

Finding 'The One Best Way'

*An appreciation of Frank B. Gilbreth,
the father of motion study*

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It has been over a century since the birth of Frank B. Gilbreth. Yet his accomplishments still stand out for their fervor and devotion to a single goal: the elimination of waste and the discovery of "the one best way" of doing work. This ideal became his credo and his religion, and he did everything in his power to make clear the tragedy, as he saw it, of waste going on everywhere.

Gilbreth fought this special variety of sin wherever he found it. Addressing a group in Germany, he suddenly drew from his pocket a handful of change and threw it into the audience. They were surprised and alarmed, but they hurried to pick up the coins. Gilbreth's face beamed as he shouted, "You are all shocked at this waste of a few small coins, but you can't see the enormous waste going on around you. Why, you are wading knee-deep in waste, but you don't realize it."

Born on July 7, 1868, in Fairfield, Maine, Gilbreth began his career at the age of 17 as a bricklayer. He had passed the entrance examinations for M.I.T., but he was urged by his Sunday school teacher to pass up college to go to work for him in the construction business. In 1885 bricklayers were making the impressive sum of \$3 a day. Gilbreth needed the money and he accepted the job.

Trying to learn his new job, Gilbreth studied how bricklayers worked. He found they performed work in three ways. They used one set of motions when working deliberately but slowly; a second set when working rapidly; and a third set when trying to teach their helpers. It was this simple observation that led to the establishment of the first precepts of motion study. For, as Gilbreth realized, if one set of motions was right, then the other two must be wrong.

Gilbreth was determined to learn to lay bricks the

"right" way. At first he was the slowest apprentice on the job, but soon he began developing his own ideas. Designing his own scaffolds and work methods, Gilbreth cut the motions required to lay a brick from 18 to 6. Within a year he was the fastest bricklayer on the job. A journeyman was expected to lay 175 bricks an hour while Gilbreth could easily lay 350.

Several years later, Gilbreth testified before the Interstate Commerce Commission in the famous Eastern Rate Hearing Case. He explained his new science of bricklaying as follows:

Bricks have been laid the same way for 4,000 years. The first thing a man does is to bend down and pick up a brick. Taylor pointed out that the average brick weighs ten pounds, the average weight of man above his waist is 100 pounds. Instead of bending down and raising this double load, the bricklayer could have an adjustable shelf built so that the bricks would be ready to his hand. A boy could keep these shelves at the right height. When the man gets the brick in his hand, he tests it with his trowel. If anything this is more stupid than stopping to pick up his material. If the brick is bad he discards it, but in the process it has been carried up perhaps six stories, and must be carted down again. Moreover, it consumes the time of a \$5 a day man when a \$6 a week boy could do the testing on the ground. The next thing the bricklayer does is to turn the brick over to get its face. More waste: more work for the \$6 boy. Next what does the bricklayer do? He puts his brick down on the mortar and begins to tap it down with his trowel. What does his tapping do? It gives the brick a little additional weight so it will sink into the mortar. If anything

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this is more stupid than any of the others. For we know the weight of the brick and it would be a simple matter in industrial physics to have the mortar mixed so that just that weight will press it down into the right layer. And the result? Instead of having eighteen motions in the laying of a brick, we have only six. And the men put on the work to try it lay 2,700 with apparently no more effort than they laid a thousand before.¹

Nothing succeeds like . . .

By 1895 Gilbreth had begun his own construction business. In the 10 years previous he had worked at such a wide variety of trades that he was able to draw a journeyman's pay from more than 50 specialties. In his new work, Gilbreth's method was essentially what it had been on his first job—to eliminate fatiguing and time-wasting motions. Gilbreth analyzed each job he undertook to eliminate any unnecessary motions. Recognizing that *speed* is an essential factor in construction work, "Speed Work" became his motto.

In order to assure that cost arrangements would be satisfactory to his customers, Gilbreth designed a Cost-Plus-A-Fixed-Sum Contract. Before long Gilbreth's work spread from Maine to New Mexico, and from London to Berlin. At one time he employed up to 10,000 men. He even maintained an office in London, performing work for the Admiralty and War Office.

In order to keep track of all the work his company was involved in, Gilbreth ordered weekly photographs be taken, showing the progress of each job. These were supplemented by daily correspondence and an array of supporting forms. Dams, houses, factories, canals, skyscrapers, and even whole towns (for example, Woodland, Maine) were constructed by the Gilbreth Company. Much work was performed in San Francisco following the great earthquake and fire.

Gilbreth's record-setting performances drew increasing attention. Following unheard of practices, Gilbreth would start moving construction materials toward a job site even before a contract was awarded. Then, once the contract was signed, he would startle the public by beginning work within hours.

As Gilbreth's ideas gained prominence, they also gained acceptance. But persuaded that "a system that was not in writing was not worthy of the name," he set out to put his ideas into book form. Working in con-

junction with his wife, Lillian, Gilbreth published *Concrete System* and *Field System* as early as 1908, and followed with *Bricklaying System* (1909), *Motion Study* (1911), *Fatigue Study* (1916), and *Applied Motion Study* (1917).

As Gilbreth's contacts grew, his interests broadened. Influenced by James Mapes Dodge, president of the Link Belt Company, he became involved in ASME, the American Society of Mechanical Engineers. Here he met Frederick W. Taylor and other leaders of the new "scientific management" movement—men like Henry L. Gantt and Harrington Emerson.

And so, into scientific management

It did not take long before Gilbreth realized that Taylor's practice of "timing how long it takes to do work" was as new to him as his own practice of studying motions as a part of better methods leading to "the one best way to do work" was unknown to Taylor. Soon the concepts of scientific management as a complement to his own work were drawing more and more of his attention. By 1912 he had completely given up the construction business and began devoting full-time efforts to management consulting.

With the same single-minded attention Gilbreth had given to bricklaying, he now studied the field of scientific management. More and more convinced that "the greatest waste in the world comes from needless, ill-directed, and ineffective motions," Gilbreth was the first person to use motion-picture cameras to analyze a worker's motions. In 1915 he put roller skates on messengers in Montgomery Ward's office to reduce their fatigue and increase their speed of delivery. In another experiment, he observed 150 operations for the removal of the appendix—to find "the one best way." In conjunction with his wife, Lillian, he authored papers such as, "The Application of Scientific Management to the Work of the Nurse," "Motion Study in Surgery" and "Scientific Management in the Hospital." At one point, he even prepared a study of the motions of epileptics. And with the same dedication, working now with Walter Camp, he analyzed the swings of golf champions such as Gil Nichols and Francis Ouimet. Nor was the national sport exempt from his studies after he filmed and analyzed a baseball game between the Phillies and Giants at the Polo Grounds.

Gilbreth, despite the connotations of "speed work," remained something of an idealist. It is said that "nothing ever aroused his temper more than a selfish employer who wanted to adopt all the latest things in management in his plant but wanted to hog all the sav-

¹U.S. Congress. Senate. *Evidence taken by the Interstate Commerce Commission in the matter of proposed advances in Freight Rates by Carriers.* (August to December 1910), S. Doc. 725 (Ser. Set 5,908), 61st Cong., 3d sess., 1910-11.

ings himself and not share with his workers." In contrast to the "blacklists" of the period, Gilbreth therefore instituted a "white list" designed to provide rewards for men who had worked well. Then, in an effort to develop the skills of the men who worked for him, Gilbreth developed "a three-position plan" of promotion. Under the plan, each man should perform his own job but also train the man below him to be his successor

and to learn the next higher position to which he might move in the organization.

In such efforts as these, Gilbreth worked to develop every employee to his fullest potential. As Gilbreth put it, "We want to find the highest task a man can perform permanently, year after year, and thrive, and be happy. A man wants to do more than get fat; he wants to be happy." **R**