

ment, to correct any injustice that may be done him in relation to his ordinary every day work by simply choosing his own pace and doing the work as he sees fit. That remedy lies open to him at any minute, and the workman will do it every time he is treated unjustly under scientific management, just as he would under any other management. In other words, injustice on the part of the employer would kill the goose that lays the golden egg.

The Chairman. Would not your suggestion of cooperation on the part of the workman with the management (the management being the sole and arbitrary judge of the issue) be very much like the lion and the lamb lying down together with the lamb inside?

Mr. Taylor. Just the opposite. The lion is proverbial of everything that is bad. The lion is proverbial of strife, arrogance—of everything that is vicious. Scientific management cannot exist in establishments with lions at the head of them. It ceases to exist when injustice knowingly exists. Injustice is typical of some other management, not of scientific management.

The Chairman. Mr. Taylor, do you believe that any system of scientific management induced by a desire for greater profit would revolutionize the minds of the employers to such an extent that they would immediately, voluntarily, and generally enforce the golden rule?

Mr. Taylor. If they had sense they would. And let me tell you, Mr. Chairman, that that is the best answer. Not immediately. I have never said that. You cannot persuade any set of men, employers or employees, to adopt the principles of scientific management immediately. I have always said that it takes a period of from two to five years to get both sides completely imbued with the principles of scientific management. And I have further said, which I wish to repeat and emphasize, that nine-tenths of the trouble comes from those on the management side in taking up and operating a new device, and only one-tenth on the workmen's side. Our difficulties are almost entirely with the management.

The Chairman. Is it not true that scientific management has been developed with a desire to cheapen the production in order that there might be greater profits?

Mr. Taylor. Mr. Chairman, in one of the

books which I have written on scientific management, in paragraph 21, page 1343, in the paper-covered pamphlet entitled "Shop Management," and which is in the possession of the Chair, in large print—and I believe this is perhaps the only paragraph in that whole book written in this very large print—is emphasized this fact:

This paper is written mainly with the object of advocating high wages and a low labor cost as a foundation of the best management and of pointing out the general principles which render it possible to maintain these conditions, even under the most trying circumstances, and of indicating the various steps which the writer thinks should be taken in making a change from a poor system to the better types of management.

The Chairman. In the same book, Mr. Taylor, do you not undertake to show that high wages are brought about by taking a workman who has been employed at a lower-priced class of work and putting him at work on a portion of the work formerly performed by the high-class workman and then giving him a higher rate of wage than he had before in the lower class of work, and yet a lower rate than was actually paid to the skilled workman who performed that work prior to that time?

Mr. Taylor. I have pointed out that under the principles of scientific management, with the teaching and kindly guidance which the workmen receive from the teachers who are over them in the management—I won't say over them; who are helping them in the management—with the high standards which are placed before them and taught to them; with the better methods of doing work (which are gradually developed through the joint efforts of hundreds of men) I have pointed out that when any workman of any caliber receives this unusual training and is given these unusual opportunities, that he is thereby enabled to do a higher and a better and a more interesting and finally a more remunerative class of work than he would be able to do under the old system of management, and that when he did this higher class of work he was paid a higher day-work

wage. That is, his wages were first advanced beyond the price he had received in the past, and that, in addition to this advance, he received daily a premium of from 30 to 100 per cent for carrying out the instructions which are daily given to him.

And this applies not only to those workmen who do the cheaper kinds of work, but to all workmen high and low. For example, a man who under the old system of management has only sufficient brains to sweep the floor, under scientific management is taught and trained and helped so that he finally learns how to use, say, a grinding machine or to do some of the more elementary kinds of machine work. He is taught to do a class of work which is far more interesting and requires more brains than the sweeping to which he was formerly limited. And he is then given the higher wages and the interesting conditions and surroundings which accompany this higher class of work. At the same time the man who was under the old system on the grinder is taught to do some of the simpler kinds of "high-class machine work." Of course you understand I am speaking now of types of men who under the old system were limited by their mental capacity to simple work such as running a grinder; I am not speaking of the exceptional man who was born with plenty of brains to do high-class work, but who did not have the good fortune to learn a trade when he was young; but I am speaking of the man whose mental caliber would naturally limit him to sweeping the floor or running a grinder. Now, to continue the illustration, the drill-press hand, for instance, by this same teaching and training, is enabled to do the work of the lathe hand, and the lathe hand is enabled to do the work of the high-priced tool maker or a man of that mental caliber.

You understand I am not speaking literally; I am speaking by way of example. And finally the tool maker becomes one of the teachers to show the men lower down all along the line how to do their work—to show them and teach them and guide them in their work. Now, this upward movement of all the men is not confined to any one class; it applies to all types of workmen. They all rise to a better class of work and to higher pay under scientific management.

The Chairman. Take the illustration, for instance, of a man of the mental caliber of a common laborer and who is employed as a common laborer. What were the rates paid, say, at Midvale, under scientific management to the common laborer as compared with the wages paid to the common laborer under the ordinary management by the United States Steel Corporation at Pittsburgh?

Mr. Taylor. The wages of common laborers when I was at the Midvale Steel Works (and I left there in 1889) ranged from \$1.20 per day to \$2.70 per day, with piecework added.

The Chairman. From \$1.20 to \$2.70 per day?

Mr. Taylor. Yes. In other words, under scientific management there is no standard or uniform rate of pay for laborers, nor for any other group or class of men. And I want to emphasize this fact, Mr. Chairman, which does not seem to be at all recognized by the world at large, that workmen differ just as much as horses differ. Now, we all know that there is a vast difference in horses. I do not mean anything degrading to the workman by this comparison, but I dare say some one will say that I am comparing workmen to beasts. We all know that horses differ, and yet very few people seem to recognize that there is an even greater difference between different members of the human species. There is just as much difference between laborers as there is between horses. I think I can say with truthfulness that the laborers to whom we paid \$2.75 a day at the Midvale Steel Works quite as fully earned their high wages as did the cheaper men who were only paid \$1.20 per day.

The Chairman. This man at \$2.70 a day, how many hours does he have to work?

Mr. Taylor. Ten hours.

The Chairman. Is that the usual time of work?

Mr. Taylor. Yes, sir; 10 hours per day, with the exception of certain departments of the plant, in which it is impossible to shut the apparatus down. For instance, the open-hearth furnace department. As we all know, it is as impossible to shut down an open-hearth furnace as it is to stop the sun from setting. It takes a week to shut down an open-hearth