suggests, and which is of the essence of scientific management. It is as scientific a method as the series of studies leading up to the discovery of high speed steel, and if Mr. Cooke is less bold in his conclusions than Mr. Taylor, at the end of that famous series of experiments, it is because his materials are human and not inanimate and therefore subject to greater and less predictable variations.

There are two major obstacles to the achieving of that degree of co-operation between management and men that Mr. Taylor advocated and that Mr. Cooke by implication favors in his paper. One of them was recognized so clearly by Frederick W. Taylor that in a sense it formed the basis of his philosophy and led him to the elaboration of what came later to be known as the principles of scientific management. This was the fact that the ideas and practices of management may be such as not only to make co-operation unlikely but such as to make it positively dangerous for the workers to attempt to adjust themselves consciously and enthusiastically to the purposes of management.

Nowhere, I think, will you find a more eloquent condemnation of restriction of output on the part of the workers nor a clearer indictment of management on account of its responsibility for it than in Frederick W. Taylor's "The Principles of Scientific Management."

His influence and the influence of scientific management generally have been steadily in the direction of the elimination of the sort of exploitation of the worker that makes co-operation impossible.

The other obstacle is one that is clearly suggested by Mr. Cooke's paper. It is not enough that the purposes of management should be such as to entitle it to the confidence and support of the workers—they must have convincing evidence that such is the case. Wherever the rank and file of the workers are in ignorance of the problems and purposes of management, co-operation is unlikely and suspicion is to be expected.

Hence the great contribution to sound principles of management suggested in this paper. The clear inference to be drawn from this study of co-operation in a limited field is, I think, that the following steps be taken: First, the organization of the employes in any establishment on such a basis as to make possible the selection of such representatives to deal with management as will command the confidence and respect of the rank and file of the workers. Mr. Cooke suggests that this may be accomplished either through a trade union or through what has come to be known as a company union. Personally, I am inclined to doubt that it can in the long run be accomplished through the agency of the company union. But that is of no significance here. I am in thorough agreement with Mr. Cooke's basic contention at this point. The prerequisite is that the representation must be such as to continue to command the confidence and respect of the rank and file of employes. If only that can be accomplished, the name that you give to it is immaterial.

The second essential is the frank inter-change of opinion. It is essential that management and workers shall understand each other. If there be honesty of purpose on the part of management and a willingness to deal justly with employes, that fact will become increasingly apparent as the secrecy and mystery are removed.

The third essential suggested here is that questions about which management and workers are unable to agree should be referred to the judgment of disinterested and intelligent outsiders.

Mr. Cooke's paper is of outstanding importance because it shows that where these three principles have been in effect it has been possible to bring about co-operation with respect to one of the most difficult and knotty problems with which management and workers are concerned. In a field where suspicion generally runs riot, and where co-operation is usually withheld to the last ditch, it has been possible to develop understanding and co-operation to a very high degree. If such a feat can be accomplished in the field of production standards, are we not provided with a sound basis for the belief that much more extensive co-operation is possible?

Charles W. Lytle and David B. Porter.[14] Mr. Cooke has pointed out the only rational procedure for the introduction of time study methods, namely, the treatment of employes as a group rather than as individuals. The pioneers in this field dealt with individuals because employers had always treated their workers that way. Today the specialization of machines and the extreme division of labor have broken down individual relationships and have welded the employes into groups which are keenly conscious of their common interests. This movement has manifested itself in many forms of employe representation and participation in management. It is wholly in accordance with modern developments, therefore, that such a vital factor as the establishment of production standards should be considered from the standpoint of its effect upon group reactions.

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The Cleveland agreement shows an enlightened view on the part of the garment workers toward a mutual interest in lower unit costs, made possible by the measurement of output. On the other hand the employers in that industry have shown great enlightenment in conceding to employes an equal interest in the determination of standards, and the recognition of the importance of steady work. Furthermore, the spirit of democracy in industry which is established by this agreement is thoroughly vindicated by the broadminded and constructive criticism rendered by the garment workers through their Union's letter of comment on Mr. Goodell's investigation of the standards situation. This kind of helpful participation is far removed from some early and now obsolete practices of carrying on time study operations in secret.

Mr. Cooke has indicated that no group is going to be enthusiastic about a system of production standards which would bar a considerable portion of its number from further work. This group point of view compels management's recognition. In order to satisfy this point of view some engineers have studied the normal worker, with the result that their standards which seemed high at first were eventually too low. While interest should center around the normal worker, it is a mistake to neglect the "sport" or exceptional worker. His methods and motions may be studied and built into the structure of "the one best way." Thus his skill may be captured and acquired by the normal workers who ultimately raise their performance to a point approaching that of the exceptional worker. The increase is accomplished by the elimination of waste motion, not by additional energy. This was illustrated in a recent paper before the American Management Association by Mr. Blakely of the General Electric Company, wherein he cited the case of a worker whose performance had been below average. This person was instructed in the methods of the one best way as developed by micro-motion studies, and ultimately attained the performance of the fastest workers. We wish to stress the educational aspect of capturing the "one best way" and teaching it to others. Advancement through greater earning power of course must follow.

Mr. Cooke has stated at the beginning of his paper that improvement and standardization of processes are necessary preliminaries to final time study. We wish to emphasize the importance of that preliminary for two reasons; (1) because we believe that positive results have been defeated because of neglect of it, (2) because in that phase lie many of the agencies for promoting the group morale, here so splendidly portrayed.

Thomas W. Mitchell.[15] I agree heartily with the thesis that a good understanding of the purpose of time study, even of something of its technique, by the body of workers, and endorsement of time study by them are important elements in its successful application.

Much of the misunderstanding of and opposition to time study by those who have not come into intimate contact with it are due to ideas suggested by the fact that the timing instrument was called a "stop watch." This suggested the strenuous effort of the sprinter or other speeder on the race track. Mr. Taylor's dwelling upon the selection of a *first-class* man for time study observation reinforced the suggestion, confirmed the misunderstanding and heightened the opposition.

The big job is to get the great body of workers, including their leaders, to understand that *one* of the two great problems in production is to conserve resources—and that time study is merely a method of scientific investigation, the object of which is to promote such conservation. We all experience a variety of wants. Our wants of each variety are satisfied either by the consumption of goods of a particular variety or by the application of some particular variety of personal service. The goods are produced by the application of energy to material substance. The rendition of personal services also usually involves the expenditure of energy. The various material substances become available day by day or season by season only in limited quantities. Energy with which to convert

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