electric energy in the region, and about two-thirds of the industrial electrical energy requirements.

Although in the industrial world generally there is an increasing reliance upon market and sales forecast in budgeting for long-term capital expenditures, the electric utility industry of necessity has been the leader in the field of long-range planning. The long life of our installations, the extensive lead time frequently required, the very magnitude of our plant and investment, the irreversibility of so many of our decisions, and the possibility that our mistakes may be equally irreversible, have made the necessity of long-term planning well recognized in the utility field. As examples of long life we can cite the hydro-projects which, although amortized over a 50-year life, have a much longer useful life, or the

tower transmission lines with 35-year lives. These facilities must be carefully located so as to be useful and revenue-producing throughout their service lives, and thus pay off the capital investment. Electric utility capital expenditures for generation, transmission and distribution facilities are very large—in the United States expenditures are currently about 14.5 million dollars every day. The industry's capital requirements in the next six years will be as much as in the previous 80-year history of the industry. The Pacific Northwest utility plant investment (Federal, private and public) is at present on the order of nearly 2 million dollars each day. Over the course of the next ten years it will become even larger. If the cost of power to the consumer is to be kept low, every dollar must be spent prudently.

In the Pacific Northwest, Federal, publicly owned, and investor owned generation and transmission facilities are linked together by a vast regional transmission network—part of which is owned by BPA and part by other electric utilities. Power from both Federal and non-Federal hydro-electric projects flows into this grid. Because of BPA's position as one part of a regional utility pool, a high degree of liaison and agreement is required among all parties, in both planning and operational activities, for the preparation of load market forecasts which provide the basis for scheduling and operating of generation and transmission facilities.

The public utilities' primary responsibility is to provide an adequate and dependable supply of electrc power at all times and to all places where it is required. To do this we must know years ahead where power will be required, when it will be needed, and in what amounts. Electric load estimates or market estimates therefore constitute the foundation for all planning in the electric utility business. Every distributor of electric power, large or small, wholesaler or retailer, requires accurate load estimates for power supply studies. These are used to schedule sources of generation, system transmission and distribution studies, budget preparation to finance required new investments in plant, rate studies for revenue analysis, and sales promotion programs to insure that the facilities are fully loaded, thereby lowering unit costs and making it possible to keep costs to the consumer at the lowest possible level.

Detailed load estimates are prepared month by month for 10 years ahead. One hundred twenty estimates of peak load and 120 estimates of energy load for each substation makes 240 estimates for each substation. When multiplied by hundreds of substations this means literally thousands of individual estimates.

BPA has assigned economists in each of its Area Offices to work with its utility customers in the preparation of load studies. A load study first requires an analysis of the economic characteristics of the study area covering its natural resources, industrial and employment opportunities, and its potential for growth. Population change in the Pacific Northwest, at least, is dependent upon opportunities. Some areas may be an exception to this rule such as Arizona where so much of the immigration con-

sists of people who "already have it made." But here in the Pacific Northwest, immigration is dependent on employment opportunities. Future employment is the basis for our population estimates. These in turn form the basis for estimates of the number of residential, commercial, industrial and other classes of electric consumers. The total estimated number of consumers for a given delivery point, when multiplied by the use per consumer, gives us the estimated load. Several customers may take power at a single delivery point. The sum of these estimates determines the planned transformation capacity of the substation. The sum of several substations may be used to determine the capacity and design of a transmission line. The sum of all loads in the region is used to plan and schedule required generation. These thousands of figures are punched on IBM cards and coded so that load data may be tabulated to meet a variety of planning requirements. For example, loads throughout the region are coded to show the particular rate schedule at which the power is sold. Machine sorting of load estimates by rate schedules may be used to prepare a revenue estimate. Or the total regional loads for a selected winter season may be totaled and averaged by machine for purposes of reservoir regulations.

Our planning may be classified according to the time period covered. Regulating the reservoirs and scheduling the power planning proceeds on an annual basis. Construction planning covers from ten to twenty years. We also try to look ahead for as long as fifty years to be sure that the facilities we install today will be useful and economical throughout the life of the facility.

When our hydro supply is exhausted, only about 15 years from now, what will be the most economical energy source—coal, oil, gas-fired thermal generation, or nuclear generation? Will some of the so-called new "exotic" sources be economical which convert chemical or heat energy directly into electricity? Will the generation be at the load center, thus saving transmission cost; or will it be in remote areas requiring increased transmission? Loads are predicted to grow from 12 million kilowatts today to nearly 100 million kilowatts by the turn of the century only 35 years from now. How can we transmit this power to the load centers when our right-of-way through mountain passes are already limited? Transmission corridors through the forests and mountains take a lot of land. How can we conserve this use of land? Higher voltages, of course, carry much large ramounts of power over the same right-of-way. Will present research in CRYOGENICS (the use of super-cooled conductors) prove the answer by permitting the entire Northwest loads to flow over two or three cables. Obviously, the answers to many of these problems require twenty-first century thinking today. This involves the ultimate problem of keeping our staffs from becoming obsolete in a period of rapidly changing technology. How do we stimulate creative thinking?

We depend to some extent on consultants with whom we contract to perform specific research activities. In this way we can maintain a stable

staff and rely on the consultants to carry the "peaks" that are encountered. At the same time we obtain experience not available on our own staff. However, the primary load for keeping the staff informed falls on the technical library. The constant flow of new technical literature must be rapidly disseminated to the affected members of the staff. Until recently our librarian, relying on his memory, would route abstracts of technical literature to the individuals he thought might be interested. This operation is now being computerized, using a program developed by IBM.

I will attempt to describe it in my non-professional terminology. Each engineer engaged in planning activities will be "profiled," that is, he will be asked to read a number of technical papers and underline key interests which indicate his field of interest. These "key words" will be fed into the memory bank of the computer. As new abstracts reach the library, they will be read by the computer, and associated with the proper individuals. The system will be operational by January 1967, and at that time each engineer will begin receiving abstracts of interest to him via the computer.

By 1969, if the engineer desires more than the abstract he will be able to receive on request "hard copy" (a complete text) via facsimile services. The BPA library will be able to request photoprints via facsimile from a multitude of large libraries, government and otherwise, throughout the United States.

IV APPENDICES

Appendix A

OUTLINE OF INSTITUTE TOPICS

MONDAY

- Planning Concept—Anatomy of a Comprehensive, Integrated Plan
- Planning Process
- Dimensions of a Plan
- Planning Environment
- Organizing for Planning
  - Role of State Librarian
  - Role of Individual Librarian
  - Role of Staff of State Librarian—Each Level of Administration
  - Role of Staff of Individual Librarian—Each Level of Administration
  - Role of State Legislature and Departments
  - Role of Federal Government

TUESDAY

- Need Determination
- Keeping Up-To-Date With Changing Conditions Which May Influence the Future
  - Role of the Library
- Establishment of Goals and Objectives
- Establishment of Format for Submitting Proposals
- Establishment of Evaluation Criteria

WEDNESDAY

- Data Collection and Processing
- Problem Solving and Decision Making
- Testing Tentative Plan
- Preparing Final Plan
- Obtaining Approval of Plan

THURSDAY

- Implementation of Plans
- Initiating Action on Approved Plans
- Keeping Up-To-Date on Progress of Plans
  - Establishing Implementation Schedule
  - Collecting and Processing Control Data
  - Analyzing and Interpreting Significance of Variance
  - Taking Corrective Action

FRIDAY

- Evaluating Results at End of Implementation Period
  - Standards of Measurement
  - Results Achieved
- Interpretation of Variance
  - Report Results
- Auditing Overall Planning Process
  - Relative to State Objectives and Goals
  - Relative to Sound Principles of Administration

INSTITUTE STAFF

Program Chairman: Eloise Ebert, State Librarian

Consultant and Lecturer: Dr. Preston P. LeBreton
Professor LeBreton is author of *Planning for Small Business*, and *General Administration: Planning and Implementation*, and co-author of *Planning Theory*.

SPECIAL LECTURES:

Tuesday: "Forecasting—Significant Trends of Interest and Concern to Librarians"
Professor Donald N. Johnson, Associate Director of Urban Planning, Bureau of Municipal Research, University of Oregon

Wednesday: "Operations Research" (A team presentation)
Dr. Robert C. Meier, Associate Professor of Production and Policy, University of Washington
Dr. William T. Newell, Associate Professor of Policy, Personnel Relations, and Production, University of Washington

Thursdays: "Comprehensive Planning in Other Fields" (A panel on present planning efforts of each group of interest to Librarians)

Moderator: Stanley W. Bryan, Office of Planning and Institutional Research, University of Oregon

S. H. Mallicoat, Administrator, Oregon Division of Planning and Development, Portland

Lloyd Anderson, Director of Planning Services; Cornell, Howland, Hayes, and Merryfield, Planning Consultants, Portland

James G. Gruetter, Chief, Branch of Power Marketing, Bonneville Power, Portland

Appendix B

SELECTED READING LIST

Pennis, Warren G., Beane, Kenneth D., and Robert Chin. *The Planning of Change.* New York, Holt, Rinehart & Winston, 1961. (PC)

Branch, Melville C. *The Corporate Planning Process.* New York, American Management Association, 1962. (CPP)

Cyert, Richard and James March. *Behavioral Theory of the Firm.* Englewood Cliffs, N.J., Prentice-Hall, Inc., 1963. (BTF)

Ewing, David W. *Long-Range Planning for Management.* New York, Harper & Row, 1964. (LRPFM)

Jones, Manley H. *Executive Decision Making.* Rev. ed. Homewood, Illinois, Richard D. Irwin, Inc., 1962. (EDM)

Le Breton, Preston P. *General Administration: Planning and Implementation.* New York, Holt, Rinehart & Winston, Inc., 1965. (GA)

Le Breton, Preston P. and Dale A. Henning. *Planning Theory.* Englewood Cliffs, N.J., Prentice-Hall, Inc., 1961. (PT)

Leibenstein, Harvey. *Economic Theory and Organizational Analysis.* New York, Harper & Brothers, 1960. (ETOA)

Payne, Bruce. *Planning for Company Growth.* New York, McGraw-Hill Book Company, Inc., 1963. (PFCG)

President's Commission on National Goals. *Goals for Americans.* Englewood Cliffs, N.J., Prentice-Hall, Inc., 1960. (GFA)

Simon, Herbert A. *The New Science of Management Decision.* New York, Harper & Brothers, 1960. (NSOMD)

Spencer, Milton H. and Louis Siegelman. *Managerial Economic* . Homewood, Illinois, Richard D. Irwin, Inc., 1959. (ME)

Steiner, George A. *Managerial Long-Range Planning.* New York, McGraw-Hill Book Company, Inc., 1963. (MLRP)

Thompson, Stewart. *How Companies Plan.* New York, American Management Association, 1962. (HCP)

Daily Reading Schedule

MONDAY
Planning Concept, Process
Organizing for Planning

PT—Chapters 1, 2, 7, 8, 9
GA—Chapters 1, 2, 3, 4, 5, 11
PFCG—Chapters 1, 2, 9
MLRP—Select one chapter (3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19)
Also read chapter 1, 2, 20
LRPFM—Also read chapter 1, 2, 3, 4, 5, 14, 15, 16, 17, 18, 19, 20, 21, 22, 28
EDM—Also read chapter 9
CPP—Also read chapter 1, 2. 3, 4
HCP—Section I—How Companies Plan
Section III—Case Studies and Experience in Organization and Operations
NSOMD—Book containing only fifty pages
BTF—Chapters 1, 2, 6

TUESDAY
Need Determination
Goals and Objectives

PT—Chapter 3
PFCG—Chapters 3, 4
LRPFM—Chapters 39, 40, 41, 42, 44, 47
EDM—Chapters 1, 2, 3, 4, 10, 11
ME—Chapters 1, 2, 3
GFA—Chapters 1-15 (General reading)
HCP—Section II—Problem Solving: Objectives and Impetus
BTF—Chapters 3, 4

WEDNESDAY
Problem Solving and Decision Making
Preparing Plan
Gaining Approval

PT—Chapters 4, 5, 6, 10, 11
PFCG—Chapters 5, 6, 7, 8, 10, 11
LRPFM—Chapters 31, 32, 33, 45
EDM—Chapters 5, 6, 7, 12
ME—Chapters 4, 5, 6, 7, 8, 9, 10, 11, 12 (General reading)
CPP—Chapter 5
HCP—Section II—Problem Solving: Objectives and Impetus
BTF—Chapters 5, 9, 11

THURSDAY
(Implementation)

GA—Chapters 6, 7, 8, 9, 10
EDM—Chapters 8, 14
CPP—Chapter 6
POC—Should be read over for general opinion

FRIDAY
Evaluating Results
Auditing Overall Planning Process

PT—Chapter 12
GA—Chapter 2 (pp. 45-50)
GA—Chapters 6 (pp. 127-132), 12
PFCG—Chapter 12
CPP—Chapters 6, 7

Appendix C

PARTICIPANTS

FIDELIA ALBUSH, Librarian, Kennedy Junior High School, Eugene

NORMAN D. ALEXANDER, Head of Public Services, Portland State College Library

OMAR A. BACON, Librarian, Public Library of Medford and Jackson County

MRS. JONATHAN BENJAMIN, West Lane Community Library

DR. JEAN P. BLACK, Librarian, Portland State College Library

MRS. HELEN R. BROADBECK, Librarian, Crater High School, Central Point

SUSAN E. BROADBENT, Librarian, Gilbert School, Portland

MRS. ARLIE BROWN, Trustee, Milwaukie Public Library

JAMES H. BURGHARDT, Associate Librarian, Library Association of Portland

MRS. MARGARET A. CAMM, Consultant, Montana Library Commission

C. EDWARD CARROLL, Librarian, Southern Oregon College Library

MRS. ROSE MARIE CAUGHRAN, Librarian, McMinnville Public Library

MRS. WILLIAM DASHNEY, Trustee, Oregon State Library

ROSE DAVIDSON, Consultant, Oregon State Library

MRS. ALMA DICKIE, Librarian, Lake Oswego Senior High School

MRS. ALMA DOBBERFUHL, Librarian, Concordia College and High School, Portland

MARY I. DOWNEY, Head of Extension Department, Library Association of Portland

ELOISE EBERT, State Librarian, Oregon State Library

RICHARD B. ENGEN, Head, Field Services Division, Oregon State Library

ROBERT F. FREELAND, Librarian, Helix High School, La Mesa, California

MRS. ANNA MARIE GOULD, Branch Coordinator, Douglas County Library

IVY GROVER, Librarian, Deschutes County Library

DR. CARL W. HINTZ, Librarian, University of Oregon Library

PHYLLIS HOCHSTETTLER, School Library Consultant, State Department of Education, Salem
SHIRLEY HODGMAN, Library Supervisor, West Linn Public Schools
MRS. HELEN HOWARD, Librarian, State Tax Commission
DONALD R. HUNT, Associate Librarian, Oregon State University Library
MRS. IAN B. JAMIESON, Trustee, Gilliam County Library
MRS. NANCY JARVIS, Elementary Librarian, Ontario Public Schools
HOLWAY JONES, Social Science Librarian, University of Oregon Library
MRS. EDNA R. KARCZAG, Librarian, Klamath County Library
MRS. JEANNE LARSON, Librarian, Corvallis Public Library
DR. PRESTON P. LE BRETON, Professor and Chairman, Department of Policy, Personnel Relations and Production, College of Business Administration, University of Washington
FREDERICK F. McLEAN, Librarian, Southwestern Oregon College Library, North Bend
BROTHER DAVID MARTIN, C.S.C., Librarian, University of Portland Library
BARBARA J. MAUSETH, Consultant, Nevada State Library
MRS. FLORENCE L. MOBERLY, Librarian, Josephine County Library
CLARA E. NASHOLM, Librarian, Eugene Public Library
MRS. ADDIE MAY NIXON, Librarian, Klamath Falls Public Library
MRS. W. S. OUDERKIRK, Trustee, Newport Public Library
MRS. MARTHA PARSONS, Librarian, Lebanon Public Library
MRS. CLEO E. PECK, Supervisor, Instructional Materials Center, David Douglas High School, Portland
MARY E. PHILLIPS, Librarian, Library Association of Portland
LUELLA R. POLLOCK, Librarian, Reed College Library
MRS. BETH PRIDEAUX, Librarian, Stayton High School
MRS. FERN C. PRIOR, Librarian, Treasure Valley Community College Library, Ontario
MRS. MARIE SCHULTZ, Assistant Director, Field Services, Texas State Library
LAURENCE H. SOLOMON, Consultant, Oregon State Library
LOIS TISH, Librarian, Cascade College Library, Portland
MRS. MYRNA E. VAN HORN, Librarian, Springfield Public Library
MRS. RUTH WATSON, Librarian, Coos Bay Public Library

Appendix D

INSTITUTE SPEAKERS

LLOYD E. ANDERSON is manager of the Portland office of Cornell, Howland, Hayes, and Merryfield. He received a Bachelor of Science in Civil Engineering from the University of Washington in 1950. He has wide experience in urban and regional planning having served as planning administrator for the King County Planning Commission; first Director of the Multnomah County Planning Commission; Associate Director of the Bureau of Municipal Research and Services, University of Oregon; and Deputy Director of the Oregon State Department of Planning and Development. He has also participated in an industrial development study in Venezuela. He is a member of the American Institute of Planners; the American Society of Planning Officials; and the Urban Land Institute.

STANLEY W. BRYAN is Associate Professor of Architecture, School of Architecture and Allied Arts, University of Oregon; and Campus Planner and Architect in the Office of Planning and Institutional Research. He graduated from the University of Washington and received his Master of Architecture from Massachusetts Institute of Technology in 1948. He has had extensive experience as an architect in Washington, Oregon and California and is a registered architect in each state. He was a Fulbright research scholar in Finland in 1960-61. He has worked as a design consultant to the San Mateo County Planning Commission, Redwood City, California and in research on the future of the San Francisco Bay area.

JAMES G. GRUETTER is chief of the Power Marketing Division of Bonneville Power Administration. Power Marketing includes economic studies, load forecasts, industrial marketing studies, and sales promotions. He graduated from Reed College and received a law degree from Northwestern College of Law. He also attended the American University Graduate School in Economics. Mr. Gruetter has been a member of the National Advisory Committee on Loads to the Federal Power Commission. He is a member of the Committee on Sales and Business Development. He is a member of the Oregon State Bar and the Institute of Electrical and Electronic Engineers.

DONALD NOBLE JOHNSON is Associate Director, Urban Planning, Bureau of Municipal Research and Services, University of Oregon. He attended Grinnell College in Iowa and received his A.B. from Reed College in Portland in 1946. His varied experience includes positions as Su-

pervisor of Statistical Department and Senior Research Assistant, Federal Reserve Bank of San Francisco; Economist, Bonneville Power Administration; Highway Economist, Oregon State Highway Commission; and City Planner, Portland City Planning Commission.

SAMUEL H. MALLICOAT is the administrator of the Division of Planning and Development of the Department of Commerce in Oregon. He was recently elected director and member of the executive board of the Association of State Planning and Development Agencies. Previous to his present position, he was assistant manager of the Oregon Association of Railroads. He graduated from Oregon College of Education and Northwestern College of Law. He is a member of the American Industrial Development Council.

ROBERT C. MEIER is Associate Professor of Production and Policy in the College of Business Administrtation, University of Washington. He received his B.S. from Indiana University and his M.A. and Ph.D. from the University of Minnesota. He previously taught at the University of Minnesota. He has had considerable consulting experience with business firms and the U.S. Government and has presented papers at numerous professional meetings. He is currently engaged in research on the use of computers in managerial science. He prepared *PERT-Critical Path Orientation Course*, for the Department of the Navy and co-authored (with S. H. Archer) *An Introduction to Mathematics for Business Analysis* published by McGraw-Hill in 1960.

WILLIAM T. NEWELL is Associate Professor of Policy, Personnel Relations and Production in the College of Business Administration, University of Washington. He received his B.A. from the University of Colorado, an M.B.A. from the University of Denver and his Ph.D. in 1962 from the University of Texas. He has had prior academic experience at the Sloan School of Management of the Massachusetts Institute of Technology and at the University of Texas. He participated in the Aerospace Industry Manufacturing Seminar and the Aerospace Industry Purchasing Seminar sponsored by the Boeing Company and the University of Washington. He is currently working on a research project for the Western Management Science Institute on computer simulation as well as other research related to planning and managerial decision making. He is author of *Long Range Planning Policies and Practices*, issued by the Bureau of Business Research, University of Texas.