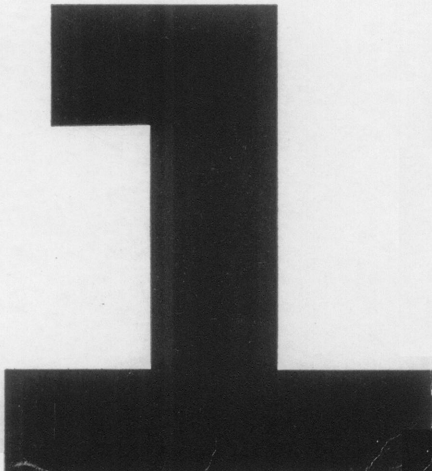
RESEARCH DEVELOPMENTS IN PERSONNEL MANAGEMENT

PROCEEDINGS OF FIRST CONFERENCE
UNIVERSITY OF CALIFORNIA, LOS ANGELES



RESEARCH DEVELOPMENTS IN PERSONNEL MANAGEMENT

Proceedings of the First Conference, held on the campus of the University of California, Los Angeles, June 7 and 8, 1956

Presented by:

INSTITUTE OF INDUSTRIAL RELATIONS (Los Angeles)
GRADUATE SCHOOL OF BUSINESS ADMINISTRATION
UNIVERSITY EXTENSION
UNIVERSITY OF CALIFORNIA, LOS ANGELES

PERSONNEL & INDUSTRIAL RELATIONS
ASSOCIATION, INCORPORATED
AMERICAN SOCIETY OF TRAINING DIRECTORS,
LOS ANGELES CHAPTER

CONFERENCE PLANNING COMMITTEE

ARTHUR J. IMM, City of Los Angeles Department of Water and Power, ASTD
NORMAN M. KELLETT, Norris-Thermador Corporation, PIRA
CLIFFORD LANG, AiResearch Manufacturing Company, PIRA
VERNON SHEBLAK, Pacific Finance Corporation, ASTD
ROBERT F. SMITH, Institute of Industrial Relations, UCLA
IRVING R. WESCHLER, Graduate School of Business Administration, UCLA

SESSION CHAIRMEN

ROBERT A. ALEXANDER, Electro Data Corporation, PIRA
ROBERT ARMSTRONG, President, Personnel & Industrial Relations Association
IRVING BERNSTEIN, Institute of Industrial Relations, UCLA
JAMES E. CAVE, Geven Manufacturing Company, PIRA
CHARLES K. FERGUSON, Department of Conferences, University Extension, UCLA
LAURIE LARSEN, AiResearch Manufacturing Company, ASTD
DAVID E. MARTIN, Ducommun Metals & Supply Company, ASTD
LEWIS S. PECK, McCulloch Motors, Inc., PIRA
O. V. POPE, Grayson Controls Division, Robertshaw-Fulton Corporation, PIRA
PAUL PRASOW, Graduate School of Business Administration, UCLA
ROBERT F. SMITH, Institute of Industrial Relations, UCLA
JOHN F. WALSH, President, American Society of Training Directors, Los Angeles Chapter
R. A. WALTER, California Bank, ASTD
IRVING R. WESCHLER, Graduate School of Business Administration, UCLA
ROBERT A. WILKINSON, Prudential Insurance Company, ASTD

Published in 1957
Copies of this volume may be purchased at $1.00 each from the
Institute of Industrial Relations
University of California, Los Angeles 24, California

Foreword

The improvement of policies and methods in personnel management inevitably depends upon research, whether it be carried on by company, government agency, or university. And, like other aspects of management, the administration of employer-employee relationships becomes more productive as the field's own distinct body of knowledge grows.

Holding this premise, the sponsors of the Conference on Research Developments in Personnel Management seek to achieve three aims in presenting this event:

1. To accelerate the application of the fruits of research by making available to personnel and industrial relations professionals at one convenient time and place reports on some of the most significant studies currently being conducted.
2. To promote the performance of research by organizations of all types.
3. To provide the leaders and members of research projects a vehicle for making known results of their work.

In the attainment of these goals, there should be substantial contributions to the operating efficiency of the industrial relations director, personnel manager, training director, wage and salary administrator, employment manager, employee services specialist, and of the line manager, whose increased productivity is the staff professional's constant objective.

On the pages which follow are the manuscripts or résumés of presentations made at the First Conference on Research Developments in Personnel Management, held at the University of California, Los Angeles, June 7 and 8, 1956.

Personnel and Industrial Relations Association, Incorporated, Los Angeles

American Society of Training Directors, Los Angeles Chapter

Institute of Industrial Relations, University of California, Los Angeles

Graduate School of Business Administration, University of California, Los Angeles

Contents

Research and the Future of Personnel Management

DALE YODER
Director, Industrial Relations Center,
University of Minnesota

To begin with, we have taken some liberties with the phrasing of the subject. We have first of all reversed the order, so that it reads: The Future of Personnel Management and Research. Subsequently, after thinking through the nature of the remarks to be made, we have simplified it still more, so that what we now have to say might well be summarized in the simple declaration: The Future of Personnel Management *Is* Research.

As a framework for these observations, we will discuss the "three R's in personnel management's future" and list them as (1) Recognition, (2) Responsibility, and (3) Research. We can conclude, as you might suspect, that the greatest, the most important and essential is Research.

We might, at this point, ask some questions. Where is personnel management headed? What changes can be expected in the future? How can personnel men meet these future assignments?

Recognition of Personnel Management

Perhaps the most obvious characteristic of the future of personnel management is the recognition it is receiving and will receive. From coast to coast personnel men have arrived. Yesterday, the industrial relations man had a minor part in the drama of work and working relationships. He was far to the side of the central scene, largely a spectator in the day-to-day, front-page action. Today he plays a major role. Tomorrow he may well become the star.

Yesterday, he was a friend of the management family—or a poor relation. He was a functionary to be tolerated, largely because most employers wanted to be in style. If you called on the personnel manager, you were often directed to a small shack in the far corner of the company lot. The personnel man was a blustery backslapper, or a furtive fanny-patter, or sometimes merely a jittery, insecure, worried, wistful watcher, well out of the main stream of working relationships.

Today—and in the tomorrows ahead—all this has changed. The personnel manager has moved from far out in left field to home plate. Today and tomorrow he is very realistically at bat. A person ushered into his offices now is overwhelmed with lavish furnishings—carpets that tickle the ankles. His office has been moved from the small shack in back to the front of the building.

Reason for New Status

Two major changes explain this transition. One is the present and prospective shortage of labor, which makes it the scarcest resource. It isn't difficult to obtain capital to begin a new enterprise. It isn't a problem to obtain materials with which to manufacture goods. But adequate supplies of labor are a thing of the past.

The other major change is the development of a new role for all employers and managers in which they see themselves as competing coaches of working teams. The first of these changes is the simple result of a situation in which we have learned how to produce capital much more rapidly than we produce people, ready for work. The second major change reflects a growing consciousness on the part of managers that it is they who are looking for jobs and fighting to keep their jobs rather than the rank-and-file members of their work teams. They have become coaches or *agents* and their major problem is getting, keeping, coaching, developing, and inspiring the members of the work teams they coach. This is the new version of management, *agency management.*

Labor will be the scarce resource in the foreseeable future largely because we have little use for "raw" manpower in today's economy. Further, the labor force is decreasing in relative size. This is the result of a number of forces: (1) We lose three million men to the military forces in any one year. (2) Education is increasing both in number of people attending school and in the length of their educational period. (3) There is more and earlier retirement. May I note on this point that fifty years ago only 2 per cent of the working force were under a pension fund. Today, 80 per cent of the labor force have pension plans. (4) Shorter hours reduce the labor force. By 1965, the thirty-six or thirty-seven hour work week will be common. It is estimated that in 1975 the thirty-five hour work week will be well established. When the turn of the century comes, it is expected that the twenty-four hour work week will be in vogue.

University of Minnesota
Industrial Relations Center

Periodical Check-List
Where to Find Articles on Manpower Management
Quick Guide and Selector

From: "Manpower Management Five-Foot Shelf," University of Minnesota Press, 1956

ACTIVITY OR FUNCTION	PERIODICALS																				
	Advanced Management	AMA-Personnel Series	Business Week	Dun's Review and Modern Industry	Factory Management & Maintenance	Fortune	Harvard Business Rev.	Industrial & Labor Relations Review	Journal of Applied Psychology	Labor Law Journal	Management Methods	Management Record	Management Review	Mill and Factory	Monthly Labor Review	NICB Studies in Personnel Policy	Personnel	Personnel Adminis.	Personnel Journal	Personnel Psychology	Public Personnel Review
Policy and Programming	O	O	O				O	F	O			O	O				F	O	F	O	O
Organization & Org. Planning	F		O	O					O		O	O				O	O	O	O	O	
Staffing	O		O	O	O	O		O	F		F	O	F	O	O	O	F	O	F	F	O
Training, Management Development	F		O	F	F	O	O	O	O			F	F	O	O	O	F	O	F	O	
Labor Relations	O		O	O	O	O	O	F		F		O	F	O	O	O	O		O	O	
Compensation	O			O	O	O	O	O	F	O	F	O	F	O	F	O	F		O	O	
Rating	O	O			O		O		O		O	O	O				F		F	F	
Benefits & Services	O	O	O		F	O	O	O	O	O	F	F	F	O	F	F	F	O	O	O	
Morale & Communications	O		O	O	F	O	O	O	F		O	O	F	O	O	O	F		F	F	O
Auditing & Research	O	F		O			O	F	F								F		F	F	

KEY: F—Frequent articles on the subject. Good place to look first. O—Occasional articles on the subject.

We have come through an interesting history. In the old days labor could leave or stay. There was always plenty more. Then we moved into a period of paternalism and anti-unionism. Next we watched the union-containment period when the personnel manager's job was to keep the union from having too much control. This was an especially trying time, for if the personnel manager killed the union he was out of a job. Yet, if the union got too strong he would get fired for that. Now we have emerged into a period of teamwork where there is a "live and let live" philosophy.

Meanwhile, top management has become man-minded. Today, the success and future of every business may be forecast in terms of its success in managing people. The result is inevitably and unavoidably a new emphasis on—and top priority for—manpower management. On this point it is interesting to note the increase in capital per employee over the years. In 1929 there was an average of $5,000 of capital per employee; today there is $11,000 capital per employee. Some industries have $50,000 per employee, and the oil industry currently has $90,000 of capital for each employee.

All of this means that the person who can handle this scarce resource will be more sought after as time goes on. Some have become upset over recent talk about automation. I think automation is an hysterical name for progress that has been going on for years.

The interest by management in this problem is evidenced in the number of seminars executives attend. Over 60,000 managers attended American Management Association seminars this year, and personnel management subjects continue to draw the biggest crowds.

Signs of New Recognition

Many signs of the new recognition for personnel people are evident. Everywhere the industrial relations department has achieved staff status. The number of staff members in personnel has increased from one for each 167 workers in 1952 to one for each 130 workers in 1956. Managements are paying, on the average, more than $70 per employee to secure competent advice on "people" problems. In 1948 only $48 per employee was expended. Top personnel men now average salaries amounting to 30 per cent of the president's salary. The average salary for a personnel manager in 1948 was $8,000; in 1956 it is $11,000. (If any of you are not now receiving this much, I'll be happy to send a copy of this speech to your president with that statement underlined in red.) Five per cent of these top personnel men are vice-presidents. Three-fourths of them participate in special bonuses and supplementary compensation; in 77 per cent of these cases the average bonus amounts to $2,200 per year.

New Demands on Personnel Management

But this recognition has its costs, and that is why our second "R" stands for responsibility. Perhaps we should have described it as the "R" in pressure or problems. For the same changes that have brought prestige have also put more pressures on the manpower staff. Top management has said in effect, "You heard what I promised the boys on the team. Now show me how to deliver." The result is much greater responsibility, more problems, and much more pressure on those who stand as the specialists in personnel.

The only answer to these added demands on personnel men is greater professional competence on their part. In a little study we conducted with 100 presidents of firms, we found that seventy-seven of them thought that personnel men should be licensed. Now, I don't say that to scare anyone—merely to indicate the thinking of these presidents on this problem. The educational attainments of personnel have been rising. As of 1956, only one-third do not have college degrees. Twenty-four per cent have advanced degrees. Of these, 15.6 per cent have a Master's, 1.2 per cent have a Ph.D., and the rest have an LL.B. or other degree.

Along with greater personal competence, personnel men must quickly learn more and they must learn the right answers. We need more facts instead of fables. Our third "R" refers to research simply because research is the most efficient, time-saving, rapid method of solving the kinds of problems with which manpower managers are confronted. Research means systematic, purposive investigation. That is the only possible way to find dependable answers quickly. There is no shortcut to an understanding of the kinds of problems with which we are faced. We need to learn how to get people, keep people, inspire people, and convince them that their management is the best there is. No simple, impressionistic answer will meet the need. When our advice is to be tested immediately, we can no longer depend on tradition and folklore.

The present-day problems confronting personnel men and women are problems that require professional attention and competence, and the essence of professional understanding is to be found in research. The professional approach is a state of mind and not a degree or a course. It is an attitude of continued learning. The personnel manager of the future must bring research into his own life and program in these principal ways: (1) He must understand what it is and how it is done. (2) He must keep abreast of the advances made in research by others through a careful reading of current literature. (3) He must do research.

Future of Personnel Management

As we polish our crystal ball and gaze into the future of personnel management and industrial relations in this country, we should pause a bit to gain perspective. It is important to remember that this system of ours is like nothing that has existed in any earlier era. We set out, less than three hundred years ago, on a glorious adventure, a magnificent experiment, the greatest research project of the ages. We have undertaken the job of finding how to develop and maintain gigantic work teams of free men and women. No feudal prince or lord can order these team members to work. No totalitarian political power requires them to accept jobs or stay on the task to which they have been assigned. No tribal rule forces them to slave if they would eat.

Already we have come a long way in the perfection of this new and untried system. We have made great advances, far more than enough to convince us of the inherent superiority of the new order. But we face more problems and new problems. The most difficult of them are "people" problems—problems of organizing and stimulating and motivating people. They are problems in an area more complex than the behavior of the physical elements. Prediction and control are more complicated than forecasting the weather or creating and distributing atomic energy.

In such a situation, careful, systematic, purposive, additive investigation—research—must be the major tool in our kit. Personnel managers, as the principal agents of managements and men, must learn to use research, to understand research, and to conduct research.

Our opportunities in this field are unlimited. They represent a challenge with tremendous appeal—a challenge to make work more satisfying and rewarding and thus to insure more of the good life for all our people. We can only meet this challenge by rapid improvement in our own competence and in the advice and counsel we are prepared to contribute. This means we must understand and keep abreast of and do much more research. For only research can provide an essential understanding for building and maintaining enthusiastic work teams of free men.

Discussion

QUESTION: In what areas might a company engage in research that would be valuable to everyone and ourselves?

DR. YODER: I could be smart and say any field. If you look at the list you were handed, you will get a notion of the past research that has been done. You will note that management development was the vogue for a while. Now the hottest area appears to be communications. Whatever you do, I hope you feel obligated to report it. We had a conference lately where thirty-five companies reported they had research programs. Only one had written it up.

QUESTION: One of our problems is that our research was adequate for our purposes but was not done sufficiently well to publish.

DR. YODER: This may well be realistic—or it may be modesty. Whatever the case, publish the facts you received. Indicate in the article just what you did. Be sure you publish even though you didn't find anything. I might offer one suggestion. Call up your local professors and get them to recommend some graduate who has had experience in writing research into appropriate form for publication. This will be of benefit to both your company and these students.

Imagination—Undeveloped Resource

HARRISON G. GOUGH
Associate Professor of Psychology,
University of California, Berkeley

Our concern today is quite properly with the practical uses of imagination and creative thinking and with the ways and means in which originality can be fostered and put to constructive use. Nonetheless this is a research-oriented conference, and so we have something of a need and an obligation to consider our topic from as broad a point of view as is compatible with these basic interests.

Creative thinking would seem clearly to be a special aspect of the general field of thinking and problem-solving. This field in psychology is a weighty one, having a distinguished research history and a vast panorama of theory and scholarship. We can say very little about this great breadth of material, but we would be remiss in our responsibilities if we did not mention a few of the landmarks and high points. In the refer-

ences which are to be distributed with the report of this conference (see page 10), I have indicated a number of titles which provide competent reviews and surveys of the topic (5, 6, 9, 11).

The experiments of E. L. Thorndike on problem-solving of cats, first published in 1898 (10), constitute one of these landmarks. Thorndike placed his animals in a puzzle box, from which release could be secured by moving a button, pulling a loop of wire, or manipulating some other simple mechanism. The method of attack on these problems which seemed most characteristic of his cats was "trial and error." Efficiency of behavior in gaining release, of course, increased rapidly as the animals became familiar with the puzzle box; yet "trial and error" seemed to be the initial step in each instance.

The role of theorizing, planning, hypothesizing, and other deliberate approaches to problem solution is minimized in the Thorndike experiments. Later researchers, particularly the German psychologist Kohler (7), more than made up for this limitation in Thorndike's work. In a way, however, Thorndike's original view on problem-solving is of more interest to us in our topic today than these other formulations, for "imagination" can be looked upon as the ultimate extension of the behavioral trial and error Thorndike emphasized. To put it another way, creative imagination is the quintessence of trial and error behavior.

In addition to this stream of development coming down from Thorndike's work, modified, of course, by the criticisms and additions of the Gestaltists and others, there is another research tradition of experimental studies of human thinking. From these we can find evidence pertaining to learning, recall, retention, transfer, interference, reminiscence, and other issues that merit specification in human learning. I will not mention any particular studies or individuals under these headings just yet, as we shall shortly have occasion to take up specific experiments and concepts when we turn to our principal topic of creative thinking.

One point of view concerning creative thinking with which many people are familiar has not yet been mentioned. I am referring to the kind of speculative, "armchair" analyses in which the "steps" and "sequences" of creative thought are spelled out as reflection indicates they have occurred. Perhaps the best known instance of such an analysis is in the book by Graham Wallas, *The Art of Thought* (12). Wallas contended that creative thinking observes four stages: preparation, incubation, illumination, and verification. The very orderliness and symmetricality of this formulation, which on first reading seems so attractive, is what constitutes its inherent weakness. Imaginative thinking seems in truth to be much more characterized by disarray, complexity, ferment, and turmoil. Processes overlap, ebb and flow, and intermix to an extent scarcely compatible with notions of fixed stages and sequences.

What seems to be needed for an understanding of the creative thinking process is a look at thinking itself, a direct concern with the ongoing activities of imagination and cognition. For help in this endeavor we can turn to the writings of psychologists like Karl Duncker (1) and Max Wertheimer (13), two men whose work is pre-eminent among those who have attempted to study the processes of creative thinking.

Specification of the Problem

This might be the appropriate time to specify in somewhat more explicit fashion just what it is that we will be covering in our discussion this morning. Our interest is pretty clearly in creative thinking, but under this general heading there are sub-issues which merit separate listing. One such issue is the kind of situation which is most conducive to the development of original thought, and most favorable to its expression. How should conditions of work in a research laboratory, for example, be established so as to maximize the possibility of creative and effective scientific effort? How should research scientists be treated if one's goal is to bring to the fullest fruition any sparks of originality and inventiveness which they possess?

Perhaps I ought not ask such questions, for as I have planned my remarks for today I have no answers—explicit or implied—for them. To my knowledge there is no research evidence now available which bears directly upon them. This is a disconcerting state of affairs, but one which should be rectified in the near future as more and more of the work in psychology seems to be turning to a study of the normal, effectively functioning individual and of the conditions that serve to enhance his self-actualization.

Some of the issues which such research will take up can be forecasted, however. What reactions should be given to the efforts of a research scientist? Should his work be treated with skepticism and disbelief, forcing him to convince his critics and prove the validity of his claims? For many, the first response to this proposal is, "Of course not!" Yet, one of the folk principles of widest acceptance concerning originality is that "necessity is the mother of invention." A harsh, critical, and unaccepting environment in which errors and mistakes are highlighted and punished and only the most exceptional and unassailable achievements rewarded might turn out to be "best"—best, that is, in the sense of yielding greatest returns in invention

and original thinking per unit of men and time.

In this experiment on "research climates" which we are outlining, a second situation would be one in which a moderately skeptical responsiveness would prevail. Acceptance of new solutions and new analyses would be relatively difficult to win; a greater change from the first set of conditions would be with respect to errors—here there would be little attention paid to them. This research climate would then be indifferent to errors and mistakes, but would maintain its reserve and incredulousness with respect to discovery.

A third climate of opinion would emphasize emotional support, reassurance, and group backing. New ideas, advances, changes, shifts in analysis, and the like would be welcomed enthusiastically. Errors, misses, blind alleys, would be discounted and everything possible would be done to diminish their impact on the research worker. All negative reinforcements such as criticism, sarcasm, and expressions of disbelief would be illegal. Everything possible would be done to put motivation on a positive basis and to encourage and reward invention whenever and wherever it appeared.

Which set of conditions would yield most in the way of demonstrable research achievement? To me this is a deeply intriguing question. I wish the project had been done so that I could now announce to you which method had been proved best. Unfortunately, it has not been done and so we are all going to have to endure a little unresolved tension. I apologize for this particular outcome, but I would like to point out in mitigation that such tensions are supposed to be quite helpful in other learnings. I am going to present a few "brain teasers" in a moment or two; when they come, any tensions carrying over from the above experiment can be put to work in solving these new problems.

This leads us up to the two other aspects of the originality question which we shall consider this morning. One of these is the processes and problems involved in creative thinking; the other is the personality factors, motivational sets, and habits of mind that characterize persons with greater and lesser potential with respect to creative originality. On both of these topics there is enough research evidence to give us something concrete to observe and think about.

Processes and Problems in Creative Thinking

In this section we will be concerned primarily with the cognitive side of creativity and inventiveness. The motivational and personological aspects will be discussed in the next section. From a cognitive perspective, two essential elements seem to be involved in creative imagination. The first of these is reorganization and reanalysis of the perceptual field, or of the problem as it is first encountered. The second is an appreciation of and attention to the elegance and esthetic quality of the alternatives that are considered in coming to a solution of the problem. Creative thinking when it is most distinctive always reveals both of these elements.

Let us see if we can concretize the first of these components—the task of reorganizing and reanalyzing. A popular mental puzzle can serve as our example. Assume that you are given two pails, one of which can hold five gallons of water and the other three. The task is to go to the well and bring back exactly four gallons of water. If you can introspect while you try to solve this problem—look within at your own thinking, that is—you will see at first hand what is meant by "reorganizing." The pails are filled, poured out, poured into each other, and so on. About now, if you have not encountered any severe blocks or obstacles, you should be attaining a solution to the problem. "Aha," you say, "of course. Just pour the water like this, and then like that, and there you have it. Very neat indeed."

Now what about the role of esthetic quality? I would like to introduce another problem as an example. Is the number 1,000,008 divisible by 9? How do we find out? Well, one method, perfectly accurate and satisfactory, is to carry out the division. The correct answer, "yes," is readily attained in this way. But there is another way of solving the problem which although no faster or more accurate is nonetheless more "elegant" in the sense of the word we are trying to explicate. What is the number 1,000,008? Why, it is merely the sum of two numbers, 999,999 + 9. Seen this way, the question "Is the number divisible by 9?" is specially meaningful. The answer is not merely "yes," but "yes, of course it is."

Let us take another example, this time from Wertheimer's book, *Productive Thinking* (13). The problem presented by Wertheimer is to obtain the sum of this series:

$$-63,\ -26,\ -7,\ 0,\ +1,\ +2,\ +9,\ +28,\ +65$$

A first, and least esthetic, solution can be attained by adding and subtracting as indicated. The answer obtained in this way is +9.

A second solution involves an organization of the series. A series of pairs can be abstracted starting with the two end terms (−63 and +65), then the next two (−26 and +28), and so on. For each pair, the value is always +2. There are four such pairs plus the center term of +1. The sum of the series is therefore $(4 \times 2) + 1 = 9$. The same answer is obtained as in the first mode, but the nature of the problem-solving is more elegant.

Now there is a third way of solving this series which

some of you have probably already noticed. The series seems to be "lopsided," that is, it is off-center to the right. What if the value "–1" is subtracted from each term in the series? The result would be as follows:

–63,	–26,	–7,	0,	+1,	+2,	+9,	+28,	+65
– 1,	– 1,	–1,	–1,	–1,	–1,	–1,	– 1,	– 1
–64,	–27,	–8,	–1,	0,	+1,	+8,	+27,	+64

Each term in this converted series can be seen to be the cube of its location in deviation terms from the origin. The equation $x_n = n^3$ summarizes this relationship.

The question now is: What is the sum of this series? The sum of the transposed series is obviously 0. The original series is reproduced by adding one to each term of the "basic" series; the sum of the original series must therefore be the same as the number of terms it contains. Nine terms are included, hence the sum is 9.

These three solutions to the problem of finding the sum of the series illustrate what is meant by the esthetic factor in problem-solving. Each solution is accurate and correct. But there is a definite hierarchy of elegance in the mode of analysis. The third solution is beyond doubt the most elegant. Creative thinking at its best seems always to be guided toward solutions of this third type.

Need for Insight

What about ways of facilitating the attainment of solutions to problems such as those we are considering? There are many aids and helpful hints which various writers have presented, but perhaps the best statement is provided by Karl Duncker's two admonitions to (1) analyze the situation, and (2) analyze the goal. The first of these is understandable enough and usually observed. It is the second which is too often neglected. In many problems a description of the functions which a solution would serve is itself enough to lead to an answer. In problem-solving experiments one often sees the paradoxical situation in which the subject has in fact reached a solution which he fails to recognize. An analysis of the goal helps greatly in sensitizing the observer to the properties that will characterize a solution. Then, if trial and error experimentation yields such a solution, the chances that it will be recognized and retained are increased.

One of my colleagues at the University of California Institute of Personality Assessment and Research, Dr. Richard Crutchfield, has carried out many experiments with a set of problems which he calls his "insight puzzles." In one of these problems the subject enters a room and sits at a table across from the experimenter. On the table is an inverted shell casing containing a piece of cork. The problem is to get the piece out of the casing. The casing is attached to the table, so that it cannot be moved about or tipped over. On the table are various props and tools which the subject can use if he chooses: a piece of string, pliers, bottle of Coca Cola, screw driver, and a box of Kleenex.

The typical approach on this problem is to try to use the screw driver, and then the pliers and string. The underlying aim in the approach is apparently to pull, scoop, or otherwise lift the cork out of the casing. The "insight" that is required to solve the problem is to think of floating the cork to the top rather than lifting it. An analysis of the problem from the standpoint of the properties of a solution helps to discover this method. In a solution the cork will be at the top of the casing from which it can then be removed. Any condition in which the cork is found nearer the top of the casing is thus a step toward a solution, and so on. Such a train of thought leads shortly to the idea of a floating cork, and from there to the use of the liquid in the bottle is a quick step. A reanalysis of the situation is also involved in attaining the final solution, for the pliers must be viewed as a potential bottle-opener instead of in its more common functions.

Tacit Assumptions

This comment about the perception of the pliers introduces another problem in creative thinking and problem-solving, namely our tendencies to see objects in certain ways and in certain groupings but without subjective awareness of these perceptual structurings. An example from the work of Harrower (4) will illustrate. Read over the following sentence:

It was and I said not so.

The implicit structuring given to this sentence by nearly everyone is this: "It was, and I said, 'not so.' " This reading, of course, is not particularly meaningful. A more sensible meaning is afforded if another structuring is employed: "It was 'and,' I said, not 'so.' "

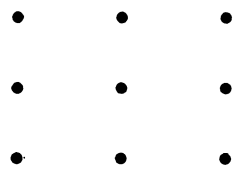
Another of Harrower's sentences is as follows:

Time flies you cannot they alight at such irregular intervals.

The typical construction of this sentence is "*Time* flies, *you* cannot; they alight at such irregular intervals." This reading is relatively meaningless. The "correct" structuring reads this way: "Time *flies* you cannot, *they* alight at such irregular intervals."

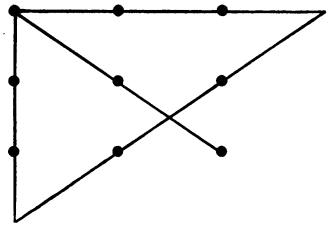
Another factor in the implicit structuring of a problem is the attribution of "tacit assumptions" or rules to the problem. One of the common examples in illus-

trating this tendency is the "nine dot" problem. Look at the nine dots presented below:



The problem is to draw four lines without letting one's pencil leave the paper in such a way as to pass a line through each dot. Trial and error ordinarily lead to many failures on this problem. If one examines such failures for a common mistake, it can usually be observed that all of the attempts fall within the boundary of the square defined by the nine dots. But this restriction of the lines to the area bounded by the dots is not given in the rules of the problem; this restriction is on the contrary a "tacit assumption" of the person trying to solve the problem.

The problem, in fact, can only be solved when this tacit assumption is set aside, as shown below in a correct solution:



Another problem which illustrates the issue of "tacit assumptions" is a well-known matchstick puzzle. The task is to construct four congruent equilateral triangles using six matchsticks. Trial and error behavior usually leads to various attempts to arrange the matches on the table top, putting one over another, and so forth. All such attempts will lead to failure, and all such attempts have in common an erroneous "tacit assumption." The assumpton in this case is that all of the triangles must lie in the same plane. The problem can only be solved when three of the matchsticks are used to form the base of a pyramid and the other three to define its sides. The result is a tetrahedron, an object whose four surfaces meet the requirments of the problem.

The overcoming of these grouping and self-limiting errors is one of the chief problems of creative thinking. Many "break-throughs" in scientific research are nothing more than the freeing of thought from these unwarranted restrictions.

Assessing Determinants of Originality in the Individual

In the time remaining in our session this morning I would like to undertake a discussion of the third issue I mentioned at the start, the factors which are related to the originality potential of the individual. We will be interested in this section in ways and means of assessing inventive talent, and in the personality factors which apparently play a role in determining this potential.

One of the established ways in psychology of measuring aptitude for a task is to test the individual on a part of the task. Performance, say, during the first few weeks of a training program is usually a good predictor of achievement at the end of the program. Many tests in psychology for aptitudes like mathematical aptitude, art aptitude, musical aptitude, and so on, present the subject with a sampling of material from the domain of interest and then estimate his general promise from his effectiveness in dealing with the sample.

This approach is an eminently sensible one in the study of creative thinking, and has been used to advantage in the program of Dr. J. P. Guilford at the University of Southern California (3). Guilford and his collaborators have developed many tests which require responses assessable in terms of the dimensions of originality. The principal dimensions, in the opinion of the Guilford group (14), are represented by the rarity, the remoteness, and the cleverness of the answers given by the subjects. Suppose the "test" is to assign captions to a series of cartoons. The first cartoon might picture an older man at a desk seemingly speaking harshly to a younger man standing alongside. From the rarity standpoint, points could be given for titles appearing no more often, say, than once in each 100 test booklets. "Cat has his tongue" might be such a title.

The remoteness aspect is less a matter of simple frequency, more a matter of judgment of the scorer. A caption like "Clothes make the man" might receive a point for remoteness. The third element, cleverness, is also principally a matter of judgment; agreement of judges is the method used to guard against arbitrariness and solipsistic standards. A caption like "Jones, these personality tests not only show that you are an ambitious, enterprising man, but also that you are after my job!" might strike an indulgent scorer as worth a point.

The testing procedures of clinical psychology are also well adapted for estimating originality. Murray's Thematic Apperception Test (8) can offer an example. In one of our studies at the Institute of Personality Assessment and Research we gave this test to seventy men who were being considered for admission to one of the professional schools of the university. The test consists of a series of cards with pictures, for each of which the subject is to make up a story. These stories

are usually examined clinically for indices of character traits, inner conflicts, behavioral tendencies, and the like, of the subject. They can equally well, however, be rated for their degree of creative originality.

In the instance I am describing, ratings of originality of each of the stories told were made by experienced testers. The two examples about to be given come from opposite ends of the rating dimension. I think it will be clear enough which is which.

The card for which the two stories were told shows a young boy seated at a table looking at a violin. His head is between his hands, and his elbows are resting on a sheet of music spread under the violin.

Story A. This is the story of a small boy who is dreaming of the day when he will be a great violinist. The violin belonged to his father, who had been a great artist in his own day. The boy wants to pick up the violin, but it is too big for him as yet.

Story B. This is a young lunatic who is anticipating using the strings of his violin for connecting a long line of dead cats. These he will place in the window of the butcher shop and many people from all around will flock to buy these delicacies.

Another way of looking at this matter of the determinants of originality is to identify the underlying personality and motivational factors which predispose toward originality. This is the aspect of the problem on which I have myself been working the past six or seven years. On the basis of this experience and research I have gradually come to consider five factors as having fundamental importance. They are listed below:

1. *Intellectual competence.* The capacity to think, to reason, to comprehend, and to know.
2. *Inquiringness as a habit of mind.* An unending curiosity about things, about people, and about nature; an inner spur toward resolution and discernment.
3. *Cognitive flexibility.* The ability to shift and to adapt, and to deal with the new, the unexpected, and the unforeseen.
4. *Esthetic sensitivity.* A deep-seated preference for and appreciation of elegance of form and of thought, of harmony wrought from complexity, and of style as a medium of expression.
5. *Sense of destiny.* This includes something of resoluteness and (naturally) of egotism, but over and above these a belief in the foregone certainty of the worth and validity of one's own future and attainment.

It is easy enough to derive a list of factors such as that above. The research task for the psychologist is to provide some way of bringing the dimensions under research control: to provide some method for determining whether or not they are present in an individual and, if present, to what degree.

To attain this goal of differential measurement I first chose on theoretical grounds a set of three tests to define an anchoring point for each of the five dimensions. The battery of fifteen tests resulting from this procedure was a fairly time-consuming one, requiring from eight to ten hours for completion. However, in order to secure valid and comprehensive coverage of each facet this length seemed justified.

The next step was to develop what I call an "approximation index" for each dimension. The "approximation index" is not meant to define the factor, but rather to provide an estimate of an individual's standing on it. The method employed here was to correlate personality test items with each of the five anchor points, searching for items which would relate significantly to one and only one of these reference points.

For each factor, twenty items were eventually found which met this criterion: that is, which correlated with the reference factor but with no other. Each cluster of twenty items was then treated as a unit, resulting in five experimental scales. A sample item from each scale is given below.

Dimension	*Item*
1. 0–1 (intellectual competence)	a. I don't like to work on a problem unless there is the possibility of coming out with a clear-cut and unambiguous answer. (false)
2. 0–2 (inquiringness as a habit of mind)	b. I get sort of annoyed with writers who go out of their way to use strange and unusual words. (false)
3. 0–3 (cognitive flexibility)	c. For most questions there is just one right answer, once a person is able to get all the facts. (false)
4. 0–4 (esthetic sensitivity)	d. I would like to hear a great singer in an opera. (true)
5. 0–5 (sense of destiny)	e. Barring emergencies, I have a pretty good idea what I'll be doing for the next ten years. (true)

These five scales have been collected into a single

testing instrument,[1] along with an additional scale called "P-4" which seeks to assess some of the motivational components of personal success and constructive achievement. This test is the Differential Reaction Schedule, or DRS. It is currently being used in research studies of graduate students, laboratory scientists, and military personnel. I am not going to take time to detail the findings which are being obtained, for our interests today are more with overall trends and indications than with specific findings. Furthermore, we are pretty close to the end of the time allotted for this session. Suffice it to say that the results so far obtained with this schedule are very encouraging. Correlations on the order of +.40 and +.45 are being found with criteria of research originality and productivity. The scales are also showing the patterns of correlations which one would expect with other psychological tests and measuring devices.

This brings me to the end of my discussion today. I have tried to present some of the background and general psychological factors out of which our point of view concerning creative originality can be derived. Comment was then made upon the nature of the thinking process, and upon some of the problems and pitfalls which creative imagination must overcome and transcend. Lastly, attention was directed to factors of personality and character which seem to function as "determiners" of original behavior. Tests for assessing these factors were described, and the development of a new personality assessment questionnaire for creative originality was briefly summarized.

[1] *The Differential Reaction Schedule*, copyright 1955 by Harrison G. Gough, Ph.D. Available for research use only, on special permission of the author. The DRS contains 132 true-false items and takes from 15 to 20 minutes to administer.

References

1. Duncker, K. *On Problem-Solving*. Psychol. Monogr. No. 270, 1945 (translated by L. S. Lees).
2. Gough, H. G. *Staff Memoranda on Creative Originality*. Berkeley: University of California Institute of Personality Assessment and Research, 1952–1956.
3. Guilford, J. P. "Creativity," *Amer. Psychol.*, 5 (1950), 444–454.
4. Harrower, Molly. "Organization in Higher Mental Processes," *Psychol. Forsch.*, 17 (1933), 56–120.
5. Hartmann, G. W. *Gestalt Psychology*. New York: Ronald Press, 1935. Pp. 179–201 especially.
6. Humphrey, G. *Thinking*. London: Methuen, 1951.
7. Kohler, W. *The Mentality of Apes*. New York: Harcourt, Brace, 1927 (translated by E. Winter).
8. Murray, H. A. *The Thematic Apperception Test*. Cambridge: Harvard University Press, 1943.
9. Skinner, B. F. *Science and Human Behavior*. New York: Macmillan, 1953. Pp. 242–256.
10. Thorndike, E. L. *Animal Intelligence: An Experimental Study of the Associative Processes in Animals*. Psychol. Rev. Monogr. Suppl., No. 8, 1898.
11. Vinacke, W. E. *The Psychology of Thinking*. New York: McGraw-Hill, 1952.
12. Wallas, G. *The Art of Thought*. New York: Harcourt, Brace, 1926.
13. Wertheimer, M. *Productive Thinking*. New York: Harper, 1945.
14. Wilson, R. C., J. P. Guilford, and P. R. Christensen. "The Measurement of Individual Differences in Originality," *Psychol. Bull.*, 50 (1953), 362–370.

Automation's Impact on Future Personnel Policies

RALPH R. CANTER
Associate Social Scientist,
The RAND Corporation

At the outset let me point out that I am not an expert on automation. An expert has been described as a man with a briefcase who is more than one hundred miles from home. I do not have a briefcase with me this morning and am less than twenty miles from home. My office is in the System Development Division of the RAND Corporation located in downtown Santa Monica. Bob Smith, of the Institute of Industrial Relations, pointed out to me in planning for this presentation that many of you are probably not familiar with the RAND Corporation and its particular functions. The RAND Corporation is an independent, nonprofit organization similar in some respects to a research institute but without any specific precedent. Its principal business is to provide long-term scientific studies designed to aid the U. S. Air Force in making long-range decisions. To carry out such work, RAND employees

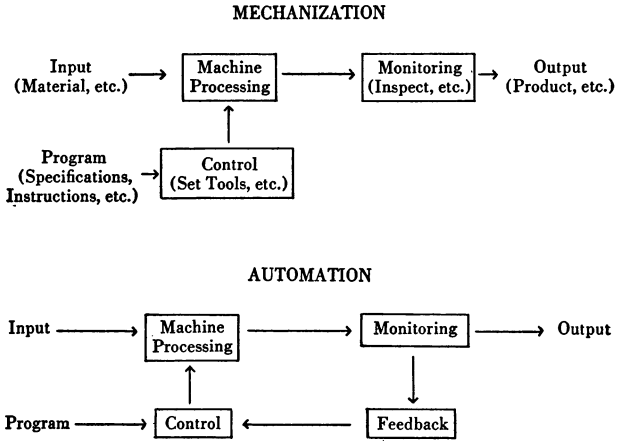
are persons with many different kinds of academic backgrounds, principally involving the physical sciences, engineering, economics, mathematics, aerodynamicists, political scientists, psychologists, and other persons with assorted special backgrounds. The System Development Division was recently formed to carry out the work of providing a system training program for the Air Defense Command of the Air Force. This particular training program involves the design and preparation of large-scale training exercises using a tremendous quantity of training materials. Without the use of electronic digital computers and automated processes, we could not possibly obtain the magnitude of production and the degree of accuracy required in the training materials. I should later like to return to the System Development Division in reference to the use of electronic computers in automation.

Automation Defined

First, I will talk about automation in terms of definition and scope. Then I shall attempt the difficult task imposed by the title of this session.

Automation has been defined in an almost superficially simple form as "the use of machines to run machines." This is the definition used by Peter Drucker in his *Harper's Magazine* series entitled "America's Next Twenty Years." John Diebold used the definition of automation as "a means of organizing or controlling production processes to achieve optimal use of all production resources: mechanical, material, and human." He points out that perhaps the basic meaning of automation is the organizing of industrial processes as complete integrated systems, from the introduction of the raw material to the completion of the final product. It may be a physical product or, in a business sense, it may be information.

Industry essentially follows two basic steps in approaching automation. First is to organize each of the several steps of the production process into a fully integrated system. The oil refineries pioneered in this step. The chemical industry, processing industries, and the nuclear production industry, for example, have since followed in going through this first step of automation. They have changed what formerly had been batch processes into integrated systems. The second step is to take the system and to control it in such a way that it operates at optimum all the time. The technology of automation deals with the transmission and use of information about the performance of the machine while it is performing. Such information involves the use of self-regulating mechanisms and feedback mechanisms. The following chart, I think, can aid us in understanding the operation of feedback and how mechanization is transformed to automation. Computers enter into the picture by providing monitoring, feedback, and control functions.



Function of Computers

Electronic computers are providing the chief means of automatically governing the operation of much manufacturing equipment. The principal type is the electronic digital computer which relies on the basic arithmetic of addition and subtraction for its operation. It performs a long series of essentially elementary steps in a very rapid sequence. It is possible for such a computer to solve highly intricate problems very rapidly. Computers also compare, collect, and make logical choices between alternatives. However, the entire operation of the computer is based upon written-in instructions, instructions which man gives it. Words and mathematical expressions are both symbols, that is, symbols for ideas or quantities.

Word symbols can be altered to correspond with symbols which a computer is built to handle. It is, therefore, possible for computers to handle all types of information. Most computers are now built to handle binary numbers. Binary numbers are composed of only two kinds of digits, most commonly one and zero. The various possible higher combinations of zeros and ones can be used to represent letters of the alphabet or large arithmetical numbers.

Functionally, computers essentially contain the same type of unit; however, they may vary considerably in their physical structure. The most common computer unit contains three elements: (1) a computing element which actually processes and compares data or makes a logical choice, (2) a control element which schedules the sequence of operations and automatically programs the action of the computing element, and (3) a memory or storage element capable of retaining in permanent or temporary form information necessary for operating the machine. There also is an input unit which is for

putting information into the computer and an output unit to withdraw and record information from the computer.

The real difficulties in using computers are to find ways of speeding up the input and output: that is, putting information and instructions into the computer and getting out of it the report and recording of the computer operation. In order to program a computer it is necessary to know precisely what is required and to reduce the problem to a series of precisely defined elemental steps. At each stage the machine must figuratively ask a question which can be answered by "yes" or "no" represented in binary form.

Earlier, I made reference to the work at the System Development Division of the RAND Corporation wherein we use computers extensively. I believe that nearly everybody in our division is acutely aware of this necessity to know precisely what is required in the job and to reduce the problem to a series of precisely defined elemental steps. The many things that we would like a computer to do may seem very simple in terms of our own mental operations, but when they are set down on paper in terms of program operations, they may fill many, many papers because of alternative courses of action that might be taken at each step.

We believe that the important thing to know about the computer is the fact that the computer can act extremely rapidly and with extreme accuracy, both of which are far beyond the human capabilities. By linking up machines that store information, machines that can count and calculate maxima and minima within fractions of seconds, and machines that are more sensitive to errors than any human being could ever be, we have a system that can carry out a whole sequence of operations with uncanny speed and precision. It is then obvious that on the floor of the factory or in the office, automation will have real meaning and will provide extensive change.

Impact of Automation on the Economy

Before going on, I should like to establish six points which seem generally agreed upon by experts in the area of automation, both on the labor organization side and on management side. First, in a sense, automation clearly is not at all new. You have all probably heard of the fact that we had automation in this country in 1784. Oliver Evans in that year built an automatic flour milling plant near Philadelphia. This plant took the raw material, the wheat, and turned out finished flour without being touched by human hands. Many experts view automation as simply a normal extension through research and development of mechanization. For example, there is the notion called "Detroit Automation" which is defined as the "automatic handling of parts between progressive production processes." However, what is *new* in automation is that through the development of electronic computers we are now able to greatly multiply man's ability to do mental or symbolic work. It is generally agreed that this kind of extension does cause automation to be raised far above the level of merely advanced mechanization.

Second, through automation and the introduction of labor-saving machinery techniques, whole new industries have arisen and others may be expected to arise. The electronics industry, of course, is probably the most striking example wherein automatic processes are being introduced. As evidence of this, a Department of Labor statement is relevant: The electronics output in 1952 was 275 per cent higher than in 1947 but was produced by only 40 per cent more workers.

On the side of other new industries, certainly atomic energy and atomic isotope production should be noted. The very nature of the materials to be dealt with here are such that they could never have been harnessed by hand method and by close human contact. Only wholly automatic processes could provide the means. In addition, polyethylene, which is a commonplace product today around the house in the form of squeeze bottles and the like, is almost completely automatically produced because of the need for precision timing, workers' safety, and the necessity to make the product at extremely high pressures.

Third, each new product generally results in new jobs being opened up in the production of basic materials, the providing of services and maintenance, and, of course, the performance of paper work. It has been pointed out that automation seems most directly to point to the manufacturing industry; however, only about 30 per cent of the employed population are directly working in manufacturing. This would seem to indicate that with the great expansion of automation, there should be a decline in the proportionate numbers of persons employed directly in manufacturing relative to the numbers employed in services and many other nonmanufacturing industries. Of course, the problem that goes with it is recognized: namely, the displacement of workers from one industry to another. In some instances there will be the physical necessity for a worker to move from his home town or city to some distant city. However, it is very likely that the rate at which automation will be introduced into many industries and companies will be so slow that the effect on the economy in general will not be noticeable, and in some specific cases will not be very much of a hardship on employees. In other industries, however, this may not be true, and it may be that a number of indi-

viduals will suffer personal, mental, or physical hardship as the adjustments in regard to automation go forward. I refer especially to the hardships of the displaced middle-aged and older workers through obsolescence of their lifetime skills. More will be said of this later.

The fourth point is that the country is faced with a shortage of scientists, technicians, and skilled labor and will continue to be threatened with such shortages for many years to come. Figures frequently quoted refer to Soviet Russia's output of engineers and technicians in contrast to the United States' output. For example, it is estimated that this year we will graduate from 27,000 to 30,000 engineers whereas Soviet Russia will graduate 50,000; that we will train 50,000 technicians and Russia will train 1,600,000. One striking difference that is not so frequently quoted is the fact that Soviet Russia will have among her engineers and technicians somewhere between one-third and two-thirds women, whereas the United States will have only 1 per cent women. The main point being stressed here is that other countries do have the capacity to turn out effectively trained technical personnel and clearly this country should have the same capacity.

Automation, of course, requires many, many persons with technical-training backgrounds. In broad general terms, the advent of automation increases the need for men trained in design, construction, supervision, and maintenance of electronic gear and automatic machines. Perhaps, insofar as engineering itself is concerned, the new term which I have read in the papers called "system engineer" would probably cover these four activities, although I am not sure of this. However, insofar as skilled operational-type personnel is concerned, these would probably be required by separate categories such as the design, construction, maintenance, etc. Here I refer to such jobs as machine maintenance, mechanics, component material handlers, electronic technicians, key punch operators, computer programmers, control equipment technicians, program adaptation personnel, and many others.

The fifth point has to do with the population and population growth and may be used as a basis for arguing the necessity of automation and its immediate expansion. The population stands in the vicinity of 167½ million people. It is estimated for 1965 to be in the vicinity of 190 million people and by 1975 to reach somewhere in the vicinity of 220 million people; thus by 1975 this amounts to a gain of approximately 55 million more people. One of the striking features of this growth is the fact that only about 15 million will be added to the work force in that period. It is estimated that about 22 million people would have to be added to be proportional to the total population today. Thus we will find ourselves short by 12 or 13 per cent of the number of persons in the labor force were we to remain proportional to today's figures. Our population will continue to grow on both ends; that is, more younger people and older ones living longer. It is obvious that an increase in productivity will be required to take care of this added demand.

On the other side of the picture, labor organization leaders fear that the total number of jobs will be considerably diminished proportionate to the present-day data. Labor leadership is also especially worried about the dislocations required in the labor force. New plants, particularly newly automated new plants, are rarely located in the old town, the site of the old plant, and therefore the workers in the old plant do not have other jobs to turn to with ease.

While we could spend a good deal of time and probably have some fun figuring out ways of making predictions as to what the actual labor force and number of jobs and so on will consist of in the 1965 to 1975 decade, I feel that it is safe to say that we have to acknowledge labor's worry about pockets of unemployment, and we also have to acknowledge management's worry about the tremendous need for additional skilled personnel and the need for capital monies for investment.

Sixth, management and unions generally have been found prepared to accept the human cost of displacement and retraining as charges against the savings from the introduction of automation. By and large, management and union personnel have recognized that by careful planning and scheduling, with sensitivity to the timing of investment and technological changes relative to the state of general business, stoppage of employment can be minimized. Automation generally has taken place during periods of expanding production.

Problems of Recruitment

At this point I wish to move on to a discussion of (1) recruitment and selection, (2) training, (3) work organization, and (4) some general problems. Peter Drucker has stated that automation's most important impact will not be on employment but on the qualifications and functions of employees. While there may be very few workers on the production floor of tomorrow's push button factory, at the same time an incredibly large number of men will be required behind the scenes in highly skilled jobs as machine builders, machine installers, repairmen, controllers of the machinery and of its performance, and programmers who prepare information and feed it into the machine. Additionally large numbers of highly educated personnel will be

needed in new jobs as designers of machinery, draftsmen, system engineers, mathematicians, logicians, and so on. Lastly, large numbers will be needed for new managerial jobs which require a high ability to think, to analyze, to make decisions, and to assume risks.

Drucker estimates that the increase both in the number of managers and in the demands made upon them may very well be the largest of all the social impacts of automation. Now let us consider why this is so. To take advantage of the new technology of automation, it is almost inevitably necessary in every single instance to redesign the product, or the process, or the machinery, and sometimes to redesign all three. John Diebold has emphasized the necessity for completely rethinking the entire production process as a step in preparing for automation. My experience with this has led me to realize the tremendous difficulty that is present in attempting to analyze in the most minute detail the actual operational elements that are involved in automating a process.

Automation technology easily ranks as one of the most complex technologies known. The reason for this discussion is to emphasize the necessity, in recruiting and selecting personnel, for upgrading whole segments of the population in a very short time in terms of their education and training. Within this framework, recruitment becomes a national problem. It is not just simply a problem for each individual organization alone as it generally has been, but now it becomes a problem for the entire school system, for the military services, for all industry associations, and so on, to worry about.

John Weir, a psychologist at Cal. Tech., recently reported on the needs of the future. He pointed out that of every 100 American youths, 80 go through the 9th grade, 59 through high school, 13 through college, and only 3 obtain degrees in science or engineering. He pointed out that we lose in this process 50 per cent of our capable youths and 33 per cent of those who are exceptionally talented. Recruiting, then, takes on a new definition: the need for finding ways and means of holding the young people in school and in educational status up through at least formal technical training and for actual collegiate training. Industry may well have to deny itself the opportunity of obtaining intelligent untrained persons and to hold off until training is completed.

Another note in regard to recruiting is the fact that women are employed only minimally in technical fields. As I pointed out earlier, only 1 per cent of our engineers are women; in fact, only 11 per cent of our scientists are women. This is a clearly prominent source in the future for recruitment of technical personnel. Again our culture must be effectively changed to make it possible for women to want to enter into technical educational programs.

I suppose that one of the main conclusions we can reach, then, is that the need for better educated personnel will exist at all levels in all kinds of jobs in the industrial company for the next twenty years. It would appear that automation will require the ability to think, a trained imagination, good judgment, plus some skill in logical methods, some mathematical understanding, and some ability well above the elementary level to read and write so others can understand. The serious educational problem, of course, is to prevent the person's education from preparing him only for his first job. The concept of a liberal technical education may have to be developed.

When it comes to the recruitment of managerial personnel, it would be extremely hard to find a school of any kind in the formal educational sense where a person could acquire the education needed to be a manager in the automated plant. To a very great extent it seems likely, in agreement with what Peter Drucker has said, that the educational job will have to be done in and by the business itself. Large companies in particular will probably have to become educational institutions even more than they do today. Remember that automation is a uniquely specialized kind of activity in the sense that the automated process and the product designed to be produced in automated processes are wholly unique to that particular organization, and do not represent some broad general principle being applied in one setting. Thus, because of the particular, specialized kind of knowledge that exists in that particular plant, the manager must essentially be trained in that plant.

Selection of Personnel

I suppose that in one sense everything that I have said about recruitment may seemingly come under the heading of selection. However, I want to talk about selection from the standpoint of the particular kinds of factors that need to be taken into account in selection for the automation-type job. Nearly every automated job has as a requirement the ability to visualize what goes on inside the processing equipment, the ability to understand in exact detail what is taking place. Selection to a very large extent will center, in my thinking at least, around the ability to use symbolic language or symbolic thinking. For those jobs which are demanding of creativity, obviously measures of creative thinking would be required.

The military forces are today facing and using automation. They have developed, of course, some of the most advanced forms of system operation; that is, using

equipment which is classed as automated. The psychologists in each of the three branches of service are hard at work studying something that is generally recognized to be trouble-shooting, in terms of trying to identify tests or other devices which will predict who can effectively do this job. The job essentially consists of the ability, upon failure of a piece of equipment, to diagnose and to locate rapidly the source of the failure and to take immediate action to correct the failure. A large amount of test equipment has been developed to aid in this, but it still requires considerable human ability to know how to use the equipment and to be able to analyze the process and think out approximately where this difficulty might have been caused.

There has been a good deal of discussion of the need for people trained in mathematics to fill jobs in the future. As far as I can see, the concept in mathematics would only be a specific predictor or indicator that the individual was able to work effectively in an automated-type job situation. I think that it would be possible to select on some other basis than mathematical ability. However, I do think that mathematical ability is probably as good an indicator as we can ever hope to get if we view it as requiring great ability to perform logical actions and to be able to conceptionalize in some way other than English. I personally hope that it may be possible in the future to find ways and means of developing such ability, that is, the ability to think in terms of a symbolic language and to do this in strictly logical fashion.

For the untrained, unskilled person, I doubt if the industrial network will have very many openings in the future. There will be some, of course, and there will also be a number of openings in other types of industry for that sort of person. In fact, he will be very much needed for doing jobs of the unskilled variety in service industries established to support automation.

One of the particular kinds of requirements that I think will be imposed upon industry through the advent of automation will be the necessity for evaluating not only the lower limit of the intelligence and aptitude range for a given job, but also the upper limit of that range. It has always seemed to me to be one of the more wasteful procedures in this country to worry about selecting the individual who has minimum qualifications, and not worry about his maximum qualifications. This has been particularly true in the military services. As far as I know, we have never attempted to set an upper ceiling or cut-off score above which an individual cannot be assigned to a job. I should think that industry would gain quite a few personnel for the hard-to-fill difficult jobs were it able to adopt this particular practice. The gain would be reflected in having better qualified individuals available for more highly demanding positions in the automated industrial setting. As far as can now be ascertained, all of today's problems associated with recruitment and selection will be very much with us in the future. This does not mean there will not be new varieties of difficulties that must be taken into account at that time.

Training for Automation

Next I am going to talk about training—again, from a very broad standpoint. The experts, both on the side of labor organizations and on the side of management, have agreed very definitely to the need for adequate retraining in order to equip personnel of the work force to take on jobs in automated settings.

One of the very strong points made by Walter Reuther, for example, regarding the effect of automation has been this: automation in Detroit means unemployment in South Bend. The significance of this statement lies in the fact that, because of the interdependent nature of our manufacturing network, an action in one place may have its effect rather distantly removed. This means that there is an important task to be performed by volunteer management associations in cooperation with government: to identify potential sources of such difficulties and then, first, to attempt to prevent such difficulties from happening and, second, to help the workers to be retrained for other jobs.

In industry in particular and society in general, we will have to assume responsibility in providing means for retraining, transferring, providing unemployment compensation and hours of work for those affected by the dislocations of improvements such as automation brings. We will probably see the development of a new series of schools, or perhaps they might be called facilities. At any rate, these training facilities would be required for people in the new technology of automation. I understand that some industries have already worked out arrangements with local schools to provide the beginnings of such training—that is, a course of study that includes applied physics and applied electricity and electronics.

However, there is a particular aspect of training which must be accounted for in every organization, and this is that management must plan to have personnel trained and available to prepare the organization for automation. It is simply not possible to decide, well, we have enough money together now; let's automate the plant beginning tomorrow morning at 0800. An extremely important and crucial factor is the necessity to provide training for a set of individuals with superior ability now within the company, who could design and specify or build the necessary new equip-

ment. A real danger is in failing to have enough trained manpower to do the automation planning and development for the particular company. Such a step must be taken far, far in advance of the actual installation period. A while ago, we mentioned the fact that automation demands total analyses of the processes that are used in manufacture, in terms of functions rather than in steps that are now being performed, and that what is essential here is to rethink the entire operation—that is, to decide what is to be automated in terms of functions, groups of functions, or elements, rather than in terms of the discrete steps that are now being used in manufacturing the product.

Machines now manufacture the cards on which are automatically printed the circuits used in the manufacture of radios and television sets. To some extent, the process was based on what human beings would be able to do when putting that circuit together. However, human fingers were too large to undertake certain jobs after others had been already run. Therefore, one of the things that the people who automated this particular manufacturing job did was to rethink the entire operation through from the standpoint of what logically can follow what and not what logically can a person with a machine do in sequence. The machines were designed specifically to fit the requirements of a logical manufacturing sequence, meeting certain criteria of reliability and accuracy without human intervention insofar as possible. Of course, people have to do such thinking and make such decisions.

One of the training requirements which it appears to me will be very necessary is to train management and supervisory personnel and employees on the need to create the conditions where rethinking can be done. No more is it going to be possible for one man to keep within himself the entire nature of the production design and production process. This is the exact reason why computers are so valuable: they can take into account so many variables that might be interacting at one time. In the rethinking process computers might be of aid but they have to be instructed, and this matter of determining what instructions to give them is involved in the rethinking operation. Therefore, training will have to proceed along the lines of establishing the climate for effective participation in decision-making in regard to how this process might be established, bearing in mind that separate individuals have many separate pieces of information that will act as interdependent, interacting variables in that situation.

Furthermore, at certain points in time during the planning and development period, consultants and consulting organizations on automation may have real special value to the organization. I've always felt that organizations, and particular persons in the organizations, might well benefit from training in how to use a consultant.

Another aspect of training has to do with the provision of something like seminars in which the engineers and the operational personnel review, in considerable, exact detail, what is going on inside the automated process machinery. Our experience at RAND indicates the necessity to identify, at frequent intervals, the production program status. That is, we have a computer program, setting up instructions which tell the computer what to do. This program must be reviewed from time to time to make sure that it is functioning properly, that it is performing in the fashion that it was meant to. Conferences are necessary to refresh one's understanding.

In connection with training in all of its various forms, I anticipate the need and the growth of new training aids materials. Because of the immense complexity of the automation process—for example, the monitoring equipment, control equipment, feedback equipment associated now with the production equipment—it will require something in the form of a three-dimensional model or relatively extensive diagramming to be able to communicate and to instruct and teach what is involved in the operations as they are carried out in normal operating conditions. Individuals will have to be trained in such content because their jobs will be much more dependent on having an insightful knowledge of what is happening and what is the meaning of a given light, not in terms of just simply what the individual has to do but what caused that particular light to come on at that particular time. What is its relevance for the total operation that is being carried out? In other words, individuals will have to be trained in terms of the total process, not their one separate activity in regard to that process.

Further, our experience in the RAND system training program shows a definite necessity for the whole crew of operational personnel to be trained together on, let us say, simulated exercises or simulated problems. This is because of the interdependence of the various jobs and the necessity for the crew to learn how to communicate effectively with one another when things go wrong or when problems arise. For example, in a relatively completely automated setup, the personnel who will be operating the machines through central control panels, the operational and maintenance personnel must learn how to work together effectively in obtaining a quick and accurate diagnosis in order to repair the difficulty. Training will have to be looked at from a broad standpoint involving the total personnel on the shift, rather than from the standpoint of each

individual on the shift or from each individual component position. We have to remember now that it no longer is a system operated as a series of connected components; in automated situations, there is a system in which all aspects are tied together and which is one continuous operation. Therefore I am suggesting that people must be trained to operate this system as a system, as a continuous operation, and they must be trained to be an effective part of the system.

Effect on Work Organization

Let me now turn to the question of work organization. Training is an appropriate introduction to the problem of work organization in regard to the organization of employees, which generally followed vertical lines in the past but which in the future will be different in this regard. I do see a definite shift in the relative roles and status of various groups within the organization. These may have a direct impact upon the form of the organization.

I can illustrate this from the standpoint of which is line and which is staff in the new day of automation. Engineers produce the specifications for the construction of the machinery; they supervise the construction of the machinery; they supervise the installation of the machinery; they supervise the maintenance of the machinery; they tell others how to operate the machinery; they assist in what instructions will be given to the machines (in this latter case, let us suppose it is a computer-controlled operation; then there will be programmers who will actually write out the instructions to the machine and who will be the ones responsible for making changes in the program so the machines will perform differently). What I am saying is that engineers and mathematical programmers have a tremendous amount to do with the actual operational activity of running the plant. You couldn't very well do with the engineering staff, as it has been previously called; they now become the engineering line and they now become the production organization in this particular problem area.

Certainly, in regard to this general problem of work organization, there is another specific example of difficulty regarding whether engineers are line or staff. For example, it seems pretty clear that automation will only go into those plants which have long-run production. The large amount of fixed capital required will limit the rate of automating. Better tools and machines will be required, and a rapid rate of obsolescence for old equipment will occur. It will be necessary to visualize, at any rate, the demand for either two or three shifts. Automation is a 24-hour-a-day proposition, seven days a week in most instances. Now in some cases, it will be possible to have only two shifts because the third will be involved almost entirely with maintenance activity. I suppose we can all recognize the fact that an engineering group will have to be present on every one of these shifts. Engineers will have actual line duties and responsibilities which have to be carried out in regard to the operation of the equipment.

Of course, in this connection, there will arise a number of other difficulties. Certainly there will be issues with the unions and the professional groups in regard to shift differentials in pay, in regard to seniority and the choice of shifts, in the rotation of shifts. Another work organizational factor which I think will undoubtedly appear from time to time—at least it has been appearing for many years to date—is the jurisdictional-type problem as seen by two or more different labor organizations. An automated situation involves electrical devices by the dozens, packed in with all kinds of mechanical components. Thus, it will be pretty hard to discriminate, let us say, the tool mechanic and the electronics man at certain points in the process. I do not have any knowledge—perhaps some of you have and will volunteer—as to whether or not automation increases jurisdictional disputes or whether similar activities at the present time are making for special difficulties along these lines.

Another factor that relates somewhat to this general problem area of work organization is the question of the sources of satisfaction for the individual worker. For example, how can any product of an automated factory be identified with any individual worker? In this particular instance I suppose it would be possible for the individual worker to point out that he really made the whole product and perhaps this is the approach that should be used. However, in the case of worker satisfaction in general, I think it should be quite clear that the team approach, the group organization approach, or however one would wish to describe it, is crucially essential to develop. This bears repetition: No individual is going to be able to know the entire operation, is going to understand the intricacies and the interdependence of the various equipment in fine detail. This can only come as a product of the separate knowledges of all the individuals who function in respect to different aspects of the system operation.

To some extent this is more true in the plant situation than it is in an office situation, say, where both of them have been automated to a great extent. The reason is: in the office situation, the computers (which would be the basis for automating office situations since what is required is the handling and the processing of information) will be equipped to report on the results of their activity; such computers can be programmed to

report and print out their results in English. As a kind of aside, this is a rather interesting point. RAND has been in contact for many years with the various and sundry developments that have been taking place over the country in industry regarding the installation and use of computers. Recently it was reported that in one company—this is seemingly true for several—soon after the computer installation was complete and programs were checked out, etc., they found themselves with no particular business, so that computer staff had to go to the various departments and beat on their doors and on their desks to get problems to work on. Very shortly after that, the personnel in the organization got acquainted with what they could get out of the computer. Now the computer is almost overloaded because everything now is sent to the computer operation. People are acquiring masses and masses of information which it was never possible for them to have before. Such additional information, of course, has created new kinds of demands upon the production organization and upon the engineers. Having this increased information has increased the understanding, enabled a more flexible approach, and increased the need for improvements in the products and in the processing. Through such improvements, the engineers have had to go to work and try to put the new information and requirements into actual operation and into actual production. If I had to make one statement about automation, it would be that it has its primary effect in providing more accurate information that gets used in improvement of process and product. Improvement is the most general result.

Another aspect of work organization is the fact that the unions have indicated definitely that they will press for shorter and shorter hours with no decrease in pay. It is necessary in their eyes to cope with automation through this particular mechanism. They wish to achieve a 35-hour week this year and next and to achieve something in the nature of a 30-hour week by 1965 (Walter Reuther indicated the Monday through Thursday week, that is, the 32-hour week).

The main basis for the union argument has, of course, been declared invalid by many people—that is, since, in the union's eyes, there will not be enough jobs for everyone, the number of hours should be cut down and the number of jobs spread out. However, another new basis for their argument is the fact that, with increases in productivity in industry, the real wages should be increased. The workers should be able to have the gains in the form of more spare time. Spare time, shorter work week—this may well indicate that there will be something on the order of four work shifts, assuming the shorter work week were the case. This will make for a number of organizational problems since, say, four 6-hour shifts would mean a fair amount of additional overhead in supervisory personnel, etc.

Assuming the shorter week, and therefore assuming more leisure time, it would then appear incumbent upon the unions or management or both to provide for an increased liberal or general educational program and for recreational programs of various sorts. One of the ways in which the unions may well accept a shorter work week would be in terms of longer paid vacations, more paid holidays, occasional long weekends. Nevertheless, the pressures for such hour-objectives will continue for a period of time.

Future Policy Issues

Now that I have pointed out a series of problems, I would like to summarize with a new series of general problem areas that can be raised as future policy issues. What I am saying is that personnel executives have the responsibility of seeing that each company has developed a sound policy in regard to each of the following points:

(1) One problem area is the constantly increasing need for companies to make some beginning toward initiating preparatory research on automation. This research is meant to include the whole spectrum from raw materials handling methods to market and distribution policies, to psychological research studies on how best to classify and reassign employees. (2) Another is the general problem of employee wage scales, especially in regard to the guaranteed annual wage. What basis will be sound in the automated situation? (3) Persons of the older working generations may desire early retirement rather than retraining in the automated job. However, in the future it may well be that, due to the nature of the new jobs, they can work on—and will want to—far past present retirement ages. (4) New jobs to be created by automation should be defined as quickly and as early as possible. (5) The worker must be acquainted with the nature of these new jobs and training must be undertaken in order to provide him with the basic skills necessary to accomplish the job which he chooses. (6) The means must be provided for imparting these basic skills—either from the standpoint of a public or vocational trade school (of which there are not nearly enough for future requirements) or through industry's training activities. (7) Such training must be carried out on a continuing basis—at the minimum a six-month or yearly refresher training course, if it is not possible to have a continuing seminar training session every two weeks or so. (8) Industry must be prepared in the

event that it decides, say, to build a new plant containing automated operation, to locate this plant in an area accessible to individuals who will be displaced by the opening of this plant and closing, perhaps, of an old one. What I am saying is that this is a proper and desirable objective in order to ease the burden of displacement, where and if it occurs. (9) We must recognize the necessity for providing income (such as displacement insurance) and means for persons displaced totally from any possibility of employment with the automated operation, to have time to learn a new job. (10) Industry must be able to evaluate properly the new skills which a worker brings to a new job and reward him appropriately for his efforts.

Liberal Education in a Business Civilization

ABBOTT KAPLAN
Assistant Director, University Extension, University of California, Los Angeles

The focus of this conference is on research. Unfortunately, there has been very little research on the effect and role of liberal education in business. In view of the current interest of an increasing number of business and industrial leaders in liberal education for the development of business executives, I should like to discuss with you some aspects of liberal education and their implications for managerial training. I should also like to suggest that more research is needed in this area.

Let us then examine the nature of a business civilization, the meaning of the liberal arts, the implications of the liberal arts for industry, and finally let us look at several liberal arts programs which have been developed for executives in business and industry.

The Nature of a Business Civilization

Ours is a business civilization. The predominant aspect of a business civilization is its emphasis on things—material things. It is primarily concerned with the manufacture and distribution of goods for a profit. In previous civilizations man has been interested in material things, too, but rarely has their pursuit been so pervasive or their influence and domination over all other values and goals been so great. In pre-industrial, western societies, although he was concerned with the means of subsistence, literate man's aspirations lay elsewhere than in the primary or exclusive pursuit of material things. He was more concerned with the meaning of life, with values, with personal salvation.

Commenting on our business civilization some years ago, James Truslow Adams pointed out that the business man, dealing with material things and with the satisfying of the world's material wants, inevitably tends to locate happiness in *them*, rather than in the intellectual and spiritual, unless he constantly refreshes his spirit away from business during his leisure hours. Without this refreshment he becomes the complete materialist. He may, upon accumulation of wealth, fill his home with great works of art and literary masterpieces, but if he cares more for riches, luxury, and power than for a humanely rounded life, he is not civilized but what the Greeks properly called a barbarian. And it is, for the most part, the business man who sets the values and goals in our society.

Aside from narrowness of interests, the business man tends, by the very nature of his preoccupation, to be concerned with the short view. Rarely does he take the long view. Seldom is he concerned with the significance of his actions for the long run. More seldom still is he aware of the implications of his activities for the body politic, for the general welfare. He is the pragmatist par excellence. How well will a device or procedure work in achieving the goal of ever greater profits? This is his basic criterion.

This is not to say that all but material values are excluded in a business civilization. All civilizations and societies are made up of many strands and hues. Contradictory values frequently exist side by side. Our civilization is not devoid of moral, spiritual, and aesthetic values. But we are indicating here the preeminence of material values in a business civilization.

Speaking of the British in the heyday of their prosperity and power, a famous novelist said: The ledger is the Britisher's bible on weekdays; the Bible his ledger on Sundays. And so perhaps it is with us.

But having said the above and having underscored the essentially materialistic basis of our business civilization, let us be wary of overstating it. Perceptible changes in the business climate have occurred—particularly within the past twenty-five years. The growth of great, stable corporate structures has prompted greater interest in the longer view as well as somewhat greater concern for the general welfare—if only moti-

vated, in some cases, by concern for the effect of economic instability on their own enterprises. Nor can the effect of large-scale unionization be overlooked. But nowhere is the change more discernible than in the area of personnel relations. At no time since the beginning of the industrial revolution has so much interest been manifested by management in the employee as a human being, rather than as just another ingredient in the production process. At no time in the past was there such interest as currently in the employee's job satisfaction, his opportunities for growth, and the development of his full capacities.

Paradoxically enough, this interest has developed in a period when all the pressures are for ever increasing specialization and for narrower rather than broader training. Or perhaps it is precisely because of our increasing specialization that awareness of its shortcomings and pitfalls is developing. Specialization is not only true of industry but of our universities as well. The latter are beginning to realize that while we are turning out competent specialists and practitioners, we are not turning out well-educated, broadly rounded men. It is for this reason that schools like MIT are placing greater emphasis on the humanities in their curriculum and the School of Engineering at UCLA emphasizes a broad engineering program rather than specialization in civil, electrical, or petroleum engineering.

Similarly, thoughtful business and industrial leaders view with alarm lack of breadth and understanding exhibited by their younger executives and potential leaders. For, as never before, industry requires broad gauged men who understand not only the minutiae of their business—how to produce and distribute—but the nature of human relationships, the implications of business policies, the interrelationships within the economy, the effect of political policies, domestically and internationally, and the social effects of business decisions. In short, business requires leadership skilled in thinking as well as in doing. Training and specialization tend to emphasize the latter rather than the former. The liberal arts, on the other hand, deal with ideas, with the development of the human mind and spirit.

It was recognition of this difference that led John L. McCaffrey, president of the International Harvester Company, to write in a recent issue of *Fortune:*

> ... The world of a specialist is a narrow one and it tends to produce narrow human beings. The specialist usually does not see over-all effects on the business and so tends to judge good and evil, right and wrong, by the sole standard of his own speciality.

and Irving Olds, retired chairman of U. S. Steel, to say that,

> The most difficult problems American enterprise faces today are neither scientific nor technical, but lie chiefly in the realm of what is embraced in a liberal arts education.

What do we mean, then, by the humanities or the liberal arts?

Meaning of the Liberal Arts

Essentially the liberal arts are those studies which embrace the great literary, philosophic, and artistic works of mankind and which give man greater insight into himself and the world around him. They are liberal because they liberate the mind from preconceptions, from bigotry, from the pressures of the immediate and the imminent. They are concerned with ideas and values that are universal and possibly eternal. They make man one with the great minds and spirits of all times and all places. They suggest a greater significance and meaning to life and a purposefulness to man's being.

In terms of the liberal arts, man is viewed as an end, not as a means. They aim toward developing human excellence rather than mere proficiency in a skill or profession. They seek clarification of basic problems and their relationships and understanding of various fields of subject matter and their interrelations. They are more concerned with the "why" and meaning of things and ideas than with "how to do it."

In discussing the essentials of a liberal education and the characteristics of the liberally educated man, a committee report by members of the faculties of Andover, Exeter, Lawrenceville, Harvard, Princeton, and Yale states:

> ... The liberally-educated man is articulate, both in speech and writing. He has a feel for language, a respect for clarity and directness of expression, and a knowledge of some language other than his own. He is at home in the world of quantity, number, and measurement. He thinks rationally, logically, objectively, and knows the difference between fact and opinion. When the occasion demands, however, his thought is imaginative and creative rather than logical. He is perceptive, sensitive to form, and affected by beauty. His mind is flexible and adaptable, curious, and independent. He knows a good deal about the world of nature and the world of man, about the culture of which he is a part, but he is never merely "well-informed." He can use what he knows, with judgment and discrimination. He thinks of his business or profession, his family life, and his avocations as parts of a larger whole, parts of a purpose which he has made his own. Whether making a professional or a personal decision, he acts with maturity, balance, and perspective, which come ultimately from his knowledge of other persons, other problems, other times and places. He has convictions, which are reasoned, although he cannot always prove them. He is tolerant about the beliefs of others because he respects sincerity and is not afraid of ideas. He has values, and he can communicate them to others not only by word but by example. His personal standards are high; nothing short of excellence will satisfy him. But service to his society or to his God, not personal satisfaction alone, is the purpose of his excelling. Above all, the liberally-educated man is never a type. He is always a unique person, vivid in his dis-

tinction from other similarly educated persons, while sharing with them the traits we have mentioned.

In short, the object of a liberal education is to turn out well-rounded people, to develop the whole man.

Implications of the Liberal Arts for Industry

If the liberal arts are particularly effective in developing the more complete and well-rounded man, does it mean that we drop all specialized and technical training and limit our educational efforts to the humanities? This would obviously be absurd. In a technological society such as ours, highly specialized and technical skills are essential. No matter how much a person may cherish the works of Shakespeare, when he calls in a surgeon to perform a delicate operation he is more concerned with the doctor's skill than in his knowledge of Shakespeare. What I should like to suggest is that both training in skills and education in the humanities are essential to the modern man.

One may also add that the liberal arts imply a certain educational and philosophic approach—not merely specified subject matter areas. The study of the humanities will not be a liberating experience unless approached humanistically. The mere memorization of facts and information, even though they pertain to literature and philosophy, does not provide a liberal education. It is only when thinking is stimulated, interrelationships are seen, intellectual curiosity is aroused, and criteria and values are developed that men become educated. Facts and information are essential to judgments and insights but rote knowledge alone does not stimulate intellectual growth. In this sense, then, much of what we do in training might be more educational if a liberal arts approach were employed: if the trainees were stimulated to think, to weigh alternatives, to examine broader implications.

Granting that professional and technical training could be more educational if a liberal arts approach were employed, exposure to broader fields of study and thought is essential to the well-rounded man. Because of the ever increasing specialization on the one hand and the increasing interrelatedness of social, political, and economic factors on the other, the typical professional or technical program tends to develop basic skills and techniques but little of the self-knowledge and understanding of society that a complex world requires. We develop competent doctors and engineers—probably the most competent in the world. We are the greatest appliers of scientific discoveries. We are preeminently practical. Our primary concern in regard to most fields of knowledge is for their usefulness and practicality. This has tended to diminish our curiosity in knowledge for the sake of understanding and has diverted our attention from the search for meanings and reasons in nature and society. In fact, our very emphasis on the practical may be the least practical in the long run. It is significant, as Conant has pointed out, that most of the fundamental discoveries in science and mathematics in recent years have come from European scientists or those of European training, where the emphasis has been on pure science and research rather than on the applied and practical. Nuclear fission, of course, is the most notable but not the only example.

We are thus faced with a dilemma. The amount of information in all fields has increased enormously. To be a good doctor, a good engineer, a good business executive, more and more specialized knowledge is essential. The pressures for inclusion of additional technical information in our professional and technical programs increase, while at the same time pressure is growing to expand humanistic studies in an already crowded curriculum. The period of formal schooling is already far beyond what it was fifty or even twenty-five years ago. Few well-trained doctors today start practice before the age of thirty. To a lesser degree this is true of other fields as well.

Must we then resign ourselves to the fact that because of the great increase of knowledge in professional and technical fields, training for one's particular field must of necessity be narrow and specialized and that we cannot, much as we might desire, hope to develop well-rounded men in the professions and in industry? I do not believe so, for the above is premised on the notion that a man's education is coterminous with his period of formal schooling. This, of course, is sheer nonsense. People learn and develop to a greater or lesser degree throughout their lives. Why must we then assume that people must learn all they are ever going to learn, or need to know, during their pre-work period of formal schooling?

In view of our vastly increased productivity and the consequent reduction in the work week, adequate leisure time is now available for a man to pursue his further education and development, even after he has completed his formal schooling and embarked upon his professional or business career. This suggests that perhaps some specialized subjects pursued in the formal period of schooling might better be postponed until he is actually engaged in his occupation. These may well have more pertinence and meaning then than if studied earlier. If this were done, more time would be available for the humanities in the period of formal schooling and we might produce more well-rounded, educated graduates.

What does all the foregoing mean policy-wise for industry? Well, it suggests, first, that in employing personnel, particularly in positions of leadership or potential leadership, we place greater emphasis on broadly educated rather than narrowly trained candidates. This new emphasis would in itself help relieve the pressure on the schools for greater specialization. Secondly, it means that industry, which in many instances has done remarkably well with on-the-job training, would be equally concerned with the continuing education of its employees, particularly those scheduled for higher executive and administrative positions. This continuing education, hopefully, would include those subject matter areas calculated to stimulate thinking and imagination, perception and understanding of themselves, their fellows, and the society in which they live. The power and importance of business and industry in our civilization require the best and most enlightened leadership in business we can develop. Such leadership cannot be developed through the mastery of business or technical skills alone, but requires the depth of thought and the breadth of imagination embodied in the liberal arts.

Liberal Arts Programs for Business Executives

During the past few years a number of experiments in liberal arts education for management have been launched in various parts of the country. Although it may be too early to judge their value and effect, a brief description of two of the experiments and the tentative conclusions of their sponsors merit our attention. The two programs are: the Bell Telephone Company of Pennsylvania's Institute of Humanistic Studies for Executives and the Institute for Executive Leadership in Memphis, Tennessee.

The Bell Telephone Company Experiment

In early 1953, the Bell Telephone Company of Pennsylvania decided to experiment with a new type of executive training course. For a long time the company had provided technical and business training courses. It felt that this type of training alone no longer served to develop the kind of leadership needed today. It recognized that the pressures within the company tended to emphasize specialized knowledge and skills. The men coming up the administrative ladder in the company were competent technicians but not especially well suited to provide the kind of leadership necessary to cope with the new problems of top management. Describing the inception of the program, W. D. Gillen, president of the company, remarked,

> Looking back, it was apparent that our predecessors in all businesses were concerned mainly with production, sales, finance, and technological advancement. Their problems were centered mostly within the business itself. Today, in addition to these matters, we feel the effect of the increasing influence of social, political and economic changes which have taken place, and thus a business now has to consider itself in relation to the community, to the nation and to the world, as well as its position within its industry. . . .
>
> Looking ahead, it seems to us that our successors will have to meet problems that are even more difficult than those facing us today, and, consequently, must be better prepared than we have been. I think there will be a need for more creative insight and wider range of reference—particularly in the fields of human behavior. . . .
>
> We felt that what was needed was some kind of program that would sharpen the individual's creative insight, widen his frame of reference to many fields of human behavior, and provide him with some techniques with which he could test the logic and consistency of his own thinking.

It was this thinking that led the company to establish at the University of Pennsylvania an educational program in the humanities and social sciences, the Institute of Humanistic Studies for Executives. The stated objectives of the program are:

1. To enable a potential future executive to understand and interpret the social, political, and economic changes, both national and world-wide, which will influence the problems of corporate management to an increasingly greater degree in the future. This might be defined as developing a breadth of outlook, looking toward future "statesmanship" in the business.
2. To indicate the importance, impact, and use of history, science, philosophy, and the arts in the world today, particularly as they influence large groups of people such as employees, customers, and stockholders.
3. To motivate the participants in the program to accept the concept of intellectual activity as a never-ending process to be continued throughout life
4. To balance with a humanistic background the almost complete attention given by younger men in the business to acquiring technical knowledge and competence as a result of working in an atmosphere of intense competition with other individuals.
5. To offset a tendency to overconformity, which is bound to occur in a business which is highly specialized and which promotes almost entirely from within the organization.

In the academic year 1953–1954, seventeen men from middle management in Bell System companies throughout the country were given ten months' leave of absence with full pay to attend the specially devised program at the University of Pennsylvania. The staff of the Institute was drawn primarily from the faculty of the university but included professors from Swarthmore and Bryn Mawr. In addition, one hundred and sixty of America's leading intellectuals were invited as guest lecturers. Among these were Lewis Mumford, W. H. Auden, Clyde Kluckhorn, Ludwig Lewisohn, Virgil Thomson, Henry S. Commager, and David Riesman.

The program included lectures, discussions, seminars, and "bull sessions." The students visited the United Nations and the museums of Washington, Philadelphia, and New York; they attended concerts and a Quaker meeting.

The courses were deliberately planned so that the participants proceeded from unfamiliar ideas and studies to those closer to their own experience. They studied, among others, the Bible and the Bhagavad-Gita, the Iliad and the plays of Sophocles and Shakespeare. They read Dante's *Inferno*, *The Brothers Karamazov*, *Remembrance of Things Past*, *Ulysses*, and *The Magic Mountain*. The final period was spent on American civilization: the making of the Constitution, the industrialization of America, the revolution in sex mores, the structure of American character.

In the academic years 1954–1955 and 1955–1956, similar groups from middle management, numbering nineteen and twenty-four respectively, took the course. The present curriculum of the Institute includes twelve different courses involving a total of 550 class hours—an average of sixteen hours per week. Extensive reading and special written reports are required. The courses include:

Practical Logic	46 hours
Economic History and Thought	45 hours
History and Aesthetics of Music	25 hours
World Art	72 hours
Literature	
Masterpieces of the Past	32 hours
Modern Literature	48 hours
Social Science	42 hours
Ethics	48 hours
History and Meaning of Science	48 hours
Industrial Relations	38 hours
American Civilization	72 hours

What have been the results of the program thus far? The Bell Telephone Company of Pennsylvania feels that in a program of this kind it will be four or five years before the results will become readily apparent. The first year's group was given psychological tests at the beginning and at the end of the program. It was also compared with a control group of men of similar ages and levels of responsibility. The results of the tests persuaded the company that it is headed in the right direction but also indicated that such testing could not give a complete answer.

The reactions of the faculty and the participants, however, were even more persuasive. Professor Digly Boltzell of the University of Pennsylvania, who helped organize the Institute, wrote in *Harper's* last year:

> The Institute of Humanistic Studies for Executives, we were confident, introduced seventeen men of affairs to a new world of ideas, new values, new interests, and to a new type of personality, the intellectual; and the men of affairs changed considerably. They have taken to buying books and building their own libraries; they are collecting classical records and are more aware of the architectural clichés in American suburbia.

Anonymous responses by members of the group to a questionnaire at the end of the course, as well as letters written to faculty members months later, revealed a number of changes in attitude and habits. In general, the men developed greater confidence in themselves, increased their understanding and effective expression, had far more intellectual curiosity, and read considerably more. Although they developed a greater criticalness they became more tolerant too. They increased their sense of personal identity and self-realization.

They felt that their greater self-confidence resulted in a greater ability to make decisions as well as a kind of emotional detachment in their work. This in turn created an even "stronger desire for more and broader responsibility in the business."

The company is convinced that the program—by developing better rounded, more articulate, more perceptive men—is also developing better citizens and better telephone company men.

The Institute for Executive Leadership

A different pattern—one geared to a local community and not limited to one company—is the Institute for Executive Leadership offered by the Memphis Adult Education Council and Southwestern University at Memphis, Tennessee.

Launched more than a year ago, the program is intended to offer executives in Memphis "the liberating effects of the higher arts." The participating executives continue at their regular full-time work but devote four hours each week to study and attend weekly half-day group sessions. Describing the program, the Institute brochure states:

> These sessions will consist of experiences of varying degrees of remoteness from the average experiences of the business executive. Gradually he will begin to see the connections between his educational and his business experiences. This carry-over is what is so often lost by those who withdraw from practical affairs for long periods of study. However, the participant in this institute should not expect to find immediate relationships between his study and his work. New and deeper patterns must be formed, and there are some remote questions which must be asked and answered before he can find satisfactory answers to his immediate problems. His present certitudes may be shaken but as he gains the benefits contemplated he will develop a new confidence in decision-making.

The program is scheduled over a two-year period. It is essentially a discussion program supplemented by authorities in the fields under discussion. The first year is devoted to a consideration of Man and His Life in Inter-Human Relations. It is broken down into three major units: The Liberating Art, Man and the Arts, and Human Relations. The second year is devoted to Man and His Life as Affected by Science and Technology. It, too, is divided into three major units: De-

sign for Today, Economic Affairs, and American Civilization.

Here, again, the program is too new for any detailed conclusions to be drawn. But the sponsors of the program report much the same kind of reactions from Institute members as reported in the Bell Telephone experiment. Participants developed new interests and new ways of looking at problems. They learned to express themselves better, read more, and developed considerably more self-confidence.

It is difficult to say at this point what pattern should be followed in developing comparable programs in the liberal arts for business executives. Should they be full-time resident programs for an entire year like the Bell program? Weekly part-time programs spread over two years like the Memphis plan? Or summer resident programs such as the one recently held at Pomona College? Perhaps for the next few years—until we learn more about the effects of the extant programs—we should experiment with various patterns, depending on local situations and considerations. But one thing appears clear: these programs have the potential for adding an additional dimension and breathing a new spirit into business leadership in America. John Stuart Mill said many years ago: "Men are men before they are lawyers or physicians or manufacturers; and if you make them capable and sensible men, they will make themselves capable and sensible lawyers, physicians or manufacturers."

Newer Applications of Group Creative Thinking

EDWARD M. GLASER
Consulting Psychologist,
Edward Glaser & Associates

Creativity may be defined as a pattern of abilities and interest that enables a person to produce or bring into being ideas that are rather new, or at least partly new, in application to some given problem or context. Creativity is not a unitary factor but is rather a collection of different component abilities or other traits. Fluency, flexibility, and originality are among the qualities that seem involved in creative thinking.

Background

The method for stimulating group creative thinking here presented is the outgrowth of work by Osborn and many others on how best to elicit the latent power of people to recognize problems, produce solutions, and evaluate the suitability of the results of thinking. Ideas that are new or partly new (creative ideas) can be brought into being in each of these three aspects of intellectual functioning. Today our major focus will be on applications of group creative thinking to problems encountered by organizations in general and business organizations in particular.

In Toynbee's analysis of the history of mankind, he concluded that the civilizations which survived over long periods of time were those which continued to remain alert to challenge. Those which became more complacent and uninspired tended to decay or to be overthrown. The civilizations which remained alert to evolving problems and gave both creative and judicious thought to solving those problems tended to surmount their difficulties and retain their vitality. A similar spirit of "creative discontent" seems to characterize healthy organizations. Those which maintain an unusual degree of vitality and progressive leadership over a long period of time seem to be continually willing to review established ways of doing things to see if still better ways may be found.

Group creative-thinking sessions represent an attempt to utilize a greater degree of the potential brainpower resident within the people who comprise an organization. The techniques for doing this are secondary. An appropriate atmosphere is the primary factor necessary for the technique to function fruitfully. By an "appropriate" atmosphere I mean a nondefensive one. There must be a "welcome sign" out for the free-flowing expression of ideas, criticisms, and suggestions. It is in such an organization—one that truly welcomes challenge—that group creative-thinking sessions are likely to be the most productive.

There is one precaution worth particular note if an organization wishes to experiment with group creative-thinking sessions. In group activities of this sort the individuals are encouraged to become highly involved in the company's goals and problems. Involvement,

together with a nondefensive atmosphere, is among the major factors which determine the outcome of the sessions. For this reason, if the members of the group do not feel that their ideas really are appreciated and utilized—or at least given careful consideration by the appropriate persons in higher echelons—the participants are apt to lose interest and thus discontinue their feelings of involvement. Consequently, before people are invited to participate in creative-thinking sessions, careful planning is necessary to provide for follow-up of ideas by those who have decision-making power; provision needs to be made for feedback to the participants so that they learn what has happened to their brain children.

There are five ways in which the group's ideas may be handled:

1. Some ideas may be fully accepted and implemented promptly. This is clearly the ideal outcome when practicable and appropriate.

2. Some ideas may in principle be accepted but action held off for one reason or another. The reasons for delay in implementation need to be given to the group.

3. Some ideas may need, for good reasons, to be rejected or studied further. The reasons should be communicated clearly.

4. Sometimes ideas are tabled or seemingly forgotten with no further reference or explanation.

5. Sometimes ideas are verbally accepted, then forgotten, with no action or feedback to the participants. The last two procedures will tend to destroy the interest of a group organized for producing ideas.

In evaluating the ideas presented by the group it should be remembered that the effectiveness of any decision generally is determined by two factors:

1. The quality of the decision. Is the idea sound technically? Is it sound costwise?

2. The acceptance of the decision by those who must implement it. How well is the decision understood and supported by those involved?

This second factor can be of considerable importance in connection with the effectiveness of any idea or change. Often a technically second or third "best way" of doing something may in practice be the most effective methodology if those concerned will make it work by their interest and support.

Procedure for Stimulating and Eliciting Group Ideation

The Desirable Attitudinal Set

This should be discussed initially with the group by the psychologist or appropriately trained group leader and should include the following elements:

1. An informal atmosphere of open-minded interest in wanting to try or use group creative-thinking procedures.

2. A general climate of desire for new ideas and interest in constructive change evidenced by top management in particular and supervisors in general *rewarding* the exercise of creativity, ingenuity, and sound initiative. A prevailing, undefensive, and autocritical spirit that encourages challenge of current practices and perpetual effort to bring about well-founded improvement in present policies and procedures.

3. An atmosphere of mutual cordiality, of identification with each other as members of a group with some common purpose, such as interest in the problem about which new ideas or creative thinking is wanted.

4. An atmosphere which encourages spontaneous expression of any idea or impulsive or unconventional notion; freedom from concern about "looking foolish" for voicing imperfect ideas; freedom from having to "back up" an idea. (An idea that sounds ridiculous may spark another that is practical.)

5. A feeling of freedom from overmotivation or from tense pressure to solve the problem in a great hurry, yet a fairly keen interest in that problem or some aspects of it.

The Process

1. Set brainstorming sessions apart from other conferences. Generally (but not always) participants should all be of roughly the same rank.

2. Set a clearly and briefly defined topic or problem about which creative thinking is desired (for example, how to make company sales meetings more effective; how to cut costs; how to improve an organization or product or service or skill; how to reclaim scrap and salvage, or put it to use; how to go about solving a given human or administrative or technical problem). Unless the group members prefer to get together without advance notice of the subject, send each panel member a written statement of the problem a day or two ahead of the meeting time to encourage deliberate thinking about the problem. Limit each group to about five to twelve persons. Several such panels may operate simultaneously. A broad definition of the problem, for example, "How can we develop better methods of heating, browning, and dehydrating the surface of bread?" generally is better than a narrow definition like, "How can we design a better toaster?"

3. Encourage every person in the group to "spout off" all possibly helpful ideas, contributions, or solutions which occur to him, and outlaw any kind of evaluation or criticism at this stage. Use a bell or similar device to warn those who may begin to criti-

cize, evaluate, adjudicate, or get off the objective. Seek quantity, not quality.

4. Record (by machine, stenographer, or someone taking notes) all verbalized ideas.

5. Encourage panelists to "hitch-hike," to strive to combine or add to or sharpen up ideas which others have expressed.

6. Keep going until the flow of ideas has more or less stopped. (Forty-five minutes to an hour and a half usually is sufficient for this purpose.)

7. Read aloud all the recorded ideas and invite questions only for the purpose of clarification and for restatement of ideas where necessary. These questions often can be answered best through examples, metaphors, and the like.

8. For brainstorming with a very large group, divide the large group into several smaller ones. Pose the same problem for all, and have each subgroup contribute its one best idea.

The Follow-up

1. *Method 1.* When the flow of creative ideas has stopped, obtain a preference vote from the group as to which idea they would be most interested in evaluating at the next meeting. At that meeting, undertake critical appraisal of this idea. When that has been carried through to some form of action such as "accepted and implemented" (if the group has the authority to do this), or "recommended to appropriate management people for investigation and action," or "recommend for further study by committee of the creative-thinking group," or "not recommended for adoption," then review the entire list of ideas (always permitting addition of new ones) and obtain a vote on the next idea which the group would prefer to take up for analytical appraisal, and so on. In this way the original brainstorming group carries through to the evaluation stage, although other persons may be called upon to participate in evaluation.

2. *Method 2.* As soon as possible following the meeting, have a committee organize and list the separate ideas under appropriate headings (and keep the list open-ended for the addition of new ideas); then submit a copy of this list to all participants in the creative-thinking group. Each person can then rank the various ideas in their order of interest and importance as he sees it, and send the list back to the person acting as secretary. The individual rankings then are averaged, and an order of priority is thus established for subsequent consideration and evaluation of each idea, with carry through to some form of action as indicated in Method 1.

3. *Method 3.* In cases where it is not feasible to have the entire brainstorming group (or groups) participate in the follow-up evaluation, a committee may be appointed to go through all the ideas and categorize them under appropriate headings. Various evaluation committees comprised of particularly qualified persons from appropriate divisions of the organization might then be assigned to each category of ideas. Their deliberations and recommendation regarding each idea may in turn be sent back to some committee responsible for overall carry-through of this project. That committee might refer the recommended ideas to the appropriate line people, with some provision for keeping track of each idea until final decision is made to implement it, reject it, or table it for further study or later action. It is important in this procedure to provide feedback as promptly as possible and at various stages of progress at least to those who participated in the original brainstorming sessions. Reasons for rejecting or tabling ideas should be explained briefly, with opportunity for anyone interested to ask further questions.

In all three methods of idea evaluation, it is important to provide for further clarification as may be needed through ascertaining certain relevant facts, gathering needed information, and the like.

Employee Opinion Research in Management Decision-Making

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

Decision-making is an essential function of management. The activities in any organization will grind to a halt unless there is a flow of appropriate decisions. It must be realized, however, that decision-making is not an isolated function of management; it is inseparable from communication. In the first place, there must be some communication in advance of decision-making. Such communication is essential in order for management to know that a decision is required and to secure facts on which to make the decision. This relationship

between communication and decision-making is widely recognized.

In addition, communication and decision-making are related in at least two other ways. A frequent mistake on the part of management is to overlook the need for communication after a decision has been made. A supervisor requests a wage increase for one of his men. His recommendation is approved promptly. What thought is given, however, to how the employee is told about his wage increase? An executive receives a report, including recommendations for action. He studies the report carefully and approves it. What consideration is given to how the recommendation will be put into effect? A committee meets to discuss a pressing problem. Eventually a solution is developed which is approved by everyone present. The meeting then adjourns, with no discussion as to how the decision will be put into effect, who should be told about the decision, or when the news will be released—to mention but a few of the questions of communication.

Finally, it must be recognized that no matter how carefully the decision has been made and no matter how well it has been communicated, there is need for additional communication to follow up on the effectiveness of the decision. Such communication may indicate that the original decision needs to be re-explained or perhaps even modified. Thus, communication and decision-making may form a continuous circle.

How can employee opinion research help in decision-making? An employee opinion poll or survey is one method of communication to secure information as to what employees think about certain topics, especially about their jobs, their employer, their supervisors, and personnel policies and procedures.

Opinion Research Methods

Opinion research may be conducted by two different methods. One method makes use of a face-to-face interview between a trained interviewer and an employee. This method has the advantage of obtaining the maximum amount of information from any one individual. Since such an interview will take from one to two hours as a bare minimum, it can usually be used only on a sampling basis. It is also difficult to secure carefully trained interviewers who will report what the employee actually said, rather than what the interviewer thinks he said.

Another approach is to use a questionnaire. This has the advantage of obtaining some response from practically all the employees; it does not permit anyone to follow through, however, to see what an employee really meant by some of his stated opinions.

The questionnaire method can, in turn, be divided into two approaches. One method is to use a standardized questionnaire which can be applied to employees in any company and in any industry. The other approach is to develop a specialized questionnaire to fit the recognized needs of a specific organization.

In order not to duplicate the work of other organizations, the Industrial Relations Section of the California Institute of Technology has emphasized the making of opinion polls through specialized questionnaires. I am not in a position, therefore, to indicate how standardized questionnaires or interviews can help in making management decisions.

The illustrations which will be presented are based on surveys conducted by the Industrial Relations Section. The specialized questionnaires used consist of three parts. The first group of questions asked provide some personal information about the individual filling in the questionnaire. This information often includes sex, approximate age, approximate length of service, department, location, type of work performed, and other characteristics which may help in analyzing opinion.

The second part of the questionnaire consists of detailed questions. These usually cover a wide range of subjects, but they are confined to matters in which the company is interested and in which some decision may be made.

The third part of the questionnaire provides space for each employee to make comments in his own words. These comments are not limited as to subject matter. The employees are encouraged to write anything they want to on any subject whether it has been covered in the detailed questions or not. Usually these free comments are divided into three sections: (a) What are some of the things you like best about working for your company? (b) What are some of the things you like least about working for your company? and (c) Any additional comments. With this approach we have often secured comments from 90 per cent of the employees.

Opinion Research Results

The balance of this presentation summarizes a few of the results which have been obtained from employee opinion polls and which have been used in making decisions by management.

One type of information which has been secured through employee opinion polls is the communication required before a decision is made. No management can make a decision until it knows that a decision is required. It also must have some information to help make a proper decision.

The free comments of employees are of great help

in solving this general problem. An opinion poll can collect a great mass of information because it is fairly common for about 90 per cent of the employees to make an average of four or five comments each. These comments can be divided into approximately ten major categories which can be subdivided into eighty or more specific subjects. Such an analysis not only shows the wide range of employee interests, but when 5 per cent or more of the employees make comments on the same item it can be regarded as statistically significant. An analysis of these comments may show that the company has a problem which it did not recognize.

One specific illustration may suffice. In one survey when no question was included about rates of pay, it was discovered that over 40 per cent of the employees made specific comments about pay. This unusually large number of unfavorable comments on rates of pay convinced the top management that it should take a look at the situation. When it did examine the results of wage surveys, it agreed that some changes were necessary. It should be pointed out that the subsequent adjustment in wage rates was not publicized as having been the result of the employee opinion poll.

In many surveys it is possible to segregate these comments by types of employees. Such analyses may show that supervisors as a group are confronted with certain special problems. It should be recognized that in many organizations there are more blocks to communication within management than there are between employees as a whole and management as a whole.

The answers to the detailed questions in the main part of the questionnaire also help to show where decisions are required. Most persons who have examined the results of opinion polls in other companies have been shown only the total results. It should be realized that practically every survey also results in a series of departmental reports. On most questions in most surveys we have found more variation of results within any one company than between the total results of that company and the total results of other companies. These departmental reports help the management of that department, as well as the management of the company as a whole, to see where some specific corrections are needed.

Finally, these opinion polls can help employers answer this basic question: What do employees want to know? In many cases management may feel that employees are already securing enough information, and it may even feel that employees resent communication from management. Questions are frequently included in a poll to give the employees a chance to indicate what kind of information they want and to indicate further whether they are receiving too much or too little information along these lines. When employees indicate that they do want to know more about the American business system, the management may decide to give them some basic training in economics. It can do this without feeling that it is imposing something on the employees that they do not want. Many programs of communication, including bulletin boards and plant papers, have been improved by learning what is of most interest to the employee.

Another important phase of communication, which was referred to earlier, is how to communicate decisions which have been made. Opinion polls have been of great value in studying how employees receive their information and especially in finding out how they want to receive this information. The general results show that rank-and-file employees in large companies are willing to receive information through general sources such as bulletin boards and employee house organs, but there is a liking for face-to-face communication from their immediate supervisors. Supervisors themselves, as a group, want this information through face-to-face methods wherever possible, and, of course, they want to receive this information before employees receive it.

Finally, we should look at how employee opinion polls help to follow up on decisions which have been made. A good illustration of this technique can be found in appraisals of benefit plans. Sometimes an opinion poll may show that employees do not fully understand existing benefit plans. As an illustration, in one company it was discovered that only about 15 per cent of the employees knew that the company paid the entire cost of unemployment insurance.

Other results may show that benefit plans have not been designed to fit the real needs of employees. Men and women may not want the same plan. These conclusions, however, should be based on actual measurement in each specific company. As an illustration, it is generally felt that sick-leave plans are more important to women than to men. Nevertheless, in one specific survey, the men indicated that they valued sick leave more highly than did the women. It is also to be expected that some plans will be of more value to older workers than to younger ones. As an illustration, a pension plan is likely to be more appealing to the older age groups than to the younger ones. Management needs to know, however, whether this change takes place at age fifty and over, or whether it may appear as early as thirty or thirty-five.

Management should not look on employee opinion polls as a one-shot proposition. The first employee opinion poll can give the company a picture of where it is at that moment. When it discovers that some

changes should be made, and after these changes have been put into effect, it is important for management to learn whether or not these changes have been effective. As a result, management should consider opinion polls as a continuing appraisal of all of their personnel procedures. As an illustration, one company in its first survey learned to its surprise that many first-line supervisors were not as effective as the company had assumed. Analyses of the results showed that the real problem was that management itself had not given much training to its first-line supervisors. The attitude of supervisors on safety, which the company had emphasized, was rated high, but other aspects, such as planning work, encouraging suggestions, and passing on information, were rated as low. As a result of the first survey the company undertook some intensive supervisory training programs. In a subsequent poll the supervisory ratings were improved by an average of approximately 20 percentage points. Thus, the company was able to measure, first of all, the need for supervisory training, and, as the result of a subsequent poll, it was able to measure some of the improvements which had been achieved.

To summarize, the Industrial Relations Section of the California Institute of Technology, on the basis of thirty-eight surveys in twenty-six different companies over a twelve-year period, has illustrated that employee opinion research can help management decision-making by improving communication before the decision is made, by learning how to communicate decisions, and by following up on the effectiveness of these decisions. The opinion polls, by themselves, do not make decisions; they can only help management carry out its responsibilities for making proper decisions.

Sensitivity Training—Useful Implement in Developing Leaders?

ROBERT TANNENBAUM
Associate Professor of Personnel Management and Industrial Relations, University of California, Los Angeles

Our focus here today is a research focus. I do not propose to build a case for what sensitivity training accomplishes. In fact, we are in the early stages of developing the methodology of this type of training, as well as in researching it. It will certainly be some time before we will be able quite definitely to answer the question which is raised by the title of this session. I do propose, in the time available to me, first, briefly to describe sensitivity training to you; and, second, in greater detail, to point up some basic questions which need to be raised in evaluating the effectiveness of human relations training programs, with a particular focus on sensitivity training as a case instance.

What Is Sensitivity Training?

This training is offered locally through a number of different programs. Many of you are familiar with the seminar we conduct three times a year called "Sensitivity Training for Managers." Another program, presented this summer for the first time, is entitled "Sensitivity Training for Top Executives." We have a class called "Leadership Principles and Practice" (B.A. 152), which is offered both here on campus and, through Extension, in Los Angeles and a number of other localities in Southern California. In this class the sensitivity-training method is essentially used. Then we have the two-week, full-time, intensive summer workshop called the Western Training Laboratory in Group Development, which is offered during the last two full weeks in August on our Santa Barbara campus. Finally, there are a number of individuals in this area, many of them present here this afternoon, who have experimented with sensitivity training in one form or another within their own organizations.

With respect to the nature of sensitivity training, I would first say that our broad objective is to facilitate attitudinal and behavioral change. More specifically, we are aiming at two broad groups of sub-objectives. The first such grouping involves a number of understandings. We hope to assist the trainee in gaining a better understanding of other individuals, the individuals with whom he interacts. We hope to help him gain a greater understanding of interpersonal relations or group processes—the key forces that are operative in group situations when individuals come together, for example, to collaborate through teamwork in arriving at common objectives. And we try to help him gain a greater understanding of the broader organizational

and cultural context within which his interpersonal relations occur. Accuracy of understanding of these social phenomena—of others, of interpersonal relations, and of the broader organizational and cultural context—is now being called *social sensitivity*.

The other grouping of sub-objectives includes a number of items, all of which are related to greater effectiveness at the behavioral level. We feel that it is not enough that an individual gain insight into others, interpersonal relations, and cultural factors, but additionally it is essential that he be able to translate these insights into appropriate behavior. Such an ability to respond appropriately in the light of one's understandings is called *behavioral flexibility*. We hope, for example, to help the trainee to listen more effectively—listen for feeling as well as for meaning, "hear" things from the other person's point of view. We try to help him frame his messages in a way that will really reach and be meaningful to the individual to whom he is communicating. We try to help him become a more effective interviewer. We try to help him handle more effectively such strong feelings as hostility and aggressiveness.

In thinking about the two sub-objectives of sensitivity training, we have formulated the tentative hypothesis that improvement in social sensitivity and in behavioral flexibility is probably most closely associated with the personality development of the individual himself—development toward what some writers call self-actualization and others, emotional maturity. It is our hunch that deficiencies in social sensitivity and in behavioral flexibility stem from unresolved personality problems within the individual. He will probably not gain greater social sensitivity nor behavioral flexibility until he comes to grips with these problems that blind him as he looks out at the social world around him and inhibit him from behaving in the ways that make sense to him. In short, self-understanding is at the core of sensitivity training.

It would be helpful, if time permitted, to describe in detail the kind of atmosphere that we try to create in the training environment to make it possible for individuals to take a look at themselves. Suffice it to say at this point that we are quite concerned in creating an atmosphere conducive to change—an atmosphere of warmth, acceptance, and understanding which facilitates the trainee's looking at himself a little more closely.

Sensitivity-training groups vary in size from about fifteen individuals up to thirty. Generally, the trainees come together in an informal setting around a rectangular arrangement of tables. I suppose the attribute which would most characterize the training environment other than that of warmth, acceptance, and understanding would be that of relative lack of structure. This is an aspect of the training situation which does trouble a lot of the trainees. They start asking us very early in the game: "Why don't you make like a leader?" "Why don't you tell us what we are doing?" "What's our agenda?" "You're the expert, tell us what to do." "Tell us what the answers are." Our refusal to supply answers often upsets the trainee because he has to begin looking at his own discomfort when structure is lacking and to assume responsibility for structuring the situation from his own point of view. He then discovers that although he would like to structure it in one way, there are other people who would like to structure it in another way and that he can't get his way unless he conveys his point of view to the other person. However, the other person often really doesn't want to understand things from his point of view. As these things go on, individuals begin to gain the insights and behaviors that can add so much to their interpersonal effectiveness.

I realize that this is a bird's-eye view of sensitivity training, but I think it is enough to give you a feel for what we are aiming at and for what you might find in a sensitivity-training session. With this much said, I would like to move on to the second main area and the one which is of greatest concern here at the present conference, namely, the area of evaluating the impact of human relations training.

Evaluating the Effectiveness of Human Relations Training Programs

Many of us, for a number of years, have been engaging in various kinds of human relations training. Almost everyone who has been involved in such training has really been troubled about the basic question: what results are we achieving? Are desired goals being achieved, or are we just pursuing a fad that has gained wide, but ephemeral, acceptance? Certainly we who are involved in doing sensitivity training are very much concerned with its evaluation. We are now asking ourselves some key research questions—questions which probably should concern anyone who is involved in evaluating human relations training. I am going to talk generally about this, using for illustrative purposes our own thinking about evaluating sensitivity training and reporting to you some of the relevant research activities we now have underway.[1]

I plan to cover three broad problem areas. The first

[1] The findings of a number of our studies, which Irving Weschler, Fred Massarik, Jerry Reisel, Jack Zenger, and I have been conducting, will be reported in the professional literature in the near future.

is, what are the objectives of the training? The second is, what about the training process itself? Presumably, the training process represents the stimuli which we try to create, which we hope will bring about the changes that we define by our objectives. So, what kinds of questions can we raise about the training process itself? And, finally, how do we go about assessing the impact of whatever training we do, assessing it with reference to the objectives that we have established?

Program Objectives

The first problem area is that of the objectives of the training—the objectives which later provide the basis against which evaluation is performed. The first question we have to ask ourselves here is: *Whose objectives are relevant?* If we are running a program within an industrial organization and the firm is paying for the training, the employers' or superiors' objectives are most relevant. For those of you who run programs in industry, these objectives are the most compelling. But let us look a little more closely at this. Is the superior's frame of reference in stating objectives the only relevant one? Perhaps the peers' point of view might be pertinent. We talk a lot about teamwork, about collaborative effort between individuals. What would people who have to collaborate with Joe really like to see happen to Joe? He may behave in a way that makes it extremely difficult for his peers to get along with him, to work with him, to communicate with him. They might have something to say as to what we should try to achieve in facilitating change in Joe.

Further, perhaps Joe's subordinates, from their point of view, might also have something to say about what the objectives of Joe's training should be. There is some research to indicate that the objectives that his superiors define for an individual might be quite different from those defined for him by his subordinates. Very often the superior is thinking in terms of task-oriented kinds of objectives, in terms of greater immediate productivity, of keeping the pressure on in order to get the work done; whereas subordinates are thinking in terms of greater understanding, greater acceptance, better recognition. Customers and other outside parties who have relationships with people within the organization might also have something to say about the objectives toward which the human relations training of Joe should be aimed.

Those of us who do training often face the problem of differences between the objectives which we, as trainers, would like to see implemented and the other kinds of objectives which I have mentioned. We have certain notions as to what end results would be most desirable, and these often conflict with those of others. I have had a number of you who run programs in industry talk over with me this particular problem. You feel that the objectives you have in mind would make most sense to the organization itself. But in trying to accomplish things that make sense to you, you find yourself getting into difficulty with other people in the organization because they don't understand your objectives and the relevance of the attainment of these objectives to organizational purpose.

Oftentimes we find, in creating a permissive atmosphere in a group, that the group itself starts defining its own training objectives—the ones that are most meaningful to the group as a whole. We then run into difficulties when these objectives differ from objectives imposed on the group from the outside. For example, in a class here on campus we faced a problem in the area of grades. As instructors, from the organizational point of view, we have to give the students grades. And yet the students feel that grades involve evaluation of the student, the setting apart of one student from another, the assessment of differences that are at a subjective level and pretty hard to tap. The feeling is that this evaluation process interferes with the training process and they'd like to get away from it. Yet there are pressures from the outside in the direction of making some sort of evaluation.

Finally, the objectives of the trainee himself might become relevant. We're always doing things to other people (for their own good, of course). There is great pressure to be manipulative, to try to create situations in which we mold people in directions that we, playing God, think are appropriate directions. And yet, in reality, the trainee himself might, as a unique human being in his own right, have objectives which do not coincide with at least some of the objectives from other points of view that I have mentioned. In our training sessions, we often discover that the trainee would like to get certain things for himself out of the training which might not have organizational sanction. There is a conflict generated here, and one that has to be dealt with.

What are the objectives of sensitivity training? I have a hunch that at some deeper level there is a close interrelationship between the objectives from many of these different points of view. I think I could make a strong case for the position that the objectives which we have set for sensitivity training, if attained, would facilitate the attainment of most of the other objectives that have been mentioned. But this contention itself is something that needs to be further evaluated.

A second question in the area of objectives has to do with the values that are implied by the objectives we

establish. Here we get into the area of ethics and raise some embarrassing questions. We often get a feeling, as people talk to us about the training work we are doing, that they have some notion in their mind as to the kind of person they would like to develop. This brings us back to the idea of molding a person of a certain type. Some people would like to mold men who can sell others. Some would like to mold people in the image of the general who can give commands, who is strong and has no hesitancy in giving his orders curtly and crisply. Others would like to mold the leader in the image of the kind father who can give his people the right answers—the paternalist who is always looking out for the best interest of his people. And there are others who would like to mold the trainee in the image of a facilitator who can function in a way to help other people realize their fullest potential. These are at least some of the molds that people have in mind when they think about training.

There is one precept which I think most often guides us implicitly if not explicitly in the sensitivity training we do. It is that the trainee is his own best judge as to the direction in which his growth should go and that it is perhaps unwise, if not ethically wrong, to tell the individual that he should change in certain specified ways. Rather, we feel we should help the individual to get an insight into what he is, to facilitate his examination and evaluation of this, and to help him make his own decisions as to the direction of his own growth.

A third question is that relating to the time dimension of the objectives. As we define objectives, are we concerned primarily with short-term or long-term effectiveness? We design some programs, it seems to me, to help people do some specific thing better in the short run. For example, we might take a group of people from the business office of the telephone company and train them to deal more effectively with customer complaints. On the other hand, to use sensitivity training as an example, here we are primarily interested in broader, longer-term objectives, which I think are the only realistic ones when we are concerned with some fundamental personality reorganization.

I want to emphasize this point rather strongly, because it poses some real problems for the trainer. The trainer who is oriented, as we are, toward these longer-run objectives really has a tough nut to crack when he is faced with immediate bread-and-butter considerations within his own organization. There is often some feeling that the trainer ought to be able to run the trainees through a ten-session program and have them come out much better people. It is very hard to get across the notion that an individual who is now forty years of age has taken forty years to build into himself what he now is. To expect that in just ten sessions anyone can remake an individual in dramatic ways is expecting a lot. As one works in terms of long-run objectives in this human relations training field, it seems to me that he must accept the fact that no single experience is going to remold an individual. He must recognize that any given program is just one experience in what probably should be a long series of experiences within our organizations, not only in training sessions but in a person's relations with other people in the organization, in his opportunities for other outside experiences, and the like.

A fourth question related to objectives concerns the depth within the personality of the change which might be brought about. An objective near the surface is the attainment of greater knowledge. Some of our programs do aim for this objective. The individual succeeds in the program if he can answer an examination covering certain specific human relations material. One thing related to the acquisition of knowledge that has troubled us in some of our programs is that trainees often pick up a lingo. So, when they go back to the job, they talk a good game of supervising. They talk, for example, of permissive, democratic approaches to dealing with other individuals; but in fact their on-the-job behavior reflects more rigid, more authoritarian forms of behavior. These individuals, we feel, are often just reached at the intellectual level and are not really reached at a deeper personality level.

A somewhat deeper objective might involve the adoption of a new ego-ideal by the trainee—a new conception of what he would like to be like—even though, at this point in time, basically he doesn't change very much. He might change behaviorally at the public level, that is, at the level of his overt behavior, but not change at a deeper, more permanent psychological level.

The trainee might change at what we call the private level, a level of which he is consciously aware. For instance, he may after training be better able to accept certain attributes of his own personality as really being him, and yet not be able to admit this to people in his external world. He thus gains insight at the private level but is not able to make this insight public. Finally, some change might be effectuated at the unconscious level. One thing that has intrigued us after many of our training sessions has been that individuals will verbally report, "Say, I got an awful lot out of this." "Well, what did you get out of this?" "Gee, I just don't know." There is a feeling that something has happened, that there has been some kind of progress, some kind of growth, and yet it is pretty hard to make this explicit. It is not quite within the person's consciousness.

The Training Process

We next come to the second problem area in the field of training evaluation; this one embraces concerns about the training process itself. What goes on in the training process becomes potential stimuli which may or may not have a learning impact on the trainee. The basic question becomes: what is it that may generate a change within the trainee in the direction of the objective or objectives which we specify? It would be wonderful if we knew the answer to this one. We could look at our cookbook and find, perhaps, that items a, f, g, and m are the things that ought to be done in the training situation to implement the attainment of our objectives. So we incorporate these elements into the training process with high assurance that upon completion of the training the trainee will have reached the point specified by our objectives. Some would feel this to be the trainer's Utopia, but we certainly are exceedingly far from attaining this dream world.

I find most trainers to be concerned about this particular area. We all have experimented rather widely in varying elements of the training process, always wondering about the impact on the trainee of each of our variations. Doing research in this problem area is exceedingly complex, and I should state at the outset that very little has as yet been done. However, it is an area in which you might contribute much within your own organizations by attempting to evaluate the impact of variations in your own training methods.

There are many variables involved in the training process. Because of this, one wonders how best to relate variations in any one of these elements to variations in training outcome. Experimentally, this can be done by holding all other conditions constant and varying but one aspect of the training process at a time. But little of this type of thing has as yet been done.

While the following list of variables in the training process is certainly incomplete, it should give you a good feel for the kinds of things I have in mind. I have classified them under various major headings.

1. *Conditions of the Training.* One problem here is *voluntary versus compulsory attendance.* What impact does this have on what an individual gets out of the training? Is the trainee present because he wants to be there or because his boss has implied to him that this is something the company expects him to do? And what is the differential impact of volunteerism versus compulsion in attendance?

What about *continuity of group membership?* How important is it that you start and end with the same group of individuals? Is it possible to start with a given group, and then as some leave to bring in new individuals? Some trainers feel that changing membership is desirable, because it is constantly introducing new elements into the group and therefore new learning possibilities. Others feel that the group ought to be kept constant during its training from beginning to end.

What about *the length of each session?* Is an hour enough? An hour and a half? Two hours? Two hours and a half? What is the optimum length of the training session for any given objective? And what is the training impact of variations in the length of sessions? Typically in our Sensitivity Training for Managers workshop we use three hours per session—an hour and a half before dinner and an hour and a half after. In our Sensitivity Training for Top Executives workshop this summer, we are going to have a two-hour session following dinner. We hope to get at least some tentative impression as to whether this particular time variation makes any difference in what goes on.

Then there's the question of *the time interval between sessions.* We run our Sensitivity Training for Managers workshop once a week during the regular semesters. In the summertime, however, we typically schedule our sessions for twice a week. Many industrial programs with which I am familiar use time intervals of up to a month in length. Do these variations in timing really make any difference?

Another variable is *the length of any given training unit.* Some units are planned for five sessions, some for ten, and some are viewed as continuing experiences. Some in this room have experimented with programs that take three full days. They take their executives away from the job to some comfortable location for a long weekend and design for them a full-time experience. They have experimented with this kind of arrangement as against one involving periodic during-working-hours sessions.

2. *Group Factors.* What is *the optimum size of the training group?* If the group is too small, the likelihood is great that it will not contain the variety of experiences, backgrounds, and personalities that can make the group experience a most rewarding one. As you get into larger size groups, there is less opportunity for individuals to participate; you are able to reach more people, although often more superficially. Also, they can personally escape with greater anonymity behind large numbers when the going gets too tough. We have experimented with groups varying from fifteen to thirty members. Our present feeling is that for sensitivity training a group size somewhere around fifteen would be most desirable; yet in the work we are now doing we feel compelled to take in more because we want to try to reach a larger number of people.

There is the problem of *the composition of the group.* What kinds of people do we want to try to get together in any given training group? Those of us who have done training have puzzled about the appropriate personality mix within any given group. Some groups are more productive—we feel they move a lot faster—than other groups; and we think this has some relationship to the particular personalities in the group. Within this past year I have had one group with many nice people in it, but theirs were bland personalities. There was no one who really wanted to get in there and pitch; no one who had strong attitudes or points of view on issues. Nearly everyone was rather sweet and kind and trying to be understanding and pleasant, and didn't want to get out on a limb. I had a feeling that not too much happened productively, in contrast with other groups which made excellent progress with a different kind of personality mix. So, another fascinating area for future research is trying to determine the relationship of the personality mix within any given training group to the outcome of the training itself.

We are also concerned about *the expectancies of these trainees* as they come to the training. As we have done more and more sensitivity training, we have noticed an interesting thing. People were really frustrated in the first few programs, because they had heard little about this program. But now their expectancies are different. They have been told by Oscar back at the plant, "Now look, Joe, the first two or three sessions you'll really be upset and there'll be a lot of things going on that you won't understand, but take it easy, boy; it'll make more sense as you go through it." So Joe has certain expectancies built up within him which have some kind of impact on his reaction to other variables in the training situation.

We have puzzled about *the relevance of the level of intelligence to training impact.* Some of us have the hunch that there is a certain minimum intelligence level below which individuals don't get very much out of sensitivity training. In the unstructured situations which we create, there is a lot happening which often does not seem to be connected. The people who, I suspect, are below a certain intellectual level have great difficulty in seeing interrelationships between things that on the surface seem quite diverse. Those with a higher level of intelligence, I believe, are probably better able to start tying together what on the surface appear to be rather diverse kinds of experiences and to make them add up to something rather meaningful. However, they might be more skillful at using verbal defenses.

Then there is the problem of *the readiness of the trainee for change.* We find in sensitivity training that there are usually some trainees who dramatically change as a result of any given training experience, and we wonder why. Is there something about their background up to this point that makes them ready now for this kind of experience? How do we define this readiness? What does it take really to prepare or to select an individual who will gain most from this kind of an experience?

Still another problem in the area of group factors has to do with *the training setting itself.* Managers can be brought together, as we often do it here at the university, from different companies and from different ranks, or people from the same level can be brought together from different organizations or from different parts of the same organization. Within a given company we can do what we call "vertical training." From within the same company we bring people together from different levels, where we try to help them work through the collaborative problems they face in dealing with each other across levels. Or we can set up diagonal groupings in which we have different status levels represented in the training, but we don't bring together immediate superiors and subordinates. We need to know a lot more about the differential impact of grouping trainees in these different ways.

3. *Training Methods.* There is a wide variety of human relations training methods in the bag of tricks of the trainer. He can give *lectures* or *lecturettes* (short lectures spontaneously presented during training sessions at times that seem appropriate). He can use *the conference method,* the newer Pigors *incident process, role playing, film forums, buzz groups, sensitivity training.* There are many different methods available to him. What is the differential impact of these different methods on the trainee? What guidelines do we have to help us in choosing one method as against the other? Under what circumstances is one method more appropriate than another? Should we employ but one method during any given training sequence, or should we try to vary the methods? We have few answers for these kinds of questions.

We are puzzled in this area of training methods about *the appropriate emphasis on what we call content and on what we call feeling.* A straight lecture would illustrate extreme emphasis on content. Some trainers feel that they can be most helpful to trainees by bringing them a lot of cognitive material. Others feel, however, that the primary focus should be on feeling. The trainer should not do very much by way of bringing in content, but rather should help his trainees function primarily at what we call the feeling level. Which of these levels is the more appropriate? And when?

What role does knowledge play in relation to experi-

ence? As one looks at the total learning process what is the optimum timing between these two? We sometimes use the deductive approach, starting with general principles imparted through films, lectures, reading, etc. Then we move into specific instances. At other times we use the inductive approach, which I think most of us doing sensitivity training prefer. Here we try to help the individual gain experience first, and then conceptualize it in a way that will be most meaningful to him. We sometimes present spontaneous lecturettes to give more meaning to an experience which has been common to the trainees during an immediately preceding time period. We are still not certain of the optimum relationships between knowledge or cognitive structuring and learning itself.

4. *The Training Environment.* What is the outside context from which the trainee comes and what impact on his learning does this outside context have? In sensitivity training we find that a lot of resistance to change that gets generated stems from the fact that our trainees are often thinking about "back home." The trainee gets insights in the training sessions that suggest to him that perhaps he might become more effective by behaving in a different way. But then he asks himself the question: "If I start behaving that way back home, what are they going to think of me? They'll disapprove of this; they'll think I'm off my rocker." He's faced squarely with conflicting pulls. On the one hand his training experience leads him toward a different kind of behavior; yet he knows that he is still a part of a social organization back home—that he can't change in ways that will be frowned upon back there. Fleishman at Ohio State, using as subjects foremen who were brought for supervisory training to a central training school, demonstrated that those who went back after training, into a social environment where the values and modes of operation were contrary to those imparted through the training process, soon had the training wash off them. However, those who went back into a social environment supportive of what they got in the training situation retained to a considerable extent that which they picked up through training.

5. *The Role of the Trainer.* A problem in this area with which we have experimented without arriving at any final answers is *whether one trainer or two trainers is the more effective.* In the sensitivity training programs for managers and at the Western Training Laboratory we use two trainers, but in the class which we offer here on campus and in other settings we use only one.

A more basic problem relates to *the impact of the trainer's personality on the training outcome.* What does the personality of the trainer impart to the training environment and ultimately to the trainee himself? Is there a gap between what the trainer sees himself as doing and what he is actually doing? Does the trainer tend to see himself in one way and to be seen in another way by the trainees? Do certain of his personality problems keep him from coming to grips with problems in these same areas in the training situation itself? Does he tend to emphasize (or to avoid) problems that occur in the group that are problems within his own personality?

Some research relating to these questions is now being completed within our Human Relations Research Group. Irv Weschler and I have served as guinea pigs in this research, which has been carried out by a clinical psychologist on our staff. Our campus classes in sensitivity training during this past semester have provided the setting. Irv and I each had sections of this class that were rather similar in many respects. I suppose the key difference between these classes would be the difference between Irv's personality and mine. The clinical psychologist sat in on every one of the sessions of both sections and tape-recorded everything that happened during the entire semester. Following each of the class sessions he sat down separately with Irv and with me for about three-quarters of an hour and depth-interviewed us with respect to the role we played as trainers in the immediately preceding session.

Irv and I do not know even now what the research design is nor what specific hypotheses are being tested. A third member of our group, Fred Massarik, is working with the clinical psychologist in the area of design and experimentation. But we do know that this has been an exceedingly rewarding learning experience for us, and we hope that some worth-while findings will result. I think we have learned some things about ourselves. We've learned that we often think we are doing certain things when we are really doing something else; we find that we have certain impacts on the group of which we are completely unaware; we find that we avoid dealing with certain kinds of problems because they lie in the area of our own personality deficiencies. By the end of this summer we should have some preliminary findings on this phase of our research.

Assessing the Impact

I turn now to the last main point. Assuming that we are clear on our objectives and that we know what methods we want to use in any particular training situation, how do we go about assessing the impact of the training? Are the changes which occur in trainees those which are specified by our objectives? A number of problems, which of necessity must be treated briefly here, arise as we attempt to answer these questions.

First, in order to be able meaningfully to assess what occurs as a result of training, *it is necessary to use a control group* comprised of individuals *not* receiving the training for comparison with the results achieved in the training (experimental) group. To find a control group comparable to the experimental group in all significant respects except for the training variable is often quite a difficult task.

Second, there is the question of *when the assessment is to be made.* We should probably try to get measurements prior to the individual's coming into training; then we should get measurements during training and right at the end of the training. Increasingly it is becoming clear that we should get measurements at time intervals after the training (e.g., three months and six months after training) to see how much of what apparently has happened to the individual during training gets lost after he gets back on the job.

Next we are faced with the question: *What do we measure, and how do we measure?* When we are primarily aiming at knowledge, tests to measure the acquisition of knowledge can be administered. With reference to other objectives, we often ask the trainee what he got out of the training. But we wonder how to evaluate what he says. Does he tell us what he thinks we would like to hear? Does he have to convince himself that he got something out of the training, even though he didn't? Perhaps things have happened to him at the private level or at the unconscious level, and he would have difficulty in reporting these learnings. We do have an opportunity to observe his behavior—both before and during, and after the training; and there are many different people who can observe him and make judgments about whether his attitudes and behavior have changed. These observations might be made by the trainer himself, by other observers such as our clinical psychologist, by work associates. Within a year or two, we hope to go out into the field to get measurements and observational judgments from our trainees and their peers, superiors, and subordinates before, during, and after the training.

We are also concerned with trying to get certain measurements of personality change. A major part of our current research involves trying to develop some tests, to adapt others, and to use still others in their present form to measure some of the variables we think are closely tied to the objectives which we have specified for sensitivity training. We are using, for example, the California Personality Inventory (developed by Harrison Gough) which purports to get at many of the personality dimensions that we think are involved in the change sensitivity training brings about. I also want to describe two other somewhat novel measuring devices that we are currently developing. One consists of some written projective sketches of people and how they interact in interpersonal situations. We have given our trainees these sketches at the beginning of the training and at the end, and have asked them to answer specific questions about the key characters in the sketches, about what kind of an individual each is, whether they would like each one or not. We are interested in seeing whether the trainee becomes more insightful with respect to these individuals by the end of the training as compared with the beginning—whether he sees more of each individual's personality dynamics and is more accepting of them.

Secondly, we have given each of our students in our campus class a blank notebook which we labeled a diary. We asked each student to sit down at the end of each session and independently write a note to "Dear Diary." We asked him to express his feelings, attitudes, and reactions to whatever happened in the training situation. It was left this open-minded, this unstructured. We now have, from three sections of this class, completed diaries written by about seventy different students. We plan to analyze their contents in the hope that they will reflect to us something of what happened to the students during the course of the semester. Does each student become more insightful of the group process, of others, and of himself as he goes through this training? Are training events seen by the trainers as critical incidents seen in the same way by the students? These are just some of the questions we hope the analysis of the diaries will answer.

While this presentation of necessity has been rather sketchy, I hope it has highlighted some of the key problems that all of us face as we think about evaluating human relations training and that it will suggest to you some of the things you might do to evaluate your own programs.

Personnel Management under a Labor Agreement

ORME W. PHELPS
Professor of Industrial Relations,
Claremont Men's College

The main problem of the student of personnel management these days is the absence of information about the management of personnel in the largest and most important managerial area in the United States: the unionized segment of medium- and large-scale private industry. The shortage of data results from the splitting of management functions between *personnel* managers and *labor relations* officers, with the former restricting themselves to the discretionary, unilateral personnel procedures, and the latter dealing with matters covered by the labor agreement.

Gaps in the Literature

There is a considerable body of literature on personnel management, but much of it is quite unrealistic and the remainder largely irrelevant to the major problems of employer-employee relations. For example, consider the case of the most widely adopted personnel management text in the United States, latest revision in 1955. In this book there are five chapters—ninety pages—on wage policies and administration, with only two and one half pages on "union influence on wage policy." There is nothing in the book on wage administration under a labor agreement, nothing whatever on union attitudes or contract patterns with respect to piece rates, incentives, single rates, rate ranges, spreads, differentials, overtime, shifts, escalation, productivity increases, or wage guarantees. There is not a word on wage arbitration. Two chapters in the book are on union-management relations, one historical and the other on the grievance procedure. All illustrations in the text apply to production and maintenance employees in the large industrial corporation.

This book is strictly typical: two to four chapters on "joint relations," "employee representation," or "collective bargaining," and then the customary unilateral approach to personnel functions throughout. The importance of textbooks to this discussion is that the better books reflect the research done in the field, some of the writers are themselves research men, the books themselves are in line with the treatise literature, and, finally, they indicate what students are taught as the scope and content of personnel management. To discuss seriously, in an industrial setting, wage administration, job evaluation, promotion and transfer, the various fringes, discipline and discharge, and so on, without benefit of the policies written into union-management agreements or grievance bargaining and arbitration, is unrealistic to say the least. Such discussion would be inapplicable to personnel management in General Motors, U. S. Steel, International Harvester, Lockheed Aircraft, and any other of the large, important, solidly organized major corporations in the United States.

To a degree, the lapses in the personnel management literature may be filled in from the literature of *collective bargaining:* the textbooks, reports, analyses, etc. In these, one gets at least the contractual pattern, in greater or less degree, and some mention of the joint process: negotiation, consultation, grievance bargaining, arbitration, and the like. However, the collective bargaining literature has distinct limitations as a source of information for the student of personnel management. In the first place, the volume alone is stupendous and beyond the coverage of any single reader. See, for example, the monthly bibliographies in the *Monthly Labor Review* and the *Industrial and Labor Relations Review.* Secondly, collective bargaining studies, as a type, suffer from too many facts and too few hypotheses. A large part of the material seems to stem from no hypothesis at all, other than that "if it is, it should be recorded." A third objection is the distinct lack of sifting or synthesis of the multitude of case studies, records, statistics, observations, and reports. The emphasis, for many years, has been on "field" research almost to the exclusion of critical analysis based on established standards of economic analysis or institutional behavior. Finally, and most important of all, where a hypothesis is stated or apparent, in nineteen cases out of twenty, it is nonmanagerial in purpose and results. This means that the implications for personnel management must be derived as secondary conclusions from the judgments of the writers. An example is the series of labor-market studies emanating recently from Berkeley and Princeton, wherein there are important corrections of widely held and long-standing erroneous assumptions about the recruitment of industrial employees, but the corrective material is in the form of factual information almost casually included to support the conclusion about labor-market behavior.

The Neglected Area

The blind spot in personnel management today is the series of steps falling between the clauses of the labor agreement and work process as carried out by the rank-and-file employee. It consists of (1) management's interpretation of the agreement, (2) the apparently more and more frequent consultations between various levels of management and the local union representatives in the plant, (3) the agreement or disagreement of shop stewards, committeemen, and business agents with managerial interpretation, (4) the 95 to 99 per cent of grievance disposals that take place before the final few go to arbitration, and (5) the general pattern of "established practices" under the agreement that forms the labor-market structure in the unionized plant or firm. This is the most important area of personnel management today, and as a type it is the least known, the most inadequately described, and the most incompletely analyzed of any managerial area.

These things cannot be found out from the textbooks. They cannot be discovered, except in fragmentary chunks here and there, in the treatise literature. They are tremendously detailed and complicated. I think we should know how they are done, why they are done the way they are, what the arguments are for the various methods and the objections to them, and the comparative results, from both the managerial and the employee's point of view. If personnel management, as a subject for investigation, is to be confined to the functions where management exercises discretionary, unilateral authority, then personnel managers are going to become like the caricature of the expert, knowing more and more about less and less. For a number of reasons I consider this undesirable. I shall indicate four of them.

The Unionized Segment of Industry

First, the relative size and importance of the unionized portion of private industry seems to have had little attention. There are approximately 65 million people in the civilian labor force of the United States, depending on the season of the year that the count is made. Of these, some 12 million are proprietors, self-employed, and unpaid family labor, leaving 53 million as the employed labor force, working not for themselves but for someone else for wages or salaries. About 6.5 million of these are government employees and therefore of limited organizability. Another 6.5 million are employed by private individuals as domestic servants (over 2 million), farm labor (over 2 million), part-time service and repairmen, clerical help in professional offices, and by private nonprofit institutions such as schools, colleges, hospitals, churches, chambers of commerce, etc. Deducting these two groups leaves a business population of 40 million employees.

It is here, in this 40 million business and commercial employees, that trade unionism is appropriate and that it flourishes. About 19 million of these workers are under a labor agreement, 18 million of them as card-holding union members and 1 million as free riders working under a labor agreement without taking out membership. The 40 million employees of business firms are split about half and half between small firms on the one side and medium-size and large firms on the other, if the breaking-point is considered to come at size 300. There are thus 20 million workers in small companies, with a very high proportion of them in quite small companies—99 employees or less. There are 16 million employees in firms of less than 100 total personnel. In companies of this size, personnel management is a matter of face-to-face contact between the employee and the employer and requires little of the formalism and delegation necessary in the large corporation. Nevertheless, there are probably 7 million union members working for small firms in this country, most of them craft unionists in the building trades, maritime trades, amusement industries, service organizations, and the like.

It is in the firms of 300 and over that personnel management is a problem. Of the 20 million employees in such firms, 15 million are in firms of 1,000 or more employees each, where formal delegation of authority and responsibility is inescapable, where no chief executive can know all his employees as individuals, and where the separation of personnel functions and their assignment to specialists is now routine. Around 12 million of these 20 million employees are working under a labor agreement—at least 60 per cent of the total. The remainder—8 million—consist of either the employees of unorganized firms or the unorganized minorities of unionized firms. The latter, of course, are separated from the labor agreement only by the jurisdictional boundaries of the "bargaining unit," which is not too sharp a dividing line in all cases. As a result, these employees—clerical, technical, and supervisory mainly—often benefit directly from contract negotiations as it is hardly conceivable that a wage increase of 10 cents per hour to production and maintenance employees of an industrial corporation could be withheld from the white-collar group without strong feelings of resentment. The employees of unorganized firms differ only in degree in that the large corporation, unionized or not, can disregard the established pattern of wages, hours, and fringes in the industry or in the community at its peril.

The primary conclusion to be drawn from the fore-

going is that the dominant influence in firms where personnel management is a necessity is the labor agreement. It follows easily then that most personnel management and the most important personnel management takes place under the agreement.

Employee Rights

Second, under a labor agreement the rules of personnel management are different, not just in degree but in order of magnitude. In the absence of an agreement, the employee has no rights other than to his earned pay and a reasonably safe workplace, plus certain protected liberties guaranteed by labor relations statutes. Under an agreement, his entire pattern of employment is something to which he has a "right" in the legal sense—that is, he can point to someone who is obligated to provide him with the things he has a right to. What is more, these rights are enforceable and enforced, time after time, often at considerable expense to employers who are careless or who guess wrong about the meaning of a phrase or a clause in the contract.

Most of this enforcement is not of public record—the 95 to 99 per cent of grievances disposed of without recourse to arbitration. Of the balance—the arbitration awards—a significant sample is available in the reports published by the Bureau of National Affairs and Prentice-Hall. It is in these awards that personnel management under a labor agreement is most adequately described today. This brings me to point no. 3.

Rules of Interpretation

Third, the "new order" in personnel management has produced a set of professional rule-makers—the arbitrators. Now, the really interesting feature of arbitration is that the rules which recur again and again and are rapidly becoming the substance of a general industrial jurisprudence are *not* stated in the agreement. They are rules of interpretation. That means that they underlie the contract—constitute, in effect, a set of major premises, for which the clauses of the agreement and the facts of the situation are secondary propositions leading to a conclusion. This is neither good nor bad; it is simply inevitable. When a written proposition and an agreed set of facts produce a dispute as to the result, the matter can only be settled by the introduction of a third variable. It is this third variable—burden of proof, past practice, publicity given the employer's policy, the employee's previous record, etc.—which the arbitrator supplies. These rules *are* on the record, and should be studied, analyzed, compared, and evaluated. They must be taken into account in any attempt to formulate a theory of joint management of personnel, which is my fourth and last point.

Joint Management of Personnel

Fourth, we need a theory of joint management of personnel. Under the labor agreement, in the typical large industrial corporation, joint management of personnel is a fact and has been for a long enough period of time to provide the raw material for a number of hypotheses. The problem is relatively unique in managerial experience and has assumed its present major proportions during the last twenty years. It violates one of the most widely accepted canons of management *per se*—whether industrial or military or political—the unbroken straight line of authority and responsibility running from bottom to a single source at the top as a basis for decision-making and execution. These may be the reasons for the lack of speculation to date. Nonetheless, such joint management is a fact with respect to personnel in the most significant sections of private industry. What is more, it works. It is therefore high time to attempt to systematize the various approaches on some theoretical basis. For example:

1. Should it be some refinement of what in fact it pretty generally is—mutual conciliation, mutual veto, and the umpire?

2. Should it be on the principle of separation of powers? And if so, what powers and how should they be separated? Consider, for example, a comparison of current practices in steelmaking, building construction, and longshoring.

3. Should it be on the principle of division of powers (federalism), as proposed by the management representatives to the President's Conference on Labor-Management Relations in 1945, and flatly rejected by the union representatives to the same conference?

4. Or should it be on some other basis? There are many possibilities; the above are suggestive only.

We have a wide variety of collective bargaining systems in this country, ranging from the strict craft setup to the most inclusive general industrial agreements, with all sorts of relationships between the parties—cooperative, tolerant, arms-length, antagonistic. They should provide the raw material for quite a number of theoretical hypotheses of how to manage personnel jointly. At least, I would suppose so. Whether all of them can be subsumed under a single systematic theoretical structure or whether there are basic differences that call for contrasting premises I am unable to say. However, I think the problem is one of sufficient importance to justify some very careful thought and collaboration among the students of personnel management in a framework of collective bargaining.

How Good Is Psychological Testing?

EDWIN E. GHISELLI
Chairman, Department of Psychology, University of California, Berkeley

I conceive of my main function here today not to give you information, but rather to make you think. You people are fully capable of reading the professional literature about testing, and certainly some of you are more up to date than I am. So I shall try to stir you up a little, by goading you and by throwing out a few ideas you might not have thought much about. I am not going to talk very long—just long enough to provide a basis for discussion and, I hope, to provoke you.

Why Use Tests?

A test is an aid in the selection and placement of employees. It is a tool of the trade of the personnel officer. As with any tool we cannot hope to evaluate its effectiveness unless we understand the problem situation in which it is to be used—and the problem situation must be stated specifically. For example, suppose I have a tool called a gimmik and I say it is to be used in straightening things out. This seems a clear and precise statement. But you may well ask whether a gimmik is to be used in straightening out bent nails, dented automobile fenders, or delinquent boys.

It seems to me that business and industry have approached tests from the wrong end. A great deal of attention has been given to examining the specific nature and content of tests, and to problems connected with their administration and interpretation, but there has been very little concern with the problem situation that calls them in to use.

The problem situation where tests are used is the selection of employees. Under selection we can include upgrading, promotion, and the like, since they are merely special cases of selection. We are attempting to choose among candidates the best men for the job in which vacant positions occur.

Now this is going to sound like a very silly question—but I am going to ask it, nevertheless. Why do we try to differentiate among candidates for a job? Why don't we take the very first man who comes along when a vacancy occurs? The answer we are likely to give is that some candidates will make better employees than others.

But remember I want more specificity in my answers. I am a long hair and I don't understand these things very well. So I shall ask this question: How do I tell a good worker from a poor one? Let me make the question specific and tell a true story. How do you tell the difference between a good casualty insurance salesman and a poor one? I was setting up test selection procedures for an insurance company and asked this very question. I was smiled at, of course, and told that a good one sells a lot of insurance and a poor one very little. Now it just happened to turn out that on my experimental tests the highest producer earned the highest scores. When I proudly showed this to the sales manager, he said the test was wrong because that man was a poor employee. When in surprise I asked why, I was informed that the man did not get along with the other people in the office, and management was thinking about firing him.

This is what so frequently happens. An organization states the rules of the game and then does not adhere to them in any consistent fashion. We say that a good worker is one who makes few errors, and then terminate a man because he is tardy too often.

What I am saying is that before we can select employees, we must know for what we are selecting them. Do we want employees who are high producers, accurate, prompt, safe, or whatever? In most instances we shall want some combination of these qualities. But then we should say so, because in many of these areas there are no tests available to measure these qualities. You wouldn't use a monkey wrench to hammer nails; at least you shouldn't. And you shouldn't use a mechanical aptitude test if your problem is tardiness.

Tests Differ

This brings me to my next point. We can distinguish between two types of tests, store-boughten and tailor-made. There are many tests on the market published by reputable concerns, and like store-boughten clothes they may or may not fit. Specially designed tests or a specially designed testing program, like a tailor-made suit, is by far more likely to fit. But it also costs far more.

I can run a lathe, and sometimes I do. But I can't work material anywhere near as round or precise as even a machinist's apprentice can. Now my work is not bad, but skilled people do it far better. So you must ask yourself whether your organization can only afford store-boughten tests, or whether you are in position to utilize the services of a professionally

trained personnel man who can tailor a testing program to the specific needs of the organization.

In differentiating between store-boughten and tailor-made tests I am not so much referring to the construction of tests as to their validation in a given organization for a specific job. Don't get me wrong. I am not urging you to build tests from scratch. What I am suggesting is that you try out experimentally tests already available on the market to see if they achieve what you want in the selection of employees. I am urging research or follow-up on the effectiveness of tests.

It has been my experience that particular tests which work well in one organization may be far less effective in another even for the same type of job. But even more important, a given test may predict different aspects of job proficiency in quite different ways. Let me illustrate. One company with which I worked had trouble with both production and labor turnover. In an experimental tryout I found a number of tests that gave fairly substantial predictions of productivity. On the average the higher the scores the better was the production. The company wanted to use these tests immediately, arguing that good producers would surely be contented and stay on the job. However, I insisted on waiting to see how scores were related to turnover. Ultimately when turnover data became available and were checked against test scores, a very different kind of relationship showed up. Those who stayed tended to have average scores and those who left tended to have either high or low scores. If we had selected those persons who earned high scores and rejected the rest, we would have come out with workers who sure enough would be high producers but who would not stay very long with the organization. On the other hand, if we selected those with average scores we would get people who would stay on the job but who would be indifferent producers. In this dilemma we had to go to quite different tests which did not predict either production or turnover as well, but on the average gave us people who tended to be good producers and who stayed on the job.

As I pointed out before, research and development of this kind requires money. In the case I just described the research program added about three dollars to the regular costs of hiring a man. However, the company estimated that it saved about $150 on each person employed.

What Do We Get for Investment in Tests?

The matter of costs brings up my last point. Let me state the selection problem another way. We differentiate among candidates for a job rather than hiring or promoting them at random in order to improve some particular state of affairs. By selecting or rejecting men at the time of hiring we hope to increase production, reduce accidents or turnover, minimize wastage, or whatever. Now note we can achieve these very same ends by other means. We might redesign work methods, install better equipment, change the incentive system, or institute a very thorough training program.

Suppose our task is to improve safety and we have $50,000 to do it. How should we spend this money? Shall we put it into installing safety guards on equipment, in safety training, in a safety publicity campaign, or in a selection program? Obviously I cannot answer this question, but you must. I am sure the answer will be different in different organizations. However, I can give you a statement of what tests can do. Under the best of circumstances selecting employees by tests will give you an improvement of about 15 to 20 per cent. To develop a testing procedure that will do this requires both money and time. The wisdom of experts will not achieve it—a research program will be necessary.

Undoubtedly you will say that the 15 or 20 per cent improvement is not much—and I will agree it is not. But let me ask you this: Can you show me sound data clearly proving that better equipment, a fancy human relations program, or an elaborate training program will do better—or even as well? You may say yes, but I'm a hard man to convince.

Now don't get me wrong. I like equipment design, human relations programs, and training. I believe that they are beneficial. I have faith in them. But when I must choose between faith and facts I'll take the facts when money is to be spent. Facts collected for over half a century support the usefulness of tests. Therefore, happily or reluctantly, I am forced to conclude that tests are a necessary part of personnel procedures.

<>

In connection with his talk, Professor Ghiselli distributed the following mimeographed material:

SUMMARY OF FINDINGS CONCERNING THE VALIDITY OF OCCUPATIONAL APTITUDE TESTS

For over half a century psychologists have been investigating the effectiveness of various types of tests in the selection of employees in a wide variety of jobs. The results of these many studies have been summarized in a monograph, E. E. Ghiselli, *The Measurement of Occupational Aptitude*, University of California Publications in Psychology, Vol. 8, No. 2, 1955. Certain portions of this monograph have been abstracted and are presented here.

In the following paragraphs the various major types of aptitude tests are described. The average validity coefficients for each of these types of tests for each kind of job are given in tables 1 through 6. The validity for each type of test and each

job is differentiated in terms of the value for prediction of success in job training, and for prediction as to job proficiency attained after training.

All types of tests have not been investigated for all jobs. Therefore, in many areas information about the validity of tests is lacking. It is hoped that these summary values of the effectiveness of aptitude tests will be of help in planning testing programs.

Types of Aptitude Tests

Intelligence—All of the tests that are ordinarily termed intelligence or mental alertness tests are included in this category. Examples are the Otis tests and the Army General Classification Test.

Immediate Memory—In these tests the individual is presented with some material, and after a short period of time he is called upon to remember it. For example, the test might present lists of five or ten place numbers on one side of the page and the individual is required to read each number, turn the page and write the number in an appropriate place on the opposite side. These tests have also been called number writing, recall, and memory for details.

Substitution—These tests require the individual to learn and utilize a code. He may be presented with a code such as A = 7, B = 2, etc., and then make appropriate substitutions of numbers in a random order of letters, referring to the code as frequently as he desires.

Arithmetic—Here are included all tests that require arithmetic computations. Sometimes these tests have face validity, as, for example, being presented as a change-making test.

Spatial Relations—Spatial judgments of various sorts are required by these tests. In the most common kind the individual is presented with plane figures and he must determine the shape of the composite figure that will result when several of the plane figures are assembled together. All paper-and-pencil tests of spatial relations, such as the Minnesota Paper Form Board Test and the block counting items of the MacQuarrie Mechanical Ability Test, are included in this category.

Location—In this kind of test the individual must identify the location of each of a series of points and/or make judgments concerning the distances between them. In some instances he simply has to identify the greatest or smallest distance and in others he must reproduce a pattern on a different scale. The copying and location parts of the MacQuarrie Mechanical Ability Test are examples.

Number Comparison—These tests consist of a series of pairs of numbers. Both members of each pair contain the same number of digits, the number varying from five to ten or fifteen. In some pairs all digits are exactly the same while in others one or two of them are different. The individual is required to indicate which pairs are the same and which are different. An example is the number comparison part of the Minnesota Clerical Test.

Name Comparison—These tests are similar to the foregoing type except that pairs of names are used instead of pairs of numbers. The name comparison part of the Minnesota Clerical Test is an example.

Cancellation—Tests of this kind consist of letters or numbers arranged in random order, and the individual is to cross out all letters or numbers of a specified kind.

Pursuit—Pursuit tests present tangles of lines and the task is to follow, by eye alone, one line at a time from beginning to end through the tangle. The pursuit part of the MacQuarrie Mechanical Ability Test is an example.

Perceptual Speed—The intent of these tests is to measure the speed with which similarities and differences in simple figures can be perceived.

Mechanical Principles—In these tests problems illustrative of simple mechanical principles are presented pictorially. The problems involve such things as the power of levers and the directions and speed of movements of combinations of pulleys and gears. An example is the Bennett Mechanical Comprehension Test.

Tracing—Tests in this category are intended to measure speed and precision of movement. An example is the tracing part of the MacQuarrie Mechanical Ability Test that requires the individual to follow a prescribed path with a pencil.

Tapping—In this category are included only tests of the paper-and-pencil variety. Emphasis is upon speed of movement, and typically the individual taps as rapidly as he can with a pencil, putting two or three dots in each of a series of squares or circles. The tapping part of the MacQuarrie Mechanical Ability Test is an example.

Dotting—This test is similar to the tapping test except that precision of movement is stressed. As in the dotting part of the MacQuarrie Mechanical Ability Test, the individual puts a single dot in each of a series of very small circles.

Finger Dexterity—All varieties of pegboard tests are grouped together in this category. In the large proportion of these tests the individual picks up small pegs and inserts them into holes. In some instances, however, he makes a simple assembly such as putting washers on rivets and inserting the assembly into holes. The Purdue Pegboard and the O'Connon Finger Dexterity tests are examples.

Hand Dexterity—While these tests do involve finger dexterity to some extent, the major purpose is to sample a somewhat larger set of motions involving the wrist. For example, in the Minnesota Turning Test the individual picks up blocks one at a time, turns them over, and replaces them.

Arm Dexterity—The purpose of these tests is to measure a very gross motor dexterity. In most cases, as with the Minnesota Placing Test, they involve the picking up of blocks and the carrying and placing them in another position.

Personality—All personality inventories regardless of the trait they are presumed to measure are included in this category. This very broad grouping was necessitated in view of the fact that many inventories are not labeled by trait names. Furthermore, many titles involve trait names that are not generally accepted or are commonly used. In many investigations a personality inventory is given to a group of workers and an item analysis is conducted. Those items found to be valid are grouped together into a final form of the inventory, and the validity of this inventory is determined on the basis of the responses of the original group of workers. In this review an attempt was made to eliminate all such studies, and to include only those where cross validation was reported for an independent group or where a scoring key was devised on some other basis. The Bernreuter Personality Inventory is typical of the inventories herein dealt with.

Interest—Inventories of this kind, such as the Strong Vocational Interest blank, are indications of preferences concerning such topics as avocations, occupations, and school subjects. Studies wherein the validity was reported on the basis of scoring keys developed from the experimental group of workers were not included.

TABLE 1

VALIDITY COEFFICIENTS OF TESTS FOR SUPERVISORY OCCUPATIONS

Type of Test	General Supervisors		Foremen	
	Training	Proficiency	Training	Proficiency
Intelligence	...	.36*	...	.25*
Arithmetic	...	.20+	...	.20*
Spatial Relations	...	...	...	.21*
Cancellation	...	.32+	...	...
Mech. Principles	...	...	...	.23*
Personality	.16	.20×	...	.15*
Interest	...	.53	...	...

* In this and in all following tables * indicates coefficients based on 1,000 or more cases, × coefficients based on 500 to 999 cases, + coefficients based on 100 to 499 cases, and coefficients with no symbol are based on less than 100 cases.

TABLE 2

VALIDITY COEFFICIENTS OF TESTS FOR CLERICAL OCCUPATIONS

Type of Test	General Clerks		Recording Clerks		Computing Clerks	
	Training	Proficiency	Training	Proficiency	Training	Proficiency
Intelligence	.44*	.38*	.40*	.25*	.23+	.18*
Immediate Memory	.....	.29×	.32*	.36+	.46	.26×
Substitution	.21+	.25*	.24×	.25×	.34+	.26×
Arithmetic	.43*	.28*	.48*	.15×	.35+	.28*
Spatial Relations	.28*	.04+	.28*	−.02+	.....	.24+
Location	.24×	−.03+	.49	.11×	.....	.28+
Number Comparison	.42	.25*	.29+	.29*	.35+	.33×
Name Comparison	.40+	.27*	.36+	.33×	.19	.34×
Cancellation	.....	.22×	.58+	.19*	.11	.24×
Pursuit	.21+	−.17	.....	.12+	.....	.35+
Perceptual Speed	.....	.38+	.42*	.....	.....	.....
Mech. Principles	.24*	.....	.24*	.....	.....	.....
Tracing	.....	−.09	.17+	.11+	.08	.42+
Tapping	.....	.10+	.23+	.15+	.16+	.14+
Dotting	.....	.12+	.13+	.17+	.16	.03+
Finger Dexterity	.....	.29×	.09×	.25+	.....	−.11+
Hand Dexterity	.....	.16+	.30	.16	.....	−.05
Arm Dexterity	.....	.14+	.09	−.09	.60*	.34
Personality	.....	.29×	.....	.19+	.....	.13
Interest	.....	.....	.....	−.02	.....	.....

TABLE 3

VALIDITY COEFFICIENTS OF TESTS FOR SALES OCCUPATIONS

Type of Test	Sales Clerks		Salesmen	
	Training	Proficiency	Training	Proficiency
Intelligence	...	−.10*	...	.31×
Immediate Memory	...	−.08+	...	...
Substitution	...	−.16	...	...
Arithmetic	...	−.12+	...	.41+
Number Comparison	...	−.14+	...	.22
Name Comparison	...	−.15+	...	...
Cancellation	...	.02×	...	...
Personality	...	.35*	...	.37×
Interest	...	.34×	...	.31*

TABLE 4

VALIDITY COEFFICIENTS OF TESTS FOR PROTECTIVE AND SERVICE OCCUPATIONS

Type of Test	Protective Occupations		Service Occupations		Vehicle Operators	
	Training	Proficiency	Training	Proficiency	Training	Proficiency
Intelligence	.46+	.27*	.50×	.07+	.18*	.14*
Immediate Memory	.28+	.26+	.10+	.....	.....	.....
Arithmetic	.30×	.15+	.59×	−.11+	.14*	.04+
Spatial Relations	.33+	.11+	.42×	.....	.21×	.....
Location	.....	.....	.....	.....	.....	.18×
Number Comparison	.....	.19+	.....	.14+	.....	.....
Name Comparison	.....	.24+	.....	−.17+	.....	.....
Cancellation	.....	.....	.....	−.27+	.....	.....
Perceptual Speed	.30+	.....	.....	.....	.08×	.....
Mech. Principles	.41+	.27+	.....	.....	.36*	.21*
Tapping	.....	.....	.....	.....	.....	.32+
Dotting	.....	.....	.....	.....	.....	.28+
Finger Dexterity	.....	.19+	.....	.....	.....	.....
Hand Dexterity	.....	.....	.....	−.09+	.....	.....
Arm Dexterity	.....	.....	.....	−.01+	.....	.....
Personality	.....	.24×	.....	.16+	.....	.....
Interest	−.09	−.01+	.....	.....	.....	.26+

TABLE 5

VALIDITY COEFFICIENTS OF TESTS FOR THE TRADES AND CRAFTS

Type of Test	Mechanical Repairmen		Electrical Workers		Structural Workers		Processing Workers		Complex Machine Operators		Machining Workers	
	Training	Proficiency	Training	Proficiency	Training	Proficiency	Training	Proficiency	Training	Proficiency	Training	Proficiency
Intelligence	.38*	.18×	.43*	.47+	.29*	.09+	.35*	.24+	.34*	.28+	.30*	.08×
Immediate Memory	.30*	...	.31×	.21	.13×	.13+	.31+	.15+	.12+	.30+	...	−.02+
Substitution	.34	...	.34	−.17	.31×	.31	...	.34	...	.26+	.27+	.21+
Arithmetic	.40*	.27+	.45*	.07	.30*	.15+	.35*	.02	−.08	.29+	.33*	.20+
Spatial Relations	.34*	.22+	.33*	.33+	.28*	.31+	.35*	.16+	.36*	.30×	.33*	.11*
Location	.24×	.07	.24	.23+	.23×	.23+	.24	.21+	.28	.25+	.24+	.04+
Number Comparison	.22	.23	.16	.17	−.04+	.08+	.24+	.21	.42	.14+	.02+	.12
Name Comparison	...	.53	.09	.13	−.01+	.08	.14+	.20	.57	.22+	−.02+	.25
Cancellation	...	.04	...	.21	...	.21	...	...	.20+	.23	.28+	...
Pursuit	.17×	.50	.12+	.32	.18	.24	−.13	.17+	.41	.33+	.19	.01+
Perceptual Speed	.40*	.03	.43×	.36	.29*	.35+	.34×	.19+	...	.28	.35×	−.12
Mech. Principles	.37*	.35+	.40*	...	.31*	.14	.40×	...	...	.40+	.33*	.57+
Tracing	.21+	.27	.24+	.15	.24	.30+	.17+	.24+	.22	.19+	.21+	.06+
Tapping	−.01+	.21	−.11	.19	.20+	.18+	−.01+	.39	.24	.19+	.05+	.08+
Dotting	.20+	.11	−.14	.01	.13+	.20+	.02+	...	.26	.11+	.14+	.06+
Finger Dexterity	.19×	.17+	.15*	.18+	.24×	.30+	.22×	.30×	.11	.14*	.24×	.08*
Hand Dexterity	.17	.12+	−.38	...	...	.24	...	...	.40	.46	...	.29+
Arm Dexterity	.08	.07	−.10	...	...	.24	...	.32	.34	.33	−.03+	.11+
Personality	...	...	...	...	...	...	...	.30+	...	.24+	...	...
Interest	.37	...	...	...	...	...	...	...	.31	...	...	−.13

TABLE 6

VALIDITY COEFFICIENTS OF TESTS FOR INDUSTRIAL OCCUPATIONS

Type of Test	Machine Tenders		Bench Workers and Assemblers		Inspectors		Packers and Wrappers		Gross Manual Workers	
	Training	Proficiency	Training	Proficiency	Training	Proficiency	Training	Proficiency	Training	Proficiency
Intelligence	−.31	.16*	.02+	.22*	.19×	.35×	.22×	.13×	−.03+	.26×
Immediate Memory	...	.17*	...	.06*	...	.14+	...	.24+	...	...
Substitution	...	.19×	...	.12*	...	−.01	...	.16+	...	...
Arithmetic	...	.15*	.39+	.09×	.27	.18+	.43×	.14+	...	...
Spatial Relations	...	.11*	.24×	.15*	.27*	.24×	.22+	.13×	...	.35
Location	...	.11*	.29+	.19*	.19×	.18×	...	.16×	...	...
Number Comparison	...	.20*	...	.15*	...	−.02+	...	.13*	...	...
Name Comparison	...	.17*	...	.10*	...	.17+	...	.20*	...	...
Cancellation	...	.25+	...	.36×	...	−.11	...	.24+	...	...
Pursuit	...	.15*	.28+	.15*	.09+	.09+	...	.16+	...	...
Perceptual Speed	...	.31	.26+	.27*	.12×	...	...	...	...	...
Mech. Principles	...	...	...	.56+	...	.42+	...	...	...	...
Tracing	...	.16*	.16+	.18*	.09	.20+	...	.12+	...	...
Tapping	...	.12*	.16+	.14*	.10+	.06+	...	.14+	...	...
Dotting	...	.15*	.22+	.15*	.08	.06+	...	.13+	...	...
Finger Dexterity	.21	.15*	.44*	.25*	.00+	.14*	...	.08*	...	.15+
Hand Dexterity	...	.23+	.50+	.14+	...	−.02+	...	.15*	...	...
Arm Dexterity	...	.15×	.54+	.24×	...	.00*	...	.24*	...	.43+
Personality	...	...	...	.50	...	...	...	...	...	...
Interest	...	.26	...	.02	...	...	...	...	...	...

Changing Personnel Practices in the Smaller Organization

FRANCES B. TORBERT
Chairman, Department of Management,
San Diego State College

This will be a story of four companies in which experiments in group participation in certain kinds of management problems were tried. The companies are small, ranging from about 100 to 400 people, and each one has had conventionally authoritarian management. Although small, the companies are the leaders in their particular field in San Diego.

Leadership in dollar volume has been accompanied in each company by better than average profit performance. Morale ranged from average to superior in each of the organizations, prior to the beginning of the experiments. Despite their leadership, these firms all showed mixtures of strength and marked weakness in company management. In each case, it was the belief of the company president and his chief assistants that performance could be improved by improvement of personnel methods and by modification of some management practices. In no case was the company willing to permit a situation in which we could experiment with only part of the work group. Consequently there was no opportunity to compare performance in a control group with that in an experimental group.

Four Case Histories

I

The most interesting of the experiments concerned a company in which the original effort was concentrated on improvement of employee training and reduction of labor turnover. The president of this company also realized that he was not delegating enough authority and responsibility to his executives. He had built the company from scratch with an investment of only $250 of his own money to the point where it now does an annual business approaching three million dollars—all this in a period of a little over ten years. Despite a marked tendency on his part to make quick decisions and to override subordinates, he felt that he could and must reduce his own participation in day-to-day details of operations. In the midst of a discussion of several aspects of company management, the president observed one day, several years ago, that I had in my automobile a copy of Henry L. Nunn's book, *The Whole Man Goes to Work* (Harper, 1953). I told him that Mr. Nunn had been lecturing to one of my classes that day and that I had called to the students' attention the availability of copies of this book in the college library. The president asked if he could borrow my copy. The next morning I received a phone call stating that he had read the entire book the night before and wanted to embark on a program of running his company in the same fashion as Mr. Nunn had managed the Nunn-Bush Shoe Company. He also stated that he had ordered ten copies of Mr. Nunn's book for use by other executives and supervisors in the company.

The Nunn-Bush Experiment

Here we should pause to describe briefly the unique approach to company management which Mr. Nunn began to develop as far back as 1915. The Nunn-Bush Shoe Company is best known for its "52 pay checks a year" plan. It probably should be even better known for the extraordinary experiment in democratic management which Mr. Nunn initiated and which now continues, after his retirement from the presidency. At Nunn-Bush, the basic policy of management is based on this credo: management will not dictate, nor in any way behave in an arbitrary fashion toward employees. In return employees agree not to be arbitrary in their demands on management. All employees of the main plant are members of an independent union, and the union and company have an agreement that in any case where differences arise between the union and the company, both parties will agree to accept as final and binding the decision of an outside arbitrator. In all the years in which this agreement has existed, only two items have ever brought the parties close to arbitration, and in both instances a decision was arrived at without outside arbitration. The employees, through their union, have taken over almost all the usual disciplinary functions with which supervision must concern itself in the ordinary business. In addition, important general decisions affecting the business as a whole must be approved by the union through its executive committee. For example, if the company desires that the price of shoes of a certain style should be increased, the price change can be put into effect only after the union executive committee has given its approval.

The employees, through the union, not only participate in management decisions, but are given all sta-

tistical information normally restricted to management. Nunn-Bush has also, for many years, had as a member of the Board of Directors a rank-and-file employee, elected by all company employees in a general election. In many other ways, too numerous to be described here, Nunn-Bush has operated in an atmosphere of unusual "give and take" and has developed an extraordinary degree of employee participation in company management.

An Adaptation of Nunn-Bush

In view of the marked differences in temperament between Mr. Nunn and the young San Diego company president, I had many misgivings as to the local company's ability to adopt Mr. Nunn's principles and practices. It will be seen later that the company here has indeed not gone the whole road that Nunn-Bush has traveled. What has happened, however, has been interesting. Within a few days after the supervisors and executives had read the pertinent sections in Mr. Nunn's book, the company called a meeting of all its employees. The president described the Nunn-Bush program and asked employees if they would like to operate under a similar one. A large number of questions were raised, and even after lengthy discussion it was apparent that many people at the meeting had not fully grasped the ideas presented. At the end of nearly an hour and a half, a majority of the people present understood at least broadly what was being proposed. The president suggested a vote on the inauguration of a similar plan, and the resulting decision was almost unanimous in favor of Nunn-Bush style "industrial democracy."

After this meeting, developments in different departments varied from little or no change to drastic overnight modifications in departmental management. In one department all members had a meeting of their own the day following the general meeting; they elected departmental representatives to meet with the department head on matters affecting employees, and introduced a system of fines for lateness, absenteeism, breaking of rules, and other activities not conducive to smooth and efficient operation. They decided that when fines had grown to a substantial amount, the money would be used for a department party. After the party, further accumulations would, at least for a time, be set aside for Christmas presents for needy families. The levying of fines proceeded with a good deal of amusement and good natured "ribbing" among the employees. The department head and his assistant found that disciplinary problems completely disappeared.

Some other departments soon adopted the fine system, and all elected employee representatives. Fines met with varying success and were eventually dropped in some groups. The employee representative program has continued vigorously in all departments. There is now a regular monthly meeting of representatives from each department, which in some cases is attended by various members of company management and in other cases by the members of the employee council alone.

At no time has the program developed into a full-blown equivalent of the management practice at Nunn-Bush. At times supervisors have reverted to conventional authoritarian management practices, usually without observed complaint or resistance from department representatives or employees as a whole. In some cases it appears that employees have been content with the way the supervisor has managed and have felt no particular need to take a more aggressive part in his plans and his direction of the department.

It should be added at this point that prior to the inauguration of this program, the employees had voted themselves out of a rather weak and not too honestly run local of a national union. Under the new program an employee association has been formed which has not as yet taken on the full range of activities normally characteristic of the labor union. Possibly some of the reasons for this have been the company's superior wage structure and benefit programs, and the feeling on the part of employees that they do have a share in management thinking. However, it may be that the association will sooner or later become more like a conventional union, or more like the Nunn-Bush organization.

Top management in the company has repeatedly slipped back into ways of doing things which run counter to Henry L. Nunn's philosophy. In many cases, past habits and forgetfulness seem to have been responsible. In other instances, executives have been aware that what they were doing might have been referred to the employee group, but the feeling has been, "Well, this isn't the kind of thing they'll probably care too much about anyhow, so why don't we go ahead instead of taking time to call an employee meeting or a department representative meeting." At the rank-and-file level, most first-line supervisors have been reasonably successful in adhering to the original plan. Some supervisors have shown extraordinary skill and understanding in using a participative approach. At the other end of the continuum has been conventional operation except on a few items about which employees are normally particularly concerned.

Results of the Program

There are many interesting aspects of the recent history of this company which time does not permit describing, but we might say that this experiment has been a qualified success. The company has continued to grow

rapidly, and its profit and loss statement continues favorable. Operating department profits have significantly improved, but have been offset by increased overhead expenditures over which supervisors and employees have no control. In the long run these outlays should contribute to the enlargement of the business. An immediate distribution profit-sharing plan has been inaugurated, and it is now hard to say how much reduced labor and materials cost can be traced to profit sharing as such, and how much to participative management. Despite difficulties which have at times taken on a somewhat comic quality, there is no evidence that management or employees wish to abandon the plan. Employees want "a share in the task of thinking," and management is committed to a philosophy of trying to maintain and enlarge this share, despite occasional backsliding or forgetfulness. The future of this company's operation should be an interesting one to follow.

It should be noted that the largest degree of sharing in decision-making has been in the area to which many authorities feel such sharing *should* be restricted. This is the "area of freedom" of the first-line supervisor. This concept, so well developed by Norman Maier (*Principles of Human Relations,* Wiley, 1952), assumes that anything the supervisor is free to decide or do may be a joint decision of those he supervises. In the company whose recent history has just been sketched, however, employee participation has sometimes concerned matters of all-company nature, especially via the employee council.

II

The second company I would like to refer to is the largest firm of the four. It is a long-established, conservative, and highly successful organization. The president is old-fashioned in many of his viewpoints, with somewhat paternalistic tendencies, but has nevertheless acceded to many of the "modern" management recommendations of his staff.

About eight years ago, the management of this company decided to conduct an anonymous employee attitude survey and to follow the survey with concerted efforts to put into effect any changes which the results would indicate were needed. Following a study of survey results, I was asked to conduct meetings with all employees in the company to discuss the problems revealed by the study. Beginning with the first group of employees with whom I met, volunteer committees were created to work on each major area where a difficulty had been revealed. These committees had membership of three to five persons, with the chairman selected by the committee at its first meeting. Both written and oral reports were made by committee members on their recommendations. As each successive group met (there were fifteen to twenty employees in each), new committees were formed to take on the identical problems studied by members of previous groups. By the time the series of meetings had been completed, a tremendous amount of committee work and group discussion had been devoted to each problem area.

The results of group and committee recommendations were in nearly all cases put into effect almost exactly as recommended. In very few cases did management even suggest minor changes in the recommendations of employee groups. This seems to validate the concept that group decisions made by rank-and-file employees are usually realistic and workable. The changes covered practically every imaginable area of company policy and practice, with emphasis on personnel matters. New procedures were set up, manuals and handbooks were written, and a variety of other changes were made. The time period over which major changes were put into effect ran to about a year and a half. Interestingly enough, the president, who had been expected to react negatively to many of these new measures, was permissive with regard to practically all the changes, and was eventually persuaded on all of them.

Following this period of marked change, the company went through several years of relatively minor use of employee assistance in management problems. Later on, another spurt of participative activity took place, and in the last few months there has again been an increase in the use of group decision in management. A quite revolutionary change in operating methods in the company's largest single department has been made entirely on the basis of employee analysis and recommendation. It is significant that the group of employees who developed the plans for this change had been working under great pressure and had been putting in extensive overtime hours prior to the planning of the change. As soon as the new plan was well developed, practically every member of the group involved commented on feeling free of fatigue and even exhilarated. Several people said that they could "hardly wait" to see the full utilization of their new program, which was being put in piecemeal, and which could not be completed until the telephone company could make major changes in phone installations. This experiment suggests a major factor in group-decision management. It seems to be typical of people who are allowed to plan and develop programs on their own, instead of receiving them ready-made from management, that they develop stimulated and enthusiastic at-

titudes of mind, and a deep commitment to making plans and decisions effective.

It should be noted that the general character of top management in this company has never ceased to be conventional in most of its aspects. In spite of this fact, the use of participative approaches has been accepted by most executives confidently and with enthusiasm, even though they do not wish to experiment with a full-fledged, continuous program of group decision as a method of management.

III

In the third company which will be discussed here, a form of brainstorming was utilized in a series of employee meetings, in which everyone from the most junior employee through executives participated. The company had never tried anything of this sort before, and under a previous president had been highly authoritarian in structure. With the obvious enthusiasm and interest of a new president in the brainstorming program, employees plunged into a rapid and varied series of recommendations for change which ranged from minor to all-embracing modifications in company operation. The largest number of usable ideas were concerned with business-getting, or with improvements in customer service. Over one hundred specific changes were made as a result of these meetings, some of them as minor as changes in wording of signs and notices, others resulting in the development of entirely new company ventures. A very elaborate and complete procedure manual was voluntarily developed by two employees who insisted on doing some of the work on their own time, but who were compensated later for this effort through a special bonus. During the period in which all this activity was taking place, the company put in an immediate distribution profit-sharing plan. Volume and profits have significantly improved during the period since the brainstorming program began, but again it is difficult to say how much improvement has stemmed from increased employee participation and thinking, and how much from the profit-sharing incentive.

This company has also simmered down in its use of employee participation in management, but has retained one program which promises to develop further. This is the creation of an employee council made up of four persons: three selected from major department groups and one elected at large. This group meets regularly with a company vice president, and occasionally with the company president. Since the inception of the committee, a number of significant changes in company operation have been effected. The committee has been particularly involved in changes having to do with personnel procedures, the company's health and welfare plan, and the like. It is interesting to note that one supervisor and two executives have been dismissed during the period of this activity. One of these dismissals was vigorously urged by rank-and-file employees who had previously felt unwilling or unable to present to management their long and serious list of objections to the supervisor's numerous inefficiencies and also to certain aspects of his personal conduct. The employees also complained of what they described as unqualified "dead wood" in management, which was a reference to two ineffective and idle executives who were eliminated within a few months after the supervisor was dismissed. The disappearance of these three men seems in itself to have done much to improve operations and atmosphere in this small company.

IV

The fourth organization has a nervous, impatient, somewhat cynical, but very shrewd and able businessman as president. Exceptional business ability on his part and that of his general manager has given the company a brilliant business history. Something of the temperament of the president, however, may be guessed by the fact that quite a few years ago in a fit of exasperation he fired every employee in his organization. Within a few days he had hired everyone back at an increased salary.

This man took an almost deriding attitude toward the idea of experimenting with employee participation in management thinking. He stated that most of his employees were too stupid and too lazy to have anything to contribute but complaints. The general manager, who is a man of almost completely opposite temperament, persuaded the president to let him try some limited experiments in this area and pointed out that a group of extremely successful salesmen who were under his own personal direction were already operating on this basis without the president's having been made aware of it. The general manager indicated that the outstanding competitive success of the salesmen might be due to the effective way in which they planned and studied problems as a group, with the general manager's service as a moderator.

Meetings have been held subsequently with groups of employees from areas where operational difficulties have been experienced. In each case, the results have been to locate accurately the sources of difficulties and to develop recommended solutions to problems. There has been concrete evidence of morale improvement where these problem-centered groups have been free to operate. One result of the meetings has been a series of requests by employees for more on and off the job

training. This has resulted in a variety of activities which have ranged from home study blueprint reading courses to an improved program of sales meetings with branch managers and their employees, and trips to the Los Angeles area by employee groups to visit factories from which the company buys some of its component parts and materials.

Conclusions

It is doubtless clear that in none of these four cases was any very scientific or formalized program undertaken. In no instance was work in these companies primarily done on a research basis, and when the attempt was made to use more research-minded methods, and to contrast control groups with experimental groups, complete resistance was met. Nevertheless, I believe that these informal approaches at giving employees an increased opportunity "to share in the task of thinking" have been of some interest. There is evidence in each company that participation has improved motivation, performance, labor turnover, and other factors of importance to management. It is significant that in all cases but one the company has essentially continued to operate along more or less usual lines. The implication seems to be clear that considerable participation by rank-and-file employees in management decisions can go hand in hand with more or less autocratic management. It also seems clear that attempts to move very rapidly toward more democratic management usually result in some later backsliding. However, in none of these cases was there complete regression back to old methods. (Contrast with this the example of complete regression reported by William F. Whyte in the Hovey and Beard case in *Money and Motivation.*)

Another conclusion is that employees are realistic and do not necessarily expect millennial results when a management decides to venture into more cooperative and participative methods. (However, there is always the possibility that management may build up expectations which cannot or do not materialize and which conceivably would be upsetting to morale.) In substance, it seems nevertheless to be true that even modest and sporadic increases in the use of participative methods have some positive effects on production, profits, and the willing and interested cooperation of the human beings employed in the companies involved. Perhaps the future will give us more complete and convincing evidence, as more companies, large and small, embark on deliberate programs of rank-and-file involvement in the processes of management.

Employee motivation through high wages, superior benefit programs, company recreation activities, and the blurbs of conventional downward communication has certainly not proved rewarding. Conventional profit-sharing, deferred or immediate, has an uncertain history. The separation of planning from doing can continue to exist unchanged in large companies and small, no matter how good the "personnel" program, and no matter how many supervisors are told to give employees "a sense of" participation. Perhaps the only avenue toward better business results is that of giving the doers more real planning to do. The ultimate concern of the ethical business firm in this case would be consistent with the concern of those who are thinking about people, not business. Industrial society need not reduce human beings to "a dust heap of individuals without links to one another." The man who is genuinely involved in the problems of his job has at least one link with his society, outside his own family, and it is a link which can grow in strength and size.

Anticipating the Government's Role in the American Economy

NEIL H. JACOBY
Dean, Graduate School of Business Administration, University of California, Los Angeles

The future role of the federal government in the American economy depends on two factors: the dominant political complexion of the government (i.e., Republican or Democratic) and the economic situation arising to which the government will react.

Effect of the Political Complexion

The political complexion is probably not as important in economic policy as it was a few years ago. The passage of the Employment Act of 1946, as a bipartisan measure, indicates that Republicans and Democrats are closer together in economic philosophy than formerly. There are, however, some differences which would show up distinctly in the event of a recession. The Republicans would probably emphasize expansion of

private expenditures through tax reduction and other programs providing incentives to private spending. The Democrats most likely would favor expansion of public expenditures. Either party, however, is committed to, and would be expected to, maintain prosperity.

What Are the Prospects for Sustained Prosperity?

As described in my recent book, *Can Prosperity Be Sustained?*, the prospects are good because of the "economic break-through" achieved in the past decade. Events since World War II have led to new economic potentials and to changes in legislation and policy which have made far more stability in the economic scene. Maintaining this new stability will require much attention by the government *and* by the people.

There is evidence now of more intelligent public understanding of economic affairs. For example, the nation is facing a federal budget surplus this year, yet there is no responsible talk of a tax cut. People are beginning to believe in the idea of budget surpluses being used to prevent price inflation in time of prosperity. This rejuvenated thinking takes the place of the "balanced budget" concept, and reflects a growth in economic literacy of the public. A second example is the acceptance of flexible money policies and extensive credit controls.

The Elements of the "Economic Break-through" of 1940–1955

Expansion of Research and Development

The largest single contributing element to the economic break-through is the growth and expansion of research and development. In 1940, one billion dollars went into this area; in 1955, five and one-half billion. The pace of industrial technology is not only high but is accelerating, forcing emphasis on plant and equipment purchases. Business plans for 1956 call for expenditures as high as thirty-five billion in a year when sales of consumer durable goods are tapering off. This new idea of emphasis on research and development will continue into the future. In fact, with successes multiplying, the future suggests even greater increases.

Income Explosion

The recent decade has seen not only a lifted level of income but also a wider diffusion of higher incomes. Half of all United States families now have annual disposable incomes of more than $4,000. Only one-fifth reached this level in 1940—in dollars of today's purchasing power. This $4,000 figure is a point at which bare subsistence is passed, and plans can be made for more extensive spending. Consumer debt has risen, *but* consumer assets have increased to a greater extent.

World-wide Drive to Industrialization

Since World War II the industrialization rate in other parts of the world has been greater than our own. South America shows a rate of growth in industrial production of 5.5 per cent per year. Western Europe shows 5 per cent, while the United States rate is 4 per cent.

In the twenties and thirties, the United States was trying to move ahead in a stagnant world. Today the whole world is moving—creating newer markets, broader trade, and increasing foreign investment. All these help to accelerate our own progress.

Economic Competition with the USSR

This is an important and much overlooked development of the past few years. It will cause Americans to foster greater participation in our own system—expansion and improvement of the free market economy. Our manufacturing growth was the greatest in the world in the twenties and thirties. The USSR's growth is now outstripping us. In the last ten years it is estimated that Soviet manufacturing production increased 12 per cent per annum against about 8 per cent for the United States. The USSR has lagged considerably, however, in increasing standards of living and will be forced to pay more attention to housing and to its people in general.

The Soviets are planning to provide economic and—even more important—technical aid to other countries. They have recognized that what the people of the world want is not goods but know-how. Technical assistance is necessary to win support from the rest of the world, and I believe the United States will go further in the future with its programs of technical aid.

A Better-educated Business Management

Education has played an important part in the post-war economic trends and will continue to play an important role. United States industry is more and more being led by professionally educated managers. This newer crop of executives is making better plans based on insights into governmental policy, economic conditions, and world affairs. The long-range planning these managers are evolving is based on sound reasoning, and as such gives greater stability to the economy.

These developments give us optimism that the government will not be faced with the extreme pressures of the thirties. Mild recessions, such as that of 1953–1954, are to be expected. They can be met head-on and reduced by governmental easing of credit and reduc-

tion of taxes (as was done in 1953–1954). Other controls operate virtually independent of direct action. These are the built-in controls like the income tax which dampens impending recessions in periods of boom by limiting excess buying power. Agricultural policies also contain built-in dampers forestalling recessional periods.

Seven Keystones for a High-incentive Economy in the Future

We can look forward to a good economy—an economy which *accentuates planning* and which is based on these foundations:

1. An economy which provides a strong floor of individual and family security.
2. An economy which provides an adequate and growing stock of public assets (highways, education, etc.).
3. An economy following flexible money policies.
4. One which provides a tax system promoting growth.
5. One which fosters vigorous competition.
6. An economy which stimulates business investments.
7. An economy which fosters broader international trade and investment.

The Months Ahead

The nation's economy has been at a high level for several months. In fact, the April monthly income was the highest of all time. There are some cross currents, however. Automobile production and home building have lagged. There may be some letdown this summer, but the high rate of spending on equipment and machinery and on industrial, commercial, and municipal construction will prevent recession this year, and may produce a new record.

The prospects are generally good for the coming year. I expect the Federal Reserve to ease credit, thereby stimulating investment. I expect the President will ask for a cut in taxes. I expect defense spending to rise and highway building to increase. These things tend to show that if there is a decrease in our economy it will be shallow and quickly surmounted.

Progress in Public Personnel Research

JOSEPH W. HAWTHORNE
General Manager,
Los Angeles City Civil Service Commission

Before getting into the subject which has been assigned to me, I should like to spend a little time in discussing the nature of research, some more time in discussing the nature and limitations of researchers, some more on the difficulties of research techniques and on areas in need of research, and then, if there is any time left, which I doubt, a little time on the assigned topic.

What Is Research?

I am sure that it is quite unnecessary to remind this group of the frequency with which the word "research" is misused. Searching through libraries to find what someone else has said about a subject is not research. In spite of the frequency with which we hear of "files being researched," such a process is definitely not "research," although finding the object being researched may be said to be a miracle. Even though my own university granted a graduate degree on the basis of a thesis on how to wash dishes, I am extremely dubious that that is real research. Real research is making something known that has previously been unknown. It answers questions to which no one previously knew the answers. One more criterion of real research is that it must answer a question correctly. Many a piece of alleged research cannot stand up when tested by further research. When it is finally proved conclusively that somebody "way back when" answered a question wrong, the original piece of work, however carefully performed, was obviously not research.

I recall that one time two doctoral candidates in mathematics both undertook a piece of research on the same question. One arrived at one result and the other had a conflicting result. One had done a piece of research and the other hadn't, and the entire faculty of that and related departments had to get into the act to determine which was which, and which candidate was entitled to his doctorate.

All too often, a piece of alleged research is published and, because of the reputation of the researcher or the popularity of his conclusions, is accepted as fact. The researcher who conclusively disproves such findings has done research. The false concluder has not.

The Nature of Researchers

It is a most unfortunate fact that research must be performed by the human organism. No other organism existing, of which we are aware at the present time, not even an electronic computer, seems to have what it takes. So let us take a brief look at the human organism.

Without detracting in any way from the spark of divinity, which I firmly believe to exist in all of us, there is much of us that has only recently emerged from the primeval. Speaking geologically, or even biologically, man has existed but for a brief instant. Only a few eons ago, the green scum which formed on the hot pools of the cooling earth spilled over into the seas and eventually crept onto the land. Anatomically, physiologically, and psychologically we are shackled by these origins, much as we hate to admit it, and much as we rationalize or repress these origins. If you do not believe this, ask the next ten people you talk to why we swing our arms, and I will almost guarantee that you will get ten answers, none of which will point out that the swinging arms are in the same motion as the forelegs on which we once walked.

Ask the next ten people you meet what is the most motile or the most sensitive part of the body, and most will say, "The fingers," not wishing to admit that, as in other animals, the tip of the tongue is far more sensitive than the tip of the fingers, and that the muscles of the mouth are much more motile than the fingers. If you don't believe this, compare the time that it takes to extract the seeds from a grape, first with the mouth and then with the fingers, or test that which feels smooth to the fingers, but rough to the tongue. Only recently, in biologic time, have we removed our paws from the ground, and only still more recently have we been able to oppose our thumbs to our fingers so that we can manipulate objects, and thereby increase our knowledge of them.

Limited Reception of Stimuli

Knowledge is acquired by accumulating and storing experiences which we obtain from the physical world around us through our sense organs, visual, auditory, olfactory, gustatory, and about two dozen others. How well are we equipped to do that? We know, for example, that sound waves exist in the physical world, ranging in frequency from zero to approaching infinity, whereas most of us can apprehend only approximately from 30 to about 17,000 vibrations per second. Furthermore, to differentiate between two sounds, one has to be approximately one-tenth greater in intensity than the other before we can perceive a difference. Light waves exist in the physical world, wave lengths in the ultraviolet, running down to an infinitesimal fraction of a millimeter, and up and up through the infrared and beyond, to waves in excess of 25,000 meters. We are capable, however, of perceiving wave lengths only from approximately .0004 to .0008 centimeters, and of perceiving differences in light intensity only when two lights differ by at least 1 per cent. Similarly, all of our other senses are crude mechanisms which apprehend rather vaguely a limited part of the world around us, and it is most difficult to determine what forces there are in the universe for which we have no sense organs at all.

Giving Meaning to Stimuli

The fact that we are able to sense very little of our environment, and that we sense that little inaccurately and, I might add, with wide variability, depending on a host of conditions within and around us, is only the beginning of our difficulties in trying to acquire knowledge. Every purely sensory experience is given a meaning called a "percept." We sense a visual stimulus of a certain shape; we perceive a chair; we sense a sound; we perceive a word. The meanings attached to the many stimuli which we are receiving uninterruptedly throughout our existence, derive not from the stimuli themselves, but from us as individuals. The meanings of given stimuli vary widely from one individual to another, and vary with dozens of conditions affecting us as individuals. Any sensory object may have many different meanings attached to it while the mind is struggling to produce something acceptable. We have all experienced sensing an object in the distance as we approach it in an automobile. It may have several meanings attached to it before one fits. Furthermore, the same stimulus will evoke a wide variety of meanings in the same individual, depending on many variables. Dim sounds may mean rattling dishes to a hungry man, a running stream to a thirsty man, and whispering words of endearment to one otherwise satiated. Meanings of the same stimulus vary with our past experience; for example, lines on a spectograph mean one thing to the layman and something entirely different to a physicist. Foreign policy or farm policy means one thing to a Republican and something entirely different to a Democrat.

Another difficulty with humans as researchers is that, of necessity, experiences acquired must be retained and recalled. Here again, the imperfection of the human organism shows up. Although it is possible, as some psychologists seem to think, it is probable that not all sensory experience is retained in memory. Certainly, that which is retained is not all subject to recall, and all of that which is subject to recall is not recognized

as having been what we sensed in the first place. Here again, we have many variables entering in to determine what can be recalled and recognized. Most of what is recalled depends upon what we wish to recall, and those things which are unpleasant to us tend to be rejected and buried in the limbo of the unconscious.

Interference of Emotions

One more pattern of organismic behavior causing difficulty in research is that in addition to our sensory-perceptual-conceptual system, we have a vestigial function left over with little or no apparent use, known as emotion, which, by the definition I choose to use here, is the awareness of a visceral disturbance, minor or gross, accompanying a stimulus. In fear or anger, for example, a whole host of bodily functions are activated, all of which tend to suppress rational cortical activity and to bring into play bodily functions of a more primitive sort which had survival value in our biological progenitors.

Thus, the quickening pulse, the more rapid circulation, the sudden release of blood sugar, the tendency of the blood to clot quicker, the increased oxygen intake, and other physiological reactions which comprise the emotion of anger, all serve to aid the organism to survive a violent physical encounter. All of this would probably have nothing to do with research except that the human organism has a habit of attaching these emotional states, to a lesser degree, to other stimuli than our natural enemies—for example, systems of ideas, concepts, and the like—and that the reasoning process tends to be short-circuited. The sight of a cat arouses anger in a dog without the necessity of any cortical process. To the extent that we attach emotions to ideas, the same is true in our thinking.

For example, I once knew of a person, the head of a department in one of the so-called exact sciences, who had worked out a theory of the scheme of things in his field and was so emotionally attached to his theory that anything counter to it short-circuited the cerebrum and went immediately to the viscera. Any piece of research yielding results counter to the theory was immediately doomed, and honest candidates for the doctorate in that department, whose research results failed to support the theory, had to go elsewhere for degrees.

Other Limitations of Researchers

A further difficulty of unknown seriousness is in the limitation of our experiences. No concepts can be formed, no ideas can be conceived, which are not based on our experiences. The oldest among us have lived but a jiffy in biologic time. Our immediate environment, that is, the earth on which we live, has existed only for an instant in astronomical time. In fact, some of the light emanating from distant galaxies prior to the creation of our world has not yet reached us. With so little experience of so little of the universe, how can we know, how can we even imagine, what forces are at work to shape our ends?

One other interesting limitation I should like to mention. It has been fairly well established that most of our thinking, that is, taking known bits of experience, associating them, and drawing logical conclusions therefrom, probably takes place in the higher cortical centers of the brain, probably the frontal lobes. And yet large sections of the human brain can be removed and thrown away, and the patients seem to get along without much difficulty—in fact, in many instances, exhibit improved behavior. Many observations lead to the conclusion that the best of us use but a small portion of that thinking apparatus which has been provided for us. Nor is this phenomenon unusual in nature. Frequently, there appears in the biological series a structure or a function which apparently has no immediate use. The brain casing of the frog, for example, is much larger than necessary to encase the relatively small brain which the frog possesses. One might almost conclude that nature is looking forward to the time when such a casing will be necessary. It could well be that she is again looking forward to the time when the millions of cells comprising the human brain will be more completely used.

Problems in Personnel Research

Now, for a big look at our own field, that of personnel research, which must, of necessity, be conducted on personnel—and nothing we know of is more difficult or complicated. One of the prime difficulties is pointed out by Herrick in his "Brains of Rats and Men," when he states that whereas there are 10 to 56th power atoms in the world, and 10 to 66th power atoms in the universe as we know it, the number of possible pathways which an impulse can take through a human brain is 10 to the 2,273,000th power, a figure impossible for us to conceive, much less to count.

Another difficulty is in the lack of research methods. Take a typical research problem, such as the effect of rest periods on production. About the only method of attack is to set up a control group and a test group, without rest periods, and if the difference is three times the sigma of the difference, we are very apt to conclude that the effect of the rest period is to increase production. I should like to reminisce a bit on this procedure.

I once had a colleague, an ardent ratrunner, who let me have the upper 10 per cent and the lower 10 per

cent of his rats which had been tested on an examination consisting of learning to find food at the end of a complicated maze. I had hoped to find some chemical differences in the brains of the bright versus the stupid rats. I found, to my amazement, that the lecithin or fatty tissue content of the lower 10 per cent was greater than that of the upper 10 per cent and, applying the usual statistical procedure, found that the dumb rats were "fat heads." The difference was nine times the sigma of the difference, well beyond statistical certainty. A second experiment gave the same statistically certain difference, but with one slight variation: this time the results were reversed.

This suggested another line of inquiry. My colleague would each year set up various test conditions, running a control group against the test group, and if one differed from the other by three times the sigma of the difference, the inference was drawn that the differences were due to the test conditions. Those conclusions may or may not have been true. All that I could get through my sense organs was that when I took 500 rats, which had been accumulated as controls, and divided them at random into groups comparable in size to the test groups, there were as many significant differences found as were found to be due to the test conditions.

This experiment was later repeated with a large group of human subjects, all of whom had taken the same civil service examination; and, again, when they were divided at random into groups of from ten to one hundred, an appreciable number of statistically significant differences were found when, as far as could be seen, no differences other than chance differences existed. All this is by way of attempting to prove the obvious, namely, that only by repeating and repeating, and by further repetition, by the researcher himself and by other researchers, with uniform results, can we begin to suspect that there may be a remote possibility of drawing some sort of conclusion.

Important Contributions of the Past

In spite of difficulties with ourselves as researchers, difficulties with ourselves as subjects for research, and difficulties with available techniques, what has been done in a relatively short time is awesomely impressive. I should like to list a few of the outstanding contributions that seem to me to have a direct bearing on our work. Let me stick my neck way out on the chopping block, a normal position for personnel people, and list the ten most important contributions to our field. Some may shock you. If so, it was not entirely unintended.

1. First, in point of time, I believe should be mentioned the brilliant piece of research by an Austrian monk, named Mendel, who discovered some time prior to 1884 that certain unit characteristics of sweet peas were inherited and transmitted in accordance with fixed and immutable laws. Although the work went unnoticed for better than half a century, and has been attacked even in modern times and banned in Communist countries, where it runs counter to their philosophy, his conclusions still stand.

2. Second place, although I am not presuming to rank these in their order of importance, goes to Sir Francis Galton, who demonstrated rather conclusively that mental unit characters in man were also inherited and transmitted by exactly the same fixed and immutable laws formulated by Mendel. In proving this with his study of twins, he invented a tool, the correlation coefficient, without which we would have very little in the measurement of man.

3. Third in this series I place the work of Charles Darwin, who in his *Origin of Species* formulated the principle of natural selection, the law of the survival of the fittest. Stated another way, competition or struggle for survival is biologically necessary if the species is to improve or even survive. To me, never in the history of the science of man has there ever been a more important piece of work, nor one which is more completely ignored today. Most governments on either side of the Iron Curtain are blithely proceeding at accelerated speeds on the assumption that the struggle is unnecessary—that the Great White Father should and will provide for all things, security from the cradle to the grave. If honest officials say in unguarded moments that "bird dogs who struggle for their own food are to be preferred to lap dogs who howl for it," or "a basic condition of liberty is that it is a privilege to suffer as well as to prosper," they are damned for making a booboo rather than praised for stating a biological law.

Education proceeds on the assumption of "learning readiness," that no struggle is necessary to learn, but that learning will be acquired naturally when the child is ready for it. Even medicine, while recognizing for the most part the truth of the principle, is forced by its ethical standards to enter into the struggle on the side of the unfit and to preserve them until such time as they can reproduce their kind. Industry apparently goes right along with the trend. The work of our own personnel people seems almost entirely devoted to upsetting the principle that the struggle is a biological necessity and to providing a company welfare state for the worker.

4. Fourth is the development of psychophysical methods. I believe the work of Weber and Fechner deserves a place in the first ten, not for what they were trying to accomplish, but for the techniques they developed

incidentally. The method of equal appearing intervals and the method of paired comparisons added by Thurstone have not yet begun fully to be exploited in personnel work, although Ned Hay has cleverly used the method of JND in salary work, and service ratings have been determined by the method of paired comparisons.

5. The fifth contribution, in my opinion, was that of Cattell and certain of his contemporaries who established the fact that differences in the many and various physiological measurements in vogue at the time were not errors in measurement, but real differences in individuals; that in any measurable human trait there are wide differences from one person to another.

6. Of outstanding importance was the contribution of Binet, who devised for the first time a technique of measuring individual differences in the purely mental field and started the whole field of mental testing.

7. Certainly among the first ten rates the development of factor analysis by Spearman, Thurstone, Holzinger, and others, which techniques led to the conclusion that there are certain, as yet undetermined, elements or unit characteristics of mentality. Further research may well answer the question as to what elements are needed, and in what amounts, for various occupations.

8. In their work on the unconscious, whatever opinions we may have of Freud and other psychoanalysts, it seems obvious that they have conclusively demonstrated that consciousness is a relatively small focal point compared to the vast realm of the unconscious, and that human behavior is not fully to be understood until more is known of those hidden depths. I nominate this work for the eighth place, again insisting that this is not in order of importance.

9. In the development of psycho-chemico-therapeutics, a number of years ago it was discovered that some of the worst cases of schizophrenia, suffering from complete withdrawal from reality, could be brought back to a short period of normalcy by the inhalation of carbon dioxide, indicating a clear relationship between the purely chemical and the mental. Since then, a whole field has opened up, especially with the discovery of chorpromozine and the other tranquilizers. We now not only have chemicals that calm us down, but chemicals that will induce excitement, make us tell the truth, reduce the feelings of fatigue, stimulate our imaginations and mental processes generally; chemicals that will make a mother rat nurse her young in normal fashion or, when withheld, make her abandon them completely, and a host of others. Their possibilities in the future in the personnel field are beyond the wildest imagination. Think of the impact on the labor market, as well as the consumer market, if chemo-therapy could empty the jails and mental hospitals.

10. My first nine nominations, excepting Mendel and Darwin, have been researches on the genus homo. I do not think this list would be proper without a mention of the beginning of some research on jobs, the work of man independent of the man, a new science, perhaps, maybe "nom-erg-ology," the science of the work of man. The accolade for this, I think, must go to Shartle and those with him who worked out job families and produced the first dictionary of occupations. Just what physical and mental abilities are essential to the superior performance of each of the jobs in the dictionary offers plenty of research opportunity for years to come.

These are my ten. I have mentioned no one who has pioneered in research in leadership or supervision, or those principles of organization most satisfying to the worker. Had I done so, another place should be created for the researcher who has done most to get the worker to accept his responsibilities to work willingly and efficiently, regardless of the depth of the sugar coating of his supervision or the type of his organization. But so far as I know, no such researcher exists. Indeed, if he turned up, he would probably be read out of meeting. And I cannot nominate the former without giving the latter a chance. I have not mentioned group interviews, patterned interviews, recent techniques in service ratings attitude measurement. But I believe that I have given you ten outstanding contributions to our work, that although some may seem somewhat remote, the absence of any one would leave a huge gap in the things we should know about the people with whom we work.

Legal Influences on Personnel Management and Industrial Relations

EDGAR A. JONES, JR.
Assistant Professor of Law,
UCLA Law School

I find it encouraging that a group of practical men, concerned daily with the unending round of industrial problems involving people in their relations with each other, should take two days from their work to participate in a conference designed to bring them up to date on research developments in personnel management. Of course, this is a true indicator of how really practical you are. One of our most prominent judges once observed that the pre-eminent lesson of his lifetime has been that the most practical thing in the world is theory. Theory is usually the produce of research rather than happenstance observation. This is because, functionally, research is *thought applied specifically to the uncovering or solution of explicitly formulated problems, whether drawn from real life directly or hypothetically.* No matter what field of knowledge (or suspected knowledge) it explores, research is a continuing effort to understand the human situation and its environment more fully, which is to say, more fruitfully.

Of course, you don't need to wear a white jacket and be surrounded like Alec Guinness by weird glass extrusions and foul smells in order to do research. A measure of uninterrupted time and a great deal of hard work seems to be the universal formula whether the researcher is concerned with drosophilia flies and their offspring, or the impact of law upon industrial relations and of industrial relations upon law.

Labor law is a field of study, *and practice,* which is unique in one particular respect. The law professor who teaches labor law immediately finds that most of his students are dedicated souls who long ago chose up sides and are strongly propelled toward each facet of labor law by preconceptions of varying degrees of intensity—and density. Emotional involvement, whether for labor or for management interests, is perhaps the greatest obstacle to understanding and, thus, progress which can be encountered in this field. A lawyer—I could as accurately say, an industrial relations director—who can see only his client's side of a labor dispute is ill equipped to represent and advise his client intelligently. He sees just half the picture, he's only half informed, and his client is getting only fifty cents' worth of advice and representation for his dollar. Having a semi-informed lawyer represent a client in this important and delicate area of human and economic relationships is not unlike allowing a medical student to operate on a patient. It simply is irresponsible. And yet, instances of this kind of irresponsibility are hardly isolated on the industrial scene. I'm sure that each of us in this room could detail specific cases.

A lawyer, or an industrial relations director, who does not understand the motivations and the sensitivities of the persons with whom his client is involved is deficient in two respects. He cannot serve his client with complete tactical effectiveness any more than a general whose mind is incapable of grasping the psychology of his enemy can plan effective battle strategy. I hasten to add, however, that fair and effective representation in labor relations does *not* necessarily involve a cold war attitude of suspicion and maneuvering for advantage. This brings us to the second deficiency of our ill-informed lawyer or industrial relations director. He hampers, if he does not cripple, his client in achieving the all-important goal of harmonious relations built on a mutual understanding of the common goals of fruitful productivity and personal realization. In the pursuit of these, the interests of labor and management are united, whether or not it be realized by the individuals involved. Students of labor relations constantly, and rightly, emphasize the fundamental and unique fact of the continuing relationship of the employer and his employees. There is no Reno in labor relations. Divorce is impossible. The relationship can be severed only by the death of the enterprise. Yet it cannot continue in good health, and it will not realize its potentials, if its members war against each other.

We have learned enough about the psychology of human personality to know that much of the strife and tension that afflicts humanity, within a nation and among nations, is the result of failures to understand, or to try to understand, the motivations of others. Please note that I have just said, understand motivations. I did not say, accept goals as valid and desirable. But even though understanding does not entail acceptance, it does typically result in tolerance. Mutual tolerance, based on a realistic awareness and respect concerning existing pressures and motivations, is precisely what labor and management greatly need today. Even as I say that, however, you must be thinking, as am I, that there has been substantial progress in that direction

in the nation and in Southern California. Although local labor relations are still hampered by the echoes of past conflicts, it is undeniable that great and healthy progress has been made in Southern California toward sensible, self-interested live-and-let-live labor relations based on mutual understanding and trust. The hangovers of earlier days of distrust and violence are indeed readily observable, but they just mean that the fastest growing industrial area in America also has the opportunity to become the fastest maturing in labor-management relationships.

Now, all this may sound quite platitudinous. But it needs saying, and repeated saying, for it is of fundamental importance. It needs saying and reflection by people who sit in your offices as well as by people who sit in mine and in union halls. I would appreciate your bearing in mind this afternoon that I carry no brief for either labor or management. I strive, with no guaranty of other than effort, to be an impartial but interested and sympathetic observer. To that utterly self-serving declaration, let me also add that, while I am sure that each of you individually is eminently objective in considering these problems, we have to be mindful of all the other fellows in this room that we've got to be concerned about.

Since we couldn't possibly hope in one afternoon to get into the myriad ways in which law and industrial relations interact, even if I talked in Esperanto, what I propose to do is to examine with you just a few basic problem areas which are and will remain of continuing significance and concern no matter which way the political scales may happen to tilt in Washington, Sacramento, and Los Angeles.

Professor Jones then discussed the following issues:

The Basic Goals

A. Freedom of individual and group expression, development, and partisanship
B. Equality of economic opportunity
C. Friction-reducing cooperation
D. Flexibility of administration

The Basic Concepts

A. Competition vs. Regulation
Report, Attorney General's Committee (1955), Chapters VI and VII.

B. Materialism vs. Personalism
Orwell, *Animal Farm* (1946).

C. Democratic Procedures vs. Unilateral Control
1. *Black v. Cutter Laboratories,* 4 Cal. 2d 788, 278 P.2d 905 (1955), affirmed by U.S. Sup. Ct., June, 1956.
2. Matter of Arbitration Between Douglas Aircraft *and* IAM 1578, 23 L.A. 645 (1954).
3. *UE Local 506 v. General Electric Co.,* 127 F. Supp. 934 (D.C. 1954), 231 F.2d 259 (C.A., D.C., March, 1956).
4. *Richfield Oil Corp. v. NLRB,* 110 NLRB No. 54, enforced, 29 Lab. Cas. #69,690 (C.A., D.C., 1956), cert. denied, 350 U.S. — (1956). See Reilly, *A Return to Legislative Intent,* 43 Geo. L.J. 372 at 402 (1955); Jones, *The Problems of Size in Antitrust Thinking: Theories in Search of Facts,* 3 UCLA L. Rev. 141 at 164 et seq. (1956).

D. Management Prerogative
1. Matter of Arbitration Between Weber Aircraft Corp. *and* IAM 727, 24 L.A. 821 (1955).
2. Jones, op. cit. supra.

E. The Nature of the Collective Bargaining Agreement
1. Matter of Arbitration Between Shell Oil Co. *and* OCAW (CIO), 24 L.A. 748 (1955).
2. *Association of Westinghouse Employees v. Westinghouse Electric Corp.,* 210 F.2d 623 (C.A. 3, 1954), affirmed, 348 U.S. 437 (1955), rehearing denied, 349 U.S. 925 (1955).
3. *NLRB v. Lion Oil Co.,* 221 F.2d 231 (C.A. 8, 1955), cert. granted, 350 U.S. 986 (1956).
4. *Mastro Plastics Corp. v. NLRB,* 350 U.S. 270 (1956).

Judicial Attitudes

A. *Godchaux Sugars, Inc. v. Chaisson,* — La. —, 27 Lab. Cas. #68,912 (1955).

B. *Capital Service, Inc. v. Bakery Drivers,* 29 LRRM 2666 (Cal. Super. Ct., 1952).

C. Jones, *Picketing and Coercion: A Jurisprudence of Epithets,* 39 Va. L. Rev. 1023 (1953).

The Problems of Freedom of Action and Expression

A. The Employer
1. *Truck Drivers Local 449 v. NLRB,* 231 F.2d 110 (C.A. 2, 1956).
2. *NLRB v. F. W. Woolworth Co.,* 214 F.2d 78 (C.A. 6, 1954).
3. *NLRB v. American Tube Bending Co.,* 134 F.2d 993 (C.A. 2, 1943); 205 F.2d 45 (1953); Hearings, *Taft-Hartley Revisions,* Part 5, 83d Cong., 1st Sess. (1953) at 2599.

B. The Worker
1. *Railway Employees v. Hanson,* — U.S. — (May 21, 1956), reversing, 160 Neb. 669, 71 N.W.2d 526 (1955).

2. *NLRB v. General Drivers, Local 968*, 225 F.2d 205 (C.A. 5, 1955), cert. denied, — U.S. — (1955).
3. *NLRB v. B.M.O.C. Local 459*, 228 F.2d 533 (C.A. 2, 1955), cert. applied for 3–23–56.
4. *IBT Local 695 v. Vogt, Inc.*, — Wis. —, 71 N.W.2d 359 (1955), reversing court below, 74 N.W.2d 749 (1956), on rehearing, withdrawing opinion and mandate previously entered, and affirming court below. See also, Jones, *The Right to Picket*, 102 U. of Pa. L. Rev. 995 (1954); Jones, *Picketing and the Communication of Ideas*, 2 UCLA L. Rev. 212 (1955).
5. *NLRB v. Seamprufe, Inc.*, 222 F.2d 858 (C.A. 10, 1955), affirmed, — U.S. — (1956).

Personnel Management's Future in Perspective

GILBERT BRIGHOUSE
Professor of Psychology,
Occidental College

I understand that when the committee planning this function was deliberating on what to do with the last hour, they felt they had a difficult personnel problem—two difficulties really. The first one was to find somebody bright enough to do the job of summing up the conference, yet dumb enough to accept the assignment. A second difficulty was that with concurrent sessions he must somehow or other split himself between two rooms. I would like to congratulate your committee, Bob, on having found the only schizophrenic imbecile in Southern California.

I might say that Bob was nice enough to make arrangements for two men to take notes on the sessions, and to fill me in. I would especially like to thank Don Wolfhope and Jack Zenger, both here at UCLA, for doing this. Another person who helped unofficially was Skeet Avery of the Southern California Edison Company.

First, as I have listened to many of you at coffee breaks and as I look at my own feelings, this has been a great experience for all of us. We have had a tremendous amount of stimulation, and the whole conduct of the conference has been comfortable and pleasant for each of us. The ideas that have been given to us have covered a wide range and have had a real impact on a great many people here.

The Challenges to Personnel Management

The whole theme has been one of challenge to each of us. This challenge has taken a good many forms.

An Expanding Economy

We have the point which Dale Yoder made yesterday morning and which has been implicit in several other papers since: that productivity is going to continue and will increase; that the labor market will become, not absolutely smaller, but relatively smaller in terms of the demands of production. We have the estimates in this book (*The Next Fifteen Years*) that per capita income will go up; there will be tremendous demands for new housing, for new products. Every chart in here has a curve going up toward the right. We have the reassurances by Neil Jacoby this noon that as far as he as an economist can see, it looks as though the future is a reasonably comfortable one for us. I was delighted to hear him because I have had to suffer through a great many lectures by economists in my time and he was really the first one I ever heard who talked so I could understand him. It was a lucid and logical presentation. Each of these men seemed to say that there will be increased demand and increased productivity. This obviously means increased work for all people in industrial relations.

Going along with this, as a further challenge posed by automation, Ralph Canter pointed out that automation is not something new which has just been born, but it is a movement which has been accelerated by recent discoveries in electronics. It is a method of proceeding which poses some strains upon employees if it comes rapidly, as it does in some companies, and which therefore inevitably has a challenge for everybody in industrial relations—most especially for the training director. We have the challenge that many people will have to learn new skills as a plant becomes automatized; the problems imposed by transfers to new jobs; the problems of communication so that everybody understands what is going on; and problems of marketing which will need to be solved. Automation then simply adds one more big area of challenge to the already challenging tasks of the IR men.

Research Problems

We have had a repeated challenge on research. Yesterday morning Dale Yoder urged that we all do research and that we don't hesitate to publish even though it may be just a small study. In fact, he made it sound wonderfully easy as he talked about it, and many of us felt we should go right out and do some—which would be a very fine idea. However, since then we have had some other voices which have suggested that it's not quite as easy as it looks before one starts. If Ed Ghiselli were here he would say that research is "peachy grand," but he pointed out that one of the big difficulties whch we always face in research is that of the criteria. If we are going to try to measure the effectiveness of a selection program, we have to ask "selection for what?" For most companies it is extremely difficult to nail down exactly what it is when we say that here is a successful person or here is an employee who is not successful. What are the real things that mark off the one who succeeds from the one who fails?

A further complication Ed pointed out is that even if we can nail down the criteria at a given time these darn things change (it's like putting a nail through a bowl of Jello). They are always in flux. The man who is a highly successful industrial engineer by the standards of 1956 might not be as successful by the standards of 1958.

Joe Hawthorne also pointed out some difficulties that we have in doing research: the imperfections of our sensory and perceptive apparatus, so that we see, hear, sense only a very small part of the stimulation around us; the imperfections of memory which tend to make us remember selectively. Darwin made a point of writing down negative evidence immediately, because he had discovered that his memory was such that he could remember easily all of the evidence which supported his theories and would tend to forget those things which went against them. So he had to write them down at once.

We had some further difficulties pointed out by Lee Stockford when he suggested that a couple of studies which had been conducted at Lockheed had some holes in them. He cited the glycol study (to try and find out whether or not spraying glycol in a plant would reduce the frequency of colds and infections) and the vitamin investigation. Although some felt that these studies were conclusive and definitive, further analysis demonstrated that wish and suggestion tended to enter in and negate any conclusive results. It is very difficult indeed to do research in these relative, intangible human relations fields.

I have a friend at Occidental who had further proof of some of these difficulties. He is a political scientist. At Berkeley some years ago he was asked to be one of the volunteers in some investigations which were being carried on there by some psychologists. They wanted to repeat and amplify some of the work of the OSS in personnel appraisal. The volunteers spent a couple of days going through tests and being observed in a variety of situations. One of the situations required that a small group within a short time limit had to agree on the ten greatest men of the twentieth century. The group in which my friend Kroeber, a social scientist, found himself was composed almost entirely of physical scientists (chemists, physicists, mathematicians). As soon as they got the assignment they began tossing out names—Einstein, Thompson, Fleming, etc. Kroeber said: "Wait a minute what are our criteria?" They retorted: "Everyone knows Einstein is great," and added more names. Every few minutes he tried to intrude the idea that we have to have some measuring stick to decide who is great, but without success. The following week a friend of Kroeber's was a guinea pig in this same experience. On this occasion the entire group was made up of social scientists—economists, political scientists, sociologists, etc. Apparently on that occassion they began immediately to wrestle with the problem of criteria—they spent their entire period and never got around to deciding on names. So our professional hobbies tend to make us do one or the other: either get eagerly into the act or spend so much time deciding what to do that we never get around to it.

We had from Lee Stockford this morning a number of cogent suggestions on ways in which we can get around some of the difficulties and do some research. First he classified research in industrial relations into three broad categories: pure research, where there is no immediate economic motive involved—where the aim is knowledge for the sake of knowledge; basic research, where you have a purpose but it is still a relatively broad one; and applied research, where you try to tackle some relatively small and well-defined problem. He also classified the types of research into the logical, the historical, the case study method, the survey, the statistical approach, and the experiment. Most scientists, of course, have some predilection for the last, but inevitably experimentation is difficult, time-consuming, and very expensive. There has been hardly any of it in industry. We have had many surveys and case studies and a great many statistical studies, but very few people have had either the energy or the resources to carry on a true experiment.

Then Lee outlined some of the steps that are involved in definition of the problem, in isolation of the variables, and in the actual study itself. Finally he discussed

the method of reporting, because here of course is what will determine whether or not there will be a chance for further research. He emphasized the necessity for clear persuasive reporting in order to gain acceptance of research by management.

We have had papers which pin-pointed the problems of research as they apply to selection and to other activities of people in IR. This morning Ed Ghiselli gave a somewhat guarded endorsement of psychological tests. He summarized by saying that something like a 10 to 20 per cent gain in selection accuracy can be achieved through the judicious use of tests. He gave a good many warnings about the ways in which we can go wrong: one by introducing tests just for the sake of testing; another by using tests when we don't have a selection problem but where the difficulty lies more in recruiting; another in the use of tests which are not themselves defensible as such. Ed took a dim view of personality and projective tests and pointed out that there is very little conclusive evidence on personality test validation in industry and that little is disappointingly low.

Ed went on to suggest that the weighted application blank has considerable value. One of the values is that the Industrial Relations Department itself can conduct this study. We can take whatever criteria of success are available and find which of the application blank items make differentiations between the successful and the unsuccessful. I gathered from his discussion that the most important criteria are anatomical ones. He was describing how in the selection of secretaries and typists the psychological factors may carry less weight than facial appearance and other attributes. He gave some endorsement to intelligence tests and to the interview, the latter not because it is accurate (as a means of prediction it is tragically inaccurate in most studies) but rather because it does give a valuable point of contact.

We have had some discussion of research in labor relations. Orme Phelps feels that here too we have a tragic lack of definitive knowledge; there has been much too little research. He pointed out the contributions of the arbitrators and their capacity to set precedents which can later influence the work of industrial relations people, and the efforts of the arbitrators to codify a set of laws and regulations which will serve to set up standards for the future. He pointed out that the union has a potent influence not only on the plant which is unionized but on everybody else in the community, including nonunionized shops. Then he discussed his joint management theory: that when one has a union contract one already has joint management. He suggested three kinds of relationship between management and union: One would be management by separation, much like the separation in the federal government between the judiciary, the executive, and the legislative branches. Another would be joint management by division, as in the division between federal and state governments. The third would be consultative joint management in which the two try to work together.

Another area of application has been in wage and salary research. Milford Alway's discussion of some of the implications here included: the profile method for making surveys of wages and salaries for technical engineering people; the conference method, which has a good many advantages; and, most widely used, the mail survey of wages and salaries. He raised questions about the adequacy of the sample—do we really take populations which are representative of the total population? And questions as to the adequacy of the definition. The industrial engineer in Plant A may do very different things from the industrial engineer in Plant B. He also made the very intriguing point that if a plant says, "We want to pay wages which are close to the community average," this has the effect of raising wages all around, because by definition half the people will be below the average and those plants may feel they have to raise things up. Therefore the average goes up and there is a continual scramble to keep things going. (We might notice parenthetically that we get a similar kind of spiral with the fringe benefit program.) There was also mention of the influence in Southern California of the airframe industry which inevitably sets standards which influence other industries.

Another challenge was for research in the general field of employee opinion. Bob Gray described some of the methods by which opinions, attitudes, and morale can be surveyed—the interview and the questionnaire. He suggested some of the ways in which we can set up a questionnaire that will sample the kinds of information we want to get. He cautioned against sampling opinions in any areas where management doesn't want to do anything. If the management doesn't intend to paint the men's restroom, it's better not to raise questions about it. He suggested the importance of clear communications. He will not undertake a survey unless management agrees to make a complete and factual report of the findings to all employees. He pin-pointed and underlined the necessity of very clear communications in this field, and illustrated these by some neat examples.

This afternoon, from Edgar Jones, we have had a presentation of some of the legal complications in the work of people in industrial relations: the significance of such history-making decisions as that in the Rich-

field stock plan; and the point that increasingly in recent years public policy and public opinion seem to be making a difference to the courts. A hundred years ago a court might render a decision and say in effect, "The public be damned." Now, courts and boards of arbitration seem to have an ear tuned to how people are feeling. Therefore, here particularly it follows that the public relations activities of people in personnel can carry a great impact.

Creative Imagination

Another area where we have been challenged is in the whole field of invention and creative imagination. Very few of us ever come anywhere near our full potential. Harrison Gough and Ed Glaser gave us two pictures which were mutually complementary. The climate: how does this enter in? The climate first of the plant as a whole, and then of the session where people are trying to think up improved methods. The role of intelligence—a desirable attribute but certainly far from sufficient. The inquiring attitude. Perseverance. Remember the famous quotation from Edison: "Inventiveness is ten parts inspiration and ninety parts perspiration." The role of flexibility of mind. Harrison put some things on the board to tease us and showed that we have to adopt a flexible point of view. A few minutes before, Bob Tannenbaum had given us an even more dramatic example of flexibility when on the spur of the moment he was ready to come up and give his talk when Harrison's plane was late. Harrison bothered me with a little jingle which goes:

"Come, waiter, fill this —— —— ——
Until the —— runs over.
Today we —— upon this ——,
Tomorrow —— to Dover."

For those of you who were in the other session at that time, one has to fill in each blank with a four-letter word which has the same letters in each of the blank spaces. If any of you get the answer, please tell me.

Harrison suggested that esthetic sensitivity is a requisite for creativity. Some solutions are more "elegant," more esthetically satisfying, than others. Finally, there is the sense of destiny in that the creative individual, even though he may be using his imagination upon a relatively minute part of the work, still has a sense of fulfillment, a feeling that he is tackling something here which will carry on and will exert its impact upon the future.

Ed Glaser gave us a picture of the way in which a brainstorming session can operate. He described two essential stages: one of complete freedom to express ideas no matter how goofy they may seem to be—freedom from any criticism at all; and second, the evaluative session in which one tries to see whether or not any of these ideas will come through and how the best ones might be implemented. He too stressed the importance of good reporting—if an idea is not accepted, the author of the idea should know why it was not acceptable.

Education

Then we turn to the very significant area of training and the implications of research here. First of all, let's eliminate this word "training." One trains a dog or a horse. Training is essentially a coercive operation where we do something to somebody else. At least for this afternoon let's use the word "education," the provision of opportunities for learning. Late yesterday afternoon, we had a challenging paper by Bob Tannenbaum describing some of the work which he and Irving Weschler have been doing in sensitivity education. One of the goals of this work is to help each individual in the group to gain further empathy, an understanding of other people and an ability to put himself into the shoes of the other one. There was a story about a gentleman who sent his son to Dartmouth. When the boy came home at the end of the year second in his class, the father just raised hell with him. "What do you mean by wasting my money and all this time going there and only being second; you've got to do better than that," he said. In the sophomore year the boy really piled on the effort and emerged top in the class. When he brought this grade report home his father looked at it and said, "Top in the class, huh; Dartmouth can't be a very good school!"

We might translate this incident into many industrial situations. I know of an estimator who has felt that he had an experience not unlike this young student's. In a manufacturing company, they were about to make twenty rather complicated items on a special order. He came up with the estimate that they would cost $50,000 each. The first one unfortunately ran about $60,000. He was called in by his boss and given a real chewing because he had gone so far under in his estimates. But as the shop began to gain experience in these things, they got the price down and the last two or three came out at only $40,000. Now he was called in again and bawled out because he had overestimated. Like this boy he felt that his boss did not have much empathy. Sensitivity gives us some understanding of what the point of view of somebody else might be.

Bob described the second goal as the gaining of insight—understanding of oneself. One perhaps can't separate these two because we do know that it is diffi-

cult to have much empathy unless one has some degree of understanding of oneself and acceptance of oneself. The two go hand in hand. His third goal is the development of emotional maturity—that rather vague but highly significant quality that all of us would like to have, the ability perhaps to be integrated, grown up, well adjusted, to take the rough and tumble scramble of everyday life. Some recent studies have shown that this is a prime factor in executive success. Those who have this quality of emotional maturity seem to be the ones who make it. Bob also gave us a very interesting discussion of the conditions affecting the way in which such sessions take place. How much time should be taken? How long should the sessions last? How should they be spaced? Should the members be all on the same level? Or should you have a vertical arrangement? Or a diagonal one? What methods should be used—lecture or lecturette, discussion, case study, role playing, and so on?

The Assets of Personnel Management

I want to come back in a few moments to this study of Bob's. But first let's turn our attention to the assets which personnel and training people possess with which to meet these challenges. The papers we've heard have material which falls logically into three general areas: the challenges, the assets, and then the implications for what will actually occur. Among the assets, a good many nice things have been said here: Neil Jacoby's picture of the generally reassuring economic situation; Dale Yoder's story of how things have changed in the relationship of the personnel man to the rest of the outfit. He mentioned how just a few years ago personnel was tucked in some old shed way across the other side of the yard. Nowadays it's more likely to have nice offices and other comfortable symbols of status. We have the statement by Dale that personnel people generally are making more money today. He said the average figure for personnel directors in 1948 was $8,000 and that today it is $11,000. I did hear some mutterings to the effect that many people don't reach the average, but at least the overall statistical picture looks somewhat encouraging. He mentioned the greater budgets for industrial relations.

Another asset is the approach to professional status of the personnel man. Dale suggested two or three criteria of the profession yesterday; one was the matter of attitude and another would be working more with the head than with the hands. I would like to suggest several other criteria here. One is that we don't have a profession until there is a social need. Society has to have a necessity for the services of a profession before we can have a profession. We don't need to argue that we already have a social need for personnel and training work. Second, there is the criterion of specialized knowledge. The papers we have heard in these two days tell us that there is already a large body of specialized information. Third (and here we are not so well off) is the power to regulate the selection and training of people going into personnel. This is not yet codified but certainly in an informal way many training directors and personnel directors are using influence to build up both the preparation and selective procedures. Another criterion that marks a profession is that it is differentiated into subspecies or subspecialties. Obviously personnel work meets this criterion. The next one is that there is a system of ethics generally recognized by members of the profession. Here we are certainly on the way—this too lacks codification. There is no Hippocratic oath for personnel people but a great many men and women in the field certainly try to abide by some personal set of ethics. Then, a last criterion, people in professions can influence legislatures. I don't know how much influence personnel people exert here. Some other professions, notably medicine and education, are very successful in exerting leverage upon a legislature. Personnel will eventually have to come toward that too.

The greater degree of professionalization and status of the personnel man is reflected in a good many ways. One is in the fact that we find among personnel people today less tendency to blame somebody else than was true fifteen years ago. There is a story of the psychiatrist who looked up to see a man coming into his office wearing two fried eggs on top of his head and a rasher of bacon over each ear. The psychiatrist asked, "You wanted to see me?" and the man said, "Yes, it's about my brother." At times we have tended to say: "This human relations stuff is all right, but don't give it to me. Give it to my boss; he's the one who needs it." Fifteen years ago a good many personnel people were very much concerned with getting the boss to change. "If he would only understand the personnel point of view." Nowadays we are more secure, we don't worry as much, and we fortunately are developing not only professional personnel people but also professional managers. The development of real talent among executives is one of the things, of course, that is helping personnel.

A further example of the assets we have is the picture which Joe Hawthorne gave us this afternoon of the long and honorable history of personnel. In fact he drew up a Hall of Fame. He suggested ten individuals or movements which have been significant in giving a background of precedent: the work of Mendel and the understanding of the laws of inheritance;

Francis Galton and individual differences; Darwin and the understanding of the struggle for survival. I gather Joe is not too happy about those who would like to have everything as easy as possible. Next the work of Weber and Fechner in the development of psychophysical methods. Then Cattell and Binet and the measurement of individual differences. Factor analysis, particularly the work of Spearman, Thurstone, and Holzinger—work that has given many new slants on the ways in which primary abilities of human beings are interrelated. Then Freud. I thought perhaps there was a slightly grudging note to Joe's presentation there, but Freud and his many followers have given us some understanding of unconscious motivations. Then the work in chemotherapeutics—Miltown would be a famous example. I happened to be in the drugstore last night and my druggist told me he sells more Miltown than anything else in the store (but not all of it to personnel men). Finally, the work of Carroll Shartle in job descriptions and leadership. Then Joe left a space open for us to fill in as we see best. So there are the many assets which we have: the long history, increasing status, increasing recognition as a profession, better relations with management, and the generally good economy. With these we should be able to meet the challenge.

Implications for the Future

Bob asked if I would take a look into the future. My crystal ball is just as cloudy as everybody else's so I trust that you will take the discursions that follow with a large grain of salt. I would make a guess that we shall have less emphasis in personnel upon techniques, and more upon broader understanding. I know all of us have seen examples where a given personnel technique works wonderfully in Plant A and is a miserable failure in Plant B. A suggestion system is a fine idea for X and a poor idea for Y. Individual wage incentives are liked by some people and despised by others. We could go down the line with practically any technique and find that it has tremendous variations in its acceptability. But if we look at the broader principles, including the "climate" and the social psychological relationships in the plant, we can get away from techniques and get nearer to genuine understanding. Here particularly I would like to applaud Frances Torbert's fascinating presentation of what happened in the small plant where the president got a "bee in his bonnet" from reading Nunn's book and in a great big hurry tried to adopt many of Nunn's precepts of management. Frances pointed out that the sudden change had its unhappy reverberations. However, in the long run (Frances is too modest to say this) due to her guidance in the company, the general vigor and enlightenment of the president, and the climate as a whole, they came through this period of turmoil into a good understanding later.

Here we have an example of a somewhat more cosmic approach to personnel than the emphasis on minutiae that we have had too often. In this same general cosmic area, in an effort to look at the more significant and more subtle aspects of personnel work, we would need to refer again to Bob Tannenbaum's paper yesterday afternoon. Here too, the emphasis is not upon a "canned" method of doing something, not upon any one technique but rather upon gaining broad understanding.

This brings us to some really knotty problems. Perhaps the knottiest of all in this field was raised in the discussion after Bob's paper. What are the ethical problems involved? Bob suggested that what we are trying to do in sensitivity sessions is to help the individual gain more empathy and insight and maturity in his emotional life. But whose standards shall we judge by? This is a tricky question which faces psychiatrists, psychoanalysts, and clinical psychologists as well as training directors and personnel people. I remember some years ago a student who was very anxious to go into music and seemed to have some talent for music. His father, a successful businessman, demanded that he come into the company so that he could eventually take it over when his father retired. The knotty question for the faculty counselor here was: Should our aim be to let this boy express himself and his hunger for music or should it be to help him adjust himself to the demands of reality in the shape of his father?

We have exactly the same kind of question whenever we engage in any sort of human relations education. What do we want? At lunch yesterday, Abbott Kaplan gave us some ideas about the answer to this. What we are looking for is the broadly developed, liberally educated individual. He made it clear that he wasn't in favor of throwing technical education out of the window. It was not an and/or but rather an and/and proposition. He felt that we need both the technical side and also the broad training in the social sciences and in the humanities. He cited several very encouraging examples of this: The Memphis plan, the Telephone Company plan at Pennsylvania, and to some extent the new GE University on the Hudson will have some of these features. The rather general willingness of more people in management to accept the idea of a broader education is encouraging. We might add the example of Caterpillar Tractor in Illinois, which allows its employees to subject themselves with company help

to a tremendous range of courses both in the plant and in local institutions.

Let us look at this question, "What are we educating for? How much can we do for a man whom we are trying to educate?" One interesting answer comes from a little episode in the life of Sigmund Freud. One of his associates and biographers, Theodore Reik, has described how as a young man, just joining Freud's circle, he was faced by a perplexing question. He was near his Ph.D. in Psychology. Should he work toward his M.D. or should he do what his heart desired—get married? He was in love and couldn't do both. So on a walk one afternoon with Freud he asked the Master, "Shall I marry or take up my medical education?" Freud's answer was this: "In matters of any significance nobody else can possibly advise you. Listen to your own unconscious." Freud himself couldn't know what was the right course for Reik, nor did Freud feel Reik's own conscious mind would give him the right answer. In the significant decisions of life we have to listen to the unconscious. In the light of future events apparently Reik made the right decision—he got married! He also managed to do very well in his profession.

But there are sharp limits to what we can do. Bob made the differentiation yesterday between official acceptance of an idea, conscious acceptance, and unconscious acceptance. In a course we can give people a vocabulary so they can get official acceptance and maybe intellectual acceptance on the conscious level, but whether it really gets into the blood stream and into action is a very different question. One of the most interesting personalities of the twentieth century was an Arab who was born in Lebanon and lived his last years in the United States, Kahlil Gibran. In one of the sections in his book, *The Prophet,* he deals with the relations of parents and children. This material, it seems to me, is precisely translatable into terms of the relation of personnel to line, supervisor to subordinate, etc.

And a woman who held a babe against her bosom said, Speak to us of Children.
And he said:
Your children are not your children.
They are the sons and daughters of Life's longing for itself.
They come through you but not from you,
And though they are with you yet they belong not to you.

You may give them your love but not your thoughts,
For they have their own thoughts.
You may house their bodies but not their souls,
For their souls dwell in the house of tomorrow, which you cannot visit, not even in your dreams.
You may strive to be like them, but seek not to make them like you.
For life goes not backward nor tarries with yesterday.

You are the bows from which your children as living arrows are sent forth.
The archer sees the mark upon the path of the infinite, and He bends you with His might that His arrows may go swift and far.
Let your bending in the archer's hand be for gladness;
For even as He loves the arrow that flies, so He loves also the bow that is stable.[1]

If you translate that into relationships in the company—how much can we do and how much should we do? This is the area where we shall have vigorous intellectual wrestling matches in the years to come. Do we know what a given employee or a given supervisor really needs? I must admit that I often think I do and I have friends who think they do. If only that stinker Joe would improve his human relations. If only Bob would learn to show some initiative. So we go making plans for alterations in the basic architecture of somebody else's personality. But it is difficult to do anything that is fundamental and that really makes a change. Even if we can, do we have a right to do it? I would like to suggest this as one possible way in which the answer might come. Freud, when asked what he felt to be the marks of a mature, integrated individual, answered: "To work and to love." These are criteria of real maturity. If we can, in the plant, set up conditions under which people are able to work productively and to have such satisfactions that they are also able to love (love here not in the romantic sense but in the generous altruistic sense), we are providing the best that we as people in industrial relations can do.

One other formulation of this might go like this. Every one of us has a need to be aggressive. All of us want to feel that we are autonomous, that we are making our own decisions, and that we are self-regulated. At the same time and just as potently, all of us want to feel that we are loved, that we belong, and that people accept us. We often find that these two needs are in direct conflict with each other. You could draw up a continuum with the need to be a character at one end and the need to belong to the team at the other end. We go through life making various compromises to try to satisfy both sets of needs at the same time. It is basically along this continuum from individuality to group performance that we find the satisfactions and the unhappinesses of human relations in the plant. Here's Joe who is too aggressive. He's always rubbing people the wrong way. He's bumptious. Here's Bob who is so sweet he is letting himself get twisted around by others—a weak piece of straw in the wind. We would like to have Joe be more on the team and

[1] Reprinted from *The Prophet* by Kahlil Gibran with permission of the publisher, Alfred A. Knopf, Inc. Copyright 1923 by Kahlil Gibran; renewal copyright 1951 by Administrators C.T.A. of Kahlil Gibran Estate, and Mary G. Gibran.

we would like to have Bob be more of an individualist. But we don't want either one to lose the present good qualities he has. While Joe gets on the team and comes over here, he can't afford to be less aggressive—to have less initiative. While Bob shows more individuality and self-regulation, he can't afford to lose his ability to be liked and to belong.

Essentially what we have to set up in a human relations educational program is the kind of condition under which individuals may be both individual characters, separate, distinct personalities, and at the same time members of the team in the full sense of that term. This would be an impossible task if people were fundamentally one or the other. Fortunately there is a great deal of evidence to suggest that the basic personality pattern of every one of us is a pattern of balance. Joe gets out of balance here by being too rough and Bob by being too sweet. But basically both of them are by nature potentially balanced—personalities that are separate and at the same time personalities that belong. It is this great gift that is built into each of us from the very beginning, to be eventually mature, balanced people, that perhaps gives us the clue to what we can do as personnel people. We can't say to Joe: "I'm going to make you a better team member." Nor can we say to Bob: "I'm going to make you more aggressive." But we can as supervisors and as personnel people set a climate which will allow Joe's friendliness to appear, and Bob's aggression to develop. We can have an atmosphere in which creativity—the wish to be free and the wish to belong—can all come out. I would suggest then that the most we can do is to allow people to grow up rather than trying to make them grow up.

We hark back in summary to what Dale said, "Personnel is on its way." It's growing, it's becoming a real profession, and a fine kind of an occupation. It grows because it makes provision for other people to grow too.

I would like to conclude on this note. One of the finest articles that has appeared in the whole field of management is one that came out in the *Harvard Business Review* a couple of years back on "Sky Hooks," done by a man in the Personnel Department at Standard Oil of Ohio. A very encouraging thing has been that of all the requests for reprints which the *Review* has received, this article on "Sky Hooks" was the one that was most often requested. Many people in management and personnel sensed the need for "Sky Hooks," for that ethical, meaningful side of life, and here we have tangible evidence.

This has been a wonderful experience these two days. We owe a vote of thanks to UCLA, PIRA, and ASTD for giving us some stimulation. Thank you very much.