

Professions
(1956)

c.2

Supervision of Scientific and Engineering Personnel

Compiled by

JOHN T. LLOYD

Clarence J. Hicks Fellow, 1954-1955

and

ROBERT D. GRAY

Director, Industrial Relations Section

Bulletin Number 26

Industrial Relations Section

CALIFORNIA INSTITUTE OF TECHNOLOGY

Pasadena, California

INSTITUTE OF INDUSTRIAL
RELATIONS LIBRARY
UNIVERSITY OF CALIFORNIA
BERKELEY

SEP 14 1956

Supervision of Scientific and Engineering Personnel

Compiled by

JOHN T. LLOYD //

Clarence J. Hicks Fellow, 1954-1955

and

ROBERT D. GRAY //

Director, Industrial Relations Section

(**Bulletin Number 26**)

Industrial Relations Section

CALIFORNIA INSTITUTE OF TECHNOLOGY

Pasadena, California 1956

COPYRIGHT 1956 BY
INDUSTRIAL RELATIONS SECTION
CALIFORNIA INSTITUTE OF TECHNOLOGY
PASADENA, CALIFORNIA

No portion of this Bulletin may be reproduced without the written permission of the Industrial Relations Section, California Institute of Technology, except by a reviewer who may wish to quote brief passages for a review in a periodical.

PRINTED IN U.S.A.
CITIZEN PRINT SHOP, INC.
LOS ANGELES 13

ACKNOWLEDGEMENTS

This outline was derived from a number of conferences and meetings sponsored by the Industrial Relations Section of the California Institute of Technology. In 1953 the Industrial Relations Section held its first Summer Conference on "Supervision of Engineering, Scientific, and Technical Employees." As a result of this program a series of ten evening meetings was held on the same subject between January and March, 1954. Again in the summer of 1954 a full-time conference was held and this was followed in the spring of 1955 by two series of evening meetings. During 1955-56 other groups discussed preliminary drafts of this summary. The outline, therefore, is a composite of the subjects discussed and the opinions expressed in these meetings. Some information was obtained from the literature available in the Industrial Relations Library and other libraries of the California Institute of Technology. Most of the material, however, has been drawn from the discussions and outlines of the following conference leaders:

GILBERT BRIGHOUSE
Chairman, Department of Psychology
Occidental College

ARTHUR CHERKIN
Vice President and Director, Research
Don Baxter, Inc.

WILLIAM H. CORCORAN
Associate Professor of Chemical Engineering
California Institute of Technology

ROBERT D. GRAY
Director, Industrial Relations Section
California Institute of Technology

L. CLAYTON HILL
Professor of Industrial Relations
University of Michigan

THOMAS KENNEDY
Director, Industrial & Public Relations Department
Atlas Powder Company

RUSSELL L. MOBERLY
Director, Management Center; and
Professor of Business Administration
Marquette University

JAY L. OTIS
Director, Psychological Research Services
Western Reserve University

PAUL FIGORS
Associate Professor of Industrial Relations
Massachusetts Institute of Technology

C. T. REIBOLD
General Engineering Personnel Supervisor
Pacific Telephone and Telegraph Company

JOHN E. SHERBORNE
Assistant Manager of Research
Union Oil Company of California

DAVID G. SOASH
Director of Research
Merchants and Manufacturers Association

L. ROBERT SORENSEN
Lecturer, Industrial Relations;
Personnel Representative, Jet Propulsion Laboratory
California Institute of Technology

JOHN R. WEIR
Associate Professor of Psychology
California Institute of Technology

A. M. ZAREM
Manager, Los Angeles Division
Stanford Research Institute

TABLE OF CONTENTS

	PAGE
I. CHARACTERISTICS AND DEVELOPMENT OF THE PROFESSIONAL EMPLOYEE	1
A. Definition of the Professional Employee	1
B. Characteristics of the Professional Employee	2
C. Incentives for the Professional Employee	3
II. BUILDING AND MAINTAINING A GOOD TECHNICAL TEAM	5
A. Nature and Function of the Technical Team	5
B. Selling the Technical Team to Management	5
C. Selection of the Technical Team	6
D. Promotion of Present Employees	6
E. Hiring New Employees	9
F. Recruiting for the Technical Team	10
G. The Application Blank	11
H. Interviewing	12
I. Testing	15
J. Selection of New Employees	16
K. Integrating New Men into the Technical Group	16
L. Working Conditions	18
M. Training	19
N. The Supervisor's Role	21

III. APPRAISAL OF PERFORMANCE	25
A. Why Appraise Performance?	25
B. Problems of Appraising Performance	25
C. Performance Rating Methods	26
D. Development of a Plan for Appraising Performance	27
E. Administration of the Appraisal Plan	28
IV. THE SUPERVISOR'S ROLE IN PROFESSIONAL DEVELOPMENT	29
A. Development of the Supervisor Himself	29
B. Requirements for Success as a Professional Employee or as a Supervisor	29
C. On-the-job Training	32
D. Methods for Increasing the Professional Employee's Interests, Experience, and Knowledge	33
E. Specific Knowledge and Training Requirements of Higher Jobs	34
V. POLICIES FOR SALARY ADMINISTRATION	35
A. Introduction and Preliminary Concepts	35
B. Methods of Determining Salaries	37
C. Possible Bases for Establishing Salaries	37
D. Prerequisites for Systematic Salary Administration	38
E. Basic Problems of Systematic Salary Administration	38
F. Separate but Interrelated Aspects of Systematic Salary Administration	38
G. The Use of Job Descriptions	39
H. Preparing Job Descriptions	39
I. Job Evaluation	41
J. Other Salary Policies	42
K. Functions of the Personnel Department in Systematic Salary Administration	42
L. Functions of the Supervisor in Systematic Salary Ad- ministration	42

VI. BENEFIT PLANS	43
A. Principles Underlying Benefit Plans	43
B. Reasons for Establishing Benefit Plans	43
C. Costs of Benefit Plans	44
D. Analysis of Risks of Employment	44
E. Who Should Benefit	45
F. Tests of a Benefit Program	45
G. Premature Death	45
H. Old Age	46
I. Illness and Accident	47
J. Unemployment	48
K. Supplemental Benefit Plans and Employee Services	48
L. General Problems of Administering Benefit Programs	49
VII. HANDLING COMPLAINTS AND GRIEVANCES	51
A. General Objective	51
B. Definition of Basic Words	51
C. Review of Characteristics of Professional Employee	51
D. Prevalent Sources of Grievances of Professional Employees	52
E. Recognizing an Employee with a Complaint	53
F. How to Forestall Complaints and Grievances	54
G. A Plan of Action for Handling Complaints and Grievances	54
H. Handling Difficult Problems by Interviews	57
VIII. UNIONIZATION OF PROFESSIONAL EMPLOYEES	63
A. The Legal Background	63
B. Reasons for Unionization of Professional Employees	64
C. Do Engineers and Scientists Want Unionization?	65
D. Can Unionization Solve the Basic Problems?	65

IX. COMMUNICATIONS	67
A. Definition	67
B. Essential Elements for Communication	67
C. Types of Communication	67
D. Methods of Communication	68
E. How to Communicate	69
F. Problems of Communication in Management	69
G. What to Communicate to Employees	70
H. Who Should Be Told	71
I. Who Should Tell	71
J. Importance of the Supervisor in Communication	71
K. Timing of Communications	72
L. Role of the Personnel Staff	72
M. Principles Underlying Successful Communication	72
X. ORGANIZATION OF A PROFESSIONAL WORK GROUP	75
A. General Statement	75
B. Organization Planning	75
C. Basic Principles of Organization	77
XI. WHAT PROFESSIONAL WORKERS EXPECT OF THEIR SUPERVISORS	79
A. The Growth of Business Administration	79
B. The Qualities of Leadership that Enrich the Personal Life of the Individual in Business	80
C. The Supervisor's Role in the Direction of His Subordinates	81
D. "The Unwritten Laws of Engineering"	82

I

Characteristics and Development of the Professional Employee

A. Definition of the Professional Employee

1. There is no one concise definition available.

Regulations under the Wage and Hour Law include the following requirements for a professional employee:

- a. His "primary duty" must consist of the "performance of work requiring knowledge of an advanced type in a field of science or learning customarily acquired by a prolonged course of specialized intellectual instruction and study . . ."
 - b. The work must require "the consistent exercise of discretion and judgment in its performance."
 - c. The work must be "predominantly intellectual and varied in character" and "of such a character that the output produced or the result accomplished cannot be standardized in relation to a given period of time."
2. Although a college degree in engineering or science does not make a man professional, it is useful in showing, to some extent, the following information about an unknown individual:
 - a. The man has been taught to think and analyze.
 - b. He has had an opportunity to learn how to express himself.
 - c. He has had access to a large amount of knowledge not otherwise readily available.
 - d. He has had experience in working on analytical problems.
 - e. He has been screened at the college level.
 3. In this outline the word "professional" refers to scientists and engineers only.

B. Characteristics of the Professional Employee

1. The professional employee has the ability to:
 - a. Recognize the problem
 - b. Marshal facts and sift essential information from unessential information
 - c. Organize his efforts and think or carry the problem through to a logical and sound conclusion
2. The professional employee thrives on knowledge.
 - a. He is curious.
 - b. His curiosity leads him to seek more knowledge.
 - c. He recognizes that the lack of knowledge is itself a problem.
 - d. He has an urge to solve problems.
 - e. He has the desire to transmit his findings and build on them.
3. The professional employee needs approval of his intellectual accomplishments, a major source of prestige.
4. The professional employee feels a need for independence and freedom of thought and action.
 - a. He respects and appreciates good supervision, but he wants to maintain his state of professionalism and independence.
 - b. He may accept from his supervisor an indication of the objective of the required research and the nature of the problem, but he prefers that the method of attack be left to him.
5. The professional employee is "self-energized."
 - a. Many of his rewards come from within himself.
 - b. He is independent of others for motivation.
 - c. He may be willing to perform menial and painstaking operations as a means of verifying or establishing something creative. He would not be satisfied to perform similar operations without the reward of creative achievement. (This may explain his reaction to "paper work.")

6. The professional employee has "drive."
 - a. He has the capacity for work coupled with the constructive direction of personal effort.
 - b. He has the desire to achieve results for the sake of the results as well as for personal gain.
 7. Management ability in the professional employee is dependent on skill in human relations.
 - a. Management ability and business success appear to be related to the amount of participation in school and civic functions.
 - b. Increased skill in human relations can be taught successfully to professional employees.
 - c. Professional employees can be evaluated with respect to effectiveness in human relations. From these evaluations, estimates of training needs and of growth potentials can be made.
- C. Incentives for the Professional Employee (incentives may be defined as factors and conditions which stimulate a professional employee to perform with satisfaction.)**
1. Recognition is often the primary incentive. It may take many forms, of which salary may or may not be the most important.
 - a. Recognition may come from several places:
 - (1) Within the laboratory or department
 - (a) From immediate and higher supervisors
 - (b) From fellow workers
 - (2) Within the company
 - (3) Within the industry, community, or profession outside the company
 - b. Specific recognition may be gained through:
 - (1) Writing of reports
 - (2) Oral presentations
 - (3) Committee activities
 - (4) Publication of findings
 - (5) Participation in educational programs
 - (6) Patents
 - c. Symbols of prestige include service pins, personal telephone, private office, routing list, staff meetings, etc.

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

2. Inspired leadership is a very important factor in creating incentive. The following conditions are essential for inspired leadership:
 - a. Adequate work direction
 - b. Understanding by supervision
 - c. Personal contact by management
3. The opportunity to grow stimulates the interest of the professional employee in the future of both himself and the company. Such opportunity can be provided by:
 - a. Training
 - (1) Day-to-day coaching on the job
 - (2) In-plant training
 - (a) Supervisory training
 - (b) Technical development
 - (3) Advanced university courses
 - b. Committee activities such as the following:
 - (1) Participation in management problems (identification with management)
 - (2) Interdepartmental coordinating committees
 - (3) Industry committees
 - c. Professional societies
4. Other incentives include:
 - a. Security
 - b. Travel
 - c. Challenging work
 - d. Working with well-known people
 - e. Pleasant physical surroundings

II

Building and Maintaining a Good Technical Team

A. Nature and Function of the Technical Team

1. The team in general refers to a primary group in daily work with face-to-face contacts.
2. The technical team is generally thought of as a team of individuals ranging from scientists and highly professional personnel to technicians, clerical assistants, and craftsmen. This group handles technical problems.
3. The functions of a technical team revolve about the following fundamentals:
 - a. Stating the problem or defining the purpose of the project
 - b. Analyzing the elements of the problem including economic and time considerations
 - c. Attacking the problem
 - d. Developing one or more solutions
 - e. Testing the solution

B. Selling the Technical Team to Management — Ask These Questions:

1. How important is the technical team to the company?
2. What will it cost the company to build a good technical team?
3. What will it cost the company not to build a good technical team?

C. Selection of the Technical Team

1. Promotion of present employees (see D.)
2. Hiring new employees (see E. to J.)

D. Promotion of Present Employees

1. Advantages of promotion from within the technical team
 - a. More is known about an employee than about an applicant:
 - (1) His knowledge and skills
 - (2) His attitudes
 - (3) His interests
 - (4) His abilities
 - b. There are fewer adjustments to and within the group. He is more easily absorbed if he is not a stranger.
 - c. Promotion within the department or company is an incentive for others.
 - d. It encourages self-development.
 - e. There is a chain reaction from promotion in which one promotion results in another to fill the newly formed vacancy. Thus one promotion may result in many and may be felt all the way to the bottom.
 - f. Promotion from within reduces the break-in period. The promoted individual already has a knowledge of the company.
2. Disadvantages of promotion from within the team
 - a. Promotion from within does not provide "new blood," added experience, or special knowledge.
 - b. It may appear to increase the total amount of training required. Each of the cumulative promotions requires training for the new jobs.
 - c. It may not provide the best talent available.
 - d. It may not meet needs during rapid expansion.
 - e. Cut-throat competition or feelings of jealousy may arise.

BUILDING AND MAINTAINING A GOOD TECHNICAL TEAM

3. Overcoming the disadvantages of promotion from within
 - a. Control the hiring and promotion procedure so that new blood can be absorbed.
 - b. Stimulate interest in training programs and professional societies so that new ideas can be introduced.
 - c. Plan policies and procedures for hiring, promotion, and retirement.
 - d. Use consultants to make new ideas available and to stimulate present employees.
4. Planning a program of promotion from within
 - a. Policies and procedures for hiring, promotion, and retirement need to be developed.
 - b. Resistance of the supervisor to interdepartmental promotion of a subordinate must be overcome. Discussion of the following questions may help to change the attitude of a supervisor:
 - (1) To what extent does a supervisor lose when one of his men is promoted?
 - (2) What may a supervisor lose if one of his men is not promoted?
 - (3) What does a supervisor gain when one of his men is promoted?
 - c. Bases for promotion must be established. The following should be considered:
 - (1) Satisfactory work on present assignment
 - (2) Estimate of performance on the proposed assignment
 - (3) Estimate of the ultimate capacity of the individual (subject to reappraisal and change)
 - (4) Length of service
 - (5) Physical condition
 - d. Complete job descriptions¹ must be available for better organization and for effective application of hiring and promotion policies.

¹Job description — the written statement of the operations, duties, equipment, methods, working conditions, organizational relationships, responsibilities, and other essential factors of a single job or position.

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

- e. Personnel records must be maintained to show the following information about the employee:
 - (1) Education and training (before and after employment)
 - (2) Experience before employment by the company
 - (3) Experience after employment by the company
 - (4) Rating of performance
 - (5) Personal information — age, sex, marital status, dependents, health, etc.
 - (6) Community participation
 - (7) Membership in professional organizations
 - (8) Publications, patents, accepted suggestions, etc.
 - f. A forecast of vacancies should be maintained to help plan promotions.
 - g. Assistance in the development of the employee needs to be provided.
5. The location of authority in making a promotion
- a. The personnel department acts in an advisory capacity only, but it helps make information available to the immediate supervisor about all qualified persons.
 - b. The immediate supervisor is responsible for making the final decision on a promotion.
 - c. Higher management is responsible for the actions of the lower management and must see that company policies are followed.
 - d. The employee has the final right to accept or reject a promotion. (Reasons for rejection may reveal conditions that should be corrected in the organization.)
6. Discussion of the promotion with employees
- a. The immediate supervisor needs to discuss the promotion with the employee who will be promoted. This is necessary to determine the acceptability of the promotion to the employee and to describe the responsibilities of the new position.

BUILDING AND MAINTAINING A GOOD TECHNICAL TEAM

- b. Employees who were considered but who will not be promoted should be told the circumstances of the final decision in order to minimize ill will and bitterness.
 - (1) Lay the groundwork for the decision ahead of time.
 - (2) Be frank and honest in explaining reasons for the decision.
 - (3) Assure the individual that he has been given careful consideration.
 - (4) Review the strengths and weaknesses of the individual with him.
 - (5) Restate the remaining opportunities that exist for him.
 - (6) Do not make any promises (explicit or implied) which cannot be kept.
- c. What may happen if such a discussion is not held?
 - (1) Will you know for certain that the employee wants the promotion?
 - (2) How will employee who is not promoted and who wants the promotion react when he learns from someone other than his supervisor that another person was selected?
 - (a) He may resent it.
 - (b) He may resent it and complain.
 - (c) He may resent it and quit.
 - (3) How will these attitudes of the employee affect the supervisor?

E. Hiring New Employees

- 1. Recruitment (see F.)
- 2. The application blank (see G.)
- 3. Interviewing (see H.)
- 4. Testing (see I.)
- 5. Selection (see J.)

F. Recruiting for the Technical Team

1. Sources of professional employees
 - a. Colleges and universities — current graduates and alumni
 - b. Professional associations
 - c. Friends of present employees (Why should bonuses not be given?)
 - d. Advertisements
 - e. Employment agencies and consultants
2. The selection of good employees depends upon getting acquainted with prospective individuals. This can be done by:
 - a. Interviewing and testing
 - b. Summer employment prior to graduation
 - c. Part-time employment
 - d. "Cooperative Plan" — the student alternates between formal education and practical experience on a job
3. Recruiting can be facilitated by having the prospect become acquainted with the company. A variety of methods can be used:
 - a. Plant visits by students
 - b. Lectures at schools and professional associations
 - c. Pamphlets distributed through schools
 - d. Summer employment prior to graduation
 - e. Part-time employment
 - f. Contests
 - g. Scholarships and fellowships
4. The initial interview should be conducted to find needed qualities and to eliminate only the obviously unqualified applicant. The danger in a poorly conducted screening interview is that candidates may be eliminated who are actually excellent potential employees. Once they have been rejected because of the screening interview, they are lost to the company.

5. The final selection of a new employee is the responsibility of his immediate supervisor. The applicant usually wants to meet his prospective supervisor. The personnel department should do only the preliminary screening. (The problem of hiring professional employees at present may appear to some to be too pressing to permit complete adherence to this rule.)

G. The Application Blank

1. Types of forms
 - a. Special form for professional employees
 - b. Supplemental form in addition to regular application blank
2. Questions on the application blank — there are two types of questions for the purpose of becoming acquainted with the applicant as well as learning about his background:
 - a. A closed-end question is one that requires a factual answer — a date, a name, or just "yes" or "no." For example:
 - (1) When were you born?
 - (2) Who was your last employer?
 - (3) Do you have any friends or relatives employed by the company?
 - b. An open-end question requires an extended answer which may reveal qualities of the personality and character of the applicant that should be explored in the interview. For example:
 - (1) What would you like to be doing in five years?
 - (2) What work experience have you enjoyed most and why?
 - (3) What attracts you to this company or industry?
3. Quality control of the application blank (weighted application blank)
 - a. To determine what information is wanted from the application blank, two to six of the following groups of employees in the company are established:
 - (1) Hired and doing well
 - (2) Hired and doing fairly well
 - (3) Hired and doing poorly
 - (4) Hired and quit but would be rehired
 - (5) Hired and quit but would not be rehired
 - (6) Filled out application but not hired

- b. The selected groups are then studied with respect to their answers to the following typical application blank questions. (Only a few are presented here. It is suggested that more be used.)
 - (1) Age
 - (2) Marital status
 - (3) Number of dependents
 - (4) Number of civic clubs
 - (5) Amount of life insurance
 - (6) Home ownership
 - (7) Number of jobs held and job changes
 - (8) Salary on last job
 - (9) Length of residence in the community
- c. It is possible to measure the relative importance of the various factors in predicting to which of the six groups an individual may belong. Based upon these findings a weighted application blank can be established, using only those factors which have a demonstrated relationship to success or lack of success on the job. Points may be assigned to the various questions and the total points for an individual will place him in one of the six groups.

H. Interviewing

- 1. An interview is any conversation between two individuals where the purpose, broadly, is to give information, get information, and influence attitudes.
- 2. The interview, to be reliable, must be skillfully conducted.
 - a. Studies have shown that interviewers are inconsistent with each other and with themselves.
 - b. Performance predictions are inaccurate.
 - c. The reliability of the interview improves with more specific job information.
 - d. The reliability of the interview improves with the use of trained interviewers. (Interviewing is a skill which many can acquire with training and practice.)

3. There are five basic interview forms.
 - a. The structured interview is one that has a predetermined series of subjects to be covered. The interviewer directs the conversation.
 - (1) The interviewer must know specifically what he is looking for.
 - (2) The structured interview covers the material rapidly with a minimum of prejudice.
 - (3) The structured interview provides similar information for the comparison of two or more applicants.
 - b. The non-directive interview encourages the applicant to lead and carry the conversation. The interviewer only follows the conversational path.
 - (1) Much is learned about the feelings, aspirations, and attitudes of the applicant.
 - (2) The applicant has an opportunity to express himself and feels free during the interview.
 - c. The stress interview which intentionally tries the emotions of an individual is in a developmental stage and shows promise where it is important to know how an individual may react under pressure. If used, special care should be placed on the termination of the interview in order to close it on a cordial level. There are four successive roles for the interviewer to play:
 - (1) Friendly
 - (2) Hostile
 - (3) Disinterested
 - (4) Friendly
 - d. Situation interviews place the applicant in an imaginary situation to find his reactions and decisions.
 - e. Combinations of the various interview forms exist to meet the specific requirement of a given interview.
4. Building a good technical team begins with the employment interview.
 - a. Primary functions of the employment interview:
 - (1) To obtain facts and impressions about the applicant for appraisal with respect to employment and placement
 - (2) To provide the applicant with sufficient information about the job and the company
 - (3) To promote good public and employee relations

- b. Planning the interview — know or determine the requirements of the job to be filled in terms of necessary qualifications and characteristics.
- c. Appraising the applicant
 - (1) Delay final appraisal of the applicant until the necessary information is obtained. Impressions of the statements and of the individual begin to form unconsciously from the beginning of the interview, but a premature appraisal hinders the information-gathering process.
 - (2) Make the appraisal on the basis of a comparison of all the information obtained against the job specifications. In doing this, consider how the individual is likely to react in the work situation.
 - (3) Make a constant effort to allow for biases or prejudices while appraising the applicant.
 - (4) Avoid classifying the applicant in terms of a previous holder of the job, and do not judge an individual's whole character from one particular good or bad quality.
 - (5) Consider such factors as:

(a) Age	(l) Physical well-being
(b) Appearance	(m) Professional interests
(c) Attitudes	(n) Reasons for leaving past employers
(d) Development potential	(o) References
(e) Draft status	(p) School grades
(f) Education	(q) Security status
(g) Experience	(r) Self-support through college
(h) Faculty recommendations	(s) Special abilities
(i) Hobbies and outside interests	(t) Student activities
(j) Minimum acceptable wage	(u) Technical ability
(k) Personality	
- d. Closing the interview
 - (1) At the close of the interview, the applicant should know clearly what his status is and what should be done next.
 - (2) If the applicant is acceptable, the interviewer should explain the job in sufficient detail for understanding.

- (3) If the applicant is not acceptable, the rejection should be made in such a way that he will feel fairly treated but will understand that no position is available for him. This may be accomplished by pointing out that the applicant is probably better suited for another type of work. This may bring him to eliminate himself. The interviewer may inform the applicant tactfully that his particular abilities do not seem to be suited to the jobs available.

I. Testing — A Means of Becoming Acquainted with an Individual's Potential

1. Test data are useful for measuring traits and abilities which cannot be determined by interview.
2. Tests provide data which will allow a reasonably accurate prediction of the future performance of an individual on a job.
3. Tests are designed to measure:
 - a. Intelligence — ability to learn
 - b. Aptitude — capacity to learn in a specific field
 - c. Job knowledge — present ability to perform
 - d. Personality — tendencies toward adjustment
 - e. Interests
4. Tests should not be used to the exclusion of other selection techniques.

J. Selection of New Employees

1. Who is responsible?
 - a. The personnel department is in a facilitating and advisory capacity only. It can aid in recruitment and in securing information about applicants. It can weed out obviously unqualified applicants. It can aid in handling paper-work. It can supply some information to applicants.
 - b. The immediate supervisor is responsible for making the final selection or recommendation for selection.
 - c. Higher management is responsible for the action of lower management and must see that company policies are followed.
 - d. The applicant has the final right to accept or reject an offer of employment.
2. Selection is more accurate from a negative than from a positive point of view. This means that the rejection of an applicant as not suitable may be more accurate than the choosing of the best qualified applicant. The lack of some qualifications may be more certain to result in failure on the job than the presence of such qualities will guarantee success on a job.
3. The decision to offer a position to an applicant should be based upon a careful appraisal of all facts brought out by:
 - a. Application blank
 - b. Interviews
 - c. Testing
 - d. Reference checks
 - e. Physical examination

K. Integrating New Men into the Technical Group

1. General facts about groups
 - a. Men are highly social and dependent.
 - b. The technical group has a common purpose.
 - c. Interdependence and perception of a group grow positively together.

BUILDING AND MAINTAINING A GOOD TECHNICAL TEAM

- d. Group feelings may develop from:
 - (1) Mutual achievement
 - (2) Mutual confidence
 - (3) Good leadership
 - (4) Interdependence
 - (5) Perception of the group
 - (6) Informal folkways
 - (7) Geography of the plant
 - (8) Commuting to work
 - (9) Forms of address
 - (10) Razzing and kidding
 - (11) Lunch-time activities
 - (12) Recreation off the job
 - (13) Communications
 - (14) Symbols of prestige — service pins, telephone, private office, routing list, staff meetings, etc.
- e. Dangers inherent in groups
 - (1) Allegiance to the group may take precedence over allegiance to the company.
 - (2) Resentment against new employees can make the job of integration into the group even harder.
- 2. The group must be considered when integrating a new employee into it.
 - a. The new man should be properly introduced to his job and to each member of his new group. The introductions can be spread over several days or weeks except for his immediate work group.
 - (1) Explain the new man's place to the men who will work around him.
 - (2) Explain the broad purpose of the company to the new man.
 - (3) Show the new man his work place and facilities for his use.
 - (4) Explain his job and employment conditions.
 - (5) Explain his individual duties.
 - (6) Reassure the new employee that his choice of company and industry was good.

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

- b. He must be included in the group folkways.
 - c. His work must be made meaningful to him. (Explain how his job affects or is affected by the jobs of people around him.)
 - d. The immediate supervisor should consult with the new employee frequently to find out how he is getting along and to help him into the group.
3. The employee's first day is most important. The greatest benefit or harm can be done on the first day.
 4. Do not give the new man too great a quantity of literature to read at first or he will not read any of it.
 5. Take advantage of paydays, lunch hours, coffee breaks, etc., to add to the employee's information about his job and its surroundings.

L. Working Conditions — The "Climate for Research or Engineering"

1. Physical environment
 - a. Adequate working space
 - b. Good lighting and ventilation
 - c. Lack of noise and vibration
 - d. Minimum of distractions
 - e. Good equipment
2. Organizational environment
 - a. Justifiable policies that encourage initiative
 - b. Procedures consistent with policies
 - c. Reasonable hours of work
3. Human environment
 - a. Effective supervision
 - b. Compatible fellow employees

M. Training — A Solution to the Problem of Controlling Motives, Goals, and Attitudes of Subordinates (Factors which characterize and motivate professionals have been discussed previously. Training can modify these factors to improve the efficiency of the team. It has been aptly stated that "education is a journey, not a destination."² A college education is an indication that a man has probably learned enough to earn while he continues to learn. It follows, therefore, that the employee should be encouraged to continue his learning and, to the extent justified, provision should be made by the company for his further development.)

1. Continued education and development may be encouraged by:
 - a. Reimbursing tuition paid for courses completed satisfactorily
 - b. Conducting seminars
 - c. Sponsoring company courses
 - d. Giving recognition for completion of courses (let top management know)
 - e. Making information about courses available
 - f. Establishing a training department
 - g. Sponsoring trips to technical meetings
 - h. Keeping a supply of technical magazines
 - i. Having a complete library and making time available for library research
 - j. Sponsoring membership in technical societies
 - k. Assisting with publication of papers
 - l. Recognizing publications
 - m. Paying for ideas and suggestions
 - n. Finding subjects for university extension courses to be taken in the plant
 - o. Encouraging membership in civic organizations and clubs
 - p. Giving a variety of assignments
 - q. Letting employees teach other employees (a great deal can be learned by teaching)
 - r. Stimulating committee activity

²A. C. Monteith, "Developing the Young Engineer," *Mechanical Engineer*, LXIX, No. 7 (July, 1947), p. 548.

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

2. In-plant training is valuable for continued learning.
 - a. Courses may be provided by the following:
 - (1) Universities
 - (2) Competent members of the company staff with a bent for teaching
 - (3) Outside lecturers
 - b. Training may provide the following:
 - (1) Information about the company
 - (a) Organization
 - (b) Functions of various departments
 - (c) Scope of activities
 - (d) Policies, procedures, etc.
 - (2) Participation in functions other than own specialty
 - (3) Specializations peculiar to the company or job
 - (4) Learning to work with various types of people encountered in the company
 - (a) The professional needs to understand the motives, goals, attitudes, and behavior of the "working man."
 - (b) The professional needs to understand the motives, goals, attitudes, and behavior of the management and operating supervision.
 - (5) Committee activity
 - (a) Two types
 1. Departmental
 2. Inter-departmental
 - (b) Development of poise, self-assurance, confidence and tolerance
 - (c) Recognition of need for acceptance of ideas by others
 - (d) Acceptance and compromise
 - (e) Recognition that almost everyone has something worthwhile to offer

BUILDING AND MAINTAINING A GOOD TECHNICAL TEAM

- c. Responsibility and authority should be delegated to the extent that they can be assumed. The supervisor should be willing to help by providing freely from his experience but in such a manner that the employee is encouraged to reach his own conclusion regarding the proper course of action.
- d. Teamwork should be encouraged.
 - (1) Stimulus is provided by encouraging discussion of problems with associates in a position to supply varying points of view.
 - (2) Team attack can result in greater creativity on the part of an individual (*synergism*, the concept that the whole is greater than the sum of its parts). This is discussed by Bush in *Teamwork in Research*,³ in which he cites the principle formulated by Mary Follett of "... coordination as the reciprocal relating to all the factors in a situation."⁴ In this process a type of "chain reaction" occurs in which A stimulates B, who stimulates C, who in turn stimulates A, etc., to the end that all are raised above a former plane.
- e. Recognition should be provided.

N. The Supervisor's Role — A Dual Responsibility

1. Technical

- a. Planning
 - (1) Determining objectives of contemplated research
 - (a) Search for understanding
 - (b) Search for a solution to a problem
 - (c) Basic design data
 - (2) Scope
 - (a) Area to be covered
 - (b) Range of variables to be scanned

³G. P. Bush and L. H. Hattery, *Teamwork in Research* (Washington, D. C.: American University Press, 1953), p. 178.

⁴H. E. Metcalf and L. Urwick, *Dynamic Administration: The Collected Papers of Mary Parker Follett* (New York: Harper and Brothers, 1942), p. 299.

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

- (3) Methods of approach
 - (a) Pencil-and-paper study
 - (b) Experimental work
- (4) Facilities required
 - (a) Available
 - (b) To be supplied
- (5) Assignment of responsibility
 - (a) Individual
 - (b) Team
- b. Execution
 - (1) Delegation of responsibility and authority
 - (2) Training and instruction
 - (3) Availability for advice
- c. Review of technical adequacy of work
 - (1) Results meaningful
 - (2) Conclusions supported by data
 - (3) Previous work in same field considered
 - (4) Work being competently performed
 - (5) Work within field of assignment
 - (6) Continued assessment of whether objective has been or is likely to be accomplished
- d. Liaison
 - (1) Coordination
 - (2) Reporting
 - (3) Exchange of information
 - (a) Intra-staff
 - (b) Between research group and agencies for which it operates

BUILDING AND MAINTAINING A GOOD TECHNICAL TEAM

2. Administrative

- a. Budget preparation (The confidence of management in the research director and his force is important.)
- b. Personnel matters
 - (1) Recruitment
 - (2) Promotion
 - (3) Keeping employees informed
 - (4) Estimates of efficiency
 - (5) "Climate" for research
 - (6) Symbols of status — recognition of achievement
- c. Facilities
 - (1) Ascertainment of needs
 - (2) Source of supply
 - (3) Scheduling
 - (4) Maintenance
- d. Reports (The "slant" of reports is important.)
 - (1) Progress reports
 - (2) Terminal reports
 - (3) Summaries
- e. Scheduling
 - (1) Priorities
 - (2) Integration of activities to provide the minimum elapsed time per project
 - (3) Timing the termination of laboratory work and the instituting of pilot or field tests
- f. Checking rate of progress
 - (1) Estimating time of solution for usefulness
 - (2) Calculating manpower vs. equipment

- g. "Public Relations" and "Selling"
 - (1) Selling to many groups
 - (a) Those who supply funds
 - (b) The design group
 - (c) The operating personnel
 - (d) The general public
 - (2) Presentation of findings
 - (a) Reports
 - (b) Semi-commercial or commercial tests
 - (c) Informational programs
 - (3) Reducing lag between research and application
 - h. The supervisor's technical duties should be reduced or he should delegate them to allow time for supervisor-employee relations which cannot be delegated successfully, like day-to-day contacts.
3. *Problem: how can the supervisors' technical load be reduced so that he can function adequately as an advisor? Can some of his technical duties be delegated to allow him time for the day-to-day contacts essential to employee-supervisor relations?*

III

Appraisal of Performance

A. Why Appraise Performance?

1. To let the employee know where he stands (This recognizes his need for approval and indicates where attention is needed. Keeping the employee advised also makes it easier to effect any future changes that appear necessary. People like to have their progress discussed regularly. It is more likely that the employee will have his progress discussed when there is a rating system than when there is none.)
2. To form the basis for employee development and training
 - a. Identify individual training needs
 - b. Recommend training program to meet individual needs
3. To aid in determining merit increases
4. To aid in job placement, work assignment, and promotion
5. To guide in reducing and reassigning work force
6. To lay the groundwork for possible future discipline or for the explanation of no salary increase or promotion
7. To stimulate the attention of the supervisor

B. Problems of Appraising Performance

1. Rater disinterest, negligence, incompetence
2. Inconsistent application of the system (Individuals can give different values to the various components.)
3. Emotional bias of rater
4. Influence of seniority on appraisal
5. Emphasis on incidental, rather than pattern, behavior
6. Superior's lack of counseling skill in interviews
7. Use of periodic appraisal to replace day-to-day supervision
8. Ineffective training of raters
9. Negative employee attitudes toward the system

C. Performance Rating Methods

1. Informal judgment by superior
2. Graphic rating scale with descriptive phrases for degrees — this form appears to be used most frequently.
3. Forced choice — the rater is required to choose from each of a large number of small groups of apparently unrelated statements one which is most, and another which is least, applicable to the individual. Because of the difficulty in explaining some of the forced decisions, this method makes it hard for the supervisor to have a follow-up interview with the employee.
4. Field review — the supervisor is interviewed about his subordinates. This method requires highly skilled interviewers and is expensive and time-consuming.
5. Critical incident — an incident involving the performance of an important part of an employee's job is recorded at the time that it occurs. The supervisor tells the employee of the incident at the same time that he records it, and the employee's record is made available for the employee's inspection. Although this method requires a little extra time on the part of the supervisor, it is felt that the benefits are sufficient to balance the time consumed. The supervisor must realize that it is easier to observe mistakes than to notice good performance. He should record both.
6. Descriptive phrase — the rater scores an employee by finding the best descriptive phrase for him (starts work on time, uses imagination, etc.).
7. Common consent — supervisors and other personnel and administrative people together rate individual employees. This method tends to reduce the influence of individual opinions.
8. Self-rating — the employee is asked to make a sincere analysis of his own characteristics.

D. Development of a Plan for Appraising Performance

1. Which of the following or other factors should be appraised?

a. Ability to learn	q. Loyalty
b. Adaptability	r. Open-mindedness
c. Appearance	s. Oral expression
d. Citizenship	t. Perseverance
e. Company-mindedness	u. Personality
f. Conference leadership	v. Planning
g. Cooperation	w. Quality of work
h. Courage	x. Quantity of work
i. Dependability	y. Resourcefulness
j. Imagination	z. Sincerity
k. Initiative	aa. Stability
l. Intelligence	bb. Tact
m. Integrity	cc. Technical ability
n. Job knowledge	dd. Tenacity
o. Judgment	ee. Training ability
p. Leadership	ff. Written expression
2. How many factors should be appraised?
3. What weight, if any, should be given to each factor? Can this weight be the same for all positions?
4. How many degrees or grades can be measured from each factor?
5. How frequently should appraisals be made?
 - a. Regular period
 - b. To meet specific situations
6. How can raters participate in the development of the appraisal plan? (Participation will build support for the plan.)

E. Administration of the Appraisal Plan

1. Need to run pilot plans of the appraisal system before employing throughout the plant
2. Need for written standard practice
 - a. To establish responsibility
 - b. To stimulate consistent application of the plan
 - c. To explain plan to employees
3. Essential data for appraisal and discussion of appraisal
 - a. Adequate job descriptions
 - b. Standards of acceptable performance, to the extent possible
 - c. Continuous personnel records of past appraisals, job progress, special training and education, etc.
4. Fundamental principles in training and developing raters
 - a. Gaining acceptance of the plan and purpose
 - b. Giving instruction on what to rate, how to rate, and when to rate
 - c. Sharpening rater's skills of observation and perception
 - d. Resolving differences in individual value concepts
 - e. Presenting common rating errors and pitfalls
 - f. Developing skill for the performance review and the counseling interview
 - g. Retraining raters who display incompetence
5. Post-rating counseling interview between superior and employee
 - a. Proper attitude and purpose of the superior
 - b. Directive versus nondirective counseling (Nondirective counseling lets the individual reach his own conclusions from the supervisor's and his own observations. Directive counseling informs the individual of the supervisor's conclusions.)
 - c. Means of dealing with problem cases
 - d. Follow-up interviews and on-the-job day-to-day coaching
 - e. Study of the cause as well as of the effects
6. Analysis of results of appraisals
 - a. Function of personnel staff
 - b. Comparing ratings with company and departmental norms and medians
 - c. Feed-back of results to counsel-raters

IV

The Supervisor's Role in Professional Development

A. Development of the Supervisor Himself

1. He must be competent professionally.
2. He must accept responsibility for the development of his subordinates.
3. He must know how to help his subordinates develop.
4. He must have the ability to exercise individual judgment.

B. Requirements for Success as a Professional Employee or as a Supervisor

1. Intelligence

a. Types

- (1) Ability to learn
- (2) Verbal intelligence
- (3) Mechanical intelligence
- (4) Social intelligence

b. Degree of intelligence

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

2. Personal qualifications
 - a. Integrity
 - b. Initiative
 - c. Dependability
 - d. Sense of responsibility — an emotional state in which a person has a feeling of dissatisfaction if he fails to do those things he is morally or ethically bound to do
 - e. Adaptability
 - f. Courage
 - g. Sense of humor
 - h. Ability to get along with others
 - i. Good social habits
 - j. Health
3. Interest
 - a. As a supervisor
 - (1) In the job of being a supervisor
 - (2) In personal development
 - (3) In advancement
 - (4) In the company
 - (5) In employees
 - b. As an employee
 - (1) In the job
 - (2) In personal development
 - (3) In advancement
 - (4) In the company
4. Knowledge
 - a. Required of supervisor
 - (1) Work supervised
 - (2) Own duties
 - (3) Own authority
 - (4) Policies and procedures
 - (5) What his supervisor expects
 - (6) What employees want
 - (7) What management needs to operate profitably

THE SUPERVISOR'S ROLE IN PROFESSIONAL DEVELOPMENT

- b. (Knowledge) required of employee
 - (1) How to perform assigned work
 - (2) Importance of assigned work
 - (3) Relation of assigned work to other operations
 - (4) Company policies and procedures
- 5. Skills
 - a. Required of supervisor
 - (1) Skill involved in work supervised
 - (2) Skill in supervision
 - (3) Skill in communication
 - b. Required of employee
 - (1) Skill involved in assigned work
 - (2) Skill in communication
- 6. Experience
- 7. Education
- 8. Attitudes
 - a. A job attitude is the frame of mind through which the job is regarded.
 - b. Attitudes are formed by the integration of intelligence, interest, personal qualification, knowledge, skills, experience and education.
 - c. Types of attitudes required
 - (1) Sincerity
 - (2) Loyalty
 - (3) Enthusiasm
 - (4) Ambition
 - (5) Real interest in others
 - (6) Identification with organization
 - (7) Interest in job and company
 - (8) Open mind

C. On-the-job Training (The department head, with the assistance of a training department, has the basic responsibility for training. Management should be cognizant of the training programs in effect.)

1. Steps in training or coaching
 - a. Preparing for training or coaching (see 2.)
 - b. Evaluating current knowledge of trainee (see 3.)
 - c. Assigning the task or making suggestions (see 4.)
 - d. Follow-up (see 5.)
2. Preparing for training or coaching
 - a. Learn how to train and coach.
 - b. Become familiar with task to be assigned.
 - (1) Knowledge and experience required
 - (2) Equipment involved
 - (3) Material to be used
 - (4) Assistance available
3. Evaluating current knowledge of trainee
 - a. Knowledge retained from formal education
 - b. Knowledge retained from previous experience
 - c. Prior performance on similar or related work
 - d. Extent of familiarity with equipment and material to be used
4. Assigning the task or making suggestions
 - a. Discuss objectives of project.
 - b. Describe importance of task and its relation to other projects.
 - c. Indicate limits as to time, cost, assistance, availability, etc.
 - d. Make certain that gaps in information revealed in evaluation are filled.
 - e. In making suggestions, use questions instead of statements if possible. Example: Do you think that this method would work better?

THE SUPERVISOR'S ROLE IN PROFESSIONAL DEVELOPMENT

5. Follow-up

- a. Encourage discussion of progress and problems.
- b. Review progress of project as required.

D. Methods for Increasing the Professional Employee's Interests, Experience, and Knowledge

1. Participation in company-sponsored courses or outside courses

- a. General management programs
- b. Faculty-led in-plant programs
- c. Graduate programs

2. Membership in professional societies, etc.

- a. Technical
- b. Managerial
- c. Engineering

3. Preparation of technical articles for publication or presentation at society meetings — company should provide:

- a. Library and research time
- b. Clerical and statistical assistance
- c. Opportunity for review and criticism
- d. Adjustment of duties
- e. Try-out, evaluation, and submission

4. Professional recognition

- a. Awards
- b. Bonuses
- c. Percentage on inventions
- d. Attention and prestige
- e. Fair division of work
- f. Contact with executives
- g. Community activities
- h. Communications

E. Specific Knowledge and Training Requirements of Higher Jobs

- 1. Training in attitudes
- 2. Training in technical matters
- 3. Training in human relations
- 4. Training in administrative and supervisory items
- 5. Training in procedures analysis
- 6. Training in work simplification

V

Policies for Salary Administration

A. Introduction and Preliminary Concepts

1. Why are salaries paid?
 - a. For work performed
 - b. To recruit competent employees
 - c. To retain competent employees
 - d. As an incentive for better work
 - e. Not for amount of education and training as such — education and training must be used in the work
 - f. Not for length of service unless length of service results in improved performance
 - g. In short, salaries must be related to the work performed by the individual and not to the individual as an individual.
2. Does a salary have to be determined?
 - a. Yes. It does not determine itself. It is necessary to pay a salary; therefore, a salary must be determined by someone and by some method.
3. How often does a salary have to be determined or considered?
 - a. When hiring a new employee
 - b. When a new position is created
 - c. When a promotion or transfer occurs
 - d. When there is a change in performance of the individual
 - e. When there are changes in conditions outside the company (such as changes in cost of living, changes in prevailing rates, etc.)
 - f. When there are changes in conditions inside the company (such as expansion or contraction of operations, wage increases for other employees, etc.)

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

4. Do most employees think that their salaries are "sufficient" or even "adequate"?
 - a. If "sufficient" or "adequate" means what a person wants, it is obvious that it is not possible to pay such salaries. The aim in setting a salary is to find a "justifiable" salary: one that can be explained to the employee and to other employees.
5. Should everyone get the same salary?
 - a. If salaries are to be related to the work performed, and if various employees do different work, it would not be justifiable to pay everyone the same salary.
6. Should everyone get a different salary?
 - a. In a large company, there are likely to be some individuals who should receive the same salary as others because they are performing approximately the same work in approximately the same manner. It is inadvisable to have minute differences in salaries. For example, one man should not receive \$400 per month and another individual receive \$405 per month. Such a small difference could not be explained or justified. In a large company, it is not possible for everyone to get a different salary.
7. Can everyone be paid average or higher-than-average salaries?
 - a. Simple mathematics dictates that if anyone receives a higher-than-average salary, someone must receive a lower-than-average salary.
8. Can salaries be kept secret?
 - a. It is possible in some circumstances for certain salaries to be kept secret.
9. Can anyone be kept from having an *opinion* as to what salaries are being paid within the company or outside the company?
 - a. Even though an employee may not *know* what salaries are being paid to other persons, he may have an *opinion* on this subject. This opinion may be based on indirect evidence such as the purchase of a new car by another employee or even the smile on the face of an employee who has just had a talk with his supervisor.

POLICIES FOR SALARY ADMINISTRATION

10. Can a salary be determined solely by a salary survey?
 - a. No. A salary survey is a time-consuming process. The usual survey covers 20 to 40 positions. If a company had 500 different types of positions, it could not complete a survey of all these positions. It is often impossible to find comparable positions in other companies or industries to be included in the survey.
11. Can salaries be determined automatically or scientifically?
 - a. No precise formula has been developed for determining salaries. A systematic procedure can be used, many facts may be obtained, but judgment is involved in the entire process. Judgment must be used in selecting companies to be included in a salary survey and in determining what positions can be compared. The interpretation and application of the salary data also involves the use of judgment.
12. Are employees motivated by salaries alone?
 - a. Salaries are an essential, but insufficient, motivation of employees. Professional employees especially are motivated by non-financial elements such as chance for advancement, recognition of accomplishment, etc.

B. Methods of Determining Salaries

1. Unilateral decision by management
2. Individual bargaining
3. Collective bargaining
4. Systematic salary administration
5. Combination of two or more methods

C. Possible Bases for Establishing Salaries

1. Systematic salary administration
2. Comparisons with other companies and industries
3. Favoritism
4. Number of people supervised
5. Competition
6. Type of work
7. Length of service
8. Cost of living
9. Chance

D. Prerequisites for Systematic Salary Administration

1. Willingness to pay justifiable salaries
2. Willingness to discuss salaries

E. Basic Problems of Systematic Salary Administration

1. External relationships and comparisons
 - a. How do salaries compare with those paid by other companies in the same industry, in the community, or in other communities?
 - b. What is the labor market?
 - c. What do salary surveys reveal?
2. Internal relationships and comparisons
 - a. How do salaries compare with those paid for similar or related work in the same department, plant, or company?
 - b. What does job evaluation reveal?
 - c. Will dissatisfaction arise from internal relationships?

F. Separate but Interrelated Aspects of Systematic Salary Administration

1. Job description — the written statement of the operations, duties, equipment, methods, working conditions, organizational relationships, responsibilities, and other essential factors of a single job or position
2. Job evaluation — the process of assigning relative values to jobs in accordance with their duties and responsibilities
3. Salary structure
 - a. Flat salary or range in rates — the range in rates is generally preferred for professional employees because it tends to stimulate initiative.
 - b. Automatic progression or merit increase — the automatic progression is much like a flat salary.
 - c. Width of salary range
 - d. Overlapping of salary ranges
 - e. Emphasis on maximum or emphasis on the midpoint of salary range — the emphasis on the midpoint of salary range allows and promotes promotion.
4. Pricing of jobs — pricing may be based on salary surveys, and interpolations made by job evaluation.

G. The Use of Job Descriptions

1. Salary surveys
2. Job evaluation
3. Rating of employees
4. Development of employees
5. Selection of employees

H. Preparing Job Descriptions

1. Scope — describe the job briefly, emphasizing the size of the position, using significant, specific figures wherever possible. Indicate the geographical area of the position or designate the organizational units in which it functions. Where pertinent, indicate the range of complexity or difficulty of the position.
2. Functions performed
 - a. Divide the position into its major parts or duties. Describe each of these in a separate, numbered paragraph.
 - b. List duties in chronological or other logical sequence. If the position involves a regular cycle of duties, the first step or duty in the cycle should be described in the first numbered paragraph, and succeeding steps in succeeding paragraphs. For other positions, the most important or the most common regular functions are best placed first. In either case, functions that are infrequent or of little importance should be grouped in the final paragraph.
 - c. For each function, state specifically what is done, how it is done (unless obvious), and why it is done (unless obvious). This should illustrate enough of the work methods used, and the purpose of each part of the position, to clarify each duty and its full significance.
 - d. Beside each numbered paragraph, indicate the percent of time spent on that part of the position. These percentages indicating the time-importance of various parts of the position will sometimes be rough estimates but should total 100%.
 - e. For positions which require frequent, important transactions with others within the company, indicate the position (or type of position) contacted, average frequency (per week or month), and the type of business transacted.

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

3. Minimum qualifications — it has been found that this section should be restricted to special requirements such as licensing of an engineer. Qualifications such as college graduation or a number of years of experience do not describe a position and are not helpful in making salary comparisons.
4. Supervision and functional assistance received
 - a. Immediate supervisor — furnish the position title (not the name) of the immediate, direct supervisor of this position. When other positions give orders or furnish work direction, list these with careful qualifications on the type of instructions from each.
 - b. Supervision received — describe the following phases of supervision:
 - (1) How frequently and in what detail is new work assigned?
 - (2) How frequently and extensively is assistance and guidance provided as the work progresses?
 - (3) How much is the work checked and evaluated in process or at its completion?
 - (4) To what extent are the functions of this position performed according to predetermined procedures?
 - (5) How available is the supervisor when the employee needs help?
 - c. Functional assistance — specify type of functional or technical assistance available through manuals or other written instructions. Indicate the accessibility and purpose of this assistance.
5. Responsibility and authority
 - a. Men — tabulate the number and job classifications of employees supervised directly by the man or indirectly through subordinate supervisors, and specify the degree of supervision given and any special responsibility for safety of men. Exclude functional supervision (which should be detailed under "functions performed").
 - b. Materials or products — specify the responsibility and authority for obtaining, handling, processing, transporting, and storing materials or products (excluding equipment). Describe unusual safety requirements.

POLICIES FOR SALARY ADMINISTRATION

- c. Operations or functions—describe the degree of accountability and authority for operations, processes, or functions, and describe unusual safety requirements. Indicate in dollar value the authority, if any, to requisition materials and services without review by higher positions.
 - d. Equipment—state briefly the extent of responsibility and authority for physical property, including equipment, tools, machinery, buildings, and other facilities. Specify unusual safety requirements. Indicate in dollar value the authority, if any, to requisition materials and services without review by higher positions.
 - e. Money—indicate, when pertinent, the amount of direct monetary responsibility and authority in terms of cash actually handled or direct authority to commit the company to spend money. Specify whether position is bonded.
 - f. Business relations—describe the accountability and authority for relations between the company and outside firms or individuals, especially sales and public contact responsibilities. Confine this section to transactions with outsiders, and detail intra-company contacts under "2. — Functions performed."
- I. Job Evaluation — The Process of Assigning Relative Values to Jobs According to Their Duties and Responsibilities**
- 1. Methods
 - a. Over-all comparison
 - (1) Job ranking
 - (2) Job classification
 - b. Composite of several comparisons
 - (1) Point plan
 - (2) Factor comparison method
 - 2. Differences in jobs (aside from differences in individuals)
 - a. Responsibilities
 - (1) Materials, personnel, and other cost items
 - (2) Amount of supervision received
 - (3) Supervision exercised

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

- b. Kind and type of decisions — limitations on the use of judgment and initiative
- c. Knowledge required (It cannot be assumed that a given amount of education or experience will result in a given amount of knowledge.)
- d. Working conditions

J. Other Salary Policies

- 1. Hiring rate
- 2. Rate of progression
- 3. Salary paid on promotion
- 4. Overtime (consider provisions of Wage and Hour Act)

K. Functions of the Personnel Department in Systematic Salary Administration

- 1. Recommend and evaluate policies and procedures
- 2. Administer approved policies and procedures
 - a. Keep complete records of all promotions and reviews
 - b. Keep supervision informed
 - c. Monitor the system and check for uniformity
- 3. Compile salary information and surveys

L. Functions of the Supervisor in Systematic Salary Administration

- 1. Follow established policies or procedures
- 2. Conduct periodic reviews of individual performance
- 3. Recommend exceptions to policies and procedures
- 4. Recommend changes in policies and procedures
- 5. Recommend adjustments of salaries
- 6. Justify company's position to subordinates
- 7. Maintain performance records

VI

Benefit Plans

A. Principles Underlying Benefit Plans

1. Employee benefit plans aid the economic security of employees, but they must also benefit employers, consumers, and the public. Benefits to employers include aid in recruiting and maintaining an effective work force and aid in creating and maintaining a high degree of employee morale. The acid test is the ultimate effect of the plans on total cost per unit of output. Consumers may also benefit if the total cost per unit is reasonable.
2. Costs of benefit plans are in part fixed costs and are in part variable in relation to total salaries and wages. The return to the company per dollar spent on benefit plans often is much greater than the return per dollar paid in salaries and wages.
3. Benefit plans are not a substitute for wages and salaries but they are part of "compensation." Because of high income tax rates on salaries of professional employees, some benefit plans can be considered as "deferred salaries."
4. Benefit plans should be reviewed regularly.

B. Reasons for Establishing Benefit Plans

1. Imitation of plans developed by other companies
2. Competition for employees with other companies
3. Fear of union activity
4. Stabilization of employees (As an employee's seniority increases, his stake in the company and its benefit plans becomes greater.)
5. Protection of employees' health

6. Incentive
7. Economic and legal pressure
8. Provision for superannuation
9. Enhancement of the prestige of the professional employee
10. Administrative intelligence — recognition that benefit plans can be of value to the company

C. Costs of Benefit Plans

1. Cost of providing benefit plans
2. Hidden cost of *not* providing benefit plans

D. Analysis of Risks of Employment

1. Types of risks
 - a. Loss of income to employee
 - b. Increased expense for employee or dependents
2. Who is subject to risks
 - a. Employee
 - b. Dependents of employee
3. Causes of risks
 - a. Premature death
 - b. Old age
 - c. Illness and accident
 - (1) Industrial
 - (a) Temporary or permanent
 - (b) Partial or total
 - (2) Non-industrial
 - (a) Temporary or permanent
 - (b) Partial or total
 - d. Unemployment

BENEFIT PLANS

E. Who Should Benefit

1. Employee
2. Dependents of employee
3. Employer
4. Consumer
5. Society

F. Tests of a Benefit Program

1. Do the benefit plans meet the needs of employees?
2. Do the benefit plans meet the definition of insurance? (Insurance is the substitution of a small but certain loss for a large and uncertain one.)
3. Are the benefit plans within the resources of employees, the employers, and the economy as a whole?
4. Do the benefit plans attract and retain competent employees without freezing the labor market?
5. Are the benefit plans considered as a substitute for wages?
6. Do the employees understand the benefit plans?

G. Premature Death

1. Types of insurance available
 - a. Group life insurance
 - b. Straight life insurance
 - c. Decreasing life insurance

2. Setting up and administering a group life insurance plan
 - a. How much insurance should be provided?
 - b. What employees should be covered?
 - (1) Classification by type of job or position
 - (2) Classification by length of service
 - (3) Classification by age
 - c. Contributory or non-contributory plan
 - d. Accidental death and dismemberment
 - e. Continuation for retired employees
 - f. Relation to other benefit plans
 - (1) Pensions
 - (2) Old Age and Survivor's Insurance (Social Security)
 - g. Handling of the death benefit checks
3. Benefits of life insurance program
 - a. To employee and his dependents
 - b. To employer

H. Old Age

1. Essential characteristics of a pension plan
 - a. Funded
 - (1) Trustee
 - (2) Insured
 - b. Compulsory membership after stated length of service and age
 - c. Optional annuity forms
 - d. Integrated with Old Age and Survivor's Insurance
 - e. Compulsory retirement age
 - (1) 65 in most companies at present
 - (2) Future prospects for a higher age because of:
 - (a) Decreasing mortality rate (longer span of life)
 - (b) Low interest rate
 - (c) Increasing price level
 - f. Provision for early retirement
 - g. Preparation for retirement
 - h. Maintaining contact with retired employees

BENEFIT PLANS

2. Problems of pension plans (Total and permanent disability is not part of pension problems.)
 - a. Contributory or non-contributory
 - b. Vesting rights
 - c. Relation to life insurance and severance pay
 - d. Supplementary pension programs
3. Benefits of pension plans
 - a. To employee who retires
 - b. To employer
 - c. To other employees

I. Illness and Accident

1. Industrial accidents and illness
 - a. Workmen's compensation
 - (1) Insured plans
 - (a) Private insurance companies
 - (b) State Compensation Insurance Fund
 - (2) Self-insured plans
 - b. Accident prevention
2. Non-industrial accidents and illness
 - a. Types of coverage
 - (1) To protect against loss of income
 - (a) Sick leave with pay—a privilege, not a right (Consideration must be given to: qualifying period of service, number of days per year, advantages of cumulation for unused sick leave, waiting period. Payment of unused sick leave destroys purpose of sick leave with pay, which is to protect the employee from loss of income as a result of his illness.)
 - (b) Disability benefit
 - (c) Group accident and health weekly indemnity
 - (d) Total and permanent disability

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

(2) To meet added expenses

- (a) Hospital**
- (b) Surgical**
- (c) Medical**
- (d) Catastrophic or major medical supplemental insurance**

b. Who is covered

- (1) Employee**
- (2) Dependents**
- (3) Retired employee**

J. Unemployment

- 1. Unemployment insurance**
- 2. Severance pay**
- 3. Guaranteed annual wage or guaranteed employment**
- 4. Supplemental unemployment insurance (misnamed guaranteed annual wage)**
- 5. Stabilization of employment**

K. Supplemental Benefit Plans and Employee Services

- 1. Car allowance**
- 2. Coffee break**
- 3. Company cafeteria**
- 4. Company sponsored parks and recreation facilities**
- 5. Country club membership**
- 6. Credit union**
- 7. Discount on company product**
- 8. Education programs**
- 9. Library**
- 10. Paid holidays**
- 11. Paid lunch hours and lunches**

BENEFIT PLANS

12. Paid technical dues, state professional license, conventions, etc.
13. Paid vacations
14. Parking facilities
15. Patents and suggestion plans
16. Personal business leave
17. Personnel services (ride sharing, housing, etc.)
18. Profit sharing
 - a. An incentive
 - (1) For employees
 - (2) For management
 - b. A method of financing benefit plans and especially pensions
 - c. A method of communication
19. Purchasing service
20. Salary during jury duty or military service
21. Shift pay differential
22. Stock purchase plan
23. Thrift plan

L. General Problems of Administering Benefit Programs

1. Integration of plans
2. Relation to length of service
3. Explaining plans to employees
4. Annual report on employees' current status under benefit plans
5. Relation to other policies — employment, training, wage and salary administration, etc.
6. Union welfare plans

VII

Handling Complaints and Grievances

- A. General Objective — to prevent employee morale from being undermined by unsettled complaints or grievances. A complaint or grievance should not be regarded as a nuisance but as an opportunity to correct a cause of dissatisfaction.

B. Definition of Basic Words

1. Dissatisfaction — anything that disturbs an employee, whether or not he expresses his unrest in words.
2. Complaint — a spoken or written dissatisfaction, brought to the attention of management or union representatives.
3. Grievance — a complaint that has been ignored, over-ridden, or in the employee's opinion otherwise dismissed without due consideration.
4. Personal Problem — any irritation or misunderstanding which is caused by factors, conditions, or personal relationships occurring outside of the company.

C. Review of Characteristics of Professional Employee

1. Professional employee requires acknowledgment of his status and prestige.
 - a. Supervisor should use plural forms (we, our, etc.) in communications.
 - b. Employee should be involved in credit for the work.
2. Needs opportunity for self-expression.
3. Places high value on psychological rewards.

4. Wants to give and receive precise answers.
5. Does not want to take a grievance outside his own department.
6. Does not want to bother supervisor with his particular problems.
7. Tends to be introverted. Therefore, many small things may be turned inward and accumulate until an explosion point is reached.

D. Prevalent Sources of Grievances of Professional Employees

1. Work assignment
 - a. Below employee's capability and area of interest (Do not divide work into too small assignments.)
 - b. Poor distribution of rush jobs and "undesirable" jobs
 - c. Inequitable distribution of overtime work
 - d. Frequent interruptions and reassignments
 - e. Jurisdictional conflicts
2. Attitude and actions of supervisor
 - a. Over-supervision and unreasonable standards
 - b. Failure to communicate
 - c. Failure to delegate responsibility and authority
 - d. Failure to relinquish detail work
 - e. Incorrect use of aggressiveness — needling
 - f. Restraint on employee self-expression
 - g. Open criticism in front of other employees
 - h. Failure to recognize meritorious work
 - i. Taking credit for ideas of subordinates
 - j. Passing the buck
 - k. Disinterested attitude toward employee
 - l. Calling conferences without preliminary planning or outline of topics to be covered
 - m. Favoritism
 - n. Too much pressure or not enough pressure

HANDLING COMPLAINTS AND GRIEVANCES

3. Attitudes and actions of fellow employees
4. Compensation
 - a. Unfair differentials with fellow employees
 - b. Too slow a rate of progress
 - c. Out of line with area or industry practice
5. Working conditions

E. Recognizing an Employee with a Complaint (It is desirable to recognize that an employee has a complaint, grievance, or personal problem before he formally presents it to his supervisor. A person with a complaint usually reveals his dissatisfaction in his attitude and behavior. A supervisor may often detect dissatisfied employees by keeping himself sensitive to low morale.) — Some indicators of dissatisfaction may be:

1. Lack of cheerfulness or enthusiasm
2. Loss of interest in work
3. A critical or antagonistic attitude toward the job, the company, the supervisor, or fellow employees which is often displayed by disparaging remarks
4. Sullenness or surliness
5. Excessive tardiness and absenteeism
6. Low output
7. Too many errors
8. Lack of cooperation
9. Neglect of responsibilities
10. Reduced aggressiveness and initiative
11. Non-observance of rules
12. Heated arguments or quarrels with fellow employees
13. Evasiveness
14. Taking advantage of privileges
15. Requests for transfer

F. How to Forestall Complaints and Grievances

1. Observe and talk with employees at work each day. Be approachable.
2. Answer these questions about each employee:
 - a. Is his output satisfactory?
 - b. Does he seem to be interested in his work?
 - c. Is his attitude good?
 - d. Is he cooperating with his fellow employees?
3. If the answer is "no":
 - a. Drop around to the employee's work place and chat with him.
 - b. If something seems wrong, ask the employee to come to the office or some place where you can talk with him in private and without interruptions.
4. Inspect working conditions periodically.
5. Look over salary rates to see if they are out of line with those paid others for similar work.
6. Help employees get ahead.

G. A Plan of Action for Handling Complaints and Grievances

1. The initial interview
 - a. Be receptive and available.
 - b. Handle the complaint or grievance as soon as possible. Set time and place if other duties prevent immediate handling.
 - c. Hold conference in private and keep interruptions down to a minimum.
 - d. If employee is emotionally disturbed, do not respond to his mood.
 - (1) Try to be calm.
 - (2) Talk slowly.
 - (3) Talk in low voice.
 - (4) Be friendly.

HANDLING COMPLAINTS AND GRIEVANCES

- e. Let the aggrieved employee state his case. Do not interrupt him except to ask questions which will help him to tell his story.
 - f. Avoid introduction of own bias.
 - g. Do not make a decision at the first conference if you do not have all the facts of the case or are not authorized to make a decision.
 - h. Tell the employee when he may expect to hear from you (and be sure that he does).
 - i. Let him know that he is welcome to come back if he wants to discuss the matter in the interim.
2. Get *all* the facts and feelings from all available sources:
- a. All employees concerned
 - b. Personnel records
 - c. Company policies, plant customs, rules, and regulations
 - d. Conditions and methods of work involved
3. Decide under whose jurisdiction the complaint or grievance falls.
- a. Do not make any decision if the complaint involves:
 - (1) Employees not under your immediate supervision
 - (2) The expenditure of more money than is authorized
 - (3) A change in company policies, rules, and regulations
 - (4) A modification of company-established standards, procedures, or processes
 - b. When passing a complaint or grievance on to a superior, submit a statement of the facts to him.
4. Seek advice of the personnel staff where it seems desirable.
5. Consult immediate superior for advice and support.

6. Make a decision.
 - a. Put the facts together in an orderly arrangement.
 - b. Study them and list all the solutions that come to mind.
 - c. Apply the following tests to each of them:
 - (1) Does this solution conform to company policies, rules, and regulations?
 - (2) What effect will it have on employee discipline? Efficiency? Morale?
 - (3) Will it make for a smooth-running organization?
 - (4) Select the solution which best meets the above tests.
 - (5) When in doubt, check the solution with your superior.
7. Take action.
 - a. Make the changes desirable or practical under existing conditions.
 - b. Confer with the employee.
 - (1) Give him the facts.
 - (2) Tell him what has been done.
 - (3) Sell him on the fairness of the solution if possible.
 - (4) Be friends at the close of the interview.
 - (5) Aim to have him leave with a desire to carry on as a working member of the team.
 - (6) If he is not satisfied with the solution, help him put his complaint into writing.
8. Follow up.
 - a. Live up to commitments scrupulously.
 - b. Drop around to the employee's work place in a few days and chat with him. Find out his current opinion of the solution.
 - c. Observe him at work.
 - (1) Is he interested in his work?
 - (2) Is his output satisfactory?
 - (3) Is his attitude good?
 - (4) Is he cooperating with his fellow employees?

H. Handling Difficult Problems by Interviews

1. General principles underlie all the interview forms and purposes.
 - a. In every interview the interactions of two people are involved, each with his own purposes, knowledge, viewpoint, attitude, and feelings. These different purposes, attitudes, etc., may be difficult to reconcile when a supervisor interviews an employee.
 - (1) The employee is likely to read hidden meanings into the supervisor's remarks. The employee has a tendency to say things that will impress the supervisor, and he may not feel free to express himself. This results from the different positions of employee and supervisor.
 - (2) This natural barrier should receive careful consideration by the supervisor in each contact. If he is sensitive to the differences in purposes or viewpoints, he can establish satisfactory interviewing relationships more quickly.
 - b. The establishment of rapport, or a friendly relationship, is a first essential since this procedure will tend to reduce the interferences that hinder mutual understanding. Rapport is more easily established during the interview if previous contacts between the supervisor and employee have been mutually satisfactory. Where this has not been the case, particularly from the employee's viewpoint, a sudden change in behavior on the part of the supervisor may be viewed with distrust by the employee. In trying to establish rapport:
 - (1) Maintain a friendly, easy attitude.
 - (2) Develop mutual interests. For example, both the supervisor and the employee have a basic interest in good performance, congenial working relationships, and continued service, and this can usually be illustrated by the problem at hand.
 - (3) Do not argue with or find fault with an employee as this may force him to fight back to save face. A lecture or a cross-examination also may be an attack on an employee's self-respect with a consequent loss of accord. Criticism can be effective without being personal.
 - (4) Develop confidence by showing a genuine interest in, and consideration for, the employee. Show respect, tolerance, and understanding of his viewpoint and avoid being one-sided.

- c. The employee should be the central figure in the interview at all times.
 - (1) The supervisor should be an understanding listener and should encourage the employee to express his views freely.
 - (2) The employee should be helped to feel that his reactions and what he has to say are important.
 - d. The supervisor should take great pains to remain objective and should attempt to recognize his own biases and prejudices.
 - e. The supervisor should weigh carefully the disposition of information given in confidence.
 - (1) Confidential information divulged by an employee sometimes is vital to the running of the business. If such information needs to be passed through the lines of organization, the employee's agreement should be obtained.
 - (2) Keeping all other such information in strictest confidence is a basic requirement.
 - f. Care should be used in giving advice.
 - (1) Every effort should be made to assist the employee to reach his own conclusions, particularly in a personal problem.
 - (2) Advice by the supervisor should be concentrated on the furnishing of information which the employee does not already have.
2. Understanding - listening is an effective interview tool.
- a. The technique which requires the greatest skill and which most facilitates the application of the foregoing principles is that of understanding - listening. This means:
 - (1) Listening in a positive, attentive way, so that the employee will express his real, rather than his superficial, feelings.
 - (2) Listening for the prime purpose of understanding the situation and the employee's reaction to it.

HANDLING COMPLAINTS AND GRIEVANCES

- b. Understanding-listening is difficult for two primary reasons:
 - (1) Managerial people are accustomed to giving orders, making decisions, and directing others. Consequently, in an interview they are more likely to "tell" people or to get them to tell something rather than to encourage free discussion by listening and understanding.
 - (2) The object of most interviews is to convince the employee of something or to acquire certain information upon which judgments can be made. Managerial people tend to concentrate right from the start, therefore, on having the employee see their own viewpoints rather than on attempting to understand the employee's viewpoint.
- c. Understanding-listening involves two prerequisites:
 - (1) The supervisor must have the desire to reach a better understanding of the employee and the situation, and of the relationship between the two. (When this desire has been developed, the remainder of the requirements of understanding-listening can readily be acquired.)
 - (2) The interview must be conducted in such a way as to make this understanding possible. The interviewer must be sensitive not only to the words being said, but also to the feelings, attitudes, and motives reflected by what is being said. What the employee says must not be regarded as an objective statement of fact. In many instances it is merely an expression of feelings or a reflection of a motive or an attitude. It follows that if the interviewer is sensitive to the total content, his response will be to the facts, attitudes, feelings, and motives underlying what is actually said. A response that neither affirms nor denies leaves the direction of the discussion to the employee. Methods of doing this are discussed below.
- d. Specific techniques — the general rule is for the interviewer to respond in such a way as to encourage further expression by the employee as well as to reflect the total content of the employee's statement. This is frequently called "the listening response." There is no specific "right" response, but some suggestions may be helpful, as follows:
 - (1) Respond by manner: a nod of the head, a smile, a "listening" pause.
 - (2) Use brief, neutral responses such as, "That must have been interesting." "I see." "I understand."

SUPERVISION OF SCIENTIFIC AND ENGINEERING PERSONNEL

- (3) Repeat the last remark or phrase of the employee in the form of a question. For example, if the employee says, "I don't know what is the matter with this place — it used to be different;" the supervisor might then repeat in a questioning tone, "It used to be different?"
 - (4) Rephrase the particular expression of feeling or attitude, usually in the form of a question, as, "You feel you are not making proper progress?" This response requires skill in order to avoid adding new thoughts and directing the interview away from the subject the employee really has in mind.
- e. Questions must be used with discretion.
- (1) Questions should be used as little as possible as they may guide the interview away from an expression of the employee's true feelings. They may, of course, be necessary to start the discussion in an area of mutual interest, to provide transition to new areas of discussion, to clear up or go deeper into a specific area, to insure understanding, etc.
 - (2) Phrase questions so that they will encourage expression rather than a "Yes" or "No" answer. Not, "Do you like working with the night people?" but rather, "What is your feeling about working with the night people?"
 - (3) Remember that a question-and-answer technique rarely gets the whole or the real story. It frequently increases barriers and interferences.
- f. Broadly speaking, the result of understanding-listening is a mutual exchange that provides understanding, development, and acceptance.
- (1) The employee gets a better understanding of himself, of the situation, and of his relation to it. In many cases he may develop a different interpretation of the situation or of the problem.
 - (2) The supervisor obtains a better understanding of the individual, of the situation, and of how the individual sees the situation. In addition, he usually has a better basis on which to take action, and a better opportunity to evaluate the employee's acceptance of any conclusions reached.

HANDLING COMPLAINTS AND GRIEVANCES

- g. Understanding-listening is a skill that can be acquired only by practice. As the skill is acquired, the supervisor will get a broader understanding of its use to him. The following training method is suggested:
 - (1) Conduct a number of interviews utilizing the understanding-listening approach.
 - (2) Use a tape recorder for a temporary record of the interview. Or immediately after the interview write up or dictate a verbatim account of what happened on an "I said . . ." "He said . . ." basis, identifying on the margin of the write-up the feelings, attitudes, and motives expressed by what was said.
 - (3) Analyze each of the responses in terms of such questions as:
 - (a) Did my response indicate that I was aware of the total content — motives, attitude, etc.?
 - (b) Was it appropriate, neutral, and indicative of awareness, interest, and understanding?
 - (c) Did it encourage the employee to express his viewpoints or did it stifle expression or change the course of the conversation?
 - (d) What would have been a better response?
 - (4) Consider whether the total objective of the interview has been obtained. If not, go back over the responses to see what could have been done differently.
- h. The foregoing discussion does not mean that the supervisor should merely listen throughout his interviews. Almost every interview will be an alternation of giving information and getting information. But it does suggest that the supervisor emphasize listening until his understanding of the employee and of the employee's viewpoints has developed to the point that he can determine the best action to follow.

VIII

Unionization of Professional Employees

A. The Legal Background

1. The Wagner Act. Between 1935 and 1947 various labor organizations attempted to include professionals in heterogeneous bargaining units. Because professionals almost always were in the minority and because the Wagner Act had no special provisions for the recognition of the professional as an individual or as a member of a professional society, it was possible for a labor union to include the professional in its bargaining unit with a simple vote of the majority of all company employees. The only recourse for the professional group that did not want to join a heterogeneous organization was the formation of a special association for collective bargaining. By forming their own union many professionals felt that they were forestalling membership in unions dominated by non-professionals.⁵
2. The Taft-Hartley Act. The Taft-Hartley Act has attempted to protect the professional from membership in a heterogeneous union without requiring him to form his own union. Section 9B of the Act reads as follows:

"The Board shall decide in each case whether, in order to assure to employees the fullest freedom in exercising the rights guaranteed by this Act, the unit appropriate for the purposes of collective bargaining shall be the employer unit, or subdivision thereof:

Provided, that the Board shall not (1) decide that any unit is appropriate for such purposes if such unit includes both professional employees and employees who are not professional employees unless a majority of such professional employees vote for inclusion in such unit . . ."

⁵Waldo E. Fisher, *Collective Bargaining for Engineers, Circular No. 9* (Pasadena: Industrial Relations Section, California Institute of Technology, August, 1946), p. 4.
Franklin Thomas, "Organization of Engineers for Collective Bargaining," *Engineering and Science Monthly* (Pasadena: California Institute of Technology, March, 1944), III, No. 3, pp. 3-4.

Robert D. Gray, "The Engineer in the Labor Picture," *Engineering and Science Monthly* (Pasadena: California Institute of Technology, March, 1944), III, No. 3, pp. 4, 15-19.

B. Reasons for Unionization of Professional Employees*

— much of the present unionization of professional employees may be attributed to the following common complaints or beliefs:

1. Engineers and scientists feel that they are forgotten people.
2. They feel that their salaries are out of line with their education and professional status.
3. Their promotions often are not based upon merit.
4. Engineering supervisors and their recommendations are often by-passed and disregarded by management.
5. Assigned work is routine and of a non-professional nature.
6. Information is poorly distributed among professional employees.
7. The responsibilities of the professional employee are not well defined.
8. The professional employee's supervisor is not interested in helping the professional employee gain recognition and advancement.
9. Department heads are evasive and unreliable when questions concerning company policy, salaries, etc., are asked.
10. Working conditions and facilities are poor.
11. Professional employees are not identified with management.
12. The professional employee's grievances are often deferred to permit prompt handling of the grievances of unionized groups.
13. He feels insecure in his position and would like more security.
14. He sometimes thinks his boss is inhuman and expects too much work from him.

*Fisher, *op. cit.*

C. Do Engineers and Scientists Want Unionization? — the results of a recent poll of 64,000 members of three engineering societies show the following:⁷

1. Collective bargaining for engineers and scientists is opposed by 72% of those polled.
2. 66% believe that collective bargaining is incompatible with professional status.
3. Only 3.7% of those polled were members of unions.

D. Can Unionization Solve the Basic Problems?

1. The shortage of professional personnel probably does not have much effect in speeding up or retarding unionization. Unionization may be influenced by how the professional is treated or by how he thinks he is being treated.
2. The problem of the supervisor today is one of understanding people and getting work done through people. He can get it by force or persuasion. In the latter, he must understand his people as well as understand himself. He must realize that people do not remain static — they either go forward or backward.
3. If men are expected to grow and develop, they must be kept moving, even though people by nature resist change. Basically speaking, the professional group needs the same kind of attention that other people need. The problem of directing professional people may not be with them as much as it is with their supervisors.

⁷"What About Unions," *Chemical and Engineering News* (February 7, 1955), XXXIII, No. 6, p. 536.

IX

Communications

A. Definition: Communication involves the transmission and reception of an idea from one person to another. Communication is never-ending, is inevitable for management, and is an essential tool of management.

B. Essential Elements for Communication

1. Transmitter
2. Message — ideas, words, pictures, actions
3. Receiver
4. Knowledge that the message was received and understood

C. Types of Communication

1. Down (one-way)
2. Down and up (two-way)
3. Circular — example: executive, staff, line
4. Individual to individual — usually on the same organizational level (grapevine)
5. Intentional and unintentional
6. Formal and informal

D. Methods of Communication

1. Oral
 - a. Staff meetings
 - b. Interviews
 - c. Periodic conferences
 - d. Training courses
 - e. Grievance meetings
 - f. Grapevine
 - g. Everyday contacts
 - h. Committee meetings
 - i. Tape recordings
 - j. Luncheon meetings
 - k. Talks
 - l. Public address system
 - m. Telephone
2. Written
 - a. Employee publications
 - b. Posters
 - c. Annual reports
 - d. Magazines and newspapers
 - e. Educational literature
 - f. Budgets
 - g. Job instructions
 - h. Graphs and charts
 - i. Bulletin boards
 - j. Procedure manuals
 - k. Pay envelope enclosures (for material related to the pay-check)
 - l. Letters to employees
 - m. Attitude surveys
 - n. Suggestion systems
 - o. Letters to management
 - p. Motion pictures

COMMUNICATIONS

E. How to Communicate

1. Success in communication depends upon gaining acceptance of what is said. Therefore, the communicator must carefully plan not only what to tell but how to tell it.
2. One of the best ways to gain acceptance is to give reasons which have meaning to those being informed.
3. Where persuasion is needed, the oral word can be more effective than the printed word. There is better opportunity to observe reaction and adapt the presentation to gain the required end.
4. If the details are complex or if the facts are those which the employees do not want to believe, it will undoubtedly be necessary to follow up with a review and a retelling.
5. Keep the channels open both ways by inviting employee response. Communications will flow *down* more easily if a few observations and opinions flowing *up* are welcomed — even unpleasant ones.
6. In planning to communicate always seek more than one method. A meeting which is reinforced by a letter sent home or a poster which is reinforced by an announcement over the public address system is more effective than an announcement which gets only one treatment.

F. Problems of Communication in Management

1. Human weaknesses
 - a. People do not listen attentively.
 - b. People do not read well.
 - c. People do not remember long.
2. New people
3. New problems
4. Varying connotations of words

G. What to Communicate to Employees^a (Distinguish between what is needed and what is wanted.)

1. Tell employees the facts that will make them feel that they belong and that they are an informed and inseparable part of their job, their department, and the company.
2. Tell those things that will make employees and managers have a feeling both of opportunity and security. This will remove the wonderment, anxiety, and aimless questions that make for confusion and indifference at work.
3. Select those things to tell people which they will take pride in knowing and which will help satisfy their needs for attention, status, and the feeling of importance.
4. Tell employees all that they will eventually learn by themselves. By doing this the facts can be given truthfully and constructively and thus prevent distortion through lack of information.
5. Three categories of facts to be communicated:
 - a. Those that should be told *immediately*. They are the things that directly affect a man or his job. These include work assignments, flow of work in offices, methods of operation, standards of production, rate of pay, overtime hours, rules and regulations, duties and responsibilities, quality of performance, job security, etc.
 - b. Those that should be told *as soon as possible*. These are facts a little less directly or less immediately connected with the work operations or the physical conduct of the office or the plant. These facts affect knowledge and attitudes necessary to coordinate each man's work with that of other people or departments. They deal a little more with the future and with situations a little distant from the job. They include vacation pay, company services, management policy, departmental organization, the place of the job in the whole scheme of things, expected standards of personal conduct, the finished product, and anticipated changes in operations, systems, or personnel that influence the man, the job, or the department.

^aHelen Baker, John W. Ballantine, and John M. True, *Transmitting Information through Management and Union Channels* (Princeton: Princeton University, Industrial Relations Section, Dept. of Economics and Social Institutions, 1949). Adapted from Johnson & Johnson, "Guiding Rules for Communications," Appendix A, pp. 134-136.

COMMUNICATIONS

- c. Those that *may* be told. These might be thought of by some as luxury items. They deal broadly with the company, its growth and expansion, the company production line, its advertising, sales, research, legal, manufacturing departments and their problems, broad company policy, the economic order, etc.
6. Things that are necessary for people at one level to know may become luxury items for people at another level. There are no hard and fast rules for determining what to tell. Good judgment and knowledge of what people want to know should be the guide.
7. Employees have a broad and almost unlimited desire for information. Results of surveys indicate that few employees think that they receive too much information.

H. Who Should Be Told

1. Everyone who will be directly affected should be told.
2. It is better to tell someone who does not need the information than to overlook someone who does. "People who are forgotten are resentful."⁹

I. Who Should Tell¹⁰

1. Telling is best accepted from the employee's immediate superior.
2. In choosing who should tell, try to pick a person who is highly acceptable personally, and who has a record for communicating clearly and interestingly.

J. Importance of the Supervisor in Communication (Results of surveys show that employees want to receive information through their supervisors. This is not being accomplished even though management also wants to communicate to employees through supervisors.)—To achieve what management and employees both want it is necessary to:

1. Train supervisors in the importance of communication.
2. Show supervisors how to communicate.
3. Keep supervisors informed.

⁹See Baker *et al.*, *op. cit.*, p. 135.

¹⁰See Baker *et al.*, *op. cit.*, p. 135.

K. Timing of Communications¹¹

1. Release of information should be timed so that a supervisor always hears it before his subordinates do.
2. All persons on any level who receive information to pass on must share a responsibility for passing it on as nearly simultaneously and uniformly as possible.
3. If information is to be released about any event, it should be given out before rumors, gossip and conjectures have a chance to get started. If the information deals with vacations, shutdowns, etc., it should be released soon enough to be useful to the individuals whom it was intended to affect.
4. All announcements should be timed so that the reasons given for them will not conflict with other information fresh in employees' minds. (The employment of outside consultants to study the need for a revised plant layout was announced on a bulletin board on the same day that employees were informed that there were to be layoffs because of a decline in sales.)

L. Role of the Personnel Staff

1. Clarification of the problems of communication
2. Analysis of experiences of other companies
3. Development of techniques to be used by line organization
4. Follow-up

M. Principles Underlying Successful Communication

1. All members of management should know the value and importance of communication.
2. All members of management should be kept informed if they are to carry out their own responsibilities for communication.
3. Every decision of any executive should include planning for the communication of the decision to those who are affected.

¹¹*Ibid.*

COMMUNICATIONS

4. The most difficult thing in communication is determining who will be affected by the decision and, therefore, who should be told. This requires that mature, stable, and successful people, usually well up in management, put themselves in the shoes of others who are less secure before judging what the latter should know.
5. Give employees the information in which they are interested and give it to them in the way they prefer.
6. The more highly educated the person, the more necessary it is that he be correctly informed. If he is not informed, he cannot feel he is a member of the team nor can he contribute to it.
7. Communication with employees should be through the line organization. This encourages employees to look to their supervisors for information.
8. Three rules for good communication are:
 - a. Every man should have one boss.
 - b. Every man should know the limits of his job.
 - c. Every man should keep his boss informed, and every boss should keep his men informed.
9. The "open-door" policy, as commonly defined, fails because it short circuits the line system of communication and omits middle management.
10. There are many methods of communication. Each company must develop its own internal and external means. Organization cannot be separated from communication. Emphasis should be put on developing a group of people who have no fear in communicating with others in the organization and who therefore can fulfill their own obligations in this field.

X

Organization of a Professional Work Group

A. General Statement

1. Through organization planning and policy guidance, the engineering or research administrator seeks to establish and maintain a predetermined quality of social structure and human relations in order to achieve the objectives of his group.
2. Most companies are becoming increasingly aware of the two basic problems of this area:
 - a. The structure of the organization
 - b. The staffing of the organization

B. Organization Planning

1. Organization is essential.

Management accomplishes its objectives through organization.

 - a. Organization planning may be the key to the solution of many administrative and technical problems.
 - b. To plan intelligently, an administrator must have a picture of where he is at the *present* and also one of where he wants to be in the *future*.

c. Organization planning is based on the objectives of the organization.

(1) Need for general knowledge and understanding of objectives

(2) Long-range vs. short-range objectives

(3) Feasibility of objectives

(a) Should it be done?

(b) Could it be done?

2. Organization is inevitable.

Since organization is essential for accomplishment of results, some form of organization is inevitable. The only choice by management is the degree to which organization is developed by planning or by chance. The solution of this problem requires an intelligent application of the following concepts:

a. Administration

b. Supervision

c. Delegation

d. Staff assistance

3. Organizations are dynamic.

a. People are constantly changing, both as individuals and as groups.

b. Other factors are changing such as size of company, size of group, products, processes, markets, etc.

4. Organization must be tailored—"Structure is not an end in itself and can do nothing by itself."¹⁵

There is no such thing as an ideal organization chart; each organization has to be tailored to suit the current needs of the company in question.

¹⁵Henry Dennison, *Organization Engineering* (New York: McGraw-Hill Book Co., 1931), p. 204.

C. Basic Principles of Organization

1. Principle of delegation of authority and responsibility

Responsibility for the execution of work must be accompanied by the authority to control and direct the means of doing the work. The authority and responsibility must be in balance. One of the more typical weaknesses in organization lies in the delegation of responsibility and the withholding of the authority needed to supply the proper balance. Another common weakness is the failure to delegate any authority and responsibility.

2. Principle of ultimate authority or accountability

This implies that the responsibility of a higher authority for the actions of his subordinates is absolute. In the process of running an organization by delegation, some executives acquire the unwarranted notion that they divest themselves of responsibility in favor of a subordinate. This is not true. The executive should realize that through delegation he has complicated his administrative problem in that he now has not only the responsibility for the primary task to be accomplished but also for the individual to whom he has delegated the specific responsibility.

3. Principle of unity of command

One person in each organizational unit has the authority to make decisions appropriate to his station, and each employee has a single immediate supervisor to whom he is responsible and who, in turn, is responsible to his immediate supervisor.

4. Principle of exceptions

Managerial efficiency is greatly increased by concentrating attention upon questions of policy and on variations from routine, planned, or standard courses of action.

*What Professional Workers Expect
of Their Supervisors*

A. The Growth of Business Administration—Alfred Williams, President of the Federal Reserve Bank of Philadelphia, has traced the development of management as follows:¹²

1. Autocratic management — captains of industry
2. Scientific management — rule of thumb replaced by inductive techniques — rational and studied approach to business management
3. Management by negotiation — effect of collective bargaining — government regulations
4. Democratic management — the recognition of the individual
 - a. Intelligence is the capacity to solve problems.
 - b. Intelligence is usually specific.
 - (1) Mathematical
 - (2) Mechanical
 - (3) Aesthetic
 - (4) Social
 - c. A person can excel in one type of intelligence and yet be mediocre in others.
 - d. A leader must maximize specific intelligence in individuals and minimize the limitations.

¹²A. H. Williams, "Business Leadership in a Democracy," *Mechanical Engineering* (April, 1953), LXXV, No. 4, p. 284.

- e. Because an employee spends such a large part of his time on the job, tremendous opportunity exists for an inspired and wise leader to assist in the development of his workers both technically and socially.
- f. An approach based on the supposition that "the individual is the hard core of value in American life" can result in:
 - (1) Advancing business as a successful venture
 - (2) Increasing the contribution of a business to the welfare of mankind
 - (3) Improving the understanding of social problems both by the leader and by his workers
 - (4) Providing satisfaction in each individual for his motives, goals, and desires

B. The Qualities of Leadership that Enrich the Personal Life of the Individual in Business—Williams classifies them as follows:

- 1. Technical competence — a leader should be master of his special field. He does not have to be able to do the job of every man working for him, but he must be able to evaluate his subordinate's work
- 2. Broad intellectual interest — for example, knowledge of history (comprehension of social change), knowledge of foreign relations (one cannot afford to be provincial), knowledge of literature (a means of acquiring spiritual insight and breadth of view)
- 3. Social intelligence — capacity to understand and deal with people, especially in groups
- 4. Possession of well-knit moral, ethical, and spiritual values — these give the leader an inner drive and a respect for the worth and personality of the other man. Such values build the poise and strength a leader must have to deal with the difficult and frustrating experiences which occur.

C. The Supervisor's Role in the Direction of His Subordinates (T. M. Linville¹⁸ approaches technical management from this point of view: "What qualities of leadership should an employee expect with respect to getting the job done?" According to Linville, the purpose of management in engineering work is to complete the assignment on time, at reasonable cost, and with reasonable human effort. The problem is to accomplish the work of management—planning, organizing, measuring, and coordinating—by leadership of people.)

1. Inspiring and encouraging men
2. Teaching
 - a. What is to be done, where, and why
 - b. How and when the work is to be done, by whom, and why
 - c. Special knowledge and skills
 - d. Cooperation and team play
3. Stimulation
 - a. Provoking interest
 - b. Stimulating ambition
 - c. Stimulating participation
 - d. Giving sense of belonging
4. Motivating personnel through:
 - a. Compensation
 - b. Incentives
 - c. Recognition and promotion
 - d. Respect and loyalty

¹⁸T. M. Linville, "Management of Engineering Work," *Electrical Engineering* (December, 1932), LXXI, No. 12, p. 1091.

D. "The Unwritten Laws of Engineering"¹⁴ (Interesting comments on the behavior and techniques of engineering executives are made by W. J. King in his paper of this title.)

1. Every executive must know what is going on in his area. This works both ways. Communication must be up and down.
2. The leader should not try to do the whole job himself. Delegation of authority will develop men and is a must if efficiency is to be maintained at a maximum.
3. The leader should put first things first.
4. Cultivate the habit of "boiling things down" to essentials.
5. Keep feet on the ground. Do not get excited in emergencies.
6. Plan the work, and then work the plan.
7. Provide a satisfactory organization.
 - a. Assign definite responsibilities
 - b. Recognize conditions when it is necessary to assume more authority
 - c. Do not create bottlenecks
8. An executive owes it to his men to:
 - a. Promote their professional interests.
 - b. Permit his men to take better positions.
 - c. Never over-ride or "short-circuit" men.
 - d. Keep men properly informed.
 - e. Never criticize a man in front of others.
 - f. Show an interest in what the men are doing.
 - g. Never miss a chance to commend a man for a good job well done.
 - h. Never "pass the buck" — always assume full responsibility for the group and the individuals in it.
 - i. Do all possible to protect the personal interests of the men and their families, especially when they are in trouble.
 - j. Do all possible to see that the men get the salaries and working conditions to which they are entitled.
 - k. Do all possible to see that the company gets the results to which it is entitled.

¹⁴W. J. King, "The Unwritten Laws of Engineering," *Mechanical Engineering* (May-July, 1944), LXVI, pp. 323, 398, 459.