

on selection of learners of dress-making, of the machine trades, and of certain clerical occupations. From the psychological point of view, and as a result of study by means of psychological techniques, these men of science have made useful suggestions to managers of tea warehouses, laundries, oil works, glass works, and railways.⁶

Meanwhile in America psychologists interested in the technical applications of their science have devoted themselves chiefly to problems arising in the schools. Some are active in commercial applications of psychological methods and facts, but only a few of these have been primarily concerned with problems of industry as distinct from business. Several psychologists have studied advertising, made analyses of appeals and proposed ways of measuring the relative effectiveness of these appeals in advance of publication. They have studied the psychological aspects of the laws against infringement of copyright in order to establish objective standards of allowable similarity of trademarks and trade-names. More psychologists have been concentrating on problems of selection, development and supervision of personnel, particularly of clerical and sales personnel. We shall see later some of the difficulties these investigators have faced, discouragements which can be overcome by the cooperation of employers and engineers imbued with the spirit of truly scientific management. Let me describe a case in point.

Last summer a former student of mine was asked to help clear up a difficult situation in a department of a factory where, in comparison with other departments in the same building, labor turnover was high and output discouragingly low. There were 90 employees in the department, mostly young men from 19 to 25 years of age. The work was that of soldering wires to strips of jacks. This is not easy to do rapidly and skillfully; but beginners can get started on actual production within a few days and can be earning bonus in four or five months. They are guaranteed a good hourly rate from the start, but are an expense to the company until they have acquired skill and speed enough to be making piece rate. In spite of what seemed to be adequate financial incentive, good working conditions and diligent efforts of supervisors and foremen, too many of the men left for other jobs, and too few of those who stuck to their work earned any bonus. The management raised

⁶Journal of the National Institute of Industrial Psychology, 1922, 1923, 1924.

several questions. Were they hiring the right type of worker for this department? The employment office was choosing bright alert young men not under 19 years of age. Would a minimum age of 26 be better, or a more stolid, substantial type of worker? Could a better training program be prepared, so that the new men would make more rapid progress? Should the piece-rate be raised, or a lower level set at which the bonus incentive would begin to operate?

The investigator began by learning the job himself. Then he became supervisor of the training squad. He won the confidence of workers and management, but it was some time before the most serious single difficulty in the situation became obvious. The department was a relatively new one, and at the time it was established some of the inspectors of the product were not sufficiently experienced and competent. In the pressure for production these inspectors had passed quality which later brought complaints from users. On five distinct occasions during their first year inspection had had to be tightened. Naturally, from the worker's point of view, each sharpening of the inspector's scrutiny was equivalent to a cut in piece-rate. No wonder the investigator heard the comment, "What's the use? They don't want ye to earn no money." The forceful statements of the foreman to the contrary carried no weight in face of these facts.

Inspection in that department is now more stable. The guaranteed hourly rate has been reduced and the piece-rate raised, although no one knows to a certainty that this step was necessary. A training program has been installed, carefully planned in its details so that the progress of the new men in skill and increased output should be steady, without long discouraging plateaus during which the beginner makes no progress in speed because he has to unlearn wrong habits formed in the initial stages of learning. But months must go by before the "What's the use?" tradition is forgotten; and so long as the mental effects of that first year continue to be passed on from workers in that department to the newly hired employees, it will be difficult to carry out any really scientific experiment in selection, training or supervision of employees. To make such experiments the psychologist asks for dependable individual records of daily output or for some other measures of ability, to use as criteria against which to check the effects of improvements that are being tried. Consider, for example, the problem of finding out the effects of different types of training on this particular job.

Should speed be sacrificed to accuracy until after the elementary processes are well mastered, or should speed be stressed almost from the beginning of training? Do the slow initial learners ever reach a satisfactory final level of speed, or should they be transferred to other jobs as soon as their slowness in learning this one is demonstrated? Do the younger or the older applicants eventually make better workers—the small, wiry, quick-moving boys, or the large, strong, steady boys? These and a dozen other questions can some day be answered definitely by means of scientific experiment in that department, but not until the troublesome and still prevalent mental attitude of the employees has been conquered, and conditions—both in the plant and in the workers' minds—stabilized sufficiently to make output a fairly reliable criterion of each employee's actual ability and worth to the concern. The psychologist cannot establish that stability; it must be done by management.

I have said that the industrial psychologist asks of management patience, discrimination and research opportunities, as well as reliable criteria. Let us consider each of these points in turn.

1. Psychology asks management to be patient because we know that many of the most pressing problems of industrial psychology are problems in social psychology—the most backward, most speculative, least scientific branch of psychology. Forward strides have been taken by social psychology in recent years as a result of contacts with medical and clinical points of view; but not everyone recognizes how far we still are from an ideal technique of research in problems involving volitional or emotional aspects of human nature and the clash of personalities. Psychologists need time and help in learning how to measure and to mold fundamental drives and basic traits of personality and character.

We ask you to be patient because all thorough-going research moves slowly. The Mazda lamp of today was not developed within a month or a decade after the appearance of Edison's first incandescent light. Similarly, it has taken nearly twenty years for psychologists to bring the methods of measuring intelligence to their present modest degree of reliability and validity. It is hardly to be expected that during this year or next, psychologists, even with the heartiest cooperation of management, will be able to solve definitively any large number of the questions which are puzzling us all today.

We ask you to be patient because as yet too few psychologists have an adequate background of familiarity with industrial management. An opportunity to see some of your problems from the inside will be most helpful to psychologists in developing good judgment and insight. Some of us know only too well our limitations of familiarity with actual working conditions of plant and office management. We ask you to be patient while we are getting this necessary background.

We must ask you to be patient also with psychologists whose interest in the problems of management differs in some regards from that of the management engineer. Our methods of investigation, to be sure, are not fundamentally different from those of any science which employs analysis and measurement to establish significant correlations between phenomena. But a difference between psychologist and management engineer sometimes comes to light in the relative emphasis placed on importance of output or profits on the one hand, as against comfort and satisfactions of the workers on the other. Management engineer and psychologist are both concerned to increase output and also to increase the well-being and enduring satisfactions of the men; but the psychologist is likely to think first of how he can help adjust the worker to his work, or how he can make the work more tolerable or agreeable, trusting that there will be no diminution of profits but perhaps an increase.

Another difference in point of view sometimes shows itself when psychologist and management engineer are faced by an acute practical problem. The engineer wants to clear up the bad situation at once, introducing simultaneously as many remedies as his good judgment suggests. The psychologist, on the other hand, wants to test out certain general principles because he is looking to the remote future as well as to the immediate problem; consequently he is more likely to want to introduce the proposed improvements one at a time, letting each operate singly long enough to measure the results and demonstrate whether or not it is really an effective remedy. In other words, he wants to control all the variables and modify them one at a time, in order to be certain of his scientific findings. The psychologist is tenacious of his scientific method, and for this reason asks management to be patient.

2. Psychology asks more discrimination than management engineers have sometimes shown in the selection of psychological collaborators. I have known