

in the time set, which was the standard time plus the percentage for the class in which the operator was placed. Competent "instructors" drawn from the ranks of the "exceptional" or the "first-class" operators were assigned to assist the workers in the lower classes who were promoted as rapidly as they proved eligibility for a higher rating. We also made their pay increase retroactive upon promotion to cover all jobs accomplished in the prescribed time for the class to which they had attained. Some operators we found fell short because through overanxiety they rushed, some had developed awkward or faulty habits involving wasted motions and efforts, some lacked self-confidence and needed only a kindly word of encouragement. The number who failed to make the grade was almost nil and for these work for which they were better suited was found.²⁹

In the general machine shop or a plant engaged in comparable work, the existing variation in skill or productive ability may be taken care of largely by assignment of men to work for which they are qualified. However, when a man first starts to work under the task system, temporary additions to the standard time may be desirable. Most of the reassignment or classifying of workers may, however, be accomplished long before the time to start task work has been reached.

In the past methods followed in determining the percentages temporarily to be added to the standard task time, while reasonably satisfactory in the instances concerned, have not been scientific to an adequate degree. The scheme described by Messrs. Lowry, Maynard and Stegemerten under the heading of "leveling," together with that for classifying skill and effort, strikes me as going a long way toward providing a truly scientific method for grading individual ability and determining these temporary additions to standard time. We speak of "scientific selection of workers" but, although much thought and considerable research have been devoted to the development of a technique of selecting, principally by those interested in what is termed personnel management, we must still fall back upon the best judgment afforded by experience in the matter of initial selection and upon trial under practical working conditions as a check. It is in the development of a technique that will be worthy of the term "scientific" that I think the Lowry, Maynard and Stegemerten method referred to above may present important possibilities. Such

²⁹Comment on A Report on the Production Standards Situation in the Ladies' Garment Industry of Cleveland, August, 1925.

a technique should involve sensible and practical tests of workers on typical standard operations, and should permit comparison of their performance with a standard of performance worked out by studying a first-class worker on the same operations.

If it is a mistake, for the reasons I have endeavored to point out, to make time studies with an "average" worker, it would appear to be an even greater mistake to base standards of production upon average performance as indicated by time studies of a number of operators, including the good, the bad and the indifferent. My views on this were expressed in the memorandum already referred to. From this I quote the following:

If I may be permitted to use a somewhat inelegant expression, Mr. Katofsky "said a mouthful" when he remarked: "From the viewpoint of time-study data such as must be used if the standards system is to prove fair and satisfactory there can be only two standards, namely, accurate or reliable and inaccurate or unreliable. . . . There can be no grades in between."

Here Mr. Katofsky has put his finger on the cause of most of the troubles so far experienced—and there are, I fear, more to come unless radical, corrective steps are taken. The desired improvement cannot, however, in my estimation, ever be effected so long as the present method of making studies is adhered to. I can readily understand the reasons that led to the adoption of the present basically wrong procedure and have little hope of its immediate correction, but I am convinced that eventually, in the light of experience, the plan which I shall describe will and must be adopted if enduring benefit is to result.

Briefly, the principal error lies in attempting to base the standard on the production of the average worker. I should consider figures arrived at as a result of studies of work done by ten workers, supposedly including a range from the fastest to the slowest, as not being worth the time and trouble taken to accumulate them. Such studies cannot help but be inaccurate individually and their faults are increased in proportion to their number. This practice is based upon and is calculated to perpetuate an all too prevalent error to the effect that there is a wide and permanent difference in the skill and productive ability of different workers on the same kind of work. Or in other words, that some workers are predestined to be and remain first class, some fair to middling and others poor. Such a doctrine is revolting and I believe unsound socially and economically.

If my experience has taught me anything, it is that this difference diminishes in direct ratio as the quality of management improves. I recall most vividly my experience in a plant the nature of whose work was sufficiently comparable to that in the ladies' garment industry where under the old management piece-work earnings ranged, taking the earnings of the supposedly best workers as 100, down to 40, the average being around 65. In commenting on this the plant manager expressed keen regret but felt no respon-

sibility for the state of affairs which he regarded as an incurable misfortune. The statement "some of them are good and some are poor workers" ended the matter so far as he could see. But after improving and standardizing conditions, providing adequate service to the worker and replacing the old type of "boss" supervision with functional foremanship of a type calculated to provide help when and where most needed, the force as a whole attained a productive efficiency of over 95 per cent of a standard based on studies of the work of a first-class operator.

By this I do not want to be understood as saying that time studies should not be made upon more than one operator in determining a standard for a given operation. Often it will be found by combining various elements from the method followed by each of several first-class workers, that a method superior to that based upon the work of the best individual may be built up. Likewise, where any question exists as to whether the operator whose work is studied is truly "first class" and has really co-operated, results should be checked by studies of other operators. It is important that time studies be made on a first-class operator not only because of his superior skill and speed but because of his ability to effectively co-operate in the undertaking. This is well expressed by Joseph A. Piacitelli, who said in his paper "Selection of Workers for Observation":

The workers studied by the investigator employing the motion-study technique in which the late Major Frank B. Gilbreth pioneered, are selected largely on the basis of the contribution they can make toward the establishment of the best method. Usually much of the desired data is obtained from the study of the best available. By best available the worker who produces most is not necessarily meant, but the one whose method shows the greatest productivity possible, although he may not exert enough effort to realize its possibilities. In other words, the production record does not always indicate the best workers from the point of view of the methods employed by them. Invariably, however, the best workers, as indicated by their records, do have good methods and it is usually desirable to study them. Workers whose methods for any part of a cycle appear to be less fatiguing are also selected for the same study. The best workers available should be selected for the following reasons:

1. That they invariably employ methods of least fatigue.
2. That they usually have the highest degree of automaticity, thus making possible the analysis of a higher order of skill.
3. That the motion study-technique, making use of the motion-picture film and clock, permits a minute analysis of the method and performance.
4. That the technique permits a more detailed description of the established method (that is, in elements of motion) and shortens the learning period.

5. That the composite best method can be more easily transferred, making a higher performance standard attainable by all normal workers.

Aside from the qualities already mentioned the worker selected for observation, regardless of the technique employed by the observer, should preferably be one with ability to learn and demonstrate new methods; one who is not disliked by his fellow workers and who will serve as nearly as possible as a co-investigator.

It is the opinion of the writer that the analysis of the performance of the best workers available, from the standpoint of method and economy of effort, and the transference of their combined skill contribute most toward elevating the performance standard of the department as a whole, and this, of course, is desirable from the point of view of lower cost and higher wages. We have both the intellectual and physical equipment to increase the effectiveness of our productive efforts and should make the most of our opportunity to practice, and benefit therefrom, the three regulative principles of industrial management ably stated by Church and Alford as, "the systematic use of experience"; "the economic control of effort" and "the promotion of personal effectiveness." The greatest progress can be made by utilizing, to the best advantage, the facts derived from the study of leaders in their respective activities, whether the activities are carried on in the office or in the shop; in the store, or in the bank.³⁰

Another leading authority in this field, William O. Lichtner, says in his book, "Time Study and Job Analysis":

Although due consideration must be given to the relative importance of quality and quantity on the operation, one thing may be said definitely—the studies should be made on an employee who is skilled. This is advisable for the following reasons:

1. His motions are more uniform.
2. He works more steadily.
3. He is apt to use the best methods and to adapt himself more easily to new ones.
4. The influence of the personal equation is less pronounced.
5. The results manifest his fluctuations and are more dependable.

The erratic work of the unskilled employee throws all manner of unnecessary variables into the detailed unit times. It will be necessary to determine whether the variation in the time taken by an element is due simply to the fact that the employee is unskilled, or is due in part to the material he is working upon or the tools he is using. Under these conditions it will require more studies and a greater degree of skill on the part of the analyst to determine the correct times accurately.

In group work, since the speed is limited by the speed of its slowest members, the personnel of the group must be considered to see whether it is composed of skilled employees, and if not, whether such a group can be brought together.³¹

³⁰"Selection of Workers for Observation," *op. cit.*, p. 138.

³¹Pp. 154-155.