which scientific management has been introduced, I know of not one single strike of workmen working under it after it had been introduced, and only two or three while it was in process of introduction. In this connection I must speak of the fakers, those who have said they can introduce scientific management into a business in six months or a year. That is pure nonsense. There have been many strikes stirred up by that type of man. Not one strike has ever come, and I do not believe ever will come, under scientific management.

What Scientific Management Is

What is scientific management? It is no efficiency device, nor is it any group or collection of efficiency devices. Scientific management is no new scheme for paying men, it is no bonus system, no piece-work system, no premium system of payment; it is no new method of figuring costs. It is no one of the various elements by which it is commonly known, by which people refer to it. It is not time study nor man study. It is not the printing of a ton or two of blanks and unloading them on a company and saying, "There is your system, go ahead and use it." Scientific management does not exist and cannot exist until there has been a complete mental revolution on the part of the workmen working under it, as to their duties toward themselves and toward their employers, and a complete mental revolution in the outlook of the employers, toward their duties, toward themselves, and toward their workmen. And until this great mental change takes place, scientific management does not exist. Do you think you can make a great mental revolution in a large group of workmen in a year, or do you think you can make it in a large group of foremen and superintendents in a year? If you do, you are very much mistaken. All of us hold mighty close to our ideas and principles in life, and we change very slowly toward the new, and very properly too.

Let me give you an idea of what I mean by this change in mental outlook. If you are manufacturing a hammer or a mallet, into the cost of that mallet goes a certain amount of raw materials, a certain amount of wood and metal. If you will take the cost of the raw materials and then add to it that cost which is frequently called by various names—overhead expenses, general expense, indirect expense; that is, the proper share of taxes, insurance, light, heat, salaries of officers and advertising—and you have a sum of money. Subtract that sum from the selling price, and what is left over is called the surplus. It is over this surplus that all of the labor disputes in the past have occurred. The workman naturally wants all he can get. His wages come out of that surplus. The manufacturer wants all he can get in the shape of profits, and it is from the division of this surplus that all the labor disputes have come in the past—the equitable division.

The new outlook that comes under scientific management is this: The workmen, after many object lessons, come to see, and the management come to see that this surplus can be made so great, providing both sides will stop their pulling apart, will stop their fighting and will push as hard as they can to get as cheap an output as possible, that there is no occasion to quarrel. Each side can get more than ever before. The acknowledgment of this fact represents a complete mental revolution.

Intelligent Old-style Management

There is one more illustration of the new and great change which comes under scientific management. I can make it clearer, perhaps, by contrasting it with what I look upon as the best of the older types of management. If you have a company employing five hundred or a thousand men, you will have in that company perhaps fifteen different trades. The workmen in those trades have learned absolutely all that they know, not from books, not by being taught, but they have learned it traditionally. It has been handed down to them, not even by word of mouth in many cases, but by seeing what other men do. One man stands alongside of another man and imitates him. That is the way the trades are handed down, and my impression is that trades are now picked up just as they were in the Middle Ages.

The manufacturer, the manager, or the foreman who knows his business realizes that his chief function as a manager—I am talking now of the old-fashioned manager—ought to be to get the true initiative of his workman. He wants the initiative of the workman, their hard work, their good will, their ingenuity, their determination to do all they can for the benefit of his firm. If he knows anything about human nature, if he has thought over the problems, he must realize that in order to get the initiative of his workman, in order to modify their soldiering, he must do something more for his men than other employers are doing for their men under similar circumstances. The wise manager, under the old type of management, deliberately sets out to do something better for his workmen than his competitors are doing, better than he himself has ever done before. It takes a good while for the workmen to stop looking for that "nigger in the wood-pile," but if the manager keeps at them long enough he will get the confidence of the men, and when he does workmen of all kinds will respond by giving a great increase in output. When he sets out to do better for his men than other people do for theirs, the workmen respond liberally when that time comes. I refer to this case as being the highest type of management, the case in which the managers deliberately set out to do something better for their workmen than other people are doing, and to give them a special incentive of some kind, to which the workmen respond by giving a share at least of their initiative.

What Scientific Management Will Do

I am going to try to prove to you that even that type of management has not a ghost of a chance in competition with the principles of scientific management. Why? In the first place, under scientific management, the initiative of the workmen, their hard work, their good-will, their best endeavors are obtained with absolute regularity. There are cases all the time where men will soldier, but they become the exception, as a rule, and they give their true initiative under scientific management. That is the least of the two sources of gain. The greatest source of gain under scientific management comes from the new and almost unheard-of duties and burdens which are voluntarily assumed, not by the workmen, but by the men on the management side. These are the things which make scientific management a success. These new duties, these new burdens undertaken by the management have rightly or wrongly been divided into four groups, and have been called the principles of scientific management.

The first of the great principles of scientific management, the first of the new burdens which are voluntarily undertaken by those on the management side is the deliberate gathering together of the great mass of traditional knowledge which, in the past, has been in the heads of the workmen, recording it, tabulating it, reducing it in most cases to rules, laws, and in many cases to mathematical formulæ, which, with these new laws, are applied to the co-operation of the management to the work of the workmen. This results in an immense increase in the output, we may say, of the two. The gathering in of this great mass of traditional knowledge, which is done by the means of motion study, time study, can be truly called the science.

Let me make a prediction. I have before me the first book, so far as I know, that has been published on motion study and on time study. That is, the motion study and time study of the cement and concrete trades. It contains everything relating to concrete work. It is of about seven hundred pages, and embodies the motions of men, the time and the best way of doing that sort of work. It is the first case in which a trade has been reduced to the same condition that engineering data of all kinds have been reduced, and it is this sort of data that is bound to sweep the world.

I have before me something which has been gathering for about fourteen years, the time or motion study of the machine shop. It will take probably four or five years more before the first book will be ready to publish on that subject. There is a collection of sixty or seventy thousand elements affecting machine-shop work. After a few years, say three, four or five years more, some one will be ready to publish the first book giving the laws of the movements of men in the machine shop—all the laws, not only a few of them. Let me predict, just as sure as the sun shines, that is going to come in every trade. Why? Because it pays, for no other reason. That results in doubling the output in any shop. Any device which results in an increased output, is bound to come in spite of all opposition, whether we want it or not. It comes automatically.

The Selection of the Workman

The next of the four principles of scientific management is the scientific selection of the workman, and then his progressive development. It becomes the duty under scientific management, of not one, but of a group of men on the management side, to deliberately study the workmen who are under them; study them in the most careful, thorough and painstaking way, and not just leave it to the poor, overworked foreman to go out and say, "Come on, what do you want? If you are cheap enough I will give you a trial."

That is the old way. The new way is to take a great deal of trouble in selecting the workmen. The selection proceeds year after year. And it becomes the duty of those engaged in scientific management to know something about the workmen under them. It becomes their duty to set out deliberately to train the workmen in their employ to be able to do a better and still better class of work than ever before, and to then pay them higher wages than ever before. This deliberate selection of the workmen is the second of the great duties that devolve on the management under scientific management.

Bringing Together the Science and the Man

The third principle is the bringing together of this science of which I have spoken and the trained workmen. I say bringing because they don't come together unless some one brings them. Select and train your workmen all you may, but unless there is some one who will make the men and the science come together, they will stay apart. The "make" involves a great many elements. They are not all disagreeable elements. The most important and largest way of "making" is to do something nice for the man whom you wish to make come together with the science. Offer him a plum, something that is worth while. There are many plums offered to those who