

mainly by imitating the best methods of those workmen with whom he comes closely into contact. Trades, then, are learned now practically as they were in the Middle Ages. They are transmitted from hand to eye and comparatively little is learned from books. I think I may truthfully say that during the two apprenticeships I served; one as a pattern maker and one as a machinist, I did not spend more than two and a half hours in reading books about my work. Of course there are many more books and more useful books published now about the different trades than there were 37 years ago; but, still, my impression is that the same fact remains true. I have had the object lesson of watching my own son, who left college at the end of his freshman year and is working a year in a machining shop under the sad, baleful conditions of scientific management as they have been pictured by some of the witnesses before this committee, in which he is obliged to do a severe task every day. I have given this boy as many books as I could on the machinist's trade, but I do not think he has yet spent an hour reading the books we have put before him; so that my opinion remains the same about the present-day apprentice as it was about the old one; that is, that he is learning almost all that he gets through the old traditional channels.

Notwithstanding this fact the knowledge which every journeyman has of his trade is his most valuable possession. It is his great life's capital, and none the less valuable—perhaps even more valuable—from the fact that it is attained in the old-fashioned traditional way rather than through such study as is to be had at school or college. In my judgment, then, the manager who really understands the problem which is before him must appreciate that the most important thing for him to do under the old type of management which is in common use is to get what may be called the initiative of his workmen, and by this I mean the workman's hard work, his good will, his ingenuity, his determination to do everything that he can to further his employer's interest. Now, owing to the fact, as I have tried to explain at the opening of my testimony, that practically all of the workingmen of this coun-

try are fully convinced that it is for their interest to go slow and to restrict output instead of turning out a maximum output, no manager who really understands conditions as they exist in our shops would dream that he could get the true initiative of his workmen unless he did something more and better for them than is done by employers in the average shop—unless he gave his workmen some special incentive, some reason, for wishing to do more work than is done in the ordinary shop. Because, as I have already stated, the average workman is engaged during a very considerable part of his time in watching the clock to be sure that he doesn't work so fast as to spoil a piecework rate; to be sure that he is not doing what he would look upon as an injustice to himself and his fellow workmen.

There are a few manufacturers, perhaps not more than one manufacturer in a hundred, however, who are large enough minded and whose hearts are kindly enough disposed to lead them to honestly desire that their employees should be better off than the employees of their competitors; to lead them to try and arrange matters so that their employees can earn higher wages than the employees of their competitors. And if these employers will only persist long enough in deliberately paying their men higher wages than are paid to the workmen of their competitors, it has been my observation that invariably the workmen respond by giving them their real initiative, by working hard and faithfully, by using their ingenuity to see how they can turn out as much work as possible, instead of using their ingenuity, as they ordinarily do, to convince their employers that they are working hard and yet not work hard enough to spoil any piecework job.

Now, this special case, this rare case, in which the management deliberately treat their employees far better than the employees of their competitors are treated, to my mind represents the best of the older types of management. And I again assert that any manufacturer who will only persist long enough in treating his employees in this way will succeed in getting their true initiative. I have known a good many employers to set out to adopt this scheme of paying higher wages than their com-

petitors and become discouraged because their employees did not immediately respond by doing their share under this new arrangement. It must be remembered, however, that workmen are naturally and very properly suspicious of their employers. If they have lived long in this world, they have seen or heard of a great many tricks being played by employers. Now, again, gentlemen, I do not wish to be quoted as saying that all employers are tricky, but I do wish to say that, in my judgment, employers are just as tricky as workmen are tricky, neither more nor less so.

All of you men here who are workmen know that there are a whole lot of tricky workmen, and all you men here who are employers know that there are a whole lot of tricky employers; not that any very large portion of workmen are tricky, and not that a large portion of employers are tricky men, but tricky men are there just the same, on both sides. You cannot blame, therefore, any set of workmen for being slow in responding to even this kindly treatment; what they suspect is—and they can almost all point to some personal experience or to some friend's experience to warrant their suspicion—what they suspect is that this is merely a trick on the part of their employer to get them to work at a higher rate of speed and then, through some infernal excuse or reason or flimflam game, that ultimately the piecework price will be cut down and they will find themselves working at a high rate of speed for the same old pay.

Thereupon, at 2.28 o'clock p. m. the committee took a recess for 30 minutes.

After Recess.

The committee reconvened at 2.58 o'clock p. m., pursuant to taking a recess, Hon. William B. Wilson (chairman) presiding.

Mr. Taylor. What I want to try to prove to you and make clear to you is that the principles of scientific management when properly applied, and when a sufficient amount of time has been given to make them really effective, must in all cases produce far larger and better results, both for the employer and the employees, than can possibly be obtained under even this very rare type of management which I have

been outlining, namely, the management of "initiative and incentive", in which those on the management's side deliberately give a very large incentive to their workmen, and in return the workmen respond by working to the very best of their ability at all times in the interest of their employers.

I want to show you that scientific management is even far better than this rare type of management.

The first great advantage which scientific management has over the management of initiative and incentive is that under scientific management the initiative of the workmen—that is, their hard work, their good will, their ingenuity—is obtained practically with absolute regularity, while under even the best of the older type of management this initiative is only obtained spasmodically and somewhat irregularly. This obtaining, however, of the initiative of the workmen is the lesser of the two great causes which make scientific management better for both sides than the older type of management. By far the greater gain under scientific management comes from the new, the very great, and the extraordinary burdens and duties which are voluntarily assumed by those on the management's side.

These new burdens and new duties are so unusual and so great that they are to the men used to managing under the old school almost inconceivable. These duties and burdens voluntarily assumed under scientific management, by those on the management's side, have been divided and classified into four different groups and these four types of new duties assumed by the management have (rightly or wrongly) been called the "principles of scientific management."

The first of these four groups of duties taken over by the management is the deliberate gathering in on the part of those on the management's side of all of the great mass of traditional knowledge, which in the past has been in the heads of the workmen, and in the physical skill and knack of the workman, which he has acquired through years of experience. The duty of gathering in of all this great mass of traditional knowledge and then recording it, tabulating it, and, in many cases, finally reduc-