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THE OLD DU PONT COMPANY'S ACCOUNTING SYSTEM LASTING A HUNDRED YEARS: AN OVERLOOKED ACCOUNTING SYSTEM

Abstract: Accounting historians have not yet realized that there existed another complete accounting system before the formation of the modern accounting system of today which Johnson and Kaplan's *Relevance Lost* characterizes by the "integration" of cost and financial accounts supported by "inventory costing." In that earlier accounting system, cost and profit calculations were made in a past particular ledger account or accounts, namely trading account(s), where accounting practices opposed to "inventory costing" and "integration" were used. The historical existence of that accounting system is overlooked by accounting historians. The example of the old Du Pont Company (DPC) this paper presents will bring it to light.

Cost and profit calculation were made in four trading accounts in the double-entry ledger at the old DPC as it was purchased by the new DPC in 1902. One of its trading accounts dated back to 1804 when the old DPC started production of gunpowder. Early cost and profit calculations in that trading account were examined by the new DPC's staff in the early 1940s. They prepared schedules showing the cost data, sales revenues, and profit measurement recorded in the early trading account. These schedules give evidence that the old DPC recorded the costs incurred and used the cost data to compute profit for financial accounting purposes, but in different ways from today's "inventory costing" and "integration." This old DPC's accounting system resulted from the application of the double-entry system to industrial accounting and was in use throughout the nineteenth century. By revealing the historical existence of that overlooked accounting system, this paper will show that accounting history may be described as evolution of the traditional accounting system made through double-entry bookkeeping in which the trading account was of vital importance and the transition from that traditional accounting system to the modern integrated accounting system supported by inventory costing.

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INTRODUCTION

Johnson and Kaplan [1987] describe accounting history as evolution of management accounting and the formation of “inventory costing” supporting the “integration” of cost and financial accounts as a turning point of that evolution. This paper will show that accounting history may be described as evolution of cost and profit calculation for financial accounting purposes and that the formation of “inventory costing” supporting “integration” may be regarded as a turning point of this evolution.

Johnson and Kaplan [1987] give the definition of the integration of cost and financial accounts as follows: “The term *integration* meant that all amounts reported in financial statements, whether they were period expenses or end-of-period assets, had to be traceable to original (*i.e.*, historical) cost of recorded transactions [p.131; emphasis in original]. This “integration” was supported by “inventory costing – a bookkeeping procedure that manufacturing accountants follow to separate the production expenses of an accounting period from the cost of manufactured product inventories at the end of the period” [p.130]. Inventory costing that Johnson and Kaplan refer to is today’s costing for financial accounting purposes. According to Johnson and Kaplan [1987, p.130], “inventory costing “ was promoted by public accountants after 1900. Before that, “inventory costing” was not executed and “manufactured inventories” were valued “with dollar amounts that originated outside the books of account” [p.131]. Johnson and Kaplan strongly contend that before 1900 “inventory costing” supporting “integration” was lacking in the chapter sub-titled “Relevance Lost” in their book. Three points may be made regarding that Johnson and Kaplan’s observation.

It should be noted, at first, that Johnson and Kaplan characterize the modern accounting system of today by the integration of cost and financial accounts supported by inventory costing.

Second, Johnson [1972, p.469] find “a completely integrated double-entry cost accounting system” at Lyman Mills in the mid-nineteenth century. That is based on the fact that the two mill accounts in Lyman Mills’ home office (general) ledger constituted “trading accounts” which contained “entries for non-manufacturing expenses and sales in addition to entries for manufacturing expenses” to “provide profit and loss data useful in determining the semi-annual dividend to shareholders” [p.471].¹ Johnson’s contention that Lyman Mills had a integrated

¹ Lyman Mills had “a double-entry general ledger..., as well as a double-entry

accounting system is definitely denied by Johnson and Kaplan [1987]. They note that “Lyman Mills did not compile cost accounting data in their mill accounts in order to attach cost to product inventory for financial reporting purposes” [p.28]. Thus Johnson and Kaplan present the Lyman Mills case as one that gives evidence that “inventory costing” supporting “integration” did not exist before 1900. However, it should be noted that they still acknowledge that cost data were used to compute profit in the trading accounts for financial accounting purposes noting that Lyman Mills’ trading accounts “provided profit and loss data useful in determining the semiannual dividend to shareholders” [Johnson and Kaplan, 1987, p.28]. In short, Johnson and Kaplan deny the presence of “inventory costing” and “integration” at Lyman Mills in the mid-nineteenth century, on the one hand, and acknowledge the presence of costing for financial accounting purposes different from inventory costing, on the other.

Third, although they acknowledge the presence of costing for financial accounting purposes before 1900, Johnson and Kaplan [1987] minimize this fact and finally renounce acknowledging this fact in the chapter sub-titled “Relevance Lost” in their book.² They treat costing practices before 1900 only from the angle of management accounting. Thus they describe accounting history as evolution of management accounting.

Of the three points above, only the third point influenced accounting history research. Historical studies from the angle of management accounting, represented by Fleischman and Parker [1997], flourished after the publication of Johnson and Kaplan [1987].³ The second point above was completely neglected by the historical studies on management accounting and by accounting history studies in general. The objective of this paper is to shed light on that neglected issue of accounting history research. This

factory ledger” [Johnson, 1972, p.469]. Fujimura [2003] specified the relationship between the two kinds of ledgers which Johnson [1972] failed to do.

² The following passage is found in the chapter the Lyman Mills’ case is treated. “...they provide cost information that is systematically and reliably reconciled with profit and loss. But Lyman Mills managers did not invest resources in the compilation of this information in order to prepare their semiannual financial reports” [Johnson and Kaplan, 1987, p.30]. The last sentence gives the impression that Johnson and Kaplan deny any use of costing for financial accounting purposes. However, it only means that inventory costing was not executed. As the preceding observation suggests, they acknowledge that cost data were used to compute profit.

³ See Fleischman [2009] which is the most recent review article on studies of management accounting history.

paper treats the system of cost and profit calculation for financial accounting purposes found at the old Du Pont Company (DPC) that lasted a hundred years from the American Industrial Revolution. As seen later, the old DPC used a trading account or accounts that recorded costs to compute profit for financial accounting purposes.⁴ Costing for financial accounting purposes performed in the trading account, namely that past practice opposed to “inventory costing” for today’s integrated accounting system, is the issue this paper addresses.

This issue, which relates to the second point above, has been completely neglected by accounting historians. To be sure, some authors such as J. R. Edwards and T. Boyns paid attention to the financial accounting aspect of earlier accounting practices. However, they did not address the trading account, nor did they treat costing for financial accounting purposes. For example, Boyns, Edwards, and Nikitin [1997], which includes the summaries of earlier works of themselves and others, noted: “for the period and firms studied, there was a single, integrated accounting system”[p.16]. They used the word “integrated” to indicate that they found a financial accounting aspect in earlier accounting practices. However, the use of the word “integrated,” at the same time, means that they were indifferent to the difference between costing practices of the past and inventory costing for today’s integrated accounting system. It further means that they were indifferent to costing for financial accounting purposes itself. In fact, their interest was only in “the practice of cost calculation...for managerial purposes [Boyns, Edwards, and Nikitin, 1997, p.16]. They did not address the issue of costing for financial accounting purposes, nor did they approach the process of profit calculation for financial accounting purposes, which was recorded in the trading account. They showed no interest in the trading account which is the key account to recognize the past particular accounting system for what it was. In fact, in the case studies made by Edwards and Boyns [1992] and Edwards, Boyns, and Anderson [1995], they did not notice the presence of trading accounts although some accounts in the cases may be regarded as trading accounts. This is because their research focused only on costing for management accounting purposes. The trading account and the issue of costing for financial accounting purposes were outside their interest. From their approach, evolution of accounting attaining to today’s integrated

⁴ The precise definition of the trading account will be given when treating the old DPC’s early trading account.

accounting system can not be described; besides, the question as to when and how today's integrated accounting system was formed can not be posed. In this sense, their studies are not historical studies.

The preceding discussion indicates that there is a serious, unbelievable gap in accounting history research. The system of cost and profit calculation for financial accounting purposes that existed before the advent of today's integrated accounting system remains unknown. Accounting historians have never imagine that there existed another system of cost and profit calculation for financial accounting purposes in earlier times. The historical existence of another accounting system was suggested by Johnson and Kaplan [1987] as the second point noted earlier and by Fujimura [2000; 2007], but they have not drawn the least attention of accounting historians. The gap remains. The objective of this paper is to fill this gap in accounting history and by that, to present a new understanding of accounting history, based on the example of the old DPC.

There are complete series of double-entry ledgers and journals of the old DPC from its founding year, 1801, through its end, February 1902, among the old company's numerous accounting records comprising the collection Accession 500, Series I housed in the Hagley Museum and Library (formerly the Eleutherian Mills Historical Library). These books of account have been available since before Chandler and Salsbury [1971], for the purpose of describing the early history of the new DPC, searched the documents housed, at that time, in the Eleutherian Mills Historical Library. However, except Roxanne T. Johnson [1989], academics have paid little attention to the old DPC's books of account. R. T. Johnson examined the ledgers, the journals, and other books of account of the early nineteenth century DPC, but could not notice the presence of a trading account. As a result, she could not comprehend the accounting system of the old DPC at all. Her failure reflects the existing state of accounting history research that still continues. The trading account was not in her mind as were and are the other accounting historians.

In order to find out the presence of trading accounts, the writer surveyed all the ledgers of the old DPC and made closer examinations of the first two volumes covering the years 1801-1816 and the last two volumes covering the years 1891-1902.⁵ In its early years, DPC opened only one trading account in its

⁵ See References at the end of this paper.

ledgers, which was named "Factory." In its last two ledgers, there were four trading accounts: in addition to the long lasting "Factory" account summarizing the operating activities of the black powder mills in Wilmington, the "Wapwallopen Mills" account for the black powder mills on Wapwallopen Creek, Pennsylvania, the "Iowa Powder Mills" account for the black powder mills in Mooar, Iowa, and the "Gun Cotton Works" account for the smokeless powder works at Carney's Point, New Jersey.⁶ The profits or losses determined in the four trading accounts were transferred to the "Profit and Loss" account to which the dividends paid were debited.

The writer was not the first to examine the old DPC's trading accounts. It was done by the new DPC's staff a long time ago. Documents showing that the new DPC's staff examined the old DPC's books of account are found in a huge collection, The Longwood Manuscripts, Group 10, Papers of Pierre S. du Pont (1870-1954), housed in the Hagley Museum and Library. This collection was what Chandler and Salsbury [1971] used as their "basic source of information" [p.615]. As well as the documents used by Chandler and Salsbury, the collection includes the documents pertaining to the historical studies of the old company's accounting records made by anonymous staff of the new DPC, to whom the traditional accounting system must have been of the near past. The studies cover the whole period of the old company's existence, and almost all documents are undated. Among these documents are found two sets of schedules covering the old company's early years, one covering the years 1802-1809, and the other the years 1810 -1815. Each set includes a balance sheet, a profit and loss statement, a schedule showing a process of profit determination in the "Factory" account, a schedule summarizing the cost debited to the "Factory" account, and a schedule summarizing the sales credited to the "Factory" account, as well as a schedule calculating a return on investment. This paper uses the schedules covering the years 1802-1809. As will be seen later, the schedules suggest that the old DPC's trading account, namely the "Factory" account, by recording costs on its debit and sales on its credit, played a central role in profit measurement as did the mill trading accounts in Lyman Mills' home office ledger. An accounting system such as that found at the mid-nineteenth century Lyman Mills, which was

⁶ The "Wapwallopen Mills" account was opened in May 1859, the "Iowa Powder Mills" account in September 1888 and the "Gun Cotton Works" account in December 1892 [Ledgers C, No.9, and No.10].

characterized by the use of the trading account, was found at the early nineteenth century DPC. The records in the “Factory” account will show that there was another costing for financial accounting purposes different from inventory costing for today’s integrated accounting system.

As evidenced by the ledgers noted earlier, trading accounts were used at the old DPC until it was purchased by Coleman, Alfred, and Pierre S. du Pont. After purchasing the old company, Pierre S. du Pont examined the old company’s books of account [Chandler and Salsbury, 1971, pp.54-55]. No one has ever indicated that Pierre questioned the old company’s trading accounts. The use of the trading account was a common practice at that time. That old company’s accounting system dated back to the early nineteenth century, when Chandler [1977] described “the traditional enterprise” prevailed. This paper addresses such a long lasting accounting system. This long lasting accounting system existed before the advent of today’s integrated accounting system. It is such an accounting system that has been overlooked by accounting historians. Therefore, the revelation of the historical existence of another accounting system will lead to the overall revision of the existing understanding of accounting history. This paper will present a new understanding of accounting history, about which some discussion will be made at the end of this paper.

OWNERS’ EQUITY AND DISTRIBUTION OF PROFITS

E. I. du Pont de Nemours and Company, the old DPC, was, at first, organized in Paris on April 21, 1801 for the term expiring January 1, 1810, in order to establish a powder works in the United States. Eleuthère Irénée du Pont, as “the Superintendent of the Manufactory (*le Directeur de la Manufacture*),” was responsible for constructing and running the powder works [*Acte d’association* (deed of association), LMSS].⁷ In accomplishing these tasks, he transferred the French gunpowder technology to the United States [Stapleton, 2006]. The powder works was constructed on a land of 65 acres on the Brandywine River, four miles upstream from Wilmington, Delaware, which was pur-

⁷ An English translation is in R. T. Johnson [1989, Appendix A]. Another English translation entitled “Original Articles of Partnership” is in LMSS. The two English versions are a little different from each other and do not translate all the articles of the French original version. Hereafter only the French version will be referred to.

chased in 1802 and production started in 1804 [Kinnane, 2002].⁸ The deed of association (*Acte d'association*) stipulated that books be closed and profit be distributed every year. However, except an incomplete one, the closing process occurred only at the end of the term of association on December 31, 1809.

Table 1 is the balance sheet prepared by the new DPC's staff. The old DPC itself did not prepare separate financial statements at that time. Instead, the old company on December 31, 1809 closed the balance sheet accounts to the "Balance" account in the ledger in accordance with the continental system, which listed all balance sheet accounts with their balances; and the corresponding entries were made, beforehand, in the journal [Ledger "A" and Journal B].⁹ The balance sheet in Table 1 reproduces and condenses the entry in the "Balance" account in Ledger "A" as well as the corresponding entries in Journal B. The item "All Others" on the debit side in Table 1 shows the total of 59 accounts' balances and the item "All Others" on the credit side that of 19 accounts' balances. The balance sheet shows two groups of figures, namely those presented in 1910 annual report and those resulting from a more thorough analysis of the ledger made in 1943. That means that the balance sheet was prepared in 1943. Therefore, the new DPC's staff made thorough examinations of the early accounting records of the old DPC in the early 1940s. It seems that the other five schedules covering the years 1802-1809 that were noted earlier were also products of the study of that time, although the balance sheet and the other five schedules are contained in different boxes (see References at the end of this paper).

⁸The purchase of land in 1802 may be confirmed by Journal B. The beginning of production in 1804 may be confirmed by Factory Book (see References at the end of this paper)..

⁹About the continental system, see Dicksee [1921, Chaps. V and VI]. The deed of association stipulated: "*Le Directeur de la Manufacture suivra dans les Comptes les principes de comptabilité établis en France par l'Administration des Poudres et Salpêtres*" (The superintendent of the Manufactory will follow the principles of accounting established in France by the *Administration des Poudres et Salpêtres* in the Accounts). The *Administration des Poudres et Salpêtres* (the Office of Powder and Saltpeter) ran the state-owned powder works [Stapleton, 2006, pp.230 and 232-233]. Littleton [1933, pp.82 and 132] describes the balance account in the ledger as the old practice that was to be replaced by "separate financial statements." Jones [1985] notes the use of balance accounts by Welsh industrial enterprises from the 1740s to 1830. The similar practice is noted by Edwards and Boyns [1992, p.169] concerning the Derbyshire and Nottingham Company in 1750-1765.

Table 1 (Debit Side)

**E. I. DUPONT DE NEMOURS & COMPANY
BALANCE SHEET
DECEMBER 31, 1809**

	Figures Presented In <u>1910 Annual Report</u>	Figures Resulting From More Thorough Analysis of Ledger (in 1943)
<u>ASSETS</u>		
Cash	\$1,911.66	\$1,911.66
Accounts Receivable	31,914.11	32,318.57
Bauduy, Peter	\$ 5,792.62	\$ 5,792.62
Cazenove, A. C.	3,033.36	3,033.36
Girard, A.	5,865.52	5,865.52
McCall, Arch	4,888.42	4,888.42
Parent, Chas.	2,792.99	2,792.99
All Others (various debtors with small balances)	<u>9,541.20</u>	<u>9,945.66</u>
Bills Receivable	1,130.00	1,130.00
Inventories	31,521.95	25,808.98
Brimstone(5,179#)	336.63 (a)	336.63
Cooperage	321.00 (b)	321.00
Charcoal Wood	432.00 (a)	432.00
Gunpowder(38,994#)	21,780.64 (b)	21,780.64
Saltpetre (12,777#)	2,938.71 (a)	2,938.71
Mortgage (c)	<u>5,712.97 (a)</u>	<u>---</u>
 	<hr/>	<hr/>
TOTAL WORKING CAPITAL	\$ 66,477.72	\$ 61,169.21
Plants and Properties	\$ 42,750.00	\$ 42,750.00
Real Estate	\$ 12,000.00	\$ 12,000.00
Houses	9,100.00	9,100.00
Plants	<u>21,650.00</u>	<u>21,650.00</u>
Mortgage (c) – “Angelica (N.Y.) property and store goods”	<u>---</u>	<u>\$ 5,712.97</u>
TOTAL ASSETS	<u>\$ 109,227.72</u>	<u>\$ 109,632.18</u>

Original Notes:

(a) Classified as Materials totaling \$9,420.31.

(b) Classified as Finished Product totaling \$22,101.64.

(c) On October 31, 1834, \$4,712.97 was written off to Profit and Loss; on December 31, 1850 the balance of \$1,000.00 was charged to Estate of E. I. duPont.

Note: # means weight in pound.

Table 1 (Credit Side)

	Figures Presented In <u>1910 Annual Report</u>		Figures Resulting From More Thorough Analysis of Ledger (in 1943)
LIABILITIES			
Accounts Payable		\$ 20,987.36	\$ 23,118.50
Accrued Wages (Workmen)	\$ 2,279.42		\$ 2,279.42
Bidermann, Jacques	1,043.99		1,043.99
Broom, Jacob (balance due on purchase of land)	---		1,091.05
Buck, A	1,545.96		1,545.96
DuPlanty, R.	487.97		487.97
DuPont, E. I.	11,792.69		11,792.69
DuPont, V. deNemours & Company	149.23		149.23
Necker, Germani	266.25		266.25
All Others (various creditors with small balances)	<u>3,421.85</u>		<u>4,461.94</u>
Bills Payable (3 months ma- turity)		6,900.00	6,900.00
Mortgage (Jacob Broom - bal- ance due on purchase of land)		<u>1,091.05</u>	<u>---</u>
TOTAL CURRENT LIABILITES		\$ 28,978.41	\$ 30,018.50
Capital Stock (18 Shares at \$2000. each)		36,000.00	36,000.00
	Shares	Amount	
E. I. DuPont	1	\$ 2,000.00	
DuPont Farther & Company	12	24,000.00	
Jacques Bidermann	1	2,000.00	
P. Bauduy	<u>4</u>	<u>8,000.00</u>	
	18	\$36,000.00	
Surplus		44,249.31*	43,613.68*
Net Profit for period 1802 to 1809, Incl.		<u> </u>	<u> </u>
TOTAL LIABILITIES		<u>\$ 109,227.72</u>	<u>\$ 109,632.18</u>

Original Note:

* Difference between \$44,249.31 and \$43,613.68 or \$635.63 represents interest credited during December 1810 (applicable to period 1802-1809) to various accounts (Surplus being charged).

Source: LMSS, Group 10, Series A, File 418-3, Box 392.

The net profit recorded in the 1910 annual report is the same as that recorded in the "Balance" account although the asset and liability numbers it lists are a little different. On the other hand, DPC's staff of the early 1940s determined the net profit \$635.63 less than the original number in the "Balance" account. This is because they determined the number given to "All Others" under the heading "Accounts Payable" \$635.63 greater than the original data. Except these two modifications, the 1943

data in Table 1 faithfully reflect the original data in the “Balance” account.

As Table 1 shows, DPC’s staff of the early 1940s who prepared the balance sheet used the words “capital stock.” A note made by DPC’s staff that exceptionally bears a date (March 25, 1941) points out as follows: “The original organization of E. I. du Pont de Nemours & Company April 21, 1801 was more in the form of a modern corporation than that of a modern partnership.”¹⁰ The records in the ledger show these two natures [Ledger “A”]. Each partner (shareholder) had two kinds of personal accounts. One was a capital account called “account in Co.” and the other a current account called “account proper.” (The personal accounts under “Capital Stock” in Table 1 are accounts in Co. and the corresponding personal accounts under the headings “Accounts Payable” or “Accounts Receivable” are accounts proper). In the ledger also, an account (temporarily) recording the contributed capital was opened, which was named “Stock.” At first, the “Stock” account was credited with the total capital, \$36,000, with the explanation “by Sundries; Amt. Subscribed for,” and the corresponding debits were made to the partners’ current accounts (accounts proper). Then the “Stock” account was debited with \$36,000 and the corresponding credits were made to the partners’ capital accounts (accounts in Co.). All these transactions were dated April 21, 1801, the founding date. The “Stock” account temporarily symbolized a nature of corporation but was immediately cleared to zero. The capital was recorded in the partners’ (shareholders’) capital accounts. The “Stock” account revived at the end of the period as an account functioning as a retained earnings account. \$44,249.31 on Table 1 that the 1910 annual report recorded as “Surplus” was the net profit of the first accounting period credited, on

¹⁰“Interest of Management in the Affairs of the Partnership of E. I. Du Pont de Nemours & Company 1801-1899” [LMSS]. The deed of association stipulated that the liability of the partners be limited to their investment in the association. (The related article is only found in “*Acte d’association*” [LMSS]). But “Laws of Delaware, 1797,” have no provisions for Partnerships or Corporations,” according to a note made by the new DPC’s staff which bears a date (March 25, 1941) [“Original Partnership of 1801,” LMSS]. On the part of France, its Code of Commerce was promulgated only in 1807, which recognized the following four types of business entities: *société en nom collectif* corresponding to general partnership, *société en commandite simple* corresponding to limited partnership, *société en commandite par actions* which was a type of corporation with a top executive or executives with unlimited liability and which still existed today, and *société anonyme* corresponding to the ordinary corporation which was under the government’s authorization until the 1867 law.

December 31, 1809, to the "Stock" account and recorded in the "Balance" account as the "Stock" account's balance [Ledger "A"]. At the beginning of the next year, the "Balance" account was not opened. Instead, the "Stock" account served as the opening balance account before serving as the retained earnings account in the new accounting period. To the "Stock" account, under the date of January 1, 1810, the total credit accounts' opening balances were debited and the total debit accounts' opening balances were credited with the explanations "to Sundries" and "by Sundries." Each balance sheet account made a corresponding credit or debit to record its opening balance [Ledger "B"]. That process was, at the same time, the process of distributing all the net profit in the first accounting period. (Note that the "Stock" account did not function as a retained earnings account at that moment). The distributed profits were virtually credited to the partners' accounts through the above process. The credits were made not to the partners' capital accounts but to their accounts proper. The opening balance of each partner's account proper was determined (except the "DuPont, Father & Company" account that had no balance) by adding its (credit or debit) ending balance of the preceding year and its distributed profit. This process is detailed in Journal B.¹¹

Table 2 reproduces the "Statement of Profit & Loss" which, as noted earlier, seems to have been prepared by the staff of the early 1940s. The statement reproduces and condenses the entries in the "Profit & Loss" account in the Ledger "A" with some modifications. It shows \$65,485.66 as "Operative Earnings from Sales." That is the amount the new DPC's staff considered to be that of the profit that should have been determined in the trading account in the ledger, the "Factory" account. The profits actually determined in the "Factory" and "Profit & Loss" accounts in the ledger are referred to in the following section.

As shown in Table 2, the "Statement of Profit & Loss" is accompanied by the schedule on the distribution of the net profit which is originally recorded by entries dated January 1, 1810 in Ledger "B" and an entry in Journal B. The distribution of profit noted earlier was, in reality, made in this way. The deed of association stipulated the mode of profit distribution as follows:

¹¹The account proper of only one partner (P. Bauduy) showed a debit balance, \$5,792.62, at the end of the preceding year (see Table 1). As a result, the sum debited and credited to the "Stock" account on January 1, 1810 should have been \$103,839.56 (\$109,632.18 – \$5,792.62). Journal B shows this amount, but the "Stock" account in Ledger "B" did not. One possible interpretation is that it was a simple error.

Table 2

**E. I. Du PONT DE NEMOURS & COMPANY
STATEMENT OF PROFIT & LOSS
PERIOD 1802 to 1809 INCLUSIVE
(PRODUCTION COMMENCED MAY 1, 1804)**

OPERATIVE EARNINGS FROM SALES (Schedule "A")		\$65,485.66*
 <u>EXPENSE</u>		
Discount on Bills Payable and Bills Receivable		3,955.90
Interest		15,773.02
DuPont, Father & Company - Interest on Shares	\$4,608.75	
DuPont, Father & Company - Interest on Shares (credited to account of E. I. duPont)	3,781.77	
Jacques Biderman - Interest on Shares	1,043.99	
Peter Bauduy	1,618.55	
Peter Bauduy - Interest on Shares	2,298.63	
E. I. duPont - Interest on Shares	200.41	
E. I. duPont - Interest on Private Account	798.31	
DuQuesnoy - Interest on Shares	466.66	
Necker Germani - Interest on Shares	740.19	
Miscellaneous	<u>215.76</u>	
Miscellaneous Charges		<u>2,143.06</u>
 TOTAL EXPENSE		 <u>\$21,871.98</u>
 Net Profit for the Period 1802 to 1809 (Distributed as below)		 <u>\$43,613.68</u>

Original Note: * \$65,485.66 equals 12.1% earned per annum on average investment of \$95,612.44. (For calculation of *Average Investment* see attached statement)

DISTRIBUTION OF NET PROFIT			
	<u>SHARES OF CAPITAL</u>	<u>SHARES OF PROFIT</u>	
DuPont, Father & Company	12	12/30 as Partner	\$17,445.47
Jacques Biderman	1	1/30 as Partner	\$1,453.78
Peter Bauduy	4	4/30 as Partner	\$ 5,815.15
		3/30 as Other	<u>4,361.37</u>
E. I. duPont	1	1/30 as Partner	1,453.78
		9/30 as Manager	<u>13,084.13</u>
	<u>18</u>	<u>30/30</u>	<u>\$43,613.68</u>

Source: LMSS, Group 10, Series A, File 418-3, Box 391.

18/30 to the “shareholders (*actionnaires*),” 9/30 to the “Head of the Manufactory (*chef de la Manufacture*),” namely E. I. du Pont, and 3/30 to “one of the architects of the Establishment (*un des auteurs du Projet et de l’Etablissement*)” who had not yet been determined. The distribution was made in conformity with this stipulation (the 3/30 were distributed to P. Bauduy). However, as noted earlier, the total distributed profit recorded in the ledger and journal is not \$43,613.68 but \$44,249.31. In any case, the distribution of profit was made in the way shown on the bottom of Table 2. As it shows, profit measurement for profit distribution was performed at the early old DPC. This paper is concerned with its accounting system fulfilling such a financial accounting function.

PROFIT MEASUREMENT IN A TRADING ACCOUNT

The “Factory” account of the old DPC, as a trading account, had much the same features as did the two mill trading accounts in Lyman Mills’ home office ledger. Lyman Mills’ home office ledger mill accounts were inventory accounts in the sense that they recorded finished goods inventories as their beginning and ending balances. Such inventory accounts were debited with manufacturing and non-manufacturing expenses and credited with sales. Credited with sales, Lyman Mills’ home office ledger mill accounts recorded profit or loss and became trading accounts [Fujimura, 2007, p.171]. Dicksee [1921, p.93] described the specific feature of the trading account as “partly real and partly nominal.”

Table 3
Factory Account (Condensed and Modified)
(From May 16, 1804 to December 31, 1809)

Saltpeter	\$122,111.77	Sales & Others	\$292,422.33
Brimstone	4,664.86	Purifying Saltpetre	2,974.43
Workmen	2,279.42	Real Estate	2,381.38
Factory Book	67,713.29	Cooperage	321.00
Others	51,750.94	Charcoal Wood	432.00
Profit	<u>71,791.50</u>	Gun Powder	<u>21,780.64</u>
	<u>\$320,311.78</u>		<u>\$320,311.78</u>

Note: The first entry in this account (pertaining to gunpowder delivered to sundries) is dated May 16, 1804. The entries over eleven folios in the original account are condensed into the above account by the writer. The following modifications are made to the original entries. “Gun Powder” (the finished goods inventories) is, in reality, not credited to the original account. In the above account, by crediting \$21,780.64 of “Gun Powder,” the profit is stated larger by the same amount than it is in the original account. That means the profit should be \$50,010.86 in the original account. However, the actual debited amount of the profit was \$50,010.85½. Correspondingly, the amount the writer gave to “Others”

should become 51,750.94½. In fact, there is an entry recording an amount with the third decimal place among the entries included in "Others." It is the amount \$50,010.85½ that is transferred from the "Factory" account to the "Profit & Loss" account. In the latter account, there is another entry recording an amount with the third decimal place. By this number, the third decimal place of the profit figure is adjusted. Therefore, the profit of \$50,010.85½ may be presented as \$50,010.86 from the beginning (therefore as \$71,791.50 in this table). Correspondingly, the writer gave \$51,750.94 to "Others."

Sources: Ledger "A" [Accession 500]; Journals A and B [Accession 500].

The same feature might be indicated to the "Factory" account in the ledger of the old DPC. The account in Table 3 is what the writer prepared by summarizing the entries in the "Factory" account in Ledger "A" from 1804 to 1809. Many of the debit entries in the "Factory" account relate to manufacturing and non-manufacturing expenses. "Gunpowder is a mixture of saltpetre, charcoal and sulphur, usually in the proportions of 75:15:10" [Crocker, 1999, p.3]. Of the three kinds of materials, saltpeter and brimstone (sulphur) consumed were debited to the "Factory" account. They were transferred from the materials inventory accounts called "Saltpetre" and "Brimstone" [Ledger "A"]. In this first accounting period, and in this accounting period only, most cash expenditures were first recorded in a blotter named "Factory Book" and mistakenly in another blotter named "Factory Building Book" for the years 1806 and 1807. These blotters detail expenditures but only the yearly totals are recorded in the journal and ledger. The total of six years is \$67,713.29, which is shown as the sum of the item "Factory Book" in Table 3 [Journals A and B and Ledger "A"].¹² Among these expenditures are those concerning charcoal wood, cooperage, and wages. The expenditures related to obtaining charcoal wood (cutting, transportation, or purchase) and to cooperage are detailed in the blotters,¹³ where the wages are recorded on a monthly basis. In order to record these items on an accrual basis, the charcoal wood and the cooperage (barrels and kegs) remaining unused

¹²The yearly totals are recorded in the journals and ledger as follows: on February 11, 1806 for the total expenditures of each of the years 1804 and 1805, on December 31, 1808 for the total expenditures of each of the years 1806, 1807, and 1808, and on December 31 1809 for the total expenditures of the year 1809. The total of the six years amounts to \$67,713.29, while the expenditures recorded in the Factory Book and Factory Building Book amount to \$68,635.51. The expenditures relating to the difference between this \$68,635.51 and \$67,713.29 seem to have been debited to the "Factory" account separately and therefore included in "Others."

¹³Charcoal making was part of gunpowder making. Therefore, charcoal wood is recorded as materials. According to Crocker [1999, p.20], "Gunpowder was traditionally packed in oak barrels and kegs of various sizes...Most powder mills had their own cooperage, and this employed a large portion of the workforce."

were credited and the accrued wages payable (“Workmen”) were debited to the “Factory” account as shown in Table 3. The counterbalancing entries were made to the accounts “Charcoal Wood,” “Cooperage,” and “Workmen” which were opened only for this purpose [Ledger “A”].

On the other hand, most of the credit entries in the “Factory” account relate to sales as shown in Table 3. “Gun Powder” is the ending finished goods inventory. Of the remaining four items on the credit of the “Factory” account, “Cooperage” and “Charcoal Wood” have been referred to. “Purifying Saltpetre” represents an amount charged to a personal account, “U. S. Navy Department,” for purifying saltpeter, which should be deducted from the expenses debited to the “Factory” account. \$2,381.38 recorded as “Real Estate” shows the total payments made to the previous landowner and recorded in the blotters mentioned earlier. This amount was credited to offset the expenditures included in those of the item “Factory Book” in Table 3 and was transferred to the company’s fixed asset account, “Real Estate.”¹⁴ Therefore, in principle, the “Factory” account records expenses on its debit side and sales and the ending finished goods inventory on its credit side in this first accounting period. Thus, the resulting profit is recorded on its debit side.

However, the actual entries in the “Factory” account in the ledger did not fully comply with the trading account format. The finished goods inventory, “Gun Powder” in Table 3, is not credited to the “Factory” account. Therefore, the actual profit debited to this account is \$50,010.86 (\$71,791.50 – \$21,780.64).¹⁵ It is this amount that is transferred to the “Profit & Loss” account. In the account in Table 3, the writer modified the original data so as to indicate that the “Factory” account shows the complete trading account format potentially.

In Ledger “A”, instead of crediting the “Factory” account with the ending finished goods inventory, a special account named “Gun Powder” was opened only to record the ending finished goods inventory amounting to \$21,780.64, and this on the debit side, of course. The counterbalancing credit was made to the “Stock” account which, as noted earlier, functioned as a retained earnings account at the close of the first accounting period. To the credit of the “Stock” account also, the debit balance of the “Profit & Loss” account, \$22,468.67, was transferred. The

¹⁴This “Real Estate” account corresponds to the item “Plants and Properties” in Table 1.

¹⁵In fact, \$50,010.85½. See the note in Table 3.

“stock” account’s total credits, $\$44,249.31 = \$21,780.64 + \$22,468.67$, represents the net profit of the first accounting period. That amount is recorded as the “Stock” account’s balance in the “Balance” account. It is that amount that was accepted as the net profit of the first accounting period by the new DPC’s staff of around 1910 as shown in Table 1.

Therefore, the finished goods inventory produced a profit equivalent to its value only by its existence in the books. This treatment of the finished goods inventory indicates that E. I. du Pont and his bookkeeper knew that the normal or standard accounting methods of the time required that the finished goods inventory be credited to the “Factory” account in accordance with the ordinary trading account format. If they had done so, the profit determined in the “Factory” account and transferred from this account to the “Profit & Loss” account would have been $\$71,791.50$, as Table 3 shows, and the profit transferred from the “Profit & Loss” account to the “Stock” account would have been $\$44,249.31$, the full amount of the net profit in the first accounting period. Because they knew that was a normal practice, E. I. du Pont and his bookkeeper could treat the whole value of the finished goods inventory as profit.

The preceding discussion emphasizes the necessity of distinguishing between a normal practice and an actual practice. It may be said that the old DPC’s case just seen suggests that the trading account format represented a normal practice at that time. In fact, the entries in the “Factory” account came to fully comply with the trading account format from the accounting period January 1 to August 31, 1818 [Ledger “C”].

THE OLD DU PONT COMPANY’S ACCOUNTING METHODS RECOGNIZED BY THE NEW DU PONT COMPANY’S STAFF

The entries in the “Factory” account in the first accounting period are made over eleven folios. It is not easy for an outsider to read all of these entries correctly and to determine the total sales and expenses of the period. These amounts are provided by the following schedules prepared by DPC’s staff of the early 1940s: “Statement of Operative Earnings from Sales” reproduced in Table 4 and “Cost of Manufacture” reproduced in Table 5. The amount of sales on the row “Grand Total” in Table 4, $\$251,585.74$, represents the total net sales in the first accounting period. That suggests that the item “Sales & Others” in Table 3, which is created by the writer, comprises the amounts to be offset by the correcting debit entries included in the item “Others”

Table 4

SCHEDULE "A"
E. I. DU PONT DE NEMOURS & COMPANY
STATEMENT OF OPERATIVE EARNINGS FROM SALES
PERIOD 1802 TO 1809 INCLUSIVE (PRODUCTION
COMMENCED MAY 1, 1804)

	QUANTITY (POUNDS)	SALES		COST OF SALES		OPERATIVE EARNINGS FROM SALES	
		AMOUNT	PER POUND	AMOUNT	PER POUND	AMOUNT	PER POUND
<u>GUNPOWDER</u>							
Agents	332,215	\$131,175.72	\$.3949	\$88,312.60	\$.2658	\$42,863.12	\$.1291
Others	143,040	58,310.99	.4077	40,256.17	.2814	18,054.82	.1263
U. S. Government	54,287	20,254.50	.3731	15,871.73	.2924	4,382.77	.0807
TOTAL GUNPOWDER	529,542	\$209,741.21	\$.3961	\$144,440.50	\$.2728	\$65,300.71	\$.1233
<u>GUNPOWDER (MANUFACTURED WITH U.S. SALTPETRE)</u>							
U. S. Government	57,413	\$6,184.34	\$.1077	\$5,264.90	\$.0917	\$919.44	\$.0160
<u>REMANUFACTURED GUNPOWDER (U.S. GOVERNMENT)</u>							
Navy and War Departments	265,900	\$21,784.19	\$.0819	\$24,383.64 (a)	\$.0917	(\$2,599.45)	(\$.0098)
Francis Breuil, Philadelphia, Pa.	40,000	13,600.00	.3400	11,694.68 (b)	.2924	1,905.32	.0476
Samuel McCall, Philadelphia, Pa.	3,450	276.00	.0800	316.36 (a)	.0917	(40.36)	(.0117)
TOTAL REMANUFACTURED GUNPOWDER	309,350	\$35,660.19	\$.1153	\$36,394.68	\$.1176	(\$734.49)	(\$.0023)
GRAND TOTAL	896,305	\$251,585.74	\$.2807	\$186,100.08	\$.2076	\$65,485.66	\$.0731

Original Note: See separate statement showing details of sales by years

Original Notes: (a) Assumed to have been remanufactured without Saltpetre. (b) Assumed to have been remanufactured with Saltpetre furnished by the Company. (\$8,026.59 covers cost thereof).

Source: LMSS, Group 10, Series A, File 418-3, Box 391.

Table 5 (Top Half)
COST OF MANUFACTURE
1802 TO 1809 INCLUSIVE
(OPERATIONS COMMENCED MAY 1, 1804)

DETAILS OF MANUFACTURING COSTS								
Salaries								\$13,296.16
E. I. duPont (April 1, 1804 to September 30, 1809 at \$1800 per annum)								\$9,900.00
Charles Dalmas (April 1, 1804 to June 30, 1809 at \$600 per annum)								3,100.00
Charles Parent								161.16
Charles Cazeau								<u>135.00</u>
Wages (Including boarding of hands)								27,915.94
Saltpetre (534,511 lbs.)								122,111.77
Brimstone (99,957 lbs.)								4,664.86
All Other Costs								39,891.99
Peter Bauduy -- Commissions, etc.								9,047.90
U. S. Government (Credit for purifying Saltpetre)								(2,974.43)
Legal Expenses, etc. -- Charles Munns' Suit								1,135.73
Depreciation of Factory Buildings, etc.								6,305.84
Miscellaneous								<u>26,376.95</u>
Total								<u>\$207,880.72</u>
ALLOCATION OF MANUFACTURING COSTS								
	Production							
	<u>Pounds</u>	<u>Salaries</u>	<u>Wages</u>	<u>Saltpetre</u>	<u>Brimstone</u>	<u>All Other Costs</u>	<u>Total Costs</u>	<u>Per Pounds</u>
GUNPOWDER								
Sales by Agents	332,215	\$4,722.75	\$9,915.65	\$66,663.86	\$1,656.94	\$14,169.43	\$97,128.63 (a)	\$.2924
Sales to Others	143,040	2,033.45	4,269.33	28,703.10	713.42	6,100.90	41,820.20(b)	.2924
Sales to U. S. Government	54,287	771.74	1,620.31	10,893.49	270.76	2,315.43	15,871.73	.2924
Inventory in hands of Agents December 31, 1809	33,150	471.26	989.43	6,652.04	165.34	1,413.90	9,691.97 (c)	.2924
Inventory in our own Mills, etc. December 31, 1809	5,844	83.08	174.42	1,172.69	29.15	249.27	1,708.61 (d)	.2924
	<u>568,536</u>	<u>\$8,082.28</u>	<u>\$16,969.14</u>	<u>\$114,085.18</u>	<u>\$2,835.61</u>	<u>\$24,248.93</u>	<u>\$166,221.14</u>	
Per Pound		\$.0142	\$.0298	\$.2007	\$.0050	\$.0427		\$.2924
GUNPOWDER (MANUFACTURED WITH U.S. SALTPETRE)								
Sales to U. S. Government	57,413	\$816.18	\$1,713.61	--	\$286.35	\$2,448.76	\$5,264.90	\$.0917
REMANUFACTURED GUNPOWDER (U.S. GOVERNMENT)								
Sales to Navy and War Departments	265,900(f)	\$3,780.02	\$7,936.34	--	\$1,326.19	\$11,341.09	\$24,383.64	\$.0917
Sales to Francis Breuil, Philadelphia, Pa.	40,000(e)	568.64	1,193.88	\$8,026.59	199.51	1,706.06	11,694.68	.2924
Sales to Samuel McCall, Philadelphia, Pa.	3,450(f)	49.04	102.97	--	17.20	147.15	316.36	.0917
	<u>309,350</u>	<u>\$4,397.70</u>	<u>\$9,233.19</u>	<u>\$8,026.59</u>	<u>\$1,542.90</u>	<u>\$13,194.30</u>	<u>\$36,394.68</u>	<u>\$.1176</u>
GRAND TOTAL FOR THE PERIOD	<u>935,299</u>	<u>\$13,296.16</u>	<u>\$27,915.94</u>	<u>\$122,111.77</u>	<u>\$4,664.86</u>	<u>\$39,891.99</u>	<u>\$207,880.72</u>	<u>\$.2223</u>

Original Notes: (e) Assumed to have been remanufactured with Saltpetre furnished by the Company.

(f) Assumed to have been remanufactured without any Saltpetre.

Table 5 (Bottom Half)

Saltpetre consumed	534,511 lbs.		
Less Estimated loss in refining, etc. (14.61%)	<u>78,109</u>	"	
Assumed quantity of Saltpetre actually used (75% of Gunpowder produced)	456,402	"	
Brimstone	99,957	"	
Percent Brimstone to Gunpowder Manufactured	10.69%		
S U M M A R Y			
	SALES		COST OF
	POUNDS	AMOUNT	SALES
GUNPOWDER			
Agents	332,215	\$131,175.72	\$88,312.60 *
Others	143,040	58,310.99	40,256.17 **
U. S. Government	<u>54,287</u>	<u>20,254.50</u>	<u>15,871.73</u>
	529,542	\$209,741.21	\$144,440.50
GUNPOWDER (MANUFACTURED WITH U. S. SALTPETRE)			
U. S. Government	57,413	6,184.34	5,264.90
REMANUFACTURED GUNPOWDER (U. S. GOVERNMENT)			
Navy and War Departments	265,900	\$21,784.19	\$24,383.64
Francis Breuil, Philadelphia, Pa.	40,000	13,600.00	11,694.68
Samuel McCall, Philadelphia, Pa.	<u>3,450</u>	<u>276.00</u>	<u>316.36</u>
	<u>309,350</u>	<u>\$35,660.19</u>	<u>\$36,394.68</u>
	<u>896,305</u>	<u>\$251,585.74</u>	<u>\$186,100.08</u>
Original Notes:			
* COST OF SALES BY AGENTS		** COST OF SALES TO OTHERS	
Cost as above (a)	\$97,128.63	Cost as above (b)	\$41,820.20
Adjustment -- Difference between value at which inventory in hands of agents 12/31/09 of 33,150 lbs. was set up on books, viz.		Adjustment -- Difference between value at which inventory on hand 12/31/09 of 5,844 lbs. was set upon book, viz.	
\$.5583 per lb.	\$18,508.00	\$.5600 per lb.	\$3,272.64
and actual cost thereof as above, \$.2924 (c)	<u>9,691.97</u>	and actual cost thereof as above, \$.2924 (d)	<u>1,708.61</u> <u>(1,564.03)</u>
	<u>\$88,312.60</u>		<u>\$40,256.17</u>

Source: LMSS, Group 10, Series A, File 418-3, Box 391.

created also by the writer, which are often referred to as "return entries" in the ledger [Ledger "A"].¹⁶ The data shown under the

¹⁶R.T. Johnson [1989, p.70] notes: "Initially, the record keepers credited all powder distributions directly to the 'Factory account.' For direct sales to customers or company principals, this constituted an accurate recognition of revenue.... Transfers of powder to agents for disposal on behalf of the company did not constitute a completed earnings process, however, and therefore should not have been credited to the 'Factory' account until the agents sold the powder to a third

heading “Details of Manufacturing Costs” in Table 5 are, except “Depreciation of Factory Building, etc.,” the expenses incurred in the first accounting period.

Tables 4 and 5 show that DPC’s staff of the early 1940s prepared these tables supposing that the ending finished goods inventories were credited to the “Factory” account. Because there are no beginning inventories in this first accounting period, the cost of the finished goods sold of each category, which are recorded in Table 5 under the heading “Allocation of Manufacturing Costs,” must represent each category’s cost of sales to be recorded in Table 4. However, as to the sub-categories “Sales by Agents” and “Sales to Others” within the category “Gunpowder,” further calculations for obtaining their costs of sales are made in the original notes at the bottom of Table 5. In these calculations, each cost of sales is obtained by subtracting from the real cost of sales the difference between the estimated price and the cost of the related finished goods inventories. This process of computing the pretended cost of sales indicates that DPC’s staff of the early 1940s made the calculations supposing that the ending finished goods inventories were credited to the “Factory” account. In this supposition, the difference between the higher estimated price and the cost of each inventory produces profit. To record the profit produced in this way, DPC’s staff of the early 1940s reduced the cost of sales by the profit for each of the two sub-categories. These modified numbers are reproduced in Table 4. Thus, in Table 4 profit calculation in the framework of the trading account is reconciled with the modern profit calculation formula, namely sales minus cost of sales equals profit. That means that the profit recorded on the row “Grand Total” in Table 4 must agree with the profit debited to the trading account in Table 3. However, they are a little different. The difference, \$6,305.84, is explained by the fact that the depreciation expense, \$6,305.84, is included in the “Manufacturing Costs” in the schedule in Table 5, while it is charged not to the “Factory” account but to the “Profit & Loss” account in the ledger [Ledger “A”].¹⁷ It seems certain that DPC’s staff of the early 1940s supposed the same trading account format as does Table 3 in under-

party.” R. T. Johnson [1989] does not refer to the related correcting entries. Of course, other kinds of correcting entries were also made.

¹⁷It seems that this depreciation does not mean periodical depreciation to be charged as manufacturing expense. It rather relate to revaluation of the fixed assets. The old DPC did not perform periodical depreciation even in its last years [Ledgers N0. 10 and No.1]. Lyman Mills executed replacement accounting [Fujimura, 2004]. The writer supposes the old DPC did the same.

standing the entries in the "Factory" account in the ledger.

The preceding observation suggests that DPC's staff of the early 1940s knew the traditional accounting system very well. The trading account in Table 3 represents a normal practice in the traditional accounting system. The accounting system of the old DPC should be understood on the supposition that its "Factory" account took the complete trading account format shown in Table 3. The schedules in Tables 4 and 5 well explain cost and profit calculation performed in this complete trading account. Further, the cost records in Table 5 show the specific features of the costing for financial accounting purposes made in the trading account.

First, the items listed under the heading "Details of Manufacturing Costs" suggest that the "manufacturing costs" include both manufacturing and non-manufacturing costs. The salaries of E. I. du Pont and legal expenses may be regarded as general and administrative expenses, while the commissions of Peter Bauduy are selling expenses. That indicates that the item "Miscellaneous" includes other non-manufacturing expenses as well as factory overhead, other than the expenses for charcoal wood and cooperage. In any case, both manufacturing and non-manufacturing costs are recorded in the "Factory" account, and in such an account profit is calculated. Manufacturing and non-manufacturing costs were not treated differently in profit calculation in traditional accounting.

In passing, the above suggests that "cost of sales" mentioned earlier was not cost of sales in the strict sense. On the other hand, the profits determined in the schedule in Table 4 and the "Factory" account may be regarded as operating profit in the broad sense.

Second, the data on the costs by category under the heading "Allocation of Manufacturing Costs" indicate that costs, more specifically conversion costs, are assigned to only finished goods sold or inventoried. In other words, work-in-process inventories (as partly completed units) are not the object of costing. That suggests that the work-in-process inventories are valued at materials costs alone and recorded in the materials accounts, namely in the accounts "Saltpetre," "Brimstone," and "Charcoal Wood." In fact, the old DPC had no account specifically devoted to record work-in-process inventories.¹⁸

¹⁸Only one time, work-in-process inventories (as partially completed units) were recorded distinctively in the books at the close of the accounting period on June 30, 1814. After December 31, 1809, the old Du Pont Company closed the books on June 30, 1814, December 31, 1814 and December 31, 1815. These periods, namely from January 1, 1810 through December 31, 1815, were covered by the other set of schedules noted at the outset of this paper. A compound entry

Third, different estimated prices are given to the two categories of finished goods inventories in the calculations of cost of sales made in the original notes at the bottom of the schedules in Table 5. The ledger and journal [Ledger "A" and Journal B] record only the total weight and amount of the two categories, as shown in the balance sheet in Table 1. DPC's staff of the early 1940s drew these prices from the records in Waste Book B. Therefore, the prices shown there are those given by the old DPC. It may be presumed that the old DPC determined these prices based on market prices. The original notes at the bottom of the schedule in Table 5 show that the inventory "in hands of agents" on December 31, 1809 is estimated at 55.83 cents per pound and the inventory on the factory site for "Sales to Others" on the same date at 56 cents per pound. Although these prices are much higher than the related sales prices recorded in Table 4 that are the averages in six years, they seem to reflect the market prices of gunpowder at the end of 1809. According to one of the six schedules recording detailed data on sales for the years 1804 to 1809 which will be treated in the following section and

made on the credit of the "Factory" account on June 30, 1814 was detailed by the corresponding entry in the journal where a record of partially completed units is found. There, as the inventories at the end of the period, "GP Unfinished in the mill @48 Cts \$7,603.20" and "GP in the magazine ready put up @52Cts \$7,852.00" are recorded together with "GP in the hands of several agents" that was valued at 56 cents per pound [Journal "B"]. ("GP" is, of course, gunpowder). However, it should be noted that not only "GP in the magazine" but also "GP Unfinished" were valued by reference to market prices. According to the schedule for the years 1810-1815 corresponding to that in Table 4 [LMSS], the average sales price per pound of "Gunpowder" is \$0.5616 and according to the schedule for the years 1810-1815 corresponding to that in Table 5 [LMSS], the average cost per pound of the category "Gunpowder" is \$0.4278. Therefore, the partially completed units were valued higher than the cost of the finished gunpowder and may be presumed to have been valued based on or considering the market prices of the completed gunpowder. R. T. Johnson [1989, p.77] highlighted the above journal entry and wrote as follows: "These nineteenth-century record keepers even went so far as to value what constituted 'Work-in-Process Inventory,' and recognized completion of this in-process powder in ensuring periods." However, the fact that work-in-process inventories were recorded does not come as a surprise. They existed actually and physically. The question is how they were recorded. As noted earlier in the text, partially completed units were valued at their materials costs and recorded in the materials accounts in general (R. T. Johnson overlooked this fact). In the case noted in this note, the partially completed units were valued at market and recorded in the "Gunpowder Outstanding" account, which was opened in Ledger "B" to record the finished goods inventories. It should be noted that the recording of partially completed units on June 30, 1814 had no influence on the schedules covering the years 1810 to 1815. They have the same formats as the previous schedules do.

its successor for the years 1810 to 1815, the annual average sales price of the category "Sales by Agents" is 49.68 cents per pound for the year 1809 and 58.09 cents per pound for the year 1810; and that of the category "Sales to Others" is 49.80 cents per pound for the year 1809 and 56.35 cents per pound for the year 1810.¹⁹ Those annual average sales prices for the years 1809 and 1810 suggest that the old DPC estimated the inventory values at the end of the year 1809 based on the market prices at that moment. Therefore, the finished goods inventories credited to the "Factory" account are not valued at cost but based on market prices, at a much higher price than cost in this case. However, the entry to record a write-up of the finished goods inventories is not made in the ledger. The old DPC gave the value higher than cost to the finished goods inventories without recording a write-up. The finished goods inventories were valued with a dollar amount that originated outside the books of account.

The above three specific features found in the records of the trading account show fundamental differences between the traditional accounting system and the modern accounting system of today that Johnson and Kaplan [1987] characterize using the terms "integration" and "inventory costing." The practice noted as the third point above is what Johnson and Kaplan [1987, p.131] note as the practice that was opposed to "integration" and "inventory costing." Johnson and Kaplan note only that practice as the practice against "integration" and "inventory costing" found in the traditional accounting system. However, it should be noted that not only the third point but all the three points above are opposed to inventory costing. In inventory costing for financial accounting purposes, only manufacturing costs are regarded as an asset when they are incurred. As noted as the first point, manufacturing and non-manufacturing costs were not treated differently in the trading account. The differentiation between inventoriable costs and period costs did not exist at the old DPC's accounting system. As noted as the second point, conversion costs are not assigned to work-in-process inventories (as partly completed units).²⁰ That indicates that costs were not regarded as an asset when they were incurred. The third point indicates the same thing. The finished goods inventories were valued based on market prices, at a price much higher than

¹⁹"Sales of Gunpowder and Remanufactured Gunpowder, Period May 1, 1804 to December 31, 1809, Inclusive" and "Sales of Gunpowder and Remanufactured Gunpowder, Period 1810-1815 Inclusive" [LMSS].

²⁰This fact itself was perceived by Johnson [1972, p.470].

costs, without making a write-up. That indicates that costs were not regarded as an asset when they were incurred. All the three specific features of traditional accounting found in the old DPC's accounting system show that inventory costing for financial accounting purposes that supports today's integrated accounting system was lacking at the old DPC.

At the same time, the three specific features suggest the presence of a consistent logic in cost and profit calculation made in the trading account. As noted above, the finished goods inventories were valued based on market prices. That means that profit was computed on the basis of production. Not profit on sales but profit on production was computed in the trading account. In this profit calculation, the differentiation of inventoriable costs and period costs makes no sense. Therefore, both manufacturing and non-manufacturing costs were treated in the same way in the trading account. Both constituted the costs of finished goods. That means that finished goods inventories were valued at the total of both costs when they were valued at cost.²¹ It is suggested by the fact that the costs allocated to the inventories in Table 5 comprise both manufacturing and non-manufacturing costs. Further, the fact that conversion costs were assigned to only finished goods means that the costs incurred during the year represent the costs of the finished goods completed during the year. Therefore, the manufacturing and non-manufacturing costs recorded in the trading account, which are shown in Table 5, represent both the costs incurred during the year and the costs of finished goods completed during the year. These costs were matched against the revenues they generated. Profit on production was measured in that way in the trading account.

ADDITIONAL COMMENTS ON THE OLD DU PONT COMPANY'S ACCOUNTING SYSTEM

Although in a different way from that of today's methods,

²¹ Manufactured inventories may have been valued at cost. According to Fujimura [2000], at Schneider and Company, a French company, (1) work-in-process inventories in job costing were valued at full cost including both manufacturing and non-manufacturing costs; (2) work-in-process inventories in process costing recorded as departmental finished goods were valued at full cost including both manufacturing and non-manufacturing costs; and (3) work-in-process inventories in process costing to be treated as partially completed units were valued at material costs only. Some of the complete records concerning job costing that were used to value inventories are reproduced in Fujimura [2002].

the old DPC, in its early years, grasped the costs incurred and used the cost data to compute profit. However, aside from balancing the accounts on February 11, 1806 without accompanying profit measurement, the old company did not close the accounts until the end of the first term of association. It did not close the books annually despite the stipulation of the deed of association noted earlier. That did not mean, however, the old company was not able to close the books annually, as will be seen from now.

As indicated by an original note in the schedule in Table 4, a schedule recording annual sales was prepared by DPC's staff of the early 1940s, which is entitled "Sales of Gunpowder and Remanufactured Gunpowder." Table 6 reproduces only part of that schedule. As this table suggests, regarding the sub-category "Agents" within the category "Gunpowder," sales are recorded for each individual agent. Although omitted, the data on all the categories and sub-categories corresponding to Table 4 are recorded in the schedule. In Table 6, only the data of the years 1804 and 1809, other than those of the total of the six years, are reproduced, partly. On the part of the schedule, of course, the full data of all the six years from 1804 to 1809 are recorded. More importantly, there is a set of schedules in the Hagley Museum and Library named "Powder Sales Book" in the catalogue and covering the years 1804 through 1814 that the new company's staff seem to have relied on in preparing the schedule partly reproduced in Table 6. All the data in the schedule "Sales of Gunpowder and Remanufactured Gunpowder" are found in the old company's set of schedules that are much more detailed.²² A handwritten note on the cover of the old company's set of schedules suggests that the schedules were filed to the Delaware Court of Chancery for the suit of E. I. du Pont and others with Peter Bauduy on April 14, 1818. Therefore, the schedules were prepared after the related accounting periods passed and to cope with litigation. Nonetheless, the schedules prove that the old company was capable of preparing annual data. That indicates that the old company was capable of closing the books annually. Only it did not do so.

²²The new company's staff made one modification to the original: the \$10,085.15 sale in 1809 by McCall is recorded as that of 1810 in the original. It seems that the data by category and subcategory in the columns "Quantity" and "Sales" in Table 4 were obtained from this old company's schedule.

Table 6
SALES OF GUNPOWDER AND REMANUFACTURED
GUNPOWDER
PERIOD MAY 1, 1804 (DATE PRODUCTION COMMENCED)
TO DECEMBER 31, 1809, INCLUSIVE

	TOTAL			1804			1809		
	Pounds	Amount	Per Pound	Pounds	Amount	Per Pound	Pounds	Amount	Per Pound
<u>GUNPOWDER</u>									
<u>AGENTS</u>									
Buck, A.	550	\$ 184.04	.3346						
Bowden R. & Company	8,050	2,432.13	.3021				125	\$ 60.94	\$.4875
Brujeire & Teisseire	12,475	5,435.90	.4357				8,675	4,230.96	.4877
Cazenove, C. A.	24,390	10,163.13	.4167				14,650	6,784.06	.4631
Delaire & Canut	5,750	2,545.26	.4427				4,450	1,988.06	.4468
Dowes, I. D. P.	1,350	465.79	.3450						
Drummond, R.	3,500	1,630.51	.4659				3,500	1,630.51	.4659
DuPont, V. deNemours & Co.	2,400	787.52	.3281						
Girard, A.	92,975	33,779.65	.3633				19,625	9,592.74	.4888
Gundacker, J.	1,656	559.06	.3376						
Hancock, John	11,750	5,013.57	.4267				5,350	2,999.16	.5606
Hastings, S.	1,104	409.97	.3713						
LaForest, A.	13,715	5,829.36	.4250				3,375	2,017.69	.5978
McCall, Arch	108,700	46,388.99	.4268	13,250	\$ 5,137.92	\$.3878	18,500	10,085.15	.5451
Mein & Rogers	1,650	566.70	.3435				1,650	566.70	.3435
Mitchell & Sheppard	11,550	4,036.49	.3495	950	365.00	.3842			
Parent, Chas.	2,200	1,080.00	.4909						
Pitray, L. A.	2,250	1,032.37	.4588				2,250	1,032.37	.4588
Shewell, Thos.	12,500	4,478.27	.3583				1,125	384.40	.3417
Snydan & Wickoff	3,725	1,035.62	.2780						
Stoney, J.	2,725	837.25	.3072						
Sullivan, J. & Company	1,000	255.97	.2526						
Thurston, J.	1,325	457.19	.3450						
Watkinson & Company	2,050	714.90	.3487						
Whipple, John	2,875	1,056.10	.3673						
TOTAL AGENTS (25)	332,215	\$131,175.72	\$.3949	14,200	\$ 5,502.92	\$.3875	83,275	\$41,372.74	\$.4968
<u>OTHERS</u>	143,040	58,310.99	.4077	12,000	4,632.25	.3860	23,356	11,630.85	.4980
GRAND TOTAL	896,305	\$251,585.74	\$.2807	26,200	\$10,135.17	\$.3868	205,431	\$63,850.62	\$.3108

Note: The original schedule records the data of each year from 1804 through 1809. The data after the subcategory "Others" are omitted except those concerning "Grand Total." The original schedule shows each agent's office's location as follows: Buck, A., Fredericksburg, Va.; Bowden, R. & Company, Norfolk, Va.; Brujeire & Teisseire, Philadelphia, Pa.; Cazenove, C. A., Alexandria, Va.; Delaire & Canut, Charleston, S. C.; Dowes, I. D. P., Albany, N. Y.; Drummond, R., Norfolk, Va.; DuPont, V. deNemours & Co., New York, N. Y.; Girard, A., New York, N. Y.; Gundacker, J., Lancaster, Pa.; Hancock, John, Boston, Mass.; Hastings, S., Boston, Mass.; LaForest, A., Richmond, Va.; McCall, Arch, Philadelphia, Pa.; Mein & Rogers, Newport, R. I.; Mitchell & Sheppard, Baltimore, Md.; Parent, Chas., New Orleans, La.; Pitray, L. A., Charleston, S. C.; Shewell, Thos., Philadelphia, Pa.; Snydan, & Wickoff, New York, N. Y.; Stoney, J., Charleston, S. C.; Sullivan, J. & Company, Boston, Mass.; Thurston, J., Newport, R. I.; Watkinson & Comapny, Hartford, Conn.; Whipple, John, Providence, R. I.

Source: LMSS, Group 10, Series A, File 418-3, Box 391.

The fact that the books were not closed annually did not mean that accounting was not important for management, either. Based on a letter from E. I. du Pont to certain merchants dated March 18, 1807, R. T. Johnson [1989, p.77] made the following remarks: "E. I. did recognize that fluctuations in the prices of at least one raw material, saltpetre, influenced the minimum amount that could be charged for the final product. They must have had some concept of the underlying costs, therefore, even though there is no clear indication of this fact." The letter she quoted reads: (E. I. du Pont wished) "to keep our prices as low as the price of saltpetre can afford us." R. T. Johnson presumed that E. I. du Pont had had the knowledge of the cost of gunpowder although she could not find out evidence about the matter. Evidence that E. I. du Pont could have a precise knowledge of the cost of his product was given by the "Factory" account and the schedule in Table 5 which have been examined.

The fact that an industrial enterprise recorded costs and used the cost data to compute profit indicates that that enterprise grasped the unit costs of its products. Therefore, E.I. du Pont could ask the lowest possible price to buyers. In doing so, estimating unit costs based on the fluctuating price of a major material, saltpeter, was an effective way. In fact, the cost data in Table 5 indicate that saltpeter accounted for more than half of the cost of gunpowder; and in the first accounting period, the price of the saltpeter purchased by the old company fluctuated between \$0.1287 and \$0.4086 per pound (in terms of annual average prices, it is between \$0.1642 and \$0.3647).²³ It is very comprehensible that, in that situation, E. I. du Pont or his accountant was making speedy unit cost estimation in that way. It is also comprehensible that the records of such estimations do not survive.

E. I. du Pont's act that the above letter show suggests how a competitive market was working at that time. An industrial enterprise, a price-taker, well grasped the unit costs of its products and asked profitable and salable prices to buyers who bade prices in return. And prices were eventually determined by market forces. The fact that E. I. du Pont grasped unit costs indicates that a competitive market existed at that time.

CONCLUSION

The old DPC's accounting system that has been seen shows

²³"Saltpetre (Ledger Account) 1804 to 1815" [LMSS].

that there existed a complete accounting system comparable to but different from the modern accounting system of today that Johnson and Kaplan [1987, pp.130-31] characterize using the terms “integration” and “inventory costing.” The specific features of costing for financial accounting purposes of that traditional accounting system and its peculiar logic in cost and profit calculation have been detailed. The discovery of this another complete accounting system leads to a new understanding of accounting history, about which some discussion will be made.

The old DPC, in the beginning, ran only a small factory equipped with water-powered machinery and employing less than thirty workers for powder-making,²⁴ the cooperage workers aside. It was a single-unit, non-integrated industrial enterprise. The DPC case that has been seen seems to show a natural outcome of the application of the double-entry bookkeeping system to industrial accounting. In fact, it was the use of double-entry bookkeeping that enabled DPC to record the costs incurred and to use the cost data to measure profit. Let us review the DPC case from this perspective.

First, it must be confirmed that DPC's accounting system complied with the double-entry methods. As has been seen, the expenses and revenues were entered in the following accounts: the “Factory” and “Profit & Loss” accounts. Although the “Factory” account functioned as a trading account from the first accounting period, it was from the period January 1 to August 31, 1818 that this account came to take the complete trading account format. Here, for simplicity, the “Factory” account is supposed to take the complete trading account format from the first accounting period. Under this supposition, the “Factory” account and “Profit & Loss” account should have been working as follows. The manufacturing and non-manufacturing expenses were debited to and the related sales revenues and inventories were credited to the “Factory” account, the resulting profit being debited. The profit thus determined in this account was transferred to the “Profit & Loss” account. In the latter account, as well as the profit transferred, other expenses and revenues were recorded. The net profit thus determined in this account was transferred to the “Stock” account that functioned as the re-

²⁴The list of buildings and equipment of the first works was recorded in Waste Book B as part of the “Inventory” on June 30, 1814. The entry on the accrued wages payable on December 31, 1809 in Journal B records twenty workers. Twenty-eight workers are recorded in “Balance due to Workmen on the 31st December 1810” in Day Book.

tained earnings account. The net profit recorded in the "Stock" account was transferred to the "Balance" account to which all the balance sheet accounts were closed.

It should be noted that the "Balance" account balanced because the "Stock" account was closed to this account. The net profit recorded in the "Balance" account was not determined by the comparison of the assets and liabilities it recorded. The net profit was transferred from the "Stock" account. The net profit recorded in the "Stock" account was the result of the revenue and expense transactions recorded in the "Factory" and "Profit & Loss" accounts. Therefore, it may be said that the presence of the "Balance" account in the ledger gives evidence that DPC's accounting system was in accordance with the double-entry system.

Second, the preceding discussion indicates that DPC's double-entry system was realized by the presence of the following two accounts, namely the "Factory" and "Profit & Loss" accounts. Besides, the following accounts were used to record expenses to the "Factory" account on an accrual basis: the "Saltpetre," "Brimstone," "Charcoal Wood," "Cooperage," and "Workmen" accounts. Among them, four accounts are inventory accounts. The remaining "Workmen" account is a liability account. There was no expense account. Accounts recording revenues and expenses were a rarity at DPC. This situation suggests that the DPC case may represent a primitive state of the double-entry accounting system applied to the industrial enterprise or nearly so.

Third, it is visible that the "Factory" account, a trading account, played a critical role in making DPC's double-entry system work. The trading account is an inventory account in which costs are matched against revenues. Such a special account was used. The trading account recorded both manufacturing and non-manufacturing costs without making distinction between them and computed profit using these cost data. That was the natural outcome of the application of the double-entry system to industrial accounting.²⁵

²⁵In commercial accounting, a merchandise inventory account served as a trading account. This practice may date back to the double-entry system that Paciolo described. According to the English translation of Paciolo's text compiled by Littleton [1933], Paciolo recommended that a sale of merchandise be credited to the related merchandise account (p.75) and that a loss be credited and a profit be debited to this inventory account "in order to balance it" (pp.67 and 68). That practice that an inventory account serves as a trading account may date back to Paciolo's text.

The old DPC case indicates that double-entry bookkeeping was readily applicable to not only commercial accounting but also industrial accounting. In fact, Garner [1954, p.8], quoting F. Elder's *Glossary of Mediaeval Terms in Business, Italian Series, 1200-1600*, published in 1934, notes as follows: "As early as 1431, some 63 years before Paciolo published the first printed text on double entry bookkeeping, one finds 'rather complex sets of books in use in Medici industrial partnership.'" The complex sets of books were kept in accordance with the double entry methods from 1441 [Garner, 1954, p.9]. Solomons [1968, p.4] notes that "the period from the early fourteenth century down to the third quarter of the nineteenth century is largely, though by no means only, concerned with bringing the records of industrial activity within the compass of double-entry bookkeeping." More recently, Jones [1985, chap. IV] presents early examples of double-entry industrial accounting in Britain, the Cyfarthfa Iron works in 1791-1798 and the Mona Mine in 1829-1830. Another example in Britain is presented by Stone [1973] as to the Charlton Mills in 1810 and after.²⁶ Edwards and Boyns [1992] present much earlier examples, charcoal ironmaking companies in the region of Sheffield during the period 1690-1783. The accounting

²⁶The two authors have searched for only cost and management accounting aspects in earlier industrial accounting. As a result, they have failed to perceive its specific features epitomized by the trading account, which this paper has illuminated concerning the old DPC. However, some of the aspects found in the old DPC may also be drawn from their works. For example, from Jones [1985, pp.131-133], the presence of eight trading accounts (Cyfarthfa Furnace, New Blast Furnace, Bar Iron, Castings, Blooms, Refining Furnace, Rolling Mill, and Finers Metal) are found in the Cyfarthfa Ironworks in 1791-1798. Stone [1973] calls all the thirteen work-in-process and one warehouse accounts at the Charlton Mills trading accounts. However, only the warehouse account is a real trading account. Although the entry of this account is described only partly, it may be presumed that the warehouse account was an inventory account recording both materials and finished goods inventories and that this inventory account functioned as a trading account. The general expenses charged to the thirteen work-in-process accounts included "advertising, legal expenses, taxes and London sales allowance" [Stone, 1973, p.77]. Therefore, manufacturing and non-manufacturing expenses were not differentiated. Further, the figure reproducing one of the work-in-process inventory account shows that partially completed units were valued at materials cost only [Stone, 1973, p. 77]. The three accounts (the Smithy, Foundry, and Fitting accounts) in the double-entry ledger of Soho Foundry in the late 1790s that Williams [1997, p.175] presents are trading accounts. The profit or loss determined in each of these accounts was "transferred to the general profit and loss account" [p.174]. This Soho Foundry's accounting system is not perceived by Fleischman and Parker [1997, chap. 7] who concentrate on accounting records other than ledgers and journals in their research into British accounting practices in the 1760-1850 period.

system there was taken over by successive entities at Staveley and was in use to 1990 [Edwards, Boyns, and Anderson, 1995, pp.11, 17, and 36].

The above authors do not notice that the accounting records they examined may show the presence of another complete accounting system contrasting with today's integrated accounting system. This represents the existing state of accounting history research. The historical existence of another complete accounting system in earlier times remains unknown. This paper has tried to fill this gap in accounting history. This paper has revealed that double-entry bookkeeping, together with the trading account, enabled the industrial enterprise to record costs and to use cost data to compute profit for financial accounting purposes, and this in different way from today's. The traditional accounting system made in this way existed in the time of the Industrial Revolution and may have existed much earlier. It is this traditional accounting system that was replaced by the modern accounting system of today which Johnson and Kaplan [1987] characterize by "integration" and "inventory costing." Based on this finding, a new understanding of accounting history may be presented. Accounting history may be described as evolution of the traditional accounting system made through double entry bookkeeping in which the trading account was of vital importance and the transition from that traditional accounting system to the modern integrated accounting system supported by inventory costing. In both the traditional and modern accounting systems, cost were and are recorded and cost data were and are used to measure profit for financial accounting purposes, but in different ways.

Finally, it seems useful to make the following additional comments. First, this paper has reconfirmed that "inventory costing" supporting "integration" was crucial in making the modern accounting system of today, which Johnson and Kaplan [1987] noted. The transition from the traditional accounting system to the modern integrated accounting system should have occurred sometime after 1900. It seems worthwhile considering the historical significance of accounting theories such as historical cost, the matching concept and the entity theory in this context.²⁷

Second, the cost and profit calculations made at the old DPC in the early nineteenth century may illustrate the price-

²⁷About the history of these accounting theories, see Previt and Merino [1998, Chap.6].

taker's accounting which Adam Smith and economists who followed him saw in constructing their theories. Although he acknowledges that the American textile manufacturers in the first half of the nineteenth century "relied on double-entry bookkeeping," Chandler [1977, pp.69-71] presents a negative view on their ability of costing. Further, he explains the reason why the textile manufacturers were not interested in cost as follows: "there was little pressure on the textile manufacturers to improve cost data," for "the manufacturers had as little control over the price of cotton as they did over that of their finished cloth" [Chandler, 1977, p.71]. The preceding quotation shows that Chandler thinks price-takers do not need reliable cost data, although price takers need to know their cost of production to measure their financial performance in their profit-seeking activities. Although Chandler's error in fact recognition had been soon made clear owing to Porter [1980],²⁸ his erroneous view on the price-taker's accounting was backed by Johnson and Kaplan [1987, pp.30-31] and still remains to be criticized by no one but Fujimura [2000]. This paper has made clear that Chandler's theory presented in his book *Visible Hand* is based on the erroneous understanding of the price-taker's accounting. An overall revision of Chandler's theory is necessary.

REFERENCES

Primary Sources:

The archival records used in this paper are housed in the Hagley Museum and Library in Wilmington, Delaware (www.hagley.org). Except one record that is included in Longwood Manuscripts, Group 2, they are fall into the following two groups: Longwood Manuscripts, Group 10, Papers of Pierre S. du Pont (1870-1954), Series A (abbreviated to LMSS in the text) and Accession 500, Series I, Records of E. I. du Pont de Nemours & Co. (1802-1902) (Abbreviated to Accession 500 in the text). Here are the archival records used in the text.

Longwood Manuscripts, Group 2

"*Acte d'association.*" The full title is "*Acte d'association d'une Manufacture de Poudre de Guerre et de Chase dans les Etats Unis d'Amerique* (Deed of association of a Gun and Sporting Powder Works in the United States of America)," Box 4. (This is a hand-transcribed copy of one of the originals

²⁸Of the accounting records that Chandler [1977, p.528 (note 60)] examined to present his view, those of the Boston Manufacturing Company and the Lawrence Manufacturing Company are used by Porter [1980], who concludes that "sophisticated costing" were executed at these companies. Based on the data presented by Porter [1980] and Hoskin and Macve [1996], Fujimura [2000, pp.28-31] notes that the Lawrence Manufacturing Company recorded costs including non-manufacturing costs in its trading account in the ledger.

belonging to one of the original partners or shareholders, Necker Germany of Genève).

LMSS (Longwood Manuscripts, Group 10, Series A)

A set of statements for the years 1801-1809

Balance Sheet, Dec. 31, 1809, File 418-3, Box 392.

Statement of Profit & Loss, 1802-1809 Inclusive, File 418-3, Box 391.

Schedule "A", Operative Earnings from Sales, 1802-1809 Inclusive, id.

Cost of Manufacture, 1802-1809 Inclusive, id.

Sales of Gunpowder and Remanufactured Gunpowder, Period May 1, 1804 (Date Production Commenced) to December 31, 1809, Inclusive, id.

Average Investment Calculation for Period 1810 to 1809, Inclusive, id.

A set of statements for the years 1810-1815

Balance Sheet, Dec. 31, 1815, File 418-3, Box 392.

Statement of Profit & Loss Period 1810-1815 Inclusive, id.

Schedule "B" Statement of Operative Earnings from Sales, Period 1810 to 1815 Inclusive, File 418, Box 383.

Cost of Manufacture, 1810-1815 Inclusive, id.

Sales of Gunpowder and Remanufactured Gunpowder, 1810-1815 Inclusive, id.

Average Investment Calculation for Period 1810-1815, Inclusive, id.

"Articles of Partnership." The full title is "Original Articles of Partnership of E. I. Du Pont & Co. entered into at Paris, April 21, 1801," File 418-3, Box 391. (It is the translation of some original and is a little abbreviated).

"Interest of Management in the Affairs of the Partnership of E. I. Du Pont de Nemours & Company 1801-1899," File 418-3, Box 392.

"Original Partnership of 1801," File 418-3, Box 392.

Saltpetre (Ledger Account) 1804 to 1815, File 418-3, Box 392.

Accession 500 (Accession 500, series I)

Factory Building Book, No.848.

Day Book, 1804-1810, No.849.

Factory Book, 1804-1810, No.850.

Waste Book B, 1810-1816, No.862.

Journal A, 1801-1808, No.877.

Journal B, 1809-1810, No.878.

Journal "B", 1810-1816, No.879.

Journal, 1832-1834, No.891.

Journal No.1, 1900-1903, No.922.

Ledger "A", 1801-1810, No.934.

Ledger "B", 1810-1816, No.935.

Ledger "C", 1816-1818, No.936.

Ledger "D", 1818-1823, No.937.

Ledger "E", 1823-1826, No.938.

Ledger "F", 1827, No.939.

Ledger "G", 1828-1834, No.940.

Ledger "H", 1834-1838, No.941.

Ledger "I", 1839-1844, No.942.

Ledger "J", 1844-1846, No.943.

Ledger "A", 1846-1853, No.944.

Ledger "B", 1854-1858, No.945.

Ledger "C", 1859-1863, No.946.

Ledger "D", 1864-1870, No.947.

Ledger "E", 1871-1874, No.948.

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Ledger No.6, 1875-1878, No.949.
 Ledger No.7, 1879-1882, No.950.
 Ledger No.8, 1882-1887, No.951.
 Ledger No.9, 1888-1890, No.952.
 Ledger No.10, 1891-1899, No.953.
 Ledger No.1, 1900-1903, No.954.
 Powder Sales Book, 1804-1816, No.1500.

Secondary Sources:

- Boyns, T., Edwards, J. R. and Nikitin, M. (1997), *The Birth of Industrial Accounting in France and Britain* (London & New York: Garland).
- Chandler, A. D. (1977), *The Visible Hand: The Managerial Revolution in American Business* (Cambridge, Mass.: Harvard University Press).
- Chandler, A. D. and Salsbury S. (1971), *Pierre S. du Pont and the Making of the Modern Corporation* (New York: Harper & Row).
- Crocker, G. (1999), *The Gunpowder Industry*, 2nd edit. (Princes Risborough: Shire Publications Ltd.), reprinted in 2002 (Shire Album 160), first published in 1986.
- Dicksee, L. R. (1921), *Bookkeeping for Accountant Students*, 8th edit. (London: Gee & Co.), first published in 1982.
- Edwards, J. R. and Boyns, T. (1992), "Industrial Organization and Accounting Innovation: Charcoal Iron making in England 1690-1783," *Management Accounting Research*, Vol. 3: 151-169.
- Edwards, J. R., Boyns, T., and Anderson, M. (1995), "British Cost Accounting Development: Continuity and Change," *Accounting Historians Journal*, Vol.22, No.2: 1-41.
- Fleischman, R. K. (2009), "Management Accounting: Theory and Practice," in Edwards, J. R. and Walkers, S. P. (eds.), *The Routledge Companion to Accounting History* (London & New York: Routledge).
- Fleischman, R. K. and Parker, L. D. (1997), *What is Past is Prologue: Cost Accounting in the British Industrial Revolution, 1760-1850* (New York: Garland Publishing, Inc.).
- Fujimura, D. (1998), *A Lost Accounting System and Its Significance for Classical Capitalism: The Double Account System at Schneider and Company in the Mid-Nineteenth Century* (Institute for Advanced Studies, Hiroshima Shudo University).
- Fujimura, D. (2000), "On Some Basic Features of Earlier Costing: Schneider and Co. Around the 1840s (1)(2)," *Paper of Research Society of Commerce and Economics* (Hiroshima Shudo University, Japan) Vol.40, No.2: 9-58; Vol.41, No.1: 33-49.
- Fujimura, D. (2002), "Accounting for Scrap and Spoilage in Mid-Nineteenth Century France: The Case of Schneider and Co.," (Unpublished paper. An earlier version was presented at the Academy of Accounting Historians Research Conference, Santa Fe, NM, November 2001).
- Fujimura, D. (2003), "An Overlooked Accounting System: Lyman Mills in the First Half of the 1860s" (Unpublished paper. Part of its contents was presented as "Profit Calculation and Fixed Asset Accounting at Lyman Mills in 1863" at the Academy of Accounting Historians Research Conference, Denton, TX, November 2003).
- Fujimura, D. (2004), "Profit Calculation and Fixed Asset Accounting at Lyman Mills 1854-1875," (Unpublished paper. An earlier version was presented at the 10th World Congress of Accounting Historians, St. Louis-Oxford, August

- 2004).
- Fujimura, D. (2007), "Lyman Mills and Its Encounter with Public Accountants' Inventory Costing circa 1920," *Accounting Historians Journal*, Vol.34, No.2: 169-200.
- Garner, S. P. (1954), *Evolution of Cost Accounting to 1925* (University, Ala: University of Alabama Press).
- Hoskin, K. and Macve, R. (1996), "The Lawrence Manufacturing Co.: A Note on a Early Cost Accounting in US Textile Mills," *Accounting Historians Journal*, Vol.6, No.3: 337-361.
- Johnson, H. T. (1972), "Early Cost Accounting for Internal Management Control: Lyman Mills in the 1850's," *Business History Review*, Vol.46, No.4: 466-474.
- Johnson, H. T. and Kaplan, R. S. (1987), *Relevance Lost: The Rise and Fall of Management Accounting* (Boston, Mass.: Harvard Business School Press).
- Johnson, R. T. (1989), *An Analysis of the Early Record Keeping in the Du Pont Company 1800-1818* (New York: Garland Publishing, Inc.)
- Jones, H. (1985), *Accounting, Costing and Cost Estimation: Welsh Industry: 1700-1830* (University of Wales Press).
- Kinnane, A. (2002), *DuPont: From the Banks of the Brandywine to Miracle of Science* (Wilmington, DE: E. I. du Pont de Nemours and Company).
- Littleton, A. C. (1933), *Accounting Evolution to 1900* (New York: American Institute Publishing Company).
- Porter, D. M. (1980), "The Waltham System and Early American Textile Cost Accounting 1813-1848," *Accounting Historians Journal*, Vol.7, No.1:1-15.
- Previts, G. J. and Merino, B. D. (1998), *A History of Accountancy in the United States* (Columbus, O.; Ohio State University Press).
- Solomons, D. (1968), "The Historical Development of Costing," in Solomons, D. (ed.), *Studies in Cost Analysis* (London: Sweet & Maxwell: 13-49, first published in 1952 under the title *Studies in Costing*).
- Stapleton, D. H. (2006), "Elève des Poudres. E. I. du Pont's Multiple Transfers of French Technology," in Buchanan, B. J., *Gunpowder, Explosives and State: A Technological History* (Burlington, VT and Hants, England: Ashgate: 230-238).
- Stone, W. E. (1973), "An Early English Cotton Mill Cost Accounting System: Charlton Mills, 1810-1889," *Accounting and Business Research*, Vol. 4, No.17: 71-78.
- Williams, R. B. (1997), *Accounting for Steam and Cotton: Two Eighteenth Century Case Studies* (New York: Garland Publishing, Inc.).

Accounting History

Call for Papers

Accounting's Past in Sport

In most countries, sporting organisations are economically and socially important. Sports such as basketball, cricket, football (in its various forms), golf and hockey contribute significantly to shaping the cultures, communities and societies across the globe. While covering a diversity of activities, sport is likewise delivered and managed by means of a plethora of organisational structures from large for-profit corporate bodies to local volunteer-based community clubs. However, one factor common to all sporting organisations, both now and in the past, is the need to account and to be accountable.

A special issue of *Accounting History* on the above titled theme is scheduled to be published in the first half of 2015.

Topics for this special issue may include, but are not limited to, areas such as:

- Accounting practices in sport and/or sporting organisations
- Accountability and reporting by sporting organisations
- The diverse sources of funding in sport and their consequences for shaping notions of accountability and success
- The role of accounting in shaping the development of sporting organisations, or sports as a whole
- The interplay between sport and accounting and the development of national culture, or community social capital
- The relationship between financial (“off-field”) success and sporting (“on-field”) success
- Accountants’ contribution to sport, or the influence of sports or sporting culture on accountants and accounting practice
- Creative accounting, fraud and accounting scandals in sport

Potential contributors are encouraged to interpret the theme broadly using diverse theoretical and methodological perspectives. Submissions are particularly encouraged which explore

the multiple, complex and disconnected factors shaping accounting's past in sport and which seek to identify the impacts of accounting on organisational and social functioning. Likewise, papers published in this special issue need not be constrained by focusing only on large, national or international sports and organisations. Contributions which focus on accounting and sport in local settings are also welcome.

Submissions must be written in English and forwarded electronically to the guest editors by 30 September 2013. Manuscripts will be subject to the usual double blind review process of *Accounting History*.

Guest editors:

Potential contributors are invited to contact the guest editors to discuss their proposed topics.

Brad Potter, University of Melbourne, email: bnpotter@unimelb.edu.au

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