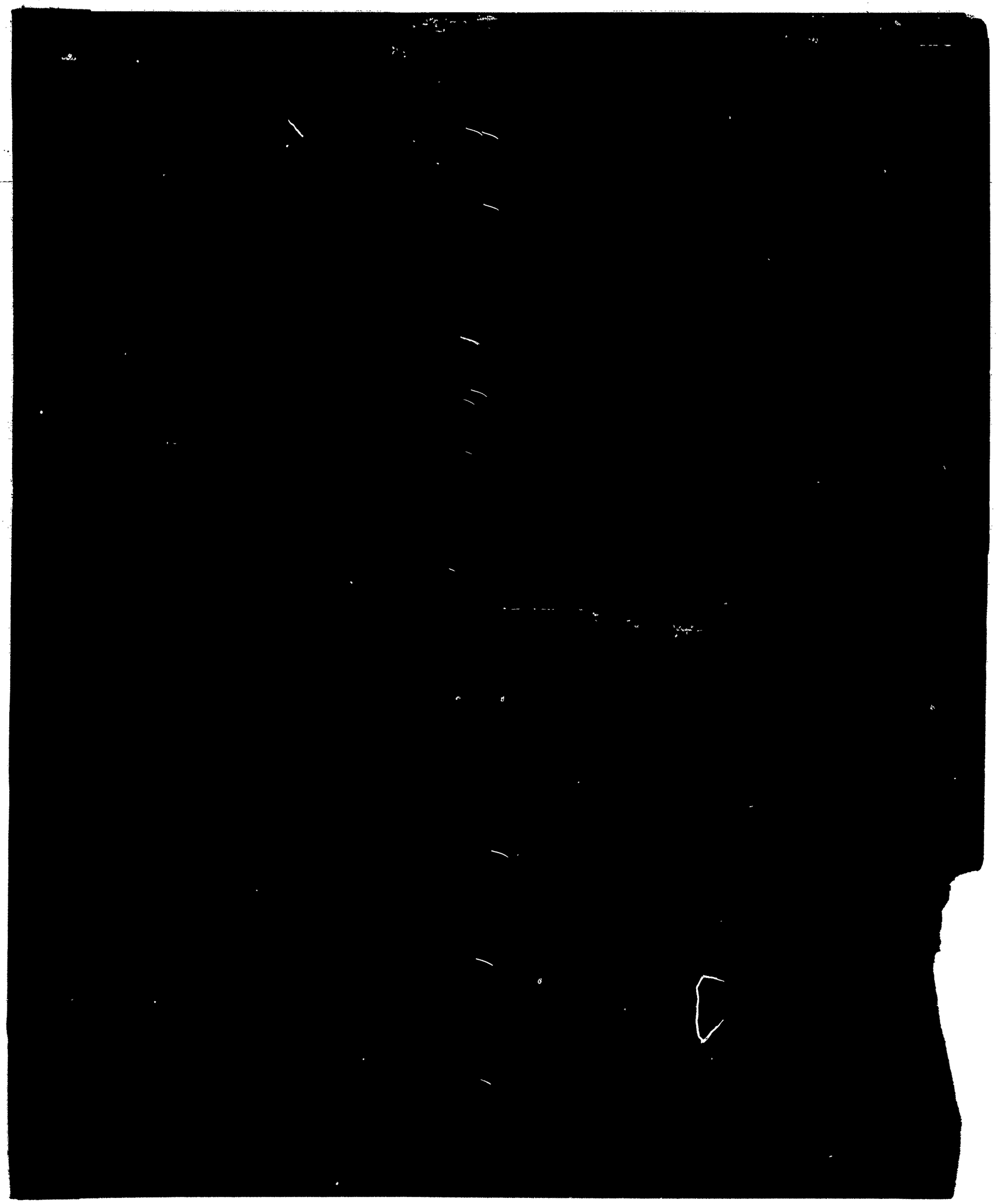

UNIVERSITY OF WISCONSIN - MILWAUKEE

RESEARCH STUDIES IN EMPLOYEE EFFECTIVENESS AND INDUSTRIAL RELATIONS

PAPERS PRESENTED AT THE ANNUAL AUTUMN CONFERENCE OF THE PERSONNEL RESEARCH FEDERATION AT NEW YORK NOVEMBER 15, 1929

Western Electric Company
INCORPORATED

CONTENTS

Test Studies in Industrial Research at Hawthorne

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A report of experiments made during the past two years of influences affecting the individuals' productivity and morale

LIKE many other industries, we have in the past endeavored to administer a personnel program through executive thought and application rather than through a strictly scientific approach to some of the problems of employee effectiveness. Feeling the need for some more accurate scientific data as a basis of further action, we have for the past two and one-half years been conducting certain test studies under laboratory conditions. What these experiments are, how they have been conducted, and what additional light they have thrown upon the field of industrial relations are the matters to which we shall give our attention in this paper.

Before we enter into a direct discussion of these experimental studies, it will perhaps be helpful if we describe briefly the setting or background of the general plant and physical conditions under which the tests were made.

Our field of observation is the Hawthorne Plant of the Western Electric Company where forty thousand men and women are engaged in manufacturing telephone apparatus and associated equipment. The plant is well located and modern in construction. Well-tried policies for personnel work in placement, training, vocational guidance, recreation, and adjustment of working conditions are in operation there. Employee relations activities include a well organized safety program; a Company-operated benefit plan, which provides pensions for employees of long service and liberal allowances for employees who become sick or injured; a savings plan; a plan enabling employees to purchase American Telephone and Telegraph stock on favorable terms; a restaurant, cafeteria, and lunch service, which supply the employees with food at cost; and the Hawthorne Club, the employee organization which provides athletic recreation and social programs, maintains a store, and at the same time operates an evening school with over three thousand students in attendance as well as a Building and Loan Association.

The management feels that employee morale in the plant is high. Shop supervision and employee relations have been and are relatively good. We have never had any serious labor problems. While we believe our personnel program has been sound and has contributed largely to the favorable conditions existing at Hawthorne, it must be recognized that such programs in every industry have been developed almost entirely on the basis of executive judgment, rather than upon the basis of actual data or facts.

This, in brief, is the background on which we have endeavored by our test studies to shed light on the subject of "humanizing industry." We do not wish to maintain that the methods used constitute an entirely new invention, or that the results obtained will furnish a panacea for all industrial ills. We do hope that we can contribute something to the progress of the science and art of human management, and that out of our efforts will come some valuable criticisms concerning the procedures which have been followed, and some constructive suggestions toward further development of studies of this type.

The origin of these studies dates back to the early part of 1927, when the Company in co-operation with the National Research Council had just finished some studies of illumination and its relationship to the productiveness of industrial workers. Obviously we cannot go into a discussion of that test here. It is enough to say that we gained from it valuable experience in the technique of conducting tests involving human behavior. We also discovered that light is only one and apparently a minor factor among many which affect output and employee reactions. It was this discovery which suggested to us the use of the experimental method in determining the various factors governing employee effectiveness. Certainly, such knowledge would be a valuable contribution to industrial efficiency and to the improvement of employee relations.

The question might be asked at this point as to why we did not conduct the studies on large groups under regular working conditions, as results obtained by this means might carry more weight than results arrived at from small scale test studies.

The answer is that we were convinced from our experiments on illumination, which were conducted in regular shop departments and on fairly large groups of people, that there were so many factors affecting the results and reaction of workers that it was hopeless to expect to evaluate the effect of any single factor in the results.

While we have not been able in the test group to test for the effect of single variables, we have been able to reduce the number of variables considerably. Such factors as amount of work ahead of the operators, changes in types of work, the introduction of inexperienced operators, and building up or reducing the force—all of which have a decided effect on the operators' morale and efficiency—have been largely eliminated in the test group.

As our first step we set aside in April, 1927, a test group for observation and experiment. So far as we

could visualize, our objective was to find the answer to such questions as the following:

1. Do employees actually get tired out?
2. Are rest pauses desirable?
3. Is a shorter working day desirable?
4. What is the attitude of employees toward their work and toward the Company?
5. What is the effect of changing the type of working equipment?
6. Why does production fall off in the afternoon?

Looking back after two and one-half years, we now realize that we did not have the real question in mind at all. Were we to add it to the list now as No. 7, it would read about as follows:

> What effect do right and wrong methods of supervision have on the operator's effectiveness and morale.

We did, however, have a distinct feeling that we were not at all sure just what we were setting out to test, but we felt that there was something to be learned from the operators if we could establish the proper relationship with them.

We may as well admit here, too, that we were so sanguine as to believe that the answers would be forthcoming in six months or a year. But instead of finding the answers and closing the books, our investigation uncovered so many other interesting problems that after two and one-half years we feel that this field for scientific research has scarcely been touched. We cite these questions here not as questions to which, in all cases, you can expect a definite answer in this paper, but rather as an indication of our starting point with its somewhat limited horizon. How we set out to find these answers and where our journey led us we shall now discuss.

Six experienced female operators were chosen at random. Their work was the assembly of telephone relays, which consisted of putting together a coil, armatures, contact springs, and insulators in a fixture and securing the parts in position by means of four machine screws. This operation can be done at the rate of about one assembly a minute. A man from the Piece Rate Setting Department was selected to supervise and observe the test.

Five of the girls were to do the actual assembly work, while the sixth was to stock and procure parts for each assembly operator. The nature of the test was carefully explained to these girls and they readily consented to take part in it, although they were very shy at the first conference. An invitation to six shop girls to come up to a superintendent's office on the top floor was naturally rather startling. They were assured that the object of the test was to determine the effect of certain changes in working conditions, such as rest periods, mid-morning lunches, and shorter working hours. They were expressly cautioned to work at a comfortable pace, and under no circumstance to try to make a race out of the test.

The test room, as seen in Figure 1, is merely a

FIG. 1. THE RELAY ASSEMBLY TEST ROOM

FIG. 2. THE DEVI

corner of a regular shop room en
The work bench and assembly ec
identical with that in the regula
for one item. At the right of ea
hole in the bench into which
deposited. This hole is the en
which there is a flapper gate
in its passage. The opening
electric circuit which controls
which records the completion

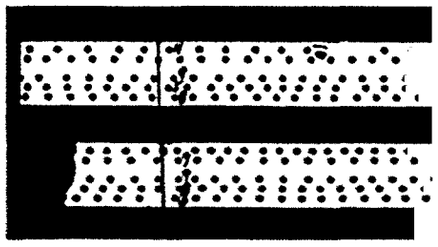

FIG. 3. THE TAPE ON

ure 2.) This
. an inch per
of holes for
en punched, a
r each instant
ure 3. Temper-
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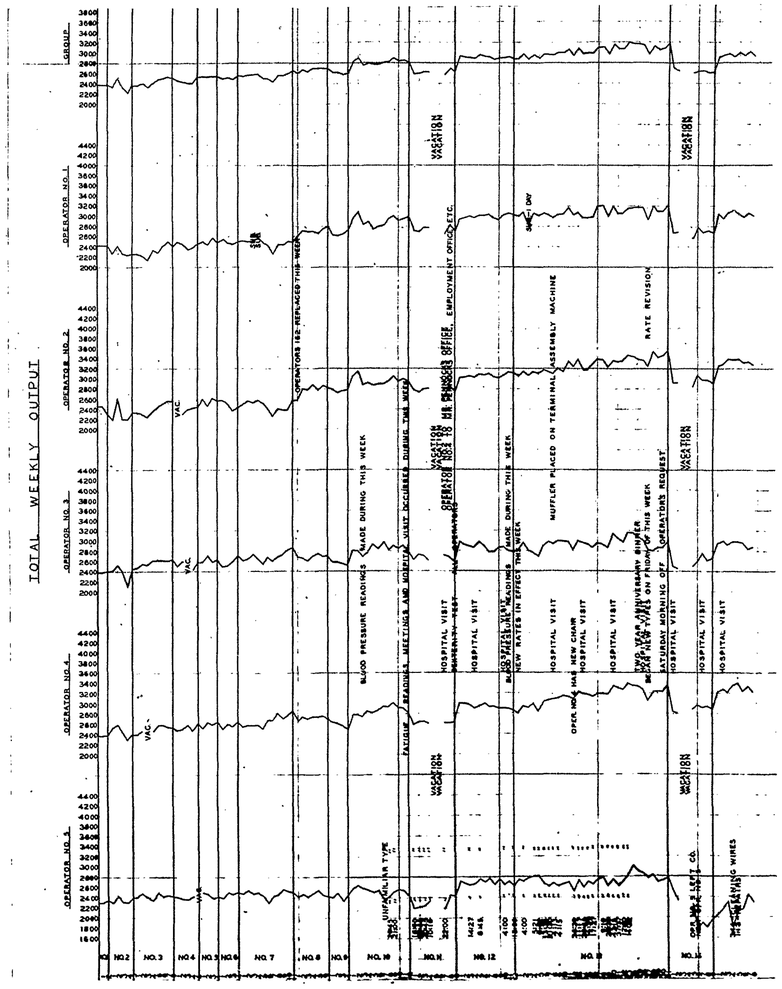

FIG. 4. THE PERFORMANCE CURVES FOR EACH OPERATOR AND FOR THE GROUP SHOWING THE WEEKLY VARIATIONS IN PRODUCTIVITY SINCE THE RELAY ASSEMBLY TEST BEGAN. PERIODS OF THE TEST ARE SEPARATED BY THE VERTICAL LINES. THE TEST CONDITIONS IN EACH PERIOD ARE SHOWN IN THE ACCOMPANYING TABLE.

SUMMARY OF TEST PERIODS

RELAY ASSEMBLY GROUP

(See Figure No. 4)

Period Number	Period Name	Dates Included	Duration	Beginning of Rest Pauses A. M.	P. M.
		1927			
1	In Regular Dept.	4-25 to 5-10	Appr. 2 wks.	None	
2	Introduction to Test Room	5-10 to 6-11	5 wks.	None	
3	Special Group Rate Introduced	6-13 to 8- 6	8 wks.	None	
4	Two 5-Min. Rests	8- 8 to 9-10	5 wks.	10:00	2:00
5	Two 10-Min. Rests	9-12 to 10- 8	4 wks.	10:00	2:00
6	Six 5-Min. Rests	10-10 to 11- 5	4 wks.	8:45, 10:00, 11:20	2:00, 3:15 4:20
7	15 Min. A. M. Lunch, 10 Min. P. M. Rest	11- 7 to 1-21-28	11 wks.	9:30	2:30
		1928			
8	Same as No. 7, Except Stop Work at 4:30	1-23 to 3-10	7 wks.	9:30	2:30
9	Same as No. 7, Except Stop Work at 4:00	3-12 to 4- 7	4 wks.	9:30	2:30
10	Same as No. 7	4- 9 to 6-30	12 wks.	9:30	2:30
11	Same as No. 7, Except Sat. A. M. off	7- 2 to 9- 1	9 wks.	9:30	2:30
12	Same as No. 3 (No Lunch or Rests)	9- 3 to 11-24	12 wks.	None	
		1929			
13	Same as No. 7, except operators furnish own lunch. Company furnishes beverages	11-26-28 to 6-29	31 wks.	9:30	2:30
14	Same as No. 11	7- 1 to 8-31	9 wks.	9:30	2:30
15	Same as No. 7, except operators furnish own lunch. Company furnishes beverages	9- 2 to present		9:30	2:30

details and procedure for setting up the tests. Since most of the data shown is in terms of production, it may be well to state that this is used purely as a measure of the combined effect of the conditions imposed. This is one of the few quantities susceptible to exact determination, and though a poor measure, seems to be about the only one available.

As a base output, a record was kept for two weeks on each test operator in her regular department and under her regular conditions (without her knowledge) before she was moved to the test room. This constituted the first or base period of the test. We now appreciate that this base period was probably too short. Following this, the girls were moved into the test room where for a period of five weeks no alterations other than the changed location were made in the conditions of work. There was no appreciable change in output following this move.

For the third period, consisting of eight weeks, the first major variation of the test was introduced. The five girls were placed on a group piece rate salary basis independent of the large group with which they were previously identified. This meant that each girl would earn an amount more nearly in proportion to her individual effort since she was paid with a group of five instead of a group of one hundred.

Following this period, the test group has been taken through twelve periods. A brief study of Figure 4 with the accompanying table will indicate the varying length of these test periods and the different test conditions introduced into each.

We made it a practice to discuss each proposed change with the group before making it. We tried to make them feel that we wanted their advice. They were told that we would tell them the results as we went along that we were putting all of our cards on the table and wanted them to be equally frank with us.

From these tests have come some startling results, startling because they were unexpected as well as because they were sometimes contrary to accepted opinion.

In the first place there was a gradual yet steady increase in production regardless, to a certain extent, of test conditions imposed. For some operators this increase has run as high as 35% to 50%. And the study has continued too long for us to attribute this increased production to the novelty of being placed under observation. The highest productivity yet reached was recorded in period 13, during which the operators had a fifteen minute rest and lunch period in the morning and a ten minute rest period in the afternoon. The lowest period of productivity was the second, which was the first one in the test room with no change from regular working conditions. However, as has been stated, the production in this period was practically the same as the base production.

Now this unexpected and continual upward trend in productivity throughout the periods, even in period number 12 when the girls were put on a full 48 hour week with no rest period or lunch, led us to seek some explanation or analysis. Observation and study suggested three possible factors which might contribute to this condition:

1. Relief from cumulative muscular fatigue.
2. Change in the pay incentive.
3. Improved psychological attitude toward the work.

That cumulative fatigue was not present is indicated by the following facts:

The weekly production curve from all test room operators over the period of the study does not show a decline in daily production during the latter days of the week which would be the probable result of cumulative fatigue. The production for Saturday and Monday is low, and that for the other four days of the week is practically the same.

Vascular skin reaction readings do not show any increase in fatigue.

The gradually rising production over a period of two years indicates the lack of cumulative muscular fatigue.

Regular physical examinations show that the health status of the girls is being satisfactorily maintained and in some cases improved. Comparative figures between the test groups and thirty-three regular operators in their old department are striking. Girls in the regular department, during a six-month interval, had about three and one-half times as many sick absences, two and one-half times as many excused absences, and three times as many other absences.

Blood condition readings taken by Prof. Mayo indicated conclusively that the physical balance of the operators was being maintained. Figure 5 charts the condition of the regular test room operators and shows a steady maintenance of organic equilibrium (or physical status), while Figure 6 charts the condition of one of the girls in the regular department and shows a fluctuating or irregular health status. It is interesting to observe that at the time this condition was noted in the readings of this operator, it was decided to see her in her regular department and suggest that she consult her doctor about her health, but the girl was absent on account sickness.

It might be interesting to observe one particular case which illustrates the effect of health on the operator's performance.

About six months after the beginning of the tests one of the operators began remarking to the other girls that she did not intend to work her head off for any one and made several other comments that were hard to reconcile with her previous attitude, which had been enthusiastic. We had several talks with her but were unable to learn the cause of the trouble. Her output was dropping while the output of the other girls was increasing, and they were beginning to criticize her for not doing her share. We then decided that it would be best to take her out of the test group and she was put back in the regular department. Shortly after this, in looking over the

medical records, we discovered that this girl had developed an anemic condition indicated by a red blood count of 3,500,000. We then had a talk with her and suggested that she take some treatment, to which she readily agreed. Her blood count came up to 4,600,000 in three weeks and she is at present in the best of health. It is now quite apparent that her physical condition accounted for her drop in output and when the other girls began to criticize her, her only defense was to talk as she did.

As to the influence of the second factor, viz.: a change in method of payment on the results, in an attempt to obtain more exact knowledge as to the magnitude of the influence we established two other test groups.

The first was another group of relay assemblers, which, you will remember, perform the same operation as that performed by the original test group. Our idea was to keep them in their department under regular supervision and with the same working conditions and change only their basis of pay. For a period of five weeks, to serve as a basis for future comparison, the production record of five girls was kept without their knowledge. They were then told that they were to be formed in a separately paid group. During the first week on this basis their average rate of output increased 13.8 per cent. About the same ratio was maintained for five weeks after which a return was made to the former pay arrangements. The operators' reaction to this was not favorable, and a tabulation of their output for seven weeks showed

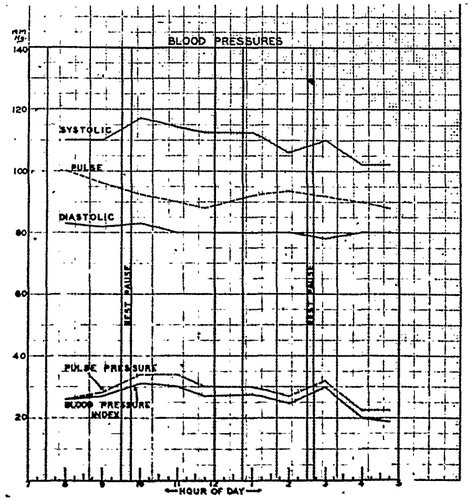

FIG. 5. BLOOD PRESSURE READING FOR ONE OF THE TEST ROOM OPERATORS. THE PULSE PRESSURE CURVE SHOWS THE DIFFERENCE BETWEEN THE SYSTOLIC AND DIASTOLIC PRESSURES. THE BLOOD PRESSURE INDEX IS A PRODUCT OF THE PULSE PRESSURE AND PULSE RATE.

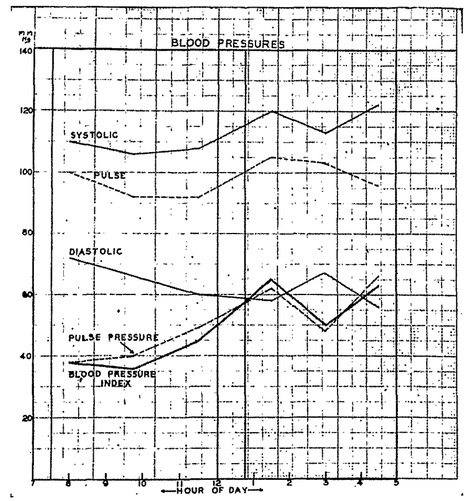

FIG. 6. BLOOD PRESSURE READINGS FOR ONE OF THE OPERATORS IN THE REGULAR DEPARTMENT.

that it ranged from 5 to 10 per cent below that of the base period.

The second group was formed with the idea of making no change in basis of pay, but to establish test conditions similar to those prevailing in the original test group. We chose five experienced mica splitters for this group. The job consists of splitting pieces of mica about 3/32 of an inch thick into sheets approximately 1/1000 of an inch thick. A needle is used to make the separation. These girls are paid on an individual piece-work basis, so no change in method of payment was necessary. A base output record was obtained by observing them in their regular department for a period of eight weeks, and they were then transferred to the test room where the conditions are the same as for the original group of relay assemblers and where they are now going through the same cycle of observation periods.

And now comes the interesting thing about this group.

From the beginning of their work under test room conditions one year ago, these operators have shown a steadily increasing production which at present is 20% above their base rate.

The first of these tests—viz., the relay assemblers set aside in the regular department—indicates increased output with increased pay incentive, but a much lower increase than shown by the regular test-group. The second test, the mica group, shows a larger increase in output with no change in pay incentive.

At this point it will be interesting to digress for

a moment to describe two extremely interesting cases in the mica group.

The first is the case of an operator forty years of age who had been somewhat of a problem for many years. She is a widow with two children. Her married life was unhappy and she had been in almost constant financial difficulties. She is a nervous type and before she was placed in the test group was frequently absent because of nervous breakdowns. Since joining the test group she has shown the most consistent gain in output of any of the operators, has gained in weight, and her absences have decreased to one-third the former rate. She is now subscribing to two of the Company's savings plans, and while as a mental case she is not cured, there has been a remarkable improvement.

The other case is that of a girl eighteen years of age, whose output has been the lowest and most erratic of any of the five operators. This girl was living at home and her mother apparently was everything that a mother should not be. The girl was forced to turn over to her mother every cent she earned and was allowed practically nothing to spend on herself. About three months ago the girl reached the limit of her endurance, left home, and is now living with a friend in a small apartment. Immediately after she had decided to make this change, her output curve smoothed out to a remarkable degree, and her total output now shows the highest percentage gain of any operator in the group. Figure 7 shows the variation in her performance both before and after the change in home conditions.

Now to resume our discussion of the main topic. We have shown that fatigue is not a governing factor in the performance of the test group, and have partially evaluated the effect of increased incentive due to change in method of pay, which leaves us convinced that the rather remarkable results we have been able to obtain with this group are due mainly to changes in their mental attitude. This we consider the major accomplishment of our entire study.

Confirming this belief there are many items of evidence. A relationship of confidence and friendliness has been established with these girls to such an extent that practically no supervision is required. In the absence of any drive or urge whatsoever they can be depended upon to do their best. They say they have no sensation of working faster now than under the previous conditions, and that their greatly increased production has been accomplished without any conscious effort on their part. Comment after comment from the girls indicates that they have been relieved of the nervous tension under which they previously worked. They have ceased to regard the

FIG. 7. THIS CHART SHOWS THE EFFECT OF HOME CONDITIONS UPON THE PERFORMANCE OF ONE OF THE OPERATORS IN THE TEST ROOM STUDIES. FOR APPROXIMATELY THIRTY-FIVE WEEKS, HER VARIATION WAS GREATER THAN THAT OF ANY OTHER OPERATOR. THEN, BECAUSE OF HER UNFAVORABLE HOME SITUATION, SHE DECIDED TO LIVE WITH ONE OF HER FRIENDS IN A SMALL APARTMENT. HER PERFORMANCE WAS IMMEDIATELY STEADIER AND HIGHER EVEN THOUGH SHE HAD NOT YET CHANGED HER RESIDENCE. FOLLOWING THIS CHANGE, AT THE END OF THE THIRTY-NINTH WEEK, HER PERFORMANCE, WHILE SLIGHTLY LOWER IN THE FORTIETH WEEK REACHED EVEN GREATER HEIGHTS.

man in charge as "a boss." Specific and individual studies which were made prove for these girls what you know about yourself—that you can work much more efficiently in a contented frame of mind than you can when your mind is in a turmoil of worry, fear, or discontent. You don't know exactly what it is that makes you produce more; neither do these girls. Yet they have a feeling that their increased production is in some way related to the distinctly freer, happier, and more pleasant working environment.

A record showing the comments of the girls, answers to many questions asked, and the closer relationship developed between operators and supervisors all show that the test room operators have consistently developed a more contented outlook on everything. As they express it themselves, they are even anxious to come to work in the morning.

A few comments of the operators might be of interest at this point. One girl after being moved into the test room said, "I liked it here from the first day. It's nice and not so crowded." Another, when the five-minute rest periods were introduced, announced in quite modern style, "Gee, that's the berries! It rests you to have five minutes like that! I hope I never see a gang boss again. We don't have to worry about getting bawled out about our rates up here." (This had reference to a practice then in vogue in her old department of checking the girls every day against a bogey.) Of the three five-minute rest periods morning and afternoon a representative comment was, "I don't like these rest periods; they break things up too much." One operator early in the test period told us that on the first day of the test she assembled thirteen thousand parts and only twelve thousand on the second day. She came in the third day expecting to be asked to explain, or as she put it, "bawled out." When this did not happen she assembled over thirteen thousand parts on the third day.

"I wish this test would last for two years," was another comment. Of the combination lunch and rest one girl had this to say: "Gee! That was swell! You feel like working now!"

The most significant comments and the ones that were the most unexpected and valuable were those concerning supervision in the old department.

It had been our feeling that the department from which these operators come, viz.: the relay assembly department, was one of our best supervised departments. The Foreman has a good personality and an interest in his employees, and we had assumed, without knowing, that his methods of dealing with people were being used by his section and group chiefs. The Foreman had also, without knowing, made the same assumption.

We were surprised to learn from the test operators that there were supervisors in the department who kept their operators in a constant state of worry and fear. One section chief got his operators into such a state of fear that some of the more timid ones actually cried if he looked at them continuously for a few minutes. Others occasionally called up to say they were sick rather than face him in the morning after a low output day.

The disclosure of such conditions in one of our departments was disconcerting, and it faced us with a serious problem to be solved. How we set about to solve it will be referred to later.

In connection with the experimental studies, the home environment and outside activities of the test room operators have been carefully studied. Thorough physical examinations have been given periodically, and a record of diet and health practices has been kept. Also pulse-rate, blood pressure, and cardio-vascular skin reaction data have been recorded at various intervals. We shall take time to enumerate here only a few interesting observations obtained from these findings:

1. The amount of sleep has a slight but significant effect upon individual performances. (See Figure 8.)
2. A distinct relationship is apparent between the emotional status or home conditions of the girls and their performance.

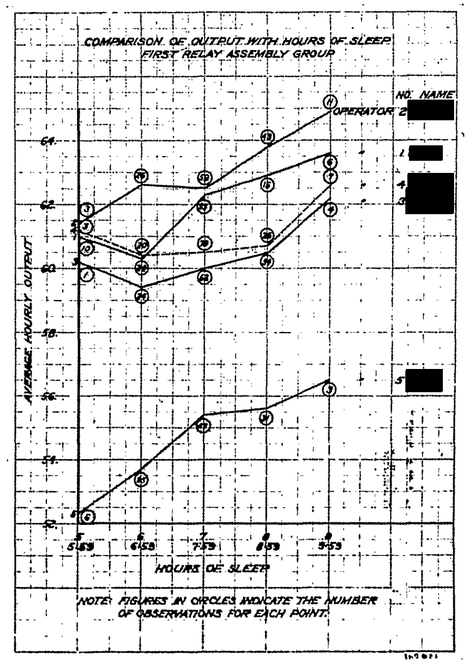

FIG. 8. EACH COLUMN IN THIS CHART SHOWS AVERAGE PERFORMANCE DURING THE DAYS IN WHICH THE PREVIOUS NIGHT'S SLEEP VARIED BETWEEN THE HOURS OF SLEEP SHOWN ON THE BASE LINE SCALE. THE FIGURES ENCLOSED IN CIRCLES SHOW THE NUMBER OF INSTANCES AVERAGED.

3. Total daily productivity is increased by rest periods, and not decreased.
4. Outside influences tend to create either a buoyant or a depressed spirit which is reflected in production.
5. The mental attitude of the operator toward the supervisor and working and home conditions is probably the biggest single factor governing the employee's efficiency.

findings and conclusions, and it would seem quite natural for you to ask this question—What practical use have you been able to make of your test results, and how do you plan to remedy the defects in supervision brought to light by the test group? The answer to this question, far too lengthy to be included here is contained in another paper entitled "A Plan for Improving Employee Relations on the Basis of Data Obtained from Employees," which will be given by Mr. Putnam.

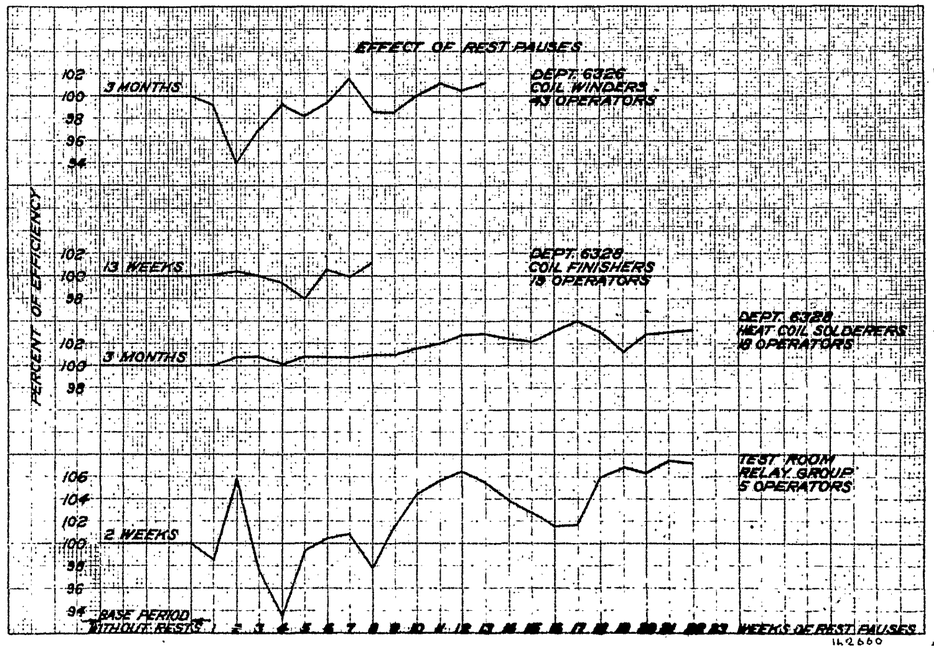

FIG. 9. TRENDS IN PRODUCTIVITY FOR SEVERAL SAMPLE GROUPS IN SHOP DEPARTMENTS HAVING REST PERIODS. THE BASE PERIOD PERFORMANCE, SHOWN AS A STRAIGHT LINE PRECEDING EACH CURVE, IS AN AVERAGE FOR THE GROUP PRIOR TO THE INTRODUCTION OF REST PERIODS.

As an illustration of the effect of home conditions, the following case is of interest: About a year ago the output of one of the best producers in the test group declined steadily for several days, and she seemed quite depressed. We got her story, which was this: She had a boy friend who was of different nationality and her mother who had been worrying over this situation for some time had recently decided that the girl had to make a change and get a beau of her own nationality. Fortunately the mother relented in a few days, and her spirits arose and her output increased to normal.

I have attempted up to this point to describe to you how the tests were conducted and some of the

Briefly stated, our findings so far and a consideration of the sensitiveness of operators to the way in which they were handled suggested to us the desirability of additional research in the field of their emotional status, mental attitudes, working conditions, and supervision. As a result we set out upon a program of interviewing all the operators in the Inspection Organization in an endeavor to secure a clear picture of their problems, worries, likes, and dislikes, as these might be related to the factors just mentioned.

In degree of importance and significance of findings, this program has already eclipsed the test studies which fostered it, and which we have been

discussing throughout this paper. The program is spreading to the other departments of the Works, and out of it has grown an entire supervisory training program based upon its findings. The continuation of our experimental studies and the administration of the interviewing and supervisory training programs have become for us a large administrative project necessitating the formation of a new organization known as the Industrial Research Division.

As another result or by-product of our experimental studies we have introduced rest periods into several of the regular operating departments. This was done to ascertain the effect on production. Up-to-date, the rest-period schedule has been extended to include approximately five thousand employees, and while all the data have not yet been compiled, the part completed shows an increase in production paralleling in some respects that of the original test group. Reference to Figure 9 will indicate the extent of this increase.

As I have indicated throughout this discussion, the original scope of our studies has become so broad and has led us into so many interesting by-paths that we ourselves have been continually amazed by and absorbed in the discoveries at each new turn in the road.

Many additional questions have suggested themselves to us since these studies were started, such as—

1. What factors contribute to the amount of defective work turned out?
2. Does the weather affect production, and if so, in what way?
3. Is there a relation between the volume of noise and the number of accidents, absences, sicknesses, and general irritability? What is the effect of music?
4. How should rest pause be utilized?
5. What would be the effects of beautifying the worker's surroundings?
6. Is overtime work worth while?
7. Is it worth while to teach employees rudiments of economics which would give them a better understanding of matters such as wage bases and labor turnover?
8. Is it desirable for employees to know the rate at which they are working? Do they limit production deliberately?
9. What are the effects of frequently changing the work of the operators from one type of equipment to another, with which they may be either familiar or relatively unfamiliar?
10. Is there a relation between nationality, mental type, amount of education, physical fitness, and the frequency of accidents?
11. Is it desirable to hold to certain ratios of nationalities within certain working groups?
12. What would be the effect of taking down the test room partitions?

While we believe that the test room method has justified itself as a sane, constructive, yet relatively inexpensive method of studying and improving employee effectiveness, we cannot hope to find, nor do we recommend, any specific formula for the cure of all industrial ailments. But if we can by such studies, or if the general field of industry can by its combined strength, find ways of bringing heart and soul, courage and contentment, life and laughter, into the lower ranks of industry, then we shall have passed many milestones upon the highway of human progress, and life for all will have become less of drudgery and more of joy.

In closing I wish to acknowledge the invaluable assistance rendered by Prof. Elton Mayo of the Harvard University Graduate School of Business Administration and Prof. Clair E. Turner of the Department of Biology and Public Health of the Massachusetts Institute of Technology.

Both of these men have been intimately connected with the study almost from its inception. Prof. Mayo has taken a keen interest in this work and also the work to be described this afternoon. We are deeply indebted to him for encouragement and valuable advice and suggestions.

Dr. Turner has advised regularly with those in charge of the experiments and all data as collected have been submitted to him for analysis. He has compiled the detailed reports, studied the literature on the subject and rendered much valuable service.

A Plan for Improving Employee Relations on the Basis of Data Obtained from Employees

By M. L. PUTNAM
Chief of Industrial Research Division, Hawthorne Works,
Western Electric Company, Inc.

New methods of training supervisors and of improving working conditions which are growing out of the investigations reported by Mr. Pennock

THE test room experiments described in the preceding paper have, in their brief existence, opened up for exploration many fields worthy of research study. In fact, the history of the original experiments is largely a story of these by-products. Development of them has, of course, been limited by facilities, time, and their prospective value. One by-product, however, seemed to demand immediate investigation and study; and it is with it that this paper is concerned.

For the present it is called " A Plan for Improving Employee Relations on the Basis of Data Obtained from Employees." In the brief course of a year it has outgrown the parent experiment and is of itself generating new by-products and an ever increasing momentum which taxes us to keep pace with its rapidly expanding perspective.

The plan at present has three aspects. First, employees are approached and asked to express themselves about the things they like and dislike relative to their job, the conditions under which they labor, and the manner in which they are supervised. Second, these comments are used as a basis for training supervisors. Third, the comments analyzed and classified by substance so that a cross section of opinion may be obtained and the causes of unfavorable remarks adjusted.

Before describing more fully these phases of the plan, let me trace briefly the course of its development as a by-product of the test room experiments.

HISTORY AND GROWTH OF THE PLAN

The records of the test room showed a continual improvement in the performance of the operators regardless of the changes made during the study. It was also noticed from the operators' conversation that there was a marked improvement in their attitude toward their work and working environment. This simultaneous improvement in attitude and effectiveness indicated that there might be a definite relationship between them. In other words, we could more logically attribute the increase in efficiency to a betterment of morale than to any of the major alterations made in the course of the experiment. We concluded that the same relationship might exist throughout the entire plant and that the best way to improve morale, which was thought to be at a comparatively high level, was through improved supervision.

At that time we were conducting, by the conference method, a course of training for supervisors in which a series of seventeen discussion subjects was used. Two of these subjects were "Morale" and "Production," which we thought of combining into a series of meetings bringing out by discussion the relationship we had found in the test room between better morale and increased production. So we asked ourselves some questions. "What is 'Morale' anyway?" "What are the factors governing morale?" "What can the supervisor do to establish better morale?" "How can the Company engender better morale through improved policies?" "Just what *is* the present morale of the working force?"

To all of these questions we had to answer, "We don't know!" We had an idea as to the meaning of morale; we had an idea as to what factors govern morale; we had fairly definite ideas about correct supervisory technique; but we had to admit that what we had was *ideas* and not *facts*.

We realized, of course, that most of our supervisory training in the field of employee relations had been based upon theory. Up to this point, supervisors had moulded their opinions by their own experiences, and the composite opinions of a group were thought to be fairly reliable criteria for most supervisory conduct. The subject of "Morale," however, with its importance shown in the test room, and with so many conflicting ideas and opinions about it, seemed to require something more definite and factual before improvement could be made through supervisory training. Consequently, we returned to our test room experience for something to guide us.

It had been found valuable, from time to time, to get from the test room operators their opinions about the changes in conditions due to the test room studies. Their comments were usually offered voluntarily, but in some instances they were asked questions. Quite often they compared their test room conditions with their memories of regular shop conditions. They even told us about a few surprising conditions, the existence of which was not even suspected. In short, they convinced us that although we might have good employee relations policies, there was still much to be desired in their application.

Their comments increased our desire to secure something actual and definite which would make improvements in morale possible. At the same time, they gave is this clue: "Why not gather some facts by approaching employees and asking them to ex-

press their comments relative to the things they like and the things they dislike in their working environment?'

This seemed to offer possibilities, and it was decided to try it experimentally in our Inspection Organization which contained about sixteen hundred skilled and unskilled employees, with both shop and office workers represented. All of these employees were to be interviewed, so that a fair picture would be obtained of the things people in various types of work like and dislike.

Considerable planning was done before the employees were approached. The project was new to us and different from anything which had been tried previously in the Company, and it seemed to have its dangers. Possibilities of unfavorable consequences were numerous. Some of the men whose counsel was sought were skeptical. Careful plans were prepared, however, and the work was undertaken along lines which may be briefly described.

All the supervisors in the organization to be studied were called together and the plan was explained to them. Their criticism was invited and various points in the plan were discussed. Generally, the plan was subscribed to; only a few of the supervisors were doubtful. Five interviewers were selected from the supervisory group to secure comments from employees. Women were selected to interview women and men to interview men. The interviewers were instructed not to interview employees whom they knew, since acquaintanceship might influence the comments. All comments were to be kept confidential; names or reference numbers were not to be attached to the interviews; and any identifying statements which might reveal the employee or his location were not to be recorded. In order to avoid undue curiosity or skepticism, only a few employees from one location were interviewed on the same day.

When the employee was asked to comment, he was assured that he was invited and not ordered to express himself; for it was felt that voluntary comments would be the most reliable. These comments were recorded and filed with those of other employees in the same group so that studies of comments from employees in the same working environment might be made.

Following these general plans, the interviewing of Inspection Organization employees was started in September, 1928, and completed early in 1929.

In brief, the procedure of the interviewer was as follows:

He approached the supervisor of a group and asked for an employee to interview. An employee was designated and usually introduced to him. If the employee's place of work afforded a chance for confidential conversation, he talked with the interviewer there; if not, they moved to an appropriate location. The interviewer explained the program to the employee in some detail and asked him if he cared to express his views. As the latter talked the interviewer made rather complete notes or took his comments verbatim, depending upon the speed with which the employee formulated and expressed his thoughts. If the employee evidenced a willingness to talk, but was at a loss for something to say, the interviewer encouraged him with questions.

The plan was a success from the start. Most of the employees seemed to enjoy the opportunity to express their thoughts, and even the supervisors became enthusiastic, a few of them asking that they themselves be interviewed. That the interviews contained many illuminating thoughts is illustrated by the following interview which was the first one obtained:

"I am not satisfied with my progress because I feel my supervisor is holding me down. I have repeatedly asked for a change of jobs to higher graded work in this section and each time I have been told I am being considered.

"Frankly speaking, I feel I am so good on my present job (because I know it was formerly handled by three men) that I feel I have as good as been told they can't afford to give me other work.

"I have often been told, and there has been no doubt they let me know, that my work is very good; but at wage revision time I don't believe they do all they can for me. They explain they are trying to fix up the men who are on higher rated work.

"There are times when my boss is inclined to be a little short and crabby, but not often.

"Other than what I have stated, my supervisors deal fairly with me, and you can always talk to them.

"I find my job interesting."

This interview, which is representative of those we obtained in the early stages of the program, differs from subsequent interviews in that the latter usually contain comments on a greater variety of topics. In general, the employees spoke frankly, and their comments were just as illuminating and interesting as those in the interview cited.

We expected the interviews to yield basic material for more effective supervisory training, but we very quickly found, through several trial conferences with Inspection Organization supervisors, that the interviews themselves, without alteration, served as most excellent material. It was found that one or two employees' interviews served adequately for a two-hour supervisory training conference. Complete notes were taken of the points discussed in these meetings and conclusions were summarized and recorded for the benefit of supervisors and the staff organizations concerned.

The direct comments of employees not only stimulated a great deal of interest in these discussions, but also furnished a very practical approach to supervisory problems. At one stroke they seemed to give the supervisor a better appreciation of the full meaning of the term "supervisor"; challenged him in his own technique; supplied tips on good and bad methods; and inspired him toward self-improvement in the handling of his employees.

Following these trial conferences, meetings were so arranged that each supervisor in the branch met in conference once every two weeks with approximately fifteen fellow supervisors. Conference leaders were selected from among those who started the interviewing work and were thought to possess the necessary qualifications.

In addition to using the comments of employees for supervisory training, it was decided to analyze and study them. At first, only the unfavorable comments were sorted out and studied to see if their causes could be removed. Later, all of the comments, both favorable and unfavorable, were classified and compiled. It was thought that this classification would give a good cross section of employee morale. This list of subjects is interesting because it indicates in a general way the things which employees talk about in their interviews. Comments on supervision are analyzed separately, but usually deal with one or more of these subjects. The present list is as follows:

Absence
Advancement
Aisles
Club for Employees
Dirt
Fatigue
Floor
Furniture and Fixtures
Hospital
Hours
Interest
Light
Lockers
Material
Monotony
Noise
Payment
Placement
Restaurant
Safety and Health
Sanitation
Smoke and Fumes
Social Contact
Steady Work
Temperature
Thrift
Tools and Machines
Transportation
Vacation
Ventilation
Washroom
Welfare
Working Space

While in some respects these subjects seem to overlap, in actual practice they do not. A rather detailed definition of what is to be included in each has been made, and, while this division is somewhat arbitrary, it does give a uniform and exact classification. When a new topic is discussed by an employee, it is carefully analyzed and listed under one of these subjects, or, if necessary, a new classification is added. Thus any of the subject-files may be quickly reviewed for all the comments relating to that particular classification. We not only have the comments filed under the general headings indicated above, but we have, in addition, a file which enables us to locate complaints in specific parts of the plant.

The success of the program in the Inspection Organization indicated the desirability of extending it to other parts of the plant. Starting early in 1929, we undertook to interview employees and offer supervisory training conferences in the Operating Organization. We have now interviewed approximately ten thousand men and women operators and supervisory training is in progress for one thousand supervisors in this group.

CHANGES AND DEVELOPMENTS IN INTERVIEWING

This discussion would not be complete without an account of the changes which have been made within the plan itself during its brief existence.

One of the most important changes pertains to the method of interviewing. We started out with an untrained personnel and scarcely the rudiments of a technique. The method adopted was rather definitely patterned on existing practices. The interviewers knew something of the interviewing done by supervisors, by employment people, and by personnel men; but here was a type of interviewing about which little was known.

One might say that each interviewer was mentally equipped with a set of questions which he expected to have answered by everyone. He was cautioned not to put them to the employees in the manner of a questionnaire; but, notwithstanding, the effect was the same, because he was not satisfied until he had, through direct or roundabout methods, solicited some comment on each one. In other words, our first interviews were opinions, all right enough; but they pertained primarily to what the interviewer and not the employee thought important. The interviewer led the conversation and the employee followed.

As time went on, however, and the staff became somewhat experienced, they gave more and more attention to anomalous and quite unexpected occurences. Now and then an unusual case was found. An employee would start talking about some point suggested, but in a short time he would be away off the subject. The interviewer would adroitly lead him back to some other point, but in a few minutes he would be back to where he was before. Regardless of what the interviewer said, the employee's thoughts tended to gravitate toward one spot. That something was uppermost in his mind, and it completely overshadowed everything else.

At other times, when the interviewer was about to leave a particularly untalkative person, a casual remark about the weather or some other commonplace would start a train of thought, bringing out the person's whole story. We began wondering whether these unexpected outcroppings were just mental aberrations or whether they were indicative of a latent source of information which our interviewing technique normally failed to tap.

The net effect of our first experience was to concentrate our attention upon our method of interviewing. It seemed that there were several serious defects in the direct question method. It might be admirably adapted to getting definite answers to matter-of-fact data such as a physician requires when he is conducting an examination; but if an interviewer were to question an employee closely on a personal matter, he would probably arouse a none-of-your-business attitude and there the matter would end. This attitude may not arise if the questions are confined to objective facts; but even here great care must be exercised, especially near the beginning of the conversation. We find that direct questioning at the start tends to put a person in a "yes" and "no" frame of mind. It tends to arouse

a spirit of opposition and a feeling of being examined, which is very difficult if not impossible to overcome once it is aroused. In many cases it causes the employee to think that the interviewer wishes information on a set of questions, and he may be reluctant about deviating far for fear of irrelevance. Furthermore, the direct question elicits remarks upon topics considered important by the interviewer and the employee may never have thought of them before. In fact, it may cause discontent by suggesting that things which the employee thought to be all right are not as they should be.

However, we have not ruled out the direct question as being entirely worthless. Far from it. It may be and is used advantageously by skillful interviewers when they have gotten the person's confidence and the two are on a conversational plane.

While we were in this stage of development, Professor Mayo became interested in the program and gave us of his time and counsel. Through his suggestions and help, and through trial and experience, our present method of interviewing has been developed.

We refer to the method as the "Conversational" or "Indirect Approach." The employee, after an explanation of the program, is allowed to choose his own topic. The interviewer follows his comments in a conversational way or by silence. He takes down the employee's comments as nearly verbatim as possible. No direct attempt is made by the interviewer to suggest a topic or to change the subject before the employee has fully expressed himself. Even then, the employee is encouraged to choose any other topic which he likes. The interviewers have listened interestedly to many subjects. Religion, philosophy, home work shops, childhood experiences, and many others far removed from the working environment are topics which frequently predominate in an interview.

The conversational method seems not only to avoid the pitfalls of the direct question, but it has unique features of its own which are well worth mentioning.

In the first place, it stimulates a feeling of confidence on the part of the employee by making him feel at ease. A congenial atmosphere is created which does much toward allaying nervousness or backwardness.

A second advantage in the conversational method is that the employee benefits from what has been called an emotional release. He may give complete expression to whatever is uppermost in his mind. He has a chance to express all the joys and sorrows surrounding his working environment or even his total social situation. This value in the interviews is one which we were not aware of at the start, but since its recognition we have been better able to appreciate its importance. We are all familiar with the tendency of some people to dwell upon unpleasant thoughts, especially when they believe they have had unfair treatment. As they dwell upon these things, such unnatural or exaggerated proportions are assumed that at times this preoccupation affects and controls their thought processes. An expression of these thoughts to one's friends or one's family may give some relief; but to express them to a representative of the management, who is a sympathetic and critical listener, affords an almost complete release, which tends to bring the individual back to normal and rational thinking. This element in the plan is evidenced by the fact that the interviewers frequently get comments from employees like this: "Gee, I sure do feel better now that I've had an opportunity to get that off my chest," or; "It sure is good to be able to tell someone my troubles because I could never say those things to my boss."

A third advantage in the indirect approach to an interview is the feeling of recognition which the employee obtains. He feels that the management values the comments of his own choosing, and that he is something more than just the source of answers to questions.

Besides the development of an interviewing technique as outlined, many interesting problems and questions have presented themselves. What would be the effect of continuously interviewing a group of employees? What is the immediate effect of interviewing as measured in production? How can the merits of the program be measured by comparison of first and subsequent interviews? These and other such questions are being studied.

Since we started interviewing, unsolicited comments relative to the program have been received from employees which indicate their reception of the plan. The following are representative:

"I have heard the other operators who had been interviewed ahead of me talking about this plan of having someone come around and letting the operators tell about the way they get treated. I would never think of going up to the office with the things I've told you, because I know I would be found out and this way I know that the Company is going to find out how many people are dissatisfied and why. I have a hunch that this man I had so much to say about is getting cold feet already, because he just hates to see the operators who are not his friends get called up to be interviewed for fear that he will be talked about, and every time one of us does get called, he gives us a dirty look, as if to try and scare us."

"I think this idea of interviewing us is a mighty good thing. It should have been started years ago; you should come around often. The men do a lot of talking among themselves about what they think is right or wrong, and sometimes it gets back to the boss; then there is hell to pay. We need somebody like you to talk to about these things, so we won't have to kick to each other and get in bad by it."

"I believe the Company is doing more for the employees now than they ever did. This is the first time I ever heard of the Company sending men around to interview the help. They never took that much interest in them before."

"Say, I don't believe those interviews will do much good. They may, but that is just my idea of them. They will do with those interviews just what they do with a lot of suggestions the men turn in. It takes too long to get action on anything around here."

"I think it is mighty fine of the Company to send you fellows around to talk to us. It isn't very often that I get a chance to talk to a cultured gentleman like you."

"I feel much better since I have been talking to you. I thank you for being so kind to me. I wish you would stop and talk to me some time when you are in the department."

"The reason I told you all this is because I know the interviews are used for the supervisors' conferences and I hope they hear all I have told you."

"It is fine of the Company to send you fellows around to talk to us. I have been working here thirteen years and have seen and heard a lot. I always kept everything to myself. This is the first time in all the years I have been here that I have had a chance to tell the Company what is going on. I knew I would have the opportunity sooner or later."

"This is the first time that anyone ever interviewed the employees. It is a good idea because otherwise you would hold a grudge against your supervisor. It seems that if you tell your troubles to someone, it is easier to keep them out of your mind."

"I have noticed quite a change around here in the last three or four months. The bosses have changed their attitude. They are not so bossy as they used to be."

"It seems like since the interviewing program has been going on the bosses are co-operating with the help and mixing up with them, and I hope what I have told you will be of some help to the Company because I can see now that they are trying to get around and find out how the employees feel about things so that they can make improvements and make everybody more satisfied."

"The Foreman has changed down here within the last two months. He wouldn't listen to us or let us voice our opinions before, but now he is quite willing to listen to anything we have to say. I see him smile once in a while and this is rather unusual."

And one employee who was approached by the interviewer said, "I don't know about this interviewing, but I'll speak to my wife about it tonight and let you know in the morning."

CHANGES AND DEVELOPMENTS IN SUPERVISORY TRAINING

Since the inception of the supervisory training program in which the comments of employees were used as a basis for discussion, several modifications and changes have been made in this part of the plan. At first we used one or two complete interviews for discussion in each meeting. After ten or twelve meetings were held in this way, a very interesting result was noted. The supervisors were beginning to appreciate more fully what it meant to be a supervisor. They were beginning to find untapped sources of employee good-will, and to see how the worker felt about their supervisory methods. They were beginning to want greater knowledge and better tools than our previous supervisory training had offered in order to fit themselves into their job with its new perspective. We began to appreciate, too, the value of this enlarged supervisory picture; but we also began to see that something more than just the greater perspective was necessary.

With some studying of the situation and with the counsel of the supervisors, we changed the plan slightly. We took one topic for discussion in each conference and selected comments from several employees' interviews on that particular subject. These comments covered as many views of the subject as the interviews contained. Thus in a single conference we had various employee expressions on the subject and discussed it from the standpoint of the best supervisory practice. We are now in this phase of the program and expect it to last several years before all of the prospective subjects are covered.

We are beginning to look upon the problem of supervisory and executive training as a series of steps, in which the "rise" represents a fuller appreciation of the supervisory ideal and the "tread" represents the knowledge and technique required to adequately fit the supervisor to reach it.

It seems entirely possible that another phase of supervisory training may develop before the possibilities in the interviews are exhausted. While this phase is as yet only an idea and could not be done under our present plan, it would seem practicable at some future time to have a capable man analyze the supervisory comments coming from the employees under any one supervisor, and then discuss with the supervisor his technique and the manner in which it is received by his subordinates.

Another modification in the supervisory training program pertains to the manner in which the conferences are conducted. In the beginning the interviews to be used were studied and certain points selected for discussion. The conference leader then held the discussion to these points. At present, however, supervisors in conference are encouraged to discuss any points they wish. The conference leader, in addition to his regular duties, is expected by the group to be a source of information and data. His job is to be prepared to answer questions of fact relative to the discussion which cannot be supplied by the group members.

The following comments from supervisors are indicative of the interest and value in this form of training. While the favorable comments far outnumber the unfavorable, several of the latter are included to show the point of view of the few supervisors who are not yet completely convinced of the plan's merits.

"I wish they had started this interviewing pro-

gram when I was first made a Gang Boss as I sure am getting a lot of good out of the conferences. There are so many points brought out about supervision that I never thought of."

"I don't think I am getting very much out of the conferences so far. We had an interview last week that brought out a few arguments, but I have been waiting for some of the problems that I have had to deal with in my section. I have been fighting for one thing for a good many years and I know that the only reason that nothing has been done about it is because the Foreman has not taken it high enough. I would like to have them discuss this problem in an interview so that I could find out what some of the other fellows would do in a case of this kind."

"Gee, my supervisors sure are getting a kick out of these conferences. This morning one of the men came to me and asked if he could attend a second conference on the same subject because he enjoyed the first one so much that he felt sure he would get enough out of the second one to pay for his time."

"I really believe you are helping some of these hard-boiled Foremen and Gang Bosses. You know after they come back from a conference they start thinking it over and I believe it begins to soak in. They begin to realize what may happen in the future for your work is just new as yet."

"The training conferences are the bunk as far as I am concerned. They don't give us credit for knowing anything around here. Why, it might be all right for a new Gang Boss, but I wouldn't say it was worth the time for our old Gang Bosses. Say, do you think the employees are telling you everything—far from it. There are many things that are brought up to the Foreman that we take care of and never say anything about, but no one ever gives us credit for it."

"I like the supervisors' conferences very much. You see, I am beginning to find out lots of things I was doing before which I know now were wrong. I did not do those things because I meant to, but I guess I just never thought about them. Now that some of these things have been called to my attention in the supervisors' conferences, I am sure doing things different."

"Did you go to the last conference we had? Say, they are getting to be good. You know, I am getting a lot of help from them. I am learning to see the operator's viewpoint of things, and I really believe I am learning to do my job much better by attending these conferences."

"The conferences have not helped me one bit. The interviews that we discussed have nothing to do with my job. I would like to see what some of the fellows in my gang think about me. I would recognize an interview from my gang in a minute. They all think that I am a son-of-a-gun here and the worst crab in the department is making the most money. I would like to know how some of the other Gang Bosses would handle the bunch of crabs that I have to deal with."

"Any supervisor that says he doesn't derive any benefit from the training school conferences in my estimation isn't worthy of his classification."

PROGRESS IN ANALYZING COMMENTS

Very few changes in the method of analyzing employee comments have been made since the work was started. With the Inspection Organization comments, only those that were unfavorable were sorted out for study. Experience in studying these indicated that favorable comments should be studied simultaneously with the unfavorable if the causes of the latter were to be properly identified. This is now being done and studies are being made to determine the best methods of securing all that is valuable from the interviews.

Many improvements and adjustments of plant conditions have already been made as a result of investigations initated by this plan. The employees' comments with respect to minor changes indicate that they attach considerable importance to conditions which we hitherto thought to be of little significance. Investigation work is going forward rapidly, and as the program develops, we expect the adjustments made to improve employee relations still further.

CONCLUSIONS

We may, in conclusion, summarize the values in this plan. It must be realized, of course, that it is still in the early stages of development and as yet all the values are not definitely determinable.

First, the interviewing of employees has had very desirable effects upon the employees themselves. Those interviewed have had a chance to fully express themselves and clear their minds of burdensome thoughts. As evidence of this, supervisors have sometimes commented that such employees are easier to supervise; and employees themselves have said that they felt better after such a hearing as the interview affords. In addition, there is the probability that interviewing improves an employee's morale because he is reassured that the management wants to better his surroundings, and he feels that he is important enough to have his opinions sought.

Second, the Company receives information and data from employees which has not otherwise been received and which serves as a basis for studying employee relations and for improving plant conditions. In addition, we are getting first hand information as to the effect which all of our personal activities, such as the thrift plans, pension and sick benefit plans, athletic activities, and vacations, have upon employees. This in itself is invaluable.

Third, the very operation of the plan makes for improved supervision. Many employees have remarked that supervision improved after interviewing was begun. It seems only natural that a supervisor who knows that his employees are going to express their favorable and unfavorable thoughts will give more attention to his method of dealing with them.

Fourth, the supervisory training made possible through the comments of employees is far superior to any of our previous programs. It is most interesting to supervisors because the employee's comments are critically made and, for all the supervisor knows, he may be the subject of the employee's remarks. It has never before been possible for our employees to criticize their supervisors so freely without fear. Under this plan they may not only speak freely, but their opinions benefit their own and other supervisors as well. Most of the supervisors are enthusiastic because they see considerable value in this phase of their training. Such an indirect method of getting employees' complaints back to the supervisor is far superior in its results to the old method of direct accusation and argument.

Finally, the comments from employees have convinced us that the relationship between first line supervisors and the individual workman is of more importance in determining the attitude, morale, general happiness, and efficiency of that employee than any other single factor. We believe we have progressed further in knowledge of employee relations during the short time this plan has been in operation than in all the previous years of the Company's existence.

Change

By PROFE
Professor of Indus
of Business Admi

The broad significance o

THE two papers to which you have listene day, the description by Mr. G. A. Pe and Mr. M. L. Putnam of two years' in the works of the Western Electric Company, professed to be little more than a matter account of the course run by investigations begin with one group of questions and continue another. I think it would be a mistake for accept so modest a description of these significant events. It seems that in two re at least these inquiries are symptomatic approach of changes, perhaps long overdue, relation between industry and the community. to these two changes that I wish to call your tion for a few brief moments before the session

The first change is in the implied relation be industrial organization and biological or inquiry. We have heard much before now application of physiology or psychology to inc It has nevertheless been true, but for the exceptions, that no industry has committed to profound meditation upon the significar biological or social discoveries, or to the basi its industrial policies upon such knowledge. Inc has tended rather to look to these studies for tially trivial tricks and shifts—ingenious devic should bring an immediate recompense. Rag tatters of physiology and psychology coupled oddments of technique have been expected to increased production or diminished labour tur or some other rather obvious justification so-called experiment. Now although the Wes Electric Company, as you know, has already s many such heartening results—and one is glad o these results have never been the end or inten the inquiry; they have been secured by the way. intention of the inquiry from the beginning ha the advancement of our understanding of situations, the development of a more precis biological knowledge of what is happening in try, and the knowledge of the general conditio affect human capacity for work. As a result of this er interest, there has been a singular freedom fr blindness consequent on trivial satisfactions. time when several of the older universities sidering the development of collaborate human inquiry, the Western Electric Compa given us a clear lead.

The inquiry begins in the failure of a ca arranged and carefully controlled experiment. Pennock and his associates conclude that, physics and chemistry can proceed to experin the selection of two or three variables, investigations cannot be so conducted, exc

RESEARCH STUDIES IN
EMPLOYEE EFFECTIVENESS AND
INDUSTRIAL RELATIONS

I. Test Studies in Industrial Research at Hawthorne by Mr. G. A. Pennock.

II. A Plan for Improving Employee Relations on the Basis of Data Obtained from Employees by Mr. M. L. Putnam.

III. Changes in Industry by Professor Elton Mayo.

TEST STUDIES IN INDUSTRIAL RESEARCH AT HAWTHORNE

BY

MR. G. A. PENNOCK

I. Introduction

A. Need for accurate scientific data.

1. What may be accomplished.
2. How may this be accomplished.
3. Its value to management.

B. Background of Western Electric Company.

1. High morale in the plant due to -

a. Recreation facilities
b. Safety Program
c. Benefit Plan
d. Savings Plan
e. Evening School
f. Proper Supervision

2. Need for a new approach to the problem based on the actual data and scientific facts instead of executive knowledge.

II. Aim to Humanize Industry

A. Not to -

1. Present a panacea for all industrial ills.
2. Maintain that this plan is a new invention.

B. But to -

1. Contribute to the progress of science of human management.
2. Make suggestions toward further development of this type.

III. Early History and Progress at Hawthorne

A. The 1927 plan in cooperation with the National Research Council.
B. Value of tests first noted.
C. The realization of the value of such knowledge.

IV. The Experiment

A. Aim - To find out -

a. If employees actually get tired out.

b. If rest periods are desirable.
c. If shorter working day is desirable.
d. What is the attitude of employees toward their work and toward their company.
e. What is the effect of changing the type of working equipment.
f. Why does production fall in the afternoon.

V. What was Actually Discovered

A. The amount of sleep has a slight but significant effect upon individual performances.
B. A distinct relationship is apparent between the emotional status or home conditions of the girls in their performance.
C. Total daily productivity is increased by rest periods and not decreased.
D. Outside fluences tend to create either a buoyant or a depressed spirit which is reflected in production.
E. The mental attitude of the operator toward the supervisor in working and home conditions is probably the biggest single factor governing the employee's efficiency.

VI. Additional Questions Which Presented Themselves During the Course of this Study.

A. What factors contribute to the amount of defective work turned out?
B. Does the weather affect production and if so in what way?
C. Is there a relation between the volume of noise and the number of accidents, absences, sicknesses and general irritability. What is the effect of music?
D. How should rest pause be utilized?
E. What would be the effects of beautifying the worker's surroundings?
F. Is overtime work worth while?
G. Is it worth while to teach employees rudiments of economics which would give them a better understanding of matters such as wage bases and labor turnover.
H. Is it desirable for employees to know the rate at which they are working? Do they limit production deliberately?
I. What are the effects of frequently changing the work of the operators from one type of equipment to another with which they may be either familiar or relatively unfamiliar?

J. Is there a relation between nationality, mental type, amount of education, physical fitness and the frequency of accidents?
K. Is it desirable to hold to certain ratios of nationalities within certain working groups?
L. What would be the effect of taking down the test room partitions?

A Plan for Improving Employee Relations
on the
Basis of Data Obtained from Employees
by
Mr. M. L. Putnam

I. Introduction

A. New plan a by-product of test studies

B. Brief of new plan

1. Employees given opportunity to express themselves in regard to -

a. Their likes and dislikes in connection with their job.
b. Their working condition.
c. Their supervision.

2. The use of these comments

a. As a basis of instructing supervisors.
b. To obtain cross-section opinion.
c. To adjust causes of unfavorable remarks.

II. History and Growth of the Plan

A. New facts evaluated

1. Noted relation between attitude and output.
2. Morale may be improved by improved supervision.
3. A definite lack of ideas and facts as to -

a. How to improve morale.
b. The status of the present morale.
c. What governs morale.

B. The answer to the problem

1. In the test room -

a. Operators reveal new problems and surprising conditions.
b. An opportunity to obtain specific facts and data.

2. Through an approach to employees by means of an interview.

a. The Plan

(1.) Interviewer introduced to employee.
(2.) Program explained.
(3.) Employee asked for his views - not forced to give them.
(4.) Interviewer makes note of important items.
(5.) Numerous questions discussed, such as -

a. Advancement
b. Fatigue
c. Hours
d. Monotony
e. Pay
f. Thrift

b. Its Results

(1.) Employees enjoy opportunity to express ideas relative to their job.
(2.) Supervisors acquire new tips on techniques.
(3.) Interviews furnish material for supervisors' meetings.
(4.) Comments analyzed and classified as to favorable and unfavorable.

III. Changes and Developments in Interviewing

A. Method of Interview seen to be important.

1. In the first interviews the interviewer led the conversation with a definite set of questions in mind.

2. On the contrary in later interviews the subjects became less limited and gave way to anomalous and unexpected occurrences.

3. "Yes" and "No" and "None of your business" attitudes taken by employees may and can be avoided by careful use of a direct question.

B. The Conversational Method

1. The employee chooses his own subject and the interviewer comments or remains silent.

2. No attempt made by interviewer to change subject until employee has fully expressed himself.

3. Frequent subjects -

a. Religion
b. Philosophy
c. Childhood experiences
d. Home Work Shops

C. Advantages of such a method

1. Stimulates feeling of confidence and congeniality.

2. Permits emotional release, that is, allows the employee to get things off his chest.

3. The employee feels that he is being recognized and that his ideas are valued by management.

D. Problems and Questions Presented.

1. What would be the effect of continuously interviewing a group of employees.

2. What is the immediate effect of interviewing as measured in production.

E. Conclusion

1. Desirable effect upon employees.

2. New facts are discerned which would otherwise not have been received.

3. The very operation of the plan makes for improved supervision, in other words makes the supervisor more conscious of his job.

4. Supervisory training made possible through the comments of employees is far superior to any previous program.

5. The relationship between first line supervisors and the individual workmen is of more importance in determining the attitude, morale, etc. than any other single factor.

Changes in Industry
by
Elton Mayo

I. Change in the Implied Relation between Industrial Organization and Human Inquiry

   A. Industry has failed to see the true value of biological and social discoveries.

      1. These devices expected to yield increased production.

      2. Their true purpose to promote the advancement of our understanding of human relations.

   B. Unanticipated changes in working conditions observed in experiments.

      1. Organic changes observed through medical examination.

      2. Changes in production afford direct evidence of worker's capacity to sustain interest in work under varying conditions.

      3. Changes in mental attitude observed through frequent interviews.

   C. Fatigue in its general conception proves inadequate for factory use.

      1. Interference seen to be direct cause of fatigue.

         a. Health and personal history.
         b. Social situation in and outside plant.

      2. Interviewing seen as a key to discovering other disequalibrium or interferences.

II. Changed Conception of Human Control a Consequence of Inquiry.

   A. Differences between Western Electric Plan and any other industrial use of the interview.

      1. The identity of the person interviewed is known only to the interviewer.

      2. Interviewers taken from employees of company and have mature experience and intelligence.

a. Interviewers as future supervisors.
b. The development of the capacity of listening.

B. Supervision takes on a new meaning

1. No longer "ordering people about".

2. Personal eccentricities of employees exposed by new technique of listening.

3. These eccentricities used to help the individual to diminish his disability and to develop self control.