

forward and not intentionally as brutal as the cold type makes him appear to be. In reality, the book as a whole gives you an impression of an unusual degree of innate gentleness and personal loyalty. It is only in individual instances that harshness seems the dominant note. A civil engineer who helped him lay out the grounds of the home he built near Philadelphia said of him: "My first impression of Mr. Taylor was that he was a terror. Gradually this was succeeded by the consciousness that a more just, democratic and kindly man never lived." And his friend and gardener said after Taylor's death: "All that is in me which is worth while I owe to Mr. Taylor."

One cannot avoid the conclusion that a good deal both of enthusiastic support and of bitter hostility was aroused as much by the personality of the man as by the merits or demerits of his system. It is fortunate, therefore, that the system as well as the man receives ample treatment; indeed, for the layman this biography is probably the best general statement of the Taylor system in print.

The whole idea, according to the author, arose out of Taylor's experience as gang boss and foreman in the machine shop of the Midvale Steel Company. He started as a laborer, and by degrees was promoted from one job to another until he found himself in charge of the shop. All along he had known that the men were "soldiering." As a machinist he had "soldiered," too, but as foreman he was determined to abolish the practice. His own account of how for three years he fought with his men over the question of what is a day's work, at the end of which time he won a partial victory, is best told in Taylor's own book, "The Principles of Scientific Management." There, too, is to be found one of the best explanations of some of the basic reasons for soldiering to be found anywhere.

Despite the winning of this partial victory over his men, Taylor was not satisfied. The trouble was that "we do not know what is a proper day's work." Soldiering under-piece work was due, he felt, to fear lest an increase in production might lead to a cut in the piece rate. He believed, however, that if piece rates were based not on the actual performances of the workmen in the shop, but "on the facts as revealed by a careful investigation, their motive for soldiering would be destroyed."

This idea was the beginning of scientific management. From the problem of getting results from

labor it was a logical step to the problem of shop equipment, for, after all, what Taylor wanted was not just to induce men to work hard, but so to organize all the forces under his direction as to achieve the maximum in quantity and quality of output. He defined the problem of the machine shop as that of "removing metal from forgings and castings in the quickest time." This meant two things: the development of the best tool, and the most advantageous use of that tool by the workman. Consequently, in addition to time studies, record cards and functional foremanship, Taylor began a series of experiments in cutting metals which led to the discovery of so-called "high-speed" steel—an achievement that brought him world-wide recognition.

There is neither space nor need here for a discussion of the various factors involved in the Taylor system of scientific management. It does seem worth while, however, to give some consideration to the methods followed in developing its two principal aspects mentioned above.

On the side of the development of the best possible tool, we see beyond question Taylor, the engineer, the scientist. Years were expended, tons of steel consumed, in discovering the best quality of steel for cutting tools, the angles at which they should be set, the depth and speed of cut, and so on. There could be no limit to time or patience in determining objective facts of this sort.

On the other side of the problem, that of what constitutes a day's work, Taylor appears to have been less fastidious. Six months devoted to a study of the angles for cutting tools brought negative results, so the study went on for two years, but in discovering the amount of work a man could do in a day the experiments seem to have been less persistent. "Two first-class laborers, to whom were paid double wages," were selected, and the time study man observed them "for weeks."

The reviewer does not mean to suggest here that Taylor was consciously unmindful of the interests of the worker, and he has no notion that the Taylor system has ever meant overwork. The experiments carried on had as their purpose the prevention of overwork as much as anything else, and they doubtless have contributed to that end. Not only is that the case, but Taylor was as much opposed to the exploitation of labor through the vicious method of cutting the piece rate as any union leader. He has been criticised for not offering the worker a wage

increase proportional to the increase in output resulting from the adoption of scientific principles, but he scorned those who scrimped and haggled over pennies in dealing with labor. During one of his lectures a manufacturer present "questioned the need of giving workers a bonus of from 35 to 50 per cent for maintaining standards; in his opinion 20 per cent would be plenty. 'Well,' said Taylor, peering at him over his spectacles, 'you are a damn hog.'"

Nevertheless there was a great contrast between Taylor's methods in finding out the truth about things and his methods in finding out the truth about men. In the former field he was scientific, in the latter unscientific. That is not surprising, for few men can play more than one role successfully. It was enough that Taylor was an engineer—he could not rightly be asked to be an economist and a sociologist as well. But the trouble was that Taylor was apparently as sure of himself in the field of economics and sociology as he was in engineering. In both fields he was dogmatic. Consequently, he fell into errors of various sorts, and often contradicted himself. For example, he declared in his "Principles" that scientific management has as its "very foundation" the idea that the interests of employer and employee "are one and the same." He thought that the question of the rate of wages could be reduced to a scientific formula, no more to be bargained over than the question of the hour for the sun to rise. But he forgot these theories in the face of concrete realities. When he was promoted to a foremanship over the machinists with whom he had formerly worked, he "told them plainly that he was now working on the side of the management"—a thing that could hardly be said to exist apart or different from the "side of labor," if the principle of identity of interests as confidently set forth above was true.

This failure to subject economic phenomena to the same clear-headed scrutiny that he gave to problems in the field of physical science did more than lead to the fallacy that economics and physics are subject to equally determinable laws. It was responsible for his failure to grasp the significance of one of the most important economic developments of his day—trade unionism. Frederick W. Taylor understood the desire of men individually to get ahead. His relations with his employees were individual and direct. It was a simple relationship, involving the giving and the taking of orders. That, to him, was the natural way and the efficient way.

He never thought of workmen in the mass as workers, cut off from certain rights and privileges, because they were workers. He thought of individual effort as the only way to make progress. An honest day's work must result in an honest day's pay—and he never really weighed the risk that the honest worker runs of not getting his honest pay because of a dishonest or stupid employer. He waved that all aside with the dictum that "nobody but a fool" would treat labor that way; but he had no formula for the defense of the workers against the "fool" employer. Or if a growing understanding of scientific principles in management was a formula, it was one that left the worker at the mercy of such an employer until he chose no longer to be a fool.

But in the development of this very formula—in the scientific management principles worked out for the salvation of both employer and employee—here, too, there was evident a lack of understanding of the workers' point of view. The idea of bargaining with an organized group was utterly opposed to Taylor's ideas of management. It could not be done; you could not in his view bargain over the laws underlying a science. He was opposed even to shop organizations promoted by the employer, and utterly divorced from trade union affiliations.

Of course, this meant warfare with the unions. It is quite true, as the author states, that in this warfare the union leaders did not always avail themselves of information they might have secured. It is, of course, equally true that Taylor and his associates did not try very hard to understand the trade unionists. They appeared to be quite unconscious of the basic historical facts that have made labor movements inevitable, and seemed to think of it as a superfluous and irritating interference with the process of sound industrial management. The present writer recalls with vividness the hostile reception accorded to the late Robert G. Valentine in a meeting of the Society to Promote the Science of Management in 1915 when he read his paper on Efficiency and Consent—the first outstanding discussion in that group in which the necessity of representation and bargaining was clearly set forth.

Much water has run under the bridge since 1915, and many of those who came to scoff at that meeting have since learned to pray. There is now a good deal of evidence that among the followers of Frederick W. Taylor there is a growing recognition of both the importance and the need of organized labor.