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FREDERICK WINSLOW TAYLOR'S CONTRIBUTIONS TO ACCOUNTING

Abstract: Taylor's system of accounting was formulated in the 1880s, basically completed in the 1890s, and implemented in various manufacturing companies up until the 1920s. The rapid growth of business and the accompanying change in capital structure in this century led to an income-statement emphasized financial accounting system on the one hand, and a decision-oriented managerial accounting system on the other. In either system, some influence of Taylor's work is still discernable.

In the early years of this century, the work of Frederick Winslow Taylor (1856-1915) generated a great interest in efficiency that swept the United States and influenced industrial life all over the world. His innovative ideas and comprehensive experiments led not only to his receiving numerous patents, but also to his earning a reputation as the father of scientific management. He is well-known, of course, for his work on task standardization. He is scarcely recognized, however, for his work in accounting. Perhaps this lack of recognition of his contributions to accounting is simply because Taylor, always busy as an industrial consulting engineer, did not publish anything on accounting *per se*. Nevertheless, Taylor's disciples often spoke of his cost accounting and general accounting systems with very high regard. But until now, very little specific information about these systems has been available.

Our research in the Taylor Collection of the Stevens Institute of Technology has uncovered several unpublished manuscripts from the 1880s and 1890s in which Taylor described in great detail his accounting systems. In the following pages we describe the ac-

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counting system that Taylor not only wrote about in these long forgotten manuscripts, but also put into practice while serving as a consultant to the Simonds Rolling-Machine Company. This study of Taylor's work in accounting is intended to augment our understanding of both his system of scientific management and the role of bookkeeping in that system. It is also intended to improve our understanding of Taylor's role in the development of industrial accounting.

Basic Objectives of Taylor's Accounting System

The main purpose of keeping accounting records in Taylor's system was to provide financial information that was useful to managers in business. It is perhaps worth noting that the accounting information provided by Taylor's system was also useful to the owners and investors of a firm. That would follow from the fact that virtually all of the business firms with which Taylor was concerned were owner-managed. Nevertheless, his chief concern in designing accounting systems was to supply management with useful information for decision-making.

Accordingly, he prescribed the following three qualitative criteria that he said a good bookkeeping system should fulfill:

1. *Usefulness.* As implied in his 1898 report at Bethlehem, Taylor's first approach to bookkeeping was through the then far-advanced railroad accounting system.¹ Twenty years later, Taylor noted that the railways were unable to determine the costs of handling passengers and freight with anything like the same accuracy that costs had been determined in the best manufacturing establishments. Upon some apparent investigation, he concluded:

The question as to the value of obtaining costs of this sort will depend entirely upon what use it is proposed to make of the costs. My advice to industrial establishments is invariably for them to scrutinize very carefully the exact use which they make of the costs which they determine . . . Unless the railways were to make active, practical, money-saving use of the cost figured, it would manifestly be merely a foolish burden for them to undertake.²

The above states explicitly Taylor's belief that, if accounting information is to be of any value, it has to be useful. Not only should useful information be developed, but also useless information or information that has not been used should be eliminated.

In his unpublished manuscript entitled "General Principles," Taylor made it very clear that "when any element is not actively used, either make it so by compelling the men for whose benefit it is gotten up to use it or else abandon the element. There is nothing sacred about any element of bookkeeping."³ He maintained this principle throughout his career. In his letter to Charles Conrad on June 10, 1911, for example, he wrote: "The rule which I have finally adopted for all accounts is to ruthlessly put out of existence all kinds of reports and records which are not practically used by those for whom they are intended."⁴

2. *Timeliness.* In the same letter to Conrad, Taylor complained that "accounts come, in nine cases out of ten, so long after the actual work has been done."⁵ The following requirement is typical in his writings on accounting:

Books should be especially designed to get off at regular intervals, i.e., daily, weekly or monthly, summarized statements giving each element or department of the business, the exact information which it needs in order to decide just what they must do to carry on their section of the work right. . . . [One objective of bookkeeping is to] keep everyone informed up to as recent date as possible as to all important facts affecting his branch of the business⁶

3. *Comparative Statements.* In various manuscripts Taylor requested repeatedly that cost sheets be made out on a comparative basis. A review of the accounting reports under his system shows that almost every sheet was prepared in that manner. The extensive use of comparative statements reflects his management by exception principle according to which,

. . . the manager should receive only condensed, summarized, and invariably comparative reports, covering, however, all of the elements entering into the management, and even these summaries should all be carefully gone over by an assistant before they reach the manager, and have all the exceptions to the past averages or to the standards pointed out, both the especially good and especially bad exceptions, thus giving him in a few minutes a full view of progress which is being made, or the reverse, and leaving him free to consider the broader lines of policy and to study the character and fitness of the important men under him.⁷

A meaningful comparison can be obtained only if the accounting figures are uniform and consistent. The controversy in the accounting profession over uniformity, consistency, and flexibility, never disturbed Taylor. Because his interest lay in individual businesses, he could assure uniformity and consistency simply by giving highly detailed instructions concerning the duties of his employees and the procedures necessary to carry out their duties.

In addition to the foregoing qualitative criteria of accounting systems Taylor maintained that the *timely comparative* accounting information be *useful* for the following four purposes:

1. *Cost Determination*

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. This cost being not merely an approximation to the truth but an exact balance; since the total expenses of the month including all such items as interest, depreciation, taxes, insurance, sales and traveling expenses of the business are distributed equitably on to the manufactures produced.⁸

2. *Performance Evaluation*

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 of the affairs of the Company, (b) an analysis and classification of the expenses of the company and a comparison with the expenses of former months. This should be in such detail as to enable the treasurer to locate either an economy or extravagance in the management of each branch of the business.⁹

3. *Pricing*

This [a detailed profit and loss account] should show in detail the profit or loss on each class of goods sold during the month. A study of this account should enable the head of the sales department to readjust prices so as to make as few losses as possible and to secure the most profitable orders while your competitors not knowing their exact costs have the less profitable work.¹⁰

4. Safeguarding Assets

The system should be so planned as to render the temptation to steal of those handling money as small as possible and also to render the complicity of at least two employees necessary in order to accomplish theft, and in case of a theft or error to enable an auditor to detect and trace same readily and rapidly.¹¹

Taylor stated the above purposes repeatedly in such later writings on bookkeeping as his 1893 manuscript entitled "Bookkeeping Under the Taylor System,"¹² his 1898 proposal at the Bethlehem Steel Company;¹³ and his report to the Tabor Manufacturing Company entitled "Cost Keeping Under the Taylor System."¹⁴

The Accounting System Described

Turning from the general purposes that Taylor established for his accounting system, we now describe the specific elements of that system as he outlined them in several manuscripts that he wrote during the 1880s and 1890s.

1. Transaction Analysis and Chart of Accounts

Two classes of transactions are specified in his 1893 manuscript.¹⁵ First, there are "transactions of the company" arising from "the services which we render other people and also those rendered by others to us." These company transactions give rise to the following general ledger accounts: accounts payable, accounts receivable, bills (notes) payable, bills (notes) receivable, cash, and interest and discounts. All these accounts are monetary items, reflecting either the earliest or the latest stages of the business operating cycle.

Second, there are internal transactions which are defined as those taking place within the company. The general ledger accounts related to this class of transactions are defined as internal accounts and include: disbursing agents (a special device of Taylor's for the control of cash transactions), depreciation, operating expenses, worked materials, merchandise sales, and income account. These accounts have in common the feature of reflecting business activities in the middle stages of the operating cycle.

The above classifications of accounting transactions reflect important structural changes which Taylor initiated in industrial firms. Taylor was among the pioneers who removed cost keeping from the general accounting office and placed it in the planning department. As a result, it became necessary to prescribe the costing function

and to integrate costing with **general** accounting. To accomplish this dual purpose, Taylor first singled out internal transactions and then designated internal accounts with the following "objects:"

It is desirable to know just what each class of goods which we manufacture costs us each month, so as to note improvement or the reverse, and it is also desirable to locate the cause of improvement and to analyze the elements that go to make up our cost. The same should be said regarding our sales. We should also be able to state each month our exact profit or loss, and accurately to locate the source and causes of either profit or loss.¹⁶

Essentially, these "objects" are nothing but the prescribed function of costing. For example, in his book, *Shop Management*, Taylor described the leading functions of the planning department including the following:

The Cost of All Items Manufactured, with Complete Expense Analysis and Complete Monthly Comparative Cost and Expense Exhibits

The Books of the Company should be closed once a month and balanced as completely as they usually are at the end of the year, and the exact cost of each article of merchandise finished during the previous month should be entered on a comparative cost sheet. The expense exhibit should also be a comparative sheet. The cost account should be a completely balanced account, and not a memorandum account as it generally is. All the expenses of the establishment, direct and indirect, including the administration and sales expense, should be charged to the cost of the product which is to be sold.¹⁷

It is thus apparent that the so-called internal accounts are mainly cost accounts dealing with profit-making activities, in contrast with company and other accounts concerning assets and liabilities. Realizing that cost accounts should be an integral part of general accounting, Taylor introduced the following concept:

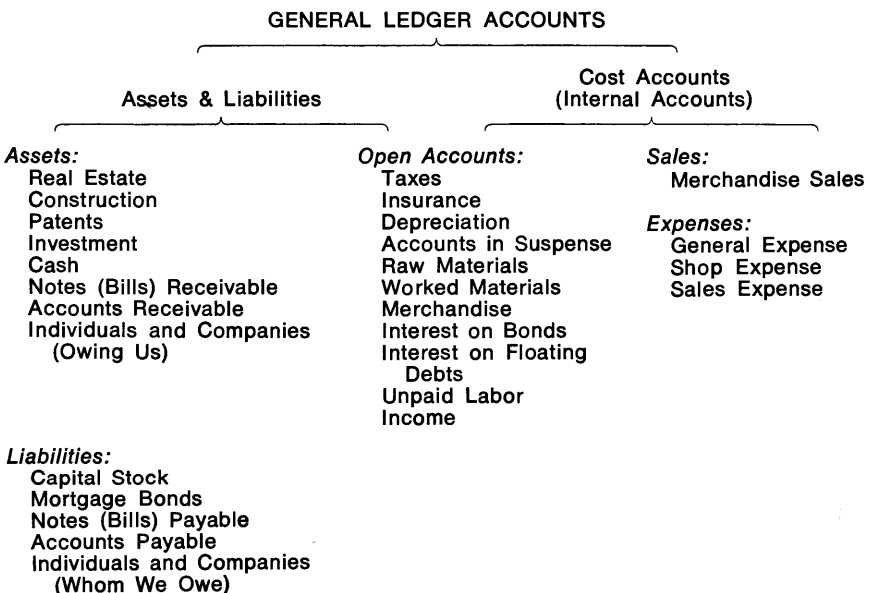
Certain of the accounts appearing among our assets and liabilities and among the "Internal Accounts" in the General Ledger are called "Open Accounts" . . . Each month . . . , a proportional amount of these accounts is transferred to some one of our "Internal Accounts," since

the accounts at the end of the month are left open, with values charged or credited to them, and since they are still "Active Accounts;" that is, accounts which are continually fluctuating in value, they are called OPEN ACCOUNTS.¹⁸

It seems that open accounts are used as links to tie cost accounts to the general accounting records. Accordingly, a chart of accounts can be drawn (see Figure 1), in which taxes and insurance are either prepaid or payable (as the case may be), depreciation is the accumulated depreciation, and accounts in suspense represents the allowance for uncollectable accounts.

Furthermore, the inclusion of accounts of individuals and companies in the chart deserves some explanation, Taylor's main concern was with regular or ordinary business operations, but he also realized that a company might have some transactions that were not along these lines. Accordingly, he designed two general ledger accounts, namely, individuals and companies (whom we owe) and individuals and companies (owing us), to record payables and receivables resulting from irregular transactions.

Figure 1
Chart of Accounts under the Taylor System



2. *The Structure of the Books*

One of the distinctive features of Taylor's system is the use of several journals as well as several ledgers. In the ledgers, all of the accounts are condensed into as small a number of headings as possible without sacrificing a clear knowledge of the general affairs of the company. These headings are placed in the general ledger, which is supported by various detail ledgers so that the desired complete information about the highly condensed accounts is still available.

All transactions are to be recorded in either the general journal or cash book before being entered in the general ledger. In the general journal, a special column is established for each of the recurring accounts such as "Bills Receivable, Dr. to Accounts Receivable," in which all of the payments that the customers send to liquidate their accounts are recorded. The total amount of each special column is posted to the general ledger once a month, while the detailed entries of each special column and those inactive accounts entered in the miscellaneous column of the general journal are posted daily to detail ledgers and general ledger accounts, respectively.

The entries in the cash book, like those in the general journal, are made under specific captions. For instance, under the "Cash, Dr. to Accounts Receivable" caption, the clients' names, the amounts of payments, and the reference to the detail ledger folio are entered. At the end of each month, the accounts receivable account in the general ledger should be credited for the total cash received. A similar procedure is followed for the recording and posting of all accounts in the books except bills payable and bills receivable, which are posted in the general ledger daily.

Among the books in Taylor's system, the most distinctive ones are probably the register of accounts receivable and the register of accounts payable. Although they are not journals, all the transactions of the company should pass through them before being entered in either the general journal or the cash book. By the use of these registers, it becomes possible to trace readily each transaction and follow it through the books, however complex the business may become or however great the volume of it may be.

In the register of accounts receivable, accounts receivable is debited, and various classes of merchandise sold are credited in their respective columns. Since all ordinary sales, cash and credit, are entered first in this register and a special column is assigned

for each class of merchandise, information about the total amount of individual merchandise sold is readily available.

In the register of accounts payable, on the other hand, all expenditures, cash and credit, have to be credited to the accounts payable column. The balance of the register comprises a "miscellaneous" column and a series of special columns for each of the chief expense accounts. The so-called chief expense accounts are those most active accounts in the general ledger including construction, worked materials, general expense, shop expense, raw materials, and stores.

The use of the two above registers facilitates month-end posting and reduces the chance of recording and posting errors. In Taylor's description of the register of accounts payable, he noted that:

Practically all of our expenses for the month are entered in the General Ledger via the general journal under their principal accounts with about twenty entries, and we are sure, barring transposition of figures in making entries in the General Ledger, that all of these accounts balance, since each page in the "register of Accounts Payable" has been balanced by itself, and the final sums which are posted at the end of the month have all been balanced.¹⁹

The above feature is also shared by the register of accounts receivable.

Another feature of the system is the use of these two registers as intermediate books between the general ledger and detail ledgers. Since the general ledger should show as few general headings as possible and while detail ledgers should be kept as complete as desired, just enough information should be entered in these two registers to enable the bookkeeper to understand and trace all the recorded transactions. For those accounts without detail ledgers, these registers will serve as their subsidiaries.

More importantly, the register of accounts receivable provides information about the total amount of the sale of each class of merchandise, while the register of accounts payable gives the totals for various expenses. As such, both of them are the main sources for cost and profit determination on the one hand, and provide an important linkage between general accounting and cost accounting records on the other.

3. Closing Entries and Account Integration

In Taylor's system, the following eleven closing entries at the end of the month are required:²⁰

- 1. Enter in General Journal totals of Register of Accounts Receivable under following captions:
 Accounts Receivable Dr. _____
 To Merchandise Sales _____

- 2. Enter in General Journal totals of Register of Accounts Payable under the following captions:
 Accounts Payable Cr. _____

By Sundries

Follow each General Ledger Account that appears in column headed Miscellaneous General Ledger Accounts, such as:

- Taxes _____
- Insurance _____
- etc.

- 3. Enter in General Journal monthly apportionment of Stores to other General Ledger Accounts:

Stores Cr. _____

By Sundries

- Shop Expense _____
- Construction _____
- Worked Materials _____
- etc.

- 4. Enter in General Journal monthly apportionment of Raw Materials to other General Ledger Accounts:

Raw Materials Cr. _____

By Sundries

- Shop Expense _____
- Worked Materials _____
- Construction _____

- 5. Transfer through following General Journal entry General Ledger Accounts to General Expense:

General Expense Dr. _____

To Sundries

- Accounts in Suspense _____
- Canada Business _____
- Interest on Bonds _____
- Boston Expense _____

- 6. Distribute General Expense to Construction, Worked Materials, and Shop Expense as indicated on General

Expense and Shop Expense distribution sheet, and enter this distribution on General Journal as follows:

	General Expense Cr.	
By Sundries		
Shop Expense		
Construction		
Worked Materials		

7. Transfer through a General Journal entry from the General Ledger, Taxes, Insurance and Depreciation to Shop Expense as follows:

Shop Expense Dr.		
	To Sundries	
	Taxes	
	Insurance	
	Depreciation	
	Rent of Shop	

8. Distribute Shop Expense to Worked Materials and Construction according to Worked Materials distribution sheet and enter in General Journal as follows:

	Shop Expense Cr.	
By Worked Materials		
Construction		

9. Sum up the cost of Worked Materials that were finished during the month and transfer through a General Journal entry Worked Materials finished to Merchandise:

	Worked Materials Cr.	
By Merchandise		

10. Sum up on detailed merchandise sheets the average cost of merchandise shipped during the month, transfer through following General Journal entry merchandise shipped during the month to Merchandise Sales Account.

Merchandise Sales Dr.		
	To Merchandise	
	Freight	

11. Transfer balance of Merchandise Sales Account to Income Account through General Journal Entry:

Merchandise Sales Dr.		
	To Income Account	

The above closing entries reveal the essence of Taylor's "interlocking system," i.e., an integration of costing and general accounting systems. As indicated earlier, integration starts from a specification of internal transactions of which most fall within the function of cost keeping. The foregoing directions for closing the books show that all of the eleven closing entries, except numbers one and two, are internal transfers, and that all of the nine transfer entries except number five and possibly number seven are directly related to cost and have to rely on cost keeping for information.

Generally speaking, the cost clerk receives slips of raw materials and worked materials issued, as well as merchandise shipped from store rooms, and time notes from the time keeper. At the end of the month, he also obtains expense and wages information from the register of accounts payable, and information regarding merchandise sales from the register of accounts receivable. Based mainly on these data, he will be able to prepare monthly reports including expense distribution, worked materials, worked materials finished and income account. All these sheets are sent to the bookkeeper, who closes the books following the procedures described above. This simplified version of Taylor's "interlocking system" is depicted in Figure 2.

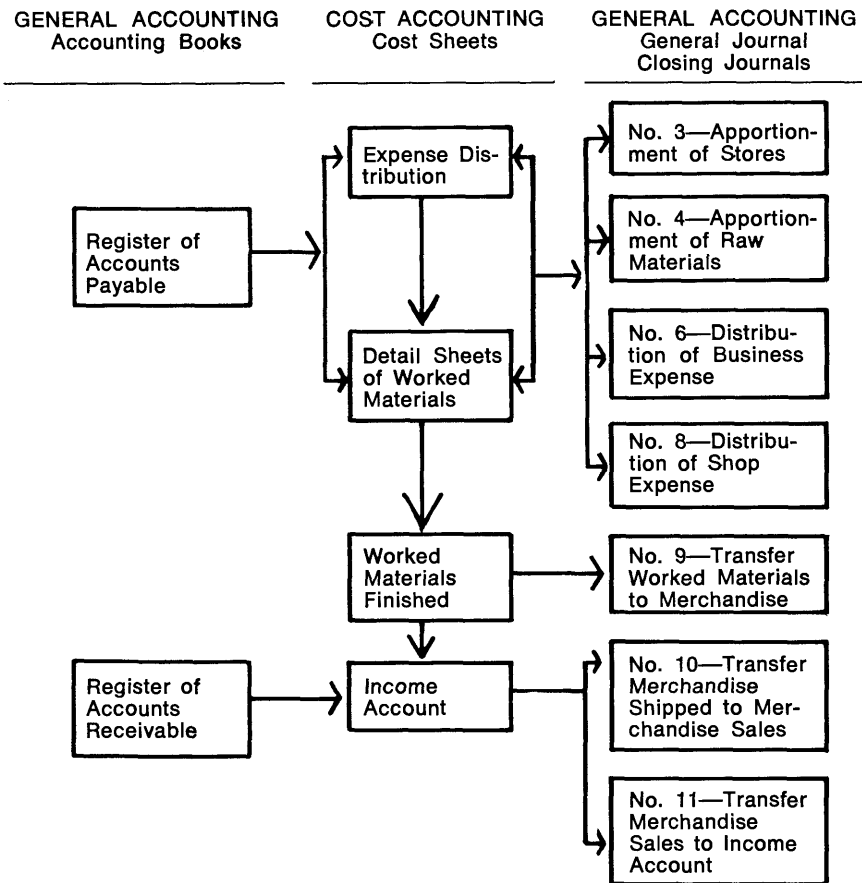
4. Accounting Reports

Accounting reports in Taylor's system generally include three basic statements: the statement of cash transactions, the balance sheet, and the income account.

a. The statement of cash transaction is used to safeguard assets and for cash planning. It is prepared daily by the bookkeeper and treasurer in contrast with the treasurer's statement which is prepared only by the treasurer. Essentially, the statement of cash transactions is an early version of a funds flow statement in combination with a bank reconciliation. The first item is the beginning balance of cash on hand. Added to it is the total receipts from accounts receivable, notes receivable, and individuals and companies accounts. Both the beginning balance and the current receipts are shown in the right hand column in which the source of cash is indicated. In the left hand column, two sum totals are entered showing the applications of cash. The first application is the total disbursement that day including payments for the accounts of audited vouchers, payrolls, notes payable, and individuals and companies. Next to it is the total ending balance, which represents balances of various bank accounts, cash on hand, petty cash, and

partial payments by the treasurer not yet recorded in the books. The ending balance of each bank account is, in turn, determined by adding the amount of the deposit in transit to the beginning balance and then subtracting outstanding checks.

Figure 2
Taylor's Interlocking System of Accounting



Supplementary to the main body of the statement is a "MEMORANDA" section providing information for cash, purchase, and production planning. This section starts with the balances due for

accounts receivable, accounts payable, notes receivable, and notes payable, as well as for freight accrued. In addition, there are the following "NOTICES:"

- Required to pay (coupons due)
- Required to pay (notes due within two weeks)
- Vouchers registered but not paid
- Accounts payable not registered
- Purchase orders unfilled
- Contracts unfilled
- Accounts receivable, two months old
- Orders entered today
- Total orders entered during current month
- Total unfilled orders on books
- Shipments made today
- Total shipments, current month
- Merchandise produced today
- Total merchandise in stock

The statement of cash transactions is presented at an early hour of each day to one of the higher officers of the company and is regarded as an important element of the business because of its usefulness in ensuring honesty and punctuality in the keeping of cash accounts.

b. The balance sheet shows the overall condition of the business including assets, liabilities, and income account. Assets are presented on the left hand side, while liabilities and income account are presented on the right hand side of the sheet. According to the 1893 manuscript, assets are classified into fixed and floating (or quick) assets. Fixed assets consist of real estate, patents, construction, and investment. Land acquired is classified as real estate; patent rights purchased are classified as patents; buildings and machinery constructed by the company itself, machinery bought, and all improvements of any kind are classified as construction; and any investments made in things other than the direct business are classified as investment.

All fixed assets are recorded at cost. For the determination of the cost of construction, however, a distinction is made between capital and revenue expenditures. Only improvements that actually add to the permanent value of property are considered as construction costs. This thus excludes repairs, maintenance, and replacement of worn out parts or tools, which are considered revenue expenditure and are included in shop expense.

Floating (or quick) assets, on the other hand, include cash, general stores, raw materials, worked materials, merchandise, accounts receivable, bills receivable, interest due the business, and various prepaid expenses such as taxes and insurance. Among these assets are inventory accounts for general stores, raw materials, worked materials, and merchandise. According to the balance sheet that Taylor designed for the Simonds Rolling-Machine Company, inventories are grouped under the caption "Materials Stock" presented separately from "Current Assets." This shows that current assets equal quick assets minus inventories, in contrast with our prevalent notion of current assets including quick assets and inventories. Also included in the floating assets is an asset valuation account, i.e., accounts in suspense (or liquidation), which is in fact an allowance account for bad debt expense, to be shown in the balance sheet as a contra account to accounts receivable.

On the right hand side, the statement starts with the fixed liabilities including capital stock, first mortgage bonds, and depreciation. As indicated in the foregoing closing entry number seven, depreciation is provided by a general journal entry with a debit to shop expense and a credit to the depreciation account. In other words, depreciation is equivalent to accumulated depreciation and is shown in the balance sheet as a fixed liability.

Following fixed liabilities are floating liabilities such as accounts payable and interest on floating debts accrued but not due. Finally, there is a summary income account presented separately on the right hand side of the sheet. The income account is also presented in detail as a separate statement.

c. The income account is a detailed profit and loss account. Taylor appears to have been far ahead of his time in stipulating that this type of account had to be included in the monthly accounting reports. The income account starts with a summarized section presenting:

Total Sales of Merchandise Made during Month
 Total Cost of Merchandise Shipped during Month
 Total Profit on Merchandise Sold
 Total Profit from other Sources
 Net Profit

In this statement, current income is to be compared with income of the corresponding month last year and the accumulated income for the current fiscal year. In the same section, two supplementary items are also presented, namely, the total cost of merchandise

finished during the month and the total order for merchandise at the end of the month.

In the lower section of the statement cost, sales, and profit are presented for each class of merchandise; for example, Balls (bicycle sized), Balls (large), Brake Pines, etc. These figures are also presented comparatively with those of the corresponding month last year and the current fiscal year to date.

Implied in this statement is the concept of matching expenses and revenues. It appears that Taylor used the concept of matching in the preparation of the expense distribution sheet (see Figure 2) and a closing entry (see foregoing closing entry number ten). It was Taylor's conception that every regular business expense, except sales expense, contributes to the value of products manufactured and is to be distributed accordingly. Sales expense, by contract, is considered as the only period expense and is distributed to the merchandise sold during the period.

Taylor's Contributions to Accounting

Taylor's system of accounting was formulated in the 1880s, basically completed in the 1890s, and then implemented in various manufacturing companies up until the 1920s. Historically, 1880-1920 was an important period during which, according to R. A. Irish, employer capitalism was replaced by managerialism.

We are today in the era of managerial accounting. Managerialism has demanded that accountancy shall be an aid to business management. . . . The accountancy profession responded in traditional fashion by conceiving the specialist science of cost accounting. The employment of cost accounting depended on reliable subsidiary information such as records of output, stores, equipment, etc., and raised the problems of overhead and its distribution.²¹

Our study reveals that between employer capitalism and managerialism, there was a transition period which may be designated as "Taylorism." According to Taylor, the shop, and indeed the whole works, should not be managed by the owner-manager, but rather by the planning department, which Taylor considered to be the nerve center of his system of management.²² Therefore, we conclude that this was essentially the first step made toward managerialism before there was any substantial dispersion of business ownership. It was during this transition period that Taylor showed

himself to be ahead of the accountancy profession by initiating a significant structural change. He placed cost accounting in the planning department and considered cost accounting to be an indispensable management aid, providing, among other things, "reliable subsidiary information" as indicated in the above quotation. It is in this regard that Taylor distinguished himself from his contemporary accounting writers and contributed to the evolution of the "era of management accounting."

After segregating costing and bookkeeping, Taylor attempted to reintegrate them through his interlocking system. During the 1880s, Metcalfe failed to reconcile costing and accounting, while Norton was not all sure about the feasibility of such a reconciliation. Like Taylor, Garcke and Fells insisted on the assimilation of factory books to the general accounting records within the double entry framework. However, their system was not practically adopted until 1910.²³ Taylor was, thus, among the first to have successfully integrated costing and bookkeeping in the late nineteenth century.

His successful integration resulted in consolidated financial and cost reports through the use of two sets of accounts: inventory and income. Accounting historians generally agree that in the 1920s there was a shift in emphasis from the balance sheet to the income statement in response to the dispersion of business ownership. Here again, Taylor's system appears to reflect a period of transition. In his system, both the balance sheet and the income account were equally emphasized for different purposes. The balance sheet was still stressed as a report of stewardship, while the income account was designated as an aid in scientific management. With his focus on owner-managed manufacturing firms, Taylor was able to put together accounting reports without regarding the internal/external dichotomy of the uses of the reports.

Taylor's accounting system was designed to be used by owner-managers. The rapid growth of business and the accompanying change in capital structure in the first decade of this century made Taylor's accounting system out of date and led to an income-statement emphasized external reporting system on the one hand and a decision-oriented managerial accounting system on the other. In either system, however, some influence of Taylor's work is still discernable.

Conclusion

We have investigated Taylor's bookkeeping system and found that his system was capable of providing timely and comparative

information useful for purposes which he designated. For example, product costs are determined in the planning department and transmitted to the bookkeeping department; performance is evaluated on the basis of comparative reports; pricing policy can be made according to the relative profitability of various products; and assets are safeguarded through a separation of duties and daily reports. Apparently, his system was tailored to meet the perceived needs of management.

Evidence shows that Taylor borrowed some basic accounting principles and methods from the railroads. Because of his experience in management, however, he was able to modify and refine them and develop his own. The transitions from product costing to managerial accounting, and from a balance-sheet reporting emphasis to an income-statement reporting emphasis were attributable to his effort to develop an accounting system within his framework of scientific management.

FOOTNOTES

- ¹Copley, Volume II, P. 142.
- ²Copley, Volume II, PP. 375-376.
- ³Taylor, Unpublished manuscript, C. P. 1.
- ⁴Copley, Volume I, PP. 368-369.
- ⁵Copley, Volume I, P. 368.
- ⁶Taylor, Unpublished manuscript, C. PP. 1, 4.
- ⁷Taylor, 1911. PP. 126-127.
- ⁸Taylor, Unpublished manuscript, B. P. 1.
- ⁹Taylor, Unpublished manuscript, B. P. 1.
- ¹⁰Taylor, Unpublished manuscript, B. P. 1.
- ¹¹Taylor, Unpublished manuscript, B. P. 2.
- ¹²Taylor, Unpublished manuscript, A.
- ¹³Copley, Volume II, PP. 142-143.
- ¹⁴Taylor, Unpublished manuscript, D.
- ¹⁵Taylor, Unpublished manuscript, A. PP. 9-10.
- ¹⁶Taylor, Unpublished manuscript, A. P. 10.
- ¹⁷Taylor, 1911. P. 115.
- ¹⁸Taylor, Unpublished manuscript, A. P. 11.
- ¹⁹Taylor, Unpublished manuscript, A. P. 16.
- ²⁰Taylor, Unpublished manuscript, E.
- ²¹Irish, P. 82.
- ²²Taylor, 1911. P. 110.
- ²³Garner, PP. 256-258.

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