

making the necessary preliminary analyses of work to be done, difficulties encountered, items to be taught. Procedures have been developed for determining the content and outlining the successive steps in a training program. Practicable techniques for giving preliminary instruction and for training on the job have been evolved. Investigations have even been made as to the difficulties met in getting executives themselves to learn and to use these improved techniques of teaching their subordinates, and as to the best ways of overcoming these difficulties. In such ways the methods of research are being profitably applied to educational problems of industry and business. As the results of such researches gradually find their way into the practice of supervisors and executives, relations of workers and management cannot fail to profit thereby.

One now hears more than formerly about the psychological importance to industry of yet another group of relations, those of the worker to his family and, indeed, to the entire circle of contacts outside as well as inside the factory gate. Psychologists with a psychiatric background have properly been reminding management that careless accidents, temper, trouble making, insubordination, absenteeism and other sorts of objectionable behavior often have their roots in worries traceable to conditions far from the immediate setting. Intensification of these worries during periods of excessive fatigue has been demonstrated. Attention has been called to the damage suffered by certain temperaments as a result of pessimistic reverie during the course of long continued monotony. One obvious implication is that a sound industrial psychology must reckon not only with temperamental differences between workers and their relative susceptibility to the effects of different sorts of repetitive or taxing labor; it must know not only the conditions in the plant predisposing to monotony or fatigue; it must realize also the influence of the varied conditions that modify the employee's anxieties and hopes, his fatigue and recuperation, both during and after working hours.

But it is one thing to recognize the importance of the total situation in determining a worker's inner feelings and outward behavior, and quite another matter to infer that, therefore, wise personnel practice will seek to inquire into intimate personal and private circumstances in order better to be

able to help make suitable adjustments. There must be no trespass on the worker's independence and self-respect. It is a neat problem of practical psychology, how to mold conditions so as to effect a maximum of well justified contentment and willing efficiency, without risk of wrecking the whole morale through resentment against uninvited paternalism. Mr. Ford marched up this hill, and then marched down again. The practical solution reached by some executives has been to leave with the workers themselves the opportunity for initiative in such matters, and for management to stand ready to move only when, as, and if needed and invited so to do.

The psychological problems of industry have now been surveyed as they present themselves to the student of the worker in his relation to his job, to his fellow workers, to his immediate supervisor and to the management of the industry in which he is engaged. Not only his relations as an individual employe have been considered, but also his relations as a member of a group which, as a group, has vitally important relations both with the management of the particular concern which gives him employment and with the industry as a whole. While there is little doubt that the most varied and intriguing psychological problems arise in studying the worker in relation to his own work, there is no question that the psychological aspects of the situation are of vital importance in considering each of these other relations also. In what ways has the science of psychology influenced industrial thought and practice with reference to these industrial relations?

How Psychology Has Influenced Industry

Industrial relations in America have been influenced by psychology in three ways. Industry has responded to psychology as science, as point of view and as method.

Psychology as Science. Psychology as a science consists of a systematized body of facts and generalizations about human nature. Foremost among the industrially significant facts of modern psychology are those which reveal the enormous range and variety of differences between people. Scarcely a generation ago American thought and practice was still somewhat under the influence of the political doctrine of equality which had been held most fervently at the time when the nation was

born. To be sure, no one had seriously contended that all men are created equal in talent; but scarcely anyone had realized how vast are the differences in native endowment and capacity for achievement until Cattell, Boas, Thorndike and others, exploring the trail originally blazed by Sir Francis Galton, found ways of quantifying and measuring individual differences. They gave graphic and mathematical expression to these measurements.

While studying the wide range of differences which people exhibit in their capacity to discriminate colors, sounds, extent of arm movements and other sensory data, they also carried forward investigations in reaction times which showed how greatly people differ in motor capacity. After many of the relatively simple processes had been examined, differences in types of attention were observed. Other investigations were centered on the measurement of differences in ability to localize sounds, to perceive spacial relations, to remember, to manipulate and construct.

The discovery of the possibility of devising units and scales for use in measuring such differences of ability was an epoch making invention. Its application was rapidly extended to the measurement of achievement in school work and has had a profound influence on educational practice. Meanwhile procedures were devised—following the pioneer work of Binet and Simon—for measuring the rate and extent of mental development. Concepts of mental age and the intelligence quotient became current. Convenient means for examining large numbers of persons at the same time were perfected; and during the war, data were secured which revealed in spectacular relief the vastness of the spread of human abilities as well as their proneness to cluster about the central tendency of mediocrity.

Differences between individuals not only in abstract intellect but also in social and mechanical abilities were studied. Certain trade tests, for measuring proficiency in different occupations, were standardized. People's interests were made the subject of inquiry, and techniques were developed for quantifying differences in mental attitudes, likes and dislikes, occupational preferences and personal tastes. More recently the ambitious task has been undertaken of measuring the strength of volitional tendencies. Character, as well as intellect and temperament, has come within the range of quantitative measurement; and while the reliability of the

methods so far developed for measuring character is so low that few psychologists will venture as yet to draw practical inferences from them, it is nevertheless significant that the idea of mental measurement has now been extended until it comprehends the entire personality.

Partly as a consequence of these researches, it is recognized, more clearly than formerly, how much individuals differ from each other in originality and initiative, in output of energy, in tact or in social sensitivity, and in self-control, as well as in general intelligence, and in a long array of specific abilities. All these facts, tersely put by Cattell and Thorndike and emphatically reiterated in public address and in semi-popular writings by Walter Dill Scott, Münsterberg, Goddard, Terman, Hollingworth and many others, have influenced the thinking and practice of industrial leaders.

Many industrialists of today, it may be recalled, were themselves students of elementary or advanced psychology in college when individual differences were first stressed. Later, in positions of business responsibility, some of them recognized acutely the need of personnel procedures which give due emphasis to these facts of human nature. Functional organization of personnel activities in factory and office, and development of techniques for personnel classification, transfer and promotion, job analysis, employment interviewing, placement, training and follow-up, probably proceeded somewhat more rapidly because of what psychology had done to make more evident the nature and extent of individual differences.

Of practical moment also have been the findings of psychology regarding the relationship between various abilities. For instance, the law of compensation has been found inapplicable. Common belief had held that the person who is greatly superior to his fellows in some regards is probably inferior to them in others—that if he is very talented in mathematics, for example, he is probably something of a dullard in athletics or in art. The facts have been found to be quite the opposite. Persons who are found to be highly superior in one ability are more often than not above the average in any other desirable trait. In other words, the correlation between favorable traits is quite generally positive. At the same time, the correlation is in most instances low. Psychologists have often been surprised to find how slight