

he does at home, and taxes his workmen and his countrymen to make up the difference, let this be shown. If the expense account and profit are overestimated, and if the labor element is cut down accordingly, let this be shown; but force without reason is war, and war is barbarism.

The boards of conciliation and arbitration in New Zealand offer at this time the most advanced solution of labor disturbance in so far as treatment is concerned. It dispenses with the barbarism of labor war, is logical and deserves attention in all countries. The limits of this paper do not permit its discussion here, further than a suggestion that it be examined carefully by everyone interested in the subject.

THE PREMIUM SYSTEM OF WAGE PAYMENT.

BY ALEXANDER E. OUTERBRIDGE, JR.

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If an observer should notice a gang of ten men in any large establishment standing idle all the day long he would naturally be amazed at the apparent lack of discipline; yet it may be confidently asserted that there is no establishment employing a thousand men in which the actual loss of time every day, through idling and gossiping, does not exceed in the aggregate the entire time of ten men for ten hours each day. A loss of but six minutes a day in this way by one thousand men equals 6,000 minutes or 100 hours, or the equivalent of the full time of ten men for ten hours. Thorough supervision of each one in order to prevent this evil of loitering—which in factory phraseology is designated soldiering—is a physical impossibility. Unlike the slave of olden time, whose sole aim was to accomplish as little as possible, even under the stimulus of the lash, the operative of to-day turns out the largest product when he is a willing worker, not needing constant overseeing. The true way, therefore, to influence the individual to accomplish the best results for his employer is to convince him that in so doing he is accomplishing the best results for himself. Few operatives succeed in obtaining regularly day by day the maximum output from any machine; some have not the requisite skill, others fail through lack of attention to small details, such as forethought and method in grouping or assembling the work, others through laziness or disinclination to turn out more than a certain amount of finished material in a day. An operative may also, perhaps, through lack of constant attention to the work, unconsciously limit the output of a costly machine and thus cause loss to

his employer far exceeding the entire amount of his wages.

If no system of espionage can prevent this loss of time, how can it be minimized? Profit sharing has been advocated as one method by which the employee could be induced to take a personal interest in the management of the business. The writer is skeptical about the permanent success of any system that has yet been devised of so-called profit sharing in any kind of manufacturing business with which I am familiar. There are so many conditions affecting profit and loss in manufacture of raw material into finished products with which the operative has no connection that it would be manifestly unfair to charge him with a share of such loss, and, on the other hand, profit may be due to outside causes to which the operative contributes nothing. He would, therefore, not be entitled to share in such profits. But apart from ethical considerations, it would be manifestly impossible to open the books of a manufacturing concern for the inspection of all of the operatives, and they would not understand the methods of accounting, even if it were practicable to do so. For these, and other reasons, profit sharing is, in my judgment, doomed to failure. Other schemes for giving the operatives an interest in the management come under the general head of business and philanthropy. This is a delicate subject and needs to be handled carefully. As a general proposition the two do not, as a rule, work together successfully. Some of the reasons therefor are not hard to find. The American workman is self respecting, independent, and generally well to do; he resents any approach to paternalism on the part of an employer. He does not desire, and will not accept, anything savoring of charity; he is suspicious of philanthropic schemes devised for his apparent welfare, especially if they curtail in any way his cherished liberty and freedom of conduct.

One of the most interesting and, for a time, promising schemes for the mutual benefit of the employer and the workmen was that of Mr. Alfred Dolge, of Dolgeville, N. Y. Here was a town created by one man; everybody was employed in one industry, and there were no clashing interests. The proprietor of the great establishment of Dolgeville graduated

from the ranks of labor, and, having begun as a poor workman, he was familiar with the hardships of the laboring class. As soon as he became an employer of labor he began to formulate his long cherished co-operative schemes; but, unfortunately, his ideas were doomed to failure in the end, although apparently based on sound principles. This lamentable failure—whatever the cause may have been—has given a sad blow to all such semi-philanthropic undertakings. In Europe many similar plans have been tried, and failures have generally resulted. In Germany a large glass works was started a few years ago by wealthy philanthropists. The entire plant was a gift to the workmen, and the necessary capital was furnished. Each employee was given an interest in the concern, and work was commenced under extraordinarily favorable circumstances. Before long internal dissensions arose; each man considered himself a boss, and within a year the working capital was sunk, the workmen scattered and the plant sold at a sacrifice. It rarely happens that business and philanthropy can unite to form a working partnership.

In my judgment, the best way to solve the problem is to make every man the treasurer of his own time, and the only practical way to do this is to pay the largest premium in addition to the standard wage rate for the largest individual output. The piecework system was devised with this in mind, but in its original form it is open to one serious objection, which always will exist, and that is that the workman fears that if he does more than a certain amount in a day, sooner or later the piecework price will be cut and the result will be that he will have to work harder than before to acquire the same amount of money. This is gradually being improved upon and the premium piecework system is the chief improvement. It has added an entirely new feature in the relation of employer and employee, and in several concerns, it has increased the rate of wages, while at the same time it has decreased the cost of the product.

While there are different methods in vogue, adapted to different circumstances, the premium system consists essentially of the addition of a premium to the base price agreed upon for any job, the amount of the premium depending upon

the reduction of time in performing the work. The method of remuneration differs radically from the ordinary piecework system of payment, for it makes each workman's interest the same as that of his employer; it pays a premium for high efficiency, and soon convinces each man that it is for his permanent advantage to turn out each day the best quality and maximum quantity of work. Briefly stated then, the premium system consists in paying a higher rate per piece for a greater amount of work done without imperfection in a given time. Several years ago Mr. Fred W. Taylor devised and put into practical operation at the Midvale Steel works a premium piecework plan which he called the differential system. This may, perhaps, be regarded as the pioneer of all the premium systems in use to-day, and it proved immediately successful. The following illustration, representing actual results obtained in daily work, will show the economy of high wages under Mr. Taylor's differential system as applied to turning certain steel forgings, of which many thousands were made.

COST OF PRODUCTION PER LATHE PER DAY.

ORDINARY PIECE-WORK SYSTEM.		DIFFERENTIAL RATE SYSTEM.	
Man's wages.....	\$2 50	Man's wages.....	\$3 50
Machine cost.....	3 37	Machine cost.....	3 37
Total cost per day.....	\$5 87	Total cost per day.....	\$6 87
Five pieces produced; cost per piece.....	1 17	Ten pieces produced; cost per piece.....	69

To further explain the difference between the simple piecework system and the premium system, reference may be made to a case where new work was introduced into an establishment undertaking an entirely new kind of manufacture. The concern had never done the work before, so did not know at all what it was going to cost. Parts of the machines were given out to the different departments to be made by day's work, because nobody knew what the cost was liable to be. The people selected to work by the day were the men who were considered the quickest and best workmen in the establishment, who would be likely to make those parts under the system of day's work as cheaply as they could be made, so that the actual cost of making them in this way might be made

the basis for a piecework price. Quite a large number of the parts were made by day's work. I saw some of the work being done myself, and did not observe anything that led me to believe that there was any loafing on the part of the men. A piece price was finally fixed based upon the average cost by day's work. After the men got more skilled in their jobs they did a little better, but the average was taken for the piecework price. It so happened that some precisely similar things were made in another establishment, and through an accident it was ascertained that an article which cost about twenty four dollars to make under this system of piecework cost about thirteen dollars to make in the other establishment where a premium system was in vogue. An investigation showed that the actual amount of labor required to make the pieces was the same in each foundry, but in one the simple piecework system of pay obtained; in the other a premium system. Then an entire change of personnel in the department, including the foreman, was made; new men were engaged to do the work on a premium system and the result was surprising. In a very short time the new men were making nearly double the wages of the former operatives and the cost per piece was reduced nearly one half.

This system, of course, does not spare the tools, which are run at a high rate, and, since its introduction, the views of progressive manufacturers regarding the economical use of machine tools have materially changed. Formerly, old tools were venerated and carefully preserved as long as they could be used. Now, the aim is to obtain the full life service in the shortest possible time, and then to consign the tool to the scrap heap. In this way tools are worn out long before they have become obsolete in design. Soldiering on the part of the operatives is effectually eliminated, wages are raised, the output increased and cost of production is decreased in an amazing ratio. All this is accomplished without exhausting toil on the part of the operative, for the machine has relieved him of most of the hard work; especially is this noticeable in handling heavy materials. In former days rupture was very common indeed among moulders in foundries, caused by frequent severe straining in lifting flasks and

moulds; now it is a rare thing to find rupture among the younger moulders, owing to the fact that in all modern foundries traveling cranes and other hoisting appliances are provided for lifting heavy materials and carrying them from one place to another.

Within my own experience there has been a great improvement in this respect. I can recollect at least six moulders in one foundry who were badly ruptured from lifting their moulds, while to-day I never hear of this trouble, for the main cause has been removed. The mechanic of to-day, who is engaged in riveting a boiler or a bridge structure, no longer spends ten hours a day in striking blows with monotonous regularity upon the rivet heads, but he is employed to control the steam or hydraulic riveting machine, a sort of giant hand, which presses the red hot rivet into place with a simple, silent squeeze of its powerful finger far more effectually than can be done by two strong men striking one hundred blows each with a riveter's hammer. This has been proved by official tests.

Certain conditions are necessary for success of any system. There are laws regarding the relation between employers and employees which are immutable, and the most fundamental of these laws is that mutual confidence and respect are necessary precedents to the inauguration of any marked change in the methods of management or the conditions of payment. Such confidence is especially important when changes are made from time wages to some form of piece wages intended to increase the output by increasing the inducement to labor. Workmen are invariably suspicious of such changes. They fear that the piece rate will be cut as soon as the capacity of the worker has been shown. Without the fullest confidence in the good intentions of the employer, therefore, so radical a reform as the one suggested can with great difficulty be introduced. Employers can acquire and retain this confidence by courtesy, by fair dealing, by providing healthful and pleasant surroundings for their employees and by protecting them and their families against the consequences of sickness or accident.

A personal incident that happened in my own case and among workmen with whom I was brought into contact illus-

trates the advantage which comes from cultivating the good will of employees. About fourteen years ago I began a series of metallurgical investigations in the establishment with which I am still connected that resulted in a considerable change, an absolute change in fact, in the character of the metal operated upon by some of the machinists. These men were, at that time, inclined to be suspicious of any change, and there was a theory ever since the days of the machining of iron that it was impracticable to do what we were attempting; it met with great incredulity, and when several very large castings thus treated were sent to the machine shop to be planed and drilled to make finished machines, opposition began immediately to come from the mechanics, who were not interested in anything that might go on in the foundry department. It was necessary for me, therefore, to walk around through the machine shops every day to examine these castings so as to find out whether the new treatment had interfered in any way with the work of the machinists; and, as I have naturally a genial feeling for my fellowman, I would always say good morning to the mechanics tending the machines. I found that this salutation was a surprise to these men, for they were not accustomed to it; some of them had been there for forty years or more and had rarely heard good morning said to them by any one in authority. It was not the custom, but I was not aware of that. One man replied to me: "What did you say?" and I said again, "good morning." Well! in the course of time these workmen began to realize that the new metallurgical method was not interfering in any way with their wages; that it did not take any longer to finish up the work and that was what they were interested in, as they were paid by the piece. So, after a while, I began to notice a change in the faces of these operatives when I said good morning, and a good many said good morning to me; but one man had told me in the beginning that I was going to take the bread out of the mouths of his wife and children, and having once said that, he was not a man to take back his word as long as he could help it. Time went by, and never did I get any answer from this man to my morning salutation although all the others had forgotten their original objections and had become most

friendly, until one day when I came along he muttered some oaths, and then, to my surprise, I noticed a smile stealing over his countenance and he said: "It isn't any use trying to make you mad, here's my hand." That was very amusing to me, but it was a conquest after years of patient waiting, and to this day we are good friends. This shows that little things count, and that social amenities in business life are not to be despised.

Another important consideration making for the successful establishment of such innovations as the premium system is a care for the well being of the employees. In my discussion of business and philanthropy I do not wish to be misunderstood, or to seem to underrate the advantages which may accrue to employees, as well as to employers, of philanthropic plans devised for the aid of sick, injured or infirm operatives. In one of the largest and most successful manufacturing establishments in the world an admirable system is in vogue, whereby unfortunate men are helped in time of need, but so judiciously and secretly is this done that the world knows nothing about it, and if I should name the establishment it would violate confidences that I have received, not from the managers of the works, but from men who have been thus aided in a way which has not awakened any other feeling than that of gratitude. You cannot find any illusion to these matters in the rules posted up in the works, and, in fact, I believe there are no rules on that subject. There is no contract in existence; there is no guarantee that if a man is injured, or if he is sick, or in trouble, that the helping hand will be extended to him, yet I doubt not that every one of the thousands of men employed in those shops goes to his daily work with a contented feeling that should an accident befall him while on duty, his family would be cared for while he might be incapacitated for work. It thus appears evident from whatever point of view the question may be studied that the value of the personal equation in management of large industrial works is a most important factor in the successful conduct of affairs.

Moreover, my views are pronouncedly toward recognizing the responsibility which rests upon the employer to the fullest extent practicable, not, however, based upon

philanthropic grounds, but because observation has taught me that one of the most profitable investments of money that can be made in a manufacturing plant is to give the largest possible advantages, in the way of conveniences and sanitary arrangements, etc., to the operatives. I remember years ago finding it a difficult matter to impress upon the superintendent of a foundry the importance of having the windows washed. They had not been washed for years, and on dark winter days the dimness in the foundry necessitated artificial light; indeed at all times the conditions were bad for the eyes of the moulders. I had a great deal of trouble to get those windows washed, and yet I am quite sure that the cost was repaid in a very few days in the saving of bad work. The introduction of steam heat into another foundry that I am familiar with was a source of expense that the managers were loath to incur, but that was also a profitable improvement; it avoided irritating and blinding smoke in the foundry on cold mornings caused by lighting woodshavings on the dirt floor; not only did it contribute to the comfort of the men, but the steam heat kept the sand warm, and the moulds did not crumble as formerly by reason of freezing of the moisture in the sand on cold nights. The introduction of shower baths, dressing rooms, water closets, and other similar comforts and conveniences, improves the character of the work and conserves the health of the workmen. I maintain that every operative who gets sick in the employ of a concern, causes more or less loss, even though he may receive no wages during the time he is incapacitated for work; another and presumably an inferior or less experienced man must be put in his place and the interests of the firm must therefore suffer. For this reason I believe that every kind of legitimate comfort and convenience that may be provided for the operatives is a source of profit to the employer although apart from the moral obligation to care for the health and comfort of the employee.

There is one impending menace to the continued success of the premium system, that is the arbitrary and shortsighted policy of some of the labor unions, which are continually striving to curtail the activities of labor by limiting the work of the more competent members of the union to the capacity of the

less competent or more indolent members. This is certainly detrimental to progress. The immediate result of such methods is to antagonize the employer, who does not object to labor unions when they confine their activities to legitimate fields of usefulness. It was just such dictatorial methods of the labor unions in Great Britain that precipitated the great and disastrous strikes of mechanics a few years ago. The loss in wages alone, though amounting to millions of dollars, was small as compared with the permanent loss sustained by the manufacturing industries in that country, caused directly by the preposterous acts of the labor unions. The ostensible ground on which this policy of the labor leaders is defended is that there is only so much work to be done and that if a machine is introduced in place of a man, or if machines are run at higher speed, the aggregate earnings of labor will be reduced. The absurdity of this opinion is by this time sufficiently apparent.

If it were not for the assistance of costly mechanical aids, so freely furnished to operatives, enabling them in many cases to quadruple the effect of their efforts, the American mechanic would be to-day making less wages, while having harder work; the output from the workshops would be smaller, and the general prosperity of the country would be less marked. If it were not for these mechanical aids the premium system would not have been developed and the true policy of the labor unions should be to foster this system in every way.

It may seem anomalous to say that the higher the class of labor in manufacturing establishments the cheaper the product, yet this has been proved time and again, and it has come to pass through the aid of machinery. The skilled workman of to-day in almost any trade is a man who can so deftly and judiciously operate a machine, or a number of machines (representing often an investment of many thousands of dollars), that the output is largely increased thereby, without necessarily increasing unduly his own physical or mental labor; the employer can well afford, therefore, to offer large pecuniary inducements in the shape of premiums to the most productive operators.

An impression has prevailed in the minds of many intelligent people, especially those not engaged in mechanical pursuits, that the substitution of so-called automatic machinery for hand labor is detrimental to the intellectual development of the wage earner, tending to make him a mere automaton, like the machine which he tends; that the skilled handicraftsman of former generations is fast disappearing, and that his successor is becoming a mere marionette, to whom the gift of brains is almost a superfluity. Daily observation in large industrial works extending over a score of years, has led me to form a different conclusion. I believe it is now generally admitted that the educational influence, upon the mind of the operative, of daily contact with machinery is a potent one, enlarging his mental horizon, giving him more accurate perceptions of the true relation of parts and fitness of things, and elevating him intellectually above the place of the old time handicraftsman. The machine once regarded as the robber of the wage earner is destined to become, indeed, has already become the missionary for his enlightenment; and when its advantages are fully appreciated in the labor world the conflicts which have marked the transition period will become a mere memory of a past era. Just as every new invention in scientific mechanism of warfare is a step toward the ultimate settlement of international disputes by arbitration, so the general diffusion of knowledge among the wage earning class through the aid of machinery and its products, is a step toward the settlement by peaceful processes of the complex questions which will, without doubt, continue to arise in the future regarding the mutual relations of capital and labor.