14. Records showing learning capacity,—a most important factor in mental development.

15. Records of efficient and inefficient learning processes.

16. Recognition of the economic importance of teaching right motions first, to all learners.

17. The new knowledge resulting from leisurely examination of stereoscopic motion pictures in a magazine stereoscope.

18. Records showing both general and special aptitudes.

19. The recognition that maximum desire for a special job and a determination to succeed at it are better prerequisites for placement at that job than a high I. Q.

20. Effect of the immediate incentive upon the motions of the demonstrator.

21. Relation of the amount of bonus above the going day rate and the hearty cooperation and adoption of The One Best Way to Do Work.

22. Proof that the Three Position Plan of Promotion, where each worker is learner and teacher, is a satisfactory incentive for continuous effort.

23. Records of fatigue, and its general and specific effects.

24. Records of rhythm which show the individual rhythm of activity, that concern relative lateness of the therbligs as well as muscle impulses.

These twenty-four specific results of the investigations outlined by no means cover the field, but indicate the results that have actually been achieved in motion psychology and the type of results that may be expected in the future.

The great psychological laboratories are still to be heard from in motion psychology. The achievements above listed are largely the result of investigations by engineers for immediate practical results.

It has been proved that nothing of great value in psychology, in management or in the correlation of the two can be expected when problems are generalized, when investigations are indefinite or when a solution that seems to have worked well on one problem is applied to another, without thorough investigations as to how far the elements of the two problems are identical.

Such problems as Dr. Person mentions,—problems of selection, placement, training or teaching, promotion, incentives, maintenance,—these all demand solutions depending absolutely upon an accurate knowledge of and proper presentation of The One Best Way to Do Work of the activity involved,—a knowledge which is essential both to psychologist and manager.

The findings above listed indicate the value of the data obtained when used to solve the very problems suggested. The twenty-four might well have been grouped as they apply specifically to problems of teaching, incentives, promotion, etc., with special stress on teaching.

Too much stress can hardly be laid on the fact that the great defect with most training plans in the past has been that the trainers did *not* have a knowledge of The One Best Way to Do Work, and depended upon obsolete methods for teaching such methods as they did have.

Cooperation between managers and psychologists is constantly increasing. In the past there have been many delays caused by the lack of a common vocabulary. Such delays still occur.

In the past the specializing psychologist has not always been able to estimate the work of the manager correctly, nor has the manager always been able to estimate the work of the psychologist, as Dr. Person has said. In some cases there has been belittling of the work,[5] and in other cases there has been over-estimate.[6] Any type of cooperation between managers and psychologists of any school will do much to overcome these handicaps, but most is being done where psychologists and managers are contributing their diverse training and equipment cooperatively to the solution of definite, isolated elementary problems, and where the results are being applied by those specially trained in the transference of skill.

Such investigations as are here outlined in nowise interfere with intelligence tests, provided the tester is intelligent, the use of the questionnaire, "brass instrument psychology," or any other type of investigation. Rather they act as necessary supplements, in that they furnish motion or behavior records of the subject being examined by any method, which are invaluable when the data are being reviewed.

Nor does the work being done in industry in anywise interfere with the work being done outside industry, whether in laboratories, institutions of any type, or any other place where research is going on. Records of champions, of experts, of amateurs, of bunglers; of super-normals, of normals, of sub-normals; of morons; of epileptics in seizure; of the handicapped,[7] physically and mentally,—all these are now available. All can be brought to bear upon the individual whose case is being studied, whether the problem be adjustment, training, promotion or any other of the numerous problems that industry affords.

These statements may seem revolutionary and theoretical when compared to usual practice in this country today. They are neither. As for practice abroad, both psychology and management in this country, especially in the field of industry, are suffering because of ignorance as to the great advances that are taking place abroad. This is, of course, the natural result of self satisfaction and the worship of a tradition. Throughout many countries, as we endeavored to point out in a paper presented before the Taylor Society in January, 1924,[8] it is customary for all possessing knowledge of the human sciences to cooperate on investigations for the betterment of industry. Even where such cooperation does not as yet actually exist, because neither psychologists not managers are adequately trained, the necessity for such cooperation is recognized, and the best existing practice in both fields, internationally, is being studied and utilized.

Kent, Farmer, Myers, Muscio, Spooner, Vernon and many others in England; Castella and Mira in Spain; Volmer in Holland; Finnbogason in Iceland; Westergaard in Denmark; Cavrot in Belgium; De Freminville, Amar, Lahey and Ottenheimer in France; Moede, Piokowsky, Schlesinger, Sachsenberg and Witte in Germany and the great scientists at the Zeiss works; Remane in Switzerland; Basta, Bezant, Klir, Kottland, Rezek, Spacek, and many others at the Masaryk Academy in Czechoslovakia; Uyeno in Japan,—all these and many others in many countries in some way interested in the human sciences are advocating such close cooperation, and are practicing it so far as is possible.

The basis of such cooperation consists of accurate and indisputable records of actual behavior or motion. We have been asked many times why we are so bitter in our opposition to half way opportunist methods of making and using records in industry. One reason for this opposition is the fact that such records are *absolutely useless* to psychology, and are a detriment to the advance of psychology in industry. They are misleading to the young students in the industries, and they furnish that which must be unlearned by the graduates of our great institutions of learning. The colleges are unintentionally deceiving their pupils. The faculties of but very few colleges know anything about The One Best Way to Do Work and their teachings unfit their pupils for immediate usefulness in the industries.

Therefore, we believe that a universal acknowledgment of the necessity for records that embody accurate, indisputable measurement and that can be used by the man who was not present when the work was made is essential, as a basis for satisfactory work in both psychology and management. Also, that preliminary to such work as Dr. Person outlines would be accurate survey, international in scope, and covering the field of all the human sciences, showing what is already being done in the field of industry to bring together psychology and management—for the advance of science and the furtherance of human betterment.

[5] Discussion of "Stop-Watch Time Study," *Bulletin of the Taylor Society*, Vol. VI, No. 3, June, 1921.

[6] "The Efficiency Engineer and the Industrial Psychologist," by Dr. Charles Myers,—*Anals of Institut d'Orientacio Professional*, Barcelona, June, 1922.

[7] See Gilbreth, "Motion Study for the Handicapped," E. P. Dutton & Co., New York.

[8] See "Scientific Management in Other Countries than the United States," *Bulletin of the Taylor Society*, Vol. IX, No. 3, June, 1924.



## Reviews

*An Introduction to the Psychological Problems of Industry.* By Frank Watts, Macmillan, 1921, pp. 240.

There has thus far been no American book dealing with the application of psychological principles and psychological knowledge to all the problems of industrial management. There have been specialized psychological discussions of advertising, selling, selection, training, and the like; but as yet it is impossible to find in one volume a critical consideration of management problems in the light of the best modern psychological scholarship. Professor Watts' book supplies this need in a remarkably effective way, when it is considered that it is written with an English setting and that it confines itself exclusively to the human problems of industrial organization, and omits all consideration of advertising and selling. Indeed, nowhere else is there yet available between two covers such a clear, accurate and persuasive statement of the uses to which psychological knowledge can be put by managers. While not exhaustive, the treatment covers effectively the fields