

is the association between abilities apparently very similar. If, as Spearman and others contend, there are certain *general factors* characteristic of a person's make-up—call them intelligence, energy, perseverance or what you will—it is certain that there are also a great number of quite specific abilities, very largely independent of one another.

These findings have lent emphasis to the need for the employment interviewer to be very cautious in inferring future accomplishments from fragmentary data, whether these data are in the form of impressions gained in conversation, mental test performance, school record, or reports from former employers. He needs all the information he can get. He especially needs to find out which items are really significant, under the conditions of work which prevail in his own plant and in the local labor market.

Another inference from these facts regarding the specificity of abilities has to do with the nature of industrial training. There is sound warrant for the tendency toward better training on the job rather than toward more formal training of a general sort.

To precisely what extent industrial practice in the United States has been modified by the body of psychological knowledge regarding individual differences and the correlation of abilities, who shall say? It is obvious that the tendencies of the past twenty years in employment, training, supervision, transfer and other personnel functions have been in the direction of greater recognition of and provision for wide differences in endowment. Public school practice has also been modified in many ways which have made it possible for multitudes of young people more easily to effect a satisfactory adjustment with the working world. Such changes might conceivably have taken place, even though psychologists had not been measuring, analyzing and comparing so many aspects of so many people. It seems reasonable, however, to suppose that the findings of these kinds of psychological research have directly as well as indirectly had a real influence in industry.

Much the same might be said regarding the generalizations from research in educational psychology. One outstanding characteristic of man is his educability, and psychologists have steadily been prying deeper and deeper into the laws of learning. Principles governing the formation of habits, acquisition of skills, mastery of technical knowledge,

elimination of gross defects of personality, development of social effectiveness, modification of likes and dislikes, and inculcation of ideals and attitudes—all these are applicable in offices, stores and factories as well as in school or college. Some of the best data regarding effects of practice and of fatigue on the work curve have come from experiments in psychological laboratories.

The doctrines of interest, and of attention and distraction, have had their application where safety devices were to be invented and installed; where jobs were to be classified according to their psychological requirements; where workers and students were to be advised with reference to their future vocational plans. The psychological theories most prevalent a dozen years ago regarding instincts and the fundamental drives which motivate human conduct, have influenced the thinking of industrial leaders regarding financial and non-financial incentives, group spirit, the damage done by fear and the value of insuring to manager and worker alike his sense of self-respect and his belief in the worth-whileness of his labor. Writers like Robert Valentine, Carleton Parker, Ordway Tead, Z. C. Dickinson, Robert Bruere, H. C. Metcalf and Whiting Williams interpreted these doctrines for economists and engineers, bridging the gulf that too often divides the psychologist from the industrialist.

Perhaps enough has been said to illustrate the way in which the subject matter of psychology has tended to affect industrial practice. A single case, more concrete than those already mentioned, will serve as a sample of repeated instances in which the discoveries of the psychological laboratory have found useful application.

For many years Professor C. E. Ferree² in the psychological laboratory of Bryn Mawr College concentrated his research on problems of the efficiency of the eye under varying conditions of illumination. He developed new apparatus and precise procedures for measuring the fatigue of vision. Using these methods, he worked out the principles which must apply to all determinations of the relative effectiveness of different intensities and distributions of light. He compared the merit of direct, indirect and semi-indirect systems. When his conclusions were first announced they ran counter to the tenets currently held by engineers; but

²Now of the Wilmer Institute.

today they are commonplaces of illuminating engineering practice. Thousands of factory employes, now doing their work under more favorable conditions of illumination, will never know that they have in part to thank a research psychologist for their relief from the annoyances of unnecessary glare, distraction and eye strain.

Psychology as point of view. Less tangible than the effects of these concrete products of psychological research, but none the less real, has been the influence on American industry of what may be called the psychological point of view. In essence this point of view consists in a more than ordinarily tenacious belief that human experience is understandable, that human behavior is not a spiritual mystery but a natural phenomenon like other phenomena of the organic world. Such a belief leads to the persistent attempt to understand one's fellows, to appreciate their motives and ambitions, to comprehend their shortcomings and their possibilities. It makes one impatient of superficial explanations of unsatisfactory employe behavior as due to "carelessness" or "laziness" or "pure cussedness." One asks, "Why was this motorman careless?" and proceeds to get the facts about his previous training on the job, his treatment by supervisors, his length and distribution of working hours, his health, his eyesight, his scope of attention, his worries and tendencies to reverie. Then such a vague blanket trait term as "carelessness" drops out of one's vocabulary. Moreover, the psychological point of view prevents an executive from letting his personal feelings warp his judgment. It helps him to be at once more objective and more intelligently aware of points of view other than his own.

The psychological point of view is that of the scientist trained to focus the searchlight of inquiry on every puzzling problem of human adjustment. It is identical with the point of view of scientific management in so far as scientific management concerns itself with the human problem of industry. If there has been any vital difference in point of view between industrial psychologists and management engineers, it is with reference to their primary purpose. The industrial psychologist has wanted first of all to help the worker, in simplifying his methods of work, bettering the conditions under which his work is done, improving his training, and developing personnel techniques which will

facilitate his adjustment to the occupation in which he will find the most satisfaction. Incidentally the psychologist may believe that these services will perhaps benefit the industry, the management and the social order also. The engineer has similar objectives but is ordinarily thought of as placing first the economic stability, prosperity and usefulness of the enterprise. The personal satisfactions accruing to competent, well paid, well trained employes are his secondary objectives.

While this contrast in points of view of psychologist and management engineer may have some historical warrant, particularly in England, it cannot be said to hold universally in America. The writer knows personally Taylorites who seem to him to place considerations of human betterment first, and to regard the industry which they plan for or manage merely as a means to the self-realization of the workers and supervisors who constitute its personnel. He also confesses an acquaintance with psychologists as well as engineers both in America and in Europe who have shown themselves willing to place their talents at the disposal of employers with a single eye to profits.

This difference in attitude and primary interest is not inherent in the science; it is a personal matter. It may depend on temperament, or on the social philosophy one holds.

The question of priority of objective might be a matter of more grave concern at this point, if it were not that the farsighted investigator—be he psychologist or management engineer—sees clearly that he must travel much the same road in either event. After all, there is a considerable identity of interest of employes, managers, owners and public. An industrial psychologist in a chocolate factory recently stated his objective as follows: "The purpose of the psychologist is to see that the workers leave the plant at night neither fatigued nor irritated nor nervous." He showed not a trace of interest in increasing the owners' profits. But when I asked the president of the corporation why he had this psychologist in his factory, the prompt and decisive answer was, "I find it pays."

Psychology in America has contributed to the point of view that it pays in the long run to attempt to understand the deep-lying motives and ambitions of people, and to work with the current of human nature rather than counter to it. It has made this point of view explicit in its application to prob-