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## LYMAN MILLS AND ITS ENCOUNTER WITH PUBLIC ACCOUNTANTS' INVENTORY COSTING CIRCA 1920

*Abstract:* This paper addresses the schedule of cost of goods manufactured and the income statement of Lyman Mills (LM) for the year 1917. They were prepared by CPAs at the request of LM, based on the books of account and its accounting system dating from the 1850s. This system was described, but not perfectly enough, in Johnson and Kaplan's *Relevance Lost* [1987]. This paper compares the schedule of cost of goods manufactured and income statement prepared by CPAs with the accounts in LM's ledger summarizing its costs and performance. It leads to the conclusion that the traditional accounting system of LM was a complete accounting system different from but comparable to today's accounting systems.

### INTRODUCTION

A report dated July 14, 1924 prepared by certified public accountants for Lyman Mills (LM) is found in the LM Collection housed in the Baker Library at the Harvard Business School. The report was prepared by the accounting firm Stewart, Watts & Bollong (SW&B) of Boston. Two of the three persons who constituted the firm, Andrew Stewart and Elbridge A. Bollong, were CPAs.<sup>1</sup> The title is *Report on the Special Examination Made for the Purpose of Adjusting the Federal Tax Returns from 1917 to 1923, Inclusive* [LM Collection, AC-1].

The report is composed of a nine-page text and 51 pages of appendices. Of the latter 51 pages, 44 are dedicated to the finan-

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<sup>1</sup>According to Kistler [1978], the society of public accountants in Massachusetts was founded in 1900, and the CPA Act in Massachusetts was enacted in 1909. The name of Andrew Stewart is found in the advertisements listing the entire membership of the Incorporated Public Accountants of Massachusetts inserted in the Boston City Directory in 1911 and 1912, inserted between pp. 162 and 163 of Kistler [1978].

cial statements of LM: two pages are for the year 1916 and six pages are devoted to each of the seven years from 1917 to 1923. The financial statements of each of the last seven years are the following:

Exhibit A: Adjusted Balance Sheet.

Exhibit A – Schedule 1: Details of Original and Adjusted Balance Sheets.

Exhibit B: Profit & Loss Statement.

Exhibit B – Schedule 1: Cost of Goods Sold.

Exhibit C: Analysis of Surplus.

Exhibit D: Reconciliation of Net Profit as per Books with Net Profit as per Exhibit B and Net Income as per Amended Tax Return (or Tax Return Filed for the years 1922 and 1923).

The statements were prepared based on LM's books of account and source documents, on the one hand; in accordance with the accounting methods prescribed by the U.S. tax laws, on the other. Therefore, the statements permit a clear comparison between the accounting practices found in LM's books of account and those imposed by the tax laws.

As will be seen later, profit at LM was basically determined in the two trading accounts in the ledger, which was the practice maintained from its early years. LM's accounting system in the 1850s, treated in Johnson's article [1972] and Johnson and Kaplan's (J&K) *Relevance Lost* [1987], continued to be in use until well after 1900. The accounting records of LM "include a double-entry general ledger...kept by the treasurer at the home office in Boston, as well as a double-entry factory ledger...kept by the mill agent in Holyoke" [Johnson, 1972, p. 469; J&K, 1987, p. 24]. Each ledger contains two mill accounts. Johnson [1972, p. 471] describes the mill accounts in the home office (general) ledger and the factory ledger as follows:

Although the amounts charged to the respective mill accounts for cotton, factory labor, and factory overhead are identical in the general ledger and the factory ledger, only the mill accounts in the factory ledger resemble modern work-in-process control accounts. Unlike work-in-process accounts, the Lyman general ledger's mill accounts contain entries for non-manufacturing expenses and sales in addition to entries for manufacturing expenses. Consequently, the mill accounts in the general ledger resemble those early nineteenth-century trading accounts which Littleton and other authorities

described as the 'bridge' between mercantile book-keeping and modern cost accounting. These accounts provide profit and loss data useful in determining the semi-annual dividend to shareholders,...

The above observation might be summarized into the following three points. First, each of the two mill accounts in the factory ledger has a corresponding account in the home office (general) ledger; the entries for manufacturing expenses are the same. Second, while the factory ledger mill accounts recorded only manufacturing expenses, the mill accounts in the home office ledger record "non-manufacturing expenses and sales in addition to manufacturing expenses" and "provide profit and loss data." Third, Johnson associates the factory ledger mill accounts with modern work-in-process accounts and the home office mill accounts with traditional trading accounts.

This paper focuses on the traditional mill trading accounts in the home office ledger in which are recorded manufacturing expenses, non-manufacturing expenses, sales, and resultant profit or loss. Although Johnson does not specify this in the passage quoted above, the mill trading accounts in the home office ledger are inventory accounts and, as will be seen later, they record the beginning and ending finished goods inventories. Such inventory accounts served as trading accounts which Dicksee [1921, p. 93] described as "partly real, and partly nominal." LM's accounting system including traditional mill trading accounts was maintained until well after 1900 and, thus, confronted the early federal income tax laws.

According to Klein [1929, pp. 5-9], the corporate excise tax, "the forerunner of the true income tax measure," was created in 1909. "It imposed a tax of 1% on the net income of corporations, above an exemption of \$5,000.00." "The imposition of a federal income tax without apportionment" was made constitutional by the Sixteenth Amendment adopted by Congress in 1911 and declared ratified on February 25, 1913, following appropriate action by the states. The resultant 1913 income tax law "imposed a normal and a graded tax (surtax) on individuals and a flat tax on corporations." Under the 1913 law, "the exemption of \$5,000.00 allowed to corporations under the Corporation Excise Act of 1909 was discontinued, but the tax rate of 1% remained unchanged." In 1916, the tax rate for corporations was increased to 2%. In 1917, income taxation was intensified as the Revenue Act of 1917 which increased the tax rate for corporations to 6%, "by adding a 4% tax to the 2% tax provided by the 1916 Act."

The rate was further increased to 12% by the Revenue Act of 1918. Also, as a war measure, the excess profits tax on business income was created by the 1917 Act, the rates of which "were made to run as high as 60%." The excess profits tax was continued until the year 1921.

Previts and Merino [1998, p. 182] noted: "The tax law not only expanded the markets for accounting services but also greatly facilitated acceptance of techniques, such as depreciation,..." LM was far from accepting the modern accounting methods imposed by the tax laws. But LM needed public accountants' services all the more because it could not adapt to the modern methods. The report by SW&B notes that LM was obliged to pay additional income and excess profits taxes for the five years from 1917 to 1921.<sup>2</sup> The total additional taxes for the five years amounted to \$255,742.67, while the total taxes originally paid were \$942,444.93. The report says:

The additional taxes due to the Government as shown above are caused chiefly by the following adjustments necessitated by the requirements of the tax law and regulations of the Internal Revenue Department.

1. Increase in income, due to the refiguring of inventories from an arbitrary basis to the basis prescribed by the Department, which was cost or market, whichever was lower.
2. Disallowance of capital items claimed as repairs on the original returns filed.
3. Disallowance of donations and inallowable reserves claimed as deductions on original returns filed.

The financial statements in the report were prepared in accordance with the above requirements and regulations and used to prepare the tax returns. It may be confirmed that the duplicates of the tax returns for the years 1922 through 1925 found in a box [AB-4] in the LM Collection were prepared based on the data on the financial statements prepared by SW&B. Regarding the years 1917 through 1921 that were the object of the additional taxes, box AB-4 contains only the original tax returns. However, it seems certain that the public accountants' financial statements were also used for the years 1917 through 1921 to prepare the amended tax returns. In the same box, a letter, dated

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<sup>2</sup>The profit and loss account of LM's home office ledger [LM Collection, CA-7] records the payments of income taxes from the 1909 corporate excise tax.

July 19, 1926, from the Internal Revenue Service is found that indicates LM's amended tax returns had been accepted based on the examinations made in the years 1922 and 1923.

Therefore, the financial statements that are included in the report are those that were already used to prepare the tax returns. Of the six kinds of statements presented earlier, Exhibit D: Reconciliation of Net Profit as per Books with Net Profit as per Exhibit B and Net Income as per Amended Tax Return (or Tax Return Filed for the years 1922 and 1923) details the points of difference between the profit calculation made in LM's books of account and that made by the following two statements: Exhibit B – Schedule 1: Cost of Goods Sold and Exhibit B: Profit and Loss Statement. Those two statements were prepared in accordance with the modern accounting methods that are summarized into the three points noted in the above quotation but not considering the treatments peculiar to taxation. Therefore, the differences between the financial statements and tax return are further specified in Exhibit D. The main part of this paper is dedicated to the comparison between the profit calculation made in LM's books of account and that found in the public accountants' schedule of cost of goods sold and profit and loss statement focusing on the year 1917.

As will be seen later, LM's profit measurement was mostly performed in the two mill trading accounts in the home office ledger. Therefore, most of the points of difference specified by Exhibit D relate to those between LM's mill trading accounts and the public accountants' schedule of cost of goods sold and profit and loss statement. Differences stem from the three points made by the report. Of the three points, as will be seen later, the second point relates to accrual and depreciation accounting. The first point, namely the lower-of-cost-or-market method, affected LM's accounting practices as inventory costing procedures. More specifically, it concerns the distinction between inventoriable costs and period costs presupposed by inventory costing. The public accountants prepared two distinct statements: Cost of Goods Sold and Profit and Loss Statement. Although the former ends and the latter begins with the cost of goods sold, they essentially reflect formats of today's schedule of cost of goods manufactured and income statement, respectively. Inventoriable costs and period costs were clearly distinguished by the public accountants. Only manufacturing costs were treated as inventoriable in the cost of goods sold schedule. By contrast, as Johnson's observation quoted earlier indicates, LM's mill trading accounts recorded both manufacturing and non-manufactur-

ing costs, which suggests inventoriable costs and period costs were not distinguished. It further means that cost and financial accounting were not differentiated. Under the traditional accounting system, which is characterized by the use of trading accounts, cost and financial accounting were not differentiated, but those records were kept within a double-entry framework sufficient to prepare a modern cost of goods manufactured schedule or Exhibit B – Schedule 1. Under the traditional accounting system also, cost data were used to determine profit to be distributed to shareholders. They were used, in today's sense, for financial accounting purposes. The nature of the traditional accounting system just outlined will be made clearer through the examinations to be made in this paper which will also suggest that the traditional accounting system was a complete accounting system comparable to today.

We have studies [Miranti, 1990; Previts and Merino, 1998; Kern, 2000] that describe the role played by federal income taxes and public accountants in the making of modern accounting after 1900. However, they deal with only the modern accounting methods and their formation. They do not describe the nature of the accounting practice that prevailed when modern accounting emerged. Modern accounting did not develop in a vacuum. The LM case treated in this paper presents an instance that details the accounting methodology with which modern accounting methods had to contend. The LM case suggests that early U.S. income tax laws and public accountants encountered an accounting system characterized by trading accounts. LM was not unique. Previts and Merino [1998, p. 212] mention an episode in 1917, where a member of American Institute of Accountants was accused of "certifying a misleading statement," namely a "mixed merchandise account" (synonymous with "trading account" in mercantile accounting), but not sanctioned. They also suggest that "as late as 1928," accounting textbooks often referred to "the mixed merchandise account."

J&K [1987, p. 130] contended: "The inventory costing procedures adopted by public accountants after the turn of the century had a profound effect on management accounting." This "profound effect" is the famous "relevance lost." However, it should be noted that J&K did not present a single case study that showed what accounting practice public accountants in practice actually faced. They could only speculate. They presented many historical cases in *Relevance Lost*, but they did not present a single case proving their main thesis, namely the "lost relevance." The LM case as treated in this paper demon-

strates the accounting practice that public accountants actually faced.

Public accountants' inventory costing clashed with the traditional accounting system's use of trading accounts at LM. As noted earlier, Johnson [1972] recognized that the mill accounts in LM's home office ledger were trading accounts characteristic of premodern accounting practices. Nevertheless, he associated the mill accounts in the factory ledger with "modern work-in-process control accounts" and interpreted LM's entire accounting system as centering on the factory ledger mill accounts. Johnson should have noticed that the factory ledger mill accounts recorded neither the beginning nor the ending balance while the mill trading accounts in the home office ledger recorded both. The specimen home office and factory ledger mill accounts inserted in J&K [1987, pp. 26-27] illustrate this situation. Can accounts that record no balance be work-in-process accounts, inventory accounts, in a double-entry bookkeeping system?

The fact is that the factory ledger mill accounts were inventory accounts but incomplete ones. The data in these incomplete inventory accounts in the factory ledger were transferred to the home office ledger and became part of the complete inventory accounts, namely the mill trading accounts. Therefore, it is the mill trading accounts in the home office ledger that should be associated with modern work-in-process accounts. This transfer process can not be understood without the understanding of the real relationships between LM's home office and factory ledgers which Johnson [1972] and J&K [1987] failed to recognize. This relates to another aspect of the traditional accounting system that is described by Fujimura [1998]. The version represented by LM is detailed in Fujimura [2003]. But describing this aspect of the traditional accounting system goes beyond the scope of this paper. What can be said here is that LM's accounting system should not be understood based on the factory ledger mill accounts that were allowed to remain in an incomplete state. It should also be noted that because the factory ledger mill accounts recorded no balances, none of their records appeared on the balance sheet. Only the balances of the mill trading accounts in the home office ledger were reproduced in the balance sheet. Therefore, only the accounting practices found in the mill trading accounts in the home office ledger can be compared with public accountants' inventory costing. Those found in the factory ledger mill accounts cannot. Johnson [1972] and J&K [1987] focused on the wrong site; this paper focuses alternatively on the

mill trading accounts in the home office ledger.

### AN OVERVIEW OF THE RECORDS IN LM'S LEDGER AND THE PUBLIC ACCOUNTANTS' FINANCIAL STATEMENTS

Table 1 charts data on profit levels recorded in the report by SW&B. The total differences in the first five years between the taxable incomes determined by the original and amended returns brought about \$255,742.67 of additional taxes as noted earlier. Of the two columns under the title "Net Profits," the one designated "Exhibit B" shows the net profit determined in "Exhibit B: Profit & Loss Statement" for each year from 1917 to 1923, more specifically the "Net Profit before Deducting Federal Income and Profit Taxes."<sup>3</sup> The column "Books" is the amount shown as "Net Profit as per books" in Exhibit D for each year from 1917 to 1923. As noted earlier, each Exhibit D records, other than this "Net Profit as per books," "Net Profit as per Exhibit B" and "Net Income as per Amended Tax Return (or Tax Return)," as well as the factors that cause the differences among these three calculations of profit. According to Exhibit Ds, the difference between the last two kinds of profit stems from only two minor factors – "Contribution disallowed" that was not deductible for tax purposes and "Interest on Obligations of U.S. Exempt from Taxation." They are, e.g., in 1917, (add) \$10.00 and (deduct) \$1,050.00, respectively.

**TABLE 1**  
**Taxable Incomes and Net Profits: 1917-1923**

	Taxable Income		Net Profits	
	Original Return	Amended Return	Exhibit B	Books
1917	\$ 426,097.15	\$ 629,906.67	\$ 630,946.67	\$ 180,402.63
1918	858,254.30	1,049,097.88	1,041,503.45	492,655.11
1919	1,124,210.61	1,288,396.40	1,290,171.40	443,626.18
1920	182,671.53	365,352.26	366,157.99	- 421,799.11
1921	444,354.76	915,585.65	916,151.22	267,167.44
1922	_____	_____	208,978.51	616,191.94
1923	_____	_____	109,169.67	233,100.34

Note: Prepared based on the data in *Report on the Special Examination Made for the Purpose of Adjusting the Federal Tax Return from 1917 to 1923, Inclusive* (LM Collection, AC-1).

<sup>3</sup>"Profits Taxes" indicates the excess profits taxes.



The comparison between the profits in the columns "Original Return" and "Books" indicates that LM had much larger amounts of taxable income than book profits, suggesting that the firm sincerely addressed the requirements of the tax laws. In order to prepare acceptable tax returns, the data in LM's books must have been modified strictly in accordance with modern accounting methods. Then, LM had recourse to the services of public accountants, and SW&B prepared the financial statements reproduced in their report.

The report says: "No increase in tax for the years 1922 and 1923 is anticipated for the reason that tax paid was computed on the basis prescribed by the Revenue Agent for the years 1917 to 1921." However, still, no change occurred in LM's accounting practices in 1922 and 1923 as evidenced by the public accountants' Exhibit Ds for the those years and suggested by the largely different amounts recorded in the columns "Exhibit B" and "Books." The financial statements prepared by the public accountants were used only for tax purposes. This situation continued until 1926. Then, at last, in the first six-month accounting period of 1927, LM took the first step to accept modern accounting methods. However, in the second six-month accounting period of 1927, LM's land, building, and machinery were sold and its liquidation began.<sup>4</sup>

Table 2 is a reproduction of the report's Exhibit A – Schedule 1 for the year 1917. It constitutes comparative balance sheets showing the data in LM's ledger (the column "BOOKS") and the data rectified or adjusted in compliance with the tax law (the column "ADJUSTED") which were originally recorded in "Exhibit A: Adjusted Balance Sheet." Table 2 exposes the presence of enormous secret reserves in LM's books. The difference between the surpluses determined by the public accountants and recorded in the books, \$2,113,872.47, represents secret reserves, a little less than half of which is accounted for by the understatement of inventories and a little more than half by the understatement of fixed assets.

It was LM's usual practice to write off newly constructed fixed assets immediately and to write down arbitrarily the fixed assets recorded in its "Real Estate and Machinery"

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<sup>4</sup>This paragraph's remarks are based on, other than those in AC-1, the documents in boxes AB-3 and AC-2 in the LM Collection. The first step was the adoption of the lower-of-cost-or-market method [AB-3]. The documents in AB-3 contain too much useful information to refer to more in a few words. Another paper would be needed.

TABLE 2

**Exhibit A – Schedule 1: Details of Original and Adjusted  
Balance Sheets, December 31, 1917**

<i>ASSETS</i>	<i>BOOKS.</i>	<i>DR</i>	<i>CR</i>	<i>ADJUSTED</i>
Cash	\$ 258,844.14			\$258,844.14
Accounts Receivable	701,137.82			701,137.82
Inventories:				
Raw Cotton	1,084,696.06	312,791.52		1,397,487.58
Goods in Process		412,837.60		412,837.60
Finished Goods	51,982.35	196,565.22		248,547.57
Supplies:				
Cloth Room	9,509.29	2,377.32		11,886.61
Fuel	14,433.49			14,433.49
Starch	25,329.14	6,332.28		31,661.42
Oil	362.74	544.10		906.84
Supplies	9,746.00	8,240.39		17,986.39
Liberty Bonds 3 1/2's	70,950.00			70,950.00
Liberty Bonds 4's	90,000.00			90,000.00
Real Estate and Machinery	1,000,000.00		1,000,000.00	
Land		166,250.00		166,250.00
Buildings		1,092,040.18		1,092,040.18
Machinery		689,681.02		689,681.02
Equipment		249,864.23		249,864.23
<b>TOTAL ASSETS</b>				
<b>LIABILITIES &amp; CAPITAL</b>	<u>\$3,316,991.03</u>	<u>\$3,137,523.86</u>	<u>\$1,000,000.00</u>	<u>\$5,454,514.89</u>
Notes Payable	<u>\$838,000.00</u>			<u>\$838,000.00</u>
Accounts Payable	8,380.25			8,380.25
Accrued Liabilities	9,194.83			9,194.83
Reserve for U.S. Taxes	80,000.00		\$ 23,651.39	103,651.39
Capital Stock	1,470,000.00			1,470,000.00
Surplus	911,415.95	1,000,000.00	3,113,872.47	3,025,288.42
<b>TOTAL ASSETS</b>				
<b>LIABILITIES &amp; CAPITAL</b>	<u>\$3,316,991.03</u>	<u>\$1,000,000.00</u>	<u>\$3,137,523.86</u>	<u>\$5,454,514.89</u>

Source: LM Collection, AC-1

account.<sup>5</sup> Periodic depreciation was not calculated. In the column containing the data on the adjusted balance sheet in Table 2, the \$1,000,000.00 given to the "Real Estate and Machinery" in the column "Books" is simply denied, which is the amount recorded in the ledger account of the same name. Instead, the amounts of fixed assets are listed by SW&B in this column by categories: land, building, machinery, and equipment. The amounts were determined by the "special examination of the available books,

<sup>5</sup>These practices at LM in the period 1854-1875 are detailed in Fujimura [2004].

vouchers and other miscellaneous records of the Lyman Mills from the time of incorporation in 1854," according to the report. The results of the examination are recorded over seven of the 51 pages of appendices. Of these seven pages, one is dedicated to the land and six are devoted to the schedules recording every year's fixed asset additions and depreciation from the founding year, 1854, through 1923. Straight-line depreciation is used there at a rate of 1% for buildings (100 years), 4% for machinery (25 years), and 5% for equipment (20 years) (no residual values considered). They were, according to the report, the "rates allowed by the Federal Internal Revenue Agent."

The useful lives accepted by the internal revenue agent were for actual physical life. Therefore, acceptable depreciation rates were much lower and the remaining values of fixed assets estimated were much greater than those existing under today's standards.<sup>6</sup> However, this latter aspect explains the merit of the public accountants' services. It was advantageous to LM that the fixed assets written off immediately be added to the fixed assets to be depreciated. Longer useful lives were advantageous in this context. Larger fixed asset values result in larger amounts of depreciation. That was what the schedules of six pages noted earlier did in accordance with the straight-line depreciation rates allowed by the internal revenue agent. In fact, at the outset of the report, the stated aim was: "This examination was made in order to ascertain the correct Plant valuation to be used in the computation of the Federal Income and Excess Profits Taxes." The schedules over six pages showing the annual additions and depreciation of fixed assets were prepared for this purpose. The results for the year 1917 are as shown by Table 2, although the depreciation bases are much larger.<sup>7</sup>

#### A COMPARISON OF THE TRADING ACCOUNTS AND THE PROFIT AND LOSS STATEMENT

Table 3 integrates the data in the two mill trading accounts in the year 1917. As Table 3 shows, materials (cotton), labor, and other items as well as beginning inventories composed of finished goods, namely cloth, were debited to the home office mill

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<sup>6</sup>Therefore, the secret reserves were much smaller from the perspective of today's standards.

<sup>7</sup>According to the schedules on fixed assets noted earlier in the text, the depreciation bases for the year 1917 are the following: "Buildings," \$1,565,994.00; "Machinery," \$1,239,034.87; and "Equipment," \$445,278.31.

accounts [Fujimura, 2004].<sup>8</sup> On their credit side were recorded ending inventories and sales. Credited with sales, the home office mill accounts recorded the resultant profits on the debit side and became trading accounts. The two mill trading accounts were, like other ledger accounts, closed semiannually. Therefore, the profit figure recorded in the integrated mill trading account

**TABLE 3**  
**Integrated Mill Trading Account: 1917**

Balance	\$42,448.20	Sales	\$3,520,069.49
Cotton	1,770,330.42	Balance	51,982.35
Labor and Wages	647,675.35		
Other Items	537,706.50		
Expense*	25,530.30		
Interest*	19,059.00		
Discount on Sales*	68,411.35		
Renewals	42,102.03		
Write-Downs of Cotton	195,000.00		
Profit	223,788.69		
	<u>\$3,572,051.84</u>		<u>\$3,572,051.84</u>

Note: Prepared by integrating the entries in Mill Account No.1 and No.2 in the two six-month accounting periods of 1917 found in Ledger G and detailed in the corresponding journal (LM Collection, BA-7 and CA-7). An asterisk is put next to the items that have the corresponding items in the public accountants' profit and loss statement in Table 4. In the public accountants' statement, "Expense" is divided into "Office Expense," "Compensation of Officers," and "Contributions." Similarly, the amounts recorded as "Interest" and "Interest on Liberty Bonds" in Table 4 together represent the total credits in the ledger's "Interest" account in the two six-month accounting periods of 1917, and the amount recorded as "Interest Paid" represents the total debits. The resultant balance is as shown in this table.

<sup>8</sup>The LM Collection includes two books that are designed to record semiannual financial statements and audit reports [LM Collection, AM-1 and -2]. From the founding year, 1854, through 1887, the semiannual statements of each accounting period were composed of a balance sheet (or two balance sheets of the same contents named trial balance and general statement), a profit and loss account, and two mill trading accounts. The mill trading accounts included in the semiannual statements recorded a variety of cloth as their beginning and ending balances and recorded only a variety of cloth as the balances. That gives evidence that the beginning and ending balances recorded in the mill trading accounts in the ledger were composed of finished goods only. An example of such mill trading accounts included in the semiannual statements is presented by Fujimura [2004]. The fact that the mill trading accounts continued to record only cloth at their beginning and ending balances around 1920 may be confirmed by another document named "Treasurer's Report to Directors," which was prepared semiannually and which included a statement summarizing the records relating to the cotton and mill trading accounts in physical terms [LM Collection, AM-7].

in Table 3 is the total of the four profit figures in the two mill accounts in the two six-month accounting periods. Likewise, the other items (except inventories) in Table 3 each show the total of the related amounts being entered half-yearly, monthly, or irregularly.

The integrated mill trading account in Table 3 was prepared in order to facilitate the comparison between the data in the trading accounts and the performance statements prepared by SW&B. Table 4 is a reproduction of the report's "Exhibit B: Profit and Loss Statement for Year Ended December 31st, 1917." The items in the integrated mill trading account in Table 3 that relate to manufacturing costs, therefore to "Cost of Goods Sold" in the report's income statement in Table 4, are "Cotton," "Labor and Wages," and "Other Items." They (and the beginning and ending balances) are treated later when the report's "Exhibit B - Schedule 1: Cost of Goods Sold" is examined. As detailed in that occasion, "Other Items" are, in fact, composed of 12 items relating to indirect manufacturing costs and outsourced bleaching costs. Therefore, as opposed to the impression Table 3 gives, the items relating to manufacturing costs account for most of the items entered in the mill trading accounts. The item "Other Items" was created to facilitate the comparison between the data other than manufacturing costs in Tables 3 and 4.

The items "Renewals" and "Write-Downs of Cotton" in Table 3 are also treated later when the manufacturing costs are examined. The remaining three items in Table 3, next to which an asterisk is placed, are those that have no connection with manufacturing costs. They correspond to items in Table 4 also indicated with an asterisk (see the note in Table 3). SW&B accepted the LM's data without modification with regard to these administrative costs, interest, and discount on sales. This is the same for the total amount of sales.

The remaining items in Table 4, namely "Capital Stock Tax," "Rentals," and "Bad Debts Recovered," are not found in Table 3. They were recorded, on the part of LM's home office ledger, in the "Profit and Loss" or "Guarantee" accounts. "Capital Stock Tax" is in the "Profit and Loss" account; "Rentals" from the company's boarding houses and "Bad Debts Recovered" are in the "Guarantee" account. Therefore, SW&B accepted the data in the ledger with regards to all the items listed after "Gross Profit on Sales" in Table 4.

The main items recorded in the home office ledger profit and loss account were the profits transferred from the mill trading accounts and the dividends payable. The account may have

TABLE 4

**Exhibit B: Profit & Loss Statement for Year Ended  
December 31, 1917**

Sales		\$3,520,069.49
<i>Deduct:</i>		
Cost of Goods Sold (See Schedule 1)		<u>2,782,100.13</u>
Gross Profit on Sales		737,969.36
<i>Deduct:</i>		
<i>Operating Expenses:</i>		
Office Expense*	\$13,720.30	
Compensation of Officers*	11,800.00	
Capital Stock Tax	<u>1,330.50</u>	<u>26,850.80</u>
Net Income from Operations		711,118.56
<i>Add:</i>		
<i>Other Income:</i>		
Rentals	6,882.69	
Interest*	3,877.48	
Interest on Liberty Bonds*	1,050.00	
Bad Debts Recovered	<u>425.77</u>	<u>12,235.94</u>
Total Income		723,354.50
<i>Deduct:</i>		
<i>Other Charges:</i>		
Discount on Sales*	68,411.35	
Interest Paid*	23,986.48	
Contributions*	<u>10.00</u>	<u>92,407.83</u>
Net Profit before Deducting Federal Income and Profits Taxes		630,946.67
<i>Deduct:</i>		
U. S. Income & Profits Tax applicable to 1917		<u>103,651.39</u>
<i>Net Profit to Surplus</i> (See Exhibit C)		<u><u>\$527,295.28</u></u>

Source: LM Collection, AC-1

Note: Asterisks are added to the original in order to show that the related items have their corresponding items in the integrated mill trading account in Exhibit 3.

recorded other additional items, such as "Capital Stock Tax" mentioned above. Besides, in LM's profit and loss account were recorded the cash payment for the federal income tax for 1916 (\$7,668.16) and the reserve for federal income tax (\$80,000) on the debit side and a credit of \$38,304.14 related to capital expenditures. These three items were excluded by SW&B in the profit calculation shown in Table 4. Therefore, the items that caused LM and SW&B to calculate different profits may be divided into two groups – the above three items and items related to gross profit that have not yet been examined.

The net profits recorded in the column "Books" in Table 1 are those drawn by SW&B from both the "Profit and Loss" and "Guarantee" accounts in the ledger.<sup>9</sup> The amount in 1917, \$180,402.63, is recorded at the top of the report's "Exhibit D: Reconciliation of Net Profit as per Books with Net Profit as per Exhibit B and Net Income as per Tax Return for the year Ended December 31, 1917," presented as Table 5. The \$630,946.67 of "Net Profit as per Exhibit B" in Table 5 is "Net Profit before Deducting Federal Income and Profits Taxes" in "Exhibit B," reproduced in Table 4 and recorded in Table 1 in the column "Exhibit B." The difference between the net profit as per books and the net profit determined by the public accountants, \$450,544.04, is explained by five factors in the schedule in Table 5. Among them, "Reserve for Federal Taxes" and "Federal Income Tax 1916" are, as has been seen, the items debited to the home office ledger profit and loss account and excluded from the public accountants' profit and loss statement in Table 4. The other item (\$38,304.14) that the ledger's profit and loss account records but on the credit side, also excluded from the statement in Table 4 concerns capital expenditures, as noted earlier. This amount, \$38,304.14, should be added to \$51,505.69 shown as "Net Capital Items Charged to Profit and Loss" in Table 5. These "Net Capital Items" were, as will be seen in the following section, charged to the trading accounts. Therefore, the expression "Charged to Profit and Loss" should be read as "charged to expense." The \$38,304.14 credited to the ledger's profit and loss account reduced the amount of "Net Capital Items Charged to Profit and Loss" by \$38,304.14. In fact, the report by SW&B indicates that LM's "PLANT ADDITIONS" was \$89,809.83 in 1917. Capital expenditure of  $\$38,304.14 + \$51,505.69 = \$89,809.83$  is the real "Net Capital Items Charged to Profit and Loss," in fact to the trading accounts. Therefore, it seems better to suppose that the statement in Table 5 records \$89,809.83 as "Net Capital Items Charged" to expense and a negative amount of \$38,304.14 together with "Depreciation not deducted on books."<sup>10</sup>

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<sup>9</sup>The "Guarantee" account was an unusual account used to camouflage the real profit and loss data by LM at that time.

<sup>10</sup>In LM's ledger, \$38,304.14 is transferred from the "Bill Payable" account to the profit and loss account. Unusual entries were made in LM's "Bill Payable" account at the time under review. Capital expenditures paid in cash recorded in the account named "New Work" were transferred to the "Bill Payable" account. Seemingly the related amounts were further transferred from this account to the mill trading accounts or the profit and loss account. As a result, it becomes obscure how capital expenditures were treated. Therefore, it is difficult to explain

TABLE 5

**Exhibit D: Reconciliation of Net Profit as per Books with  
Net Profit as per Exhibit B and Net Income as per Tax  
Return for the Year Ended December 31, 1917**

Net Profit as per books for year ended December 31st, 1917				\$180,402.63
<i>Add:</i>				
Net Capital Items Charged to Profit and Loss	\$51,505.69			
Net Increase in Inventories	398,855.44			
Reserve for Federal Taxes	80,000.00			
Federal Income Tax 1916	7,688.16	538,029.29	\$718,431.92	
<i>Deduct:</i>				
Depreciation not deducted on books			<u>87,485.25</u>	
<i>Net Profit as per Exhibit B</i>			<u>630,946.67</u>	
<i>Add:</i>				
Contribution disallowed			<u>10.00</u>	
<b>Total</b>			<u>630,956.67</u>	
<i>Deduct:</i>				
Interest on Obligations of U. S. Exempt from Taxation			<u>1,050.00</u>	
<b>NET INCOME AS PER AMENDED TAX RETURN</b>			<u><u>\$629,906.67</u></u>	

Source: LM Collection, AC-1

It may be said that the schedule in Table 5 virtually presents the three items that are recorded in LM's profit and loss account and excluded from the report's profit and loss statement as factors that cause the difference between the net profit figures. The remaining factors that Table 5 illustrates are "Net Capital Items Charged" to expense (\$51,505.69 + \$38,304.14), "Net Increase in Inventories" (\$398,855.44), and "Depreciation not deducted on books" (minus \$87,485.25). Their total is \$401,180.02, and all relate to gross profit calculation. As has already been seen, the data listed after "Gross Profit on Sales" in the report's profit and loss Statement in Table 4 agree with those in the ledger. Therefore, the \$401,180.02 should be the difference in gross profit terms between the profit figures in LM's ledger and the report. If \$25,530.20 of "Expense," \$19,059.00 of "Interest," and \$68,411.35 of "Discount on Sales" are removed from the integrated mill trading account in Table 3, this trading account

the transactions described in the text, which seems to relate to correcting entries. Nonetheless, the credit balance at the end of the year 1917 of the "Bill Payable" account is reproduced in the balance sheet in Table 2 as "Accounts Payable." This balance in "Books" was accepted by the public accountants as Table 2 indicates.



shows gross profit comparable to "Gross Profit on Sales" in Table 4.<sup>11</sup> The amount thus calculated in the integrated trading account is \$336,789.34. The difference between this amount and \$737,969.36 of "Gross Profit on Sales" in Table 4 is \$401,180.02. Thus, the remaining three factors in Table 5 mentioned above should explain the difference between the gross profit figures drawn from the integrated trading account and recorded in the report's profit and loss statement.<sup>12</sup> With that observation, we now address the remaining issue that relates to gross profit calculation.

### THE COMPARISON IN TERMS OF GROSS PROFIT

This section begins by confirming the following facts: (1) the difference between the gross profit recorded in the report's profit and loss statement in Table 4 and the corresponding profit drawn from the integrated mill trading account in Table 3 is \$401,180.02; and (2) the factors that caused the difference are "Net Capital Items Charged" to expense, "Net Increase in Inventories," and "Depreciation not deducted on books" ( $\$89,809.83 + \$398,855.44 - \$87,485.25 = \$401,180.02$ ). The three factors should explain the differences between "Cost of Goods Sold" in Table 4, on the one hand, and the records found in Table 3 except "Expense," "Interest," and "Discount on Sales" (other than "Sales" and "Profit"), on the other. "Cost of Goods Sold" in Table 4 is detailed in the report's "Exhibit B - Schedule 1: Cost of Goods Sold for Year Ended December 31st, 1917," reproduced in Table 6. The comparison between the records in Tables 3 and 6 is the object of this section.

The items listed under the heading "Manufacturing Expenses" in Table 6 are indirect manufacturing costs except the outsourced "Bleaching" costs, while "Cotton Used" and "Labor and Wages" are direct manufacturing costs. Those costs comprise the total manufacturing costs incurred during the year 1917. Under the items constituting the manufacturing costs, the schedule in Table 6 records the differences between the beginning and

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<sup>11</sup>Note that SW&B used gross sales in calculating gross profit.

<sup>12</sup>The difference between the profit figures between the "Original Return" and "Books" in 1917 in Table 1 ( $\$426,097.15 - \$180,402.63 = \$245,694.52$ ) is explained as follows. The three items recorded in LM's profit and loss account ( $\$80,000.00 + \$7,668.16 - \$38,304.14 = \$49,364.02$ ) were not applied to the original return. Federal Capital Stock Tax recorded in both profit and loss accounts ( $\$1,330.50$ ) and write-downs of cotton recorded in the mill trading accounts ( $\$195,000.00$ ) were not applied to the original return.

ending work-in-process and finished goods inventories. The cost of goods manufactured is drawn from the manufacturing costs incurred during the year by considering the difference between the beginning and ending work-in-process inventories. The cost of goods sold is obtained from the cost of goods manufactured (\$2,888,568.82) by considering the difference between the beginning and ending finish goods inventories. That is the bottom line of the schedule. Although the cost of goods sold is the bottom line, this schedule fulfills the function of a cost of goods

TABLE 6

**Exhibit B – Schedule 1: Cost of Goods Sold for Year Ended December 31, 1917**

<i>Raw Material:</i>				(Data in the
Cotton Used	\$1,781,316.70			integrated
Labor and Wages	647,675.35			mill trad-
<i>Manufacturing Expenses:</i>				ing account)
Repairs	\$87,975.23			\$135,683.03
Depreciation	87,485.25			
Bleaching*	82,365.71			82,365.71
Fuel*	80,210.62			80,210.62
Cloth Room	45,313.71			47,691.03
Property Taxes*	38,803.95			38,803.95
Supplies	31,578.06			35,984.58
Starch	30,567.29			36,899.57
Mill Expense-Office*	30,563.03			30,563.03
Insurance*	27,620.90			27,620.90
Yard*	12,792.75			12,792.75
Teaming*	5,914.95			5,914.95
Oil	2,953.60	<u>564,145.05</u>	\$2,993,137.10	3,176.38
<i>Deduct:</i>				
<i>Difference in Goods in Process:</i>				
December 31, 1917	412,837.60			
December 31, 1916	<u>308,269.32</u>	104,568.28	\$2,888,568.82	
<i>Deduct:</i>				
<i>Difference in Finished Goods:</i>				
December 31, 1917	248,547.57			
December 31, 1916	<u>142,078.88</u>	<u>106,468.69</u>		
<i>Cost of Goods Sold (See Exhibit B)</i>			<u>\$2,782,100.13</u>	

Source: LM Collection, AC-1

Note: The data in the mill trading accounts are added to the original. An asterisk is put beside the items that show the same amount in both this schedule and the integrated mill trading account.

manufactured schedule. As noted at the outset of this paper, SW&B valued inventories at lower of cost or market. Therefore, the beginning and ending work-in-process and finished goods inventories in Table 6 should have been valued on this basis. The schedule in Table 6 suggests that the costs used to value inventories are manufacturing costs. Therefore, SW&B computed the cost of goods sold in accordance with modern principles used today in preparing financial statements.

The data in the integrated mill trading account in Table 3, compared with those in the schedule in Table 6, are (1) the items relating to the manufacturing costs, (2) "Renewals" and "Write-Downs of Cotton," and (3) the beginning and ending finished goods inventories. The data on the indirect manufacturing costs and bleaching costs that are integrated into "Other Items" in Table 3 are detailed in Table 6. They are added to the original schedule, each on the same row as its counterpart is found. The manufacturing costs debited to the integrated mill trading account are those transferred from the related ledger accounts to the two mill trading accounts. The manufacturing costs on the original schedule in Table 6 lists are determined by using the data recorded in LM's ledger and source documents. The data are only modified on the part of the schedule. However, the corresponding accounts in the ledger are a little different. The data in the integrated mill trading account shown in Tables 3 and 6 are presented utilizing the items used by SW&B. The corresponding accounts in the ledger are as described below [LM Collection, CA-7].

The ledger includes two cotton accounts, just like it includes two mill trading accounts. The amount debited as "Cotton" to the integrated mill trading account in Table 3 is the total of the amounts transferred from the two cotton accounts. The amount of "Labor and Wages" in Table 3 is not that transferred from one account either. There is the "Payrolls" account in the ledger; most of the amounts relating to "Labor and Wages" are transferred from this account. The remainder is wages paid in cash and transferred directly from a cash account. Accounts with the same names as listed in Table 6 are found in the ledger except "Bleaching," "Property Taxes," and "Mill Expense - Office." "Bleaching," i.e., outsourced direct costs, is shared by the two bleaching accounts in the ledger. "Property Taxes" and "Mill Expense - Office" are recorded in only one account, "General Expense." The accounts recording direct material, direct labor, and indirect manufacturing costs (plus bleaching costs) are opened in LM's home office ledger, and the manufacturing costs

incurred are transferred from these accounts to the two mill trading accounts. The accounts recording manufacturing costs opened in LM's ledgers scarcely changed from its early years [LM Collection, CA-1 to 8]. The firm continued to use its traditional accounting system still after 1900. The accounting system that Johnson [1972] and J&K [1987] saw was maintained in the period under review. LM's accounting records were used to determine manufacturing costs incurred during the year and cost of goods sold by the public accountants. It should be noted that J&K erred in recognizing LM's accounting system. Johnson [1972] and J&K [1987] maintain that all manufacturing cost records are found in the factory ledger. However, a quick review of a series of LM's factory and home office ledgers indicates that outsourced bleaching and insurance costs, which the public accountants included in manufacturing costs, were recorded only in the home office ledgers. The complete cost records were kept only in the home office ledger and found only in the home office ledger mill trading accounts.

Although SW&B used the data in LM's ledger and source documents, it modified them. As noted earlier, the modifications relate to "Net Capital Items Charged" to expense, "Net Increase in Inventories," and "Depreciation not deducted on books" ( $\$89,809.83 + \$398,855.44 - \$87,485.25$ ). In Table 6, an asterisk is put beside the items that show the same amount in both the schedule prepared by the public accountants and the integrated mill trading account. Regarding these items, SW&B accepted the ledger's data without modification. A comparison between Tables 3 and 6 indicates that the public accountants accepted the ledger's data on "Labor and Wages" as well. Therefore, the modified data on the manufacturing costs relate to "Cotton Used," "Repairs," "Cloth Room," "Supplies," "Starch," and "Oil." Besides, SW&B did not accept "Renewals" and "Write-Downs of Cotton" as costs and added depreciation expense. Further, there are significant differences between Tables 3 and 6 regarding the beginning and ending inventories. The differences are not limited to the amounts. The beginning and ending inventories recorded in the integrated mill account in Table 3 represent finished goods only, whereas the schedule in Table 6 records work-in-process and finished goods inventories. LM's ledger had cotton and mill trading accounts but no specialized account for the recording of work-in-process inventories. The public accountants considered that LM did not record work-in-process inventories as shown by the comparative balance sheets in Table 2. In fact, LM recorded work-in-process inventories in the cot-

ton accounts. More specifically, LM valued the work-in-process inventories at materials costs only and recorded both cotton as materials and work-in-process in the cotton accounts. This issue, which is of critical importance in understanding traditional accounting, is treated in the following section. In this section, the assumption is made that LM did not record work-in-process inventories. It will facilitate the comparison between the data on the inventories recorded in Tables 3 and 6.

The differences between the data in Tables 3 and 6 should be explained by the three factors noted earlier. What "Depreciation not deducted on books" (\$87,485.25) indicates is easily understood.<sup>13</sup> It is explained by the depreciation expense (\$87,485.25) recorded only in the schedule prepared by the public accountants. "Net Capital Items Charged" to expense (\$89,809.83) relates to the amount that the public accountants considered capital expenditures but LM treated as expense. It is explained by the difference between the amounts recorded as "Repairs" and "Renewals" in the integrated mill trading account and as "Repairs" in the schedule prepared by the public accountants ( $\$135,683.03 + \$42,102.03 - \$87,975.23 = \$89,809.83$ ). \$47,707.80 of repair expenditures and \$42,102.03 of renewals expenditures were treated as expense by LM but expenditures to be capitalized by the public accountants.

The two factors just described show the difference in fixed asset accounting between LM and the public accountants. LM had recourse to renewal accounting instead of depreciation accounting. Charging capital expenditures for renewals against expense was a usual practice at LM from its early years. Immediate write-offs of expenditures for fixed asset additions were also made, but such write-offs were charged to the profit and loss account [Fujimura, 2004]. However, in the period under review, LM seems to have intended to hide that it made immediate write-offs of capital expenditures. It seems possible that the above \$89,809.83 included not only renewals but also immediate write-offs of new capital expenditures and that, generally speaking, the "Renewals" account in the ledger recorded fixed asset additions as well as renewals. Anyhow, LM's traditional fixed asset accounting practices contrast to the public accountants' depreciation accounting.

The remaining factor is "Net Increase in Inventories"

<sup>13</sup>According to the schedules on fixed assets in SW&B's report, the depreciation bases and rates for the year 1917 are the following: "Building," \$1,565,994.00 × 1%; "Machinery," \$1,239,034.87 × 4%; and "Equipment," \$445,278.31 × 5%.

(\$398,855.44). It relates to cotton, work-in-process and finished goods inventories, but also supply inventories recorded in the "Cloth Room," "Supplies," "Starch," and "Oil" accounts. The ending inventories for 1917 recorded in these four accounts, as well as in the account "Fuel," are found in the comparative balance sheets in Table 2. Table 2 indicates that the four inventories are understated by \$17,494.09 in the LM ledger. According to the comparative balance sheets of the previous year end, only "Oil" and "Supplies" are understated, by \$4,115.19 in total. Therefore, in the public accountants' view, LM improperly recorded the four inventories by \$13,338.90 during 1917. On the other hand, the Table 6 schedule suggests that the accounts "Cloth Room," "Supplies," "Starch," and "Oil" are recorded at an amount \$13,338.90 greater in LM's ledger than in the public accountants' schedule. The public accountants judged that the \$13,338.90 treated as expense by LM should be capitalized as supply inventories. Thus, \$13,338.90 of \$398,855.44 of "Net Increase in Inventories" is explained in this way.

Table 2 indicates that LM's cotton accounts understate the 1917 ending inventories by \$312,791.52. The comparative balance sheet of the previous year-end indicates that LM understated the ending cotton inventories by \$128,777.80. Therefore, the public accountants judged that the firm improperly reduced the cotton inventory value by \$184,013.72 in 1917. On the other hand, as shown in Table 3, the write-downs of cotton actually debited to the mill trading accounts in 1917 are \$195,000.00. The difference between the two amounts, \$10,986.28, is counter-balanced by the difference between the cotton used recorded in Table 6 and that recorded in the integrated mill trading account in Table 3 ( $\$1,781,316.70 - \$1,770,330.42 = \$10,986.28$ ). The amount that the public accountants did not accept as write-downs of cotton was not \$195,000.00 but \$184,013.72. Thus, \$184,013.72 of \$398,855.44 of "Net Increase of Inventories" is explained in this way.

The remaining \$201,502.82 ( $\$398,855.44 - \$13,338.90 - \$184,013.72$ ) relates to the work-in-process and finished goods inventories. In this section, as noted earlier, it is assumed that LM's ledger does not record work-in-process inventories. Therefore, the beginning and ending work-in-process inventories recorded in the schedule of cost of goods sold in Table 6, \$308,269.32 and \$412,837.60, may be regarded as the amounts understated by Lyman Mills at the beginning and end of the year 1917. For finished goods inventories, the amounts understated at the beginning and ending of 1917 are obtained by compar-

ing data in Tables 2 and 5 as follows:  $\$142,078.88 - \$42,448.20 = \$99,630.68$  and  $\$248,547.57 - \$51,982.35 = \$196,565.22$ . The total understated amount for 1917 is calculated as follows:  $(\$412,837.60 + \$196,565.22) - (\$308,269.32 + \$99,630.68) = \$201,502.82$ . Therefore, it may be said that from the public accountants' point of view, LM improperly reduced the value of its work-in-process and finished goods inventories by  $\$201,502.82$  during the year 1917. In the public accountants' view, this amount was improperly charged to expense. The remaining  $\$201,502.82$  relating to the work-in-process and finished goods inventories is explained in this way. However, unlike in the case of "Cloth Room," "Supplies," "Starch," "Oil," and "Cotton," the amount was not charged to the mill trading accounts. The direct records of this  $\$201,502.82$  are found nowhere in LM's ledger. The amount may be obtained by comparing the differences between the beginning and ending balances. In the Table 6 schedule, the difference is  $\$211,036.97$  ( $\$104,568.28 + \$106,468.69$ ), thereby reducing the cost of goods sold by an equal amount, while in the integrated mill trading account in Table 3, the difference is  $\$9,534.15$  ( $\$51,982.35 - \$42,448.20$ ). The difference of the two amounts,  $\$201,502.82$ , understates profits by the same amount. Thus, it can be seen that each of the five factors shown in Table 5 explains how the public accountants modified the data in the LM ledger.

SW&B's valuation of the work-in-process and finished goods inventories was based on the lower-of-cost-or-market method. However, since LM did not adopt this method, write-downs of  $\$201,502.82$  were not made. As noted earlier and detailed in the next section, LM valued its work-in-process inventories at material cost. Meanwhile, the company seemingly valued its finished goods inventories lower than it should have applying its normal method. However, entries writing down finished goods are not found in LM's books of account, as suggested above. Since write-downs of cotton are recorded in the ledger, the lack of such entries for finished goods seems to suggest that adjustments may have been made outside the books of account.

Here and in the preceding section, the public accountants' profit and loss statement and schedule of cost of goods sold were compared with LM's profit and loss, guarantee, and trading accounts. It has been confirmed that the public accountants, in preparing the profit and loss statement and schedule of cost of goods sold, relied on the data in the LM ledger and source documents. It has been further confirmed that the modifications made by the public accountants were specified in one of their

schedules (Exhibit D). Exhibit D, by specifying the modifications made, gives evidence that LM's ledger and source documents provided sufficient data to prepare modern financial statements and also that LM's traditional accounting system is different from but comparable to modern accounting.

This nature of LM's traditional accounting system is further clarified by comparison between the integrated mill trading account and the public accountants' statements made in this and the preceding section. First, the comparison between the integrated mill trading account in Table 3 and the public accountants' schedule of cost of goods sold in Table 6 indicates that the trading accounts fulfilled a comparable function. Thus, LM's mill trading accounts are comparable to today's schedule of cost of goods manufactured, as well as today's work-in-process account.<sup>14</sup> Yes, there were differences in accounting methods between the cost records in LM's trading accounts and in SW&B's schedule of cost of goods sold, particularly with regard to fixed asset accounting and inventory valuation methods. But the presence of the differences rather proves that both were comparable. It was highlighted by the comparison in terms of gross profit made in this section.

Second, at the same time, the comparison between the integrated mill trading account in Table 3 and the public accountants' profit and loss statement in Table 4 indicated that LM's mill trading accounts fulfilled functions comparable to a modern income statement. The mill trading accounts functioned both as a modern cost of goods manufactured schedule and an income statement. The mill trading accounts evidence that cost and financial accounting were not separated in the traditional accounting system.

The mill trading account, as an inventory account, may be compared with the modern work-in-process account. However, it differs in that the mill trading account recorded both manufacturing and non-manufacturing costs. Inventoriable costs and period costs were not differentiated in the mill trading account. Thus, when ending finished goods were valued at cost, all costs were recorded in the trading account, including non-manufacturing costs. This did not occur at LM but did, for

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<sup>14</sup>As noted at the outset of this paper, Johnson [1972] associated the factory ledger mill accounts with the modern work-in-process account. But comparable to today's work-in-process account are the home office ledger mill trading accounts. Note that the factory ledger mill accounts did not record all manufacturing costs.



example, at Schneider and Company [Fujimura, 2000].<sup>15</sup> Also, the costs recorded in the trading account were inventoriable but treated in a different way from today. In the modern accounting system, costs to be recorded in the work-in-process account are treated as an asset when incurred and as an expense when the related product is sold. Therefore, with today's lower-of-cost-or-market method, when the inventory is valued at a lower market price instead of a higher cost, write-downs must be recorded. By contrast, a value other than cost may have been given to the ending finished goods inventories recorded in LM's mill trading accounts without recording a write-down or write-up. Costs recorded in the mill trading accounts were not treated as an asset when incurred. Thus, cost and financial accounting were not separated; inventoriable costs and period costs were not differentiated; and costs recorded in the mill trading accounts were not treated as an asset when incurred.

### THE RECORDING OF WORK-IN-PROCESS INVENTORY

In the preceding section, consideration was given to the assumption that LM did not record work-in-process inventory. However, as noted there, LM did record work-in-process inventory. It valued work-in-process inventories at their materials cost and recorded them in the two cotton accounts. This practice may be assumed since, as accounts recording inventories, LM's ledger had only two cotton and two mill trading accounts other than the accounts recording supply inventories. As the mill trading accounts recorded only finished goods inventories, the cotton accounts must have recorded work-in-process as well as direct materials inventories. This assumption may be confirmed by the cotton accounts included in box AM-7 in the LM Collection that is part of a series of documents [AM-1-9] called "Semi-annual accounts, unbound, docket-filed" in the catalogue of the LM Collection.

Table 7 is a reproduction of one of the cotton accounts in-

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<sup>15</sup>It was a leading French company that ran coal mines, iron works, and machine shops. Valuation at cost was concerned with work-in-process inventories. Fujimura [2000] reveals at Schneider and Company in the 1840s that (1) work-in-process inventories in job costing were valued at full cost (manufacturing costs plus non-manufacturing costs); (2) work-in-process inventories in process costing recorded as departmental finished goods were valued at full cost (manufacturing costs plus non-manufacturing costs); (3) however, work-in-process inventories in process costing regarded as remaining in an unfinished state were valued at materials costs only. Some of the complete cost records concerning job costing that were used to value inventories are reproduced in Fujimura [2002].

cluded in box AM-7. It is named "Cotton Account Mill No. 1," and its records correspond to those of the account Cotton No. 1 in the ledger. Another cotton account in box AM-7 (Cotton Account Mill No. 2) corresponds to the account Cotton No. 2 in the ledger. The author confirmed that, for the two six-month accounting periods of 1917, the records in the two cotton accounts in box AM-7 agree with those in the two corresponding cotton accounts in the ledger except that the ledger cotton accounts record write-downs of cotton while the cotton accounts in box AM-7 do not. Therefore, the beginning and ending inventory values differ, differences that may be explained by the previous and current write-downs. Although their records agree, the cotton accounts in box AM-7 and the ledger had distinct features. First, the records in the ledger cotton accounts are essentially those of cash transactions, while those of the cotton accounts in box AM-7 are analytic as shown by Table 7. Second, as Table 7 also demonstrates, the cotton accounts in box AM-7 records numbers over three columns which are expressed, from left to right, in bales, pounds, and dollars, while the ledger cotton accounts record only dollar amounts. Third, and most important here, the cotton accounts in box AM-7 differentiate between cotton inventories as direct materials and work-in-process, while the ledger cotton accounts do not.

The balance sheet in Table 2 indicated that SW&B used the data in the ledger cotton accounts that record beginning and ending inventories without differentiating between raw cotton and cotton in process. However, as shown by Table 7, raw cotton and cotton converted into intermediate or semi-finished products were distinguished at LM. The cotton account in Table 7 refers to the following two groups of cotton as beginning inventory: "Cotton on hand, in store & on way" and "Cotton in process." "Est. frt." recorded on the first line of the opposite side is the "Estimated freight" that seems to be recorded to offset the freight expense of the cotton still in transit. As the ending inventory, the cotton account in Table 7 records cotton in the processes of carding, spinning, dressing, and weaving, on the one hand, and "Cotton on hand & on way" (the corresponding "Estimated freight" is debited) and "Cotton in Picker Room," on the other. As the beginning inventory in the next six-month accounting period, the cotton in a variety of production processes is recorded as "Cotton in process"; "Cotton on hand & on way" and "Cotton in Picker Room" are integrated into "Cotton on hand, in store & on way." The entries in the cotton account in Table 7 are illustrative of those in the cotton accounts in box

**TABLE 7**  
**Cotton Account Mill No. 1**  
**Six Months Ending June 30, 1917**

Dec. 1916	Cotton on hand, in store & on way	8,455	4,372,709	622,673.77
	Cotton in process		610,528	86,939.19
		8,455	4,983,237	709,612.96
Jan. 1917	Cotton Invoices #71/83	1,151	576,146	101,484.44
Feb. 1917	Cotton Invoices 84/98	1,109	578,186	94,337.05
Mar. 1917	Cotton Invoices 99/11	11,033	529,165	94,322.10
Apr. 1917	Cotton Invoices 112/121	620	325,360	63,756.44
May 1917	Cotton Invoices 122/141	1,641	847,780	173,394.95
June 1917	Cotton Invoices 142/146	261	138,099	32,524.17
	Waste 2 to 1		165,024	23,163.84
	Bondsville D & B Wks			42.64
	Estimated freight 6/30/17			11,023.64
	Fr. paid past 6 months			17,277.71
	Yarn 2 to 1			<u>911.40</u>
		<u>14,270</u>	<u>8,142,997</u>	<u>1,321,851.34</u>
<b>CREDIT</b>				
	Est. frt. 12/30/16			11,850.22
	Cotton paid for	7	19,398	3,314.58
	Cotton 1 to 2	7	3,612	582.25
	Yarn 1 to 2		37,703	6,907.19
	Yarn 1 to 2			911.40
	6 months waste			26,394.94
	Fr. overcharge			10.00
	Cotton in process			
	Carding			
	Spinning			
	Dressing			
	Weaving		534,902	86,226.20
	Cotton on hand & on way	5,989	3,085,826	497,435.15
	Cotton in Picker Room	<u>162</u>	<u>4,377,964</u>	<u>674,744.38</u>
		<u>14,270</u>	<u>8,142,997</u>	<u>1,321,851.34</u>

Source: LM Collection, AM-7

AM-7, providing evidence that LM valued the work-in-process inventories at their materials costs only and recorded them in the cotton accounts. The ledger cotton accounts, in fact, include such work-in-process inventories.

This method of recording work-in-process inventories was used from LM's early years.<sup>16</sup> The method means that all other costs were treated as if they were period costs. Therefore, not only non-manufacturing costs but also labor and indirect manu-

<sup>16</sup>The fact that the beginning and ending inventories in the mill trading accounts included only finished goods from its early years may be confirmed by the semiannual accounts recorded in the books AM-1 and 2 in the LM Collection. See footnote 8.

facturing costs were treated as if they were period costs. None of their costs were allocated to work-in-process as already pointed out by Johnson [1972, pp. 470-471] and J&K [1987, pp. 28-29]. A merit of Table 7 is that it gives evidence that work-in-process inventories were recorded as work-in-process.

The same practice was performed by another New England textile concern, the Lawrence Manufacturing Company, founded in 1831. According to Hoskin and Macve [1996], the company had the cotton and the cloth account which was a trading account equivalent to LM's mill trading accounts. The cloth account recorded only the finished goods as its beginning and ending inventories, meaning that the work-in-process inventories were recorded in the cotton account as at LM.<sup>17</sup> Norman and Wootton [2001, p. 77], who explored the recording of current assets on the balance sheet in the U.S. between 1865 and 1940, noted that "work in progress often was not listed on the balance sheet" in the period 1880 to 1899 and further suggested that that practice continued long after. Though that is not direct evidence, it seems to suggest that the practice of valuing work-in-process at materials cost alone survived until well after 1900.

J&K [1987, p. 28] argued that at LM "the inventories of raw cotton and goods in process are valued at market prices or nearly so." It means, as Table 7 suggests, that they were valued at acquisition costs. Regarding the valuation methods for finished goods inventories, J&K [1987, p. 147, fn.] did not refer to LM's practice, but they made the following observation: "There is strong evidence that the textile companies valued ending inventories at approximations of market price until well after 1900 and reasonable grounds to believe that nineteenth-century manufacturers in other industries never considered doing otherwise." Their view appears to be correct for it is quite normal that price-takers of the time valued their finished goods inventory at market price.<sup>18</sup> It is very likely that LM, as a price-taker, fol-

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<sup>17</sup>However, according to Porter [1980, p. 6], the Boston Manufacturing Company, founded in 1813, had the cotton, the spinning, the weaving, and the cloth account. The records in 1817 suggest that the values given to the work-in-process inventories recorded in the spinning and weaving accounts included materials and labor.

<sup>18</sup>Porter [1980, p. 12] contends that "the costs calculated were used in valuing inventory..." at the Boston Manufacturing Company in the 1830s. Hoskin and Macve [1996, p. 353] see a "lower of cost and market" approach (this expression is actually used) in the Lawrence Manufacturing Company's valuation of the finished goods inventories in the mid-19th century. Their view is criticized by Fujimura [2000, p. 31, fn.] who suggests valuation at market is most likely.

lowed the practice of the time before commencing to understate finished goods inventory values substantially in the period under review.<sup>19</sup>

## CONCLUSIONS

This paper is concerned with one single case, namely the LM, founded in 1854, which maintained its original accounting system until well after 1900 and was, circa 1920, obliged to cope with the modern accounting methods imposed by the early U.S. income tax laws. This paper presents a case study treating the interface between traditional and modern accounting methods.

The LM case suggests that the traditional accounting system was a complete accounting system comparable to today. Accounting data were gathered and processed that makes it possible to prepare a modern cost of goods manufactured schedule and an income statement. Functions comparable to those of today's cost and financial accounting were carried out by the traditional accounting system within a double-entry framework of bookkeeping. The accounting system there which confronted modern practice was a complete accounting system, present in the 19th century, which survived well into the 20th. Therefore, it may be said that, contrary to the existing understanding, the accounting system of today was formed through the transition from one complete accounting system to another. Through this transition, cost and financial accounting came to be separated with the same framework of financial reporting coming to be applied to both commercial and industrial enterprise.

The above finding was made possible by focusing on one major aspect of the traditional accounting system, namely trading accounts. As Johnson [1972, p. 471] noted, this particular type of account drew the attention of "Littleton and other authorities" who wrote eminent books on accounting history based on contemporary accounting literature. For example, the trading account (called "factory account") treated in *Bookkeeping by Double Entry* by John Fleming, published in the U.S. in 1854, is referred to by Littleton [1933, pp. 355-356] and Garner [1954, p. 67]. As to the "manufacturing account" (or "merchandise book"), treated in F. W. Cronhelm's *Double Entry by Single*, published in England in 1818, Garner [1954, p. 64] says, "it was

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<sup>19</sup>Tentative exploration into data on costs and finished goods inventories recorded in LM's semiannual accounts [LM Collection, AM-1 and 2] suggests that LM valued the finished goods inventories at market prices in the mid-19th century [Fujimura, 2003].

a sort of trading account somewhat like that used by bookkeepers in the last century [the 19th]." Littleton and Garner, referring to trading accounts treated in contemporary accounting textbooks, understood that trading accounts were widely used in the 19th century. However, this phenomenon has not drawn the attention of many undertaking archival accounting history research. Exceptions are Yamey [1964], Johnson [1972], and Fujimura [2000, 2003, 2004], although they often cited Littleton [1933] and Garner [1954].<sup>20</sup> Even Johnson ceased treating the mill accounts in LM's home office ledger as trading accounts in J&K [1987]. While Johnson [1972, pp. 469, 474] found "a completely integrated double-entry cost accounting format" in the LM accounting system, relying on the presence of the mill trading accounts in the home office ledger, this opinion concerning "integration" was renounced in J&K [1987]. This paper suggests the importance of trading accounts in understanding the traditional accounting system. It is in Johnson [1972] and not J&K [1987] that a picture closer to the real LM accounting system is described.

It should be noted that a modern cost of goods manufactured schedule and income statement may also be prepared from the books of account and source documents of LM in the 1850s. A complete accounting system did exist at that time. This paper supposes that this LM case may be generalized, and that such an accounting system appeared much earlier. In other words, this paper presents the hypothesis that another complete accounting system illustrated by that at LM served price-taking industrial enterprises in the competitive market at that time. This conforms to the hypothesis of economists who assume that a price-taker in a competitive market has full knowledge of its cost of production. In this condition, a price-taker tries to maximize its profit in an economic model. What Johnson [1972, p. 469] attempted to reveal is the accounting practices at "a price-taking enterprise such as Lyman Mills (possibly also its many competitors)." However, as his article's title suggests, he focused on "cost accounting for internal management control" and not on profit measurement in trading accounts. As a result, he failed to present a whole picture of the price-taker's accounting.

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<sup>20</sup>There are studies that treat trading accounts without recognizing them as such [e.g., Stone, 1973; Porter, 1980; Jones, 1985; Johnson, 1989; Hoskin and Macve, 1996; Williams, 1997].

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