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Research on the Evolution of
Accounting Thought and
Accounting Practice

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Objectives

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CONTENTS

David M. Porter
PEAT, MARWICK, MITCHELL & CO.

THE WALTHAM SYSTEM AND EARLY AMERICAN TEXTILE COST ACCOUNTING 1813-1848

Abstract: This study of the original accounting records of a pioneering American industrial enterprise narrows by one half the time lag between the earliest known English and American applications of industrial cost accounting. The research indicates that the precursors of the costing systems now considered essential tools of management were in use virtually from the beginning of large scale industry in America.

The transition from mercantile to industrial accounting remains one of the greatest expansions and refinements of accounting thought since the formulation of double-entry accounting itself in the 15th century. In the words of accounting historian A. C. Littleton, "this transition signified the expansion of bookkeeping (a record) into accounting (a managerial instrument of precision)."[1] Yet information as to the emergence of industrial cost accounting in Europe and particularly in America remains sketchy. Most historians have relied on published sources such as management publications and textbooks in establishing the chronology of cost accounting's development. Because of the dearth of cost accounting material published between 1820 and 1885, it is generally held among accounting historians that little of significance in the field of cost accounting occurred between these dates.[2] Recently, however, several accounting historians confirmed through research on original accounting records that industrial cost accounting was being developed with surprising sophistication in the textile mills of England and New England much earlier than previously supposed.

In 1972 H. Thomas Johnson published the results of his study of the accounting records of the Boston based Lyman Mills. Johnson challenged the conclusions of Garner and other leading business historians by demonstrating the application of a "sophisticated cost

For assistance in the preparation of this study, I wish to express my debt to the late William Holmes, to Peat, Marwick, Mitchell & Co. and to Robert Lovett of the Manuscripts Division, Baker Library, Harvard Graduate School of Business Administration.

system" in America as early as 1856, thirty years earlier than what was previously regarded as the "earliest example of a completely integrated double-entry cost accounting format."[3]

In 1973, the frontier of known factory cost accounting systems was further pushed back nearly 50 years with the publishing of Williard Stone's study of an English mill. Stone demonstrated that a "sophisticated system of cost finding" was in use at the Charlton Mills in Manchester England as early as 1810.[4]

Johnson's article describes the Lyman mills as "typical" rather than innovative and suggests further research into earlier accounting records. Having read and compared both the Johnson and Stone studies, it was the belief of this author that the 50 year gap between the earliest known English and American industrial costing systems could well be narrowed. Research by William Holmes shows that in at least one other area of accounting, that related to governmental entities, early American accounting practice more than held its own compared with contemporary European practice.[5] By examining the original financial records of several of America's first large-scale corporations, it was hoped that evidence establishing the use of American industrial cost accounting, on par with costing systems at the Charlton Mills, could be found well before 1850.

For several reasons the accounting records of the Boston Manufacturing Company, (BMC), were chosen as a starting point.[6] Founded in 1813, the Boston Manufacturing Company was the first of the large scale "second stage" textile firms in America.[7] As such, it furnished the laboratory wherein many early American solutions to several peculiarly industrial problems were pioneered. Its many technical and administrative innovations and its resounding success made the Boston Manufacturing Company the precedent after which the later Lowell mills, and even Johnson's Lyman mills, were modelled.

The BMC was the first mill either here or in England to integrate loom spinning with weaving, bleaching and dyeing under one roof. The Waltham factory changed the unit of textile production from "small yarn mill to all purpose factory."[8] This integration of the various processes which yielded finished cloth from raw cotton under one roof logically called for an accounting system capable of accurately assigning and accumulating costs throughout the many departments and stages of production.

If cost accounting indeed grew from mercantile bookkeeping as a rational response to the Industrial Revolution, the records of the BMC offer an exceptional illustration of this adaptive response.

The history of the BMC and its merchant founders is itself one of the best examples of the transition from mercantile to industrial capitalism in America.

Unlike the technicians and mechanics behind the earlier smaller mills in New England, the men behind the creation of the BMC were financiers and merchants. It was these men who grafted onto the fledgling American textile industry the financial wherewithal and the equally important managerial competence it previously lacked. The initial capitalization of the BMC in 1813 was a staggering $300,000. But it is clear that these merchants shared an appreciation for the value of accounting control commensurate with the scale of their venture. Nathan Appleton, one of the founders and a trained mercantile accountant, voiced this appreciation when he ascribed the most common cause of business failure to "a want of knowledge of the proper principles of bookkeeping."[9]

The host of technological, organizational, financial, and marketing innovations introduced by the firm's Waltham factory and later adopted by other large scale mills is collectively referred to as the "Waltham System." Though there is much written on the influence of the "Waltham System" in the abovementioned areas, little study of the BMC's cost accounting records or the degree to which the BMC's costing systems influenced other mills has been made. The latter consideration is particularly significant given that one fifth of all cotton cloth produced in this country in 1850 was from firms belonging to the "Waltham System."[10]

Previous references to the accounting systems of the BMC credit the firm with bringing to manufacturing industry the conscientious record keeping of the merchant countinghouse. S. Paul Garner described the BMC as "definitely cost conscious" but characterized the firm's accounting methodology as "exceptionally crude in comparison with techniques already illustrated by text writers such as Payen and Cronhelm."[11] This characterization is in keeping with Garners' view that "during the decades 1820-1880 little can be found which is of interest in the history of cost accounting."[12] Upon closer examination, however, the records of the BMC and affiliated mills are seen to contain an integrated costing system which, aside from its failure to include depreciation expense as we now define it, is quite arguably superior to the costing methodologies of Payen and Cronhelm.[13]

From virtually the beginning of the Waltham enterprise, clear shifts from mercantile to industrial accounting are apparent. When the company was incorporated in 1813 the by-laws charged the

**Memo. of Averages of Lawrence Man$^{g.}$ Cos.
Cotton and Cloth acctt. Aug$^{t.}$ 9th, 1834**

Mill No. 1

Cotton 199076 lbs at 15½¢ 30856.78
Loss ⅓ Waste . . . 475.29
30381.49

Pay Roll 20399.01
Repairs . . . 1033.73
General Expenses 21697.36
30 per ct of $22731.09 is 6819.30 = 27218.31
$57599.80

A 131773 lbs . 531971 Yds = 4 Yds pr lb Cost 7 pr Yd
B 49258 . . 171175 . . 3 . . Cost 9
181031 lbs Cloth - Loss 18045 lbs or 9 %
Cost p pound . . . . 31.81¾¢

Mill No. 2

Cotton 424335 lbs at 13.56¾¢ = 57571.65
Loss ⅓ Waste . . . 475.29
57096.36

Pay Roll 22677.19
35% of $22731.09 is 7955.88 30633.07
$87729.43

C 399859 lbs . . 1164869 Yds = 2.91½ Yds to lb Cost 7 pr Yd
Cost p pound 21.94¢

Exhibit 1a

Memo. of Averages of Lawrence Mang. Cos. Cotton and Cloth acctt. Augt. 9th, 1834

Mill No. 3

Cotton 289.904 lbs at 13 56/100 . . . 39.332.72
Less 1/3 Waste . . . 475.29
38.857.43
Pay Roll . . . 17447.89
25 per ct of $22731.09 is 5682.77 23.130.66
$61.988.09

C 110.027 lbs 323.073 Yds = 2.93½ Yds to lb Cost 8.64c pr Yard
D 134.179 " 366.184 " = 2.73 " " " " 9.30 " "
244.206 lbs Cost 25.38 pr lb cloth

Mill No. 4

Cotton 22.811 lbs at 13 56/100 . . . 3094.89
Pay Roll . . . 2055.70
10% of $22731.09 is 2273.10 = 4.328.80
$7423.69

C 9214 lbs 27.338 Yds
E 4191 " 13.092 "
13.405 " 40.430 Yards is 18 7/10 c pr Yard.

Exhibit 1b

Treasurer with "keeping his accounts in a perspicacious manner.[14] This he did. As early as 1817, General and Administrative overhead was allocated to the cost of manufacturing and distinctions were made between current and capitalized expense. Unexpired expenses in the form of general supplies, cotton, cloth, and even labor charges to cotton and cloth work in process, were inventoried at cost.[15] Costs were accumulated in a systematic fashion and transferred at actual cost or close approximation from one cost center to the next through the various stages of production.

A brief look at the basic production accounts in 1817 shows us the following:

Cotton costs including interest, freight, insurance, etc. were accumulated as debits in the cotton account. To prepare raw cotton for spinning, the cotton had to be picked, drawn, and carded. Labor costs of this preparation were accumulated by type in the spinning account. Beginning in 1817 these labor charges associated with work in process were inventoried at a standard per pound charge equal to the average per pound cost of preparing cotton during the period. The weaving account accumulated charges and inventoried work in process labor in the same manner. The later Lyman mills failed to inventory such work-in-process labor charges.[16]

Most notable of the accounts in 1817 which were closed out to the cloth account is the General factory expense account. Debits to this account included management salaries and miscellaneous supplies. The inclusion of general expense charges in the cloth account is the first indication of the BMC's efforts to include overhead as well as direct costs in calculating the cost of cloth manufacture.

Thus, by 1817 we see the rudiments of a costing system; a conscientious effort by the BMC to accumulate costs throughout the production process. Period costs such as watchmen's salaries were properly expensed in the period incurred and product costs such as spinning labor were carefully inventoried. Although we begin to see use of cost centers, allocation of overhead, and strict distinction between period and product costs as early as 1817, there is no evidence that unit costs by type of finished cloth were calculated this early.

Between 1816 and 1822 the BMC grew markedly in sales volume, organizational structure, and in the level of requisite accounting sophistication. Beginning in 1818, an Accounts Current ledger was kept. Unlike the earlier journals and general ledgers, the Accounts Current ledger allowed for a detailed semi-annual summary of each of the current accounts. Cotton on hand at the beginning and end of the period and cotton purchased during the period was listed by bale, pound, and accumulated cost. Spinning and weaving accounts calculated labor applied to WIP using standard costs based on actual cost to the thousandth of a cent per pound. Cloth inventory by type, (bleached and unbleached) was valued at between 14½¢ and 26¢ a yard indicating a fairly precise form of costing as early as 1822.[18]

In 1820 the company built its own bleachery wnich performed bleaching services both for the company itself and for outside customers. From the start, it was established as its own cost and profit center. Intracompany bleaching was performed at the bleachery's calculated average per pound cost. The intracompany transfer price, initially rounded to the nearest cent, was calculated to within one ten thousandth of a cent by the 1830's. Outside bleaching was performed at a profit.

Like the bleachery, the Barn was accounted for as a distinct cost center. The Barn was the cost center responsible for intracompany transportation and teaming. All hauling on behalf of other cost centers, such as the cotton, cloth, bleaching or machine shop accounts, was charged to that cost center at a standard rate. It appears that the company attempted to fully allocate barn expense. Every six months the debit and credit entries were totalled and the excess of costs over allocation calculated. This ending debit balance was brought forward to the next period. But ending debit balances remained relatively small during the period reviewed indicating that intercompany allocation of barn costs, at least in aggregate, closely approximated cost.[19]

An additional cost component which was included in cost of cloth and cloth inventory by 1822 was that of repairs. Through depreciation charges, as Payen described them in 1817, were not calculated by the BMC, or any other American company at this time as far as we know, it is arguable that the BMC's inclusion of Repair charges in the costing of cloth was made with the same intent as depreciation charges are made today; namely to recognize on a periodic basis the reduced value of fixed assets due to use and aging.[20]

One aspect of modern depreciation not adequately reflected in the cost accounts of the BMC and other early manufacturing companies was that of obsolescence. Though rapid technological advances in the textile industry in the first half of the nineteenth century caused many firms to go bankrupt due to obsolete machinery, the industry was too young and the future of technological advancement too uncertain to allow reasonable estimates of obsolescence. Instead of systematically providing for anticipated obsolescence as a cost of manufacturing, the BMC and other mill companies made periodic appraisals of fixed assets, writing them up or down as they saw fit.[21] These appraisals were usually coincident with the issuance of additional stock. Write ups or downs were charged directly through capital stock and therefore did not affect cost accounts.

The next quantum improvement in the quality of surviving costing records of the BMC occurred in 1836. This was the earliest year for which "Semi-Annual Accounts" of the firm are available. The Semi-Annual Accounts are significant because they provide the first explicit evidence that the BMC was calculating unit costs of production in aggregate and because they give strong implicit evidence to the supposition that unit costs of production by individual type of cloth were being accurately calculated rather than simply guessed at.[22]

The schedule within the Semi-Annual Accounts entitled "Cost of Materials and Expense" gives totals of each major cost component (cotton, labor, general expense, and repairs). These component costs are then divided by total production in pieces, in yards, and in pounds to arrive at average costs per class of expense and in total. The dollar figures of expenses and the production quantities used in this calculation are the same figures used elsewhere in the semi-annual accounts and in the firm's general ledger. Cost calculations were thus derived from and applied in the accounting records of the BMC in a fully integrated manner.

The semi-annual accounts also gave management and ownership detailed schedules as to the source, use, and valuation of all cotton owned during the period by lot. An equally detailed "Memo of Cloth Made" gave strict account of the production, disposition, and inventory of cloth by type. Ending inventory was valued at cost by type. These semi-annual accounts are very similar in format to those kept by the Lyman mills 20 years later.

The accuracy of the valuation of inventory and production suggests that detailed calculations of the cost of each cloth were made. For the first semi-annual period of 1836 I multiplied the yardage of each type of cloth produced by the standard costs, as used to price ending inventory, and found that the standard costs differed from actual by only .6%. (For two other years 1846 and 1854 this same test was performed similarly suggesting that valuation prices by cloth type were based on actual production costs calculated elsewhere.) Beginning in 1836 other indications of the use of accounting information for management control appear. The percentage of waste in cotton during production was included as a regular feature of the semi-annual accounts.

Although the first surviving semi-annual accounts for the BMC begin in 1836 there is strong evidence that semi-annual accounts calculating unit costs were prepared earlier than this by the BMC. The first surviving semi-annual report is number #36 indicating that semi-annual reports might have been prepared as early as 1818, the year in which the accounts current were first kept. The accounts current contained all the information necessary for the preparation of the semi-annual accounts. The assignment of inventory valuation costs to each grade of cloth as early as 1822 indicates that detailed unit costs of production were likely calculated outside of the semi-annual accounts and other formal accounting records.

Miscellaneous papers in the Baker Library Archives indicate that the BMC actively endeavored to share its technology and management systems with affiliated mills by signing formal agreements entitling these affiliates to patent rights, knowledge of machinery processes and "any knowledge, skill, art or information of any sort in any way relating to the business of manufacturing."[23] Accounting systems were clearly included in the transfer of technology from the BMC to affiliated mills.

Because existing records of the BMC appear incomplete, more detailed costing calculations were sought (and found) in the concurrent accounting records of two mills directly descended from the BMC. The costing systems and financial statement presentation of the two affiliated firms studied differed only slightly from those of the BMC. The first large mill to copy the Waltham System was the Merrimack Mfg. Co., a firm started in 1821 by the founders of the BMC and 80% owned by either the BMC or its principle shareholders. The surviving accounting records of the Merrimack Mfg. Co. prior to 1840 are very spotty and contain little evidence of costing calculations beyond what was derived from the BMC records.

In 1831 another large mill in the BMC tradition, the Lawrence Mfg. Co., was founded with an initial capitalization of $1,350,000. Surviving records for this firm are very complete and include the earliest known American examples of unit production costing calculations by type of cloth. The structure of the accounting system and the format of presentation of this firm's semi-annual accounts differ little from the BMC. This is not surprising given that

Analysis of the Profits on the business of the Lawrence Man[g] Company for the six months ending February 12th, 1848

	Mill No 1				Mill No 2		Mill No 3			
	N		W		C		C		D	
	Yards	Amount	Yards	Amount	Yards	Amount	Yards	Amount	Yards	Amount
Gross Sales by A. & A. Lawrence & Co	903,764 1	70,899 91	131,693 1	19,735 09	843,865 0	62,676 49	494,452 1	31,338 24	334,939 1	19,416 31
Less Guarantee & Insurance 2½%		1,760 –		493 38		1,566 91		783 45		485 40
		68,639 91		19,241 71		61,109 59		30,554 79		18,930 91
Less [illegible] Charges on Goods sold to A. & A. Lawrence & Co. [illegible]		3,906 –		1,094 68		3,476 57		1,738 29		1,076 95
Nett Sales by A. & A. Lawrence & Co		64,734 91		18,147 03		57,633 02		28,816 50		17,853 96
Sales by J. Aiken Agent on Cloth Rooms	2713	15 53	293	3 12	1,077 2	73 23	638 3	36 62	1,589 2	141 33
Nett Sales for six months	904,036 1	64,750 49	131,722 1	18,150 15	849,943 2	57,706 25	494,971 1	28,853 12	336,678 3	17,995 29
Add balance of Interest a/c		212 33		59 94		190 57		95 31		59 43
Goods on hand, valued at	188,475 2	12,634 96	2,589 2	233 06	485,425 1	29,163 81	242,713 3	14,681 91	242,127 1	15,738 26
	1,092,511 2	77,599 08	134,311 2	18,443 15	1,335,367 2	87,060 63	667,613 3	43,630 31	468,705 3	33,792 98
Transfers of Goods on hand from Mill No 3 to Mill No 2							21,843 2	1,875 21		
					32,385 1	1,943 10				
Total	1,092,511 2	77,599 08	134,311 2	18,443 15	1,367,752 2	89,003 73	646,450 1	42,755 10	468,705 3	33,792 98
Cost as per Table A	1,092,511 2	77,468 67	134,311 2	15,647 94	1,367,752 2	91,511 15	646,450 1	43,701 02	468,705 3	34,091 69
Profit		130 61		2,795 21						
Loss						2,507 42		1,445 92		298 71

Loss per Dollar
on:

Profit per Dollar
on:

N 130 61
W 2,795 21
C 833 17
A 874 90
[illegible] 3,866 10
[illegible] 2,561 .
M 1,910 84 . . . . 12,771 83

Loss per Mill
on:

No 2 C 2,507 42
No 3 C 1,445 92
No 3 D 298 71
1,744 63

Less Profit
on C 833 17 911 46
No 2 C 3,359 [illegible] . . . .

C 2,507 42
C 1,445 92
C 2,509 21
C 298 71 . . . . 6,611 26

6,160 57 . . . . Nett

Exhibit 2a

Analysis of the Profits on the business of the Lawrence Man^g Company for the six months ending February 12th, 1848

Mill No. 4				Mill No. 5								
O		C		A		B		G		H		Total
Yards	Amounts	Yards	Amounts	Yards	Amounts	Yards	Amounts	Yards	Amounts	Yards	Amounts	Amounts
76,761 0	8,068 93	842,365 0	63,676 49	854,966 0	20,266 .	170,604 0	17,167 57	226,404 3	17,629 79	293,447 2	18,915 74	343,290 11
	201 73		1,566 91		506 65		429 20		440 75		472 88	3,707 25
	7,867 20		61,109 58		19,759 35		16,738 37		17,189 04		18,442 41	339,582 86
	447 59		3,476 57		1,124 14		952 30		977 92		1,049 20	19,319 21
	7,419 61		57,633 01		18,635 21		15,786 07		16,211 12		17,393 21	321,213 65
1042	11 57	1,077 3	73 28	1,567 3	123 01	1,869 0	192 76	808 7	18 66	249 2	16 60	715 76
			656 39									656 39
76,865 2	7,431 18	849,942 3	58,362 63	856,533 3	18,758 22	172,473 0	15,978 83	225,613 1	16,229 78	293,697 1	17,409 86	321,676 81
	34 54		192 74		61 95		52 77		53 60		57 80	1,007 10
76,903 3	6,152 80	486,425 0	29,163 80	403,335 1	24,495 40	164,339 0	11,886 93	421,030 3	23,833 49	269,442 3	12,579 47	180,821 42
153,769 1	13,618 02	1,335,367 3	87,719 18	659,667 0	43,218 59	336,812 0	27,868 53	646,644 0	40,123 87	563,140 0	30,046 33½	503,119 37
		11,131 2	667 39									
153,769 0	13,603 02	1,324,236 1	87,051 39	659,667 0	43,218 59	336,812 0	27,868 53	646,644 0	40,121 87	563,140 0	30,046 33½	$ 503,009 37
153,769 1	12,774 85	1,324,236 1	84,410 50	659,667 0	42,343 69	336,812 0	24,002 43	646,644 0	37,760 87	563,140 0	28,135 99	496,848 80
	838 17				874 90		3,866 10		2,361 .		1,910 34	$ 6,161 57
			2,559 31									

Profit per Mill

No 4	O	180 61		
. .	H	2,745 21	2,925 82	
No 5	A	874 90		
. .	B	3,866 10		
. .	G	2,361 .		
. .	H	1,910 34	9,012 34	11,938 16
. . . .				5,778 09

Profit . . . . $ 6,161 57

Exhibit 2b

the two largest shareholders in the corporation, other than the Lawrence brothers themselves, were one-time treasurers of the BMC and therefore responsible for the presentation of that firm's semi-annual accounts.

The one notable departure from the BMC semi-annual account format is the inclusion of a new schedule, the "Memo of Averages."[24] The "Memo of Averages" provides proof that detailed costing control by grade of cloth and by production location was kept in the 1830's and that the costs calculated were used in valuing inventory and calculating profit. Each of the four mills in operation in 1834 was treated as a separate cost center. Cotton and payroll to each mill were charged at actual. Repairs and General Expense were allocated to the individual mill cost centers based on a predetermined overhead percentage rate. The per yard cost of the various grades of cloth produced in each mill was determined to a fraction of a cent. See exhibit 1a and 1b.

From the commencement of full scale production in 1834, the Lawrence Mfg. Co. maintained detailed semi-annual accounts and from the beginning these semi-annual accounts included the "Memo of Averages." These surviving unit cost calculations are 52 years earlier than the earliest unit cost calculations noted by Johnson in the Lyman Mill records and two years earlier than the first surviving BMC semi-annual accounts.[25] There is a strong likelihood that the BMC, the well from which the Lawrence Mills drew their accounting systems, was making calculations similar to those noted in the Lawrence "Memo of Averages" but that these calculations were simply not included and therefore not preserved in the semi-annual accounts.

The Lawrence Mills soon outstripped other Waltham related factories in the quality of costing information prepared. Beginning in 1848, the semi-annual accounts of the Lawrence Mills included an "Analysis of Profits" which precisely calculated the profit as well as the cost on each of nine varieties of cloth and for each of five mill cost centers.[26] This schedule proves dramatically the transformation of cost accounting into a "managerial instrument of precision" prior to 1850. See Exhibit 2a and 2b.

In conclusion, the "Waltham System" did more than simply bring to textile accounting the conscientious bookkeeping of the mercantile countinghouse. The accounting records of the Boston and Lawrence manufacturing companies illustrate in rich detail the swift transition from mercantile to industrial accounting in the twenty years from 1815 to 1835. The advanced costing systems in use at these mills during this period are the earliest known in America, 30 years earlier than those noted at Johnson's Lyman Mills. Knowledge of the existence of sophisticated costing within the "Waltham System" narrows by half the lag between the earliest known English and American costing applications. Though little cost accounting literature was produced between 1820 and 1885, it is clear that men af practice were rapidly advancing the applications of costing in America well before the much heralded "Costing Renaissance" in the final quarter of the 19th century. Virtually from the beginning of large scale industry in America the precursors of the costing systems now considered essential tools of management were in use.

FOOTNOTES

[1]Littleton, p. 359.

[2]R. H. Parker in his *Management Accounting: An Historical Perspective,* pp. 138-146, shows the traditional reliance on published works to date the development of cost accounting as well as the dearth of published material on this subject from 1820 to 1880. The first mention of cost accounting in this chronology is Wardlaugh Thompson's 1777 article in the "Accountants Guide" (York, England) describing process costing. The second mention is dated 1817, the year in which Anselm Payen published his "Essai sur la Tenue des Livres d'un Manufacturier": the first significant French work on cost accounting. The next significant published work on costing cited by Parker was not until the "Costing Renaissance" nearly 60 years later. This work by Henry Metcalf, an American, entitled "The Cost of Manufacturers", was published in 1885.

[3]Johnson, p. 474.

[4]Stone, p. 74.

[5]William Holmes, "Governmental Accounting in Colonial Massachusetts", unpublished paper, 1978.

[6]A major consideration in the selection of the records of the BMC for the purposes of this study was the availability and completeness of those records now housed at the Baker Library at the Harvard Business School. The BMC records begin in 1813 whereas equally complete records of another "second stage" mill do not start until 1832.

All original records of the Boston Manufacturing Company and the Lawrence Manufacturing Company to which reference is made in this study are housed in the Baker Library at the Harvard Graduate School of Business Administration. In the following notes these records are referred to as the "Boston Manufacturing Collection" and the "Lawrence Manufacturing Collection" respectively. The Baker Library manuscript reference number is also given.

[7]For an excellent history of the origins the American textile industry and the significant role the Boston Manufacturing Company played in that history, see Caroline F. Ware's *The Early New England Cotton Manufacture.*

[8]Ware, p. 63.

[9]William Bagnall, page 2316 of notes prepared for the second volume of his *Textile Industries of the United States* (never published). Copies of these notes

are held by the Manuscripts Division of the Baker Library of the Harvard Graduate School of Business Administration.

[10]Taylor, p. 231.

[11]Garner, *The Evolution of Cost Accounting to 1925*, 1954, p. 83.

[12]Garner, "Highlights in the Development of Cost Accounting Thought", p. 216.

[13]For a brief synopsis of the cost accounting systems of Payen and Cronhelm see Littleton, pp. 320-324.

[14]Boston Manufacturing Collection, v. 2, Directors' Records.

[15]Boston Manufacturing Collection, v. 23, General Ledger.

[16]Johnson, p. 470.

[17]Boston Manufacturing Collection, v. 34, Accounts Current.

[18]Boston Manufacturing Collection, v. 34, Accounts Current.

[19]Boston Manufacturing Collection, v. 34, Accounts Current.

[20]Johnson noted a similar absence of any systematic depreciation of fixed assets in the Lyman Mill accounts forty years later. Johnson, p. 470.

[21]Boston Manufacturing Collection, v. 42, Semi-Annual Accounts.

[22]Though it does not appear that weight was the overriding factor in calculating the cost of each variety of cloth, it does appear that there was a positive correlation between weight and the value added to bleached inventory. All varieties of cloth under three yards to the pound received a standard differential of 1¢ for bleaching and all over three yards to the pound received a ½¢ differential.

[23]Boston Manufacturing Collection, v. 187, Misc. Papers.

[24]Lawrence Manufacturing Collection, v. 41, Semi-Annual Accounts.

[25]Although Johnson found the "raw data needed to estimate product costs . . . as early as 1875", actual unit cost calculations at the Lyman Mills were not found until 1886. Johnson, p. 472.

[26]Lawrence Manufacturing Collection, v. 48, Semi-Annual Accounts.

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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 business . . . .[6]

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 managment 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 structual 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

GENERAL LEDGER ACCOUNTS

Assets & Liabilities

Assets:
- Real Estate
- Construction
- Patents
- Investment
- Cash
- Notes (Bills) Receivable
- Accounts Receivable
- Individuals and Companies (Owing Us)

Liabilities:
- Capital Stock
- Mortgage Bonds
- Notes (Bills) Payable
- Accounts Payable
- Individuals and Companies (Whom We Owe)

Cost Accounts (Internal Accounts)

Open Accounts:
- Taxes
- Insurance
- Depreciation
- Accounts in Suspense
- Raw Materials
- Worked Materials
- Merchandise
- Interest on Bonds
- Interest on Floating Debts
- Unpaid Labor
- Income

Sales:
- Merchandise Sales

Expenses:
- General Expense
- Shop Expense
- Sales Expense

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 entrly 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.

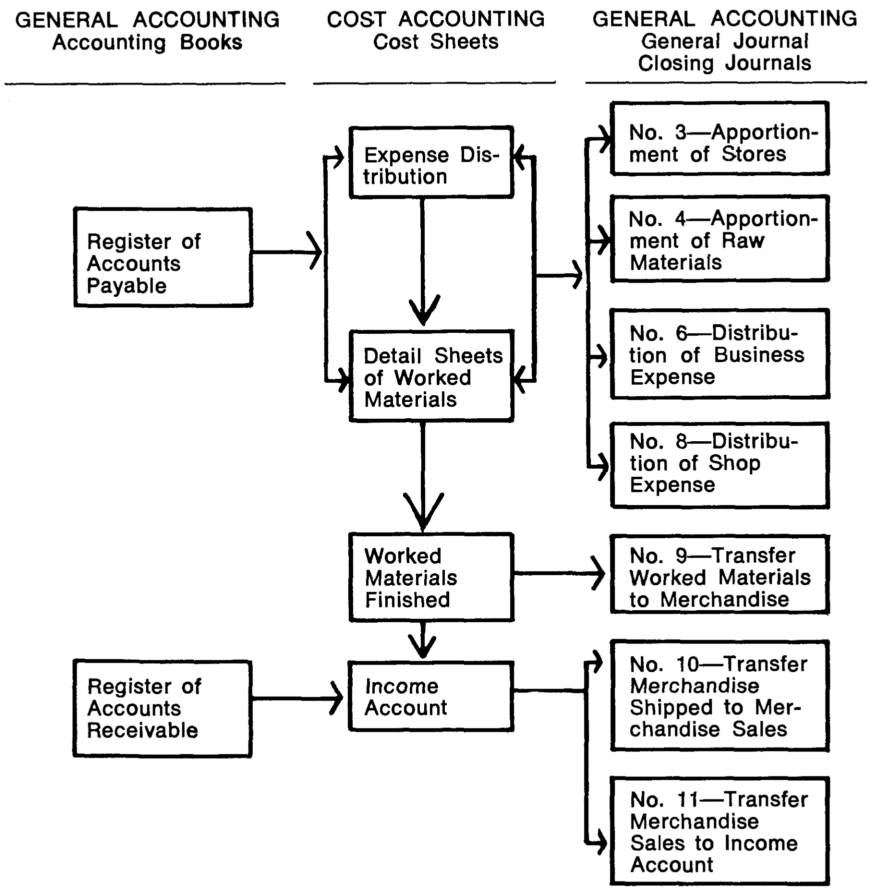
4. *Accounting Reports*

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 structual change. He placed cost accounting in the planning department and considered cost accounting to be an indispensible 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

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

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PETER DUFF: ACCOUNTANT AND EDUCATOR

Abstract: Peter Duff, an accountant in Pittsburgh, was the author of several books on accounting and also the founder of a school for bookkeepers and accountants in 1840. The Duff school is significant because of its early beginnings and the fact that the school still operates today, having outlived many of its noted competitors.

Hard by the south bank of the Allegheny River, in the city of Pittsburgh, stands a multistoried brick and concrete building which houses a number of different proprietory schools of the type commonly found in most large cities. One of these schools, however, Duff's Business Institute, has a particular interest for students of accounting history. Duff's is the present-day successor to the Accountant's Institute, a school founded in 1840 by the noted accounting writer, Peter Duff. Duff's thus antedates the Bryant and Stratton group by some 13 years and can lay strong claim to being the oldest commercial school still in operation.

Peter Duff,[1] the founder, was born in the Canadian province of New Brunswick in 1802, the son of a Scottish immigrant farmer. As a young man, he travelled to Edinburgh, Scotland for the purpose of completing his education. On his return trip home, he brought with him a large stock of mercantile goods which he planned to sell in Canada. However, the ship on which he was sailing was wrecked and his goods lost. Duff took the insurance proceeds, bought another stock of merchandise and, this time, made the voyage back to Canada without incident. He was able to sell his wares at a good profit in the city of St. John. Because of the success of this venture, Duff decided to enter upon a career as a merchant and importer. By 1835 he was reputed to be one of the most successful businessmen in St. John. He owned several warehouses and ships, and had established a reputation for honesty and ability. However, in that same year a major fire in St. John destroyed Duff's warehouses and his inventory and left him bankrupted.

After settling his affairs to the best of his ability, Duff decided to move to the United States and to seek to rebuild his fortunes. On his way west, he passed through the city of Pittsburgh. He saw Pittsburgh as a growing and dynamic center of trade and commerce and decided to remain. For a time he worked as a bookkeeper and accountant, opening and closing books, preparing balance sheets and "adjusting deranged accounts."[2] In 1840 he established the Accountant's Institute and subsequently incorporated as Duff's Mercantile College of Pennsylvania. The school offered both day and evening instruction in mercantile and steamboat bookkeeping, mercantile calculation and writing.

As was (and is) the case with many accounting educators, Duff wrote a number of texts on the subject of bookkeeping for the use of his students.[3] His most well-known work was *Duff's North American Accountant,* first published in 1848, and followed by numerous editions through 1865. The successor to this book was *Duff's Bookkeeping by Single and Double Entry,* first published in 1868, and cited as the "Twentieth Edition." It was actually an expanded version of the earlier work, with added sections on railroad accounting and national bank records as well as mercantile and manufacturing accounts. This book continued to be published through 1896 and was used by the Duff school throughout the period. In addition, in 1846 Duff published *The Western Steamboat Accountant.* This book is interesting as an early example of a specialized text dealing with the accounting procedures applicable to a particular type of business activity rather than to business record-keeping in general.

Over the years, Peter Duff brought his sons, Charles, William and Robert into both the school and his other business activities. P. Duff and Sons was an active mercantile firm dealing in molasses and related products and acting as agents for the Proctor and Gamble Company. In the advertising for his school, Duff emphasized the fact that he and his sons were not just teachers of the business arts, but also successful practitioners. Upon the death of Peter Duff in 1869, his sons continued the family business activities and the school.[4]

Recently I acquired a catalog published by Duff's school, dating to the late 1890's, which gives an interesting insight into the types of programs and conditions of study of the times. The school consisted of two departments, a Commercial Department and a Department of Shorthand. In the Commercial Department tuition was $50 for an unlimited period of study. That is, the student could take as long as necessary to complete the course of study. Instruction was on an individual basis and students could begin at any time. The program of study in the Commercial Department included the theory and practice of both single and double entry bookkeeping, banking, insurance, arithmetic, penmanship and the preparation of business forms, mercantile law, ethics and economics. Materials and supplies, sufficient for the entire course of study, including all texts, blank accounting forms, papers and business documents, pens, holders and other supplies could be purchased for $7 at the school stationery department. An additional charge of 10¢ per week was made for paper used in the penmanship course. Ink was supplied free of charge.

For the out-of-town student requiring room and board, the school was prepared to recommend suitable accommodations. Newly arrived students were advised to come directly to the school from the railway station. A member of the faculty would then escort them to the appropriate lodging house and see that they were settled. Costs for both room and board (including fire and light) were estimated at $4 to $5 weekly. In all, the prospective student could plan on spending $100 to $105 for the ten week period it would take to complete the course assuming "ordinary ability and industrious habits."[5]

Naturally, the training in bookkeeping was a major part of the work in the Commercial Department. This training was divided into three parts. First, the student studied the keeping of books for sole proprietorships, practicing the closing procedures both for losses and profits and for cases of solvency and insolvency. Second, partnership records were studied including cases where the partners shared profits equally and where they shared profits unequally. Finally, the records for joint-stock companies were studied from the time of formation of the firm to the declaration of dividends to the owners. Every kind of accounting record: cash book, day book, sales book, bill book, two and multi-column journals and general and private ledgers were studied. All necessary business papers and documentation required for the various transactions were prepared by the student as part of the study sets.

Physically, the bookkeeping classrooms resembled the typical accounting offices of contemporary business firms. High desks were provided to facilitate stepping from one book to another when necessary. However, there were stools available for use when the work was such as to permit a sitting position.[6]

A substantial number of topics were covered by the means of daily lectures which all students attended. These lectures dealt with commercial ethics, mercantile law, and correspondence, including such matters as the proper methods of folding and addressing envelopes. Heavy emphasis was placed upon the matter of penmanship for: "a poor penman can never be a good clerk; still less can he be a successful bookkeeper."[7] The subject of penmanship was taught by William H. Duff, a son of the founder and a highly regarded penman whose artistic work decorates the catalog. Each student was expected to spend a minimum of two hours daily in writing practice.

Admission to Duff's required only an elementary school education, and was open to both men and women. There were no age limitations, although few students below the age of 16 had entered the programs of the school. Prospective students without the necessary basic skills could be enrolled also, and were given individual remedial work until they were ready to engage in the more advanced training of the course itself.

A student was required to pass two sets of examinations to complete the course. First, after finishing each portion of the course, the student prepared a written synopsis of the material. This synopsis, together with all records, documents and other papers he had completed would be reviewed by an instructor. After all individual portions of the course had been completed and reviewed, the student was required to pass a comprehensive examination given by the entire faculty and covering all subject areas studied. Further work and re-examination were required in any subject in which the student was found to be deficient.

The school made no guarantees about future employment. However, successful graduates were assisted in finding positions. The success of former graduates was such as to attract the attention of prospective employers, seeking to fill vacancies.

As noted earlier, the Department of Shorthand functioned separately from the rest of the school. Tuition here was $25 for three months or $40 for six months. A 20% discount was allowed students electing to take the shorthand course along with the regular commercial course. Expenses for texts, paper and other supplies were estimated at $3 for the course. The Graham method of shorthand was recommended by Duff's. However, the Pitman and Munson systems were also taught. The course included typewriting, English grammar, spelling, punctuation and general office skills. All of the popular models of typewriters were available for student use and practice so that the student would be prepared to use any machine his future employer might supply. Ample time was provided on a daily basis for dictation practice.

Duff's recommended combining the study of shorthand and bookkeeping as a way of enhancing employment prospects. The services of a full time stenographer were not required by many small firms. However, a person skilled in keeping accounting records as well as in stenography would be of value to any business.

Today, Duff's Business Institute offers programs in the five areas of Accounting, Fashion Merchandising, Clerical, Court Reporting and Secretarial.[8] Programs of varying length lead to Associate degrees, diplomas or certificates. The school itself is located not far from the spot at which Peter Duff established his first classroom 140 years ago. In the ensuing years many thousands of persons have worked through the programs offered, and the school is a respected institution in the city of Pittsburgh. However, it is likely that many members of the surrounding business community are unaware of the long history of Duff's; a history which predates that of many large universities, and one which began with the establishment of a school for bookkeepers by a man worthy of a place in the history of American accounting.

FOOTNOTES

[1]Details of Peter Duff's life are taken from *Duff's College Catalog*, 1895, pp. 48-50.

[2]Duff (1846), p. 3.

[3]Full details of Duff's books are appended. Also see Bentley, Volume I, pp. 30, 32-33, 114, 119-120, 123-124.

[4]*Duff's College Catalog*, 1895, pp. 52-53.

[5]*Duff's College Catalog*, 1895, p. 7.

[6]*Duff's College Catalog*, 1895, p. 42.

[7]*Duff's College Catalog*, 1895, p. 19.

[8]*Duff's Business Institute Catalog*, 1979.

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20th edition enlarged and revised. However, it includes new sections on bank and railroad accounting and is virtually a new book. This was Duff's major work and served as the text at his school for many years. Subsequent editions were published in 1869, 1870, 1871, 1873, 1876, 1882 and 1896.

Duff's North American Accountant, published by the author, New York, 1848. Subsequent editions were published in New York by Harper & Bros. in 1850, 1852, 1854, and 1855. In 1854 an abridged edition was published. In 1856 an expanded edition called the 10th edition was issued. Subsequently, the expanded edition was reissued in 1858, 1859, 1861, 1863 and 1865.

The Western Steamboat Accountant, published by the author, Pittsburgh, 1846. Another edition of this work was published by the author in New York in 1847.

Also of interest, and used in Duff's school was a book authored by the sons of Peter Duff: Charles Peter Duff, William Henry Duff and Robert Peel Duff.

Duff's Common School Bookkeeping, Harper, New York, 1877. Subsequent editions were published in 1878, 1880, 1881 and 1882. Another edition was published by the American Book Company, New York, 1904.

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THE MIDDLESEX CANAL—AN ANALYSIS OF ITS ACCOUNTING AND MANAGEMENT

Abstract: The paper analyzes the development and subsequent decline of the Middlesex Canal, a twenty-seven mile inland waterway that joined Lowell in northern Massachusetts with Boston and the sea. Built from 1793 to 1804, the canal was an important catalyst in regional economic and transportation development during the early years of the American Industrial Revolution. Data from original financial records of the canal are presented for the period 1825 to 1845 when the canal was most successfully operated. The Middlesex Canal is acknowledged to be a fundamental element in the early development of Lowell as the center for textile manufacturing in the United States.

Introduction

Massachusetts, which led the colonies into the American Revolution, proved to be fertile ground in the early nineteenth century for a second revolution—the Industrial Revolution. This paper traces the financial history of the Middlesex Canal, a twenty-seven mile inland waterway which joined the Merrimack River at Lowell with the city of Boston and the sea.[1] Introduction of service on the canal marks the beginning of large scale industrial development in New England; and this study analyzes the surviving financial records of the Middlesex Canal from 1793 to 1850 in an attempt to trace the evolution of early corporate accounting practices and financial processes and to provide insights into the early years of the Industrial Revolution in this country.

Fortunately, many corporate documents have survived and are preserved in the Middlesex Canal Association Archives Collection at the University of Lowell. Existing financial records include lists of stockholders, cash assessment records, minutes of directors' meetings, annual reports of stockholder meetings, accounting ledgers from 1793 to 1824, and reports of the Agent from 1825 to 1844. In addition, numerous bundles of bills, vouchers, regulations, deeds, toll rate schedules, stock certificates and other financial memorabilia may be examined.

This paper presents an analysis and evaluation of financial data taken directly from canal records, including revenues, expenses, estimated net income and rates of return on revenues, and on original investment for the period from 1825 to 1845. In addition, an examination of dividend payments has been included to provide an assessment of return on investment to the shareholders of this early public utility. A review of the available ledgers traces the development of accounting procedures from a single entry format to a relatively sophisticated multi-column cash journal. Rudimentary internal auditing concepts were employed by the board of directors to safeguard assets and assure objective reporting of revenues and expenses; and this early illustration of internal auditing and control also is discussed.

Historical Perspective

Following the years of turmoil that marked the American Revolution, New England began to focus its attention and energies on the economic development of its inland regions. Boston, the area's largest city, was a thriving port and the center of business and commerce. Commercial leaders realized that improved transportation to interior regions was the key to economic expansion in New England.

The utility of inland water transportation had been demonstrated several decades earlier in Great Britain and Europe, where canals operated successfully before 1760. The British accomplishments in canal building were much admired by Americans who conceived a number of canal projects during the 1780s and 1790s. Although the Middlesex predates the more famous Erie Canal by twenty-five years, it was not the first American canal. When the Middlesex Canal Company was incorporated in 1793, more than thirty canal companies already had been established in the United States. Many were modest projects, while a few were of such grandiose proportions they were destined to early failure.

The Middlesex Canal, an ambitious venture by any measure, was designed to join the Merrimack River at Middlesex Village (now Lowell) and the port of Boston. Construction of the canal began in 1794 and was completed in 1804. A truly herioc engineering project, the Middlesex Canal proved to be an important catalyst for economic growth in Massachusetts.

The magnitude and complexity of the project can be demonstrated by a brief examination of the plans and specifications of the canal. More than twenty-seven miles long, the canal contained twenty locks, eight acqueducts, and forty-eight bridges. Of particular engineering interest were the canal locks, some of which were constructed of stone, others of heavy timber. The locks were from ten to twelve feet wide and of various lengths; and their average lift was seven to eight feet. Each lock was large enough to accommodate canal boats some seventy-five feet long. One of the great engineering feats of the canal was a series of three double locks which accomplished a fifty foot descent at Horn Pond, where a popular tavern overlooked the scene.

After Lowell and Boston were joined by the canal, several river locks and canals were constructed on sections of the Merrimack River north of Lowell to facilitate passage to Concord, New Hampshire. Planners envisioned barges transporting lumber, furs, grain and other materials via canal to Boston; with cotton bales, machinery and other finished goods providing return cargo to northern settlements. Lowell, which subsequently became the textile center of the country, thrived in the 1800s as a result of cheap power, skilled labor in adequate supply, and the availability of inexpensive transportation.

Upon completion of the New Hampshire locks and canals in 1814, the original dream of a functioning inland waterway from Boston to interior New Hampshire became a reality. The goal was achieved at a heavy cost, however, because the Middlesex Canal Company, as principal stockholder, financed most of the construction of the New Hampshire canals, a decision which diverted funds from the Middlesex during a crucial period in its early operation.

Organization, Leadership, Investment, and Returns

James Sullivan, Attorney General of Massachusetts, is thought to have originated the basic concept for the Middlesex Canal project. Mr. Sullivan, together with Loammi Baldwin and Ebenezer Hall, formed a committee that petitioned the Massachusetts General Court (the Legislature) for a charter in the name of "The Proprietors of the Middlesex Canal". Following affirmative legislative action, Governor John Hancock signed the incorporating act in 1793. Upon issuance of the charter, interest in the venture became widespread in Massachusetts, with the list of incorporators including some of the most prominent persons of the day. Among the shareholders in 1806 were John Adams, John Quincy Adams, James Sullivan (president of the corporation), Loammi Baldwin (principal engineer and builder), and Samuel Jaques, successor to Baldwin as Agent of the company.

Capital for construction of the canal was obtained by periodic assessments against the proprietors (shareholders). The first assessment in the spring of 1794 was levied against some fifty stockholders who owned about 740 shares of stock. Subsequent issuances of stock increased total outstanding shares to 800. From 1794 to 1806, ninety-six assessments totaling $610 per share were levied by the company, and these funds provided the primary source of capital for constructing the canal. The company also paid approximately $74,000 to acquire control of the river locks and canals between Lowell and Concord, New Hampshire; and in 1811, three assessments on the 800 outstanding shares generated $40,000 which was used to liquidate loans incurred in the river locks acquisitions. From 1808 to 1816, an additional $102,600 was invested in betterments, repairs, damage payments for lawsuits on disputed land, and similar expenditures.[2] These funds were provided both from operations and from various loans of the Massachusetts Bank and several individuals. Finally, in 1817 a single assessment of $80 per share provided $64,000 which cleared the corporation of debt and was the last assessment of funds from shareholders of the Middlesex Canal Company. The total capital cost of the canal as measured by assessments of $740 per share on 800 shares from 1794 to 1817 was $592,000.

A computation of simple interest at six persent on investors' assessments has been made by Roberts[3] in an attempt to measure total investment in the canal. If imputed interest is included in construction costs, the shareholders' contribution per share increases from $740 to $1445 per share on 800 shares, and the capital investment in the Middlesex Canal may be estimated at $1,156,000.

The corporation finally provided a return on shareholders' investment when the first dividend in the amount of $15 per share was paid in 1819. Total dividends from 1819 to 1853 (when assets were liquidated) were only $559.50 per share, far short of the $740 per share originally invested.

If financial success is measured by return on total investment, then the Middlesex Canal was a failure almost from its inception in 1794 to its demise in 1853. Total investment, exclusive of interest was $592,000 and total dividends paid were $447,600 including liquidating dividends of $116,000. Although individual stockholders may have profited on the sale of their shares, the venture would be considered a financial failure by modern standards. In 1860 the

Massachusetts legislature formally declared the company defunct and all papers were placed in the custody of the Clerk of the Middlesex County Court. Bridges over the canal were removed, the trough of the canal was filled, and disposable property was sold. An important chapter in the industrial development of New England quietly concluded.

Financial Records from 1793 to 1824

The earliest financial record of the Middlesex Canal Company dates from 1793. Titled the "Treasurer's Account", this leather bound book chronicles activities during the company's first three years. Although the board of directors was initially elected in October 1793, actual construction was delayed until the summer of 1794. Entries in the Treasurer's Accounts describe financial activities during the initial construction period and may be classified into two categories. One group records cash receipts derived from assessments levied against the proprietors. A second set of entries details expenditures for actual construction of the canal. Thus, the "Treasurer's Account" functioned as a combined cash receipts and disbursements journal.

The first set of entries is a detailed record of assessments levied by the company to finance construction of the canal. A modified single entry procedure was used in which a separate account was maintained for each stockholder reflecting assessments and subsequent receipts during the three year period. This group of accounts essentially was a simple but complete record of assessments receivable, with debits for assessments ordered by the Board and credits for stockholder payments.

When shares were transferred, a memorandum entry in the Treasurer's Account noted each ownership change, and subsequent assessments were based upon the adjusted number of shares held. Several stock transfers were traced to test the accuracy of the records; and without exception, transfers had been meticulously and correctly recorded. Individual records of more than 100 proprietors are included in the Treasurer's Accounts from 1793 to 1796.

As noted earlier, some of the most illustrious Massachusetts men invested in the Middlesex Canal. For example, the Treasurer's Account revealed that in 1793 Governor John Hancock had subscribed to twenty shares of the original issue. He died shortly thereafter, and his estate sold his interest to Joseph Barrell, a wealthy merchant from Charlestown. According to the records, Hancock or his estate paid the first three assessments totaling $140 per share prior to the sale of his shares in October, 1794. Mr. Barrell, who was a member of the first board of directors and later served as vice-president, also had an initial investment of twenty shares of stock. Apparently convinced of the project's potential, Barrell invested heavily in the canal in 1794. In addition to acquiring Hancock's twenty shares, he bought ten from Caleb Boulding, ten from Andrew Hill and twenty from his son, Joseph Barrell, Jr. His total holdings of eighty shares required a $7,000 cash investment for the twenty assessments levied during the 1794-1795 period.

By December 1796, significant ownership changes had occurred. The investments of only five of the original twenty-nine subscribers were intact. Joseph Barrell was among the dominant group of Boston investors and his eighty shares were the largest single block owned. Sixteen men held 524 of the 800 shares outstanding in 1796. Mr. Barrell's enthusiasm for the canal apparently waned during the next decade because by 1806, he had disposed of all but seven of his shares.

The cash disbursements of the company from 1793 to 1796 are contained in a single account titled "The Proprietors of the Middlesex Canal" in which were recorded annual construction costs of the canal. Detailed debits reflect payments to laborers, suppliers for materials and tools, advertising and printing costs, legal fees and even entertainment and lodging expenses. Many of the original bills and vouchers are extant and a sample of forty vouchers was taken to verify the accuracy of postings to the account. Without exception, postings were accurate, column footings were correct, and supporting documentation appeared satisfactory even by contemporary standards.

Large capital expenditures were charged to the Proprietor's Account as well as items as small as $1.50. For example, in March 1794, the company purchased the Thomas Richardson Mill on the Concord River in Billerica and built its first blacksmith shop on the property. Total purchase price for the property was $6,265,[4] an amount that was paid over a period of time. The treasurer recorded an initial payment of $1,000 for the property in March. Additionally, a debit of $533.33 ⅓ was entered for payment of a treasurer's note, and another $200 debit recorded a fee paid to Henry Putnam for his services in consummating the purchase.[5] A liability for the balance owed on the Richardson Mill was not recorded directly in the accounts. However, approval for purchase of the property was recorded in the minutes of the board of directors in November, 1794; and canal records in subsequent years reflect the payment of the purchase price in several installments.

Debit entries in the 1794 Proprietor's Account show total construction costs of $7,209.08. At March 31, 1795 the first reconciliation of the Treasurer's Account was prepared by an audit committee of the board of directors. On that date, construction expenditures totaled $15,110.11; and six assessments had been levied on the 800 shares outstanding which provided $16,000 cash for construction. The audit committee's report, written directly in the ledger, provides evidence of the board's recognition of its stewardship and oversight functions. The March 1795, reconciliation is shown below.[6]

PROPRIETORS OF MIDDLESEX CANAL

1795		1795		Doll.	
March 31	Total Expended 15,110.11	March 31	by 6 Assessments on 800 shares at 20 doll.	16,000	
			Deduct Ballance due from 23 Persons as of List Exhibited	1,125	
				14,875	
			Ballance due to the Treasurer		235.11
March 31th, 1795					15,110.11
					Doll. Cents

ERRORS EXCEPTED

We the subscribers a Committee appointed by the Directors of the Middlesex Canal to examing (*sic*) the Accounts of the Treasurer have attended that service and find them right cast and well
Doll Cents
vouched and a Ballance due to him of 235.11 that their is due to Thomas Richardson 800 Dollars on Acct of the Mills for which the Treasurer has given his Note the 27th May 1794. They also Certify that there are due from sundry of the Proprietors for Assessments by List Exhibited 1125 Dollars some of whom have acc as to
Doll
Exhibit that 1544.16 cents of his Acct was for provisions which are now an hand All which is submitted

Ebenezer Storer
J Brooks Committee

Note that twenty-three delinquent shareholders owed $1,125 in assessments at the end of March, and that the treasurer has apparently used personal funds of $235.11 to pay certain vouchers. The audit statement also reveals that an inventory of provisions had been taken and a value of $1,544.16 established, and recognizes an outstanding Treasurer's note for $800 to Thomas Richardson. The note relates to the balance due in 1795, not the full liability outstanding.

More complex, but essentially similar audit statements appear throughout the surviving records. These cash reconciliations are analyzed in more detail later in this paper.

Fundamental accrual accounting principles were not integrated in the records of the Middlesex Canal. However, in his annual report to the Directors, the Agent typically reported notes payable together with lists of accounts receivable, accounts payable and inventory of supplies on hand at the end of each year. The Agent's report was a lengthy document in which the major events of a particular year were summarized. A complete review of repairs and betterments was included as well as a summary of revenues and expenses. The annual report offered the Agent an opportunity to review his stewardship during the prior year and to recommend management decisions for implementation the next year. Thus, the annual report served both as a summary of past activities and as a vehicle for presenting future plans and goals.

Based upon available documents, the directors of the Middlesex Canal demonstrated a sophisticated awareness of their collective fiduciary responsibility to shareholders. The treasurer's accounts were audited annually, and the evidence suggests that each payment may have been examined and verified. The evidence also suggests that these early transactions were conducted in cash because reference to check numbers do not appear until much later when checks were used to pay dividends.

A second Treasurer's Account ledger for the years 1795 to 1805 continues the very detailed recording of construction costs. The accounting practices of the early years were continued in the Proprietor's Account, including annual comprehensive reconciliations of cash by the audit committee. There is no evidence that a formal general ledger was maintained during this period.

Records from 1808 to 1811 have not survived. However, accounting procedures became increasingly sophisticated because in 1814 the treasurer adopted a multi-column cash disbursements journal which closely resembles contemporary handwritten disbursements journals. The account title, "Middlesex Canal in Account with the Treasurer", supplanted the older Proprietor's Account. Column headings included date, persons paid, amount (credit to cash), and debits for betterments and repairs, boating expenses, interest expense, management expense (including salaries), and incidental charges.

Additional evidence of the increasing complexity of the accounting system was found in 1811. At December 31, lists of both customers' receivables and creditors owed were prepared which were carried forward to 1812 when collections and payments were recorded. In 1812, a separate group of Doubtful Accounts was segregated from customers' balances. During the period from 1811 to 1814 the treasurer began to record costs and expenses in several accounts, with a summary of all items recorded in the Proprietor's Account. Among the detailed accounts maintained were cash, receivables, payables, interest, new boats, betterments, improvements, Massachusetts Bank (for loans), tolls management expenses, labor, storage, wharfage, and investments. All accounts were closed annually to a General Account which was similar to a Revenue and Expense summary account. A general ledger in the modern sense either was not maintained during this period or it has not survived.

Ledgers and accounts from 1825 onward have not survived. However, the annual reports of the Agent who served as the chief executive officer of the company provide a summary of revenues and expenses for the years from 1825 to 1845, the most successful period in the canal's history.

The data in Exhibits I and II were summarized directly from the original reports of the Agent. Not surprisingly, the prinicipal revenue source was tolls, while other income from land and mill rentals and sales, and dividends from the New Hampshire river canals contributed an additional fifteen to twenty percent of annual revenues. In later years, toll revenues declined and miscellaneous income became more important.

The category, sales of land, in Exhibit I merits further comment. During the operating life of the canal, various sales of land provided an intermittent source of cash. The financial records were maintained on a cash basis, and receipts from land sales included both principal and interest on installment sales. For example, in 1835 cash of $2,232 was received from an installment sale of Eastern Township (Maine) land, which had been sold in 1834. This receipt included $1,800 principal and $432 interest. The Agent of the canal consistently failed to distinguish between principal and interest receipts during the 1830s and 1840s.

Moreover, the accounting issue of capital gains and losses was not addressed directly in the records of the Middlesex Canal. In some instances, cash from land sales was entirely capital gain because the property sold had originally been granted to the Middlesex Canal Company at no cost by an act of the Massachusetts legislature many years earlier. In later years, asset liquidations generated funds which were paid to shareholders as liquidating dividends. Here also, capital gains and losses were not specified for particular parcels of land and equipment, and depreciation expense was never recognized in company accounts and operating reports.

Principal expenses of the Middlesex Canal were wages and salaries, and repairs and maintenance to the property. The Agent of the canal apparently had a rather well-defined notion of expenditures which should be classified as capital items. However, the distinction between capital expenditures and repairs and maintenance was not always consistently applied. In 1825, for example, the Agent reported no capital expenditures and repairs, maintenance and new building of $7,317.68 (See Exhibit II). A review of the 1825 Agent's Report revealed several items that would properly be classified as capital expenditures that were included in repairs. Among the items were a bridge in Charlestown, two new wooden locks, and a new locktender's house. The Agent mentioned these expenditures as part of his report on repairs and maintenance but did not specify precise costs. In 1825, the Agent apparently reported all capital expenditures as part of repairs and maintenance. In subsequent years, new docks, acqueducts, bridges, canal boats, terminal buildings and other obvious capital items were properly classified as capital expenditures.

Cash flow was an important issue which received close attention during the operating years from 1825 to 1845. Cash flow was adversely affected by repayment of loans with interest, particularly during the early years, and by dividend payments to the proprietors which totaled $389.50 per share during the two decades from 1825 to 1845. All shipping on the canal ceased after 1851; however, as a consequence of the liquidation process, dividends of $65 and $20 per share were paid in 1852 and 1853 respectively. The last recorded meeting of the board of directors took place in 1854; and in 1860, the Supreme Judicial Court ordered the records sealed

EXHIBIT I

MIDDLESEX CANAL COMPANY

Revenues From 1825 to 1845

	1825	1830	1835	1840	1845
Revenue Sources:					
Canal Tolls	$22,716.06½	$23,384.11	$41,798.61	$24,774.39	$12,426.01
Sales of Land	3,100.00		2,232.00	420.60	1,016.85
Rentals of Real Estate		1,630.83	3,389.54	4,316.09	2,017.45
Dividend Income		1,687.50	4,725.80	3,013.00	2,152.00
Miscellaneous	514.36	785.03			
Total Revenues	$26,330.42½	$27,487.47	$52,145.95	$32,524.08	$17,612.31

Source: Reports of the Agent of the Middlesex Canal Company, Corporate Records, University of Lowell Archives Collection.

EXHIBIT II

MIDDLESEX CANAL COMPANY

Expenses and Net Income From 1825 to 1845

	1825	1830	1835	1840	1845
Expenses by Category:					
Repairs, Maintenance, and New Building	$ 7,317.68	$ 4,776.52	$ 8,862.03	$ 7,681.55	$ 3,604.09
Wages and Salaries	3,830.01	4,287.80	6,338.53	6,190.05	5,648.43
Capital Expenditures		8,752.45	11,785.41	4,826.69	2,358.54
Accrued Expenses		2,063.67	2,873.92	3,868.72	2,684.47
Interest Expense		27.00	750.00		46.67
Incidental Expenses	421.92	1,108.43	1,789.85	1,121.19	1,168.22
Total Expenses	$11,569.61	$21,015.87	$32,399.74	$23,688.20	$15,510.42
NET INCOME	$14,760.81	$ 6,471.60	$19,746.21	$ 8,835.88	$ 2,101.89
Rate of Return on Revenues	56.1%	23.5%	37.9%	27.2%	11.9%
Rate of Return on Original Investment of $592,000	2.5%	1.1%	3.3%	1.5%	0.4%

Source: Reports of the Agent of the Middlesex Canal Company, Corporate Records, University of Lowell Archives Collection.

indefinitely, thus concluding a brief but important chapter in the economic development of New England.

Early Auditing

Although the profession of public accountancy did not envolve in the United States until the 1890s, the board of directors of the Middlesex Canal Company had appointed a standing committee to conduct an annual internal audit of the financial records as early as 1795, when the canal was under construction. Initially, the audit committee was charged with assuring the accuracy of the records. After the canal began operating, the committee also was directed to recommend an annual dividend if such a payment were feasible and desirable. The minutes of the January 1830, meeting reflect a typical charge to the standing committee.

> Voted that a committee be chosen to examine the Agents and Treasurers accounts: and that Eben Chadwick, George Hallet, and Wm Appleton, Esq. be the Committee, and that the said committee report what dividend can be made . . .
>
> Voted that the Report of the Agent be approved and that the same be read to the Proprietors at their Annual Meeting . . .
>
> Voted that the committee above named make a statement of the sources of income of the Canal, and submit the same to the Proprietors at their next meeting . . .[7]

On February 1, 1830, the directors met at the Exchange Coffee House in Boston to consider the committee's response to the January 25 charge. The complete report of the standing committee is presented in Exhibit III.

The committee's report is noteworthy in several respects. First, it reveals an increasing sophistication by the committee in its evaluation of operations compared to the 1795 report shown earlier in this paper. Second, the committee required only one week to audit the Agent's records, which seems a relatively short period of time to accomplish that important task. The degree of thoroughness with which the examination was conducted is not apparent from the records; however, the committee asserted that they had carefully examined the accounts and found them to be "correctly cast and well vouched," an almost identical phrase to that used in 1795 when the canal was under construction. One wonders whether the committee would publicly vouch for the record's accuracy if they had not conducted an extensive examination of vouchers, bills and related documents. Third, the 1830 report for the year ended

December 31, 1829, contains a significant amount of detail—revenues are classified by major category and expenses and capital improvements are summarized in detail.

Finally, while concluding that prudence required passing a dividend in 1830, the standing committee (possibly responding to shareholder pressure) nonetheless recommended payment of an eight dollar per share dividend. The recommendation was accepted by the board of directors and the dividend was subsequently paid.

EXHIBIT III

Report of the Standing Committee

Middlesex Canal Company

February 1, 1830

The committee appointed by the Directors of the Middlesex Canal to examine the accounts of the agent for the past year, and report what dividend can be declared, have attended to their duty and respectfully Report . . . that they have carefully examined the Books and accounts of the Agent and find same correctly cast and well vouched . . . that it appears therefrom the whole income of the Canal during the past year amounted to $25,675.65/100 . . . derived from the following sources

VIS		
Tolls rec from the several Collectors		$21,545.80
Rents, de		2,982.45
Union Canal Dividend		321.20
Bow Canal		816.20
Dividend on 1 share owned by Middlesex Canal for 1828		10.00
		$25,675.65
which is accounted for as follows . . . VIS		
Interest on temporary loan of $1,500 J. C. Jones, Esq.		$ 25.74
Expended on Materials and Repairs		3,463.73
Management, Agent's Salary, Wages of Lock Tenders de		4,280.46
Incidental Expenses		897.26
Expended on New Works, VIS		
New Lock and Aqueduct at Medford	$4,052.09	
New House at Charleston Mills	1,382.96	
New Milk Canal Office	782.31	
New Wharver at Charleston Mills	1,843.05	
New Aqueduct at Wilmington	619.00	8,679.41
Notes in the hands of Thomas Hittite, collector of tolls unpaid to be accounted for next year		1,581.07
Deposited in the Eagle Bank to the credit of Caleb Eddy, Treasurer of the Corporation		$ 6,737.98
		$25,675.65

EXHIBIT III (Continued)

The Committee find that the only debt owed by the Corporation is the balance unpaid of the loan authorized in 1828 and which is due to the estate of John Coffin Jones, Esq., deceased in the sum of seven thousand four hundred and fifteen dollars 22/100 with interest from 1st Jany 1829 . . .

It is unquestionably the most prudent and correct course to suspend a dividend until this debt is paid, but it being the general desire and expectation of the proprietors that one should be declared and from the consideration that no new works are to be commenced this season, the Committee recommend that the payment of said debt be charged upon the income of the present year, which it is presumed will be adequate to its extinguishment and leave a surplus for a dividend equal to that now proposed. The Committee therefore recommend that a dividend of eight dollars per share be declared . . .

Boston Jany 30th 1830
Signed

Ebenezer Chadwick
William Appleton Committee
George Hallet

The Report of the Committee accepted and a dividend of eight dollars on each share owned to be paid by the Treasurer.

Attest Caleb Eddy, Clerk

Boston Feby 1 1830

Source: Middlesex Canal Company, Shareholders' Reports, January, 1830

The existence of an audit committee indicates that an internal system of checks and balances was functioning in the Middlesex Canal Company as early as 1795, and that the process was an integral part of the company's operations throughout its corporate life. Despite the absence of a public accounting profession and the paucity of tradition to guide their activities, the directors regularly assessed the stewardship of the company Agent and Treasurer. The systematic annual review of the corporation's financial records by the standing committee provides solid evidence of the board's sensitivity to its fiduciary responsibilities. Although the committee's evaluation did not constitute an independent audit in the modern sense, it clearly reflects the board of director's diligence in the exercise of its oversight process.

Conclusion

The Middlesex Canal, completed in 1804 in Massachusetts, marks the beginning of the economic expansion which transformed New England into a leader of the American Industrial Revolution. The canal facilitated transportation inland to cities and towns in northern Massachusetts and New Hampshire and encouraged trade to hitherto isolated areas, thus contributing to the settlement and development of the entire region. The mills and factories that identified Lowell as the center of textile production in the United States depended upon the canal for transportation during a crucial period before railroads were introduced in the 1830s.

The financial and operating records of the Middlesex Canal Company comprise a valuable archive for accounting historians. The archive provides a unique opportunity to examine the accounting and financial practices of an important post-revolutionary company, one of only thirty canal corporations chartered by 1793. The surviving records reveal an extraordinary attention to detail in the daily operations of the company, and the corporate records of the board of directors reflect a sophisticated understanding of the stewardship function in this first Massachusetts public utility. Although the original investment of shareholders was never returned and the canal rapidly declined following introduction of regional railroads, the Middlesex Canal nonetheless was a magnificent engineering achievement whose importance surpasses the financial aspects of its history. Despite its financial shortcomings, the canal served as a valuable catalyst in the expansion of industry in New England; and it merits study as an example of early corporate activity in the United States.

FOOTNOTES

[1]The southern terminus actually was located in Charlestown, a community across the Charles River from Boston proper. Today Charlestown is part of metropolitan Boston; and as a matter of convenience, Boston is identified as the terminus of the Middlesex Canal in this paper. After barges entered the Charles River, they could transport goods to any part of Boston; and a short branch canal entered the city and terminated at Haymarket Square, a section of Boston which in 1978 has been restored as a center for shops and offices much as it was in 1800.

[2]Roberts, Chapters III, XIII.

[3]Roberts, p. 182.

[4]Roberts, p. 65.

[5]Treasurer's Accounts, Middlesex Canal Company, 1793-1796, p. 58.

[6]Treasurer's Accounts, Middlesex Canal Company, 1793-1796, p. 84.

[7]Minutes of the Board of Directors of the Middlesex Canal Company, Boston, Massachusetts, January 25, 1830.

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PARTNERSHIP ACCOUNTING IN A NINETEENTH CENTURY MERCHANT BANKING HOUSE

Abstract: This article focuses on the contents of two nineteenth-century letters which discuss the allocation of income among the partners of a leading Anglo-American merchant banking firm, the House of Brown. The writers debate alternative methods of valuing assets and determining yearly income. In addition, the handling of doubtful accounts and their subsequent collection is examined. In both letters the writers argue for the development of clearly defined accounting principles and consistency in applying them. These letters reveal that an unusually high degree of financial sophistication had emerged in the merchant banking field by the 1850s.

While much of the recent historical literature has been devoted to analyses of business and railroad operations in the nineteenth century, the accounting methods and contributions of banking firms have remained relatively unexplored.[1] Now two previously unpublished letters written in the mid-nineteenth century by partners of the House of Brown, a leading Anglo-American merchant banking firm, offer new insight into the evolution of accounting methods and the emerging degree of sophistication in accounting thought. These letters indicate that some of the senior members of the firm were acutely aware of the problems associated with the development of principles and procedures for determining and allocating partnership profits in an equitable and consistent manner. The issues which stimulated discussion within the firm were controversies over, first, alternative methods of valuing assets and consequently the calculation of yearly income and, second, the collection of funds on doubtful accounts which had been written off directly against the senior partners' capital accounts. In both letters the writers expressed very conservative attitudes about the valuation of assets and the measurement of income.

The firm was founded in 1800 by Alexander Brown, who emigrated to Baltimore from Ireland in the 1790s. Beginning as a linen merchant, Brown soon expanded his activities to include the merchandising of other products, shipping, and the provision of various financial services. His four sons eventually joined the business, and by 1825 three of them had established branches of the partnership in Philadelphia, New York, and Liverpool.[2] By midcentury, the firm had become the market leader in two major Anglo-American financial markets—the issuance of letters of credit to American importers and the buying and selling of foreign exchange in the United States. Profits were so high in these specialized fields that the two senior partners who held the bulk of the firm's capital—William Brown in Liverpool and James Brown in New York—decided, in the 1850s, to embark on a program of diversification by making "outside" investments in railroad securities, transatlantic passenger ships (the famous Collins Line), and other properties. Some of the junior partners opposed these outside investments calling them unduly speculative; the leaders of this group were two non-family members of the firm residing in England, Francis Hamilton and Mark Collet (later Governor of the Bank of England), who had assumed day-to-day administrative control of the Liverpool branch in 1853.

Eventually, many of these peripheral investments did, in fact, decline in market value, just as Collet and Hamilton had feared. This setback intensified the debate within the partnership about the merits of investing partnership funds in railroad stocks and bonds. It led to discussions of the valuation of assets generally. As the following letter from Collet and Hamilton so succinctly reveals, the problem of declining asset values stimulated a lively discussion about the application of a "cost or market" approach in determining the partnership's income for 1856:[3]

Persia *Private*

Liverpool 12 Nov. 1856

Messers Brown Brothers & Co.
New York

Dear Sirs:

. . . .

We exceedingly regret that there should exist between us any difference of opinion, as to the mode of treating assets, not immediately convertible, in the yearly statement of accounts, but we trust the difference may be rather apparent than real, & that you have only misunderstood our meaning.

What we intended to propose was not that every asset should be absolutely sold & turned into actual Cash on the 30 Nov^r. & that every asset not so converted should be written off to Profit & Loss; but, that every asset should be reduced on the Books to such a sum as it could, beyond a doubt, be actually sold for, within a reasonable space (say of *weeks* or *months,* but not of *years*); and that everything beyond such actual money value—whether the assets be absolutely worthless, or only doubtful—should be written off. In fact, as we view it, there is only one process by which the profits of a current business can be "ascertained"; namely by comparing the liabilities with the assets, after *both* have been reduced to their cash value on the day, up to which the profits are to be calculated; by means of the interest account this is done most accurately with the *Liabilities*; but, if in dealing with the *Assets*; prospective values are applied to them which may or may not be realized at some future day, instead of bringing them to their *present Cash* value, a totally different standard is at once applied to the assets, & the result can only show an amount of "assumed", but not of "ascertained" profits.

We are not insensible to the disadvantage which under our present partnership agreement might accrue to the heirs of a junior partner by this strict course; and W^m Brown, having his attention drawn to it by your remarks, is willing & suggests that a supplementary article should be introduced to preserve to the heirs of juniors their just interest in the Bad Debt Account; and he writes to his brother to this effect by the present conveyance.

On the other hand it may not perhaps have occurred to you that if assets are left on the Books at nominal amounts beyond their convertible value, the Senior Partners are placed at a corresponding disadvantage under their obligation to pay off a junior in Cash at the rate of the previous years profits; which would of course have been less had the assets been appraised upon what appears to us the only sound principle.

Further, for the last three or four years, large amounts have had to be written off annually to supply the inadequate provisions made for Bad Debts, at the time they occurred; & upon these sums, which for the time swelled the profits, we have been all along paying a heavy Income tax.

But all such questions as these are quite minor & unimportant when compared with the grand objection, that by retaining assets on the Books at sums [other] than their convertible value, & so dividing profits which have not been fully earned, a most insidious

& deceptive principle is admitted, which has no single advantage to recommend it, but on the contrary is fraught with serious dangers.

Within our own memory American Houses that. . . .felt fully confident of their position, as we do now, have been brought to ruin by it; first bolstering up questionable accounts or bad debts with fresh advances, instead of facing out the loss at first, and then retaining the assets upon their Books at nominal values, which, if they were not purely arbitrary, could only have been realized under some concurrence of circumstances, which was waited for in vain; in the meantime they shut their eyes to the dangers of a system, which could not be remedied except at a serious sacrifice, until it slowly, but surely, brought them down. Smaller concerns, from their limited means are comparatively exempt from this risk; but it is the peculiar snare which lies in the way of large Houses with extensive means & unbounded credit, and in this light it does seem to us of vital importance that we should not give place to so dangerous a principle in any form or shape. We have no other object that the common interest of all in urging these views upon you, & we sincerely trust that they will of themselves receive your approbation & be adopted.

. . . .

We are,
Dear Sirs
Yours faithfully,
Brown Shipley & Co.

Although it is impossible to determine exactly what developments and forces influenced the Liverpool partners' consideration of accounting principles, this correspondence did coincide with several legislative alterations in English financial laws. The Joint Stock Companies Act of 1856 passed Parliament just prior to the writing of this letter. Because the new law prescribed new financial practices for certain business organizations, public discussion of the act had stimulated in England a reappraisal of basic accounting concepts.[4]

Specifically, the Joint Stock Companies Act required that the directors of each corporation "cause true Accounts to be kept":

> Of the Stock in Trade of the Company; Of the Sums of Money received and expended by the Company, and the Matter in respect of which such Receipt and Expenditure takes place; and Of the Credits and Liabilities of the Company.[5]

The annual presentation of income statements was required so that "a just Balance of Profit and Loss may be laid before the Meeting." Furthermore, the act specified that "a Balance Sheet shall be made out in every Year, and laid before the General Meeting of the Company, and such Balance Sheet shall contain a Summary of the Property and Liabilities of the Company. . ."[6]

The act did not specifically address the issue of valuation of assets nor did it detail the preparation of financial statements. However, the mere fact that for the first time presentation of accurate financial statements was required by law may have stimulated discussion of accounting principles.

Aside from these legislative actions, we have been unable to discover any direct stimulus for Hamilton and Collet's interest in the lower of cost or market principle. However, the principle had clearly been introduced into accounting thought by the mid-nineteenth century. A. C. Littleton in an article, "The Geneology of Lower of Cost or Market," traces application of the principle to fourteenth-century Italy, when a very heavy tax burden may have been an incentive for recognizing all possible losses.[7] During the seventeenth century French businessmen seem to have adopted the practice of writing down slow inventories, but Littleton argues that it was done primarily for the purpose of determining the degree of solvency. By 1862, J. Sawyer referred to the "recognized principle that stock should be valued at least at cost price (unless depreciated in value) and that no profit should be estimated until realized."[8] Meanwhile, we are unaware of any Anglo-American accounting literature that discusses the issue of lower of cost or market in terms of its impact on the measurement of income. It is conceivable that Collet and Hamilton's letter represents one of the earliest preserved discussions of this topic.

In a second letter written four years later, Collet and Hamilton focused on inconsistencies in the handling of bad debts and subsequent collections on delinquent accounts:[9]

Niagaria *Private*

Liverpool 24 March
1860

Messers Brown Brothers & Co.
New York

Dear Sirs:

. . . .

Referring to your private letter of 5 March about the private accounts, we see nothing to remark upon, except this: there appears to us an inconsistency in the principles upon which some accounts are brought under the operation of the Suspense Account & others excluded; we do not wish to raise the question by correspondence; indeed it could never have arisen had the principle been clearly defined in 1857, on what terms the Seniors assumed the Juniors' losses; but to illustrate the inconsistency that presents itself to our minds, we could say that if *all* the Surplus that may be realized from Mathison & Litchfield is to go to Credit of the Suspense Acct, (even *beyond* the amount *specifically* written off in 1857) then the loss written off in 1859 for the Thompson property should have gone to the Suspense A/c too; but if the latter was properly charged to Profit & Loss A/c, *then* any recoveries beyond the Sums which were specifically written off in 1857 should revert to the Profit & Loss account of the year when the recovery is made. The question in fact turns upon this — whether the Seniors guaranteed the Juniors for losses *beyond* what the Am^{t}. placed to Suspense A/c 1857 would satisfy? If *they did,* then they should bear the loss upon Thompson's property, on the ground that it was a lock-up, left standing at an estimated value; & then too they are entitled to *all* recoveries from the assets as they then stood; but if, as we conceived at the time—the Seniors did not engage to supply anything more (if needed) than the Suspense account would suffice to cover, *then* the loss [on] Thompson's property has been correctly charged *last* year to Profit & Loss; but then also the recoveries beyond losses *specifically* provided for (& not left to be worked out under the gross estimate) should also go to Profit & Loss. It is inconvenient now to settle the point when there is no longer any doubt as to the out-turn of the Suspense Account, viz. that it will be more than sufficient to pay all losses, and of the two original alternatives only one remains; and we do not wish or ask you to discuss it by letter; but only to settle it on your side before Mr. J. M. Brown comes out, so that we can have an understanding about it, when we can discuss it verbally.

. . . .

Yours faithfully,
Brown Shipley & Co.

To place this second item of correspondence in the proper context, it is necessary to know that during the financial panic of 1857 many American importers holding letters of credit from Anglo-American merchant bankers got into serious financial difficulties. In many cases the merchant banking firms in England who had faithfully met their obligations under letter of credit agreements were not fully reimbursed by their American customers. Because the Browns had been cautious in issuing letters of credit and had usually insisted on a margin of 20 percent in tangible assets against contingent liabilities arising under their letters of credit, the firm had weathered this crisis in much better shape than most competitors. Nonetheless, the firm did face the possibility of absorbing some losses. In these cases, the Browns retained the assets assigned to them as an initial margin and occasionally they received additional collateral from importers hoping to survive the panic.

To record these immediate losses and potential losses, the Brown partnership used at least two different methods.[10] Some moderate losses were simply written off against the partnership's profit and loss statement in 1857. In this instance, the losses were shared by both the junior and senior partners according to the pre-arranged agreement about the allocation of profits and losses. In the second method, the senior partners, James and William Brown, agreed to permit writeoffs against their individual capital accounts. Debits were made to a "suspense account" which was a contra-account to the senior partners' capital accounts. The goal of this magnanimous policy was to protect the other members of the partnership from the possibility of incurring unusually high losses in the event most of the questionable debts in 1857 were never fully collected. The amounts written off to the seniors' capital accounts were normally only a portion of a specific account that was considered doubtful, and the remaining balance was left standing on the partnership's balance sheet at its currently "estimated" value. This procedure seems to have been at the root of the problems which arose in later years.

By 1860 the House of Brown had recovered nearly all the amounts written off to the suspense accounts of 1857. At this point, questions emerged about how to record the recovery of the collected amounts. In those cases in which the senior partners had assumed personal liability for at least a partial loss on a specific account, it was not clear whether the collected amount was to be credited in its entirety to their contra-accounts or whether that sum should be divided as follows—with an amount credited to the suspense accounts equal to the original writeoff and the excess credited to the general partnership. The question could be stated as follows: at the time of the debits to the capital contra-accounts was there created thereby an implied agreement that the senior partners had assumed full responsibility for all potential losses on the designated accounts? If that interpretation was correct, then Collet and Hamilton felt that the seniors were indeed entitled to benefit individually from all sums collected, including the amounts above original writeoffs. But, on the other hand, if the senior partners had assumed liability for only a portion of the potential loss on a specific account, then any excess should accrue instead to the general partnership.

Because the matter had never been settled in 1857, uncertainties remained about accounting procedures. In their letter Collet and Hamilton noted that in 1859 the firm had finally recognized a loss on the Thompson account which was in excess of the amount originally placed in the senior partners' suspense accounts. In that case, the additional loss was charged to the partnership accounts and was consequently borne by all members of the firm. Now in 1860, the seniors proposed to credit all the sums collected from Mathison & Litchfield to their contra-accounts, including the amounts beyond the original writeoff. Collet and Hamilton felt that the handling of the two situations was inconsistent.

Unfortunately, we do not know how this matter was finally resolved. Yet it is interesting to note the intricacies which surrounded the drafting and interpretation of partnership agreements formulated over 100 years ago. Although we cannot point in this case to any external events which might have stimulated this discussion, we are aware of several developments inside the firm that almost certainly played some role in encouraging an interest in refining accounting procedures.

By the 1850s, the House of Brown was no longer a small family business, but a medium-sized enterprise with seven branch offices and several non-family members. Moreover, all the members were committed to preserving the business for their heirs, which suggests the emerging concept of an on-going concern. Because the firm actually had two main offices—one in New York and another in Liverpool—there was internal pressure to commit all major policies and operating rules to paper for later reference. The rapidly increasing volume of business after midcentury also placed greater demands on regularizing procedures. Part of this process was the desire by some firm members for a uniform, well-specified system of accounting. In concert, these factors made preestablished rules increasingly desirable for continued harmony within the partnership.

Collet and Hamilton were among the most vocal advocates of the benefits of uniformity. In both letters, they lamented the absence of consistency in handling the partnership accounts; in 1860, they argued that "had the principle been clearly defined" at the outset, the subsequent debate could have been avoided. The problems of maintaining consistency demonstrates clearly the growing need for outside accounting authorities and specialists, who could relieve the partners of the additional burden of establishing the firm's own accounting criteria. Since neither England nor the United States had an active accounting association in the 1850s, it became the responsibility of individual managers to establish their own rules for valuing assets, measuring income, and handling doubtful accounts.

From another historical perspective, it is intriguing to examine the interchange of accounting thought between the United States and Great Britain. Previously, James Edwards has argued that "just as customs, common law, and commercial practice came to the United States from England and Scotland, so did the practice of accountancy."[11] In contrast, R. A. Irish favors the United States as the source of much fresh thinking about accounting principles: "This new country, uninhibited by tradition, brought forth an examination of accounting fundamentals which was free of inborn European prejudices."[12] In this one instance, the letters originated in England, however, which raises questions about Irish's views but supports Edward's position. More research on the origin of fresh accounting thinking is clearly in order.

In conclusion, these two letters offer insights on the evolution of accounting practices and thought during the mid-nineteenth century. The debate inside the Brown firm focused on the drafting and amending of a fair partnership agreement and the judicious interpretation of its provisions. The letters provide evidence of the increased emphasis on the measurement and distribution of income. The letters indicate that the increased complexity and larger volume of business led many partners to attempt to establish permanent guidelines for accounting procedures which might avoid *ad hoc* discussions of financial principles in future years. In formulating and applying these guidelines, Francis Hamilton and Mark Collet, two of the firm's non-family, English partners, saw consistency as a crucial factor. In addition, they advocated a conservative attitude toward valuing assets on the firm's balance sheet and in the measurement of income. Finally, this need for consistent, standardized procedures later spread throughout the business environment and created a favorable climate for the establishment of a cohesive accounting profession.

FOOTNOTES

[1]G. A. Lee, "The Concept of Profit in British Accounting, 1760-1900," *Business History Review* (September, 1975), provides a general survey of the advance of accounting principles during this period. Other sources which provide background are Edey and Panitakdi, "British Company Accounting and the Law: 1844-1900," in Littleton and Yamey, eds., *Studies in the History of Accounting* (Homewood, Ill.: R. D. Irwin, Inc., 1956); M. Chatfield, *A History of Accounting Thought* (Hinsdale, Ill., Dryden Press, 1974); Nicholas Stacey, *English Accountancy: A Study in Social and Economic History, 1800-1954* (London: Gee, 1954); and A. C. Littleton, *Accounting Evolution to 1900* (New York: Russell & Russell, 1966).

[2]The history of the firm is found in Edwin J. Perkins, *Financing Anglo-American Trade, 1800-1880* (Cambridge, Mass.: Harvard University Press, 1975).

[3]Brown Brothers Harriman & Co. Papers.

[4]In the chapter entitled "Development of Experts in Accounts," A. C. Littleton, in his *Accounting Evolution to 1900*, discusses the ebb and flow of business during the nineteenth century and correlates these movements with the growth of social control through statutory regulation of public works and joint stock companies.

[5]*Collection of the Public General Statutes*, p. 433.

[6]*Collection of the Public General Statutes*, pp. 433-434.

[7]A. C. Littleton, "A Genealogy for Cost or Market," *The Accounting Review* (June, 1941). For further discussion of the history of this principle see R. H. Parker, "Lower of Cost or Market in Britain and the United States: An Historical Survey," *Abacus*, I (1965), and Kenneth O. Elvick, "Acquisition Cost Versus Revaluation: A Historical Perspective," *The International Journal of Accounting*, IX (1974).

[8]Sawyer, p. 158.

[9]Brown Brothers Harriman & Co. Papers.

[10]For discussions on the use of reserves for bad debts, see M. Chatfield, *A History of Accounting Thought*, p. 83, and A. C. Littleton, *Accounting Thought to 1900*, p. 301.

[11]Edwards, p. 144.

[12]Irish, p. 63. Also see G. J. Previts, "Origins of American Accounting," *The CPA Journal*, XLCI (May, 1976).

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THE ACCOUNT CHARGE AND DISCHARGE

Abstract: The account charge and discharge system was a competitor of the double-entry accounting system and some of its features may give answers to some of the problems plaguing our present day accounting.

As I understand it, the medieval period had at least two accounting systems running in parallel—the eventual winner, double-entry; and the account charge and discharge.

The latter was pre-eminently the system of stewardship. The steward was charged with the sums for which he was responsible (opening balance, plus receipts), and discharged of his legitimate payments; the end balance showed what he must hand over to his lord or keep in his charge for the next period.

The system had the enormous advantage, in an illiterate society, of not requiring written documents. If need be, it could be worked instead with an "exchequer"—lines on a table to act as columns for units, tens, scores, etc., and small pieces (like draughtsmen) to represent numbers. The petty official who handled the pieces at the English royal court was in time to blossom into the Chancellor of the Exchequer. Officers in attendance to check the steward's explanations did not read but heard them—hence "auditor".

Scottish Trust Accounts

The written account charge and discharge persisted in some stewardship dealings till well after the medieval period. Thus contractors to the British government were still using it—with Roman numbers—in the eighteenth century.[1] And, curiously enough, I myself was trained in it during my apprenticeship in Edinburgh; Scots law and accounting continued obstinately to prefer it, rather than double-entry, for various kinds of semi-legal reckoning such as

An excerpt the Haskins History Seminar paper on "Accounting's Roots—and Their Lingering Influence", The Academy of Accounting Historians, Atlanta, Georgia, April 1979.

testamentary trusts, "judicial factories", charities, etc. Thus, I am an anachronistic survivor of an almost extinct species.

The yearly Account C and D was like a sandwich. The top and bottom slabs were the opening and closing "estates" (the complete range of assets, at cost, and the sum due by or to the steward). The filling was a rearranged cash account—a list of receipts and payments, grouped under such heads as dividends received, wages paid, etc., with the full detail of each group displayed in chronological order; one sometimes needed four or five parallel columns to accommodate all the sub-groups and sub-sub-groups. When fitting, charge and discharge were both divided into "capital" and "revenue" sections, and so net income could be calculated. "Apportionment" between capital and revenue (for instance, of rent and interest accrued at a testator's death) was elaborate, to mirror the convolutions of Scots law; thus we apprentices grew proficient in splitting, into the parts "effeiring" to capital and to a "liferentrix", such items as the rent from pastoral farms where the rent was paid six months forehand (or was it backhand?)

The system was better than our familiar income-statement-cum-balance-sheet where trustees, etc. wanted to study all details; it had a grim logic; and it certainly gave apprentices a wonderful training in analysis and draughtmanship. It is still used by a dwindling number of Scottish solicitors. But it is incomprehensible to most readers; and, where there are many transactions, it grows voluminous and clumsy. "A monstrous beauty, like the hind-quarters of an elephant".

Trust Accounts and Early Theory

There must be many bundles of these accounts in the attics of Scottish accountants. They would surely be a far more fruitful subject for a Ph.D. thesis than today's fashionable forays into inconclusive statistical tests. For did they not constitute a prolonged—and eventually abandoned—experiment in something close to cash flow accounting? More important, they (and their double-entry counterparts outside Scotland) must have played a big role in the development of accounting theory. It seems reasonable to suppose that, as trusts flourished long before company accounting grew up, they gave the prime push to notions of income and valuation: "capital" and "revenue" become vivid when linked with the conflicting rights of known persons; theories become explicit when advocates must be briefed in legal squabbles. Accountants nurtured in trust work would automatically stretch its theory, when the time came, to companies and income tax.

However, trustees must be more influenced by legalisms and fairness than economics. So income theory may have received bias in ways that now seem unfortunate. In particular, wealth could fall or rise, yet "income" was not affected. Fairness impelled trustees to charge part of the year's administration expense against the estate if the cost was incurred to protect the person who would in the end get the estate. In this way, accountants came to accept "capital charges" that have nothing to do with the acquisition of assets, but on the contrary signal their loss. Further, gain on an asset's sale could normally not be distributed (the physical maintenance test in embryo).

FOOTNOTE

[1] I illustrate this in *The House of Hancock*, Boston: Harvard University Press (1945). It could be combined with double-entry: see William Holmes, "Governmental Accounting in Colonial Massachusetts", *Accounting Review*, January 1979, page 51.

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ASSET VALUATION: AN HISTORICAL PERSPECTIVE

Abstract: Asset valuation has been discussed in the accounting and economic literature for most of the twentieth century. In the literature, discussions ranged from advocating only historical costing to the use of current value accounting exclusively. This paper traces the development of theoretical and pragmatic discussions on the topic of asset valuation.

Inflationary pressures in the developing environment of accounting have forced accountants to begin analyzing means of reflecting the impacts of inflation on financial statements. The notion of accounting for the effects of inflation on financial reporting is not new. During the early years of this century, the idea of current cost accounting was being deliberated. For example, Hatfield discussed current cost accounting as far back as 1909. Further, in discussing the differences between accounting income and economic income, Canning indicated a preference for current costs as a valuation mechanism. And in 1939, MacNeal went as far as to suggest that "truth in accounting" can only be attained when financial statements display the current value of assets and the profits and losses resulting from changes in these asset values.

This paper represents an attempt to trace the development of theoretic and authoritative thought concerning asset valuation issues. Two tables are presented to summarize this developmental process. Table I outlines the basic asset valuation conclusions of some classic theoretical works in accounting and business. While this annotated listing is not all-inclusive, it is representative of the related substantive works of this century. Table II summarizes the asset valuation conclusions in studies performed under the auspices of authoritative organizations within accountancy.

An analysis of the development of asset valuation thought reveals the reactive nature of accounting as a discipline. Seemingly without regard to the theoretical works on asset valuation, authoritative bodies in the accounting profession had not, by the 1930s, made

TABLE I

ANNOTATED BIBLIOGRAPHY OF THEORETICAL VALUATION STUDIES

Author	*Year*	*General Conclusions*
Hatfield	1909	Historical cost is the appropriate valuation method for most circumstances, however current cost may be better at times.
Canning	1929	Assets should be valued based upon the future cash flows to be generated if such a measure is directly available. If not, an indirect measure (such as exit prices) may be used as a surrogate.
Bonbright	1937	Value to the Owner Concept — an asset's value to the enterprise is what the enterprise would lose if it was deprived of the asset.
MacNeal	1939	"Truth in Accounting" only exists when assets are valued at their current value, which is best measured by replacement cost.
Hicks	1946	Income is a change in wealth, e.g. the amount which can be consumed in a time period to leave ending wealth equal to beginning wealth.
Edwards and Bell	1961	For information to be useful in managerial decision making, replacement cost is the most appropriate valuation method.
Staubus	1961	Investors are interested in cash flows, hence assets should be valued at the present value of the future cash flows to be generated to the enterprise.
Chambers	1966	Assets should be individually valued at their current cash equivalent (exit price) and then summed to determine the aggregate value of the assets.
Sterling	1970	Assets should be valued at the price for which the assets could be sold (exit price) as one basket of goods. This is an aggregate valuation as opposed to Chambers' individual asset valuation.
Revsine	1973	The long-term investor is interested in cash flows. Current replacement cost provides the closest approximation to the present value of future cash flows generated by the assets and therefore should be used in valuing assets.

any attempts to effectively operationalize the positions of current value advocates. In fact, the trend was to adhere more closely to historical cost as an approximation of value. However, over the past few decades, several influential accounting organizations have moved toward advocating some form of inflation accounting although many of these approaches continue to adhere to the principle of historical costing.

Current trends in authoritative thought seem to indicate that authoritative rule-making bodies in accounting are moving toward recognizing the necessity for some form of inflation accounting. Witness for example the recent Financial Accounting Standards Board statement on constant dollar and current cost accounting. If it is in fact true that current values are more indicative of accounting truths than historical costs, apparently the accounting profession soon will be providing financial information that reflects "truth in accounting."

TABLE II

AUTHORITATIVE BODIES' VALUATION STUDIES

Authoritative Body	*Year*	*Study*	*General Conclusions*
American Accounting Association	1936	A Tentative Statement of Accounting Principles Underlying Corporate Financial Statements	Historical Cost is only proper valuation base
	1941	Accounting Principles Underlying Corporate Financial Statements	Historical cost is only proper valuation base
	1948	Accounting Concepts and Standards Underlying Corporate Financial Statements	Historical cost is proper valuation base but parenthetical disclosure of current value may be needed if materially greater than historical cost
	1951	Price Level Changes and Financial Statements — Supplement No. 2 to the 1948 Statement	Historical cost is appropriate valuation base for primary financial statements. General price-level adjusted statements appropriate for supplemental disclosures
	1957	Accounting and Reporting Standards for Corporate Financial Statements	Does not specify an appropriate valuation base
	1964	Accounting for Land, Building, and Equipment — Supplement No. 1 to the 1957 Statement	Current cost and holding gains and losses should be reported in the *primary* financial statements

Authoritative Body	*Year*	*Study*	*General Conclusions*
	1966	A Statement of Basic Accounting Theory	Dual presentation of historical cost and replacement cost in the *primary* financial statements
Accounting Research Division of the American Institute of Certified Public Accountants (AICPA)	1961	ARS #1 — The Basic Postulates of Accounting ARS #3 — A Tentative Set of Broad Accounting Principles for Business Enterprises	Current costs should be incorporated into *primary* financial statements
Accounting Principles Board	1962	Statement No. 1	Rejects ARS #1 and #3
AICPA	1965	ARS #7 — Inventory of Generally Accepted Accounting Principles	Discusses state-of-the-art of accounting principles thus relies on historical costs
	1969	Statement No. 3 — Financial Statements Restated for General Price-Level Changes	Optional use of supplemental disclosure of general price-level statements
AICPA Study Group on the Objectives of Financial Statements (Trueblood Committee)	1973	Objectives of Financial Statements	Use current values if they differ significantly from historical cost
Financial Accounting Standards Board (FASB)	1974	Financial Reporting in Units of General Purchasing Power — Exposure Draft	Mandatory use of supplementary general price-level adjusted statements
Securities and Exchange Commission	1976	ASR #190	Supplemental disclosure of replacement cost of plant assets and inventories with related expenses
	1978	Reserve Recognition Accounting	Present value of future cash flows used as valuation base in *primary* financial statements
FASB	1978	Financial Reporting and Changing Prices — Exposure Draft	Mandatory use of supplementary current cost information
FASB	1979	Financial Reporting and Changing Prices — SFAS #33	Requires reporting of constant dollar and current cost information for disclosure in annual reports to shareholders

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BOOK REVIEWS

Stuart W. Bruchey. *Robert Oliver and Merchantile Bookkeeping in the Early Nineteenth Century* (New York: Arno Press, 1976, pp. iii, 120, $10.00).

Reviewed by Robert Bloom
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Originally an M. A. thesis at John Hopkins University (1946), this book is based on the accounting records and business letters of Robert Oliver, a mercantile capitalist. Bruchey uses Oliver's records and letters as a springboard to illuminate the characteristics of mercantile capitalism and the development of accounting practice in the early 1800s.

Ledgers and journals were prepared by the Oliver family. Bruchey observes that each cargo shipment was recorded in a separate "Adventure" ledger account, an umbrella account which constituted a record of the revenues of the cargo and the costs of the journey, and was subsequently closed to Profit and Loss upon completion of the voyage. Occasionally, Adventure accounts were charged at more-than-cost for goods shipped. Bruchey concludes that ". . . it is conceivable . . . changing prices . . . were used as a guide to the value of goods at time of export." Secondly, perhaps ". . . price information from abroad served as the basis for cost-plus evaluations of exportable goods." Additionally, ". . . the answer is to be sought in the consideration that business ties with particular agents or particular supercargoes were stronger and longer than those with others. Long and mutually successfully relations give rise to mutual confidence. In such cases, it may be an invoice written at cost was adjudged no risk."

Ship accounts were also maintained. ". . . the Ship account represented an investment distinct from investments in adventures. The cost of a ship could not logically have been charged to any one Adventure account; a ship was the vehicle for numerous adventures."

For accounts payable, a "Charges" account was kept along with "Little Books" to represent a partial subsidiary ledger. Accounts receivable were additionally maintained. Other major ledger accounts included: Partners' capital, Bills of Exchange, Insurance, Commissions, Interest, and Rents.

Expenses pertaining to one year could have been reflected in the Profit and Loss account of another year. "Some expenses were charged to the Adventure Account, some to a Ship account, others to a Disbursements on Ship account. Accounts for Ships and those for disbursements on Ships, furthermore, were not closed at the same time that the Adventure account was closed." Moreover, the partners' capital accounts were charged for household expenses, contrary to the separate business entity principle of contemporary financial accounting.

Trial balances were also prepared, but there was little effort made to categorize accounts by type. There is no evidence that a balance sheet was developed by Oliver. Nevertheless, these accounting books seem to have furnished a valuable stewardship function, as Bruchey observes:

> Unbalanced Adventure accounts recorded the location, nature and approximate amount of capital invested in cargoes. Unbalanced Merchandise accounts recorded the value of unsold merchandise. Debit balances of accounts with individual debtors informed them of sums owed the firm. Credit balances of accounts with individual creditors informed them of sums owed to others.

This succinct essay is carefully researched, well-written, and enjoyable-to-read, though occasionally overburdened with unnecessary accounting data. To shed light on the life and times of mercantile capitalists by putting together bookkeeping records and letters of one such businessman is the mission of this book. Without this marriage of accounting records and letters, the accounts would be difficult, if not impossible, to comprehend adequately. From these sources, a particularly enlightening study emerges.

Deloitte & Co. 1845-1956 (Oxford: University Press, 1958, pp. 171, privately printed for Deloitte, Plender, Griffiths & Co.).

Reviewed by Hans V. Johnson
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The recent merger of Haskins & Sells and Deloitte & Co. has brought together two firms whose rich history spans that of professional accountancy itself. It could be argued that whereas the published history (1895-1970) of Haskins & Sells mirrors the development of professional accountancy in the United States, the history (1845-1956) of the Deloitte firm likewise reflects the profession's growth in Great Britain. The book is equally divided between pre and post 1900 periods. The character and contributions of the founding partners are presented along with clients of long standing, staff relations, overseas development of the firm, and the economic and cultural environment of the times. Material for the book was compiled from correspondence files, internal office memoranda, memoirs, and other recorded recollections of partners and staff.

William Welch Deloitte founded the firm in London in 1845 during a period of British history described as a "time of robust, if harsh, economic development." Of French heritage, the grandson of Count de Loitte, Deloitte left school at 15 after obtaining a position as an assistant to the Official Assignee of the Bankruptcy Court. Twelve years later he opened an office at 11 Basinghall Court and he and his wife established residence above the office. In 1845 the London Post Office directory listed 205 accounting firms. Mr. Deloitte aggressively sought new clients even to the point of searching the newspapers for bankruptcy filings. One letter stated "I am sorry to see your name in the Gazette, and write to offer my services. . ." A staff member recalled Mr. Deloitte as an "alert, decisive little man, with just a touch of austerity in his manner," but with a "kind heart." Leading industrialists came to recognize his outstanding abilities. His association with the Great Western Railway, starting in 1849, was a primary impetus for growth. His investigation of a stock fraud of the Great Western Railway in 1856 made him a prominent figure. Mr. Deloitte left the firm in 1897 and died one year later at age 80. His obituary appearing in *The Accountant* credited him with, among many other accomplishments, developing systems for keeping railway and hotel accounts both of which had become universally accepted.

The book is well written and includes many interesting anecdotes about public accounting practice in the good old days. What follows is a sampling of the trials and tribulations of the staff. New clerks, often 15 or 16 years of age, were furnished with a "Baton," an enclosed footlong cylinder containing three compartments: one for pens and pencils, one for a bottle of ink, and the third "india-rubbers." Inexperienced clerks received no salary for the first year, the training period, and "small salaries subsequently." The clerks worked regular nine hour days, forty five minutes for lunch, except on Saturdays when "work permitting" the office closed at 2 o'clock for the weekend. Monthly time summaries were a "constant source of complaint;" internal memos reveal that on occasion even partners were tardy in submitting their time summaries. Discipline was sometimes a problem as indicated by a letter from Mr. Deloitte to the mother of a clerk who he had just dismissed for an unexcused absence. In the letter he suggested that the young clerk be made to move back to his country home for closer supervision and away from some associates of "the most dangerous character." A subsequent letter to the mother indicates that her son had borrowed money from a client and left an I.O.U. From a staff of 10 in 1850 the firm grew to 125 in 1900. A woman typist was hired in 1902 and the "days of the two male copyists . . . were coming to an end." Previously, all correspondence, accounts, and reports were written and copied in long hand. Recollections on the initial installation of electric lights, and the intense rivalry among the staff to see who got the 16 candle power lamp, the first and the only telephone, the hazards of communicating with other staffmen in remote rooms in the building through "speaking tubes," and the laborious task of filing the mountain of paperwork all make for interesting reading.

The reviewer's favorite passages relate to the experiences recalled by a late partner of the firm, The Rt. Hon. Baron Plender of Sunbridge. Lord Plender had spent considerable time for the firm on the European continent around the turn of the century. While in Madrid he was invited to dine one evening with "a well-known Englishman who had married a Spanish lady." The Englishman had a violent temper, and thus when the butler brought in the leg of lamb, which the host believed to be too rare, he threw it "out the window behind him and it fell in the street, so that there was no mutton for us for that night's dinner." And, "his wife was overcome by her husband's behaviour, and left the table in a temper." In St. Petersburg he and other Englishmen occasionally were invited to dine with Russian friends. Caviar sandwiches and vodka, "which we found to be a particularly strong stimulant," were a prelude to sumptuous meal. "We were pressed to take more (vodka) than was good for us, and sometimes we yielded and before dinner was over . . . we were in a somewhat dazed condition much to our Russian friends delight."

Historians with an interest in the developments of accountancy in Great Britain will want to read about the impact of the Companies Acts, the creation of The Institute of Chartered Accountants, early audit reports, various business failures, and the environment during the two World Wars. This is a thoroughly enjoyable book. It is interesting, informative, and humorous. Deloitte Haskins & Sells should seriously consider having the book reprinted in paperback for wider distribution. It is a rare gem!

Martin M. Crow and Clair C. Olson (eds.), *Chaucer Life-Records* (Austin, University of Texas Press, 1966, pp. XXVI, 629, out of print).

Reviewed by Vahe Baladouni
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GEOFFREY CHAUCER (1340? - 1400), one of the great geniuses of English literature, was for the most part of his life in public service in one way or another. The son of a prosperous London vintner, Chaucer took part in military expeditions abroad, served as justice of the peace, and was elected to Parliament. He was in the service of the crown as clerk of the king's works and later deputy forester of the royal forest. In his early years, he made several trips abroad, notably to France and Italy. Some of these may have been diplomatic missions for the king; others dealt with financial matters and commercial treaties. In June of 1374, Chaucer was appointed as controller of the great customs (wool and leather) in the port of London. In 1382, Chaucer was granted the additional post of controller of petty customs. He held these posts until 1386.

Over the past several decades, Chaucer scholars have compiled and published the life-records of this remarkable man and literary genius. One publication that commands attention is edited by Martin M. Crow and Clair C. Olson, *Chaucer Life-Records.* This work was published simultaneously by Oxford University Press and University of Texas Press in 1966. This volume, which is essentially a source-book, contains four hundred ninety-three records in the the original Latin or French. For the convenience of users, the records are brought under thirty-one chapter headings. The grouping of the records by subject makes the presentation both intelligible and interesting. A chronological table of these records is also provided in the appendix. The original records are to be found in the Public Record Office, London.

A source-book of this type would not only be incomplete, but also dangerously misleading if it did not provide adequate commentary. The purpose of such commentary is above all to show what inferences may or may not be drawn from the records. With this concern in mind, the editors have made every effort to provide an up-to-date commentary. The preface of the book informs the reader about the general plan, purpose, and methods of editing used.

Of primary interest to accounting historians is chapter nine: "Chaucer as Controller in the Port of London, 1374-1386." It is the longest chapter in the book covering one hundred twenty-three pages. Included in this chapter are the following records: (1) appointments of Chaucer as controller in the port of London; (2) Chaucer's use of deputy controllers; (3) the wool quay and Chaucer's colleagues there; (4) typical records illustrating Chaucer's work at the wool quay; (5) records arising from the audit at the exchequer; (6) Chaucer's retirement from the controllerships; appointments of his successors; (7) grant of wool forfeit to Chaucer. Information useful for purposes of accounting history are also to be found elsewhere in the book.

The study of these records may well further our understanding of business and accounting practices of the times. The volume contains records illustrating contemporary methods of bookkeeping. Two surviving particulars of accounts provide considerable and varied information on the port's activities, such as volume of business and number of merchants trading in the port of London. Insight can be gotten regarding the division of the record-keeping task. There is also a wealth of information concerning the audit of the various customs.

The examination of these records can be considerably helped by reading the following background material: Norman S. B. Gras, *The Early English Customs System* (Cambridge, Mass., 1918); Mabel H. Mills, "The Collectors of Customs," in W. A. Morris and J. R. Strayer, eds., *The English Government at Work, 1327-1336* (Cambridge, Mass., 1947), Volume II; Eileen Power, *The Wool Trade in English Medieval History* (London, 1941); Robert L. Baker, *The English Customs Service, 1307-1343: A Study of Medieval Administration* (Philadelphia, 1961); E. M. Carus-Wilson and Olive Coleman, *England's Export Trade,* 1275-1547 (Oxford, 1963).

Tito Antoni, *I Partitari Maiorchini del "Lou dels Pisans" Relativi al Commercio dei Pisani nelle Baleari (1304-1322 e 1353-1355),* (The Ledgers from Majorca of the "Arbitration of the Pisans" Concerning the Commerce of Pisa in the Balearic Islands (1304-1322 and 1353-1355), Pisa, Pacini Editore, 1977, pp. 77, Lire 4,500.

Reviewed by Alvero Martinelli
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Until now, there has been a total lack of any historical documentation supporting the thesis that the naval battle of Meloria in 1284 caused the definitive downfall of Pisa as a maritime power. Due to a combination of unusual circumstances, Tito Antoni was able to find two account books dealing with duties paid by Pisan merchants to the king of Majorca. The author had previously reported the exceptional importance of these records in a paper published in 1970 and, more thoroughly, in a speech delivered in 1973 at the First International Congress of Mediterranean History in Palma de Majorca.

In the first volume of the *King's Letters* kept in the Historical Archives of Majorca there is record of an agreement stipulated between King James II (1276-1311) with the Commune of Pisa, dated November 24, 1303, for the repayment of old damages caused by Pisan merchants to the citizens of Majorca, to solve the pending litigations and to allow Pisan citizens to travel to Majorca with full freedom and security. Among other things, the document also establishes that Pisan merchants had to pay on merchandise exported from the kingdom of Majorca a tax of one *denaro* for each *lira* of assessed value (later increased to four *denari*), and eight *denari* for merchandise imported to the kingdom. The monetary unit was the *lira* of Majorca divided into 20 *soldi* and 240 *denari*. However it was not a minted unit, only an abstract currency. Furthermore, it was established that the imposition of the duty had to be administered by two collectors, one appointed by the king and the other by the city of Pisa. The money received was then to be distributed among the citizens of Majorca who had suffered any loss caused by the Pisans. Therefore, it was necessary to establish an efficient accounting system with detailed entries for the proper application of this duty.

The two account books found by Tito Antoni and preserved in the Historical Archives of Majorca belonged to this system. The analysis of the oldest of the two books reveals, in a convincing way, how intense and well established was the commerce of Pisa with Majorca and the countries on the western Mediterranean sea from the year 1304 until 1322. The analysis made by the author of the second ledger kept during a short period following the Black Death (1353-1355) also reveals the great vitality of Pisa as an important center of commerce, particularly for the trade of raw materials so important for the industrial activities of the city.

A great portion of merchandise subject to the payment of the duty consisted of raw hides originating from Africa, Catalonia of and Tuscany. However one may also notice a large quantity of items of relatively little value. This has prompted the author to formulate the theory that during the first half of the fourteenth century there was a sharp fall in freights so as to allow the transportation of not-so-valuable commodities in addition to spices and cloth, which remained the richest and most desirable items in the international commerce.

There was a detailed record of all types of merchandise loaded and unloaded on foreign ships. Each Pisan merchant had a separate account where there is record of the quality, quantity and value of all commodities carried from, to, or through Majorca, and the amount of the duty to be paid. All the accounts in the ledgers are divided into two sections on the same page. On the left hand side of the account, usually running on three fourths of the same page, there is detailed record of the cargo, together with the name of the merchant and the route to be followed or the name of the place where the voyage originated. On the right hand side of the account, the accountant recorded the amount of the duty to be paid and, eventually, the date of its payment.

According to the author, the great contribution of these records to our knowledge is that they "allow us to know not only the accounting technique used for the collection of the tax, but also the quantity, quality and value of commodities traded by Pisan merchants in Majorca." An this trade, in volume and frequency of transactions, was much more important than anybody until now had thought.

This book raises new and interesting questions concerning the economic, social and political history of Pisa during a span of fifty years. In summary, Tito Antoni is quite successful in giving us a detailed and almost complete picture of the commercial life in Pisa during the first half of the fourteenth century.

Costouros, George J. *Accounting in the Golden Age of Greece: A Response to Socioeconomic Changes.* (Urbana, Illinois: Center for International Education and Research in Accounting, 1979, pp. 91, $5.00).

Reviewed by Frederic M. Stiner, Jr.
University of Maryland

One might believe that after centuries of study, it would be difficult to say something new about the Golden Age of Greece, when there were sensational developments in every area of human expression. Costouros has overcome this formidable barrier. He shows classical Greece, particularly Athens, at its zenith, generally considered to be the fifth and fourth centuries, B.C. The purpose of this book is to show the interplay between socioeconomic factors and accounting, and to do this, he ranges over many other centuries to illustrate various points. The author is exceptionally well qualified to write this book. He is a native of Greece, with training in business received in both Greece and the United States.

The book is in four principal parts. The first briefly reviews Athenian history and economics until 404 B.C., when Athens surrendered in the Peloponnesian War. The second part shows the influence of the accounting on the socioeconomic environment of Athens. The two crucial developments were coined money and the development of writing so that transactions could be measured and recorded.

With these two parts as a foundation, the third part of the book, "Development and Evolution of the Accounting Systems," achieves the author's purpose. This third part interprets the Athenian concept of the accounting entity, and the evolution of a central bank from the Temple of Athena. The fiscal system was without a comprehensive budget, but the Athenians controlled finances by restricting expenditures as the revenue was raised. There are exhibits (which Costouros draws from other scholarly sources) showing assessments and authorization for expenditures for various entities. The collection of the quotas assessed by cities is also shown. Loans and payments were recorded, as well as inventories made of state goods. (The partial inventory of the Parthenon for 422 B.C. would make any museum curator envious.) Drawing on Tod's work,[1] the statement of cash receipts and disbursements for the Delphi Temple in 377-374 B.C. (after the Athenian collapse, but before Philip of Macedon began uniting the Greeks) shows a list of interest received from cities and individuals, and receipts from lawsuits, pledges, and rentals. Expenditures were for salaries, freight, cows, golden petals, etc. Those interested in not-for-profit and governmental accounting should find this part of the text very rewarding.

The fourth and final part of the book, a meager six pages, has a succinct summary, and a few cautious conclusions as one might expect from work developed from a doctoral dissertation.

The author has so many tantalizing facts, he should not shrink from further work in applying Grecian insights to modern society. For example, why did the emergence of democracy not give a comprehensive budget for all entities of the entire state? Having begun with a religious base, what comparisons might be made with church accounting today? There were three boards of state accountants to audit magistrates: How does this compare to the attest function of today? Auditors in Greece at that time would make unannounced observations of mercenaries receiving their pay, to be sure that all on the payroll existed. What other audit techniques have existed for over 2,000 years? As the standard of living rises, must the state bureaucracy always expand, as it did in Athens?

A major flaw of the book is that there is no index, again perhaps a result of having been based upon a doctoral dissertation. The compression of history in the first part of the book does not allow for an elaboration of Athenian history, and I think the author should have emphasized that Athens was for many years an undisputed naval power. He is silent on the influence of trading ventures of the Athenians, and what effect this may have had on their accounting. For those completely unfamiliar with the period, I recommend Thucydides' *Peloponnesian War* as a necessary prerequisite reading.

This is one of the critical periods of western civilization, and this book should be useful to historians studying this period. Unless one is able to read Greek, this book will become a primary source to those who do not read Greek. The reviewer can only hope that Costouros will continue to draw on his knowledge of Greece and ancient sources to continue to produce books as interesting as this one.

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[1]M. N. Tod. *A Selection of Greek Historical Inscriptions,* vol. II. Oxford: The Clarendon Press, 1962.

[2]New York, Random House, 1951.

G. W. Dean and M. C. Wells, Editors, *Current Cost Accounting: Identifying the Issues* (Lancaster, England: International Center for Research in Accounting, University of Lancaster, 1977, pp. 196, £ 6.25).

Reviewed by Araya Debessay
University of Delaware

This book of readings contains articles, letters and editorials, numbering thirty seven, which are systematically classified into five parts: (1) Introduction, (2) Background to Current Cost Accounting (CCA), (3) Theoretical Issues, (4) Practical Issues, and (5) Overview. Except for one article which was specially commissioned for this publication, the rest have been published in academic and professional periodicals in the United Kingdom, Australia, the U. S., Canada and New Zealand, In spite of the apparent international flavor reflected in this collection, however, the main thrust of the articles is centered on attacking the CCA proposals issued in the United Kingdom, Australia and New Zealand.

The editors have set a two-fold objective for their publication: (a) to provide the reader with systematically collected and coordinated arguments against the adoption of CCA in an effort to counteract the "unprecedented kind of advocacy on the part of the accounting profession aimed at gaining widespread acceptance of CCA," and (b) to provide a historical perspective outlining the background of CCA.

Summaries of United Kingdom Exposure Draft (ED18), issued by the Inflation Accounting Steering Group, the Australian "Provisional Accounting Standards" and the U. S. Securities and Exchange Commission *ASR 190* are included in the Introduction with some supporting editorial comments from Australian and British journals.

The Background to Current Cost Accounting section contains 14 articles which are subdivided into (1) the origins, (2) the 1950's debates and (3) the 1970's debate. This section provides an excellent historical development and the ups and down CCA has passed through over the years. The editor's objective in this section appears to be to demonstrate the fact that what is hailed now as a new phenomenon by proponents of CCA is in fact a rehash of the same issues that have been raised as early as the turn of the century. It is obvious that the editors want to see the new proposed accounting reforms rejected much as they were rejected before. Clark's article which contains a fairly extensive bibliography provides a good summary and a comprehensive critical appraisal of the various proposed accounting reforms. Zeff's familiar article, "Replacement Cost — Member of the Family, Welcome Guest or Intruder?," is an excellent introduction to the theoretical frame-work of replacement cost accounting with a good review of the U. S. literature on the subject covering the period from late 1930's to the early 1960's.

The section dealing with the Theoretical Issues contains seven articles covering most of the substantive and controversial aspects of the proposed CCA systems. The central theme in these articles, which include two by Chambers and one by Edward Stamp, is that there are several conceptual problems with the proposed current cost accounting systems. Among the serious conceptual defects discussed by the various authors are: the problems associated with the "value-to-the-business" approach to valuation; the treatment of holding gains/losses on non-monetary items as well as the purchasing power gains/losses on monetary items in income determination; the failure of CCA to account for inflation as well as the problems of additivity inherent in CCA statements.

The Practical Issues section deals with the problems of implementing the proposed CCA systems, such as the problems in auditing CCA statements, the legal implications of changing valuation methods, the problems of computing depreciation and the treatment of backlog depreciation as well as the impact of technological change.

The book concludes with an Overview section that highlights the fact that the proposed CCA systems are beset with conceptual and practical problems that make them difficult to adopt. The selection of Rosenfield's article, "Current Replacement Value Accounting-A Dead End," in this section is quite indicative of the strong anti-CCA position of the editors.

The editors have done a commendable job at systematically collecting articles which tend to counter the enthusiasms expressed by proponents of current cost accounting. In this regard opponents of CCA will love this book.

This reviewer, however, believes that it is difficult to resolve the controversy between the proponents and opponents of the CCA without first defining the objectives of external financial reporting and identifying who the users of the information are and how the information is utilized in the users' decision model. This perhaps should be done in the context of the current thinking in portfolio theory and the empirical research that has given rise to the Efficient Market Hypothesis. No attempt is made by the editors to address these issues. And, except for Lemke's article which deals with the problem of technological change in producing an income figure with "predictive ability," most of the articles do not clearly specify a common objective. In this regard the contribution of this publication at resolving the "inflation accounting" controversy appears to be limited. To the extent that it provides researchers with a handy reference of the troublesome conceptual and practical problems with the currently proposed accounting reforms, however, this book is invaluable.

Vernon K. Zimmerman, (ed.), Written Contributions of Selected Accounting Practitioners, Vol. 2: Paul Grady (Urbana-Champaign: Centre for International Education and Research in Accounting University of Illinois, 1978, pp. X, 589, paper, $8.00).

Reviewed by Ray Anderson
Footscray Institute of Technology

This book contains some of the collected writings of Paul Grady. In 1918 Grady enrolled as a chemical engineering student at the University of Illinois. He obtained financial support for his studies through part-time employment at various cafeterias. As this was not compatible with his engineering studies Grady transferred in 1920 to the College of Commerce, and selected accounting as a major. In 1923 he joined Arthur Andersen & Co., becoming a partner in 1932. Whilst organizing the Naval Cost Inspection project during World War II, he was "removed" from the partnership of Arthur Andersen & Co. From 1943 to his retirement in 1960 he was a partner in Price Waterhouse & Co.

The first three chapters deal with the university background and the public accounting experiences of Grady. These chapters give us a fascinating glimpse into the auditing approaches of those times and the problems of accounting for public utilities. A potential area for research would be an examination of the historical development of accounting practices for such bodies.

In 1942 Grady was required to organize and develop the auditing function within the Naval Cost Inspection Service. This was concerned with the auditing of War Contracts and the book contains two published articles and one paper delivered to the 1942 American Institute of Accountants on his experiences in this area.

Chapters five to eight cover the period 1943 to 1960 whilst a partner at Price Waterhouse & Co. These chapters cover Grady's writings on auditing standards, internal control, regulatory accounting, public accounting as a career, price level accounting, current cost depreciation, the role of the CPA, management advisory services, work satisfaction, control of federal expenditures and the concept of depreciation.

Chapter nine covers the period from 1960 when Grady retired as a partner from Price Waterhouse & Co. This provides Grady's comments on a wide variety of accounting topics, especially current areas of concern such as the objectives of financial statements and purchasing power accounting.

The final chapter deals with one of Grady's major contributions to accounting literature, namely Accounting Research Study No. 7, Inventory of Generally Accepted Accounting Principles for Business Enterprises. Over 300,000 copies of the *Research Study* have been sold, a testimony to its value to both accounting practitioners and educators. This book is a welcome addition to the historical literature in accounting and The Center for International Education and Research in Accounting is to be commended for its wisdom in enticing Paul Grady to make available his writings for the benefit of present and future generations of accountants.

William B. Wolf, *Management and Consulting: An Introduction to James O. McKinsey,* (Ithaca, New York: New York State School of Industrial and Labor Relations, Cornell University, 1978, pp. viii, 112, $7.95)

Reviewed by Tonya K. Flesher
University of Mississippi

Accountants should look with great pride at the accomplishments of James O. McKinsey, and Wolf's book affords an excellent opportunity for such an appreciation. Dr. Wolf is a professor of personnel and human resources management and he states in the preface that this book was written for administrators, consultants, and students of management as a guide for management and consulting. However, the first section of the book deals with a brief biography of James O. McKinsey and in this section McKinsey's accounting achievements are revealed.

McKinsey's accounting career began in 1914 at St. Louis University where he studied and taught bookkeeping. Later, McKinsey received bachelors and masters degrees from the University of Chicago and became a CPA. Before he finished his degree, George Frazer, professor of accounting, asked him to join the accounting faculty. This was a typical experience for McKinsey commencing with his high school days, as he claimed that he was hired to teach in every school he attended before he attained his degree. Also, Frazer hired McKinsey to work in his public accounting firm. Frazer sent McKinsey to New York to establish an office of the firm and during this time McKinsey lectured in accounting at Columbia University. In 1921 he returned to the University of Chicago.

In 1919 McKinsey initiated his prolific writing career. One of these early publications was a teacher's guide to the Revenue Act of 1918. In 1920, he and A. C. Hodges wrote *Principles of Accounting* for the University of Chicago Press. Also in 1920, McKinsey published the first volume of *Bookkeeping and Accounting,* followed by the second volume a year later. These two volumes were written for secondary school students. McKinsey took a pioneering philosophy in accounting education through his emphasis on principles over techniques. He required the students to view accounting from the position of a manager rather than a bookkeeper because he felt that all educated people should be able to understand accounting data. McKinsey maintained that accounting was the equal of any university course in teaching students to reason analytically. McKinsey produced three books in 1922: one a case study; the two-volume *Financial Management;* and *Budgetary Control,* his classic dealing with the subject that is now described as Management by Objectives. In 1924, *Business Administration* and *Managerial Accounting* were released. Both of these works were pioneering efforts in the respective fields of policy and management accounting. That year was a significant turning point in McKinsey's career as his interests began to shift from accounting and budgeting to managerial accounting. He was later to move further away from accounting as he developed his interests in management. After 1927, he taught only business policy courses and devoted the remainder of his time to his consulting work in his own firm to the exclusion of research and other faculty activities. He was one of the first professors of business policy in America. However, before his break away from accounting McKinsey served as president of the American Association of University Instructors in Accounting (now AAA). He also authored *Accounting Principles* in 1929. This is the book now authored by Niswonger and Fess (in its twelfth edition). The descedant of his business policy text is today one of the most popular books in that field. Thus, McKinsey's contributions may still be found in accounting and business education in the fields of budgeting, managerial accounting, accounting principles, business policy and managerial finance. He is also remembered as the former chairman of the board of Marshall Field and Company and for the consulting firm which bears his name. This legacy was left by a man who died at the age of forty-eight.

The remainder of the book is a synthesis of McKinsey's approach to consulting and management. Thus, it is the first section which would be of interest to accounting historians, while the other four sections are of limited interest and appeal, in the opinion of this reviewer. There is, however, a two-page appendix listing the principal writings of James O. McKinsey. This book would serve as an excellent example and starting point for a similar research project analyzing McKinsey's approach to accounting and budgeting.

Richard Vangermeersch, FINANCIAL REPORTING TECHNIQUES IN 20 INDUSTRIAL COMPANIES SINCE 1861, (Gainesville: University Presses of Florida, 1979, pp. ix, 100, $17.25 North America, $19.25 elsewhere)

Reviewed by Earl K. Littrell
Willamette University

This volume describes and analyzes the financial reporting practices of 20 industrial companies from 1969 back as far as 109 years to 1861. (The book's title is a bit overstated since the median company first reported in 1902, for 68 years of coverage.) The format consists of text, annual report excerpts, and tables, with 7 general topic areas broken into 63 specific financial reporting practices. Cover-to-cover, it makes dry reading, although the resulting material is nonetheless of much potential use.

Although it is a strong tradition in scholarly articles in other disciplines, historical references are not the rule in accounting articles. Probably the main use for this material is to provide such historical reference material for accounting writers. After all, tracing the history of an issue is symbolic of having made at least some literature search, and in the future one would hope to find such references in accounting as automatically as one finds the Augustinian Mendel in the genetics literature.

Two examples illustrate this point. LIFO is commonly treated as born and reared in the 1960's and '70's. 10 of Vangermeersch's 20 companies use LIFO as of 1969, and they all made the LIFO adoption in the 1941-55 period (Table 15, pp. 84-5). Similarly, the long history of the funds statement is frequently ignored. One of Vangermeersch's companies has issued a "formal" funds statement since 1902, and by the 1940's 9 of the companies were providing at least "informal" funds statements (Table 27, p. 99).

However, the sample of companies is not nearly strong enough to extend "LIFO as a post-WWII issue" and "funds statement as a pre-1950 issue" to general rule status. Instead, the sample is a convenience sample, albeit attractive. The companies were selected ". . . because of the length of time they had been reporting, the completeness of their report files at (Harvard's) Baker Library, and the goal of covering companies in as many different industries as possible (p. ix)." Of course, the author is aware of the limitations inherent in his selection procedures, and in closing he proposes expanding the study to as many as 50 companies. Still, 50 does not approach the claim to "representativeness" that *Accounting Trends and Techniques* can make with some 600 companies.

Along the way, some attention is devoted to 1920's-style asset write-ups, direct entries to retained earnings, debit bias in extraordinary classifications, and other issues. Given the data limitations, the results are more intriguing than convincing.

Nonetheless, having this volume at hand could lead to significant improvement in the quality of much of the accounting literature. This prospect can be held out for few other accounting works of 100 pages or less.

Kathryn C. Bucker, *Littleton's Contribution to the Theory of Accountancy.* Research Monograph No. 62 (Atlanta, Georgia: College of Business Administration, Georgia State University, 1975, pp. 297, $10.00, U.S., $12.00 elsewhere).

Reviewed by Gadis J. Dillon
The University of Georgia

As the author notes in her introduction, it requires considerable time to find, read and appreciate the philosophy expressed in the many writings of a prolific author. This is especially true if the writings were published a number of years ago. In his career covering the period 1920-1966, Littleton had over 300 publications, many of which must be read to appreciate his basic philosophy and its implications. Buckner provides a concise summary, intended to "develop insight as to his consistency of treatment, the evaluation of his thoughts over the years, and his possible impact and influence upon the development of accounting thought." (p. 5)

The bulk of the volume is devoted to a chronological review of Littleton's works on: 1) basic approach and views on accounting principles; 2) income determination as the central theme of accounting; and 3) the prestige of historical cost. An appendix provides a chronological listing of all Littleton's publications. Another appendix provides a brief biography.

Buckner does a thorough job of summarizing Littleton's positions with respect to the above areas. This summary should be useful to anyone seeking an understanding of the evolution of accounting thought in the period 1925-1960. Certainly Littleton provided an articulate and consistent theoretical foundation for many of the accounting procedures adopted by the accounting profession during his professional career.

There is no question that Littleton was a major contributor to accounting development. Furthermore Buckner obviously admires Littleton, which is not unusual given the extensive time and effort spent reviewing his life and writings. However, Buckner may impute to Littleton more influence than warranted. For example, in noting Littleton's unyielding support of historical cost, she concludes that "If Littleton had been more flexible in his view, it is possible that certain changes which are taking place today might have already been an integral part of today's body of accounting theory and practice." (p. 219) Littleton was indeed a leading advocate of historical cost, but his or any other one individual's defection would have had little impact on its universal adoption and use.

Overall, this volume provides an excellent and extensive summary of the positions and philosophy of a leading contributor to the accounting literature of the twentieth century. The listing of Littleton's published works and the bibliography are also helpful. Anyone without access to or time for reading Littleton's publications in the original will find this volume interesting and useful.

Maureen H. Berry, Editor
UNIVERSITY OF ILLINOIS

DOCTORAL RESEARCH

The main emphasis in this edition of doctoral research review is on finance: both public and private and from the viewpoints of both investors and investees. We commence with Hartl's survey of risks and returns to corporate bondholders during the period 1950-1974. Traditionally, investors have considered well-rated corporate bonds as a safe and lucrative investment and, with respect to safety at lest, Hartl's research confirmed this. It was another story, however, with respect to returns. On the average, investment grade bonds returned only 2.71 percent over the twenty-five year period reviewed—which could be a significant finding for those investors attracted to corporate bonds because of the unprecedentedly high yields in recent years. We shift the focus from the lender to the borrower and from the domestic to the overseas markets and look at the Brazilian experience with private external borrowing. Moura's research examined portfolio capital behavior in a large developing country, concentrating on private sector active borrowing in external financial markets, and found strong interrelationships between the stock of foreign debt and the level of domestic income.

From the private sector, we move on to examine borrowing at the macro level. Feldstein's study of New York's municipal debt structure during the period 1962-72 highlighted the key role played by the mayor in deciding how to finance the operating and capital needs of the city. Using a variety of data sources, including eight case studies, Feldstein showed that the traditional use of property taxes and long-term financing for operating and capital needs were, time after time, rejected in favor of the politically expedient issue of short-term debt. Municipal debt is, of course, an integral part of public budgeting. Once again we travel overseas: this time to review Shahroodi's study of the Iranian budgetary system during the years 1960-1976 when it progressed from a typical line-item structure towards a more program budget orientation. However, the system still had a long way to go towards reaching program budget status and Shahroodi's recommendations for improvement included increased involvement by the people and by the parliament.

For a change of pace, we conclude with two studies of issues involving CPAs: Smith's research on the development of the concept of privileged communication between a CPA and his client and Kimbell's study of third party liability in the performance of the audit function.

Investor Experience in Corporate Bonds, 1950-1974 (University of Arkansas, 1978; 39/6, pp. 3725-6-A)[1] by Robert James Hartl. The major objective of this study was to help investment decision-makers by providing them with historical information about the risks and returns to corporate bondholders. Risks were classified as: (1) call risk (the risk of early redemption); (2) interest rate risk (the risk of rising interest rates); and (3) default risk (failure to meet principal and interest payments.) Bond returns promised were compared with the return realized: the latter category including both paper capital gains and losses and coupon interest. As a secondary objective, the author was also interested in developing trend or characteristics information from the historical structure of the corporate bond market and this was used as background for the risk-return research.

The study covered the time period 1950 through 1974, years earlier than 1950 being excluded on the grounds that earlier periods would not be representative of current economic conditions. For purposes of researching market structure, all United States corporation bonds, regardless of type, were included. Only straight bonds of non-financial corporations which Moody's Investors Services Inc. rated investment quality were included in the risks and returns analysis.

With respect to the structure of the corporate bond market, it was found that the relative importance of publicly issued and privately placed bonds has varied considerably. Also that there is a concentration of corporate bond ownership in the hands of individuals, life insurance companies, and pension funds.

In reviewing risks and returns, three distinctions were made: long-term versus short-term maturity; industry of issue (industrial, public utility, and transportation); and investment quality (Aaa, Aa, and Baa ratings). The research findings were that, with respect to maturity, short-term corporate bonds provided greater realized returns and incurred less risk than long-term bonds. Differences were not large when the type of industry was considered. However,

[1]*Dissertation Abstracts International* volume and page references.

greater returns and, at the same time, greater risk was associated with transportation bonds. In practically every instance, risk and return were inversely related to investment quality.

The research findings were that interest rate risk was more significant than either default or call risk. Default experience was insignificant: especially with respect to investment quality issues. For bonds originally rated Baa or higher, no material contractual defaults were identified, with the exception of a few railroad issues. Call risk was greater in that about 12 per cent of all investment quality issues were retired prior to the original maturity date. A significant research finding was that the average annual return on investment grade corporate bonds was only 2.71 per cent despite the fact that corporate bonds have been considered by investors to be a lucrative and safe investment medium.

Private External Borrowing: The Brazilian Experience (Stanford University, 1978; 39/6, pp. 3727-8-A) by Alkimar Ribeiro Moura. The research objective was to analyze the process of capital transfer to a large developing country, using the Brazilian experience as a case study. The emphasis was on behavior of portfolio capital with special focus on the emergence of the private sector as an active borrower in external financial markets.

The background to the study is the fact that in order to accelerate its rate of growth of output, Brazil's economic policy has, since 1964, and particularly after 1967-8, been oriented toward the absorption of foreign real resources. Inflows of autonomous capital (foreign direct investment and/or portfolio investment), as well as changes in the country's stock of external assets and liabilities, have constituted the financial counterpart of this movement of goods and services. During the period 1968-74, the economy expanded vigorously and the inflow of foreign financial capital was of such magnitude that, of all developing nations, Brazil became the largest recipient of resources from OECD countries and international agencies.

The research included the following basic steps: determination of capital flows; construction of a portfolio distribution model; and derivation of a system of reduced-form equations. The basic determination of capital flows was made from demand conditions in the borrowing economy. The portfolio distribution model, constructed to explain how a Brazilian firm might select the optimal composition of its liabilities given that it had access to both foreign and domestic credit, took into consideration some of the mechanisms for adjusting to foreign-capital inflows to the domestic economy. Independent variables were: the level of domestic income, the monetary base, the Eurodollar rate, the expected rate of change in the price differential between Brazil and the United States, the level of foreign reserves, and the current account balance. The dependent variable was the desired stock of foreign liabilities held by Brazilian firms. To estimate the equation, ordinary least squares regression techniques were used with quarterly observations for the period 1969-1976.

The theoretical hypotheses underlying the model were, in general, confirmed. The stock of foreign debt was found to be highly sensitive to the level of domestic income, other explanatory variables including: the level of monetary base; the Eurodollar rate; and the expected rate of change in the price differential between Brazil and the United States.

The Politics of the Municipal Debt Structure in New York City (1962-1972) (Columbia University, 1976; 39/9, pp. 5644-5-A) by Sylvan Gary Feldstein. Municipal debt has become increasingly important as a claimant on limited revenue resources of cities and the objective of this study was to learn about the politics of choosing city finance methods. For the ten-year period reviewed, New York City raised billions of dollars through funded and temporary financing mechanisms without significant political opposition. The major finding was that the city's mayors played a dominant role in municipal debt decision making without conflicts with or challenges from such other power centers as: politicians, bankers, and bond investors. Further, that given the alternatives of raising taxes or reducing personnel and services, the mayors to an increasing degree used debt to finance municipal operating expenses. The data base consulted by the author included the city comptroller's reports, finance department documents, budget director statements, books and articles, interest group documents, personal interviews, and eight case studies. The case studies were the following: (1) the decision, in 1965, to borrow money to finance city employee pensions (Borrow-Now Pay Later for Pensions: 1965); (2) the 1969 decision to use bond money to finance anti-poverty training programs (Financing Manpower Training Programs, 1969); (3) accounting for the police parity settlement in 1971 through the capital budget (Police Parity Payment: 1971); (4) bond money subsidies in 1971 and 1972 to stabilize the subway fare (Saving the 30¢ Subway Fare: 1972); (5) the 1965 change in the New York

State's local finance law allowing the mayor to borrow additional funds (The Revenue Gap; Spring, 1965); (6) the city's issuance of short-term debt in 1969 for the New York City Housing Authority (Using Capital Notes for the Housing Authority: 1969); (7) reasons for the change in the "budget note" finance law in 1971 that allowed the mayor to issue additional notes (Raising the Budget Note Limit: 1971); and (8) why the mayor relied upon short-term borrowing for the city's middle-income housing program instead of issuing long-term bonds (Low Rents, Short-Term Financing, and the City's Middle-Income Housing Program).

The Iranian Budgetary System and Patterns of Government Expenditures, 1960-1976 (Syracuse University, 1978; 39/8, p. 5070-A) by Mohammed Reza Shahroodi. The Iranian budgetary system is the subject of this study: its origin, evaluation, integration with economic planning, and present shortcomings. The research also sought ways of further improving the system within the framework of program budgeting. Following analysis of the budget system, the author examined various individual components: revenues and expenditures; sources of deficit financing; relative shares and growth of expenditure categories, and also looked at the factors which influenced the growth of government expenditures over the last two decades.

Until it was integrated with economic planning in 1965, the Iranian budgetary system had been based on a traditional model since its inception in 1911. That is, it was concerned only with measuring revenues and expenditures without considering the related economic objectives. Further, unbalanced economic growth over this period could be traced to the fact that government investment projects, carried out by various government enterprises with conflicting objectives, were excluded from the budget. After 1965, the system underwent some drastic changes which led to improvements in the scope and contents of annual budgets. Despite the fact that these changes were referred to in the context of program budgeting, they in fact fell short of such a system and, unless these inadequacies were remedied, the author felt that there would be continued failure to meet goals.

The following recommendations were offered for improving the budgetary system: (1) more effective coordination between the groups on matters of program objectives, investment decisions, pricing policies, and budgetary procedures in order to avoid conflicting objectives and waste in public organizations; (2) the development of a series of output measures for evaluating program performance; (3) multi-year budgeting, using alternative macroeconomic assumptions, in order to provide consistency between successive annual budgets; (4) cost-benefit analysis of public programs to ensure efficient resource allocation; and (5) increased public involvement in the budgetary process and parliamentary control over the budget.

An Investigation Into Accountant-Client Privileged Communications in the Courtroom (University of Arkansas, 1978; 39/6, p. 3664-A) by George Stevenson Smith. The purpose of this study was to analyze the development of the concept of confidentiality, or privileged communication, between the certified public accountant (CPA) and his client. This broad goal was organized into the following activities: (1) tracing the historical development of privileged communications in the accounting profession and contrasting and comparing it with the experience of other professions, such as law, medicine, and ecclesiasticism; (2) analyzing state statutes, by way of court cases, which have established this privilege for CPAs; (3) determining the attitudes of CPAs, attorneys, and clients of CPAs toward the right of the accounting profession to have privileged communications, and its effect on the relationships between these three groups; (4) determining, through surveys and interviews, the position of State CPA Societies concerning sponsorship of legislation granting privileged information rights to accountants; and (5) arriving at a conclusion as to whether the accounting profession should support CPA-client privileged communications.

Research commenced with a review of the pertinent literature, court cases, and state laws. Privilege legislation had its origins in the early part of this century when accountants began to seek legal means of enforcing membership practices. A great deal of diversity was found in the way in which such statutes were enacted and interpreted by state-level courts. A Likert-type questionnaire, mailed to 1,800 randomly selected members of the American Institute of CPAs, attorneys listed in the *Martindale-Hubbell Law Directory,* and corporations listed in *Standard & Poor's Register of Corporations,* was used to assess attitudes towards the concept of privileged communications. The response rate, from all three groups together, was 64 per cent, all indicating sympathy for CPA-client privilege in the courtroom—this sympathy being most strongly expressed with respect to the tax area.

The null hypothesis was that there was no significant difference in attitudes as measured by statement mean scores of the groups.

The statistical analysis used ANOVA and Chi-Square. If a statement appeared on all three questionnaires and a significant relationship was found, a *t* test was used for making a multiple non-independent significance test among the three means. The analysis showed that the potential for disagreement existed most strongly between the CPAs and clients. Based on these findings, the following recommendations were offered: (1) that the CPA-client privilege should be restricted to tax practice; (2) that the effort to confine privilege in state statutes to the tax area should be initiated by the American Institute of CPAs; and (3) that the accounting profession should, at both the state and federal level, attempt to achieve CPA-client privilege in the federal tax area.

The Nature and Extent of Auditor Liability to the Third Party in the Performance of the Audit Function During the Period 1972 Through 1976 (Louisiana Tech University, 1978; 39/7, p. 4341-A) by James Albert Kimbell, Jr. The research goal was to determine the status of auditor liability to a third party, usually an investor, in the performance of the audit function during the period 1972-76. The following research questions formed the basis for the study: (1) what is the current status of auditor liability to the third party for gross negligence?; (2) what is the current status of auditor liability to the third party for ordinary negligence?; (3) What constitutes aiding and abetting under the federal statutes?; (4) is scienter a necessary requirement for bringing an action under the federal statutes?; (5) what constitutes reliance under the federal statutes?; (6) what is the current status of the "purchaser-seller" requirement of Rule 10b-5?; (7) how have the courts interpreted the "in-connection-with" requirement of Rule 10b-5?; (8) how have the courts interpreted the question of "particularity" in pleadings?; (9) how have the courts interpreted the question of materiality under the federal statutes?; (10) does auditor compliance with generally accepted auditing standards discharge auditor responsibility to third parties?; and (11) what are the critical problems of auditor liability for the future?

Research on these questions was carried out by reviewing common law and statutory law case rulings and consulting with General Counsel of the "Big Eight" public accounting firms. The bases for findings, suggestions for additional research, and suggested implications of the study emanated from the courts' interpretations and rulings during the period 1972-76. The research findings were that the courts have increased the auditor's responsibility to third parties through their interpretations of the federal securities laws, and that the greatest area of remedy for third parties has been the auditor's aiding and abetting of an injury. The extent of such liability has, however, been limited by legal requirements of particularity in alleged misrepresentations, the limitation of those alleged to be injured purchasers or sellers, and the requirement of knowledge (scienter) on the part of the auditor. The author suggests that: there is a need for continually monitoring court rulings to determine whether auditor-third-party liability has changed and the extent and reason for any such change.; that the auditor should communicate the intent of the audit function and auditor's certificate; and a consensus standardization of auditing procedures and disclosures as well as a review of the intent and language of the auditor's certificate.

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As 1980 will also be the centenary year of The Institute of Chartered Accountants in England and Wales, London is particularly appropriate for the Third Congress.

Congress registration fee is £25. Accommodations are available at London Business School at cost of £98, inclusive of all meals except special Congress Dinner on August 16. Program applications are available from:

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TABLE OF CONTENTS

JULY, 1980

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