Cost Accounting

Every part of Taylor's system required records. One of the most important of these was cost accounting. But he disapproved as "red tape" all records not actually made use of in management. He said:

"I have known, for instance, cost keeping to go on in industrial establishments through a long term of years with all the expense incident to it, and upon investigation found that the owners and managers of the business were paying little or no attention to the costs which they figured out." [Volume II, page 376.]

So he removed cost accounting from the general accounting department and placed it in the planning room, while at the same time tying up the cost accounting with the main books in the manner that since has become known as interlocking.

Placing the cost accounting in the planning room, he made it a by-product of operations, and thus got his costs *coincidently* with the operations. That is to say, the papers and slips he designed to plan and control operations became the documents on which were based both the cost and production records. [Volume I, page 369.]

In fact, the leading feature of Taylor's general accounting system would appear to be the unerring certainty with which it enables the manager to pick out the cause of any unusual cost or waste. [Volume I, page 365.]

Taylor's system made increased use of brains, and so increased, relatively, the "overhead," an increase justified many times over, Taylor found, by the decrease in running expenses.

The introduction of scientific management itself is, of course, an increase of overhead, and justifiable only as it is repaid with interest in decreased running expenses.

Specific Gains From Scientific Management

That scientific management pays richly is proved by the experience of those who have used it. There may be apparent exceptions due to undue haste or to following the advice of pseudo-experts. But real exceptions seem to be conspicuous by their absence.

Taylor's own verdict is:

At least 50,000 workmen in the United States are now [1911] employed under this system; and they are receiving from thirty per cent to one hundred per cent higher wages daily than are paid the men of similar caliber with whom they are surrounded, while the companies employing them are more prosperous than ever before. In these companies the output, per man and per machine, has on an average, been doubled. During all these years there has never been a single strike among the men working under this system. In place of suspicious watchfulness and the more or less open warfare which characterizes the ordinary types of management, there is universally friendly cooperation between the management and the men. [Principles of Scientific Management, page 28.]

Many specific cases are given by Copley.

The Watertown foundry had an order for a large number of molds for pack-saddle pommels. The first man put on this job made on an average of nine molds a day, and he, backed up by the civilian foreman of the foundry, who was not in sympathy with Taylor methods, contended that this production was ample. A time study having been made of the job, a new man was put on it under the premium plan, and he made on an average of 24 molds a day. . . . And after all direct and overhead charges had been taken into consideration, it was shown that the cost of each mold to the Government had been reduced from $1.17 to 54 cents. [Volume II, page 345.]

These startling contrasts apply to every phase of the manager's problem. The truth is, both master and man have habitually guessed and bluffed. Under scientific management they can guess and bluff no longer.

In one case, after discharging workmen who continued soldiering, training others to take their places,

". . . we had within three months increased the output from 15 to 25 tires a day. This output went on, right on the same machine, increasing until three or four years later we had an output of 150 tires a day."

The big jump in the production of this rolling machine came when the horsepower used in it was "immensely increased" and the men running it were put under Taylor's differential-rate system. [Volume I, page 315.]

Here is another example:

Testifying in 1912 before that Special House Committee, Dr. Hollis Godfrey, who later became president of Philadelphia's Drexel Institute, said:

"The first plant under scientific management with which I was connected was the Tabor Co. I had full opportunity there to see all books and figures, and nothing was more impressive to me than the fact that the Tabor Co., with approximately the same number of men and machines as were used under the old system, was turning out three times the production; that it was giving 73 per cent higher wages to workmen; that it had made 25 per cent reduction in the selling price of its machines; thereby producing so much saving to the consumer. Moreover, that this company, which had lost money before the introduction of scientific management, was now and had been making a good profit; that from the condition of a strike and inharmonious relations before the introduction of scientific management there had come about the friendliest feeling between management, workmen and outsiders." [Volume II, page 185.]

On another type of industry, under the management of Mr. Feiss, afterward President of the Taylor Society, Copley comments:

Only in a general way can we here indicate the outcome at that Cleveland clothing factory, with its eight or nine hundred men and women employees largely composed of immigrants from eastern and southern Europe, and the children of such immigrants. Hours reduced from 54 a week to an average of about 43 a week; productivity at the same time increased 43 per cent; wages increased on an average of 40 per cent. In 1910 the labor turnover had been 150.3 per cent (what is called a "good normal" for the clothing industry); in 1914 this turnover was 33.5 per cent. Scores of young men and women taught English at the factory, so that all might have a common medium of speech and thus really get to know and *understand* one another. A service department headed by a college woman of the highest type, and devoted largely to raising standards of living, so that all might have a vision inspiring them to learn and to earn. Hundreds of foreigners Americanized—taught not only our language, but our customs, our sports, our songs. [Volume II, page 448.]

The experience with Taylor's system under General Crozier, in the United States Arsenal at Watertown, showed extraordinary gains. As shown by an official report made in 1911:

". . . under the new system we accomplished 5.46 times as much work as under the old method of management." [Volume II, page 339.]

"In the case of the 6-inch disappearing-gun carriages, the cost of direct labor was reduced from $10,239 to $6,949, and that of direct labor and other shop expenses from $10,263 to $8,956. [Volume II, page 337.]

Taylor believed that practically every ordinary, or rule-of-thumb, establishment was desperately in need of scientific management.

"I am well within the limit, gentlemen, in saying [he testified in 1912] that not one machine in twenty in the average shop in this country is properly speeded. This may seem incredible, and yet I make the statement with a great deal of confidence . . ." [Volume I, page 249.]

Ball Bearings

"The working hours were arbitrarily shortened in successive steps to 10 hours, 9½ and 8½ [the pay per day remaining the same], and with each shortening of the working day the output increased instead of diminished . . . In this case, however, a large part of the improvement was due to the scientific selection of the girls, rather than the shortening of the hours. There is, however, no question whatever that in this case merely shortening the hours also produced an increase in output." [Volume I, page 460.]

"The final outcome of all the changes [was that] thirty-five girls did the work formerly done by one hundred and twenty. [And that] the accuracy of work at the higher speed was two-thirds greater than at the former slow speed." [Volume I, page 464.]

It is interesting to note that the girls first objected to the changes by which in the end they benefited so much.

This is one of several illustrations of the need of initiative of the management. Another was, as Taylor pointed out, that without this initiative of the management, the workers would never have discovered that the ideal shovel load is 21½ lbs.

Bricklaying

One of Taylor's followers, Gilbreth, made a striking application of scientific management ideas to bricklaying. He averaged, after his selected workmen had become skillful in his new methods, 350 bricks per man per hour; whereas the average speed of doing this work with the old methods was, in that section of the country, 120 bricks per man per hour.

Such cases of success as those just mentioned are doubtless star cases—above the average—but success is almost always marked, whenever the system is fairly tried as shown by an extensive study by C. B. Thompson.[5]

The Steam Hammer

One by-product of scientific management is a crop of inventions of which Taylor made several.

His crowning achievement at Midvale in the strictly mechanical field was his invention of the steam hammer.

He spent one or two years in collecting, from all over the world, data about the various machines that had been designed, until he found instances in which some one of the parts of each of the various machines of different designs had never broken. . . . As a result he obtained a machine which lasted for many years without a single breakdown—the first instance of its kind in the history of that art. [Volume I, pages 197-198.]

High Speed Steel

But the chief example was Taylor's discovery of "high speed steel." His experiments proved that [contrary to all tradition] by heating the tool almost to its melting point and then cooling it with a blast of cold air, a much higher cutting speed could be gained than with a tool which had never been "overheated."

One engineer has referred to it as a discovery "which is, at a very conservative estimate, worth fifty million dollars per year to the machine industry of this country." We also read that "by means of these high-speed tools, the United States during the World War was able to turn out five times the munitions that [it otherwise] could have done in the same time. On the other hand, if Germany *alone* had possessed the secret of the modern steels no power could have withstood her." [Volume I, page xv.]

Indirect Benefits From Scientific Management

Besides direct material gains from scientific management, there are numerous indirect and less ponderable gains—peace and good will between employer and employee, initiative and ingenuity, self-respect, good habits and improved character.

[5] "Scientific Management in Practice," *Quarterly Journal of Economics*, February, 1915, pages 262-307.