# One Hundred Years Later: What Would Frederick W. Taylor Say?

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**Abstract**

*A reflective survey paper dealing with the evolution of management thought and practice that has taken place during the one hundred years following the publication, in 1911, of The Principles of Scientific Management by Frederick W. Taylor. This paper includes a description of the background, education, and early work experiences of Taylor, as well as, a discussion of the time period, during which, Taylor was conceptualizing the principles of scientific management while employed in various capacities in the steel industry. Next, is a discussion describing his test, implementation, and validation of the principles of scientific management? Discussion of Taylor's legacy in the last part of this paper, includes the effect that his principles of scientific management have had on many different facets of the discipline of business and management including: accounting cost control, compensation management, human resources management, organized labor relations, operations process control management, operations service sector management, quality management, and technology management.*

**Key Words:** Frederick W. Taylor, management history, operations management, production management, scientific management.

### *1. Introduction*

This article is a reflective paper about the evolution of management thought and practice that has taken place during the one hundred years following the publication, in 1911, by Frederick Winslow Taylor of his book titled *The Principles of Scientific Management*. This paper tracks and describes some of the changes in management thought and practice that have taken place as the world has moved on through the industrial age, the information age, and has now entered what some authors label the virtual age. The paper also attempts to show the impact the original 1911 text has had on the development of management thought and practice in later years. This is not an epilogue; it is not the closing scene on the Fredrick Winslow Taylor story. Some readers may choose to disagree with the thoughts presented in this paper and that is totally in their own right to criticize or accept the observations of the author.

**1.1 The Early Years.** Frederick Winslow Taylor (1856-1915) was born in Germantown, Pennsylvania on March 20, 1856. He was the son of a fairly prosperous lawyer and mother who traced her Puritan ancestral background to an ancestor in Plymouth, Massachusetts who had immigrated to this country in the year 1629 (Copley, 1923). Fredrick or Fred as he was often called, was encouraged by his family to follow in the steps of his father into the law profession. He attended Phillips Exeter to prepare for the Harvard law exams and with hard work he soon passed the exams with honors. At this point in his career for some reason Fred elected to or was forced to turn away from entering Harvard law school because of poor health and eyesight. Instead, sometime around 1874, Fred accepted a four-year position as an apprentice pattern maker and machinist with the Enterprise Hydraulic Works of Philadelphia. There were some that thought that this diversion from law school to a low level, zero wage apprenticeship was perhaps not due to his failing eyesight but a result of his rejection of his father's choice of a profession for him (Wren, 1972).

Regardless of whatever might be the true reason Fred embarked on an apprenticeship in manufacturing that would lead to a lifetime career always in or very close to manufacturing. Fred moved from Enterprise Hydraulic Works to Midvale Steel as a common day laborer in 1878. Fred rapidly advanced from common day laborer to clerk, to machinist running a lathe, to gang boss of all lathe machinists. Three years later he became foreman of the machine shop; next he was promoted to master mechanic in charge of repairs and maintenance throughout the plant, and finally to chief engineer all in the short span of six years (Taylor, 1911a). While at Midvale, Taylor enrolled in a correspondence course offered by Stevens Institute of Technology of Hoboken, New Jersey. Taylor attended Stevens only to take examinations, and graduated with a degree in Mechanical Engineering in 1883.

Taylor moved to Bethlehem Steel Company in 1898 and remained there until 1901 while continuing to successfully develop, refine, and implement his principles of scientific management.

**1.2 Conceptualization of the Principles.** Frederick made an extensive series of observations during his years associated with industrial manufacturing. One of his early observations was that "the underlying philosophy of all of the old systems of management in common use makes it imperative that each workman shall be left with the final responsibility for doing his job practically as he thinks best, with comparatively little help and advice from management" (Taylor, 1911a, p. 9). Under this old style management, skilled machine craftsmen were left to their own judgment as to what should be the proper speed, quantity, and quality of work to be completed at their individual workstations. As the industrial revolution progressed, machine power began to overtake the need for individual human craftsmen. Large industrial organizations with many machines in production lines demanded a new type of management. Frederick in a paper on shop management warned of, and called special attention to the risks that managers would run into trying to change rapidly from the old to the new forms of management (Taylor, 1911b). During the time period from 1874 to 1884, starting as an apprentice with Enterprise Hydraulic Works through his rise to chief engineer at Midvale Steel, Taylor applied his experience and knowledge of Mechanical Engineering to study the elements or details of the mechanism of industrial management. Later, Taylor went on to present and publish a formal paper *Shop Management* that was read before the American Society of Mechanical Engineers (1911b). In his paper Taylor stated that scientific management is a combination of four great underlying principles:

> First. The development of a true science.
> Second. The scientific selection of the workman.
> Third. His (the workman's) scientific education and development.
> Fourth. Intimate friendly cooperation between the management and the men. (Taylor,1911b, p. 68)

Around 1907 Taylor first met Frank Gilbreth, and the two men found that they shared some common thoughts concerning the improvement of productivity in industrial operations. Gilbreth had a primary focus or interest in "motion study," while Taylor focused on "time study" in the industrial setting (Gilbreth, 1911, 1917). Taylor found Gilbreth's work very interesting but too narrow in scope for Taylor's approach to scientific management. Taylor read Gilbreth's motion study in which, through study of all of the motions used by laborers in laying bricks, was successful in reducing the time required to build a brick factory wall. Gilbreth entirely dispensed with some movements, introduced simple apparatus to assist the laborers, and changed the sequence of movements resulting in increasing the output of bricklayers from the old 120 bricks per man per hour to 350 bricks per man per hour (Taylor, 1911a, 1919). Taylor in reviewing Gilbreth's work was convinced that Gilbreth was successful because whether he knew it or not during his motion studies he had actually been using what Taylor described as the four elements that constitute the essence of scientific management. To justify his belief Taylor applied his four principles of scientific management (listed above in this paper) to the bricklayer scenario that had been studied by Gilbreth:

> *First.* The development (by the management, not the workman) of the science of bricklaying, with rigid rules for each motion of every man, and the perfection and standardization of all implements and working conditions.
> *Second.* The careful selection and subsequent training of the bricklayers into first-class men, and the elimination of all men who refuse to or are unable to adopt the best methods.
> *Third.* Bringing the first-class bricklayer and the science of bricklaying together, through the constant help and watchfulness of the management and through paying each man a large daily bonus for working fast and doing what he is told to do.
> *Fourth.* An almost equal division of the work and responsibility between the workman and the management. All day long the management work almost side by side with the men, helping, encouraging, and smoothing the way for them, while in the past they stood (to) one side, and give the men but little help, and threw on to them almost the entire responsibility as to methods, implements, speed and harmonious cooperation. (Taylor, 1911a, pp. 42-43)

Taylor (1911a, p. 43) went on to conclude that "the 'development of the science' is the most important of the four great elements of the new management. There are instances, however, in which the 'scientific selection of the workman' counts for more than anything else." By the year 1923 Frederick's work in conceptualizing and teaching the principles of scientific management to the industrial community resulted in his formally earning the title of *Frederick W. Taylor: Father of Scientific Management* in the book of the same name authored by F. B.

Copley (1923). Probably the most significant contribution to scientific management was Taylor's concept of separating *planning* from *doing* in production. Taylor stated that the primary functions of the planning department should include time study, line balancing, pay schedules, and systematic part identification (Taylor, 1911b). Today, we recognize that the two tasks (planning and doing) require distinctly different skills. Taylor in his view of scientific management believed that some workers should schedule work, purchase materials, analyze jobs, and perform other non-production tasks while other workers should perform the manual tasks necessary to transform raw materials into finished goods (Adam & Ebert, 1986).

**1.3 Production Management.** The term *scientific management* gave way to the more widely accepted term *production management* during the 1930's. Production management however, did not reflect all of the changes in management that resulted from Taylor's work. Without going into great detail here we can say that Taylor, in his two 1911 publications (1911a, & 1911b), set the scene for developments in many business functions and disciplines including: accounting cost control, compensation management, human resources (formerly personnel) management, organized labor relations, operations process control management, operations service sector management, quality management, and technology management. It is outside the scope of this paper to draw the links from Taylor's documentation and publications to each of the above stated business functions and disciplines. But the links do in fact exist and in the section presented below, that focuses on Taylor's legacy, there are citations to source documents describing many of these linkages as they still exist today.

## *2. Taylor's Legacy*

What is a legacy? Webster's Collegiate Dictionary defines legacy as something received from an ancestor or predecessor from the past. I think it is safe to say that Frederick W. Taylor did in fact leave something (his legacy) for us some one hundred years ago in his philosophy of scientific management that was so clearly documented in his writings. The author of this paper was first introduced to Taylor's work in the early 1960's while enrolled in an undergraduate school of business Principles of Management course. Koontz and O'Donnell (1964) were the authors of the textbook used in that class, and that textbook still warrants a place on this author's bookshelf. The Bachelor of Science degree that was earned during the 1960s was the first step by this author into a career focusing in the academic disciplines of Management and Information Science. The Koontz and O'Donnell (1964) textbook 600 pages in length and published some 53 years after Taylor's book (1911a) included at least 12 different references and as many pages describing Taylor and his Principles of Scientific Management. This was a legacy that had already lasted over 50 years. This author's deep appreciation for Taylor's pioneering ideas and research has continued to grow after nearly 50 years in the field of management. But, who else has been a receiver of this legacy? Examples listed below illustrate business management areas and disciplines that one hundred years later still show roots leading back to Taylor's work:

**2.1 Accounting Cost Control.** Taylor introduced a cost accounting system at Bethlehem that focused on moving the function of accounting from a post-mortem system of annual, semi-annual, and monthly reports too late for management to be pro-active in taking action and making changes. Taylor implemented a cost accounting system modeled after that being used at the Frankford Arsenal near Philadelphia. Taylor also succeeded in moving the cost accounting function to the planning department generating cost reports coincident with daily operations reports and in line with the philosophy of his fourth principle (Wren, 1972).

**2.2 Compensation Management.** The logic underlying job-based pay structures flows from the ideas of Frederick W. Taylor proposed early during the 1930's (Milkovich & Newman, 2008).

**2.3 Human Resources Management.** A straight piece-rate system pays employees one piece-rate wage for units produced up to a standard output level; Frederick W. Taylor proposed a differential piece-rate system that pays a higher piece-rate wage for units produced above the standard output level (Mathis & Jackson, 1997). Another author notes that one of Taylor's most important contributions was the identification of new functions for managers relating to the selection and training of new employees (Tracey, 1994).

**2.4 Organized Labor Relations.** When Henry Ford added the assembly line in 1913 to the then narrowly defined jobs that were proposed by Frederick W. Taylor in his principles, the mass-manufacturing model was established for much of the rest of the century (Budd, 2005). There was some initial opposition to Taylor's principles. The labor movement initially opposed what they called "Taylorism", and strikes against time studies and incentive pay plans resulted. At some level this underlying conflict between organized labor and management continues to exist today (Budd, 2005).

**2.5 Operations Process Control Management.** Mentioned earlier in this article (but repeated here because of its importance) is the fact that Taylor introduced the concept of using scientific methods to measure and control the processes of work, a very important contribution to industrial management (Taylor, 1919; Hampton, 1994).

**2.6 Operations Service Sector Management.** Southwest Airlines uses teamwork and rapid cleaning methods to wash windows for fast turnaround of its flights. This is an example that demonstrates some of the fundamental ideas on task assignments that Taylor introduced in his principles almost a century ago (Davis, Aquilano, & Chase, 2003).

**2.7 Quality Management.** Taylor introduced the use of mnemonic classification, leading to grouping of machines (group technology), and later renamed to *cellular manufacturing* where different parts requiring similar machines are produced. The economic benefits of group technology become significant when cost reductions in production control, materials handling, and inventory control are considered (Hampton, 1994). One could say that Taylor's scheme of classification and measurement created a building block necessary for the present day implementation of quality management.

**2.8 Technology Management.** "Changing an organization's technology involves altering its equipment, engineering processes, research techniques, or production methods. This approach goes back to the scientific management theory of Frederick W. Taylor" (Stoner, Freeman, & Gilbert, 1995, p. 419).

## *3. Summary*

To summarize, Frederick W. Taylor's legacy contribution to business management and its various disciplines is alive and well today. Taylor's contributions have survived the management evolution that has moved from the *industrial age* into the *information age*, and is now about to enter what some authors view as the *virtual age*. Entry into the *virtual age* suggests that many new applications of Taylor's principles will be seen in the future. It would be interesting to see how Taylor would apply his principles to the material contained in the article "World Class Manufacturing: Blueprint for Success" (Mylnek, Vonderembse, Rao, & Bhatt, 2005). What will be the next yet unnamed "*age*" and will Taylor's principles still fit into this future time period?

## *4. Conclusion*

As this article is being written and prepared for press we are at the eve of the one hundredth anniversary of the publication of *The Principles of Scientific Management* by Frederick W. Taylor. The question posed in the title of this article is what would Frederick say if he were to revisit the industrial management scene today? In the opinion of this author, if Frederick were to re-appear in the industrial management scene today he would say something to the effect that "after one hundred years, my ideas, my books, and my principles of scientific management have stood the test of time and have all been validated." Congratulations Frederick, we agree!

## *5. References*


Adam, E. A., Jr., & Ebert, R. J. (1986). *Production and Operations Management*: *Concepts, Models, and Behavior* (3rd ed.). Englewood Cliffs, New Jersey: Prentice- Hall.

Budd, J. W. (2005). *Labor Relations: Striking a Balance.* New York: McGraw-Hill/Irwin Copley, F. B. (1923). Fredrick W. Taylor: Father of Scientific Management. (Vols. 1-2). New York: Harper & Row.

Davis, M. M., Aquilano, N. J., & Chase, R. B. (2003). *Fundamentals of Operations Management*. New York: McGraw-Hill/Irwin.

Gilbreth, F. B. (1911). *Motion Study*. New York: Van Nostrand Reinhold Co.

Gilbreth, F. B. & Gilbreth, L. M. (1917). *Applied Motion Study*. New York: Sturgis and Walton Company.

Hampton, J. J. (Ed.). (1994). *AMA Management Handbook* (3rd ed.). New York: American Management Association.

Koontz, H. & O'Donnell, C. (1964). *Principles of Management: an analysis of managerial functions* (3rd ed.). New York: McGraw-Hill Book Company.

Mathis, R. L. & Jackson, J. H. (1997). *Human Resource Management* (8th ed). St. Paul, MN: West Publishing Company.

Milkovich, G. T., & Newman, J. M. (2008). *Compensation* (9th ed.). New York: McGraw-Hill/Irwin.

Mylnek, P., Vonderembse, M. A., Rao, S. S. & Bhatt, B. J. (2005). World Class Manufacturing: Blueprint for Success. *Journal of Business and Management*, 11(1),7-24.

Stoner, J. A. F., Freeman, R. E., & Gilbert, D. A., Jr. (1995). *Management* (6th ed.). Englewood Cliffs, NJ: Prentice Hall.

Taylor, F. W. (1911a). *The Principles of Scientific Management.* New York: Harper & Row.

Taylor, F.W. (1919). *Scientific Management*. New York: Harper & Row.

Taylor, F. W. (1911b). *Shop Management.* New York: Harper & Row.

Tracey, W. R. (Ed.). (1994) *Human Resources Management & Development Handbook* (2nd ed.). New York: American Management Association.

Wren, D. A. (1972). *The Evolution of Management Thought*. New York: The Ronald Press Company.