

the man who is trained to shovel in the mines it is not true.

Mr. Taylor. I rather fancy that, as you say, it is not true. Again, Mr. Chairman, it appears that the science of shoveling is even broader than we know anything about, and that a further investigation (I haven't a doubt) would prove that what you claim is true.

The Chairman. You say that one of the methods by which the employer can be disciplined if he fails to live up to his own methods of rules and regulations is that the workmen can drop back to the old method which you call soldiering. Would it not be part of scientific management to let out of employment entirely the man who drops back to the old conditions?

Mr. Taylor. If he were let out of employment, and another man took his place, and that man were treated unjustly, that man would do the same. It would be simply getting a second man who would do the same thing. You cannot get a fresh man who will submit to injustice any more than your old employee will.

The Chairman. The only method, then, of disciplining the employer for failure to comply with his own formulas is that the individual workmen might leave him?

Mr. Taylor. I fail to see why just exactly the same treatment could not be accorded to the employer under the scientific management who misbehaves himself as could be employed under any other type of management.

The Chairman. Would it be possible under your scientific management for the workmen to act collectively for their own protection, when it is stated that collective arrangements or collective bargaining relative to the conditions under which the workmen are to be employed cannot be permitted under scientific management?

Mr. Taylor. Mr. Chairman, I have never made any such statement as that. I dare say that some one else has made it. I never have made any such statement as that. I stated in my testimony just a little while ago that I have never seen the necessity for collective bargaining. I have never found the time when those who were engaged in scientific management needed the stress of collective bargaining to be

brought upon them in order to make them right any wrong. It is sufficient under scientific management for a single workman to step up and say, "I have been wronged" and he will have his wrong righted; to say that these conditions are wrong, and he will have an investigation made to find whether they are or are not wrong conditions, and in investigations, as I have stated, the workman always has his share.

The Chairman. If I understood your testimony correctly, Mr. Taylor, you said there was no objection—in fact that you courted the co-operation on the part of the employees relative to the conditions of employment, and yet under scientific management you would permit no interference on the part of the employees relative to the conditions under which they should be employed?

Mr. Taylor. If I made that statement then I made a statement which I did not intend to make. I think you have in mind, Mr. Chairman, that I stated that when a workman is given an instruction card asking him to do work in a particular way that until he has attempted to do that work in that way, until he has followed his instructions as they are written, that no protest on his part will be received. In other words, that you do not want to furnish a man with an instruction card which represents the careful result of years of standardization and of definite laws that have been developed and then without any trial of the method on his part have him start a debating society. That is, we want him first to do one piece the way his instruction card says, and then only after he has the personal experience of trying this method, let him come and protest in any way he sees fit, but not start a debating society every time a piece of work is given to a man. That is what I have said, and that, I think is the limit in the direction to which you refer.

The Chairman. Do you speak of Mr. Gilbreth having developed a method by which he increased the productivity of bricklayers from 120 bricks per hour to 350 bricks per hour, which would be equivalent to increasing from 960 per day of eight hours to 2,800 bricks per day of eight hours, and that the wages of the workmen in doing that had been increased approximately \$5 per day to \$6.50 per day? Do

you think that that kind of division for increased productivity shows a change of mind has taken place on the part of Mr. Gilbreth relative to the Golden Rule? Do you contend or state that \$6.50 for laying 2,800 bricks is a proper division, as against \$5 for laying 960 bricks?

Mr. Taylor. Mr. Chairman, if you will remember my detailed description of the way in which Mr. Gilbreth taught his workmen when he succeeded in laying 2,800 bricks, Mr. Gilbreth's method of working was less tiresome than when the same workmen worked under the old unscientific conditions and were laying only 900 bricks. Under Mr. Gilbreth's method he is working less hard and using fewer motions to lay 2,800 bricks than he formerly did to lay 900 bricks. He avoids entirely stooping over to the brick pile on the ground and raising his entire body up again every time he lays a brick. He reduces his motions from 18 movements per brick to 5 per brick, so that the workman himself was working less hard than he formerly did. The workman voluntarily chose his own pace. Mr. Gilbreth did not tell him how fast he must work. He did not have to lay 2,800 bricks. The workmen, of their own accord, laid 2,800. There was no limit whatever put upon them. They were merely told by Mr. Gilbreth, "Use my methods and the moment you use my method I will pay you \$6.50. That is all I ask of you, to use my methods."

The Chairman. Assuming that the workmen voluntarily laid these 2,800 bricks, did that, of their own volition, the spirit having got into their mind, some change of spirit having reached there and they did this voluntarily, laying 2,800 bricks as against 960, do you want this committee to believe that the same spirit has got into the mind of Mr. Gilbreth when he only paid them \$6.50 for those 2,800 bricks as against \$5 for 960?

Mr. Taylor. In the first place, I am not sure that \$5 and \$6.50 were the exact figures; I merely stated them as relative figures as I recollected them.

The Chairman. Well, assuming them to be that.

Mr. Taylor. Under scientific management

we have been accustomed to increase the wages of our workmen so that they receive from 30 to 50 per cent higher wages than they had before whenever they follow our instructions. That is about our raise in wages for that class of work, from 30 to 50 per cent. And I believe that the workmen all over the country who have come under scientific management are satisfied and contented and feel that they are well paid for this change in their method of working.

Mr. Redfield. Right in the same point, put down these figures and see if they are correct as to this laying of bricks. By the old method at 120 an hour, multiplied by 18 motions, equals 2,160 motions per hour. By the new method 350 bricks per hour, multiplied by 5 motions, equals 1,750 motions per hour. The product of 960 bricks per diem, therefore, was on the basis of 2,160 motions per hour, and the product of 2,800 bricks per diem was on the basis of 1,750 motions per hour, or a diminution of 410 motions per hour for the larger product, or per day of 3,280 motions less for the new method than the old with a product of 2,800 as against 960. Is that correct?

Mr. Taylor. That is correct, and, Mr. Chairman, I would add that among the eliminated motions was this terribly tiresome one of lowering the body from its full upright position all the way down to the ground and picking up a brick, and then raising the body up again before turning around and placing it on the wall. The elimination of that one motion alone is an enormous saving in effort, so that without question the workmen are working far less hard under Mr. Gilbreth's new system than they were under the old system.

Mr. Redfield. So far, Mr. Taylor, let us assume that the result may be called scientific. Now, I want to renew the question which the chairman asked in a little different form. Now, he has, though concededly at a less effort, a product of 2,800 as against 960, or in other words, our output has been multiplied by nearly three. The rule of the scientific management system is that one-half of the gain, or approximately that, should be given to the workman. If that were done his wages would rise to \$10 per day, and the employer would