

nificant that so far as is known through broad inquiry, such disturbances as have occurred have been of an altogether minor character, quickly and satisfactorily adjusted.

This fact is of preëminent importance at the present time. It is unquestionably the greatest contribution of scientific management—all the more so because secured, not as industrial "peace" was secured during the latter period of the war by governmental suppression of the disturbance of industrial conditions by either labor or capital, but by cooperation, justice, and fair dealing.

B. HIGH WAGES

It has sometimes been claimed that, in the cases of certain profit sharing and other measures, daily wages have been depressed below the market rate in the exact ratio in which profits were to be shared. Whether the claim is well founded does not concern us here. So far as the writer knows, this accusation has never been laid at the door of Scientific Management. That it is not likely with justice ever to be due to the dependent relation between daily wages and output. Starting with a current base rate of pay and the normal amount and quality of work customarily delivered by the operatives for that pay, scientific management first takes measures by which that production or that quality, or both, may be increased. Having thus provided the possibility of higher and better production, it then offers, as a matter of justice as well as of necessity, a correspondingly increased incentive for its accomplishment, payable at once, regardless of whether or not during any given period a profit is made on the business as a whole. Each is necessary to maintain the other, and the increased wage is solely dependent on and must follow immediately, not precede, increased output.

Increases in the earnings of operatives working under scientific management are too common and well known to need repetition here. Bonus percentages, above the prevailing market rate of wages, vary from 20 per cent to 40 per cent or higher depending on the character of work, and on the average are earned on from perhaps 70 per cent to 90 per cent of the jobs worked upon.¹

That the more progressive managers are beginning to question the prevalent empirical bases of wage de-

¹For typical records see Hearings before Special Committee of the House to investigate the Taylor and other Systems of Shop Management, vol. iii, p. 1502; Congressional Record, February 1, 1917, pp. 2655-57; Thompson, S. E., "Development of Scientific Methods of Management," Trans. A. S. M. E., vol. xxxix, p. 123.

termination and to seek for a more satisfactory basis is evidenced by an attempt on the part of several of them to reduce to formulae the effects of various factors previously wholly neglected or only empirically estimated. Thus Babcock² takes into account the following factors:

1. Rate of production.
2. Cost of living.
3. Number of processes workman can do.
4. Years of connected service.
5. Fixed charges rate per hour which man has chance to modify.
6. Percentage of premium earned.
7. Late or absence record.
8. Spoiled work.
9. Percentage of time under task.
10. Cooperation and conduct.

Such an attempt shows careful consideration of one of the three most important things for which the workman looks to the management: wages, conditions, opportunity.

Since the present paper is designedly little more than a synopsis of conditions as they are, it would be inappropriate to prolong it into a discussion of the various interesting social and economic aspects of scientific management as related to the wage question as a whole. It must suffice here to emphasize the undoubted fact that scientific management is leading the way both in the actual payment of wages higher than the general market level and in attacking some of the deeper fundamental phases of the problem.

C. PROPER WORKING HOURS

Mr. Taylor was one of the first to recognize and to prove the fact that overlong working hours are not conducive to high output, and that in very many cases hours of work may be sharply decreased up to a certain point and output increased simultaneously,³ this point having to be scientifically determined for each class of work. The policy of reducing excessive working hours offhand, and of continuing thereafter to reduce them to a point not inconsistent with maximum gross output, has been consistently followed by his associates,⁴ and scientifically managed factories as

²Babcock, G. D., The Taylor System in Franklin Management.

³For instance, see account of his early work at the Symonds Rolling Machine Company, "Shop Management", paragraphs 195-210. The same thing has happened in numerous other cases.

⁴See Thompson, S. E., "Development of Scientific Methods of Management," Trans. A. S. M. E., vol. xxxix, p. 123.

a body today are operating under at least as short hours as any other group of plants, while excessive hours on the part of any of them are unknown.

When one stops to consider it, it does seem rather remarkable, not to say significant, that scientific management presents such a uniform history of simultaneous increase in output, increase in quality, increase in wages, decrease in working hours and decrease in costs in those plants where it has been developed. Such is its record, nevertheless, in dozens of applications. It has ceased to be a novelty and is now the expected thing.

D. CONDITIONS OF WORK AS RELATED TO THE HEALTH AND WELL-BEING OF THE WORKERS

Looked at from a perfectly cold-blooded standpoint the return on the investment in the upkeep of the efficiency of the human machine exceeds that on the investment in the upkeep of the mechanical product. A moment's reflection will show why this must be so, for under proper conditions the human mind and heart delivers a plus which the inanimate machine is incapable of. From the entirely personal, selfish financial aspect, then, there can be no question that the very best condition for the employee is the very best condition for the owner of the business. And by the word "best" is here meant what is really best for the workman in the long run: wages neither too low nor too high, hours neither too long nor too short, general treatment neither too degrading through neglect or abuse nor too emasculating through ingratiating or paternalism.

From the purely economic standpoint, furthermore, this condition is equally true. It is economically wrong to allow the human machine to work under unsocial conditions of long hours, low wages, poor working conditions, unfair competition and lack of free scope for the proper exercise of one's individual abilities, because under such unsocial conditions best results are not obtainable from human beings. A prematurely incapacitated workman, much more than an inefficiently employed one, is a direct financial loss to the industry and a direct economic loss to the community.

But it is particularly the social and ethical aspects of the question which I wish to emphasize. That the owners and managers of plants under scientific management recognize and capitalize that source of additional personal profit is true; that they consciously consider their economic obligations may or may not be true; but that they primarily and continuously have

the best interests of their people at heart, not from any ulterior motives but because they are that sort of person, I believe can be doubted by no one who will take the trouble to visit them and their employees. They would otherwise never have achieved scientific management—for scientific management is distinctly a thing to be achieved; it cannot be purchased and it cannot be had or maintained without this attitude.

One would naturally expect, therefore, to find in such plants satisfactory conditions as regards accidents, health and sanitation, the speedy and impartial adjustment of grievances, and comfortable working conditions generally. The providing of such necessities follows almost as a matter of course. In addition are found also in varying degrees of completeness rest and recreation rooms, playgrounds, libraries, lunch rooms where necessary operated at cost, first aid hospitals, etc., on an unpretentious scale according to strict utility. Such measures, if initiated upon actual need and if properly regulated, are appreciated by the employees and express the good will of the firm toward them. Then, as a step further, there are the mutual benefit societies and insurance and retirement funds which were initiated by Mr. Taylor very early in his work and which are very characteristic of plants following his lead as well as of many others at the present time.

There is another phase of this question, however, which is of much greater importance than most of the measures enumerated in that it affects the workman during his entire working hours while he is at the machine and for his entire life as a productive member of society. While it is important to provide means for caring for him during temporary sickness or disability and after he has ceased to be productive, it is at least equally important that his period of usefulness be safeguarded and prolonged through attention to his daily work. This is accomplished through the determination of "the best day's work that a man could do, year in and year out and still thrive under." The object of time study is just this—the determination of a proper day's work which, through allowance for rest and necessary delays, the workman may do year in and year out and thrive under. The setting of a task either too high or too low is equally shortsighted, since the object for which the study is made is thereby defeated. As a vital part of the determination of such a task is the investigation of the tiring effect on a workman for each class of work, investigations commonly described today by the term "fatigue study."