

The best way to secure good principles in men is to establish them firmly in good habits. Gantt said:

"They [those working under scientific management] improve under it, both in honesty and efficiency, more than I have seen them do elsewhere. Realizing that substantial justice was being done and that to do their duty was to follow their own interest, it soon became a matter of habit with them." [Volume I, page 330. Quoted from Gantt.]

"With almost certainty they begin to guide the rest of their lives according to principles and laws and to try to insist upon those around them doing the same." [Volume I, page 328. Quoted from Taylor.]

A noted French engineer and steel manufacturer, who spent several weeks in the works of the Midvale Company in introducing a new branch of manufacture, stated before leaving that the one thing that had impressed him as most remarkable about the place was the fact that not only the foremen, but the workmen, were expected to and did in the main tell the truth in case of any blunder or carelessness, even when they had to suffer from it themselves. [Volume I, page 330.]

Thus, while Taylor was arriving primarily at the material welfare of workingmen, he reckoned among the benefits indirectly attained, the spiritual welfare and discipline in the homely virtues he himself practiced as well as preached.

Taylor stoutly defended his system from the charge that it narrowed the man and enslaved him to the machine.

Thus if the operation of those machines became work calling for less skill in the sense that there was removed from it the planning element, it at the same time, as plain execution, became work requiring more skill; work requiring much greater manual and mental dexterity; work of a greatly improved technic; work calling for a decidedly higher order of these qualities of application and industry that lie at the root of all skill and knowledge and character progress. [Volume II, page 131.]

Not the least important results of scientific management were the shortening of the hours of the workers, the higher wages, and the increased incentive to work that comes when the man realizes that his efforts are being noticed and rewarded.

Taylor's chief emphasis, however, was always on the advantage to the public of cheaper prices through increased production.

Using Past Experience

While in the end, Taylor's methods and results were almost always different from the ordinary methods and results, he invariably tried to begin where previous experience left off. He insisted on first finding out all that had been done before attempting to improve on it.

When, for instance, he set out to measure a day's work, "his first step was to look up all that had been written on the subject in English, German and French."⁶

In this case he was misled, rather than helped, by some of his supposed clues obtained from previous experimenters. These had tried to measure human work in horse-power. Taylor wasted much time and effort in trying to get some useful human equivalent of horse-power, much to the amusement of Barth, who warned him of the futility of such a quest.

Although he never deviated from his rule of exhausting every available source of information as to what had already been done, he did come to see the folly of waiting to make sure he was entirely right before he went ahead.

He not only never began far away from current practice, but deplored the idea of sudden breaks with tradition. He satirized, such foolish innovating by supposing a surgeon teaching a younger man, and encouraging originality as follows:

"Don't be hampered by any prejudices of the older surgeons. What we want is your initiative, your individuality. If you prefer a hatchet or an ax to cut off the bone, why chop away, chop away! Would this be what the modern surgeon would tell his apprentices? Not on your life!" [Volume I, page 193.]

The Essence of Scientific Management

What, then, is the essence of scientific management? P. T. Barnum, when asked what was the most wonderful thing about his "greatest show on earth," answered "that it pays!"

This is the most important thing about the Taylor System. In its sphere, and without any of the showman's exaggeration, the Taylor System is still industrially the greatest show on earth because it pays so handsomely, not only in cold cash, but in higher values as well.

If it were true that scientific management failed greatly to surpass the rule-of-thumb, its detractors would be right in claiming that it amounted to little except red tape.

It is the enormous difference which scientific management makes to output, wages, and profits, which marks it out as distinctive. "By their fruits ye shall know them."

We have already seen some of the extraordinary results of Taylor's work. We saw that productivity was commonly doubled, or tripled, or even quintupled.

⁶Volume I, page 255.

Method Rather than Devices

The present question is what is there in *method* that lies behind these *results*? What is it which makes this enormous difference between the productivity under scientific management and that under ordinary management?

Is the real secret to be found in task and bonus, slide rule, stronger belting, for instance?

The answer, as Copley's book so clearly shows, is both Yes and No. Usually and incidentally, Yes; fundamentally, No.

If we must list the chief concrete aids to scientific management, we find them, according to Taylor, as follows:

Time study, with the implements and methods for making it properly.

Functional or divided foremanship and its superiority to the old-fashioned single foreman.

The standardization of all tools and implements used in the trades, and also of the acts or movements of workmen for each class of work.

The desirability of a planning room or department.

The "exception principle" in management.

The use of slide rules and similar time-saving implements. Instruction cards for the workman.

The task idea in management, accompanied by a large bonus for the successful performance of the task.

The "differential rate."

Mnemonic systems for classifying manufactured products as well as implements used in manufacturing.

A routing system.

Modern cost system, etc. [Principles of Scientific Management, pages 129-130.]

In more general terms, scientific management breaks down every task into five principal functions: planning, preparation, scheduling, production and inspection.

But those who seek the soul of scientific management in such devices or classifications are like those who seek the soul of religion in a particular ritual. The great secret of scientific management is not to be found here. Detailed devices might express the difference between any two unscientific systems. It might be fair so to describe the difference between Smith's and Jones' systems, but Taylor's system differs from Smith's and Jones' and everybody else's in this—that his methods were not simply favorites to which he took a fancy, but the result of painstaking scientific testing.

The grand ends to which this system is all directed may be here defined as [1] the determination of best or standard ways, implements, and materials by scientific investigation and experimentation, and [2] a control so extensive and intensive

as to provide for the maintenance of all standards in this way reached. [Volume I, page xvi.]

We might, then, define scientific management as management which makes enormously better results by substituting science for guess work. The one supreme criterion of whether an industrial method is scientific or not is found by asking "has that method been *proved* to be the *best*?"

Of course, scientific management, in the ideal sense, has never been attained; in fact, strictly speaking, it is unattainable. When Taylor was testifying in 1912 and was asked: "How many concerns to your knowledge use your system in its entirety?" his reply was: "In its entirety?—none, not one."

A Revolutionary Spirit

But even these attempts to formulate the elusive essence of scientific management are apt to be barren, meaningless, and even misleading to the hovitate. The precondition for substituting scientific management for other management is a willingness to forsake everything traditional if need be, that is, if scientific investigation so indicates. Only through such a "spirit meet for repentance" can the candidate for scientific management ever expect to find the straight and narrow path to industrial salvation.

It actually was the fact that men to follow after him had to undergo a mental revolution singularly like that of a religious conversion. [Volume II, pages 124-5.]

Huxley, that great apostle of the scientific spirit, used to say that a scientific man must have a fanatical regard for the truth, that he must be ready to sit down before a fact and humbly accept it and all its implications.

That was Taylor's spirit, and history will accord to him the everlasting honor of being the first man in industry, or at any rate in industrial management, to exemplify and utilize that subtle scientific spirit which previously we associated with universities and laboratories.

When we speak of "men of science," we still think of such examples as Huxley, Darwin, Pasteur, Newton, Gibbs, Einstein. That being the case, some university professors quite naturally failed to recognize in Taylor a man of science. But the realm of science is constantly expanding, and in industry Taylor was its prophet and pioneer.

One consequence of this new apotheosis of science in industry was that when "the one best way" was discovered, scientific management paid homage to that