

young people, in whom instincts are still free and have not been crystallized in habit patterns. If psychologists could be provided with facilities for extensive controlled observation of the behavior of adults in office, shop, sports, household, church and club, I imagine much more importance would be attached to the part played by habit in adult conduct.

John Dewey, whose approach to psychology is not that of the laboratory experimenter, but that of the philosopher and interpreter of the results of laboratory experiments generally, in a recent book has given special attention to the importance of habit. In "Human Nature and Conduct," habit is the subject of the first part of the book, and impulse is the subject of the second part. At the beginning of the second part, in an explanation of why his consideration of impulse follows instead of precedes his consideration of habit, Dewey says: "Habits as organized activities are secondary and acquired, not native and original. They are the outgrowths of unlearned activities which are part of man's endowment at birth . . . Why should what is derived and therefore in some sense artificial in conduct be discussed before what is primitive, natural and inevitable? Why did we not set out with an examination of these instinctive activities upon which the acquisition of habits is conditioned?" And he answers his own question by stating that "In conduct the acquired is the primitive. Impulses although first in time are never primary in fact; they are secondary and dependent" . . . the meaning of native activities is not native; it is acquired."¹³ In other words, in the life history of any one of us impulse and instinct existed before habits were acquired; but as adults, in most matters of conduct, our habits and not our instincts are primary. In another place Dewey says: "The native stock of instincts is practically the same everywhere. Exaggerate as much as we like the native differences of Patagonians and Greeks, Sioux Indians and Hindoos, Bushmen and Chinese, their original differences will bear no comparison to the amount of difference found in custom and culture. Since such diversity cannot be attributed to original identity, the development of native impulses must be stated in terms of acquired habits, not the growth of customs in terms of instincts . . . the countless diversity of habits . . . springs from practically the same capital-stock of native instincts."¹⁴ This point of view that habit, the acquired, is primary in most specific instances of conduct has made a strong

¹³P. 89. ¹⁴P. 90. ¹⁵Pp. 91, 92.

appeal to executive after executive to whom I have presented it. Each has testified that it fits the facts of his experience, which has been chiefly with adults in factory and office. If greater cooperation between industry and psychologists should eventually be realized, I hope one line of research will be directed towards verification or disproof of this hypothesis.

VII.

Ten or a dozen years ago I was inspecting the development of new management methods at a New England factory, as a guest of the general manager and the consulting engineer. My interest in a machinist who was working in accordance with new, standardized methods having been noted, I was informed that the machinist had been with the firm some sixteen or eighteen years, and that in all the time prior to the beginning of the development of new methods he had not changed his chance-acquired methods in any noticeable particular and had not made a suggestion relating to improvement of machine, conditions or methods; but that within the year since the new standard methods worked out by the consulting engineer had been explained to him and practiced by him, he had made a dozen suggestions worthy of adoption—the first within an hour after he had started to work in the new standard way. That incident made a profound impression on me, for it was one of my first plant inspections, and my attitude towards scientific management had up to that time been susceptible to *a priori* arguments of academic friends to the effect that standardization of operations destroys initiative and weakens intelligence. Since that time I have observed it to be generally the fact that where scientific management with its standardization, planning, scheduling, instruction cards, progress records and other mechanism has been introduced, people generally show more interest, originality, initiative, and intellectual self-expression than they had done before the development of the standards, and more than is characteristic of other people engaged in similar work in conventionally managed plants.

What is the psychological inference to be drawn from these observed facts? The answer to this question was suggested by the Gilbreths ten years ago¹⁵ and is fully developed, I believe, in Dewey's exposition of the nature of human behavior in "Human

¹⁵Lillian M. Gilbreth, "The Psychology of Management," Sturgis & Walton Company, 1914; pp. 178, 179, 218, 235, 236, 240, 312, 313. Frank B. and Lillian M. Gilbreth, "Fatigue Study," The Macmillan Company, 1919; pp. 140, 146 and *passim*.

Nature and Conduct." Adult behavior is the expression of an aggregate of habits acquired by chance reactions to environment; in these habits native and individual impulses and instincts have been crystallized; habits become strengthened by repetition; incentives to the retention of acquired habits gradually become dominant over incentives to the acquisition and substitution of new habits and the probability of the formation of new or substitute habits decreases as the individual becomes older. Habits can be eliminated or changed only by the substitution of new habits, not by will power except as will power is involved in the practice of new overt acts; habit is an adjustment to environment and, adjustment once successfully made, there are fewer and fewer occasions for readjustment, that is, the intervention of intelligence. Therefore in plant after plant, in which executives, foremen and workers have been engaged and set to work "as is," and no serious thought has been given to the quality of individual or coordinated effort, we find as many varieties of methods (habits) as there are persons who have acquired their methods (habits) under different, chance environmental conditions, and we find little incentive to call on intelligence. But in a plant in which thought has been taken concerning the variety and quality of methods or habits; in which questioning of habits has become a part of the environment; in which specialized intelligence has experimented with and appraised the relative value of existing and possible new habits; in which desirable new habits have been formulated into standards; in which the substitution of the new habits for the old is facilitated by specifications and instructions concerning definite overt acts; in which explanation of "the reason why" accompanies the offering of new habits or standards;—in such plants we find not only that the acquisition of new habits is relatively easy; but also that the necessity of new environmental adjustments involved, the offering and explaining them, and the natural resistance before conviction and acceptance arouse attention, stimulate interest, call out intelligence, and generally summon to a new freedom the instincts—previously imprisoned in old habits—of curiosity, self-assertion, acquisition, construction, and so on. I ask whether this is a tenable explanation of certain observed facts. To explain them is a problem illustrative of the nature of many a problem in management which awaits investigation, and in the name of this Society I ask leaders in industry and psychology to join in the research which will deter-

mine the facts, and give us the psychological explanation.

VIII.

I should like briefly to call attention to several other phases of management the investigation of which by psychologists would be of particular service to industry.

The problem of training personnel in industry—executives, foremen and workers—offers a challenge to thorough psychological investigation. The problem of selection is of course important but it is essentially only a first step toward adjustment to the environment. Organizations are going concerns with existing personnel; few can begin *de novo* and select an entire new personnel in accordance with approved psychological tests. Personnel selected in accordance with conventional methods—essentially by chance—must be lifted by education and training to higher planes of specific performance and general cooperation; and new personnel, selected by psychological tests, must likewise be adjusted to the environment of the organization and to specific tasks. Individuals selected by intelligence, special aptitude and trade tests are selected chiefly with reference to general capacity to adjust to environment or capacity to perform certain technical operations. To education and training there remains the task of making these capacities effective: by determining the precise nature of individual differences and aptitudes, and placing and promoting employees in accordance with these differences; by fostering understanding of plant purposes and developing plant spirit; and by giving practice in overt acts of adjustment to environment. These overt acts are the stimuli which arouse interest, exercise and strengthen intelligence, call forth initiative and nourish the instinct for creative effort.

And while education and training in industry will undoubtedly rest on the same psychological foundations as all education and training, it is reasonable to assume that investigation and experiment will discover many important psychological principles, pertinent especially to the training of adults in office and factory, which have not been and will not be discovered in investigations and experiments now being conducted in connection with the education and training of young people in the schools. The education and training which faces the problem of eliminating old and creating new habit patterns in adults must inevitably observe principles and include elements not especially pertinent to the education and training of children