

to another part of the yard another set of men, each group to do a certain kind of work. It was practically like playing a game of chess in which four to six hundred men were moved about so as to be in the right place at the right time. And all this, gentlemen, follows from the one idea of developing the science of shoveling; the idea that you must give each workman each day a job to which he is well suited and provide him with just that implement which will enable him to do his biggest day's work. All this, as I have tried to make clear to you, is the result that followed from the one act of developing the science of shoveling.

In order that our workmen should get their share of the good that came from the development of the science of shoveling and that we should do what we set out to do with our laborers,—namely, pay them 60 per cent higher wages than were paid to any similar workmen around that whole district. Before we could pay them these extra high wages it was necessary for us to be sure that we had first-class men and that each laborer was well suited to his job, because the only way in which you can pay wages 60 per cent higher than other people pay, and not overwork your men is by having each man properly suited and well trained to his job. Therefore, it became necessary to carefully select these yard laborers; and in order that the men should join with us heartily and help us in their selection it became necessary for us to make it possible for each man to know each morning as he came in to work that on the previous day he had earned his 60 per cent premium, or that he had failed to do so. So here again comes in a lot of work to be done by the management that had not been done before. The first thing each workman did when he came into the yard in the morning—and I may say that a good many of them could not read and write—was to take two pieces of paper out of his pigeonhole; if they were both white slips of paper, the workman knew he was all right. One of those slips of paper informed the man in charge of the tool room what implement the workman was to use on his first job and also in what part of the yard he was to work. It was in this way that

each one of the 600 men in that yard received his orders for the kind of work he was to do and the implement with which he was to do it, and he was also sent right to the part of the yard where he was to work, without any delay whatever. The old-fashioned way was for the workmen to wait until the foreman got good and ready and had found out by asking some of the heads of departments what work he was to do, and then he would lead the gang off to some part of the yard and go to work. Under the new method each man gets his orders almost automatically; he goes right to the tool room, gets the proper implement for the work he is to do, and goes right to the spot where he is to work without any delay.

The second piece of paper, if it was a white piece of paper, showed this man that he had earned his 60 per cent higher wages; if it was a yellow piece of paper the workman knew that he had not earned enough to be a first-class man, and that within two or three days something would happen, and he was absolutely certain what this something would be. Every one of them knew that after he had received three or four yellow slips a teacher would be sent down to him from the labor office. Now, gentlemen, this teacher was no college professor. He was a teacher of shoveling; he understood the science of shoveling; he was a good shoveler himself, and he knew how to teach other men to be good shovelers. This is the sort of man who was sent out of the labor office. I want to emphasize the following point, gentlemen: The workman, instead of hating the teacher who came to him—instead of looking askance at him and saying to himself, "Here comes one of those damn nigger drivers to drive me to work"—looked upon him as one of the best friends he had around there. He knew that he came out there to help him, not to nigger drive him. Now, let me show you what happens. The teacher comes, in every case, not to bulldoze the man, not to drive him to harder work than he can do, but to try in a friendly, brotherly way to help him, so he says, "Now, Pat, something has gone wrong with you. You know no workman who is not a high-priced workman can stay on this gang, and you will have to get off of it if we can't find out

what is the matter with you. I believe you have forgotten how to shovel right. I think that's all there is the matter with you. Go ahead and let me watch you awhile. I want to see if you know how to do the damn thing, anyway."

Now, gentlemen, I know you will laugh when I talk again about the science of shoveling. I dare say some of you have done some shoveling. Whether you have or not, I am going to try to show you something about the science of shoveling, and if any of you have done much shoveling, you will understand that there is a good deal of science about it.

There is a good deal of refractory stuff to shovel around a steel works; take ore, or ordinary bituminous coal, for instance. It takes a good deal of effort to force the shovel down into either of these materials from the top of the pile, as you have to when you are unloading a car. There is one right way of forcing the shovel into materials of this sort, and many wrong ways. Now, the way to shovel refractory stuff is to press the forearm hard against the upper part of the right leg just below the thigh, like this (indicating), take the end of the shovel in your right hand and when you push the shovel into the pile, instead of using the muscular effort of your arms, which is tiresome, throw the weight of your body on the shovel like this (indicating); that pushes your shovel in the pile with hardly any exertion and without tiring the arms in the least. Nine out of ten workmen who try to push a shovel in a pile of that sort will use the strength of their arms, which involves more than twice the necessary exertion. Any of you men who don't know this fact just try it. This is one illustration of what I mean when I speak of the science of shoveling, and there are many similar elements of this science. Now, this teacher would find, time and time again, that the shoveler had simply forgotten how to shovel; that he had drifted back to his old wrong and inefficient way of shoveling, which prevented him from earning his 60 per cent higher wages. So he would say to him, "I see all that is the matter with you is that you have forgotten how to shovel; you have forgotten what I showed you about shoveling some time ago. Now, watch me," he says, "this is the way to do the

thing." And the teacher would stay by him two, three, four, or five days, if necessary, until he got the man back again into the habit of shoveling right.

Now, gentlemen, I want you to see clearly that, because that is one of the characteristic features of scientific management; this is not nigger driving; this is kindness; this is teaching; this is doing what I would like mighty well to have done to me if I were a boy trying to learn how to do something. This is not a case of cracking a whip over a man and saying, "Damn you, get there." The old way of treating with workmen, on the other hand, even with a good foreman, would have been something like this: "See here, Pat, I have sent for you to come up here to the office to see me; four or five times now you have not earned your 60 per cent increase in wages; you know that every workman in this place has got to earn 60 per cent more wages than they pay in any other place around here, but you're no good and that's all there is to it; now, get out of this." That's the old way. "You are no good; we have given you a fair chance; get out of this," and the workman is pretty lucky if it isn't "get to hell out of this," instead of "get out of this."

The new way is to teach and help your men as you would a brother; to try to teach him the best way and show him the easiest way to do his work. This is the new mental attitude of the management toward the men, and that is the reason I have taken so much of your time in describing this cheap work of shoveling. It may seem to you a matter of very little consequence, but I want you to see, if I can, that this new mental attitude is the very essence of scientific management; that the mechanism is nothing if you have not got the right sentiment, the right attitude in the minds of the men, both on the management's side and on the workman's side. Because this helps to explain the fact that until this summer there has never been a strike under scientific management.

The men who developed the science of shoveling spent, I should say, four or five months studying the subject and during that time they investigated not only the best and most efficient movements that the men should make when they are shoveling right, but they also studied