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TAYLOR'S CONTRIBUTION TO COST ACCOUNTING, A REPLY

Abstract: We respond to those issues that M. C. Wells raised in his comments on our article. We found that his comments on the association of scientific management and cost accounting, and on Taylor's historical role in cost accounting were debatable, and his discussion of the first modern book on cost accounting was inconclusive.

In his article, "Taylor's Contribution to Cost Accounting: A Comment," Wells acknowledges some of Taylor's accomplishments; however, a considerable part of his discussion focused on certain statements that we made in our paper, "Frederick Winslow Taylor's Contributions to Cost Accounting." In this paper we respond to the issues raised by Wells, starting with our original statements and Wells' related comments.

Unwarranted Association

Our Statement: An introduction to his [Taylor's] work in cost accounting... provides better understanding of his system of scientific management.

Wells' Comment: The above statement suggests a fundamental misunderstanding of the nature of both cost accounting and scientific management.

To support his argument, Wells states that "scientific management was designed to increase productivity, eliminate waste, and make individuals feel responsible for their assigned tasks. Costing was needed for pricing and identifying the sources of profit." We are not sure to what extent this concept depicts Taylor's system.

Taylor was a doer. He developed his methods and mechanisms here and there over decades and then linked them together as a
complete system of scientific management. In 1903 he presented a paper at the American Society of Mechanical Engineers in which he suggested that the shop be managed by the planning department, and that the following be one of the leading functional elements of that department:

The cost of all items manufactured, with complete expense analysis and complete monthly comparative cost and expense exhibits. 6

Several years later, Taylor published the *Principles of Scientific Management* (1911), because, during the intervening years, the concept of scientific management had become controversial. 7 From this latter publication, we derive the following framework of Taylor’s system of scientific management, which includes two leading objectives and three conceptual levels:

**Leading Objectives:**
To secure the maximum prosperity for the employer, coupled with the maximum prosperity for each employee. 8

**Level 1—Philosophy of Management**
A complete change in the mental attitude of the working men as of all those engaged in the management, toward each other and toward their respective duties and responsibilities. 9

**Level 2—General Principles of Management**
- The development of a true science
- The scientific selection of the workman
- The workman’s scientific education and development
- Intimate friendly cooperation between the management and the men. 10

**Level 3—Elements of Mechanism of Management**
- Time study
- Functional foremanship
- The standardization of all tools and motion study
- The exception principle in management
- The differential rate of wages
- Mnemonic systems
- A routing
- Modern cost system, etc. 11

Taylor further stressed that “it is no single element, but rather this whole combination, that constitutes scientific management.” 12
The foregoing shows that Taylor saw scientific management and cost accounting as more closely associated than Wells contends. In several aspects, as Wells acknowledges, the association was even necessary. For example, comparative cost reports were essential for the application of Taylor's exception principle in management. Timely recording and monthly cost analysis were crucial for placing the responsibility for any improper expense incurred exactly where it belongs. But even the distribution of shop expense, which Wells denies, was designed to serve managerial purposes. In a short paper on cost system, Taylor stated:

The object in distributing the Shop Expense . . . is that by this means one is enabled to determine for each piece manufactured whether the cost can best be reduced by pushing the machine for a greater output, even if necessary at an extra expense of labor or whether this object can be obtained only by lowering the wage cost.

Copley also noted that "the general object [of a record of machine dollar hours, which were used by Taylor as a means of shop expense distribution] was to show what each machine earned or the extent to which it was utilized. . . . Such a record plainly directs attention to the cost of maintaining idle machinery." To direct attention in this area implies an attempt to control the waste in machine time.

Before changing the subject, a word of caution is in order. Firstly, to develop fully Taylor's system of scientific management required not only considerable time, but also a favorable environment. However, none of the firms by which Taylor was employed as a consultant did give him the necessary time and neither "were the environments such as to make it possible for him to work out a complete development of his system." Moreover, Taylor himself had shifted his emphasis from a piece-rate system, to the task idea and finally to the principles and philosophy of scientific management. Thus, it is possible that scientific management could mean different things to different people. While what we had in mind was the more complete system as summarized in the foregoing, we did not intend to preclude different points of view.

Secondly, although costing was considered consistently as an element of his system of management, Taylor did, in fact, put different stress on it at different times. The following is quoted from his manuscript prepared for his Harvard lectures in 1909:

Fifteen to twenty years ago I looked upon a correct cost system as one of the most important among the various
elements of management, and in fact devoted a large part of my time to introducing systems of cost and expense analysis in manufacturing establishments. Now, however, under the modern scientific management, as far as they influence cheapness of manufacture, costs and expense analysis become . . . elements of lesser importance, and we generally leave them to the last in the introduction of our system.\textsuperscript{19}

It should be added, however, a review of his costing systems installed at various companies since 1896 reveals little significant changes in either the form or the substance.

\textit{The First Modern Cost Accounting Book}

Our Statement: This [Taylor's] system is close to Metcalfe's \textit{Cost of Manufacturers} (1855), which has been generally recognized as the first modern book on cost accounting.\textsuperscript{20}

Wells' Comment: . . . whether it [Metcalfe's book] represents "the first modern cost accounting book" as Chen and Pan claim, is however, much less certain.\textsuperscript{21}

When we chose Metcalfe's book for a comparison with Taylor's work on cost accounting, we did not intend to claim anything other than did Chatfield who made it explicit that "The first modern book on cost accounting was Captain Henry Metcalfe's \textit{The Cost of Manufacturers} (1885)."\textsuperscript{22} We also noted that, in his \textit{Evolution of Cost Accounting to 1925}, Garner chose 1885, the year that Metcalfe's book was first published, as the demarcation line for a more orderly arrangement of cost accounting theories and techniques for discussion.\textsuperscript{23}

Wells has reason to doubt whether Metcalfe's book represents the first of that kind. However, we would be interested in knowing, if Metcalfe's wasn't, what was? Wells raises the issue, provides some alternatives, but gives no definite answer. After a brief review of those alternatives, we find that the "Accounting Circulars" published by the American Bell Telephone Company and reprinted in a journal can hardly be considered as books, and that the "1884 Accounting Circular," the only issue published before 1885, consisting mainly of a chart of accounts and explanations on selected accounts such as Accounts Receivable, Outstanding Tool Tickets and
Construction, was not specifically on cost accounting. We also doubt whether Kirkman's publications before 1885 were specifically cost accounting books. For example, his 1880's book on railway expenditures includes such non-costing topics (chapters) as "Taxation of Railway Property," "The Principles that Govern the Railroad Companies," "Railway Mortgage Bonds," "Rental of Leased Roads," and "The Form of Returns for the Use of State Commissioners," to name just a few. By the same token, Carter's, Crittenden's and Sawyer's books dealing mainly with bookkeeping (as indicated in their respective titles) may not be appropriately classified in the cost accounting category—not to mention the question of their modernity.

Wells claims that Battersby's book "was a modern cost accounting book in every sense." Garner, however, was not so sure as he remarks after examining Battersby's book in great detail:

After such a pithy criticism of other authorities one might expect that Battersby's own "Prime Cost" system would be rather modern in nature. Yet when it is examined closely it is found to be only a partial improvement over the methods he criticized. As a matter of fact, Battersby was considerably better in finding faults with the work of other authorities than he was in devising a more nearly perfect cost system of his own.

Wells admits that "none of these expositions were as detailed or provided the explicit examples of product costing contained in Metcalfe's book. Nevertheless, [he adds,] it does seem that the ideas were more common than Chen and Pan would allow." While we wonder how anybody could allow or disallow the existence of certain costing ideas about a century ago, we realize that from the "first book" to the "first idea" there is a considerable shift in issue.

**Installation of Bookkeeping System At The Midvale**

**Our Statement:** It is unlikely that Taylor installed any accounting system as such [with features indicated in his paper entitled "System of Book Keeping and Reporting as Introduced"] while he was working with the Midvale.

**Wells' Comment:** There can be no doubt that he [Taylor] was speaking [at the 1886 Conference of the American Society of Mechanical
Engineers] of a system which was in operation, and which by 1886 had been in operation for a number of years.\textsuperscript{32}

It is noted that our statement was referring to Taylor's paper on bookkeeping, not cost accounting, while the paper Metcalfe presented and to which Taylor referred at the 1886 Conference was solely on cost accounting, not bookkeeping.\textsuperscript{33} Of course there can be no doubt that some accounting system had been in operation at the Midvale since and even before Taylor was hired as a laborer in 1878, but there was no evidence showing Taylor's direct involvement in the installation of any accounting system at the Midvale with the following features as indicated in his paper:

1st. \ldots The books are so arranged that at the end of each month the exact cost of each article or class of articles manufactured during the month is shown on the books \ldots .

2nd. The books are closed as completely each month as they ordinarily are at the end of the year and complete exhibits are made out and sent to the treasurer of the company and to as many of the directors as desire them showing:
   A. A complete balance sheet \ldots .
   B. An analysis and classification of the expenses of the company and a comparison with the expenses of former months \ldots .
   C. A detailed cost sheet \ldots .
   D. A detailed profit and loss account.

3rd. The books are arranged especially so that they can be balanced daily and a daily report sent to the treasurer and directors if desired giving them a complete balance of the financial side of the business.\textsuperscript{34}

While we have been unable to find any document conclusively substantiating the existence of such a system at the Midvale in the 1880s, we tend to agree with the following comment given by Carl G. Barth, who had known Taylor since the early 1880s, became one of Taylor's closest associates in 1899, and compiled Taylor's historical files in the 1930s:

No evidence has been found that Taylor had anything to do with stock keeping or accounting, in its broader sense, at Midvale but it is well known that he had already thought
out, and perhaps applied the fundamentals of the particular method of cost keeping, at Midvale ... While the write-up by Taylor [Taylor's paper indicated above] was found in one of his Midvale books, it is absolutely certain that he had not while still with that company developed the style of bookkeeping therein briefly outlined.\(^{35}\)

**Taylor's Contribution**

**Our Statement:** Accounting history has not done justice to Taylor's contributions.\(^ {36}\)

**Wells' Comment:** As he [Taylor] did nothing to promote cost systems, it is concluded that he has received the credit due to him.\(^ {37}\)

Wells acknowledges Taylor's work on cost accounting, but contends that Taylor did not publicize his costing methods.\(^ {38}\) Using a certain criterion to evaluate one's accomplishment does have merit. However, Wells does not specify the terms "promote" and "publicize" that he uses to evaluate Taylor's and others' contributions. It is true that Taylor never published anything specifically on cost accounting. His only article that appeared in an accounting journal, (i.e., *The Journal of Accountancy*), was not on cost accounting nor on bookkeeping, but on the principles of scientific management.\(^ {39}\) He was once invited to give a lecture at the University of Illinois on such topics as "the art of cutting metals" or "the cost of production," but he chose to talk about "Success" instead.\(^ {40}\)

While Taylor was silent in terms of publication and lecturing on his costing method, he did in fact utilize some rather unconventional channels to promote and publicize his methods of management, including costing. Chronologically, he spent twelve years working with the Midvale Steel Company, and became the general manager of the Manufacturing Investment Company in 1890, where he began to work with the details of accounting. Three years later, he withdrew from the Manufacturing Investment Company and started his new profession as a consulting engineer in management with a claim of his specialty in "systemizing shop management and manufacturing costs."\(^ {41}\) In this capacity, he helped organize the managements of various manufacturing companies such as the Steel Motor Works, Simonds Rolling Machine Company, and the Bethlehem Steel Works. From his files, we found evidence of those costing systems that he installed for these and other clients. Taylor retired from "money-making business" in 1901 in order to devote his time and money to promoting the cause of scientific manage-
ment. In 1904, he took up his residence at Boxly, Pennsylvania and worked for the developments of his system at various establishments, including the Tabor Manufacturing Company and the Link-Belt Engineering Company in nearby Philadelphia. It is noted that the costing system that we introduced in our article was the one that he installed at the Tabor, where, according to Copley, "scientific management was developed in entire obedience to Taylor's instructions." After Taylor had become settled at Boxly and the Tabor and Link-Belt developments were well advanced, he invited those individuals who had taken or who he wished would take an interest in his ideas to see scientific management in actual operations there. Copley further noted that:

It is certain that the year 1907 saw sudden increase of interest in his general principles, that his correspondence leaped accordingly, and that thereupon began in real earnest the pilgrimage to Boxly of men and women seeking light on all sort of management problems . . . they often came in parties of as many as twenty-five or thirty. It is conceivable that among the pilgrims were men like Holden A. Evans who were interested in, among other things, cost accounting. A few years after his visit, Evans published extensively on cost accounting. From his publications, Taylor's influence is apparent.

Another example of Taylor's influence is found in Frederic A. Parkhurst's writings. Parkhurst, an organizing engineer, published a series of articles on the applied methods of scientific management, which were later published in book form in 1911. The author made it very clear that:

Mr. Fred W. Taylor, the originator of Scientific Management, and his able associates, have described the principles in detail, and any attempt of mine to elaborate upon them would be superfluous . . . In these pages the application of methods will be treated in detail and illustrated by the history of them as applied to the Ferracite Machine Co., . . . The methods to be described are on lines parallel to those laid down by Mr. Taylor and are particularly adapted to a business employing 100 people or more.

Parkhurst presented a detailed Chief Cost Clerk's Instructions, the similarities between these instructions and those that Taylor designed for his clients, such as the Bethlehem Steel, were overwhelming.
Conclusion

We have responded to Wells' comments on our paper on Taylor's contributions to cost accounting, and found that:

1. Taylor did point out repeatedly and consistently that costing was an element of his system of management. Their association is not as unwarranted as Wells contends.

2. Those early publications on Wells' list as candidates to replace Metcalfe's 1885 book as the first modern book on cost accounting are debatable.

3. There is no new evidence showing conclusively that Taylor did, in fact, install any accounting system in the 1880s with those features indicated in his Midvale paper on bookkeeping.

4. Taylor did use some channels other than publication and lecturing to promote and publicize the mechanics of his system, including cost accounting.

FOOTNOTES

1Wells, "Taylor's Contribution."
2Chen and Pan.
3Chen and Pan, p. 1.
6Taylor, Shop Management, p. 111.
10Taylor, The Principles, p. 130.
14Taylor, "Cost System."
15Taylor, "Cost System."
20Chen and Pan, p. 13.
22Chatfield, p. 159.
23Garner, p. xi.
24American Bell Telephone Co. Ltd.
25Kirkman, Railway Disbursements; Railway Expenditures; Handbook.
26Kirkman, Railway Expenditures.
27Carter; Sawyer; Crittenden.
29Garner, p. 73.
Chen and Pan, p. 2.
Wells, "Taylor's Contribution," p. 70.
Metcalfe, "The Shop Order System."
Taylor, "System of Bookkeeping."
Barth, Book 2.
Chen and Pan, p. 1.
Taylor, "Principles and Methods."
Evans; for an unusual relationship between Evans and Taylor, see Copley, Vol. II, Ch. XI. It is noted that all Evans' publications on scientific management and cost accounting were published in those years while he kept close contact with Taylor.
Parkhurst, pp. 1-2.

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