

management would come about slowly because few of those at the head of industry would be willing to take the time and trouble involved seems to have been borne out during the post-war boom period. Superficial and half-way applications of what has passed as scientific management have sufficed. I doubt, however, that they will prove satisfactory during the next period of prosperity. I believe that the teachings and work of Taylor will be studied more carefully by those who in the past have assumed a knowledge greater than they possessed of the principles of scientific management and of the means essential to their practical application.

I believe that we of the Taylor Society, which was founded with the avowed purpose of promoting the science of management as propounded by Taylor, have fallen into the error of taking for granted a greater knowledge and more complete understanding of the principles of scientific management and of the means for their application than exists in fact. My feeling is that we may be justified in regarding the partial and imperfect applications of Taylor's teachings only as a stage on the way to something better and that our Society must show the way.

Mr. Clark's paper may well be the opening gun in a campaign. It should be followed with a series of papers each dealing in detail with the various features touched upon in his comprehensive resume.

I concur with the view expressed by Mr. Clark that in establishing standards too much emphasis should not be placed at the start on accuracy, and that an imperfect standard is to be preferred to none at all. Taylor himself advocated bringing standards, and I here use the term in Mr. Clark's sense, up progressively from one attainable level to a higher one. In my own practice I have designated these in order to avoid future difficulties as "temporary standards," "temporary instruction cards," etc.

Temporary or imperfect standards set up during the early stages of the development and installation of a system of scientific management are valuable in the direct results which they may produce, but they have perhaps a greater educational value and pave the way for the more difficult and thorough work to follow.

Mr. Clark has wisely pointed out that standards must be progressive. Obvious though this may seem, many intelligent people feel that the establishment of standards presumes or entails a lack of progress. My own experience indicates that we have more to fear from ill-considered or too rapid change than from

inertia and that our chief concern must be with maintenance of the established standards. Since the war I have seen several model installations of the Taylor system of scientific management gradually disintegrate. And this was due to failure to maintain and enforce standards rather than to any quality of immutability. Mr. Clark would do well to safeguard from the start the standards, the technique and the mechanism which he establishes by a system of periodic inspection, making this one of the duties of a qualified man. He speaks of standard-practice instructions defining responsibilities, the nature and scope of functions and inter-relationships of departments and of individuals. These are what we have usually designated as "standing orders," which also define standard procedures or methods of handling various transactions. Unless what is actually being done is periodically checked with these standing orders they will soon not be worth the paper on which they are written. Periodic check-ups will indicate the need for revision of this class of standards. But changes must be passed upon by someone familiar with the system of management as a whole in order that what may seem to be an improvement at one point may not be detrimental to others.

Mr. Clark very briefly referred to inventory control. Previous discussers have mentioned maximum and minimum quantities as a means to this end. As Dr. Person pointed out maximum and minimum quantities cannot be permanent. It is distressing to find anyone today thinking that once they have been established the job is finished for all time. The same is true of standard manufacturing lot quantities. I believe that more well-worked-out systems for production and inventory control have proven unsuccessful as a result of failure systematically and intelligently to revise maximum, minimum and ordering quantities at sufficiently frequent intervals than for any other reason. And this revision calls for a greater knowledge of the business and more business judgment than may be expected in a clerk who keeps the "balance-of-stores" records, a storekeeper, purchasing agent or department head, since it involves questions of finance, marketing, product development and manufacturing methods and policy. The wise general manager will keep a watchful eye upon it.

Probably one of the greatest single factors contributing to prolonging and rendering more acute present unemployment is excessive and unbalanced inventory. And this is due to sloppy management with its lack of foresight and prudence. One large company with

which I am familiar has been for a year past shipping out of stock about one-third of its orders in an effort to reduce an inventory that had gotten out of bounds. This means that a proportionate number of people have been added to the ranks of the unemployed, to say nothing of the loss from obsolescence and capital unnecessarily tied up. All of this might have been avoided had there been established, and more particularly, currently revised, standard maximum, minimum and ordering quantities for the various commodities manufactured. This is one of the ways that, as Mr. Kendall intimated, industry may help itself. It is typical of many others, all of which are facilitated by the type of organization, the mechanism and technique outlined in Mr. Clark's paper. As Dr. Person remarked these are only the tools of scientific management, but I should like to emphasize a point frequently overlooked: that if, as we all recognize, under scientific management it is vitally important to provide the workman in the shop with the tools most suitable to the job and to keep them in good condition, is it not of at least equal importance that we do as much for the management? That Taylor appreciated this is evidenced by the painstaking attention to detail in the comprehensive systems worked out by him or under his guidance. It is unfortunate that so many of our major executives feel that such matters are too inconsequential to receive their attention.

This criticism may, I think, also be made of our teachers of management and those who exercise financial control over management. It is easier to say what should be done than to work out the means for doing it.

In the closing paragraph of his "Principles of Scientific Management," Taylor enumerated a number of the features of applied scientific management of which he said:

"These are, however, merely the elements or details of the mechanism of management. Scientific management, in its essence, consists of a certain philosophy, which results . . . in a combination of four great underlying principles of management."

Farther on he says:

"Scientific management does not necessarily involve any great invention, nor the discovery of new or startling facts. It does, however, involve a certain combination of elements which have not existed in the past, namely, old knowledge so collected . . . and classified into laws and rules that it constitutes a science; accompanied by a complete change in the mental attitude . . . A new division of the duties . . .

and intimate, friendly co-operation to an extent that is impossible under the philosophy of the old management. *And even all of this in many cases could not exist without the help of mechanisms which have been gradually developed.*" (Mr. Hathaway's italics).

W. H. Leffingwell.\* I was particularly interested in Mr. Clark's paper because it once more emphasizes the versatility of scientific management. I firmly believe, and have believed for a great many years, that the application of these principles is infinite.

I do not see so much to criticize in Mr. Clark's paper, but my friend, Mr. Hathaway, said some things that I should like to criticize. I am very timorous in criticizing such a dyed-in-the-wool Taylor man, but nevertheless I feel that I ought to do it.

He complained about the fact that the Taylor System is not so well known as it should be. One of the reasons for that, in my opinion, is the muddled manner in which people talk. Mr. Hathaway used a word that I have consistently tried to avoid in all of my work, and that is the word "installation." You should not speak of installing the Taylor System as you would a boiler.

The word I like to use is development. Mr. Clark and Mr. Hathaway have shown us how to start the thing, and Mr. Hathaway has emphasized that it takes years to get it going. You cannot say that a thing which takes years to work out is installed; it is developed. One of the great dangers is talking about installing systems. I do not like the word "system" either, because it is so circumscribed, so small.

The general public gets the idea that if they have some kind of a perpetual inventory they have the Taylor System. Or, if they have time study, they have the Taylor System.

Mr. Taylor, himself, emphasized this. He listed a whole lot of things and said, "none of these things is scientific management."

I am very hesitant about mentioning another point. Mr. Hathaway confessed to a good deal of ignorance about economics, and I am sure I do not know as much as he does about it.

He said he was muddled by the discussion of economic questions. Perhaps I am just as muddled as he, but I do feel that if the principles of scientific management had been used all the way through our industrial system we never should have been in this condition.

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