

team, can probably enlighten you on that point.

The Chairman. I did not know but what you might have some information on the point since you were holding it up as an example.

Mr. Taylor. No; I do not know that feature. I was never bought or sold when I played. I was the pitcher of the Phillips-Exeter nine when I was a boy. They never bought or sold me. That is all I can say.

The Chairman. Are you aware of the fact that once a player has been signed by any team in the league in which he is playing that he cannot go to any other team in the league, no matter what wages are offered to him, without the consent of the team with which he had signed?

Mr. Taylor. I have an impression that that is true, but I really do not know.

At the end of my answer will you allow me to state that in citing the management of the players on the baseball team as an excellent example of the scientific management I do not have in view in the slightest degree any such management as that. I do not wish it to be understood that I approve of any such thing as that. I know nothing about that feature of the management of a ball team, and I did not have that in mind when I spoke of baseball as a fine example of scientific management. I had the careful training and coaching and teaching of the baseball players in mind. And then their coordination and the cooperation which is so conspicuous in the management of a baseball team while it is playing a game. It was that that I had in mind and not the form of contract which they sign when they join their team, or the form of agreement.

The Chairman. You spoke of the science of shoveling and the introduction of different size shovels for different weights of material, that being based upon observation. Was it not to be expected, and would it not be expected under any system of shop management, that where the workman was required to furnish his own shovel that he would furnish a shovel of a size necessary for handling the heaviest kind of material, and that consequently his shovel would be too small for the lighter kinds of material?

Mr. Taylor. I have not really considered what would be the probability in that case, Mr.

Chairman. My impression is that the workman would probably take a shovel that would insure his not overworking himself when he was shoveling heavy material, and that therefore he would incline toward taking a shovel, as you say, which would be entirely too small for the lighter materials.

The Chairman. Is it not the case for hundreds of years that men have used different sized shovels for different weights of material; where they had light material to handle continuously, using light shovels, and where they had heavy material using heavy shovels, so as to get nearer the proper weight, a man can handle?

Mr. Taylor. I have not the slightest doubt that different size shovels and implements for handling dirt have been in existence for hundreds of years. I do not know it, but I have not the slightest doubt of it. What I was trying to indicate in my testimony was that it became the duty of the management to supply the man with exactly the right implement to do each kind of work, and that the proper implement was only supplied to the men, and could be only supplied to the men, after the science of shoveling had been carefully studied, and that this was one of the results of the study of the science of shoveling.

The Chairman. I simply say, Mr Taylor, that more than 40 years ago I worked for a large coal company that required men to do shoveling, sometimes shoveling slates and shales, which are heavy, and sometimes shoveling coals, which are light. They maintained different sizes of shovels for use in shoveling the different kinds of material, an old-style No. 2 shovel being the style for handling the heavy materials and an old-style No. 5 or No. 6 for handling the lighter material or coal, the 5 and 6 being simply used for the different capacities of men, and that was before any furore had arisen with regard to shop management.

Mr. Taylor. It seems to me, Mr. Chairman, that you came very close to working under scientific management about 40 years ago yourself.

Mr. Tilson. I desire to ask a question. In regard to the 21½-pound load for shoveling,

does that apply regardless of the bulk to 21½ pounds? Is that the most economical load, regardless of the bulk?

Mr. Taylor. Yes, sir; regardless of the bulk.

Mr. Tilson. Do you take into account any difference in effect on the man, as the load varies?

Mr. Taylor. I think the load remains the same; whether the bulk is large or small the load remains the same.

Mr. Tilson. My question is just this: You found, as I understand it, that at 38 pounds to the shovel that was not an economical load?

Mr. Taylor. Not an economical one if it was too heavy a shovel load and prevented the man from doing a proper day's work.

Mr. Tilson. That is, your dirt pile grew as the size of your shovel went down?

Mr. Taylor. The pile of dirt shoveled in a day grew larger and larger as the shovel load starting with 38 pounds per shovel went down until we reached a 21½-pound shovel load, at which load the men did their largest day's work, and then again the dirt pile grew smaller and smaller as the shovel load became lighter and lighter than 21½ pounds.

Mr. Tilson. What I was trying to get is this: You have told us the effect on the pile. What about the effect on the man? Was the man as well off when he was shoveling the 21½-pound load?

Mr. Taylor. Yes; he took his natural gait all day long in each of those kinds of shoveling. The workman regulated his own pace. No one regulated it for him. The fact was that when he was shoveling with a heavy load of 38 pounds it tired him to such an extent that he went much slower, naturally. He took fewer shovel loads, and he had to rest more between shovel loads.

Mr. Tilson. Then take it on the other side, if it was very light, not more than 10 or 15 pounds?

Mr. Taylor. In order to shovel the same amount with a light load of 10 to 15 pounds that he shoveled with a 21½-pound load, he would have to work so quick—to make his motions so quick—that they then became tiresome.

Mr. Tilson. So you figure it out that regardless of bulk the easiest load for a man to handle is 21½ pounds with a shovel?

Mr. Taylor. Yes, sir.

The Chairman. Would that be true irrespective of the distance that the dirt had to be thrown?

Mr. Taylor. No, sir. I am very glad that you asked that question. That again opens another large element of the science of shoveling, and I did not wish to burden you unnecessarily with the science of shoveling. Now, that holds true up to about 4 feet in length and 5 in height; that 21 pounds is the best load. When you rise above 5 feet in height, say, the combination of 5 feet in height and 4 feet in length, and go higher than that, then you must have a lighter load. The load again falls off. You understand, Mr. Chairman, that in my direct testimony, in speaking of the science of shoveling, I only spoke (broadly speaking) of the effect of that one element of the science. I want to assure you, gentlemen, again that the true science of shoveling is quite a large affair, but I will be glad to go into it if you care to go further, and tell you more about it. It is quite a large affair.

The Chairman. There is one feature about it that I am interested in, because I am quite convinced that it was scientific, and that was your description of the forearm to thigh, when you had to use force other than the arm force to get entrance of the shovel.

Mr. Taylor. Yes, sir.

The Chairman. I wondered at that time whether you had given any consideration in your scientific investigation to the direct application of force by the thigh or knee to the back of the hand.

Mr. Taylor. Mr. Chairman, I think if you get down as low as that, that it then demands quite an exertion of force by the right leg, a pulling of the leg, which is much more tiresome than if you put the right forearm (indicating a position two-thirds way up from the knee) and throw the whole body forward. The one motion is merely a throwing of the body forward like this (indicating), while the other is a motion of the right leg requiring considerable exertion when you push in the shovel. You must also have a specially made shovel to shovel at the knee.

The Chairman. That may be true as to the man who is trained to shovel out doors, but to