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TAYLOR'S CONTRIBUTION TO COST ACCOUNTING: A COMMENT

Abstract: Frederick Winslow Taylor developed a system of cost accounting while at the Midvale Steel Company (1878 to 1890). In their article on his contribution to the development of cost accounting, Chen and Pan suggest that Taylor has not received the credit he deserves. They also assert a close association between cost accounting and scientific management. Finally, Chen and Pan compare Taylor's work with a book published in 1885 by Metcalfe.

In this comment, Taylor's contribution is more critically evaluated. As he did nothing to promote cost systems, it is concluded that he has received the credit due to him. Metcalfe's book is also evaluated, and placed in the perspective of other publications of the period.

Chen and Pan's article on Frederick Winslow Taylor's contributions to the development of cost accounting¹ is another in a long line of papers asserting a connection between scientific management and cost accounting. That connection is undeniable. But Chen and Pan's claims about Taylor's role is overstated. More importantly, perhaps, their claim that "an introduction to his [Taylor's] work in cost accounting . . . provides better understanding of his system of scientific management in general"² suggests a fundamental misunderstanding of the nature of both cost accounting and scientific management. Taylor's (and others') systems of cost accounting involved the classification and grouping of expense items so that "all such items as interest, depreciation, taxes, insurance, sales and traveling [*sic*] expenses, as well as all of the more direct expenses of the business may be charged directly and equitably onto the sources from which we derive our income."³

Scientific management, on the other hand, required detailed planning of the physical production, and a clear identification of the work to be undertaken by each worker. The only obvious connection between these requirements and cost accounting is that the job sheets or cards can be used for both purposes. The significance of this connection for the development of cost accounting will be explored in greater detail below.

There are two other points raised by Chen and Pan which deserve comment. They state that "accounting history has not done justice to Taylor's contributions."⁴ That should not be a cause for wonder. As I pointed out in a discussion of the inter-relationship between scientific management and cost accounting, "It is curious, however, that neither Taylor nor his immediate associates H. L. Gantt and A. C. Barth wrote publicly about cost accounting prior to 1914, although they were obviously not ignorant of it."⁵ As other writers, such as Metcalfe [1885], Fowler [1888], Halsey [1893], Arnold [1896], and Lane [1896, 1897] in the United States, and Garcke and Fells [1887], Norton [1889], Liversedge [1890], Mann [1891], and Lewis [1896] in the United Kingdom were doing much to promote costing, it is right that history should accord them the credit. Taylor and his colleagues were, it seems, fully occupied with questions of "gain sharing," "bonus rates" and "piece work." And it is for their contributions to that aspect of industrial management that they are best known.

Chen and Pan also suggest that it is unlikely that Taylor installed any accounting system, as such, while he was working with the Midvale Steel Company (1878 to 1890). Yet in the previous paragraph they refer to "several features of his system" derived from a "short paper found in his Midvale file."⁶ Moreover, in a commentary on Metcalfe's 1886 paper, Taylor states: "I have read with very great interest Mr. Metcalfe's paper, as we at the Midvale Steel Company have had the experience, during the past ten years of organizing a system very similar to that of Mr. Metcalfe."⁷ Taylor goes on to speak of his "experience," what "we have found," what modifications have been "adopted," and so on. There can be no doubt that he was speaking of a system which was in operation, and which by 1886 had been in operation for a number of years. Nor was that unusual. Metcalfe referred to the system as one he found "used in several shops,"⁸ and several commentators appeared to be speaking from personal experience.

Unwarranted Association⁹

The connection between the scientific management movement and cost accounting is both interesting and contentious. One view is that scientific management was made possible by the developments in cost accounting. Chapman claimed that the popularity which Taylor enjoyed arose because

. . . business management was getting more scientific,
and because a certain development in Cost Accounting

had rendered measurements possible which were not possible before.¹⁰

An alternative claim was that the collection of costs was a "by-product of the means used for increasing efficiency."¹¹ And this was the view shared by Taylor: "It has been truthfully stated that the Cost Department under the Taylor System of Shop Management is a By-Product of the System."¹² Other authors were less circumspect. Holden Evans was very active in the early years of this century, and in 1911 he published a book entitled *Cost Keeping and Scientific Management*. In it, he claimed

Scientific shop management and accurate cost keeping are inseparable. Scientific management cannot exist without accurate costs.¹³

Chen and Pan are right in the emphasis which they place on cost apportionment. Taylor paid a great deal of attention to the allocation of indirect costs because he considered it necessary for the determination of "accurate costs" to be used in

setting the selling price of an article and to determine the amount and source of profit for the different products manufactured.¹⁴

It is important to recognize the different functions being referred to by these authors. 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. These are not incompatible aims, but neither are they the same. Taylor did not confuse them, but other advocates did. Evans described one of the purposes of cost keeping as being "for the benefit of the manager, to show him where economies may be effected."¹⁵ He asserted the need for the allocation of overhead, but then denied its relevance:

The overhead charges are in no sense a measure of the efficiency of a plant, the only measure of efficiency is *total* cost and I care not how high the overhead charges go as long as *total* cost is right.¹⁶

Similarly, and perhaps more blatantly Hamilton Church, who proselytized amongst engineers during the first two decades of this century, and was probably responsible more than anyone else for the popularisation of costing systems, confused the two aims. He claimed that

The modern principle of predetermination of standard time-cost requires to be supplemented by similar standardization of overhead burden.¹⁷

What is not explained is how that standardization of overhead costs can assist with the task of identifying "available inefficiency."¹⁸

Taylor cannot, of course, be held responsible for the later misuse of the systems he developed. Nor should we detract from his considerable achievements. The question at issue is whether those achievements included the development and popularisation of novel methods of costing. Contrary to the view expressed by Chen and Pan, the available evidence suggests that they did not.

The First Modern Cost Accounting Book

Chen and Pan conclude their article with a description of Henry Metcalfe's *The Cost of Manufactures* which was first published in 1885. There can be no doubt that this publication was a milestone in the development of cost accounting. Whether it represents "the first modern cost accounting book" as Chen and Pan claim, is however, much less certain. There had been a number of books published in Britain prior to 1885 which dealt with manufacturing cost, but nothing comparable has so far emerged in the United States.

Two books are of particular interest. In 1851 Joseph Sawyer had published privately in London, a small book on bookkeeping for the tanning trade. Despite its specialised nature, it had general relevance, although it is unlikely that it had general appeal. Of more interest, therefore, is a book published in London and Manchester in 1878 by Thomas Battersby entitled *The Perfect Double Entry Book-keeper (Abridged) and the Perfect Prime Cost and Profit Demonstrator for Iron and Brass Founders, Machinists, Engineers, Shipbuilders, Manufacturers, etc.*; it was a modern cost accounting book in every sense. Battersby described the purposes of systems of bookkeeping and costing as:

Systems of book-keeping and prime cost are indispensably necessary to the successful working of a business. They lie at the foundation of a sound business; they regulate and control all its details, and demonstrate the final result. The system of book-keeping enables a man at any time to know his exact worth, the nature of his assets and liabilities, the gains or losses in detail, and how they arise, the amount of his expense or outlay on any particular undertaking, or under any head of account or branch of busi-

ness; he can compare his expenditures for similar objects during different periods, and he can analyze the results. . . . It is an effectual check against fraud and errors, which are easily concealed by a defective system.¹⁹

Six different systems of allocating overhead were described, but Battersby indicated his clear preference for basing the allocation on direct wages. His objection to allocations based on rates for individual tools or labour hours or, as was most common, on prime cost, arose because "as the expenses are not known it is pure assumption."²⁰ However, he had no such qualms about using direct wages because "wages and indirect expenses stand in relation to one another, the latter is the effect of the former and they *increase or decrease* according to the amount of capital employed."²¹

Battersby also saw clearly the connection between the cost records and the financial accounts. The aim, always, was to identify the sources of profit: "It is by no means the least part of the book-keeping to furnish accurate data of the working of each branch of the business and expenses incurred therein."²² Depreciation, and "periodical adjustments of assets"²³ were provided for in the accounts, and the required return on capital constituted the amount required to be added to "gross prime cost" in order to determine selling prices that would yield an appropriate profit.²⁴ The system thus "secured a manufacturer against loss arising from this branch of his business, and it prevents excess of profit-extremes equally disastrous in effect."²⁵

Battersby commented that he "had peculiar advantages for seeing the various methods of book-keeping and prime cost that are in general use,"²⁶ and he gave examples in Part II of his book. Other authors writing in Britain during this period also gave examples, or alluded to "practices." Sawyer's book for tanners included examples of cost accounts, but they were not articulated with the financial accounts. Edwards (writing in 1937) referred to authors, such as F. H. Carter, who published a book in 1874, and who described cost systems seen in practice in mines and quarries. In those cases, the "oncost" was added in proportion to the tonnage extracted from each gallery or level.

In the United States there were also examples of books which described costing records and accounts in different industries. Crittenden had described methods of farm accounting in 1860, and included methods of allocating the costs of "farming utensils" and general overhead.²⁷ Kirkman published a number of books on rail-

road accounting [1877, 1880, 1881, and 1886] which included "divisionalized" accounts, each division bearing its share of "joint expenses."²⁸ But perhaps the best indication of the general views of the time is given by the American Bell Telephone Co. Ltd. In its *Accounting Circular* of 1884, no reference was made to the allocation of overhead except in the case of salaries; "for instance those of the general manager" were *not* to be charged to new construction. By 1887, there had been a change of view. The circular of that year included instructions for apportioning general expenses "upon the basis of gross earnings of the exchanges."

None of these expositions were as detailed or provided the explicit examples of product costing contained in Metcalfe's book. Nevertheless, it does seem that the ideas were more common than Chen and Pan would allow. But to suggest that Metcalfe's was the first modern cost accounting book is to place an extraordinarily narrow definition on "modern." For Chen and Pan's claim to be correct, even in the United States, it would have to be restricted to engineering products.

Conclusion

It has not been my intention to detract from the contributions of Taylor and Metcalfe. But those contributions must be placed in perspective.

The records and papers which have survived suggest that F. W. Taylor (and his colleagues) understood and implemented many of the new ideas on costing. He sought to forge a link between the cost records and the financial accounts; he developed and explained methods for allocating overhead costs; he used the exception principle, and budgetary control. But he did not confuse the aims of scientific management and cost records. The latter were an appendage. They were necessary for pricing, tendering and identifying profitable lines. They could be maintained by the "planning department" because the originating documents were the same.

It is doubtful if Taylor paid much attention to cost records outside his own companies. He was a vocal and persuasive advocate of scientific management, yet he was strangely silent about costing. Accordingly, accounting history has done him the justice he deserves. He did not publicize his costing methods, and there was little in them that he could have claimed to be original. In those respects Chen and Pan's claims cannot be sustained.

Similarly, while the importance of Metcalfe's book cannot be denied (it ran to several editions), it was not in itself unique. The matters discussed and the methods illustrated within the book were the subject of much discussion at that time.

As I have indicated elsewhere,²⁹ the unique setting of the mechanical engineers in and around New York from 1879 onwards provided the greatest boost to the development of cost records and eventually of cost accounting. Taylor and Metcalfe were active members of that group of mechanical engineers. They made very significant contributions not only to scientific management, but also to cost accounting. The point of this comment is that they were not alone in those contributions. Their activities must be seen in the context of the time and of their contemporaries if we are to evaluate fairly their respective roles.

FOOTNOTES

¹Chen and Pan, "Frederick Winslow Taylor's Contributions to Cost Accounting."

²Chen and Pan, p. 1.

³Taylor, "Bookkeeping under the Taylor System," p. 2.

⁴Chen and Pan, p. 1.

⁵Wells, *Accounting for Common Costs*, p. 98.

⁶Chen and Pan, p. 2.

⁷Taylor, Comments on "Shop-Order System of Accounts," p. 475.

⁸Metcalfe, "The Shop-Order System of Accounts," p. 487.

⁹This heading, and the discussion which follows are taken from Wells, *Accounting for Common Costs*, pp. 97-102. The historical references are taken from Wells, *A Bibliography of Cost Accounting: Its Origins and Development to 1914*.

¹⁰Chapman, "Accounting in Relation to Economic Problems," p. 623.

¹¹Kendall, "Unsystematized, Systematized and Scientific Management," p. 105.

¹²Taylor, "Cost Keeping under the Taylor System of Shop Management," p. 1.

¹³Evans (1910), p. 878 and (1911), p. 7.

¹⁴Taylor, "Cost Keeping under the Taylor System of Shop Management," p. 1.

¹⁵Evans, *Cost Keeping and Scientific Management*, p. 23.

¹⁶Evans, "The Importance of Accurate Costs," p. 167.

¹⁷Church, *The Science and Practice of Management*, p. 478.

¹⁸Church, *The Science and Practice of Management*, p. 478.

¹⁹Battersby, "The Perfect Double Entry . . .," p. 4.

²⁰Battersby, "The Perfect Double Entry . . .," p. 36.

²¹Battersby, "The Perfect Double Entry . . .," p. 36.

²²Battersby, "The Perfect Double Entry . . .," p. 31.

²³Battersby, "The Perfect Double Entry . . .," p. 29.

²⁴Battersby, "The Perfect Double Entry . . .," p. 36.

²⁵Battersby, "The Perfect Double Entry . . .," p. 33.

²⁶Battersby, Preface.

²⁷Crittenden, *An Inductive and Practical Treatise on Bookkeeping by Single & Double Entry*, p. 43.

²⁸Kirkman, *Handbook of Railway Expenditures*, p. 108.

²⁹Wells, *Accounting for Common Costs*, pp. 62-70, and in the Introduction to Wells, *American Engineers' Contributions to Cost Accounting*.

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